

Agricultural Conservation Practices and Related Issues: Reviews of the State of the Art and Research Needs

1. 1998 Literature Review.

Water Environment Research 70 (4): 385-976. (1998)

NAL Call #: TD419.R47;

ISSN: 1047-7624

Descriptors: environmental monitoring/ waste treatment/ wastewater treatment/ agricultural wastes/ sediment transport/ groundwater/ nonpoint source pollution

Abstract: This issue is comprised of 46 different reviews on environmental topics in six categories: Measurement and Monitoring of Pollutants; Treatment Systems; Industrial Wastes; Hazardous Wastes; Fate and Effects of Pollutants; and Administration.

2. Abatement of volatile organic sulfur compounds in odorous emissions from the bio-industry.

Smet, E and Van Langenhove, H *Biodegradation* 9 (3-4): 273-284. (1998); ISSN: 0923-9820

Descriptors: volatile organic sulfur compounds: abatement, pollutants/ biodegradation/ biotechnology/ odorous emissions: treatment/ wastewater treatment

Abstract: Compounds of interest in this work are methanethiol (MeSH), dimethyl sulfide (Me₂S), dimethyl polysulfides (Me₂S_x) and carbon disulfide (CS₂) since these volatiles have been identified as predominant odorants in the emission of a wide range of activities in the bio-industry (e.g. aerobic waste water treatment plants, composting plants, rendering plants). In these processes, the occurrence of volatile organic sulfur compounds is mainly related to the presence of anaerobic microsites with consecutive fermentation of sulfur containing organic material and/or to the breakdown of the latter due to thermal heating. Due to the chemical complexity of these low-concentrated waste gas streams and the high flow rates to be handled, mainly biotechnological techniques and scrubbers can be used to control the odour emission. When using biofilters or trickling filters, inoculation with specific microorganisms and pH-control strategies should be implemented to optimise the removal of volatile organic sulfur compounds. In scrubbers, chemical oxidation of

the volatile organic sulfur compounds can be obtained by dosing hypochlorite, ozone or hydrogen peroxide to the scrubbing liquid. However, optimal operational conditions for each of these abatement techniques requires a further research in order to guarantee a long-term and efficient overall odour abatement.

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3. Abiotic Behaviour of Organic Micropollutants in Soils and the Aquatic Environment: A Review, Partitioning (Part I).

Stangroom, S. J.; Lester, J. N.; and Collins, C. D.

Environmental Technology 21 (8): 845-863. (2000)

NAL Call #: TD1.E59;

ISSN: 0959-3330

Descriptors: Path of Pollutants/ Organic Matter/ Organic Carbon/ Humic Acids/ Sorption/ Colloids/ Clays/ Soil Contamination/ Water Pollution/ Herbicides/ Humic matter/ Sorption/ Pollution (Soil)/ Pollution (Water)/ Clay/ Aquatic environment/ Sediments/ Pesticides/ triazine/ isoproturon/ Sources and fate of pollution/ Water Quality/ Environmental action

Abstract: Recent research has confirmed the significance of organic carbon (OC) as the key sorbent for hydrophobic organic chemicals (HOC), as well as for many polar compounds. However, the triazine herbicides exhibit a variable affinity for soil organic matter (SOM) which is attributed to the extent of humification of the organic fraction. Charge transfer mechanisms are important for triazine sorption to OC and either proton or electron transfer may account for the reaction mechanism with humic acids. For many uron herbicides (e.g. chlorotoluron, metabromuron, chloroxuron, defenoxuron), sorption correlates with SOM. However, specific interactions between uron herbicides and a limited quantity of active constituents within SOM have also been proposed to explain deviations from sorption linearity at low herbicide relative concentration. Other studies indicate that isoproturon sorbs to organic colloids in solution and that a sorption threshold to SOM may be operative.

Below the threshold, isoproturon appears to sorb predominantly to clays, indicating the presence of a limited number of 'active' sorptive sites within clay minerals. Research suggests that pesticide interactions with clay minerals may be influenced by near-surface clay geometry; the accessibility of the sorbing region of the sorbate to the active site of the clay; the identity of exchangeable cations on the clay and solution electrolytes. These recent studies indicate that interactions between micropollutants and soils and sediments often need to be evaluated on a compound-specific basis. This is especially the case for polar compounds which may partition to these environmental phases by diverse mechanisms.

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4. Abiotic Behaviour of Organic Micropollutants in Soils and the Aquatic Environment: A Review, Transformations (Part II).

Stangroom, S. J.; Collins, C. D.; and Lester, J. N.

Environmental Technology 21 (8): 865-882. (2000)

NAL Call #: TD1.E59;

ISSN: 0959-3330

Descriptors: Fate of Pollutants/ Organophosphorus Pesticides/ Photochemistry/ Degradation/ Water Pollution/ Soil Contamination/ Organic Matter/ Carbamate Pesticides/ Pesticides (Organophosphorus) / Decomposition/ Pollution (Water)/ Pollution (Soil)/ Pesticides (Organonitrogen)/ Pesticides/ Herbicides/ Chemical reactions/ Photodegradation/ Pyrethroids/ Carbamate compounds/ Organophosphorus compounds/ Hydrolysis/ Aquatic environment/ triazine/ urea/ Sources and fate of pollution/ Water Quality/ Environmental action

Abstract: The abiotic processes contributing to the transformation of pesticides in soils and natural waters are reviewed for pyrethroid, carbamate and organophosphorus (OP) insecticides; and the urea, chlorophenoxy and s-triazine herbicides. The review aims to highlight the known abiotic thermochemical and photochemical

reactions that may contribute to the overall degradation of pesticides, and to identify the environmental factors influencing degradation pathways and rates of transformation. Studies indicate that transformation by hydrolysis is restricted to alkaline pH for pyrethroids, OPs, carbamates and benzoylphenylureas, and limited to acid pH for sulphonylureas. OPs are also susceptible to catalysed hydrolysis by certain cations and mineral-bound +III and +IV metal ions. Little or no hydrolysis of triazines occurs in the water column or groundwaters, although triazines may be subject to hydrolysis in certain soils at acid pH. Tests indicate that alkaline hydrolysis is the most significant abiotic process for mono-substituted carbamates, and that photosensitised degradation is the most important abiotic pathway for many OPs. Certain pyrethroids, triazines and urea pesticides are susceptible to photodegradation. However, the potential for photosensitised transformation for the majority of pesticide classes is uncertain (e.g. ureas, carbamates, triazines and CPHs). Tests for sensitised photodegradation need to be extended and undertaken in mixtures of natural sensitizers because of the variable effects of dissolved organic matter (DOM). There appears to be insufficient information regarding the significance of hydrolysis, photochemical degradation, and metal/mineral-catalysed transformation in the environment for the majority of these extensively used pesticide classes.

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5. Accounting for seasonal nitrogen mineralization: An overview.

Vigil, M. F.; Eghball, B.; Cabrera, M. L.; Jakubowski, B. R.; and Davis, J. G.

Journal of Soil and Water Conservation 57 (6): 464-469. (2002)
NAL Call #: 56.8-J822;

ISSN: 0022-4561 [JSWCA3].

Notes: Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001, Myrtle Beach, South Carolina and Charlotte, North Carolina. Includes references.

Descriptors: organic nitrogen compounds/ mineralization/ soil organic matter/ seasonal variation/ soil flora/ decomposition/ biological activity in soil/ soil biology/ literature reviews

This citation is from AGRICOLA.

6. Achievements in management and utilization of southern grasslands.

Hoveland, C. S.

Journal of Range Management 53 (1): 17-22. (2000)

NAL Call #: 60.18 J82;

ISSN: 0022-409X

This citation is provided courtesy of CAB International/CABI Publishing.

7. Achieving soil carbon sequestration in the United States: A challenge to the policy makers.

Lal, R.; Follett, R. F.; and Kimble, J. M.

Soil Science 168 (12): 827-845. (2003)

NAL Call #: 56.8 So3;

ISSN: 0038-075X.

Notes: Number of References: 143; Publisher: Lippincott Williams & Wilkins

Descriptors: Environment/ Ecology/ climate change/ humus/ secondary carbonates/ soil carbon/ dynamics/ conservation tillage/ land use/ soil restoration/ soil degradation/ organic carbon/ wheat fallow/ chemical properties/ grassland soils/ climate change/ CO₂ emissions/ crop rotation/ global change/ central Ohio/ urban trees

Abstract: Carbon (C) sequestration in soil implies enhancing the concentrations/pools of soil organic matter and secondary carbonates. It is achieved through adoption of recommended management practices (RMPs) on soils of agricultural, grazing, and forestry ecosystems, and conversion of degraded soils and drastically disturbed lands to restorative land use. Of the 916 million hectares (Mha) comprising the total land area in the continental United States and Alaska, 157 Mha (17.1%) are under cropland, 336 Mha (36.7%) under grazing land, 236 Mha (25.8%) under forest, 14 Mha (1.5%) under Conservation Reserve Programs (CRP), and 20 Mha (2.2%) are under urban land use. Land areas affected by different soil degradative processes include 52 Mha affected by water erosion, 48 Mha by wind erosion, 0.2 Mha by secondary

salinization, and more than 4 Mha affected by mining. Adoption of RMPs can lead to sequestration of soil organic carbon (SOC) at an annual rate of 45 to 98 Tg (teragram = 1 X 10¹²) g = 1 million metric tons or MMT) in cropland, 13 to 70 Tg in grazing land, and 25 to 102 Tg in forestlands. In addition, there is an annual soil C sequestration potential of 21 to 77 Tg by land conversion, 25 to 60 Tg by land restoration, and 15 to 25 Tg by management of other land uses. Thus, the total potential of C sequestration in soils of the United States is 144 to 432 Tg/y or an average of 288 Tg C/y. With the implementation of suitable policy initiatives, this potential is realizable for up to 30 years or when the soil C sink capacity is filled. In comparison, emission by agricultural activities is estimated at: 43 Tg C/y, and the current rate of SOC sequestration is reported as 17 Tg C/y. The challenge the policy makers face is to be able to develop and implement policies that are conducive to realization of this potential.

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8. Additives to reduce ammonia and odor emissions from livestock wastes: A review.

McCrary, D. F. and Hobbs, P. J.
Journal of Environmental Quality 30 (2): 345-355. (Mar. 2001-Apr. 2001)
NAL Call #: QH540.J6;
ISSN: 0047-2425 [JEVQAA]

Descriptors: animal wastes/ feed additives/ adsorbents/ pollution control/ ammonia/ odors/ emission/ literature reviews/ microbial based feed additives/ digestive additives/ acidifying additives

Abstract: This paper reviews the use of additives to reduce odor and ammonia (NH₃) emissions from livestock wastes. Reduction of NH₃ volatilization has been shown to be possible, particularly with acidifying and adsorbent additives, and potential exists to develop further practical and cost-effective additives in this area. Masking, disinfecting, and oxidizing agents can provide short-term control of malodor, but as the capacity of these additives is finite, they require frequent reapplication. Microbial-based digestive additives may offer a solution to this problem as they are regenerative, but they appear to have been developed without a thorough understanding of microbiological processes occurring in livestock

wastes. Currently, their use to reduce odor or NH₃ emissions cannot be recommended. If the potential of these types of additives is to be realized, research needs to shift from simply evaluating these unknown products to investigating known strains of bacteria or enzymes with known modes of action. To protect the farmers' interest, standard independent test procedures are required to evaluate efficacy. Such tests should be simple and quantify the capacity of the additive to perform as claimed. The principle use of additives needs to be identified and addressed during their development. Producers may not use effective additives in one area if they further compound other problems that they perceived to be more important. There is the potential to use additives to treat other problems associated with livestock wastes, particularly to improve handling properties, reduce pollution potential to watercourses, and reduce pathogenic bacteria. Further work is required in these areas.

This citation is from AGRICOLA.

9. Adsorption and degradation: From the laboratory to the real world.

Walker, A.

In: Pesticide in air, plant, soil & water system: Proceedings of the XII Symposium Pesticide Chemistry. (Held 4 Jun 2003-6 Jun 2003 at Piacenza, Italy.) Del Re, A. A. M.; Capri, E.; Padovani, L.; and Trevisan, M. (eds.); pp. 1-6; 2003. ISBN: 88-7830-359-3

This citation is provided courtesy of CAB International/CABI Publishing.

10. Advances in Actinorhizal Symbiosis: Host Plant-Frankia Interactions, Biology, and Applications in Arid Land Reclamation, A Review.

Schwencke, J. and Caru, M.

Arid Land Research and Management 15 (4): 285-327. (2001)

NAL Call #: S592.17.A73 A74;

ISSN: 1532-4982

Descriptors: Nitrogen fixation/ Reclaimed land/ Trees/ Plants/ Reviews/ Symbiosis/ Frankia/ Nitrogen cycle

Abstract: Symbiotic association of the N₂-fixing actinomycete Frankia with the roots of more than 200 tree species from 24 genera of 8 families of angiosperms has been studied since 1829. The first successful

isolation of the microsymbiont and reinfection in the host plant was achieved in 1978. Marked advances in research and understanding of Frankia biology, its actinorhizal hosts and their interactions have made since then, although the studies on Frankia have been hampered by difficulties of isolation and their slow growth rate in vitro. Exponential growth with high biomass yields within three to four days has been obtained for a number of strains isolated from Casuarina spp. Use of BAP medium, supplemented with avian phospholipid mixtures and certain fatty acids at controlled O₂ access, optimizes growth. Monosporal cultures are scarce; recently a few became available for biochemical and genetic studies. Research using exponentially growing cultures has yielded information on a complex proteolytic system, including proteasomes, endo- and extracellular proteinases and aminopeptidases, and also on esterases, dehydrogenases, and extracellular DNases. Molecular tools have revealed a marked genetic diversity of Frankia soil populations and have enabled the definition of four clades in the Frankia phylogenetic tree. Studies on Frankia-host plant interactions have detected molecular signal exchange preceding the establishment of symbiosis. Similarly, there is progress in research on transgenic actinorhizal plants and on actinorhizal-specific genes and proteins (actinorhizins) involved in symbiotic interactions, infectivity, and host specificity. Actinorhizal plants are rapidly growing species, able to develop in N-poor soils, and for certain species, in harsh environmental stress conditions. They increase the fertility of agroforestry ecosystems, and have an economic potential for timber, fuelwood production, land reclamation, and amenity planting. The Casuarina spp. are of especial value in arid environments.

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11. Advances in grassland science.

Mannetje, L. 'T.

Netherlands Journal of Agricultural Science 50 (2): 195-221. (2002)

NAL Call #: 12 N3892;

ISSN: 0028-2928

This citation is provided courtesy of CAB International/CABI Publishing.

12. Advances in plant health management in the twentieth century.

Cook, R. J.

Annual Review of Phytopathology 38: 95-116. (2000)

NAL Call #: 464.8-An72;

ISSN: 0066-4286 [APPYAG]

Descriptors: plant diseases/ plant protection/ integrated pest management/ planting stock/ roots/ soil fumigation/ rotations/ tillage/ intensive production/ air microbiology/ plant pests/ pest control/ epidemiology/ population ecology / decision making/ prediction/ defense mechanisms/ biological control/ biotechnology/ maximum yield/ crop yield/ literature reviews/ plant disease control

This citation is from AGRICOLA.

13. Advances in poultry litter disposal technology: A review.

Kelleher BP; Leahy JJ; Henihan AM; O'Dwyer TF; Sutton D; and Leahy MJ *Bioresource Technology* 83 (1): 27-36. (2002)

NAL Call #: TD930.A32

This citation is provided courtesy of CAB International/CABI Publishing.

14. Advances in weed management strategies.

Ghersa, C. M.; Benech Arnold, R. L.; Satorre, E. H.; and Martinez Ghersa, M. A.

Field Crops Research 67 (2): 95-104. (2000)

NAL Call #: SB183.F5;

ISSN: 0378-4290 [FCREDZ].

Notes: Special issue: Plant phenology and the management of crop-weed interactions / edited by C.M. Ghersa. Paper presented at a workshop held October 13-15, 1997, Buenos Aires, Argentina. Includes references.

Descriptors: weeds/ weed control/ integrated pest management/ annuals/ perennials/ long term experiments/ population dynamics/ population growth/ developmental stages/ demography/ literature reviews

This citation is from AGRICOLA.

15. The advantages of implementation of water conservation practices in arid, semiarid regions.

Agassi, M.

Journal of Sustainable Agriculture 18 (2/3): 63-69. (2001)

NAL Call #: S494.5.S86S8;

ISSN: 1044-0046 [JSAGEB]

Descriptors: arid zones/ semiarid zones/ water conservation/ water erosion/ water availability/ rain/ runoff/ mulching/ evaporation/ water use efficiency/ aquifers/ soil conservation/ literature reviews/ erosion control

Abstract: In arid, semiarid regions (ASAR), water is the limiting factor for economical yields, and the main source of water for crops is the annual rainfall. Taking into consideration that there is no considerable soil erosion by rain water without runoff initiation, it suggested to focus on the control of rainfall water loss (runoff) instead of on the control of soil loss by rain water, e.g., to replace terracing practices with mulching and increasing of the soil surface storage practices. Mulching also reduces direct evaporation of rain water, therefore increasing rain water use efficiency by crops and the recharge of aquifers.

This citation is from AGRICOLA.

16. Aeration of livestock manure slurry and lagoon liquid for odor control: A review.

Westerman PW and Zhang RH
Applied Engineering in Agriculture
13 (2): 245-249. (1997)

NAL Call #: S671.A66

This citation is provided courtesy of CAB International/CABI Publishing.

17. Aerial pollutants and the health of poultry farmers.

Whyte, R. T.

World's Poultry Science Journal
49 (2): 131-156. (1993)

NAL Call #: 47.8-W89;

ISSN: 0043-9339

This citation is provided courtesy of CAB International/CABI Publishing.

18. Aggregate stability and assessment of soil crustability and erodibility: Theory and methodology.

Le, Bissonnais Y

European Journal of Soil Science 47
(4): 425-437. (1996);

ISSN: 1351-0754.

Notes: Subtitle: [Part] I.

Descriptors: aggregation stability/ crusting/ erosion/ soil crustability/ soil erodibility/ soil science

Abstract: Crusting and erosion of cultivated soils result from aggregate breakdown and the detachment of soil fragments by rain, and the susceptibility of soil to these processes is often inferred from measurements of aggregate stability.

Here, theories of aggregate breakdown are reviewed and four main mechanisms (i.e. slaking, breakdown by differential swelling, mechanical breakdown by raindrop impact and physico-chemical dispersion) are defined. Their relative importance depends on the nature of the rain, as well as on the soil's physical and chemical properties. The relations between aggregate breakdown, crusting and water erosion are analysed, and existing methods for the assessment of aggregate stability are reviewed. A unified framework for the measurement of aggregate stability is proposed to assess a soil's susceptibility to crusting and erosion. It combines three treatments having various wetting conditions and energies (fast wetting, slow wetting, and stirring after pre-wetting) and measures the resulting fragment size distribution after each treatment. It is designed to compare different soils, or different climatic conditions for a given soil, not to compare time-dependent changes in that soil.

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19. Agricultural chemical discharge in surface water runoff.

Smith, S. J.; Sharpley, A. N.; and Ahuja, L. R.

Journal of Environmental Quality 22
(3): 474-480. (July 1993-Sept. 1993)

NAL Call #: QH540.J6;

ISSN: 0047-2425 [JEVQAA].

Notes: Paper presented at the USDA-ARS Beltsville Agricultural Research Center Symposium XVII, "Agricultural Water Quality Priorities, A Team Approach to Conserving Natural Resources," May 4-8, 1992, Beltsville, MD. Includes references.

Descriptors: agricultural chemicals/ discharge/ surface water/ runoff/ watersheds/ grasslands/ farmland/ watershed management/ crop management/ research/ equations/ literature reviews

Abstract: The discharge of agricultural chemicals (i.e., soil-fertilizer nutrients and pesticides) in runoff waters is important from both agronomic and environmental standpoints. Presented here is an overview of our current concepts and approaches employed for describing this discharge, based on studies we have conducted over the past decade. Most of our field testing and validation of concepts regarding chemical discharge has focused on

approximately 24 grassland and cropland watersheds across the Southern Plains. Chemicals considered include N, P, K, S, atrazine [2-chloro-4(ethylamino)-6-(isopropylamino)-s-triazine], alachlor [2-chloro-2',6'-diethyl-N-(methoxymethyl) acetanilide], and cyanazine [2-[[4-chloro-6-(ethylamino)-s-triazine-2-yl]amino]-2-methyl propionitrile]. Soluble chemical discharge has been described by kinetic desorption and uniform or nonuniform mixing approaches, incorporating parameters reflecting watershed management and the nature of the surface soil X precipitation interaction. Particulate chemical discharge has been described by the relationship between the discharge enrichment ratio (chemical content of eroded sediment/source soil) and soil loss. Special situations considered include type of tillage, computed water and sediment runoff, severe storms, bioavailability of P, cover crops, and manure applications. For the most part, predicted chemical discharge values compared favorably with their measured counterparts, r² values often being > 0.9. Further research needs include refinement and development of the prediction equations, data bases, runoff indices, and multidisciplinary systems. This citation is from AGRICOLA.

20. Agricultural Contaminants in Quaternary Aquitards: A Review of Occurrence and Fate in North America.

Rodvang, S. and Simpkins, W.
Hydrogeology Journal 9 (1): 44-59.

(2001);

ISSN: 1431-2174.

Notes: Publisher: Springer-Verlag

Descriptors: North America/ Fate of Pollutants/ Agricultural Chemicals/ Groundwater Pollution/ Groundwater/ Chemical Composition/ Organic Carbon/ Sulfur/ Geologic Time/ Biogeochemistry/ Agriculture/ Aquifers/ Permeability/ Contaminants/ Pesticides/ Hydrology/ North America/ Sources and fate of pollution/ Freshwater pollution

Abstract: The intensity of agriculture has increased significantly during the past 30 years, resulting in increased detection of agricultural contaminants (nutrients, pesticides, salts, trace elements, and pathogens) in groundwater. Till, glaciolacustrine, and loess deposits of Quaternary age

compose the most common surficial deposits underlying agricultural areas in North America. Quaternary aquitards generally contain higher concentrations of solid organic carbon (SOC, as much as 1.4%), dissolved organic carbon (DOC, as much as 205 mg/L), and reduced sulfur (as much as 0.9%) than do aquifers. Their potential to sorb pesticides increases with the percent of older SOC, because diagenesis increases Koc. Denitrification consistently reduces nitrate to non-detectable levels in unweathered Quaternary aquitards. Organic carbon of Quaternary age is a more labile electron donor than carbon from shale clasts. Pyrite is a more labile electron donor than carbon in many instances. Unweathered Quaternary aquitards provide a high degree of protection for underlying aquifers, due to their large reserves of SOC and reduced sulfur for sorption and denitrification, combined with their typically low hydraulic conductivity. In contrast, agricultural contaminants are common in weathered Quaternary aquitards. Lower reserves of reduced sulfur and sorptive/labile organic carbon, and a higher bulk K due to fractures, limit their ability to attenuate nitrate and pesticides. Subsurface drainage, which is common in Quaternary aquitards because of high water tables, bypasses the attenuation capacity of Quaternary aquitards and facilitates the transport of agricultural contaminants to surface water.
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21. Agricultural drainage.

Skaggs, R. W.; Van Schilfgaarde, J.; and American Society of Agronomy. Madison, Wis., USA: American Society of Agronomy. (1999)
NAL Call #: 4-Am392-no.38;
ISBN: 0891181415
Descriptors: Drainage
This citation is from AGRICOLA.

22. Agricultural drainage water management in arid and semi-arid areas.

Tanji, Kenneth K.; Kielen, Neeltje C.; and Food and Agriculture Organization of the United Nations. Rome: Food and Agriculture Organization of the United Nations; xiv, 188 p.: ill. 1 CD-ROM (4 3/4 in.); Series: FAO irrigation and drainage paper 0254-5284 (61). (2002)
NAL Call #: S612-.1754-no.-61;

ISBN: 9251048398

Descriptors: Drainage---Management/ Irrigation---Management/ Water quality/ Arid regions agriculture

Abstract: "This publication provides planners, decision-makers and engineers with guidelines to sustain irrigated agriculture and at the same time to protect water resources from the negative impacts of agricultural drainage water disposal. On the basis of case studies from Central Asia, Egypt, India, Pakistan and the United States of America, it distinguishes four broad groups of drainage water management options: water conservation, drainage water reuse, drainage water disposal and drainage water treatment."--P. [4] of cover. This citation is from AGRICOLA.

23. Agricultural drainage: Water quality impacts and subsurface drainage studies in the Midwest.

Zucker, Leslie A.; Brown, Larry C.; and Ohio State University. Extension. Columbus, OH: Ohio State University Extension; Series: Bulletin 871. (1998)
Notes: Title from web page. Description based on content viewed May 5, 2003.

NAL Call #: 275.29-.Oh32-no.-871
<http://ohioline.osu.edu/b871/index.htm>

Descriptors: Drainage---Middle West/ Water quality---Middle West
This citation is from AGRICOLA.

24. Agricultural influence on landscape sensitivity in the Upper Mississippi River Valley.

Knox, James C
Catena 42 (2-4): 193-224. (2001)
NAL Call #: GB400.C3;
ISSN: 0341-8162

Descriptors: agricultural land use/ alluvial sediments/ climate change/ climate variability/ environmental conditions/ erosion/ floodplain stratigraphy/ floods/ landscape sensitivity/ sedimentation/ surface runoff/ tillage/ water infiltration
Abstract: Agricultural landscapes are more sensitive to climatic variability than natural landscapes because tillage and grazing typically reduce water infiltration and increase rates and magnitudes of surface runoff. This paper evaluates how agricultural land use influenced the relative responsiveness of floods, erosion, and sedimentation to extreme and nonextreme hydrologic activity

occurring in watersheds of the Upper Mississippi Valley. Temporally overlapping stratigraphic and historical instrumental records from southwestern Wisconsin and northwestern Illinois show how agricultural modification of a natural prairie and forest land cover affected the behavior of floods and sedimentation during the last two centuries. For comparison, pre-agriculture Holocene alluvial sediments document the sensitivity of floods and alluvial activity to climate change prior to significant human influences on the natural land cover. High-resolution floodplain stratigraphy of the last two centuries shows that accelerated runoff associated with agricultural land use has increased the magnitudes of floods across a wide range of recurrence frequencies. The stratigraphic record also shows that large floods have been particularly important to the movement and storage of sediment in the floodplains of the Upper Mississippi Valley. Comparison of floodplain alluvial sequences in watersheds ranging in scale from headwater tributaries to the main valley Mississippi River demonstrates that land use changes triggered hydrologic responses that were transmitted nearly simultaneously to all watershed scales. In turn, flood-driven hydraulic adjustments in channel and floodplain morphologies contributed to feedback effects that caused scale-dependent long-term lag responses. There has been a general reduction in magnitudes of flooding, erosion, and sedimentation since the mid-20th century, largely in response to better land conservation practices. The reduction trend is most apparent on tributary watersheds of a few hundred square kilometers and smaller sizes. However, the main-channel Upper Mississippi River, with associated drainage areas between about 100,000-200,000 km², has experienced increased occurrences of large floods during the second half of the 20th century. Most of these large floods have been associated with snowmelt runoff which is occurring more rapidly and earlier in the season in response to a trend toward warmer winters and springs in the late 20th century. Modification of the natural drainage network through establishment of drainage tiles and channelization has also continued during the late 20th century. Tiling and channelization have increased

drainage efficiency and probably have contributed in part to the occurrence of large floods on the Mississippi River, but the magnitudes of their effects are unknown at present. In spite of reduced sediment loads since about 1950 on all watershed scales, the anomalous high frequency of large floods on the Upper Mississippi River continues the accelerated delivery of agriculturally-related sediment to floodplain and backwater environments. The results of this study indicate that agricultural land use has escalated landscape sensitivity to such a degree that modern process rates provide a very distorted representation of process rates that occurred in the geologic past prior to human disturbance.
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25. Agricultural land fragmentation: The spatial effects of three land protection strategies in the eastern United States.

Brabec, E. and Smith, C.
Landscape and Urban Planning 28 (2-4): 255-268. (Feb. 2002)
NAL Call #: QH75.A1L32;
ISSN: 0169-2046
Descriptors: Agricultural land/ Sustainable development/ Land use/ Landscape/ United States/ Planning/ development
Abstract: Fragmentation of agricultural land by urban sprawl affects both the agricultural production capacity of the land and its rural scenic quality. In order to assess the resulting fragmentation of the three most common types of agricultural land conservation tools in the United States, this study analyzes the spatial form of three land protection strategies: a purchase of development rights (PDR) program, a clustering program and a transfer of development rights program. By assessing a series of measures of success such as total acreage protected, size of parcels, contiguity and farming status, the study compares the effectiveness of programs that have been in place for approximately 20 years, analyzing the extent to which each program prevents or enhances fragmentation. The analysis shows that although the number of acres protected is an important factor in program success, the amount of protected land remaining in active farming is additionally influenced by any development rights that may remain

with the land, the use of a variety of tools to reduce the likelihood of parcel isolation, and the adjacency and contiguity of protected parcels.
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26. Agricultural NH3 and NOx emissions in Canada.

Kurvits, T. and Marta, T.
Environmental Pollution 102 (Supp 1): 187-194. (1998)
NAL Call #: QH545.A1E52;
ISSN: 0269-7491.
Notes: From: Proceedings of the First International Nitrogen Conference, Noordwijkerhout, Netherlands, 23-27 March 1998.
This citation is provided courtesy of CAB International/CABI Publishing.

27. Agricultural pesticide emissions associated with common crops in the United States.

Benjey, William G.
Research Triangle Park, NC: Office of Research and Development, U.S. Environmental Protection Agency; 16 p.: ill., maps. (1993)
Notes: "EPA/600/A-93/065." "PB93-173136." Includes bibliographical references (p. 13-14).
NAL Call #: QH545.P4B49-1993
Descriptors: Pesticides--- Environmental aspects--- Measurement
This citation is from AGRICOLA.

28. Agricultural pesticides: Management improvements needed to further promote integrated pest management: Report to the Chairman, Subcommittee on Research, Nutrition, and General Legislation, Committee on Agriculture, Nutrition, and Forestry, U.S. Senate.

United States. General Accounting Office and United States. Congress. Senate. Committee on Agriculture, Nutrition and Forestry. Subcommittee on Research Nutrition and General Legislation.
Washington, D.C.: GAO. (2001)
Notes: Title from web page. "August 2001." "GAO-01-815." Description based on content viewed July 26, 2002. Includes bibliographical references.
NAL Call #: SB950.2.A1-A57-2001
<http://www.gao.gov/new.items/d01815.pdf>
Descriptors: Pesticides---United

States/ Agricultural pests---Integrated control---United States/ Pests--- Integrated control---United States
This citation is from AGRICOLA.

29. Agricultural Phosphorus and Eutrophication: A Symposium Overview.

Daniel, T. C.; Sharpley, A. N.; and Lemunyon, J. L.
Journal of Environmental Quality 27 (2): 251-257. (1998)
NAL Call #: QH540.J6;
ISSN: 0047-2425
Descriptors: USA/ Phosphorus/ Eutrophication/ Agricultural Runoff/ Water Pollution/ Cultivated Lands/ Nonpoint Pollution Sources/ Soil Management/ Sources and fate of pollution
Abstract: Phosphorus in runoff from agricultural land is an important component of nonpoint-source pollution and can accelerate eutrophication of lakes and streams. Long-term land application of P as fertilizer and animal wastes has resulted in elevated levels of soil P in many locations in the USA. Problems with soils high in P are often aggravated by the proximity of many of these areas to P-sensitive water bodies, such as the Great Lakes, Chesapeake and Delaware Bays, Lake Okeechobee, and the Everglades. This paper provides a brief overview of the issues and options related to management of agricultural P that were discussed at a special symposium titled, "Agricultural Phosphorus and Eutrophication," held at the November 1996 American Society of Agronomy annual meetings. Topics discussed at the symposium and reviewed here included the role of P in eutrophication; identification of P-sensitive water bodies; P transport mechanisms; chemical forms and fate of P; identification of P source areas; modeling of P transport; water quality criteria; and management of soil and manure P, off-farm P inputs, and P transport processes.
© Cambridge Scientific Abstracts (CSA)

30. Agricultural phosphorus, water quality, and poultry production: Are they compatible.
Sharpley, A.
Poultry Science 78 (5): 660-673. (May 1999)
NAL Call #: 47.8-Am33P;
ISSN: 0032-5791 [POSCAL]

Descriptors: poultry industry/ battery husbandry/ poultry manure/ application to land/ application rates/ phosphorus/ farming systems/ fertilizer requirement determination/ runoff water/ water pollution/ eutrophication/ use efficiency/ tillage/ soil testing/ losses from soil/ literature reviews

Abstract: With the concentration of poultry production and increase in operation size in several regions of the U.S., more manure is applied to agricultural land. This application of manure has resulted in more P being added than crops require, an accumulation in soil P, and increased potential for P loss in surface runoff. This situation has been exacerbated by manure management being N-based. Increased outputs of P to fresh waters can accelerate eutrophication, which impairs water use and can lead to fish kills and toxic algal blooms. As a result, information is needed on the effect of poultry production on the fate of P in agricultural systems so that compatible production and water quality goals can be met. Overall, these goals will be met by focusing on ways to increase P use-efficiency by attempting to balance inputs of P in feed and fertilizer into a watershed with output in crop and livestock. This will involve refining feed rations, using feed additives to increase P absorption by the animal, moving manure from surplus to deficit areas, finding alternative uses for manure, and targeting conservation practices, such as reduced tillage, buffer strips, and cover crops, to critical areas of P export from a watershed. These critical areas are where high P soils coincide with parts of the landscape where surface runoff and erosion potential is high. Development of management systems that address both production and environmental concerns must consider the socioeconomic and political impacts of any management changes on both rural and urban communities, and of the mechanisms by which change can be achieved in a diverse and dispersed community of land users. This citation is from AGRICOLA.

31. Agricultural sustainability and nematode integrated pest management.

Duncan, Larry W. and Noling, Joseph W.
In: Plant and nematode interactions/ Barker, K. R.; Pederson, G. A.; and Windham, G. L.;
Series: Agronomy 36.
Madison, WI: Soil Science Society of America, 1998; pp. 251-287.
ISBN: 0891181369;
ISSN: 0065-4663
Descriptors: nematicides: pesticide/ agricultural sustainability/ plant nematode interactions/ Agronomy (Agriculture)/ Pest Assessment Control and Management/ integrated pest management: crop rotation/ integrated pest management: pest control method/ sanitation/ tillage/ physical chemical methods
© Thomson

32. Agricultural waste.

Marr, J. B. and Facey, R. M.
Water Environment Research 67 (4): 503-507. (1995)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: Characterization/ Reviews/ Agricultural wastes/ Recycling/ Nitrification/ Denitrification/ Anaerobic digestion/ Industrial management/ Composting/ Waste utilization/ Drainage rates/ Land application/ Industrial Wastes Treatment/ Industrial Wastes/ Agricultural Wastes/ Chemical Reactions/ Biology
Abstract: This paper presents a review of literature published in 1994 on the subject of agricultural wastes. The review is divided into several sections, which cover: Management and characterization; Treatment; Reuse and recycle; Composting; and; Anaerobic treatment.
© Cambridge Scientific Abstracts (CSA)

33. Agricultural wastes.

Poggi Varaldo, H. M. and Estrada Vazquez, C.
Water Environment Research 69 (4): 575-603. (June 1997)
NAL Call #: TD419.R47;
ISSN: 1061-4303 [WAERED]
Descriptors: agricultural wastes/ waste treatment/ composting/ pesticides/ soil pollution/ water pollution/ literature reviews
This citation is from AGRICOLA.

34. Agricultural Wastes.

Poggi-Varaldo, H. M.; Estrada-Vazquez, C.; and Rinderknecht-Seijas, N.
Water Environment Research 70 (4): 601-620. (1998)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: Literature Review/ Farm Wastes/ Manure/ Slurries/ Phosphorus/ Nitrogen/ Sampling/ Agricultural wastes/ Animal wastes/ Sampling methods/ Agricultural runoff/ Pollution monitoring/ Eutrophication/ Ultimate disposal of wastes/ Waste management/ Behavior and fate characteristics/ Waste Management
Abstract: Both currently available and recently developed new sampling methods for slurry and solid manure were tested for bias and reproducibility in the determination of total phosphorous and nitrogen content of the samples. Sampling methods were based on techniques in which samples were taken either during loading from the hose or from the transporting vehicle after loading. It was demonstrated that most methods were unbiased.
© Cambridge Scientific Abstracts (CSA)

35. Agricultural wastes.

Poggi Varaldo, H. M.
Water Environment Research 71 (5): 737-785. (Aug. 1999)
NAL Call #: TD419.R47;
ISSN: 1061-4303 [WAERED]
Descriptors: agricultural wastes/ animal wastes/ waste treatment/ waste disposal/ soil pollution/ water pollution/ pesticide residues/ groundwater pollution/ literature reviews
This citation is from AGRICOLA.

36. Agricultural water conservation: A global perspective.

Unger, P. W. and Howell, T. A.
Journal of Crop Production 2 (2): 1-36. (1999)
NAL Call #: SB1.J683;
ISSN: 1092-678X [JCPRF8].
Notes: Special issue: Water use in crop production / edited by M.B. Kirkham. Includes references.
Descriptors: agriculture/ water conservation/ semiarid climate/ crop production/ irrigation/ temporal variation/ spatial variation/ market competition/ dry farming/ evaporation/ weed control/ irrigation systems/ water management/ irrigation water/ infiltration/ tillage/ mulches/ no-tillage/

soil water retention/ fallow/ water use efficiency/ crop yield/ harvesting date/ literature reviews

This citation is from AGRICOLA.

37. Agricultural Wetlands and Waterbirds: A Review.

Czech, H. A. and Parsons, K. C. *Waterbirds* 25 (2 [supplement]): 56-65. (2002); ISSN: 1524-4695.

Notes: Managing Wetlands for Waterbirds: Integrated Approaches
Descriptors: Agricultural ecosystems/ Wetlands/ Habitat changes/ Habitat utilization/ Reviews/ Aquatic birds/ Habitat/ Literature reviews/ Agriculture/ Breeding sites/ Foraging behaviour/ Rice fields/ Aves/ Birds/ Management/ Ecology/ Community Studies/ Conservation, wildlife management and recreation

Abstract: Waterbird use of agricultural wetlands has increased as natural wetlands continue to decline worldwide. Little information exists on waterbird use of wetland crops such as taro, hasu, and wild rice. Several reports exist on waterbird use of cranberry bog systems. Information exists on waterbird use of rice fields, especially by herons and egrets. Rice fields encompass over 1.5 million km² of land and are found on all continents except Antarctica. Rice fields are seasonally flooded for cultivation and to decoy waterfowl, and drawn down for sowing and harvest. A wide variety of waterbirds including wading birds, shorebirds, waterfowl, marshbirds, and seabirds utilize rice fields for foraging and to a lesser extent as breeding sites. In some areas, especially Asia, waterbirds have come to rely upon rice fields as foraging sites. However, few reports exist on waterbird use of rice ecosystems outside of the Mediterranean Region. Species that are commonly found utilizing agricultural wetlands during the breeding season, migration, and as wintering grounds are listed. General trends and threats to waterbirds utilizing agricultural wetlands, including habitat destruction and degradation, contaminant exposure, and prey fluctuations are presented. © Cambridge Scientific Abstracts (CSA)

38. Agriculture and Environment: A Review, 1972-1992.

Biswas, M. R. *Ambio* 23 (3): 192-197. (1994)

NAL Call #: QH540.A52;

ISSN: 0044-7447

Descriptors: reviews/ agricultural practices/ environmental degradation/ resource evaluation/ land use/ pesticide residues/ nutrition/ agriculture/ public health/ environmental quality/ Management/ Land pollution/ Ecological impact of water development

Abstract: The resources necessary for food production have shown a disquieting deterioration during the last two decades. Modern intensive agriculture has had an adverse effect not only on the physical environment but also on human health. Land has been degraded, water resources have been depleted, and genetic resources have been lost. In addition, there have been negative impacts on human health because of agricultural inputs. Extensive data have been used to indicate the evolution of the problems and the present status. © Cambridge Scientific Abstracts (CSA)

39. Agriculture and phosphorus management: The Chesapeake Bay.

Sharpley, Andrew N. Boca Raton, Fla.: Lewis Publishers; 229 p.: ill., maps. (2000)

NAL Call #: TD427.P56-A35-2000;

ISBN: 1566704944

Descriptors: Phosphorus---Environmental aspects---Chesapeake Bay Watershed---Md and Va/ Water quality---Chesapeake Bay Watershed--Md and Va/ Phosphorus in agriculture---Chesapeake Bay Watershed---Md and Va
This citation is from AGRICOLA.

40. Agriculture and the environment.

Shortle, J. S. and Abler, D. G. *Handbook of Environmental and Resource Economics*: 159-176. (2002); ISBN: 1-84376-236-6

This citation is provided courtesy of CAB International/CABI Publishing.

41. Agriculture and the environment: The problem of soil erosion.

Uri, N. D.

Journal of Sustainable Agriculture 16 (4): 71-94. (2000)

NAL Call #: S494.5.S86S8;

ISSN: 1044-0046 [JSAGEB]

Descriptors: erosion control/ agriculture/ environmental impact/ soil depth/ sediment/ streams/ lakes/

estuaries/ soil conservation/ farm income/ agricultural policy/ nature conservation/ wind erosion/ sheet erosion/ rill erosion/ social costs/ government policy/ agricultural education/ technology transfer/ research/ taxes/ literature reviews/ United States

This citation is from AGRICOLA.

42. Agriculture and water contamination: Methods of study and research.

Borin, M.

Genio Rurale 61 (12): 39-48. (1998); ISSN: 0016-6863

This citation is provided courtesy of CAB International/CABI Publishing.

43. Agriculture and Water Quality.

Barrios, A.; American Farmland Trust, Center for Agriculture in the Environment.

American Farmland Trust [Also available as: CAE/WP 00-2], 2000 (application/pdf)

<http://www.aftresearch.org/researchresource/wp/wp00-2.pdf>

Descriptors: agricultural land/ cropland/ rangelands/ water quality/ nonpoint source pollution/ best management practices/ conservation practices/ environmental protection/ agricultural policy/ environmental policy/ citizen participation/ public economics/ United States/ land stewardship/ BMPs

44. Agriculture and wildlife: Ecological implications of subsurface irrigation drainage.

Lemly, A. D.

Journal of Arid Environments 28 (2): 85-94. (1994)

NAL Call #: QH541.5.D4J6;

ISSN: 0140-1963 [JAENDR]

Descriptors: irrigated farming/ irrigation/ subsurface drainage/ drainage water/ contaminants/ selenium/ trace elements/ salinization/ toxicity/ wetlands/ wildlife/ wild birds/ literature reviews/ arid regions/ western states of USA/ California/ migratory birds
This citation is from AGRICOLA.

45. Agriculture, methyl bromide, and the ozone hole: Can we fill the gaps?

Ristaino, Jean Beagle and Thomas, William

Plant Disease 81 (9): 965-977. (1997)

NAL Call #: 1.9-P69P;

ISSN: 0191-2917

Descriptors: methyl bromide/ ozone/

agriculture/ biobusiness/ climatology/
fumigant/ methyl bromide/ ozone
depletor/ ozone hole/ pesticide/
pesticides/ phytopathology/ pollutant/
pollution
© Thomson

46. Agrochemical and nutrient impacts on estuaries and other aquatic systems.

Hapeman, C. J.; Dionigi, C. P.; Zimba, P. V.; and McConnell, L. L.

Journal of agricultural and food chemistry 50 (15): 4382-4384.

(July 2002)

NAL Call #: 381 J8223;

ISSN: 0021-8561 [JAFCAU]

Descriptors: water pollution/ runoff/ agricultural land/ nutrients/ pesticide residues/ environmental impact/ estuaries/ environmental protection/ water quality

Abstract: This paper summarizes the "Agrochemical and Nutrient Impacts on Estuaries" symposium held at the 220th National Meeting of the American Chemical Society. The focus of the symposium was to highlight ongoing research efforts to understand estuarine function and pollutant fate in these important ecosystems. Expanding urbanization and agricultural activity can result in increased particulate and chemical loads, resulting in decreased light penetration and degraded aquatic habitats. Legislative and regulatory protections, such as the Clean Water Act and Total Maximum Daily Loads (TMDLs), are considered here. Measurement of nutrient and pesticide loads and their ecotoxicological impacts are explored, as well as potential mitigation practices. The complexity and high visibility of estuarine ecosystem health will require continued examination to develop more effective agricultural and land management strategies and sound science-based regulations.

This citation is from AGRICOLA.

47. Agrochemical leaching and water contamination.

Rose, S. C. and Carter, A. D.

In: Conservation agriculture: Environment, farmers experiences, innovations, socio-economy, policy/ García-Torres, L.; Benites, J.; Martínez-Vilela, A.; and Holgado-Cabrera, A.

Dordrecht, The Netherlands: Kluwer Academic, 2003; pp. 417-424.

ISBN: 1-4020-1106-7

NAL Call #: S604.5 .C64 2003

This citation is provided courtesy of CAB International/CABI Publishing.

48. Agrochemicals and water management.

Kanwar, R. S.

In: Sustainability of irrigated agriculture: Proceedings of the NATO Advanced Research Workshop. (Held 21 Mar 1994-26 Mar 1994 at Vimeiro, Portugal.) Pereira, L. S.; Feddes, R. A.; Gilley, J. R.; and Lesaffre, B. (eds.)

Dordrecht: Kluwer; pp. 373-393; 1996. ISBN: 0-7923-3936-3

This citation is provided courtesy of CAB International/CABI Publishing.

49. Agroecosystem responses to combinations of elevated CO₂, ozone, and global climate change.

Fuhrer, J.

Agriculture, Ecosystems and Environment 97 (1/3): 1-20. (2003)

NAL Call #: S601 .A34;

ISSN: 0167-8809

This citation is provided courtesy of CAB International/CABI Publishing.

50. Agroforestry and wildlife: Opportunities and alternatives.

Allen, A. W.

In: Agroforestry and sustainable systems symposium proceedings. Fort Collins, Colo.: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station; pp. 67-73; 1995. Notes: Meeting held August 7-10, 1994, Fort Collins, Colorado. Includes references.

NAL Call #: aSD11.A42-no.261

Descriptors: wildlife / agroforestry/ ecosystems/ farm management/ land use/ land use planning/ habitats/ fragmentation/ fauna/ literature reviews

This citation is from AGRICOLA.

51. Agroforestry in North America and its role in farming systems.

Williams, P. A.; Gordon, A. M.;

Garrett, H. E.; and Buck, L.

In: Temperate agroforestry systems/ Gordon, A. M. and Newman, S. M. Wallingford, UK: CAB International, 1997; pp. 9-84.

ISBN: 0-85199-147-5

This citation is provided courtesy of CAB International/CABI Publishing.

52. Agroforestry opportunities for the United States of America.

Schultz, R. C.; Colletti, J. P.; and Faltonson, R. R.

Agroforestry Systems 31 (2): 117-132. (1995)

NAL Call #: SD387.M8A3;

ISSN: 0167-4366

This citation is provided courtesy of CAB International/CABI Publishing.

53. Agroforestry policy issues and research directions in the US and less developed countries: Insights and challenges from recent experience.

Buck, L E

Agroforestry Systems 30 (1-2): 57-73. (1995)

NAL Call #: SD387.M8A3;

ISSN: 0167-4366

Descriptors: Spermatophyta (Spermatophyta)/ plants/ spermatophytes/ vascular plants/ agriculture integrative approach/ natural resource management/ policy assessment/ sustainable development

Abstract: Efforts to improve the performance of agroforestry systems, and to expand the land area and number of people able to benefit from this integrative approach to agriculture and natural resource management, are constrained throughout the world by non-supportive land use policies. A growing sense of urgency that policy change is needed to enable agroforestry to flourish has contributed during the past two years to an unprecedented level of agroforestry policy assessment and planning activity. In the US, agroforestry has emerged from academia, where it has incubated since the mid-1980s, into the professional resource management arena. A multi-organizational agroforestry evaluation process has driven national policy and program formation to the forefront of the agenda of the agroforestry community, as it seeks to influence the 1995 Farm Bill. Internationally, the Consultative Group on International Agricultural Research and collaborators fostered a sequence of policy issue identification activities as a basis for setting strategic research priorities for forestry and agroforestry. Following a brief review of forces driving agroforestry development in industrialized and less developed countries, the paper highlights recent policy assessment initiatives in each sphere. Observations on the issues

driving and the priorities emerging from these processes are offered, to lend perspective to the critical challenges facing the agroforestry policy research community. An explanation for pervasive constraints and inconsistencies in policy effectiveness is then explored, from which a promising approach to research intervention is forwarded. It is argued that social scientists might influence agroforestry policy most favorably at this critical juncture, as perceptions of inter-dependence increase among different stakeholders in the policy system, by employing interventionist, actor-oriented perspectives and participatory methods to facilitate policy innovation and evaluation. The approach is consistent with participatory technology design processes that earlier helped to establish agroforestry as a prototype for sustainable development.
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54. Agroforestry practice and policy in the United States of America.

Garrett, H. E. G. and Buck, L.
Forest Ecology and Management 91 (1): 5-15. (1997)
NAL Call #: SD1.F73;
ISSN: 0378-1127
This citation is provided courtesy of CAB International/CABI Publishing.

55. Agronomic measures for better utilization of soil and fertilizer phosphates.

Mengel, Konrad
European Journal of Agronomy 7 (1-3): 221-233. (1997)
NAL Call #: SB13.E97;
ISSN: 1161-0301
Descriptors: lime: soil amendment/ phosphate: fertilizer, fixation, nutrient/ higher plants (Tracheophyta)/ livestock (Mammalia)/ mycorrhizal fungi (Fungi): symbiont/ Animals/ Chordates/ Fungi/ Mammals/ Microorganisms/ Nonhuman Mammals/ Nonhuman Vertebrates/ Nonvascular Plants/ Vascular Plants/ Vertebrates/ cropping systems/ farmyard manure/ soil pH/ Oxisol
Abstract: Global known phosphate deposits are a finite resource which will run out in about four centuries at the present consumption rate. Since about 90% of the phosphate mined is used for fertilizer, soil and fertilizer phosphate should be efficiently used.

Various agronomic measures are discussed relevant for saving phosphate and avoiding losses. Phosphate fertilizer rates should be adjusted to measured requirements for phosphate using soil tests. Particularly in areas with high livestock intensities soils frequently are much enriched in available phosphate and do not need further phosphate application whether in organic or in inorganic form. Excessively high levels of available soil phosphate, much higher than required for optimum crop production increase the hazard of phosphate loss by wind and water erosion and even leaching. Loss of plant available phosphate in soils occurs by phosphate fixation which is especially strong in acid mineral soils. Such losses can be dramatically reduced by liming soils to a pH of 6-7. In tropical areas where lime frequently is not available row placement of phosphate fertilizer is recommended. Oxisols with a very low pH liming, however, may promote phosphate fixation due to the formation of phosphate adsorbing Al complexes. Biological assimilation of phosphate may prevent inorganic phosphate from fixation by soil particles. Organic anions produced during the decomposition of organic matter in soils as well as the excretion of anions by plant roots depress phosphate adsorption by competing with phosphate for binding sites at the adsorbing surface. Hence farming systems and rotations which bring much organic matter into soils contribute to a better use of soil and fertilizer phosphate. Mycorrhization of plant roots with appropriate fungi ecotypes may essentially improve the exploitation of soil phosphates. The choice of the appropriate phosphate fertilizer type is crucial for its efficient use. This applies particularly for apatitic fertilizers of which the availability is poor in weakly acid to neutral and calcareous soils.
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56. Air emissions from animal feeding operations: Current knowledge, future needs.

Committee on Air Emissions from Animal Feeding Operations; Committee on Animal Nutrition; and National Research Council
Washington DC: National Academies Press; 286 p. (2003)
NAL Call #: TD886-.N38-2002;

ISBN: 0-309-08705-8
<http://www.nap.edu/books/0309087058/html/>
Descriptors: animal feeding/ emissions/ pollution control/ ammonia/ nitrous oxide/ methane/ odors

57. Air quality and emissions from livestock and poultry production/ waste management systems.

Bicudo, J. R.; Schmidt, D. R.; Gay, S. W.; Gates, R. S.; Jacobson, L. D.; and Hoff, S. J.
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.
NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes--- Environmental aspects--- United States

58. Air quality research: Perspective from climate change modelling research.

Semazzi, F.
Environment International 29 (2/3): 253-261. (2003)
NAL Call #: TD169.E54;
ISSN: 0160-4120
This citation is provided courtesy of CAB International/CABI Publishing.

59. Algae and element cycling in wetlands.

Vymazal, Jan.
Boca Raton: Lewis Publishers; xiv, 689 p.: ill. (1994)
Notes: Includes bibliographical references (p. 477-666) and index.
NAL Call #: QK565.V86--1994;
ISBN: 0873718992
Descriptors: Algae Ecophysiology/ Algae/ Wetland plants/ Wetlands/ Biogeochemical cycles
This citation is from AGRICOLA.

60. Allelopathy in agroecosystems: An overview.

Singh, H. P.; Batish, D. R.; and Kohli, R. K.
Journal of Crop Production 4 (2): 1-41. (2001)
NAL Call #: SB1.J683;
ISSN: 1092-678X [JCPRF8].
Notes: Special issue: Allelopathy in Agroecosystems / edited by R.K. Kohli, H.P. Singh, and D.R. Batish. Includes references.
Descriptors: agriculture/ ecosystems/ allelopathy/ crops/ interactions/

weeds/ trees/ soil biology/ microbial flora/ soil sickness/ crop residues/ weed control/ pest control/ allelochemicals/ pest management/ sustainability/ literature reviews
This citation is from AGRICOLA.

61. Alley cropping: Ecological pie in the sky?

Ong, C.
Agroforestry Today 6 (3): 8-10. (1994);
ISSN: 1013-9591
This citation is provided courtesy of CAB International/CABI Publishing.

62. Alterations of riparian ecosystems caused by river regulation.

Nilsson, C. and Berggren, K.
Bioscience 50 (9): 783-792. (2000)
NAL Call #: 500 Am322A;
ISSN: 0006-3568.
Notes: Publisher: American Institute of Biological Sciences
Descriptors: Riparian environments/ Dams/ Freshwater environments/ Reviews/ Environmental changes/ River basin management/ Environmental impact/ Man induced effects/ Ecosystem disturbance/ Rivers/ Literature reviews/ Management/ Habitat community studies/ Conservation/ Mechanical and natural changes
Abstract: An estimated two-thirds of the fresh water flowing to the oceans is obstructed by approximately 40,000 large dams (defined as more than 15 m in height) and more than 800,000 smaller ones (Petts 1984, McCulluy 1996). Many additional rivers are constrained by artificial levees or dikes. These hydrological alterations--to ensure water for agricultural, industrial, and domestic purposes; for hydroelectricity; or for flood protection--have changed ecosystem structures and processes in running waters and associated environments the world over. In this article, we discuss the global-scale ecological changes in riparian ecosystems resulting from dam operations.
© Cambridge Scientific Abstracts (CSA)

63. Amelioration strategies for saline soils: A review.

Qadir, M.; Ghafoor, A.; and Murtaza, G.
Land Degradation and Development 11 (6): 501-521. (2000)
NAL Call #: S622.L26;
ISSN: 1085-3278
This citation is provided courtesy of CAB International/CABI Publishing.

64. Amelioration strategies for sodic soils: A review.

Qadir, M.; Schubert, S.; Ghafoor, A.; and Murtaza, G.
Land Degradation and Development 12 (4): 357-386. (2001)
NAL Call #: S622.L26;
ISSN: 1085-3278
This citation is provided courtesy of CAB International/CABI Publishing.

65. America's Private Land: A Geography of Hope.

U. S. Department of Agriculture, Natural Resources Conservation Service.
U. S. Department of Agriculture, 1997 (text/html)
NAL Call #: 1 Ag84Pro no.1548
<http://www.nrcs.usda.gov/news/pub/GHopeHit.html>
Descriptors: private lands/ conservation practices/ environmental protection/ natural resource management/ rural areas/ land tenure/ landowners/ land stewardship
Abstract: This book tells the story of America's private, nonurban land. Private land is America's working land. It produces food and fiber, and much, much more: It also produces clean water, clean air, wildlife habitat, healthy and productive soil, and scenic landscapes. But this story is more than a national report card on the state of our Nation's natural resources; it will help the reader learn to think about land (soil, water, air, plants, and animals) in a different way. A Geography of Hope is a call to action, a call to renew our national commitment to America's private land and private landowners. The Nation will never achieve its goals for conservation and environmental quality if farmers and ranchers and all other private landowners are not engaged in a cooperative effort to use the land according to its capabilities. You'll get the facts and figures on natural resources from A Geography

of Hope, all woven into a framework of land stewardship and a vision for natural resource management in the 21st century.
This citation is from AGRICOLA.

66. Ammonia emission from field applied manure and its reduction.

Sommer, S. G. and Hutchings, N. J.
European Journal of Agronomy 15 (1): 1-15. (Sept. 2001)
NAL Call #: SB13.E97;
ISSN: 1161-0301
Descriptors: manures/ ammonia/ emission/ livestock farming/ slurries/ soil/ climatic factors/ simulation models/ geographical variation/ cultivation/ viscosity/ application rates/ soil injection/ application date/ literature reviews
Abstract: Emissions of ammonia to the atmosphere are considered a threat to the environment and both United Nation treaty and European Union legislation increasingly limit emissions. Livestock farming is the major source of atmospheric NH₃ in Europe and field applied manure contributes significantly to the emission of NH₃ from agriculture. This paper presents a review of studies of NH₃ emission from field-applied animal manure and of the methods available for its reduction. It is shown that there is a complex relationship between the NH₃ emission rate from slurry and the slurry composition, soil conditions and climate. It is concluded that simple empirical models cannot be used to predict ammonia emission from the wide range of circumstances found in European agriculture and that a more mechanistic approach is required. NH₃ emission from applied solid manure and poultry manure has been studied less intensively than slurry but appear to be controlled by similar mechanisms. The use of trail hoses, pre- or post-application cultivation, reduction in slurry viscosity, choice of application rate and timing and slurry injection were considered as reduction techniques. The most effective methods of reducing ammonia emissions were concluded to be incorporation of the animal slurry and farmyard manure or slurry injection. Incorporation should be as close to the application as possible, especially after slurry application, as loss rates are high in the 1st hours

after application. Injection is a very efficient reduction technique, provided the slurry is applied at rates that can be contained in the furrows made by the injector tine.

This citation is from AGRICOLA.

67. Ammonia emissions from animal feeding operations.

Westerman, P. W.; Arogo, J.; Heber, A. J.; Robarge, W. P.; and Classen, J. J.

In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.

NAL Call #: TD930.2-.W45-2002

Descriptors: Agricultural wastes---Environmental aspects---United States

68. Ammonia emissions from pig houses in The Netherlands, Denmark and France: A review.

Peet Schwing CMC van der; Aarnink AJA; Rom HB; and Dourmad JY

Livestock Production Science 58 (3): 265-269. (1999)

NAL Call #: SF1.L5

Notes: Nitrogen and phosphorus nutrition of the pig (EAAP Publication No. 1-99); Number of References: 22
This citation is provided courtesy of CAB International/CABI Publishing.

69. Ammonia in Animal Production: A Review.

Arogo, J.; Westerman, P. W.; Heber, A. J.; Robarge, W. P.; and Classen, J. J.

In: Proceedings of the 2001 ASAE Annual Meeting. (Held 30 Jul 2001-1 Aug 2001 at Sacramento, California.): American Society of Agricultural Engineers; 2001.

Notes: Paper number 014089; Written for presentation at the 2001 ASAE Annual International Meeting; Available through fee-based ASAE Technical Library

Descriptors: Ammonia emissions/ Emission factors/ Livestock buildings/ Animal waste storage and treatment facilities/ land application of animal manure

70. Ammonia sources in agriculture and their measurement.

McGinn, S M and Janzen, H H

Canadian Journal of Soil Science 78 (1): 139-148. (1998)

NAL Call #: 56.8 C162;

ISSN: 0008-4271

Descriptors: ammonia/ manure/ micrometeorology

Abstract: There are several reasons why the measurement of ammonia emissions is important in agriculture. The emission of ammonia from stored and land-applied manure to the atmosphere can result in a significant loss of nitrogen for crop production. It is necessary to quantify this loss to evaluate manure handling practices for maintaining the nutritive value of the manure. Minimizing the emissions of ammonia from manure also reduces agriculture's impact on the environment. A high atmospheric concentration of ammonia can result in acidification of land and water surfaces, cause plant damage and reduce plant biodiversity in natural systems. Ammonia emissions from manure coincide with odors, which are a nuisance in areas of intensive livestock operations. Reducing ammonia emissions by altering manure management will also reduce odor problems. The purpose of this paper is to review agricultural sources of ammonia and describe techniques used in determining the loss of ammonia from manure-amended soils. Micrometeorological techniques are used to estimate field scale emissions whereas, for small plots where treatment (effects) is used, chambers and mass balance techniques are more suitable methods. A simple method is described, which, when combined with a denuder sampler mounted on a wind vane, permits flexibility in experimental design and requires fewer ammonia samples than the traditional mass balance approach. A chamber method making use of diffusion samplers that can measure the ammonia concentration in the air at the soil surface is also described.
© Thomson

71. Ammonia volatilization from cow and pig manure: Results of laboratory studies with a new climate chamber technique.

Andersson, Mats.

Lund, Sweden: Sveriges lantbruksuniversitet, Institutionen for jordbrukets biosystem och teknologi (JBT); 66 p.: ill.; Series: Rapport (Sveriges lantbruksuniversitet. Institutionen for lantbrukets byggnadsteknik) 98. (1995)

Notes: "ISRN SLU-JBT-R--98--SE." Includes bibliographical references (p. 59-62).

NAL Call #: TH4911.A1S9--no.98

This citation is from AGRICOLA.

72. Ammonia volatilization from dairy farming systems in temperate areas: A review.

Bussink DW and Oenema O

Nutrient Cycling in Agroecosystems 51 (1): 19-33. (1998)

NAL Call #: S631 .F422.

Notes: From: Ammonia emissions from agriculture: Proceedings of a seminar / Uppsala, Sweden, 23-24 May 1996

This citation is provided courtesy of CAB International/CABI Publishing.

73. Anaerobic processes of treatment of manures and dung in ecology and resource economy.

Puzankov AG; Borodin VI; Grevtsov Yu I; Krivososov AA; Emelin GV; and Leonova EV

Khimiya v Sel'skom Khozyaistve 7: 27-28 (1993)

This citation is provided courtesy of CAB International/CABI Publishing.

74. Anaerobic processing of piggery wastes: A review.

Chynoweth DP; Wilkie AC; and Owens JM.

In: ASAE Annual International Meeting. (Held 12 Jul 1998-16 Jul 1998 at Orlando, Florida.)

St. Joseph, Mich.: American Society of Agricultural Engineers; 38 p.; 1998.

Notes: ASAE Paper no. 984101

NAL Call #: S671.3 .A54

This citation is provided courtesy of CAB International/CABI Publishing.

75. Analysis of Carbamate Pesticides and Their Metabolites in Water by Solid Phase Extraction and Liquid Chromatography: A Review.

Soriano, J. M.; Jimenez, B.; Font, G.; and Molto, J. C.

Critical Reviews in Analytical Chemistry 31 (1): 19-52. (2001);
ISSN: 1040-8347

Descriptors: Pesticides (Organonitrogen)/ Water analysis/ Pesticides/ Chromatography (Liquid)/ Chemical analysis/ Pesticides/ Chemical Analysis/ Liquid Chromatography/ Agricultural Chemicals/ Analytical techniques/ Pollution detection/ Agricultural pollution/ Chromatographic techniques/ Chemical extraction/ Separation processes/ Degradation/ solid phase extraction/ Monitoring and Analysis of Water and Wastes/ Identification of pollutants/ Methods and instruments/ Freshwater pollution

Abstract: Carbamates are an important, broad class of pesticides that are used extensively as insecticides, fungicides, and herbicides. Sensitive, economical, fast, and environmental friendly procedures are constantly developed to investigate their residues in water samples. The state of the art in methods based on solid phase extraction (SPE) and liquid chromatographic determination are examined here. SPE is presently the most extended method for preconcentration of carbamate pesticide residues and their transformation products from water samples. Advantages and limitations of alkyl bonded-silica, and polymeric sorbents, carbon, and mixed-phases in off-line and on-line procedures are discussed. Because some carbamates and transformation products are thermolabile, multiresidue determination is usually carried out by liquid chromatographic techniques. The most interesting reported analytical conditions are presented in a tabular form. Finally, an overview to the levels found in different environmental waters is done; concentrations were usually detected in the sub $\mu\text{g l}^{-1}$ order.

© Cambridge Scientific Abstracts (CSA)

76. Analysis of livestock use of riparian areas: Literature review and research needs assessment for British Columbia.

Powell GW; Cameron KJ; and Newman RF

British Columbia, Canada: Ministry of Forests, Forest Science Program; Working Paper 52, 2000. 37 p.

NAL Call #: QH541.5.R52-P69-2000

This citation is provided courtesy of CAB International/CABI Publishing.

77. Analysis of pesticides in food and environmental samples by enzyme-linked immunosorbent assays.

Nunes, Gilvanda Silva; Toscano, Ilda Antonieta; and Barcelo, D

Trends in Analytical Chemistry 17 (2): 79-87. (1998)

NAL Call #: QD71.T7;

ISSN: 0165-9936

Descriptors: pesticide residues/ environmental samples/ food crops
Abstract: Enzyme-linked immunosorbent assays (ELISAs) are the most extensively studied types of immunoassay and their application in pesticide residue monitoring is an area with enormous potential for growth. In comparison with classical analytical methods, ELISA methods offer the possibility of highly sensitive, relatively rapid, and cost-effective measurements. This review introduces the general ELISA formats used, focusing on their use in pesticide analysis. Identifying and studying the effects of interferences in immunoassays is an active area of research and we discuss the matrix effects observed in several studies involving e.g. food, crop and environmental samples. The procedures to eliminate the matrix interferences are briefly discussed.

© Thomson

78. Analytical chemistry of chlorpyrifos and diuron in aquatic ecosystems.

Simon, David; Helliwell, Stuart; and Robards, Kevin

Analytica Chimica Acta 360 (1-3): 1-16. (1998)

NAL Call #: 381 An1;

ISSN: 0003-2670

Descriptors: chlorpyrifos: insecticide, quantitative analysis/ diuron: insecticide, quantitative analysis/ analytical chemistry/ aquatic ecosystems / bioaccumulation/ sample recovery

Abstract: The chemistry and toxicology of chlorpyrifos and diuron are presented. These compounds represent the extremes of pesticide use both in terms of toxicity and chemistry. Methods used for their determination are reviewed with an emphasis on recent developments in sample preparation and quantification.
© Thomson

79. Analyzing correlations between stream and watershed attributes.

Sickle, J. van

Journal of the American Water Resources Association 39 (3): 717-726. (2003)

NAL Call #: GB651.W315;

ISSN: 1093-474X

This citation is provided courtesy of CAB International/CABI Publishing.

80. Animal Agriculture: Information on Waste Management and Water Quality Issues: Briefing Report to the Committee on Agriculture, Nutrition, and Forestry, U.S. Senate.

Atkins, L. L.; Jones, James R.; Van Sickle, L. D.; Vermillion, S. B.; Brown, G. T.; Klautt, S. A.; and Goldfarb, L. L.; U. S. General Accounting Office. U. S. General Accounting Office [Also available as: GAO/RCED-95-200BR], 1995.

Notes: Series: Briefing Report to the Committee on Agriculture, Nutrition, and Forestry, U.S. Senate (text/html)
NAL Call #: TD930 A75 1995

<http://www.gao.gov/archive/1995/rc95200b.pdf>

Descriptors: program evaluation/ governmental programs and projects/ conservation programs/ USDA/ animal manure management/ animal production/ concentrated animal feeding operations/ waste management/ water pollution/ nonpoint source pollution/ agricultural runoff/ water quality/ geographical distribution/ industry trends/ best management practices/ public finance/ decision support systems/ United States/ CAFOs/ BMPs
This citation is from AGRICOLA.

81. Animal Agriculture: Waste Management Practices: Report to the Honorable Tom Harkin, Ranking Minority Member, Committee on Agriculture, Nutrition, and Forestry, U.S. Senate.

U. S. General Accounting Office.
U. S. General Accounting Office [Also available as: GAO/RCED-99-205], 1999 (text/html)
NAL Call #: TD930.2 U55 1999
<http://www.gao.gov/archive/1999/rc99205.pdf>

Descriptors: program evaluation/ governmental programs and projects/ USDA/ Agricultural Research Service/ Cooperative State Research, Education, and Extension Service/ Environmental Protection Agency/ animal manure management/ waste management/ best management practices/ nonpoint source pollution/ agricultural runoff/ water quality/ bioenergy/ public finance/ research support/ agricultural policy / decision support systems/ United States/ CSREES/ BMPs/ EPA
This citation is from AGRICOLA.

82. Animal diet modification to decrease the potential for nitrogen and phosphorus pollution.

Klopfenstein, T.
Ames, Iowa: Council for Agricultural Science and Technology (CAST); Issue Paper No. 21, 2002. 16 p.
Descriptors: livestock feeding/ animal nutrition/ animal manures/ nutrients/ nitrogen/ phosphorus/ water pollution

83. Animal production, manure management and pathogens: A review.

Bicudo JR; Goyal SM; Zhu J; and Moore JA.
In: Animal, agricultural and food processing wastes: Proceedings of the Eighth International Symposium. (Held 9 Oct 2000-11 Oct 2000 at Des Moines, Iowa.); pp. 507-521; 2000.
This citation is provided courtesy of CAB International/CABI Publishing.

84. Animal waste and the land-water interface.

Steele, Kenneth F.
Boca Raton: Lewis Publishers; 589 p.: ill., maps. (1995)
Notes: Based on a conference held in Fayetteville, Arkansas, July 16-19, 1995. Includes bibliographical references and index.
NAL Call #: TD930.A55--1995;
ISBN: 1566701899 (alk. paper)

Descriptors: Animal waste--- Management/ Animal waste--- Environmental aspects/ Watershed management
This citation is from AGRICOLA.

85. Animal waste management and microorganisms.

Nakai Y
Animal Science Journal 72 (1): 1-13; 48 ref. (2001)
This citation is provided courtesy of CAB International/CABI Publishing.

86. Animal Waste Management and the Environment: Background for Current Issues.

Copeland, C. and Zinn, J.
Congressional Research Service (CRS) [Also available as: CRS Report for Congress 98-451], 1999 (text/html)
NAL Call #: TD930.2.C66 1998
<http://cnie.org/NLE/CRSreports/Agriculture/ag-48.cfm>

Descriptors: animal manures/ agricultural wastes/ animal manure management/ waste management/ environmental quality/ water pollution/ livestock production/ concentrated animal feeding operations/ public health/ cost benefit analysis/ environmental policy/ agricultural policy/ laws and regulations/ United States/ CAFOs
Abstract: Waste from animal agriculture is an increasingly prominent environmental quality issue. This background report describes the livestock production industry' today along with public health and environmental concerns related to the industry. It summarizes policies and programs of the Department of Agriculture and the Environmental Protection Agency and recent Clinton Administration initiatives; state laws and programs concerning animal waste management; and dialogues on problems and solutions initiated by some segments of this industry. The report reviews congressional responses to the issues (including two bills 5. 1323 and H.R. 3232) and outlines policy questions likely to shape congressional action. It will be updated if there is major congressional action.
This citation is from AGRICOLA.

87. Animal waste utilization: Effective use of manure as a soil resource.

Hatfield, Jerry L. and Stewart, B. A.
Chelsea, MI: Ann Arbor Press; 320 p.: ill. (1998)
NAL Call #: S655.A57--1998;
ISBN: 1575040689
Descriptors: Farm manure--- Congresses
This citation is from AGRICOLA.

88. Anthropogenic effects on the biodiversity of riparian wetlands of a northern temperate landscape.

Mensing, D. M.; Galatowitsch, S. M.; and Tester, J. R.
Journal of environmental management 53 (4): 349-377. (1998)
NAL Call #: HC75.E5J6;
ISSN: 0301-4797
This citation is provided courtesy of CAB International/CABI Publishing.

89. Anti-quality effects of insects feeding on rangeland plants: A review.

Campbell, J. B.
Journal of Range Management 54 (4): 462-465. (July 2001)
NAL Call #: 60.18-J82;
ISSN: 0022-409X [JRMGAQ]
Descriptors: rangelands/ pasture plants/ insect pests/ defoliation/ quality/ nutritive value/ geographical distribution/ ecology/ biology/ pest management/ pest control/ pognomyrmex/ orthoptera/ lepidoptera/ miridae/ literature reviews/ grasshoppers/ hemilenca oliviae
Abstract: The anti-quality effects of the major groups of insects that utilize rangeland plants for food is discussed. The biology, ecology, geographical distribution and economic thresholds of grasshoppers, crickets, Western harvester ants, ranch caterpillars, big-eyed or black grass bugs, and white grubs are reviewed. Also discussed are practical pest management strategies if they exist. Most of these rely on the integration of good range management practices and the control strategy.
This citation is from AGRICOLA.

90. Antibiotic use in plant agriculture.

McManus, Patricia S; Stockwell, Virginia O; Sundin, George W; and Jones, Alan L
Annual Review of Phytopathology 40: 443-465. (2002)

NAL Call #: 464.8 An72;
ISSN: 0066-4286

Descriptors: Pest Assessment Control and Management/ Tn5393: antibacterial drug/ Tn5393: anti-infective drug/ streptomycin: antibacterial drug/ streptomycin: anti-infective drug/ tetracycline: antibacterial drug/ tetracycline: anti-infective drug/ Erwinia amylovora (Enterobacteriaceae)/ Pseudomonas spp. (Pseudomonadaceae)/ Xanthomonas campestris (Pseudomonadaceae)/ pathogens/ antibiotic resistance: plant pathogens/ Enterobacteriaceae/ Facultatively Anaerobic Gram Negative Rods/ Eubacteria/ Bacteria/ Microorganisms/ Pseudomonadaceae/ Gram Negative Aerobic Rods and Cocci/ antibiotic use/ applied and field techniques/ therapeutic and prophylactic techniques
© Thomson

91. APEX: A new tool for predicting the effects of climate and CO₂ changes on erosion and water quality.

Williams, J. R.; Arnold, J. G.; Srinivasan, R.; and Ramanarayanan, T. S.
In: Modelling soil erosion by water/ Boardman, J. and Favis-Mortlock, D.; Series: NATO ASI / Global Environmental Change (Series I) 55. Berlin: Springer, 1998; pp. 441-449. ISBN: 3-540-64034-7
This citation is provided courtesy of CAB International/CABI Publishing.

92. The application of climatic data for planning and management of sustainable rainfed and irrigated crop production.

Smith, M.
Agricultural and Forest Meteorology 103 (1/2): 99-108. (June 2000)
NAL Call #: 340.8-AG8;
ISSN: 0168-1923.
Notes: Special issue: Agrometeorology in the 21st century: Needs and perspectives / edited by M.V.K. Sivakumar, C.J. Stigter, and D. Rijks. Paper presented at an international workshop held February 15-17, 1999, Accra, Ghana. Includes references.
Descriptors: agriculture/ dry farming/ rain/ irrigation/ climatic factors/ weather data/ planning/ irrigation systems/ sustainability/ water resources/ water use/ water use efficiency/ evapotranspiration/ relative

humidity/ solar radiation/ wind speed/ estimation/ mathematical models/ estimates/ literature reviews
This citation is from AGRICOLA.

93. The application of gas chromatography to environmental analysis.

Santos, F J and Galceran, M T
Trends in Analytical Chemistry 21 (9-10): 672-685. (2002)
NAL Call #: QD71.T7;
ISSN: 0165-9936
Descriptors: alkane: pollutant/ brominated flame retardant: pollutant/ dibenzofuran: pollutant/ halogenated compound: pollutant/ naphthalene: pollutant/ organochlorine pesticide: pollutant/ pesticide: pollutant/ polybrominated biphenyl: pollutant/ polybrominated diphenylether: pollutant/ polychlorinated biphenyls: pollutant/ polychlorinated dibenzo p dioxin: pollutant/ polycyclic aromatic hydrocarbons: pollutant/ terphenyl: pollutant/ volatile organic compound: pollutant/ air pollution/ environment/ sediment pollution/ soil pollution/ water pollution
Abstract: Nowadays, gas chromatography (GC) continues to play an important role in the identification and quantification of ubiquitous pollutants in the environment. The present article describes current state-of-the-art capillary GC in the analysis of various classes of persistent organic contaminants in air, water, soils, sediments and biota. Special attention is given to sample-preparation techniques. The organic pollutant groups covered in this review are: volatile organic compounds (VOCs); polycyclic aromatic hydrocarbons (PAHs); pesticides; and, halogenated compounds. These last include polychlorinated dibenzo-p-dioxins and dibenzofurans, polychlorinated biphenyl, terphenyls, naphthalenes and alkanes, organochlorine pesticides, and the brominated flame retardants, polybrominated biphenyls and polybrominated diphenylethers. The use of capillary-GC columns, the type of column, the need for multi-dimensional GC techniques, and the advantages and limitations of the available detection systems for the analysis of these compounds are discussed. Trends and future perspectives of capillary GC in the field of environmental analysis are also commented on and discussed.
© Thomson

94. Application of soil quality to monitoring and management: Paradigms from rangeland ecology.

Herrick, J. E.; Brown, J. R.; Tugel, A. J.; Shaver, P. L.; and Havstad, K. M.
Agronomy Journal 94 (1): 3-11. (Jan. 2002-Feb. 2002)
NAL Call #: 4-AM34P;
ISSN: 0002-1962 [AGJOAT].
Notes: Paper presented at the symposium, "Soil quality as an indicator of sustainable land management: Demonstrated successes and continued needs," held November 3, 1999, Salt Lake City, Utah. Includes references.
Descriptors: rangelands/ ecology/ soil/ quality/ monitoring/ land management/ nature conservation/ agricultural land/ indicators/ soil physical properties/ stability/ infiltration/ soil water content/ site factors/ weeds/ invasion/ erosion/ spatial variation/ literature reviews
Abstract: Recent interest in soil quality and rangeland health, and the large areas set aside under the USDA Conservation Reserve Program, have contributed to a gradual convergence of assessment, monitoring, and management approaches in croplands and rangelands. The objective of this paper is to describe a basis for integrating soils and soil quality into rangeland monitoring, and through monitoring, into management. Previous attempts to integrate soil indicators into rangeland monitoring programs have often failed due to a lack of understanding of how to apply those indicators to ecosystem function and management. We discuss four guidelines that we have used to select and interpret soil and soil quality indicators in rangelands and illustrate them using a recently developed rangeland monitoring system. The guidelines include (i) identifying a suite of indicators that are consistently correlated with the functional status of one or more critical ecosystem processes, including those related to soil stability, soil water infiltration, and the capacity of the ecosystem to recover following disturbance; (ii) basing indicator selection on inherent soil and site characteristics and on site- or project-specific resource concerns, such as erosion or species invasion; (iii) using spatial variability in developing and interpreting indicators to make them more representative of ecological processes; and (iv) interpreting indicators in the context of an understanding of dynamic,

nonlinear ecological processes defined by thresholds. The approach defined by these guidelines may serve as a paradigm for applying the soil quality concept in other ecosystems, including forests and ecosystems managed for annual and perennial crop production. This citation is from AGRICOLA.

95. Applications of fractals in soil and tillage research: A review.

Perfect, E. and Kay, B. D.
Soil and Tillage Research 36 (1-2): 1-20. (1995)
NAL Call #: S590.S48;
ISSN: 0167-1987

This citation is provided courtesy of CAB International/CABI Publishing.

96. Applied disequilibria: Riparian habitat management for wildlife.

Boyce, M. S. and Payne, N. F.
In: *Ecosystem management: Applications for sustainable forest and wildlife resources*/ Boyce, M. S. and Haney, A.

New Haven, Conn.: Yale University Press, 1997; pp. 133-146.
ISBN: 0-300-06902-2; Conference: Based on a symposium on ecosystem management held at the University of Wisconsin-Stevens Point, 3-5 March, 1994

This citation is provided courtesy of CAB International/CABI Publishing.

97. Applied wetlands science and technology.

Kent, Donald M.
Boca Raton, FL: Lewis Publishers; 454 p.: ill. (2001)

Notes: 2nd ed.; Includes bibliographical references and index.
NAL Call #: QH75-.A44-2000;
ISBN: 156670359X (alk. paper)

Descriptors: Wetland conservation/ Ecosystem management/ Wetlands/ Water quality management
This citation is from AGRICOLA.

98. Applying landscape ecology in biological conservation.

Gutzwiller, K. J.
New York: Springer; xxvii, 518 p., [2] p. of plates: ill., maps (some col.); 24 cm. (2002)

NAL Call #: QH541.15.L35 A66 2002;
ISBN: 0387986537

Descriptors: Landscape ecology/ Nature conservation
This citation is from AGRICOLA.

99. An appraisal of biological diversity 'standards' for forest plantation.

Spellerberg, I. F. and Sawyer, J. W. D.

In: *Assessment of biodiversity for improved forest planning: Proceedings of the Conference on Assessment of Biodiversity for Improved Planning.* (Held 7 Oct 1996-11 Oct 1996 at Monte Verita, Switzerland.) Bachmann, P.; Kohl, M.; and Paivinen, R. (eds.)

Dordrecht: Kluwer Academic Publishers; pp. 361-365; 1998.

NAL Call #: SD1.F627-v.51;
ISBN: 0792348729

Descriptors: forest plantations/ biodiversity/ evaluation/ literature reviews/ forest management/ standards/ nature conservation/ land use/ wildlife/ forest ecology/ objectives
This citation is from AGRICOLA.

100. An appraisal of methods for measurement of pesticide transformation in the groundwater zone.

Leistra, Minze and Smelt, Johan H
Pest Management Science 57 (4): 333-340. (2001)

NAL Call #: SB951-.P47;
ISSN: 1526-498X

Descriptors: pesticides: pollutant, toxin/ biogeochemical conditions/ catalysis/ drinking water/ ecotoxicology/ groundwater zones/ hydrolysis/ measurement methods/ microbial transformation: aerobic, anaerobic/ pH/ pesticide registration/ redox potential/ subsoils
Abstract: Laboratory and field studies show that pesticides may be transformed in the groundwater zone. Possible reaction mechanisms are chemical hydrolysis, catalytic reduction and aerobic or anaerobic microbial transformation.

Transformation in the groundwater zone can be an important element in the advanced evaluation of the potential risk arising from a pesticide in the public drinking water supply. However, rate and pathway of transformation can show large differences, depending on the biogeochemical conditions in the groundwater zone. Knowledge of the reaction mechanisms and the effect of aquifer conditions would allow vulnerable and low-vulnerable application areas for a pesticide to be delimited. An outline is given of possible approaches to quantifying these transformation processes and

using the results in registration procedures, especially in the EU and its member states. Furthermore, areas where there is need for continued research and better understanding are highlighted.
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101. An approach for assessing wetland functions using hydrogeomorphic classification, reference wetlands, and functional indices.

Smith, R. Daniel. and United States Army. Corps of Engineers. U.S. Army Engineer Waterways Experiment Station. Wetlands Research Program (U.S.).

Vicksburg, Miss.: U.S. Army Engineer Waterways Experiment Station; Series: Wetlands Research Program technical report WRP-DE-9. (1995)
Notes: Title from title page. "Final report." "October 1995." Includes bibliographical references.

NAL Call #: GB624-.A76-1995
<http://www.wes.army.mil/el/wetlands/pdfs/wrpde9.pdf>

Descriptors: Wetlands---United States/ Ecosystem management---United States/ wetlands
This citation is from AGRICOLA.

102. An approach to describing ecosystem performance "through the eyes of salmon".

Mobrand, Lars E; Lichatowich, James A; Lestelle, Lawrence C; and Vogel, Thomas S
Canadian Journal of Fisheries and Aquatic Sciences 54 (12): 2964-2973. (1997);

ISSN: 0706-652X

Descriptors: Oncorhynchus spp. (Osteichthyes)/ Animals/ Chordates/ Fish/ Nonhuman Vertebrates/ Vertebrates/ capacity/ ecosystem performance/ habitats/ productivity/ watershed health

Abstract: The intent of this paper is to show that discussion of watershed health and salmon (*Oncorhynchus* sp.) performance can incorporate a much greater degree of complexity without loss of clarity. We can and should include more temporal-spatial detail, more life history complexity, and more watershed-specific information. The framework and performance measures used in watershed management generally, and salmon management specifically, are inadequate. The bottleneck metaphor is cited all too frequently as a basis for discussion. The bottleneck

analogy is useful in understanding capacity, but capacity alone cannot explain observed responses of salmon populations to environmental change. An argument can be made that where protection and enhancement of weak stocks is the priority, productivity is a more critical variable. However, a framework built only around productivity and capacity is also not sufficient. It neglects the need for connectivity of habitats that salmon must pass through to complete their life histories. Adding life history diversity as the third component of performance provides the time and spare structure needed to deal with connectivity while also allowing for integration of populations where they mingle.

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103. An Approach to improving decision making in wetland restoration and creation.

Kentula, Mary E. and Hairston, Ann J. Boca Raton: C.K. Smoley; xxix, 151 p.: ill. (1993)

Notes: Includes bibliographical references (p. 135-146) and index.
NAL Call #: QH76.A67-1993;
ISBN: 0873719379

Descriptors: Wetland conservation---United States Decision making/ Restoration ecology---United States Evaluation/ Wetlands---United States--Management

This citation is from AGRICOLA.

104. An approach to nutrient management on dairy farms.

Kuipers, Abele; Mandersloot, Frits; and Zom, Ronald LG

Journal of Animal Science 77 (2 [supplement]): 84-89. (1999)

NAL Call #: 49 J82;
ISSN: 0021-8812

Descriptors: ammonia/ nitrate/ nitrogen/ phosphorus/ urea/ cattle (Bovidae): dairy animal, female/ Animals / Artiodactyls/ Chordates/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Vertebrates/ farm model/ grazing/ management practices/ manure/ milk production/ nutrient management

Abstract: In the European Union, groundwater should contain less than 50 mg of nitrate/L. Individual countries have developed alternative strategies for phosphorus (P). In The Netherlands, regulations based on P limited the amount of manure applied per hectare. A more balanced P supply to the land has been achieved

by transport of manure from surplus to deficit regions. Costs of processing of manure to pellets appeared to be (too) high. In animal production experiments, lowering the P content of concentrates and mineral supplements reduced P losses without an adverse effect on production. In addition to the European guideline for nitrate, ammonia volatilization should be reduced by 50 to 70%. Management practices for reducing nitrogen (N) losses were studied with a farm model, developed at PR. A combination of a more efficient use of fertilizer N, restricted grazing, and a more balanced diet, and, to a lesser extent, higher milk production per cow resulted in considerable reductions in nitrate leaching. The application of slurry by injection diminishes the ammonia volatilization at farm level by almost 50%. This technique has become obligatory, and is only allowed during the growing season. Other techniques, like low emission housing and covering of slurry storage have relatively high costs. Starting in 1998, farmers have to keep a record of nutrients on a balance sheet. A tax will be imposed on surpluses on N and P. This new instrument replaces the regulations based on P. To further improve efficiency of use of N and P, farmers have the nutrient balance sheet available as an integrated management tool. Urea content in bulk milk has been introduced as a new indicator for the utilization of N in the diet. Also, fertilizer applications are improved. Furthermore, an experimental farm was set up to integrate all available expertise and analyze the resulting nutrient flows and farm performance.

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105. Approaches to assess the environmental impact of organic farming with particular regard to Denmark.

Hansen, B.; Alroe, H. F.; and Kristensen, E. S.

Agriculture, Ecosystems and Environment 83 (1/2): 11-26. (Jan. 2001)

NAL Call #: S601.A34;
ISSN: 0167-8809 [AEENDO].

Notes: Special issue: A tribute to Hamish Sturrock. Includes references.

Descriptors: organic farming/ environmental impact/ intensive farming/ sustainability/ indicators/ nitrate/ phosphorus/ leaching/ soil

organic matter/ soil structure/ soil biology/ ecosystems/ arable land/ landscape/ biotopes/ nitrogen/ soil bacteria/ soil fungi/ soil arthropods/ earthworms/ rotations/ fertilizers/ pesticides/ crop management/ feeds/ literature reviews/ Denmark
This citation is from AGRICOLA.

106. Approaches to the economic analysis of erosion and soil conservation: A review.

Calatrava-Leyva, J. and Gonzalez-Roa, M. C.

In: Soil erosion research for the 21st century: Proceedings of the International Symposium. (Held 3 Jan 2001-5 Jan 2001 at Honolulu, Hawaii.) Ascough II, J. C. and Flanagan, D. C. (eds.)

St Joseph, Mo.: American Society of Agricultural Engineers; pp. 203-206; 2001.

This citation is provided courtesy of CAB International/CABI Publishing.

107. Aquatic ecosystems in agricultural landscapes: A review of ecological indicators and achievable ecological outcomes.

Watzin, M. C. and McIntosh, A. W.

Journal of Soil and Water Conservation 54 (4): 636-644. (1999)

NAL Call #: 56.8-J822;
ISSN: 0022-4561 [JSWCA3]

Descriptors: agricultural land/ landscape ecology/ biological indicators/ aquatic communities/ environmental impact/ land use/ pollution/ point sources/ streams/ watersheds/ nonpoint source pollution
This citation is from AGRICOLA.

108. Aquatic Sediments.

Garton, L. S.; Sylvester, B. A.; Autenrieth, R. L.; and Bonner, J. S.

Water Environment Research 65 (6): 534-547. (1993)

NAL Call #: TD419.R47
Descriptors: Aquatic soils/ Bottom sediments/ Literature review/ Path of pollutants/ Reviews/ Sediment analysis/ Sediment chemistry/ Sediment contamination/ Dredging/ Environmental impact/ Fate of pollutants/ Metals/ Model studies/ Nutrients/ Organic carbon/ Organic compounds/ Oxygen demand/ Paleolimnology/ Radioisotopes/ Sediment transport/ Suspended sediments/ Toxicity/ Sources and fate of pollution/ Identification of pollutants/ Preparation of reviews

Abstract: Many conference proceedings, texts, and summary

documents address the topic of aquatic sediments. The development of new methods and improvement or modification of existing methods have been reported for the broad categories of screening methods for organisms, sampling techniques and devices, characterization, biological techniques and analyses, and inorganic and organic compounds. Articles on biological activity are broken into several broad categories: species distribution, indicator organisms, metabolic effects, toxicity, productivity, organic and inorganic compounds, and physical and chemical processes. Several studies have investigated nutrient distribution and transformation in streams and sediments. Other topics include extraction procedures used to determine phosphorus and organic phosphorus concentrations in suspended sediments, anthropogenic activities that influence heavy metals concentrations and trace metals in marine and freshwater sediments, and factors affecting metal transport. Many organic compounds including pesticides, polycyclic aromatic hydrocarbons, surfactants, phenols and polychlorinated biphenyls, have been studied in sediments. A comprehensive handbook of dredging has been published with chapters addressing sediment, transport of solids, and environmental effects of dredging activities, including such specific topics as sediment properties and classification, resuspension of sediment, and environmental impacts of dredging. Radionuclides in sediments have been studied in relation to mobility, complexation, and removal. Sediment organic carbon accumulation, cycling, and relation to aquatic organisms have also been examined. It has been shown that oxygen concentrations have great effects on sediment systems and processes. Most of the sediment modeling papers focus on particle transport processes (water column transport and bedload movement). Other research has addressed sediment mobility, sediment suspensions, sediment transport models, and use of sediments in paleolimnology. (Geiger-PTT) 35 004736037
© Cambridge Scientific Abstracts (CSA)

109. Aquatic Sediments.

Sylvester, B. A.; Garton, L. S.; and Autenrieth, R. L.
Water Environment Research 66 (4): 496-516. (1994)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: literature review/ aquatic environment/ sedimentation/ pollutants/ sediment load/ sediment concentration/ sediment sampler/ sedimentary basins/ sediments/ sampling/ sediment pollution/ lacustrine sedimentation/ sediment analysis/ literature reviews/ Sources and fate of pollution/ Behavior and fate characteristics
© Cambridge Scientific Abstracts (CSA)

110. Aquatic Sediments.

Fuller, C. B.; Quinney, M. J.; Malupillai, N.; Sundaresan, A.; Swaroop, S.; and Ernest, A. N.
Water Environment Research 67 (4): 614-629. (1995)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: literature review/ aquatic soils/ sediments/ sediment concentration/ substrates/ toxicity/ benthic fauna/ benthic flora/ sediment pollution/ pollution effects/ benthos/ pollutant persistence/ sediment transport/ detritus/ Erosion and sedimentation/ Effects on organisms
© Cambridge Scientific Abstracts (CSA)

111. Aquatic Sediments.

Cheng, Chen-Yu; Sumner, P. L.; Fuller, C. B.; and Ernest, A. N.
Water Environment Research 70 (4): 780-807. (1998)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: Sediments/ Erosion/ Deposition/ Literature Review/ Sedimentation/ Spillways/ Sedimentary Basins/ Erosion and sedimentation
© Cambridge Scientific Abstracts (CSA)

112. Aquatic Sediments.

Hernandez, E. A. and Ernest, A. N.
Water Environment Research 5: 948-973. (1999)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: Sediments/ Water Depth/ Stratification/ Lakes/ Reviews/ Pollutants/ Polychlorinated Biphenyls / Organic Compounds/ Sampling/ PCB/ Sediment pollution/ Industrial wastes/

Sediment sampling/ Sediment analysis/ Literature reviews/ PCB compounds/ Sources and fate of pollution/ Behavior and fate characteristics/ Freshwater pollution
© Cambridge Scientific Abstracts (CSA)

113. Aquatic toxicology: Past, present, and prospects.

Pritchard, John B
Environmental Health Perspectives 100 (0): 249-257. (1993)
NAL Call #: RA565.A1E54;
ISSN: 0091-6765
Descriptors: Xenobiotics/ Pollution/ Pesticides/ Metals/ Carcinogens/ fish (Pisces Unspecified)/ mollusks (Mollusca Unspecified)/ Mollusca (Mollusca Unspecified)/ Osteichthyes (Osteichthyes)/ animals/ chordates/ invertebrates/ mollusks/ nonhuman vertebrates/ vertebrates
© Thomson

114. Arbuscular mycorrhiza in soil quality assessment.

Kling, Monica and Jakobsen, Iver
Ambio 27 (1): 29-34. (1998)
NAL Call #: QH540.A52;
ISSN: 0044-7447
Descriptors: nutrient: uptake/ arbuscular mycorrhiza (Phycomycetes)/ Fungi/ Microorganisms/ Nonvascular Plants/ Plants/ drought/ root pathogens/ soil aggregates/ soil quality
Abstract: Arbuscular mycorrhizal (AM) fungi constitute a living bridge for the transport of nutrients from soil to plant roots, and are considered as the group of soil microorganisms that is of most direct importance to nutrient uptake by herbaceous plants. AM fungi also contribute to the formation of soil aggregates and to the protection of plants against drought and root pathogens. Assessment of soil quality, defined as the capacity of a soil to function within ecosystem boundaries to sustain biological productivity, maintain environmental quality, and promote plant health, should therefore include both quantitative and qualitative measurements of this important biological resource. Various methods for the assessment of the potential for mycorrhiza formation and function are presented. Examples are given of the application of these methods to assess the impact of pesticides on the mycorrhiza.
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115. Arbuscular mycorrhizae and the phosphorus nutrition of maize: A review of Guelph studies.

Miller, Murray H

Canadian Journal of Plant Science

80 (1): 47-52. (2000)

NAL Call #: 450-C16;

ISSN: 0008-4220

Descriptors: phosphorus: nutrient/ Brassica napus [canola] (Cruciferae): oil crop/ Zea mays [maize] (Gramineae): grain crop, host/ arbuscular mycorrhizae (Phycomycetes): symbiont/ Angiosperms/ Dicots/ Fungi/ Microorganisms/ Monocots/ Nonvascular Plants/ Plants/ Spermatophytes/ Vascular Plants/ fertilizer efficiency

Abstract: The role of mycorrhizae in phosphorus nutrition of maize (*Zea mays* L.) is related to the fact that the P concentration in maize shoots at the four- to five-leaf stage affects final grain yield. In the early 1980s we observed greater early-season shoot-P concentration (mg g⁻¹) and P absorption (mg plant⁻¹) from a no-till compared to a conventional tillage system. Further studies established that the greater P absorption is due to a more effective arbuscular mycorrhizal (AM) symbiosis when the soil is not disturbed. The greater P absorption is largely a result of the undisturbed mycelium present in an undisturbed soil, rather than to increased colonization. This mycelium retains viability through extended periods in frozen soil. In the spring this mycelia network is able to acquire P from the soil and deliver it to the plant immediately upon becoming connected to a newly developing root system. Increased P absorption has not resulted in increased grain yield in field trials. Some additional factor limits yield with no-till maize preventing the advantage of early P absorption from being realized as yield. When maize follows a non-mycorrhizal crop such as canola (*Brassica napus* L.), mycorrhizal colonization is delayed, reducing early-season P absorption. Yield reductions may occur. In summary, AM mycorrhizae are involved in P nutrition of maize and an understanding of their functioning will assist us in modifying management practices to maximize economic returns through increased fertilizer efficiency.

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116. Arbuscular mycorrhizal fungi as components of sustainable soil-plant systems.

Hooker, John E and Black, Kyrsten E

Critical Reviews in Biotechnology

15 (3-4): 201-212. (1995)

NAL Call #: TP248.13.C74;

ISSN: 0738-8551

Descriptors: Angiospermae (Angiospermae)/ Phycomycetes (Phycomycetes)/ angiosperms/ fungi/ microorganisms/ nonvascular plants/ plants/ spermatophytes/ vascular plants/ agriculture/ crop rotation/ fertilizer use/ pesticide use/ selection/ tillage

© Thomson

117. Arbuscular-mycorrhizal fungi: Potential roles in weed management.

Jordan, N. R.; Zhang, J.; and

Huerd, S.

Weed Research 40 (5): 397-410.

(Oct. 2000)

NAL Call #: 79.8-W412;

ISSN: 0043-1737 [WEREAT]

Descriptors: weeds/ vesicular arbuscular mycorrhizas/ mycorrhizal fungi/ weed control/ plant ecology/ plant communities/ host plants/ botanical composition/ crop yield/ yield losses/ interactions/ soil biology/ beneficial organisms/ conservation tillage/ ground cover/ cover crops/ green manures/ literature reviews
This citation is from AGRICOLA.

118. Architectural features of agricultural habitats and their impact on the spider inhabitants.

Rypstra, A. L.; Carter, P. E.; Balfour,

R. A.; and Marshall, S. D.

Journal of Arachnology 27 (1):

371-377. (1999)

NAL Call #: QL451.J6;

ISSN: 0161-8202

This citation is provided courtesy of CAB International/CABI Publishing.

119. Assessing and mitigating N₂O emissions from agricultural soils.

Mosier, A R; Duxbury, J M; Freney, J

R; Heinemeyer, O; and Minami, K

Climatic Change 40 (1): 7-38. (1998)

NAL Call #: QC980 .C55;

ISSN: 0165-0009

Descriptors: nitrogen: fertilizer/ nitrous oxide: pollutant/ agricultural cropping/ emissions mitigation/ fertilization/ pollution control

Abstract: Agricultural cropping and animal production systems are important sources of atmospheric nitrous oxide (N₂O). The assessment

of the importance of N fertilization from synthetic fertilizer, animal wastes used as fertilizers and from N incorporated into the soil through biological N fixation, to global N₂O emissions presented in this paper suggests that this source has been underestimated. We estimate that agricultural systems produce about one fourth of global N₂O emissions. Methods of mitigating these emissions are presented which, if adopted globally could decrease annual N₂O emissions from cropped soils by about 20%.

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120. Assessing and monitoring forest biodiversity: A suggested framework and indicators.

Noss, R. F.

Forest Ecology and Management 115

(2/3): 135-146. (1999)

NAL Call #: SD1.F73;

ISSN: 0378-1127

This citation is provided courtesy of CAB International/CABI Publishing.

121. Assessing effects of timber harvest on riparian zone features and functions for aquatic and wildlife habitat.

Taratoot, Mark.

Research Triangle Park, N.C.:

National Council of the Paper Industry

for Air and Stream Improvement; 1 v.

(various pagings): ill.; Series:

Technical bulletin (National Council for Air and Stream Improvement) no. 775. (1999)

Notes: "January 1999." Includes bibliographical references (p. 36-37).

NAL Call #: TD899.P3N34-no.775

Descriptors: Logging/ Riparian

forests, Effect of water pollution on

This citation is from AGRICOLA.

122. Assessing sediment contamination in estuaries.

Chapman, Peter M and Wang, Feiyue

Environmental Toxicology and

Chemistry 20 (1): 3-22. (2001)

NAL Call #: QH545.A1E58;

ISSN: 0730-7268

Descriptors: benthic infauna (Organisms)/ estuarine biota (Organisms)/ chemical assessment techniques: background enrichment, bioavailability, grain size effects, interstitial water chemistry, sediment quality values/ estuaries: dissolved oxygen gradients, pH gradients, productive marine ecosystems, redox potential gradients, temperature gradients, variable salinity/ estuarine

processes/ estuarine sediment: chemical assessment techniques, community level assessment techniques, toxicological assessment techniques/ large scale seasonal species shifts/ paradox of brackish water/ particle composition/ salinity: contaminant partitioning controlling factor, interstitial, lateral variation, overlying, temporal variation, vertical variation/ salt wedge estuaries/ seasonal estuarine variability/ sediment contamination: estuarine, historic, ongoing/ sediments/ spatial estuarine variability
Abstract: Historic and ongoing sediment contamination adversely affects estuaries, among the most productive marine ecosystems in the world. However, all estuaries are not the same, and estuarine sediments cannot be treated as either fresh or marine sediments or properly assessed without understanding both seasonal and spatial estuarine variability and processes, which are reviewed. Estuaries are physicochemically unique, primarily because of their variable salinity but also because of their strong gradients in other parameters, such as temperature, pH, dissolved oxygen, redox potential, and amount and composition of particles. Salinity (overlying and interstitial) varies spatially (laterally, vertically) and temporally and is the controlling factor for partitioning of contaminants between sediments and overlying or interstitial water. Salinity also controls the distribution and types of estuarine biota. Benthic infauna are affected by interstitial salinities that can be very different than overlying salinities, resulting in large-scale seasonal species shifts in salt wedge estuaries. There are fewer estuarine species than fresh or marine species (the paradox of brackish water). Chemical, toxicological, and community-level assessment techniques for estuarine sediment are reviewed and assessed, including chemistry (grain size effects, background enrichment, bioavailability, sediment quality values, interstitial water chemistry), biological surveys, and whole sediment toxicity testing (single-species tests, potential confounding factors, community level tests, laboratory-to-field comparisons). Based on this review, there is a clear need to tailor such assessment techniques specifically for estuarine environments. For instance, bioavailability models including

equilibrium partitioning may have little applicability to estuarine sediments, appropriate reference comparisons are difficult in biological surveys, and there are too few full-gradient estuarine sediment toxicity tests available. Specific recommendations are made to address these and other issues.

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123. Assessing the impact of pesticides on the environment.

Werf, H. M. G. van der
Agriculture, Ecosystems and Environment 60 (2/3): 81-96. (Dec. 1996)
 NAL Call #: S601.A34;
 ISSN: 0167-8809 [AEENDO]
Descriptors: agricultural land/ pesticides/ utilization/ environmental impact/ assessment/ methodology/ movement in soil/ dispersion/ sorption/ binding/ biodegradation/ volatilization/ uptake/ dilution/ leaching/ runoff/ toxicity/ simulation models/ health hazards/ exposure/ literature reviews/ human toxicity/ ecotoxicity

This citation is from AGRICOLA.

124. Assessing the relative environmental impacts of agricultural pesticides: The quest for a holistic method.

Levitan, L.; Merwin, I.; and Kovach, J.
Agriculture, Ecosystems and Environment 55 (3): 153-168. (Oct. 1995)
 NAL Call #: S601.A34;
 ISSN: 0167-8809 [AEENDO]
Descriptors: pest management/ pesticides/ utilization/ environmental impact/ assessment/ systems/ simulation models/ indexes/ literature reviews

This citation is from AGRICOLA.

125. Assessing upland and riparian areas.

British Columbia Ministry of Forests
 British Columbia, Canada: Ministry of Forests
 Rangeland Health Brochure 1 (68), 2002. 12 p.
<http://www.for.gov.bc.ca/hfd/pubs/Docs/Bro/Bro68.pdf>

This citation is provided courtesy of CAB International/CABI Publishing.

126. Assessing wetland functional condition in agricultural landscapes.

Eckles, S. Diane. and United States.
 Natural Resources Conservation Service.
 Vicksburg, MS: U.S. Dept. of Agriculture, Natural Resources Conservation Service; Series: Wetland technical note 1. (2002)
Notes: Title from web page. "March 2002." Description based on content viewed May 13, 2003. Includes bibliographical references.
 NAL Call #: aQH87.3-.A77-2002
<http://www.nrcs.usda.gov/technical/land/pubs/directiv%5F%20files/TN%5F ECS%5F190%5F2%5Fa.pdf>
Descriptors: Wetlands---United States/ Environmental impact analysis---United States/ Wetland restoration---United States/ Wetland ecology---Environmental aspects--- United States/ Wetland agriculture--- United States/ Ecological assessment---Biology---United States/ Agricultural landscape management--- United States
 This citation is from AGRICOLA.

127. An assessment of agroforestry systems in the southern USA.

Zinkhan, F. C. and Mercer, D. E.
Agroforestry Systems 35 (3): 303-321. (1997)
 NAL Call #: SD387.M8A3;
 ISSN: 0167-4366
 This citation is provided courtesy of CAB International/CABI Publishing.

128. Assessment of aquatic and terrestrial reed (Phragmites australis) stands.

Gusewell, Sabine and Klotzli, Frank
Wetlands Ecology and Management 8 (6): 367-373. (2000)
 NAL Call #: QH541.5.M3 W472;
 ISSN: 0923-4861
Descriptors: Phragmites australis (Gramineae)/ Angiosperms/ Monocots/ Plants/ Spermatophytes/ Vascular Plants/ agriculture/ conference proceedings/ die back/ ecological significance/ economic significance/ environmental protection/ food production/ international collaboration/ lakeshore restoration/ literature databases/ nature conservation/ reed progression/ reed stands: aquatic, terrestrial/ water treatment/ weed control/ wetlands management
Abstract: A survey of recent publications shows that research on Phragmites australis has often applied

character because of the considerable ecological and economic significance of the species. The main applications are water treatment, agriculture (food production or weed control) and nature conservation. In Europe, most research on natural reed stands has been motivated by reed die-back and efforts towards protection or restoration. Reed progression and reed control have been the main concerns in other parts of the world, and reed progression has also received increasing attention in Europe. While reed die-back generally affects aquatic stands, progression can occur at both terrestrial and aquatic sites, and it can be desired (e.g. lake shore restoration) or unwanted (e.g. in species-rich fens or marshes). Therefore, reed stands need to be assessed individually to decide on management aims and appropriate methods. The varying status of *Phragmites australis* formed the background of the 'European Reed Conference' held in Zurich/Switzerland in October 1998. The seven contributions published in this special issue are introduced with particular reference to differences between aquatic and terrestrial reed stands and to approaches used in their assessment.

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129. Assessment of methods to estimate pesticide concentrations in drinking water sources.

ILSI Risk Science Institute and United States. Environmental Protection Agency. Office of Pesticide Programs. Washington, D.C. ILSI Risk Science Institute; x, 29 p.: ill. (1998)
Notes: "April 2, 1998." "Under a cooperative agreement with the U.S. Environmental Protection Agency Office of Pesticide Programs"--Cover. Includes bibliographical references (p. 23).

NAL Call #: TD427.P35A87-1998

Descriptors: Water---Pollution---United States/ Pesticides---Environmental aspects---United States

This citation is from AGRICOLA.

130. Assimilation Efficiencies of Chemical Contaminants in Aquatic Invertebrates: A Synthesis.

Wang, Wen-Xiong and Fisher, N. S. *Environmental Toxicology and Chemistry* 9: 2034-2045. (1999)
NAL Call #: QH545.A1E58;
ISSN: 0730-7268

Descriptors: Chemical pollutants/ Bioaccumulation/ Water pollution/ Sediment pollution/ Food chains/ Aquatic animals/ Aquatic organisms/ Trophic levels/ Chemical pollution/ Metals/ Sediments/ Pollution/ Reviews/ Invertebrata/ Contaminants/ Chemicals/ Diets/ Ingestion/ Toxicology/ Toxicity/ Invertebrates/ Aquatic Environment/ Foods/ Sediment Contamination/ bioavailability/ Physiology, biochemistry, biophysics/ Pollution Organisms/ Ecology/ Toxicology/ Effects on organisms/ Reviews/ Toxicology and health/ Effects of pollution

Abstract: Assimilation efficiencies of contaminants from ingested food are critical for understanding chemical accumulation and trophic transfer in aquatic invertebrates. Assimilation efficiency is a first-order physiological parameter that can be used to systematically compare the bioavailability of different contaminants from different foods. The various techniques used to measure contaminant assimilation efficiencies are reviewed. Pulse-chase feeding techniques and the application of gamma-emitting radiotracers have been invaluable in measuring metal assimilation efficiencies in aquatic animals. Uniform radiolabeling of food is required to measure assimilation, but this can be difficult when sediments are the food source. Biological factors that influence contaminant assimilation include food quantity and quality, partitioning of contaminants in the food particles, and digestive physiology of the animals. Other factors influencing assimilation include the behavior of the chemical within the animal's gut and its associations with different geochemical fractions in food particles. Assimilation efficiency is a critical parameter to determine (and to make predictions of) bioaccumulation of chemicals from dietary exposure. Robust estimates of assimilation efficiency coupled with estimates of aqueous uptake can be used to determine the relative importance of aqueous and dietary exposures. For bioaccumulation of metals from sediments, additional studies are required to test whether metals bound to the acid-volatile sulfide fraction of sediments can be available to benthic deposit-feeding invertebrates. Most assimilation efficiency studies have focused on chemical transfer in

organisms at the bottom of the food chain; additional studies are required to examine chemical transfer at higher trophic levels.

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131. Atmospheric ammonia and ammonium transport in Europe and critical loads: A review.

Ferm, Martin

Nutrient Cycling in Agroecosystems 51 (1): 5-17. (1998)
NAL Call #: S631.F422;
ISSN: 1385-1314

Descriptors: ammonia: pollutant/ ammonia deposition/ ammonia emissions/ atmospheric transport/ critical loads

Abstract: The atmosphere in Europe is polluted by easily available nitrogen (ammonium and nitrate) mainly from livestock (NH₃), traffic (NO_x) and stationary combustion sources (NO_x). The nitrogen emission from various European sources decreases in the order: agriculture, road traffic, stationary sources and other mobile sources (including vehicular emissions from agriculture), with annual emissions of approximately 4.9, 2.7, 2.7 and 0.8 Mt N respectively. The emissions have increased dramatically during the latest decades. In the atmosphere the pollutants are oxidised to more water soluble compounds that are washed out by clouds and eventually brought back to the earth's surface again. Since ammonia is emitted in a highly water soluble form it will also to a substantial degree be dry deposited near the source. Ammonia is, however, the dominant basic compound in the atmosphere and will form salts with acidic gases. These salt particles can be transported long distances especially in the absence of clouds. The deposition close to the source is substantial, but hard to estimate due to interaction with other pollutants. Far from the source the deposition of ammonium is on an annual average halved approximately every 400 km. This short transport distance and the substantial deposition near the source makes it possible for countries to control their ammonium deposition by decreasing their emissions, provided that there is no country with much higher emission in the direction of the prevailing wind trajectory. When the easily available nitrogen is deposited on natural ecosystems (lakes, forests), negative

effect can occur. The effect is determined by the magnitude of the deposition and the type of ecosystems (its critical load for nitrogen). In order to reduce the negative effects by controlling the emissions in a cost-efficient way it is necessary to use atmospheric transport models and critical loads.

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132. The atmospheric budget of oxidized nitrogen and its role in ozone formation and deposition.

Fowler, David; Flechard, Chris; Skiba, Ute; Coyle, Mhairi; and Cape, J Neil *New Phytologist* 139 (1): 11-23.

(1998);

ISSN: 0028-646X

Descriptors: nitric oxide/ nitrogen dioxide/ oxidized nitrogen:

atmospheric budget/ ozone:

deposition, formation/ plants

(Plantae)/ Plants/ soil emissions/

stomatal uptake

Abstract: Emissions of reactive oxidized nitrogen (NO and NO₂), collectively known as NO_x, from human activities are c. 21 Tg N annually, or 70% of global total emissions. They occur predominantly in industrialized regions, largely from fossil fuel combustion, but also from increased use of N fertilizers. Soil emissions of NO not only make an important contribution to global totals, but also play a part in regulating the dry deposition of NO and NO₂ (NO_x) to plant canopies. Soil microbial production of NO leads to a soil 'compensation point' for NO deposition or emission, which depends on soil temperature, N and water status. In warm conditions, the net emission of NO_x from plant canopies contributes to the photochemical formation of ozone. Moreover, the effect of NO_x emissions from soil is to reduce net rates of NO_x deposition to terrestrial surfaces over large areas. Increasing anthropogenic emissions of NO_x have led to an approximate doubling in surface O₃ concentrations since the last century. NO_x acts as a catalyst for the production of O₃ from volatile organic compounds (VOCs). Paradoxically, emission controls on motor vehicles might lead to increases in O₃ concentrations in urban areas. Removal of NO and NO₂ by dry deposition is regulated to some extent by soil production of NO; the major sink for NO₂ is stomatal uptake. Long-term flux measurements

over moorland in Scotland show very small deposition rates for NO₂ at night and before mid-day of 1-4 ng NO₂-N m⁻² s⁻¹, and similar emission rates during afternoon. The bidirectional flux gives 24-h average deposition velocities of only 1-2 mm s⁻¹, and implies a long life-time for NO_x due to removal by dry deposition.

Rates of removal of O₃ at the ground are also influenced by stomatal uptake, but significant non-stomatal uptake occurs at night and in winter. Measurements above moorland showed 40% of total annual flux was stomatal, with 60% non-stomatal, giving nocturnal and winter deposition velocities of 2-3 mm s⁻¹ and daytime summer values of 10 mm s⁻¹. The stomatal uptake is responsible for adverse effects on vegetation. The critical level for O₃ exposure (AOT40) is used to derive a threshold O₃ stomatal flux for wheat of 0-5 mug m⁻² s⁻¹. Use of modelled stomatal fluxes rather than exposure might give more reliable estimates of yield loss; preliminary calculations suggest that the relative grain yield reduction (%) can be estimated as 38 times the stomatal ozone flux (g m⁻²) above the threshold, summed over the growing season.

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133. Atmospheric dispersion of current-use pesticides: A review of the evidence from monitoring studies.

Van Dijk, Harrie FG and Guicherit, Robert

Water, Air and Soil Pollution 115

(1-4): 21-70. (1999)

NAL Call #: TD172.W36;

ISSN: 0049-6979

Descriptors: atrazine: herbicide, pollutant, toxin/ current use pesticides: pesticide, pollutant, toxin, transformation products/ lindane: insecticide, pollutant, toxin/ organophosphate insecticides: insecticide, pollutant, toxin/ application season/ atmospheric dispersion/ coastal waters/ dry particle deposition/ ecotoxicology/ gas exchange/ mountainous areas/ pesticide contamination/ remote lakes/ riverine inputs/ seas

Abstract: Recently, evidence has accumulated that the extensive use of modern pesticides results in their presence in the atmosphere at many places throughout the world. In Europe over 80 current-use pesticides have been detected in rain and 30 in

air. Similar observations have been made in North America. The compounds most often looked for and detected are the organochlorine insecticide lindane and triazine herbicides, especially atrazine. However, acetanilide and phenoxyacid herbicides, as well as organophosphorus insecticides have also frequently been found in rain and air. Concentrations in air normally range from a few pg/m³ to many ng/m³. Concentrations in rain generally range from a few ng/L to several mug/L. In fog even higher concentrations are observed. Deposition varies between a few mg/ha/y and more than 1 g/ha/y per compound. However, these estimates are usually based on the collection and analysis of (bulk) precipitation and do not include dry particle deposition and gas exchange. Nevertheless, model calculations, analysis of plant tissue, and first attempts to measure dry deposition in a more representative way, all indicate that total atmospheric deposition probably does not normally exceed a few g/ha/y. So far, little attention has been paid to the presence of transformation products of modern pesticides in the atmosphere, with the exception of those of triazine herbicides, which have been looked for and found frequently. Generally, current-use pesticides are only detected at elevated concentrations in air and rain during the application season. The less volatile and more persistent ones, such as lindane, but to some extent also triazines, are present in the atmosphere in low concentrations throughout the year. In agricultural areas, the presence of modern pesticides in the atmosphere can be explained by the crops grown and pesticides used on them. They are also found in the air and rain in areas where they are not used, sometimes even in remote places, just like their organochlorine predecessors. Concentrations and levels are generally much lower there. These data suggest that current-use pesticides can be transported through the atmosphere over distances of tens to hundreds, and sometimes even more than a thousand kilometres. The relative importance of these atmospheric inputs varies greatly. For mountainous areas and remote lakes and seas, the atmosphere may constitute the sole route of contamination by pesticides. In

coastal waters, on the other hand, riverine inputs may prevail. To date, little is known about the ecological significance of these aerial inputs.
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134. Atmospheric transport and air-surface exchange of pesticides.

Bidleman, Terry F

Water, Air and Soil Pollution 115 (1-4): 115-166. (1999)

NAL Call #: TD172.W36;

ISSN: 0049-6979

Descriptors: alpha

hexachlorocyclohexane: pollutant, toxin/ atrazine: herbicide, toxin, pollutant/ chiral OC pesticides: enantiomers, pesticide, toxin, volatilization, pollutant/ chlorothalonil: fungicide, pollutant, toxin/ chlorpyrifos: insecticide, pollutant, toxin/ endosulfan: insecticide, toxin, pollutant/ metolachlor: herbicide, toxin, pollutant/ persistent organic pollutants [POPs]: pollutant, toxin/ terbufos: insecticide, toxin, pollutant/ trifluralin: herbicide, toxin, pollutant/ PCBs [polychlorinated biphenyls]: pollutant, toxin/ aerosol sorption/ air surface exchange/ atmospheric transport/ chemical transport distance/ cold regions/ ecotoxicology/ environmental persistence/ environmental temperatures/ fog/ octanol air partition coefficient/ particle partitioning/ particle phase/ physicochemical properties/ regional scale/ sediment/ soil residue data/ soil air exchange/ surface seawater/ temperate climate/ temperature/ water/ air fugacity ratio

Abstract: Atmospheric transport and exchange of pesticides with soil, vegetation, water and atmospheric particles are discussed, with an emphasis on applying physicochemical properties of the compound to describe environmental partitioning. The octanol-air partition coefficient is promoted as a unifying property for describing volatilization of pesticides from soil and sorption to aerosols. Present-day sources of organochlorine (OC) pesticides to the atmosphere are continued usage in certain countries and volatilization from contaminated soils where they were used in the past. Models are available to predict volatilization from soil; however, their implementation is hampered by lack of soil residue data on a regional scale. The need to differentiate "new" and "old" sources is increasing, as countries negotiate international controls on persistent

organic pollutants (POPs). A new technique, based on the analysis of individual pesticide enantiomers, is proposed to follow emission of chiral OC pesticides from soil and water. Air monitoring programs in the Arctic show the ubiquitous presence of OC pesticides, PCBs and other POPs, and recently a few "modern" pesticides have been identified in fog and surface seawater. Atmospheric loadings of POPs to oceans and large lakes take place mainly by air-water gas exchange. In the case of OC pesticides and PCBs, aquatic systems are often near air-water equilibrium or even oversaturated. Measurement of water/air fugacity ratios suggests revolatilization of PCBs and several OC pesticides in the Great Lakes and, for alpha-hexachlorocyclohexane (alpha-HCH), in the Arctic Ocean. Outgassing of alpha-HCH in large lakes and arctic waters has been confirmed by enantiomeric tracer studies. The potential for pesticides to be atmospherically transported depends on their ability to be mobilized into air and the removal processes that take place enroute: wet and dry deposition of gases and particles and chemical reactions in the atmosphere. Measurement of reaction rate constants for pesticides in the gas and particle phase at a range of environmental temperatures is a critical research need. The transport distance of a chemical is related to its overall environmental persistence, determined by the partitioning among different compartments (water, sediment, soil, air), degradation rates in each compartment and mode of emission (into water, soil, air). Several pesticides found in the arctic environment have predicted lifetimes in the gas phase of only a few days in temperate climates, pointing out the need for monitoring and evaluation of persistence in cold regions.

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135. Atmospheric transport and deposition of pesticides: An assessment of current knowledge.

Van Pul, W Addo J; Bidleman, Terry F; Brorstrom, Lunden Eva; Builtjes, Peter JH; Dutchak, Sergey; Duyzer, Jan H; Gryning, Sven Erik; Jones, Kevin C; Van Dijk, Harrie FG; and Van Jaarsveld, JA

Water, Air and Soil Pollution 115 (1-4): 245-256. (1999)

NAL Call #: TD172.W36;

ISSN: 0049-6979

Descriptors: pesticides: atmospheric fate, deposition, toxin, pesticide, pollutant/ air soil interface/ air vegetation interface/ air water interface/ atmospheric transport/ ecotoxicology/ pesticide deposition/ physicochemical properties/ risk assessment implications/ surface exchange/ temperature dependency/ vapor pressure/ Henry's law constant
Abstract: The current knowledge on atmospheric transport and deposition of pesticides is reviewed and discussed by a working group of experts during the Workshop on Fate of pesticides in the atmosphere; implications for risk assessment, held in Driebergen, the Netherlands, 22-24 April, 1998. In general there is a shortage of measurement data to evaluate the deposition and reemission processes. It was concluded that the mechanisms of transport and dispersion of pesticides can be described similarly to those for other air pollution components and these mechanisms are rather well-known. Large uncertainties are present in the exchange processes at the interface between air and soil/water/vegetation. In all process descriptions the uncertainty in the physicochemical properties play an important role. Particularly those in the vapour pressure, Henry's law constant and its temperature dependency. More accurate data on physicochemical properties and particularly the temperature dependencies is needed.

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136. Automated storm water sampling on small watersheds.

Harmel, R. D.; King, K. W.; and Slade, R. M.

Applied Engineering in Agriculture 19 (6): 667-674. (2003)

NAL Call #: S671.A66;

ISSN: 0883-8542.

Notes: Number of References: 18

Descriptors: Agriculture/ Agronomy/ storm water sampling/ automated sampling/ nonpoint source pollution/ water quality/ strategies/ accuracy
Abstract: Few guidelines are currently available to assist in designing appropriate automated storm water sampling strategies for small watersheds. Therefore, guidance is needed to develop strategies that achieve an appropriate balance between accurate characterization of storm water quality and loads and limitations of budget,

equipment, and personnel. In this article, we explore the important sampling strategy components (minimum flow threshold, sampling interval, and discrete versus composite sampling) and project-specific considerations (sampling goal, sampling and analysis resources, and watershed characteristics) based on personal experiences and pertinent field and analytical studies. These components and considerations are important in achieving the balance between sampling goals and limitations because they determine how and when samples are taken and the potential sampling error. Several general recommendations are made, including: setting low minimum flow thresholds, using flow-interval or variable time-interval sampling, and using composite sampling to limit the number of samples collected. Guidelines are presented to aid in selection of an appropriate sampling strategy based on user's project-specific considerations. Our experiences suggest these recommendations should allow implementation of a successful sampling strategy for most small watershed sampling projects with common sampling goals.
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137. Background and Overview of Current Sediment Toxicity Identification Evaluation Procedures.

Ankley, G. T. and Schubauer-Berigan, M. K.

Journal of Aquatic Ecosystem Health 4 (3): 133-149. (1995);
ISSN: 0925-1014

Descriptors: toxicity tests/ sediment pollution/ bioassays/ synergism/ pollutant identification/ bioassay/ sediments/ pollutants/ toxicity/ toxicity testing/ water pollution/ Methods and instruments/ Identification of pollutants/ Toxicity testing

Abstract: Laboratory bioassays can provide an integrated assessment of the potential toxicity of contaminated sediments to aquatic organisms; however, toxicity as a sole endpoint is not particularly useful in terms of identifying remedial options. To focus possible remediation (e.g., source control), it is essential to know which contaminants are responsible for toxicity. Unfortunately, contaminated sediments can contain literally thousands of potentially toxic

compounds. Methods which rely solely on correlation to identify contaminants responsible for toxicity are limited in several aspects: (a) actual compounds causing toxicity might not be measured, (b) concentrations of potentially toxic compounds may covary, (c) it may be difficult to assess the bioavailability of contaminants measured in a sediment, and (d) interactions may not be accounted for among potential toxicants (e.g., additivity). Toxicity identification evaluation (TIE) procedures attempt to circumvent these problems by using toxicity-based fractionation procedures to implicate specific contaminants as causative toxicants. Phase I of a TIE characterizes the general physiochemical nature of sample toxicants. Phase II employs methods to measure toxicants via different analytical methods, and Phase III consists of techniques to confirm that the suspect toxicants identified in Phases I and II of the TIE actually are responsible for toxicity. These TIE procedures have been used to investigate the toxicity of a variety of samples, including sediments. Herein we present a brief conceptual overview of the TIE process, and discuss specific considerations associated with sediment TIE research. Points addressed include: (a) selection and preparation of appropriate test fractions, (b) use of benthic organisms for sediment TIE work, and (c) methods for the identification of common sediment contaminants.

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138. Background of the MSEA-RZWQM modeling project.

Watts, D. G.; Fausey, N. R.; and Bucks, D. A.

Agronomy Journal 91 (2): 169-170.

(Mar. 1999-Apr. 1999)

NAL Call #: 4-AM34P;

ISSN: 0002-1962 [AGJOAT]

Descriptors: roots/ soil water/ water quality/ mathematical models/ water pollution/ fertilizers/ economic analysis/ simulation models/ calibration/ validity/ databases/ groundwater/ groundwater pollution/ pesticide residues/ Iowa/ Minnesota/ Missouri/ Nebraska/ Ohio/ Colorado
Abstract: The Management System Evaluation Areas (MSEA) project was established in 1990 as a part of the Midwest Water Quality Initiative to

evaluate the effect of agricultural management practices and systems on the quality of water resources, to increase understanding of processes affecting water contamination, and to develop cost effective strategies to reduce water contamination from pesticides and plant nutrients. The midwest was chosen because it produces so much of the country's corn (>80%) and soybean (approximately equal to 70%) crops, and consumes >50% of the N fertilizer and almost 60% of the herbicides applied. The MSEA project collected a large volume of data across a wide region. Properly calibrated and validated, simulation models could use this database to estimate water quality impact over much longer periods than the expected life of the MSEA field program and to simulate responses for other combinations of soil, management systems, and weather conditions. The Root Zone Water Quality Model (RZWQM) was chosen for model improvement, calibration, and validation, to be followed by multilocation simulation of several specific management systems used in Midwest corn and corn-soybean production. Model improvement was an iterative process across multiple location. The next seven papers in this issue provide an overview of RZWQM Version 3.2, an explanation of the calibration-validation process, and documentation of that process and the modeling at MSEA locations in Iowa, Minnesota, Missouri, Nebraska, Ohio, and Colorado. This citation is from AGRICOLA.

139. Bacteriophages as Indicators of Pollution.

Armon, R. and Kott, Y.

Critical Reviews in Environmental Science and Technology 26 (4): 299-335. (1996)

NAL Call #: QH545.A1C7;

ISSN: 1064-3389

Descriptors: water pollution/ pathogens/ indicators/ viruses/ public health/ bacteriophage/ pollution control/ indicator species/ bacteriophages/ phages/ pollution indicators/ reviews/ bioindicators/ viruses/ Sources and fate of pollution/ Prevention and control/ Other water systems/ Freshwater pollution
Abstract: Water pollution is an undesired reality encountered in many countries. To prevent major outbreaks of infectious disease caused by

pathogenic microorganisms such as viruses, bacteria, and protozoa that contaminate the water, the scientific community has searched for various indicators that could be used to alert their presence. Among the possible indicators, bacteriophages are receiving increasing attention because of the concern with waterborne viral diseases. This review summarizes the advantages and disadvantages of utilizing bacteriophages as pollution indicators as seen from the somewhat confusing information accumulated from almost 50 years of research and proposes some new directions in the application of bacteriophages as indicators. Bacteriophages have been studied worldwide as pollution indicators because of the ease of their detection and their morphological similarity to human viruses. In addition, detection of human viruses is still a highly skilled and costly process. Generally speaking, bacteriophages have shown good potential application as indicators in certain situations, but some additional effort is needed in order to determine their real merit.
© Cambridge Scientific Abstracts (CSA)

140. Barrens of the midwest: A review of the literature.

Heikens, A. L. and Robertson, P. A. *Castanea* 59 (3): 184-194. (Sept. 1994)

NAL Call #: 450-So82;
ISSN: 0008-7475 [CSTNAC].

Notes: Paper presented at "Barrens Symposium," April 15, 1993, Virginia. Includes references.

Descriptors: plant communities/ habitats/ climatic factors/ edaphic factors/ fire effects/ habitat destruction/ literature reviews/ north central states of USA

This citation is from AGRICOLA.

141. Bayesian methods for analysing climate change and water resource uncertainties.

Hobbs, Benjamin F *Journal of Environmental Management* 49 (1): 53-72. (1997)

NAL Call #: HC75.E5J6;
ISSN: 0301-4797

Descriptors: Bayesian Methods/ Climate Change/ Climatology/ Dempster Shafer Reasoning/ Fuzzy Sets/ Global Warming/ Models And Simulations/ Water Resource Uncertainties/ Wetlands Management
Abstract: The purpose of this paper is

to outline the advantages of the Bayesian approach for analysing uncertainties involving climate change, emphasizing the study of the risks such changes pose to water resources systems. Bayesian analysis has the advantage of basing inference and decisions on a coherent and normatively appealing theoretical framework. Furthermore, it can incorporate diverse sources of information, including subjective opinions, historical observations and model outputs. The paper summarizes the basic assumptions and procedures of Bayesian analysis. Summaries of applications to detection of climate change, estimation of climate model parameters, and wetlands management under climatic uncertainty illustrate the potential of the Bayesian methodology. Criticisms of the approach are summarized. It is concluded that in comparison with alternative paradigms for analysing uncertainty, such as fuzzy sets and Dempster-Shafer reasoning, Bayesian analysis is practical, theoretically sound, and relatively easy to understand.

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142. Beneficial use of effluents, wastes, and biosolids.

Sumner, M. E. *Communications in Soil Science and Plant Analysis* 31 (11/14): 1701-1715. (2000)

NAL Call #: S590.C63;
ISSN: 0010-3624 [CSOSA2].

Notes: Paper presented at the 1999 International Symposium on Soil and Plant Analysis held March 22-29, 1999, Brisbane, Queensland, Australia. Includes references.

Descriptors: application to land/ sewage effluent/ sewage sludge/ animal manures/ composts/ gypsum/ food industry/ wastes/ paper mill sludge/ literature reviews/ nutrient content

Abstract: Anthropogenic wastes are accumulating at ever increasing rates. As an alternative to stockpiling and landfilling, land application of wastes is considered in terms of benefits to agriculture while protecting the environment. Beneficial reuse of wastes such as municipal wastewater, sewage sludge, animal manures, composts, byproduct gypsum, food processing and paper and pulp wastes are discussed both in terms of their benefits to agriculture and

requirements from the standpoint of analyses required for monitoring. Clearly, many of these wastes are highly beneficial to crop production as fertilizer substitutes and soil ameliorants.

This citation is from AGRICOLA.

143. Benefits and drawbacks to composting organic by-products.

Sikora, Lawrence J. In: Beneficial co-utilization of agricultural, municipal and industrial by-products/ Brown, S.; Angle, J. S.; and Jacobs, L.

Norwell, MA: Kluwer Academic, 1998; pp. 69-77.

ISBN: 0792351894; Proceedings of the Beltsville Symposium XXII, Beltsville, Maryland, USA, May 4-8, 1997; Conference Sponsors: Beltsville Agricultural Research Center, Agricultural Research Service, US Dept. of Agriculture with the cooperation of Friends of Agriculture Research - Beltsville (FAR-B)

NAL Call #: TD796.5.B45 1998
Descriptors: Waste Management (Sanitation)/ organic by product composting/ waste treatment methods/ benefit drawback analysis/ costs/ marketing/ pathogen reduction
© Thomson

144. Benefits of reducing domestic well nitrate contamination from concentrated animal feeding operations: A national model of groundwater contamination.

Lazo, J. K; Waldman, D. M.; Ottem, T. D.; and Wheeler, W. J., 2003 (application/pdf)

NAL Call #: HD1405 .A44
http://agecon.lib.umn.edu/cgi-bin/pdf_view.pl?paperid=8954

Abstract: This paper presents an analysis of benefits to private drinking water well users from regulatory changes for concentrated animal feeding operations (CAFOs). Combining a statistical model of groundwater quality with benefit estimates based on values available from the literature, we develop aggregate national benefit estimates for reduced well water contamination from changes in CAFO regulations. The statistical model is developed to explore truncation and selection issues. We conduct a sensitivity analysis of aggregate benefit estimates to model estimation and benefits transfer values.

This citation is from AGRICOLA.

145. Benefits of Reducing Nitrate Contamination in Private Domestic Wells Under CAFO Regulatory Options.

U.S. Environmental Protection Agency, Office of Science and Technology.

U.S. Environmental Protection Agency, 2002 (application/pdf)

NAL Call #: EPA821R03008

http://www.epa.gov/npdes/pubs/cafo_benefit_nitrate.pdf

146. Benthic-pelagic interactions in shallow water columns: An experimentalist's perspective.

Threlkeld, Stephen T

Hydrobiologia 275-276: 293-300. (1994)

NAL Call #: 410 H992;

ISSN: 0018-8158

Descriptors: Aquatic food web/ Nutrients/ Sedimentation/ algae (Algae Unspecified)/ fish (Pisces Unspecified)/ plankton (Organisms Unspecified)/ Animalia (Animalia Unspecified)/ Osteichthyes (Osteichthyes)/ chordates/ microorganisms/ nonhuman vertebrates/ nonvascular plants/ plants/ vertebrates

Abstract: Shallow water column benthic and pelagic communities are thought to be linked by trophic relationships, through life history or ontogenetic links, and by biologically or physically-mediated resuspension or sedimentation processes. It is often confusing and sometimes misleading to focus only on benthic or only on pelagic components of aquatic food webs, even though the literature on shallow water column experiments contains few experiments that give a balanced view of these components, or interactions between components in different habitats. The rarity of balanced experiments is especially troublesome because the most common types of manipulations in shallow water column experiments (fish and nutrients) often have rapid, direct effects on both kinds of habitats, or easily recognized indirect links between the two habitats that go unevaluated. Despite a large experimental literature on pelagic and benthic foodwebs (with less on both in the same systems), there appears to be continuing uncertainty about the importance to pelagic productivity of nutrients released from resuspended sediments, the role of macrobenthos in controlling plankton, and the efficacy and interaction of trophic

cascades between pelagic and benthic communities.

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147. Best management practices for poultry manure utilization that enhance agricultural productivity and reduce pollution.

Moore, P. A.

In: Animal waste utilization: Effective use of manure as a soil resource/ Hatfield, J. L. and Stewart, B. A., 1998; pp. 89-123

NAL Call #: S655.A57 1998

This citation is provided courtesy of CAB International/CABI Publishing.

148. Bioaccumulation of Heavy Metals by Aquatic Macro-Invertebrates of Different Feeding Guilds: A Review.

Goodyear, K. L. and Mcneill, S.

Science of the Total Environment 1-2: 1-19. (1999)

NAL Call #: RA565.S365;

ISSN: 0048-9697.

Notes: DOI: 10.1016/S0048-9697(99)00051-0

Descriptors: Bioaccumulation/ Heavy metals/ Zinc/ Copper/ Cadmium/ Lead/ Reviews/ Aquatic organisms/ Macrofauna/ Freshwater environments/ Feeding/ Guilds/ Freshwater organisms/ Sediment pollution/ Water pollution/ Feeds/ Pollution monitoring/ Food webs/ Trophic relationships/ Water Pollution Effects/ Foods/ Predation/ Macroinvertebrates/ Diptera/ Ephemeroptera/ Mayflies/ Insecta/ Metabolism/ Aquatic entomology/ Freshwater pollution/ Effects on organisms/ Effects of pollution

Abstract: The available literature on heavy metal bioaccumulation by freshwater macro-invertebrates has been analysed. A very uneven data distribution was found. Ephemeroptera and Diptera are the most commonly investigated orders of insect larvae, whilst many orders are not represented at all. The collector-gatherer and predator feeding guilds are more frequently investigated than other guilds. Furthermore, Zn, Cu, Pb and Cd are the most intensively researched heavy metals, and only infrequent investigations of other metals are documented. Relationships between metal concentrations in the animals and levels in sediments and waters were determined from the pooled data for three feeding guilds. No one relationship represents how each

metal interacts within the feeding guilds. Each of the four metals (Zn, Cu, Pb and Cd) displays a unique relationship between metal concentrations in sediments or waters with those in individual feeding guilds of macro-invertebrates, indicating the relative importance of different sources of metals to the different feeding types. Biomagnification of Zn, Cu, Pb and Cd has been demonstrated not to occur between these guilds.

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149. Bioaerosols from municipal and animal wastes: Background and contemporary issues.

Pillai, S. D. and Ricke, S. C.

Canadian Journal of Microbiology 48 (8): 681-696. (Aug. 2002)

NAL Call #: 448.8-C162;

ISSN: 0008-4166 [CJMIAZ]

Descriptors: animal wastes/ feedlot wastes/ feedlots/ sewage sludge/ pathogens/ air microbiology/ aerosols/ risk assessment/ infectious diseases/ literature reviews

This citation is from AGRICOLA.

150. Bioassessment and management of North American freshwater wetlands.

Rader, Russell Ben.; Batzer, Darold P.; and Wissinger, Scott A.

New York: Wiley; x, 469 p.: ill. (2001)

NAL Call #: QH77.N56-B56-2001;

ISBN: 0471352349 (cloth: alk. paper)

Descriptors: Wetland management---North America/ Environmental monitoring---North America

This citation is from AGRICOLA.

151. Biochemical and molecular basis of pesticide degradation by microorganisms.

Singh, B. K.; Kuhad, R. C.; Singh, A.; Lal, R.; and Tripathi, K. K.

Critical Reviews in Biotechnology 19 (3): 197-225. (1999)

NAL Call #: TP248.13.C74;

ISSN: 0738-8551 [CRBTE5]

Descriptors: pesticides/ microbial degradation/ literature reviews

This citation is from AGRICOLA.

152. Biodegradation of the acetanilide herbicides alachlor, metolachlor, and propachlor.

Stamper, David M and

Tuovinen, Olli H

Critical Reviews in Microbiology 24 (1): 1-22. (1998)

NAL Call #: QR1.C7;

ISSN: 1040-841X

Descriptors: alachlor: biodegradation, herbicide/ chloroacetanilides/ glutathione/ metolachlor: biodegradation, herbicide/ propachlor: biodegradation, herbicide/ Chaetomium globosum (Ascomycetes)/ Fungi/ Microorganisms/ Nonvascular Plants/ Plants
© Thomson

153. The biodiversity benefits of organic farming.

Bartram, H. and Perkins, A.
In: Organic agriculture: Sustainability, markets and policies: OECD workshop on organic agriculture. (Held 23 Sep 2002-26 Sep 2002 at Washington, D.C., USA.) OECD (eds.)
Wallingford, UK: CAB International; pp. 77-93; 2003.
ISBN: 0-85199-740-6
This citation is provided courtesy of CAB International/CABI Publishing.

154. Biodiversity, conservation and inventory: Why insects matter.

Kim, K. C.
Biodiversity and Conservation 2 (3): 191-214. (June 1993)
NAL Call #: QH75.A1B562;
ISSN: 0960-3115 [BONSEU].
Notes: Special Issue: Global Biodiversity and Conservation of Insects. Includes references.
Descriptors: arthropods/ species diversity/ nature conservation/ ecosystems/ inventories/ monitoring/ surveys/ literature reviews
This citation is from AGRICOLA.

155. Biodiversity of agricultural land: Habitats, species and hotspots.

Usher, M. B.
In: Biodiversity and conservation in agriculture proceedings of an international symposium. (Held 17 Nov 1997 at Stakis Brighton Metropole Hotel, UK.)
Farnham, UK: British Crop Protection Council; pp. 1-14; 1997.
NAL Call #: SB599.B73-no.69;
ISBN: 190139669X
Descriptors: agricultural land/ biodiversity/ species diversity/ genetic diversity/ community ecology/ landscape ecology/ habitats/ literature reviews
This citation is from AGRICOLA.

156. Biofertilizers for enhancement of crop productivity: A review.

Pathak DV; Khurana AL; and Satpal Singh
Agricultural Reviews Karnal 18 (3-4): 155-166; 52 ref. (1997)
This citation is provided courtesy of CAB International/CABI Publishing.

157. Biofertilizers in agriculture.

Gupta RP and Pandher MS
Journal of Research 33 (1-4): 209-224. (1996).
Notes: Publisher: Punjab, India: Punjab-Agricultural-University; 52 ref.
This citation is provided courtesy of CAB International/CABI Publishing.

158. Biofiltration: The treatment of fluids by microorganisms immobilized into the filter bedding material, A review.

Cohen, Y.
Bioresource Technology 77 (3): 257-274. (May 2001)
NAL Call #: TD930.A32;
ISSN: 0960-8524 [BIRTEB].
Notes: Reviews issue.
Includes references.
Descriptors: waste treatment/ biological treatment
This citation is from AGRICOLA.

159. Biogenic trace gases: Measuring emissions from soil and water.

Matson, P. A. and Harriss, Robert C.
Oxford England; Cambridge, Mass., USA: Blackwell Science; xi, 394 p.: ill.; Series: Methods in ecology. (1995)
NAL Call #: QC879.6.B566--1995;
ISBN: 0632036419
Descriptors: Atmospheric chemistry--Technique/ Bioclimatology--Technique/ Biogeochemistry--Technique/ Agricultural ecology--Technique
This citation is from AGRICOLA.

160. Biogeochemical Models Relating Soil Nitrogen Losses to Plant-Available N.

Tabachow, R. M.; Peirce, J. J.; and Richter, D. D.
Environmental Engineering Science 18 (2): 81-90. (2001);
ISSN: 1092-8758
Descriptors: Biogeochemistry/ Nitrogen cycle/ Plants/ Soil/ Fertilizers/ Simulation/ Agriculture/ Mathematical models/ Leaching/ Water Pollution Control/ Cycling Nutrients/ Nitrogen/ Soil water plant Relationships/ Model Studies/ Reviews/ DAISY model/ APS model/

RISK N model/ NLEAP model/ Land pollution/ Water quality control
Abstract: Four biogeochemical models that simulate N cycling in the plant-soil-water-atmosphere environment are evaluated. Each model considers N inputs and outputs to an agricultural system with emphasis on the relationships between mineral fertilizers and biofertilizers to plant-available N. Efficient use of N fertilizers by minimizing losses of N by NO₃⁻ sub(3) leaching, NO_x off-gas, and erosion decreases any negative impact on the environment and reduces the drain of natural resources and economic loss. A review of four existing models is conducted to evaluate the effectiveness of these models in simulating major biogeochemical relationships of added N to agricultural systems. The APS simulation model focuses on the influence of N fertilization on CO₂ sub(2) emissions with varying soil temperature. The deterministic DAISY model simulated nitrate leaching in an effort to develop sustainable crop rotations. The NLEAP model simulates nitrate leaching and allows users to evaluate various agricultural management strategies. The physically based analytical model RISK-N simulates N fluxes for major processes involving N in soil, and seems best suited for modeling the full complex of biogeochemical N cycles in fertilized systems.
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161. Bioindicators for assessing ecological integrity of prairie wetlands.

Adamus, Paul R.; Hairston, Ann J.; National Health and Environmental Effects Research Laboratory (U.S.), Western Ecology Division; and ManTech Environmental Research Services Corp.
Corvallis, OR: U.S. Environmental Protection Agency, Office of Research and Development, National Health and Environmental Effects Research Laboratory, Western Ecology Division; ix, 209 p.: ill. 1 computer disk (3.5 in.). (1996)
Notes: "Prepared ... through Contract 68-C4-0019 to ManTech Environmental Research Services Corp. and Contract number 5B6075NATA to Ann Hairston"--T.p. verso. Shipping list no.: 97-0045-P. "July 1996." "EPA/600/R-96/082."

Includes bibliographical references (p. 131-171). SUDOCS: EP 1.2:B 52/21.

NAL Call #: Fiche-S-133-EP-1.2:B-52/21-

Descriptors: Prairie ecology---United States/ Wetland ecology---United States/ Indicators---Biology---United States/ Biological diversity conservation---United States
This citation is from AGRICOLA.

162. Bioindicators for Water Quality Evaluation: A Review.

Hao, O. J.

Journal of the Chinese Institute of Environmental Engineering 6 (1): 1-19. (1996);

ISSN: 1022-7636

Descriptors: water quality/ bioindicators/ industrial wastes/ runoff/ pesticides/ environmental effects/ monitoring/ reviews/ aquatic organisms/ physiology/ species composition/ indicator species/ pollution monitoring/ Identification of pollutants/ Freshwater pollution/ Effects on organisms

Abstract: In general, assessment of water quality has been traditionally relied on the conventional pollutant parameters of biological oxygen demand and suspended solids. Often, these parameters are unable to detect those pollutants associated with industrial activities (e.g., heavy metals, solvents, toxic organics, and waste oils) and runoff (e.g., pesticides). It is not possible to chemically monitor each and every one of the possible pollutants to assess the environmental impact on water quality. It, thus, would appear logical that biological methods be used to monitor contamination levels of aquatic environments, since water pollution is essentially a biological phenomenon. Water quality affects the abundance, species composition, productivity, and physiological conditions of indigenous populations of a variety of aquatic species. Thus, the nature and health of the aquatic communities represent the quality of the water. Consequently, qualitative and/or quantitative description of the status of bioindicators may provide a viable alternative to assess water quality. The primary purpose of this study is to provide a comprehensive review of the developments in the past 10 years in the area of bioindicators of water quality. Fish, macroinvertebrates, macrophytes,

algae, bacteria and viruses as bioindicators are covered and discussed.

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163. Biological control of weeds in European crops: Recent achievements and future work.

Muller Scharer, H.; Scheepens, P. C.; and Greaves, M. P.

Weed Research 40 (1): 83-98.

(Feb. 2000)

NAL Call #: 79.8-W412;

ISSN: 0043-1737 [WEREAT]

Descriptors: weeds/ biological control/ weed control/ integrated pest management/ plant pathogens/ evaluation/ agricultural research/ field experimentation/ competitive ability/ epidemics/ provenance/ storage/ formulations/ efficacy/ literature reviews/ mycoherbicides/ plant pathogenic fungi/ Europe/ integrated weed management

This citation is from AGRICOLA.

164. Biological effects of agriculturally derived surface water pollutants on aquatic systems: A review.

Cooper, C. M.

Journal of Environmental Quality 22 (3): 402-408. (July 1993-Sept. 1993)

NAL Call #: QH540.J6;

ISSN: 0047-2425 [JEVQAA].

Notes: Paper presented at the USDA-ARS Beltsville Agricultural Research Center Symposium XVII, "Agricultural Water Quality Priorities, A Team Approach to Conserving Natural Resources," May 4-8, 1992, Beltsville, MD. Includes references.

Descriptors: aquatic environment/ surface water/ water quality/ sediment/ nutrients/ organic wastes/ pesticides/ heavy metals/ pollution/ agriculture

Abstract: Environmental manipulations and other human activities are major causes of stress on natural ecosystems. Of the many sources of surface water pollutants, agricultural activities have been identified as major contributors to environmental stress, which affects all ecosystem components. In water, agricultural contaminants are most noticeable when they produce immediate, dramatic toxic effects on aquatic life although more subtle, sublethal chronic effects may be just as damaging over long periods. Aquatic systems have the ability to recover from contaminant damage if

not seriously overloaded with irreversible pollutants. Thus, contaminant loading level is as important as type of pollutant. Although suspended sediment represents the largest volume of aquatic contaminant, pesticides, nutrients, and organic enrichment are also major stressors of aquatic life. Stream corridor habitat traps and processes contaminants. Loss of buffering habitat, including riparian zones, accelerates effects of pollutants and should be considered when assessing damage to aquatic life. Protection of habitat is the single most effective means of conserving biological diversity. Current available management practices and promising new technology are providing solutions to many contaminant-related problems in aquatic systems. This citation is from AGRICOLA.

165. Biological effects of fine sediment in the lotic environment.

Wood, Paul J and Armitage, Patrick D

Environmental Management 21 (2):

203-217. (1997)

NAL Call #: HC79.E5E5;

ISSN: 0364-152X

Descriptors: biological effects/ conservation/ deposition/ fine sediment/ habitat quality/ lotic environment/ river sedimentation/ soil science/ transport/ fish (Pisces Unspecified)/ invertebrate (Invertebrata Unspecified)/ Invertebrata (Invertebrata Unspecified)/ Pisces (Pisces Unspecified)/ animals/ chordates/ nonhuman vertebrates/ vertebrates

Abstract: Although sedimentation is a naturally occurring phenomenon in rivers, land-use changes have resulted in an increase in anthropogenically induced fine sediment deposition. Poorly managed agricultural practices, mineral extraction, and construction can result in an increase in suspended solids and sedimentation in rivers and streams, leading to a decline in habitat quality. The nature and origins of fine sediments in the lotic environment are reviewed in relation to channel and nonchannel sources and the impact of human activity. Fine sediment transport and deposition are outlined in relation to variations in streamflow and particle size characteristics. A holistic approach to the problems associated with fine sediment is outlined to aid in the identification of sediment sources,

transport, and deposition processes in the river catchment. The multiple causes and deleterious impacts associated with fine sediments on riverine habitats, primary producers, macroinvertebrates, and fisheries are identified and reviewed to provide river managers with a guide to source material. The restoration of rivers with fine sediment problems are discussed in relation to a holistic management framework to aid in the planning and undertaking of mitigation measures within both the river channel and surrounding catchment area.
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166. Biological effects of suspended sediments: A review of suspended sediment impacts on fish and shellfish with relation to dredging activities in estuaries.

Wilber, Dara H and Clarke, Douglas G
North American Journal of Fisheries Management 21 (4): 855-875. (2001)
NAL Call #: SH219.N66;
ISSN: 0275-5947

Descriptors: fish (Pisces)/ salmonid (Osteichthyes): anadromous / shellfish (Invertebrata)/ Animals/ Chordates/ Fish/ Invertebrates/ Nonhuman Vertebrates/ Vertebrates/ aquatic biology/ behavioral responses/ bioassays/ biological effects/ ecotoxicology/ environmental impacts/ estuaries/ exposure durations/ human activities/ life history stages/ mortality/ navigation dredging/ resource management/ suspended sediments/ taxonomy/ tidal flushing
Abstract: Objective assessment of the effects of increased concentrations of suspended sediment caused by human activities, such as navigation dredging, on estuarine fish and shellfish requires an integration of findings from biological and engineering studies. Knowledge is needed of (1) the suspended sediment characteristics typical of both ambient and dredging-induced conditions, (2) the biological responses of aquatic organisms to these suspended sediment dosages, and (3) the likelihood that organisms of interest will encounter suspended sediment plumes. This paper synthesizes the results of studies that report biological responses to known suspended sediment concentrations and exposure durations and relates these findings to suspended sediment conditions associated with dredging projects. Biological responses of taxonomic groups and life history

stages are graphed as a function of concentration and exposure duration. The quality and taxonomic breadth of studies on which resource managers must rely when evaluating potential impacts from activities that resuspend sediments, such as dredging projects, are addressed. Review of the pertinent literature indicates that few data exist concerning biological responses of fish and shellfish to suspended sediment dosages commonly associated with dredging projects. Much of the available data come from bioassays that measured acute responses and required high concentrations of suspended sediments to induce the measured response, usually mortality. Although anadromous salmonids have received much attention, little is known of behavioral responses of many estuarine fishes to suspended sediment plumes. Likewise, the effects of intermittent exposures at periodicities that simulate the effects of tidal flushing or the conduct of many dredge operations have not been addressed.
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167. Biological Implications of Sulfide in Sediment: A Review Focusing on Sediment Toxicity.

Wang, F. and Chapman, P. M.
Environmental Toxicology and Chemistry 11: 2526-2532. (1999)
NAL Call #: QH545.A1E58;
ISSN: 0730-7268

Descriptors: Reviews/ Sediment pollution/ Sulfide/ Polluted environments/ Metals/ Sulfides/ Toxicology/ Biota/ Behavior/ Irrigation/ Toxicity/ Pollution effects / Pollutant identification/ Behaviour/ Pollution tolerance/ Chemical reactions/ Sulphides/ Analytical techniques/ Sediment chemistry/ Sediment Contamination/ Bioassay/ Ecological Effects/ Reviews/ Toxicology and health/ Effects on organisms/ Effects of pollution
Abstract: The biological implications of sulfide in sediment are poorly understood and all too often ignored despite the fact that sulfide can be extremely important in determining sediment toxicity to resident biota. Sulfide influences sediment toxicity in three major ways, which are reviewed in detail: as a toxicant in its own right; by reducing metal toxicity by forming insoluble metal sulfide solids and/or by forming metal sulfide complexes; and by affecting animal behavior,

which in turn can alter the toxicity of not just the sulfide but also other sediment contaminants. Our present limited understanding of sulfide in sediments represents two major problems related to determining the toxicity of sediments, both in the laboratory and the field, and the causative agents of such toxicity. First, we do not know how important sulfide toxicity is to resident populations. Second, by not adequately considering sulfide toxicity, we risk underestimating toxicity and misidentifying the causative agents. Generic and specific recommendations related to resolving these problems are provided, including appropriate measurement and monitoring of sulfide in the laboratory and the field, determination of toxicity thresholds and tolerances for a wide range of sediment-dwelling organisms, further development of toxicity identification evaluation procedures, further research into sulfide effects on metal toxicity, and determination of the influence of sulfide on bioirrigation.
© Cambridge Scientific Abstracts (CSA)

168. Biological methods for determination of physiologically active substances in environmental samples.

Tumanov, A. A.; Kitaeva, I. A.; and Barinova, O. V.
Journal of Analytical Chemistry 48 (1): 2-11. (1993);
ISSN: 1061-9348

This citation is provided courtesy of CAB International/CABI Publishing.

169. Biological monitoring: Lichens as bioindicators of air pollution assessment: A review.

Conti, M E and Cecchetti, G
Environmental Pollution 114 (3): 471-492. (2001)
NAL Call #: QH545.A1E52;
ISSN: 0269-7491
Descriptors: lichen (Lichenes); bioindicator/ Nonvascular Plants/ Plants/ air pollution/ air quality
Abstract: Often as part of environmental impact studies and, above all, to obtain authorisations in accordance with prescriptions from the Ministry for the Environment (Italy), surveys and controls that use biological indicators are required. This is because such indicators are valid instruments for evaluating the quality of the air ensuing from the subject

(often an industrial plant) of the Environmental Impact Assessment (EIA). In this context, this paper aims to analyse some of the theoretical aspects of biological monitoring and to provide a progress report on the use of lichens as bioindicators of air quality, with a particular eye to the situation in Italy. The object of this paper is that of pointing out the most important lines in the current state of knowledge in this field, evaluating the methodological applications and their advantages/disadvantages with respect to traditional surveying methods.

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170. Biological monitoring of eutrophication in rivers.

Kelly, M. G. and Whitton, B. A. *Hydrobiologia* 384: 55-67. (1998)
 NAL Call #: 410 H992;
 ISSN: 0018-8158

This citation is provided courtesy of CAB International/CABI Publishing.

171. Biological monitoring: The dilemma of data analysis.

Norris, R. H.

Journal of the North American Benthological Society 14 (3): 440-450. (1995)

NAL Call #: QL141.F7;

ISSN: 0887-3593

This citation is provided courtesy of CAB International/CABI Publishing.

172. Biological substitutes for pesticides.

Gerhardson, Berndt

Trends in Biotechnology 20 (8): 338-343. (2002)

NAL Call #: TP248.13.T72;

ISSN: 0167-7799

Descriptors: pesticides/ biological pest control methods/ crop plant resistance/ environmental concerns/ health concerns/ pesticide biological substitutes

Abstract: In the 20th century an increasing number of pesticides, based on biocidal molecules, were the means for a substantial increase in food and fibre production and quality. Because of health and environmental concerns continued extensive use of such molecules is intensively debated and substitutes are often urgently required. Beside crop plant resistance, various biological control methods based on natural pest suppressing organisms are regarded as main alternatives. Several approaches and concepts also have

been tested and commercial organism-based preparations are steadily increasing. However, further biotechnological efforts are required to give them status of being practical substitutes to pesticides. At present they are not comparable to pesticides in meeting efficacy, market and other expectations, but they still have a promising future, especially where genetically modified organisms can be used.

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173. Biological weed control with pathogens: Search for candidates to applications.

Khachatourians, G. G.; Arora, D. K.; Caesar, A. J.; and Charudattan, R. In: *Applied mycology and biotechnology: Agriculture and food production/ Khachatourians, G. G. and Arora, D. K.; Vol. 2, 2002; pp. 239-274.*

ISBN: 0-444-51030-3

This citation is provided courtesy of CAB International/CABI Publishing.

174. The biologically significant attributes of forest canopies to small birds.

Sharpe, F.

Northwest Science 70 (special issue): 86-93. (1996)

NAL Call #: 470-N81;

ISSN: 0029-344X [NOSCAX]

Descriptors: wild birds/ coniferous forests/ deciduous forests/ canopy/ structure/ habitats/ forest ecology/ habitat selection/ riparian forests/ ecosystems/ literature reviews/ Pacific Northwest states of USA/ ecosystem management

This citation is from AGRICOLA.

175. Biology and ecology of higher Diptera from freshwater wetlands.

Keiper, J. B.; Walton, W. E.; and Foote, B. A.

Annual Review of Entomology 47: 207-232. (2002)

NAL Call #: 421-An72;

ISSN: 0066-4170 [ARENA]

Descriptors: diptera/ biology/ life cycle/ feeding habits/ habitats/ population ecology/ community ecology/ species diversity/ sampling/ aquatic insects/ freshwater ecology/ wetlands/ literature reviews/ cyclorrhapha/ schizophora/ niche partitioning

This citation is from AGRICOLA.

176. Biology and establishment of mountain shrubs on mining disturbances in the Rocky Mountains, USA.

Paschke, M. W.; Redente, E. F.; and Brown, S. L.

Land Degradation and Development 14 (5): 459-480. (2003)

NAL Call #: S622.L26;

ISSN: 1085-3278

This citation is provided courtesy of CAB International/CABI Publishing.

177. The biology and integrated management of leafy spurge (Euphorbia esula) on North Dakota rangeland.

Lym, Rodney G

Weed Technology 12 (2): 367-373. (1998)

NAL Call #: SB610.W39;

ISSN: 0890-037X

Descriptors: picloram / 2,4 D/ herbicides/ Aphthona czwalinae (Coleoptera): biological control agent, flea beetle/ Aphthona lacertosa (Coleoptera): biological control agent, flea beetle/ Aphthona nigricutis (Coleoptera): biological control agent, flea beetle/ Euphorbia esula [leafy spurge] (Euphorbiaceae): weed/ Spurgia esulae [spurge gall midge] (Diptera): biological control agent/ Angiosperms/ Animals/ Arthropods/ Dicots/ Insects/ Invertebrates/ Plants/ Spermatophytes/ Vascular Plants/ rangelands

Abstract: Leafy spurge, a long-lived perennial, grows in many habitats, from floodplains to grasslands and mountain slopes. The plant emerges in early spring and produces showy, yellow bracts that appear in late May. The true flowers emerge in mid-June. The plant spreads by both seeds and roots and contains a white sticky latex that deters grazing by many animals. Dicamba, 2,4-D, glyphosate, and picloram have commonly been used to control leafy spurge. Picloram plus 2,4-D is frequently used for leafy spurge control in North Dakota. Ten insect species for leafy spurge biocontrol have been released in North Dakota; the most successful have been the flea beetles, *Aphthona nigricutis*, *A. czwalinae*, and *A. lacertosa*. The leafy spurge gall midge (*Spurgia esulae*) has been most successful near wooded areas. Herbicides combined with either the leafy spurge flea beetles or gall midge have controlled leafy spurge better than either method used alone. Grazing with sheep or goats is a cost-

effective method for controlling leafy spurge top growth in large infestations. Grazing combined with fall-applied picloram plus 2,4-D reduced leafy spurge density more rapidly and maintained control longer than either method used alone. Several grass species are competitive with leafy spurge including 'Rebound' smooth brome, 'Rodan' western wheatgrass, 'Pryor' slender wheatgrass, and 'Manska' pubescent wheatgrass. Cultivating twice each fall after harvest for 3 yr in cropland completely controlled leafy spurge. A successful long-term management program should be designed for specific situations and should include combinations of herbicides, insects, grazing, and/or seeding competitive species.

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178. Biology and management of noxious rangeland weeds.

Sheley, Roger L. and Petroff, J. K. Corvallis, OR: Oregon State University Press; 438 p., 16 p. of plates: ill. (some col.), maps. (1999) *Notes:* 1st ed.; Includes bibliographical references and index. *NAL Call #:* SB612.W47B564-1999; *ISBN:* 0870714619 (alk. paper) *Descriptors:* Rangelands---Weed control---West---United States/ Weeds---West---United States/ Range plants---Control---West---United States/ Range management---West---United States/ Invasive plants---West---United States
This citation is from AGRICOLA.

179. The biology and management of purple loosestrife (*Lythrum salicaria*).

Mullin, Barbra H
Weed Technology 12 (2): 397-401. (1998)
NAL Call #: SB610.W39;
ISSN: 0890-037X
Descriptors: *Lythrum salicaria* [purple loosestrife] (Lythraceae): biology, weed, management/ Angiosperms/ Dicots/ Plants/ Spermatophytes/ Vascular Plants/ wetland ecosystems
Abstract: Purple loosestrife is an invasive, introduced plant that is usually associated with wetland, marshy, or riparian sites. It is found across the northern tier states and provinces in North America. Purple loosestrife affects the diversity of native wetland ecosystems. Infestations lead to severe wildlife habitat degradation, loss of species

diversity, and displacement of wildlife-supporting native vegetation, such as cattails and bulrushes. The plant spreads effectively along waterways, and the thick, matted root system can rapidly clog irrigation ditches, resulting in decreased water flow and increased maintenance. Effective management of purple loosestrife along waterways and in riparian areas requires integrating management strategies to prevent further introductions, detecting and eradicating new infestations, and containing and controlling large-scale infestations. Management practices that aid in the control of purple loosestrife include herbicide, physical, and biological practices. Each infestation site should be individually evaluated to determine the appropriate control measure. Factors to be considered include the proximity and type of vegetation on the site, whether the water is flowing or still, and the utilization of the site and the water (domestic, irrigation, recreation, or scenic value).

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180. Biomethanation under psychrophilic conditions: A review.

Kashyap, D. R.; Dadhich, K. S.; and Sharma, S. K.
Bioresource Technology 87 (2): 147-153. (Apr. 2003)
NAL Call #: TD930.A32;
ISSN: 0960-8524 [BIRTEB]
Descriptors: biogas/ bioenergy/ anaerobic digestion/ methane production/ temperature/ animal manures/ agricultural wastes/ sewage/ biotechnology/ reviews/ psychrophilic temperature
Abstract: Anaerobic digestion of animal manure, sewage and other agricultural wastes at psychrophilic temperatures has not been explored as extensively as either mesophilic or thermophilic digestion, probably due to little anticipation of the development of economically attractive systems using this technology. This review article discusses psychrophilic anaerobic digestion studies reported by various researchers using different substrates. The effect of operational parameters such as type of substrate, size of inoculum, concentration of volatile fatty acids, hydraulic retention time and loading rate, on reduction of TS/VS, BOD/COD and biogas yield is discussed in detail.
This citation is from AGRICOLA.

181. Biomonitoring.

Isom, B. G.
Water Environment Research 65 (4): 596-599. (1993)
NAL Call #: TD419.R47;
ISSN: 1047-7624
This citation is provided courtesy of CAB International/CABI Publishing.

182. Biomonitoring.

Lange, C. R. and Lange, S. R.
Water Environment Research 69 (4): 900-915. (1997)
NAL Call #: TD419.R47;
ISSN: 1047-7624
This citation is provided courtesy of CAB International/CABI Publishing.

183. Biopesticides: A review of their action, applications and efficacy.

Copping, L. G. and Menn, J. J.
Pest Management Science 8: 651-676. (2000)
NAL Call #: SB951-.P47;
ISSN: 1526-498X
Descriptors: Pesticides/ Chemical control/ Arthropoda/ Agricultural & general applied entomology
Abstract: A survey is given of the wide range of different materials and organisms that can be classified as biopesticides. Details are given of those currently of commercial importance, and future developments in this area are discussed. It is considered that, while in the immediate future biopesticides may continue to be limited mainly to niche and speciality markets, there is great potential for long-term development and growth, both in their own right and in providing leads in other areas of pest management science.
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184. Biophysical Interactions and the Structure and Dynamics of Riverine Ecosystems: The Importance of Biotic Feedbacks.

Naiman, R. J.; Elliott, S. R.; Helfield, J. M.; and O'Keefe, T. C.
Hydrobiologia 410: 79-86. (1999)
NAL Call #: 410 H992;
ISSN: 0018-8158.
Notes: Publisher: Kluwer Academic Publishers; DOI: 10.1023/A:1003768102188
Descriptors: Ecosystem management/ Rivers/ Physical properties/ Nature conservation/ Biotic factors/ Streams/ Climatic conditions/ Disturbance/ Forests/ Dynamics/ Ecosystems/ Structure/ Reviews/

Conservation/ Riparian Vegetation/ Biological Properties/ Habitat community studies/ Topography and morphology/ Freshwater/ Streamflow and runoff

Abstract: Characteristics of streams and rivers reflect variations in local geomorphology, climate, natural disturbance regimes and the dynamic features of the riparian forest. Hierarchical interactions between these components result in a rich variety of distinct stream communities which, when considered in combination with strong biotic feedbacks to the physical environment, present formidable challenges in discovering and understanding fundamental, system-level characteristics of natural rivers. The objectives of this article are to briefly review the traditional view of hierarchical physical controls on stream structure and dynamics and to show how this viewpoint is changing as recognition of strong biological influences on physical structure are emerging. In combination, identifying natural stream characteristics and the interactions among individual components, as well as recognizing the importance of biotic feedbacks on physical structure, form the basis for establishing effective conservation strategies.

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185. Bioremediation in the rhizosphere.

Anderson, Todd A; Guthrie, Elizabeth A; and Walton, Barbara T
Environmental Science and Technology 27 (13): 2630-2636. (1993)

NAL Call #: TD420.A1E5;
ISSN: 0013-936X

Descriptors: microorganisms (Microorganisms Unspecified)/ microorganisms/ contaminated soil/ hazardous waste/ microbial degradation/ pesticides

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186. Bioremediation of DDT-Contaminated Soils: A Review.

Foght, J.; April, T.; Biggar, K.; and Aislabie, J.

Bioremediation Journal 5 (3): 225-246. (2001);

ISSN: 1088-9868

Descriptors: Reviews/ Bioremediation/ DDT/ Soil/ Dechlorination/ Biodegradation/ Soil remediation/ Insecticides/ Aeration/

Bioreactors/ Pesticides/ Soils/ Environmental factors/ Microorganisms/ Literature reviews/ Water pollution treatment / Bacteria/ Fungi/ organic matter/ aeration/ pH effects/ temperature effects/ Bacteria/ Microbial degradation/ Land pollution/ Physiology, biochemistry, biophysics/ Protective measures and control/ Soil Pollution: Monitoring, Control & Remediation

Abstract: The insecticide 1,1,1-trichloro-2,2-bis-(4-chlorophenyl)ethane (DDT) has been used extensively since the 1940s for control of agricultural pests, and is still used in many tropical countries for mosquito control. Despite a ban on DDT use in most industrialized countries since 1972, DDT and its related residues (DDTr) persist in the environment and pose animal and human health risks. Abiotic processes such as volatilization, adsorption, and photolysis contribute to the dissipation of DDTr in soils, often without substantial alteration of the chemical structure. In contrast, biodegradation has the potential to degrade DDTr significantly and reduce soil concentrations in a cost-effective manner. Many bacteria and some fungi transform DDT, forming products with varying recalcitrance to further degradation. DDT biodegradation is typically co-metabolic and includes dechlorination and ring cleavage mechanisms. Factors that influence DDTr biodegradation in soil include the composition and enzymatic activity of the soil microflora, DDTr bioavailability, the presence of soil organic matter as a co-metabolic substrate and (or) inducer, and prevailing soil conditions, including aeration, pH, and temperature. Understanding how these factors affect DDTr biodegradation permits rational design of treatments and amendments to stimulate biodegradation in soils. The DDTr-degrading organisms, processes and approaches that may be useful for bioremediation of DDTr-contaminated soils are discussed, including in situ amendments, ex situ bioreactors and sequential anaerobic and aerobic treatments.

© Cambridge Scientific Abstracts (CSA)

187. Bioremediation of heavy metals and organotoxicants by composting.

Barker, Allen V and Bryson, Gretchen M
The Scientific World 2: 407-420. (2002)

NAL Call #: 472 SCI25;
ISSN: 1537-744X.

Notes: Online version cited April 4, 2002

Descriptors: heavy metals: binding, degradation, pollutant, toxin/ organic toxicants: binding, degradation, pollutant, toxin/ pesticides: pollutant/ polychlorinated biphenyls [PCBs]: pollutant/ polycyclic aromatic hydrocarbons [PAHs]: pollutant/ microbe (Microorganisms): diversity/ Microorganisms/ noncontaminated organic matter/ soil pollution
Abstract: Hazardous organic and metallic residues or by-products can enter into plants, soils, and sediments from processes associated with domestic, municipal, agricultural, industrial, and military activities. Handling, ingestion, application to land or other distributions of the contaminated materials into the environment might render harm to humans, livestock, wildlife, crops, or native plants. Considerable remediation of the hazardous wastes or contaminated plants, soils, and sediments can be accomplished by composting. High microbial diversity and activity during composting, due to the abundance of substrates in feedstocks, promotes degradation of xenobiotic organic compounds, such as pesticides, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). For composting of contaminated soils, noncontaminated organic matter should be cocomposted with the soils. Metallic pollutants are not degraded during composting but may be converted into organic combinations that have less bioavailability than mineral combinations of the metals. Degradation of organic contaminants in soils is facilitated by addition of composted or raw organic matter, thereby increasing the substrate levels for cometabolism of the contaminants. Similar to the composting of soils in vessels or piles, the on-site addition of organic matter to soils (sheet composting) accelerates degradation of organic pollutants and binds metallic pollutants. Recalcitrant materials, such as organochlorines, may not undergo degradation in composts or

in soils, and the effects of forming organic complexes with metallic pollutants may be nonpermanent or short lived. The general conclusion is, however, that composting degrades or binds pollutants to innocuous levels or into innocuous compounds in the finished product.

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188. Bioremediation of selenium in soil and water. [Erratum: June 1998, v. 163 (6), p. 507].

Losi, M. E. and Frankenberger, W. T. *Soil Science* 162 (10): 692-702. (Oct. 1997)

NAL Call #: 56.8-So3;

ISSN: 0038-075X [SOSCAK]

Descriptors: agricultural soils/ drainage water/ selenium/ contamination/ bioremediation/ technical progress/ soil pollution/ water pollution/ pollution control/ microbial activities/ transformation/ toxicity/ wildlife/ reviews/ California
This citation is from AGRICOLA.

189. Biosensors for environmental monitoring.

Dennison, M J and Turner, A P F *Biotechnology Advances* 13 (1): 1-12. (1995)

NAL Call #: TP248.2.B562;

ISSN: 0734-9750

Descriptors: pesticide/ pollution

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190. Biosensors for the detection of pesticides.

Marty, J L; Leca, B; and Noguier, T *Analisis* 26 (6): M144-M149. (1998)

NAL Call #: QD71.A52;

ISSN: 0365-4877

Descriptors: carbamate insecticides (detection of pollutants) dithiocarbamate fungicides (detection of pollutants) imidazolinone herbicides (detection of pollutants) organophosphorus insecticides (detection of pollutants) pesticides (detection of pollutants) sulfonylurea herbicides (detection of pollutants) triazine herbicides: detection, pollutant

Abstract: This review presents the last advances in the field of biosensors for pesticide detection. The main categories of reported sensors are presented according to the immobilized biological sensing element: immunosensors, enzyme sensors and "whole cell" sensors. The potential of each type of sensor in

environmental monitoring is discussed and the advantages and drawbacks of the described devices are highlighted.

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191. Biosolids and Sludge Management.

Krogmann, U.; Boyles, L. S.; Bamka, W. J.; Chairapat, S.; and Martel, C. J.

Water Environment Research 5: 692-714. (1999)

NAL Call #: TD419.R47;

ISSN: 1061-4303

Descriptors: Waste Management/ Solids/ Sludge/ Land Disposal/ Landfills/ Composting/ Reviews/ Sludge disposal/ Ultimate disposal of wastes

© Cambridge Scientific Abstracts (CSA)

192. Biosolids Applied to Land: Advancing Standards and Practices.

Committee on Toxicants and Pathogens in Biosolids Applied to Land; National Research Council, Board on Environmental Studies and Toxicology (BEST).

National Academy Press, 2002.

ISBN: 0-309-08486-5; Table of Contents: Front Matter, pp. i-xx; Summary, pp. 1-16 1, Introduction, pp. 17-30; 2, Biosolids Management, pp. 31-105; 3, Epidemiological Evidence of Health Effects Associated with Biosolids Production and Application, pp. 106-125; 4, Advances in Risk Assessment since the Establishment of the Part 503 Rule, pp. 126-163; 5, Evaluation of EPA's Approach to Setting Chemical Standards, pp. 164-256; 6, Evaluation of EPA's Approach to Setting Pathogen Standards, pp. 257-321; 7, Integration of Chemical and Pathogen Risk Assessment, pp. 322-334;

Glossary, pp. 335-337; Appendix A, Biographical Information on the Committee on Toxicants and Pathogens in Biosolids Applied to Land, pp. 338-343; Appendix B, Participants at Public Sessions, pp. 344-346. (image/tiff)

<http://search.nap.edu/books/0309084865/html/>

Descriptors: biosolids/ land application/ environmental management/ risk assessment/ physicochemical properties/ pathogens/ issues and policy/ Environmental Protection Agency

Abstract: This National Research Council report recommends changes in EPA's regulations for the land application of biosolids.

193. Biotechnical engineering as an alternative to traditional engineering methods. A biotechnical streambank stabilization design approach.

Li, Ming-Han and Eddleman, K. E. *Landscape and Urban Planning* 60 (4): 225-242. (2002)

NAL Call #: QH75.A1L32;

ISSN: 0169-2046

Descriptors: Streams/ Environmental restoration/ Engineering/ Riparian environments/ Revegetation/ Conservation/ General Environmental Engineering

Abstract: Focus on ecologically fragile streams in the US has resulted in heightened recognition and popularity of biotechnical streambank stabilization methods. This ancient technique re-emerges in the US in response to the link between traditional protection measures and numerous occurrences of streambank failures. The purpose of this study was to investigate biotechnical engineering as a viable alternative to traditional channelization and hard-armoring methods. Primarily by literature review, this study analyzed and organized various streambank stabilization approaches in traditional engineering, fluvial geomorphological, ecological and biotechnical engineering perspectives. Strengths and weaknesses in these four perspectives are discussed, suitable biotechnical alternatives are presented, and a cost-strength matrix of biotechnical techniques is introduced.

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194. Biotechnical erosion control.

Snider, Joseph A. and United States. Natural Resources Conservation Service. Jamie L. Whitten Plant Materials Center.

Jackson, MS: Natural Resources Conservation Service; Series: Technical note (Jamie L. Whitten Plant Materials Center) v. 12, no. 2. (1996)

Notes: Title from title page of source document. "September 1996"
Includes bibliographical references.

NAL Call #: aS627.P55-T43-v.-12,-no.-2

<http://plant-materials.nrcs.usda.gov/pubs/mspmctn9602.pdf>

Descriptors: Soil conservation/ Bioengineering/ Erosion/ Riparian ecology

Abstract: "This study was conducted [in Panola County, Mississippi] to evaluate the potential of selected plant species and Biotechnical Erosion Control (BEC) techniques for streambank stabilization in the Mid-South."

This citation is from AGRICOLA.

195. Biotechnology and environmental issues in dairying.

Tamminga, S.

In: Milk composition, production and biotechnology/ Welch, R. A.; Burns, D. J.; Davis, S. R.; Popay, A. I.; and Prosser, C. G., 1997; pp. 513-532

This citation is provided courtesy of CAB International/CABI Publishing.

196. Biotechnology and new integrated pest management approaches.

DeVault, J. D.; Hughes, K. J.; Johnson, O. A.; and Narang, S. K. *Bio/technology (Nature Publishing)* 14 (1): 46-49. (Jan. 1996)

NAL Call #: QH442.B5; ISSN: 0733-222X [BTCHDA]

Descriptors: insect pests/ biological control/ biological control agents/ microbial pesticides/ genetic control/ genetic engineering/ integrated pest management/ environmental impact/ literature reviews/ microbial insecticides

This citation is from AGRICOLA.

197. Biotechnology: Environmental impacts of introducing crops and biocontrol agents in North American agriculture.

Pimentel, D.

In: Biological control: Benefits and risks/ Hokkanen, H. M. and Lynch, J. M.; Series: Plant and microbial biotechnology research series No. 4, 1995; pp. 13-29.

ISBN: 052154405X

NAL Call #: TP248.27.P55P54

Descriptors: plant introduction/ introduced species/ crops/ livestock/ game birds/ game animals/ environmental impact/ weeds/ pests/ biological control agents/ weed control/ insects/ insect pests/

genetic engineering/ recombinant DNA/ transgenic plants/ risk/ literature reviews/ North America/ animal pests/ pest potential/ weed eating insects
This citation is from AGRICOLA.

198. Biotechnology in the treatment of animal manure.

Woestyne, M. V. and Verstraete, W.

In: Biotechnology-in-animal-feeds-and-animal-feeding/ Wallace, R. J. and Chesson, A., 1995; pp. 311-327

This citation is provided courtesy of CAB International/CABI Publishing.

199. Birds of lake, pond, and marsh: Water and wetland birds of eastern North America.

Eastman, John

Mechanicsburg, PA: Stackpole Books; xv, 271 p.: ill. (1999)

Notes: Includes bibliographical references (p. 263-266) and index.

NAL Call #: QL683.E27-E375-1999;

ISBN: 0811726819 (alk. paper)

Descriptors: Water birds---East---United States

This citation is from AGRICOLA.

200. Bound pesticide residues in soils: A review.

Gevao, B.; Semple, K. T.; and Jones, K. C.

Environmental Pollution 108 (1): 3-14. (2000)

NAL Call #: QH545.A1E52;

ISSN: 0269-7491 [ENPOEK].

Notes: Special Issue: Non-extractable residues in soils and sediments: Characterisation and Environmental Significance. Includes references.

Descriptors: pesticide residues/ technology/ soil properties/ land management/ microorganisms/ biological activity in soil/ aging/ soil pollution/ environmental impact/ literature reviews/ pesticide classes/ chemical bonding/ soil aging/ bound residues

This citation is from AGRICOLA.

201. Breeding bird communities of Midwestern prairie fragments: The effects of prescribed burning and habitat area.

Herkert, J. R.

Natural Areas Journal 14: 128-135. (1994)

NAL Call #: QH76.N37

Descriptors: Wildlife habitat/ breeding birds/ agricultural practices/ fire

Abstract: Compared the effects of habitat area and prescribed burning on breeding bird communities using Midwestern prairie fragments.

202. A brief review of the potential benefits of buffer zones as field margins in UK agriculture.

Davies, D. H. K.

Aspects of Applied Biology (54): 61-70. (1999);

ISSN: 0265-1491

This citation is provided courtesy of CAB International/CABI Publishing.

203. Broiler litter as a fertilizer or livestock feed.

Bagley, C. P.; Evans, R. R.; and Burdine, W. B. Jr.

Journal of Production Agriculture 9 (3): 342-346. (July 1996-Sept. 1996)

NAL Call #: S539.5.J68;

ISSN: 0890-8524 [JPRAEN]

Descriptors: poultry manure/ broilers/ waste utilization/ uses/ organic fertilizers/ forage/ crop production/ application to land/ nutrients/ management/ nutrient content/ beef cattle/ feeds/ nutritive value/ feed conversion/ performance/ farming systems/ integration/ reviews/ southeastern states of USA

Abstract: The growth in the broiler industry and the concomitant increase in the broiler litter generated out of these operations, coupled with increased environmental awareness, has resulted in increased interest by producers and scientists in uses for broiler litter. Long-term land applications of broiler litter have resulted in a buildup of some nutrients in certain soils. Research results indicate that annual application rates of up to 4 tons/acre of litter are acceptable, but should be accompanied by annual soil testing. Broiler litter of adequate quality is acceptable as a livestock feed, provided the litter is properly processed prior to feeding. When used as a livestock feed, the ash level in litter is of concern due to its negative effects on the nutritive value (total digestible nutrients, TDN) of litter diets containing relatively high ash levels. Based on expected levels of performance, broiler litter-based diets require varying levels of grain to meet the nutrient requirements of different classes of livestock. Broiler litter can be used as both fertilizer and livestock feed, and the combining of broiler production with a commercial beef operation represents an attractive integration of two enterprises.

This citation is from AGRICOLA.

204. Broiler phosphorus intake versus broiler phosphorus output in the United States: Nutrition or soil science?

Miles, D. M. and Sistani, K. R.
World's Poultry Science Journal
58 (4): 493-500. (2002)
NAL Call #: 47.8-W89;
ISSN: 0043-9339

This citation is provided courtesy of CAB International/CABI Publishing.

205. Buffer Zones and Water Quality Protection: General Principles.

Correll, D. L.

In: Buffer Zones: Their Processes and Potential in Water Protection Conference Handbook. (Held 2 Aug 1930-2 Sep 1996 at Oxfordshire, UK.) Cardigan, UK: Samara Publishing Limited; pp. 13-14; 1996.

Notes: Conference: Int. Conf. Buffer Zones: Their Processes and Potential in Water Protection, Woodstock, Oxfordshire (UK), 30 Aug-2 Sep 1996
Descriptors: literature review/ water quality control/ protection/ riparian land/ zones/ groundwater movement/ overland flow/ riparian vegetation/ organic matter/ soil properties/ floods/ riparian environments/ groundwater/ nutrients/ streams/ soil/ buffer zones/ flooding/ Water quality control/ Freshwater pollution

Abstract: Riparian buffer zones (RBZ) improve water quality in different ways depending upon the pathway of delivery to the water to the RBZ. Groundwater passing through the RBZ may be cleansed of nitrate and acidity due to a combination of denitrification, biostorage, and changes in soil composition. Overland storm flows entering laterally from the uplands may be cleansed of suspended particulates, with adhering nutrients, inorganic toxins, and pesticides, as well as some dissolved nutrients and toxins. Sometimes these overland flows will also infiltrate within the RBZ and become a part of the groundwater, thus also obtaining the benefits associated with groundwaters in the RBZ. During stream flooding events, waters flooding out into the RBZ may also be cleansed of sediments, nutrients, and toxic materials as a result of particulate trapping and the binding of materials on the leaf litter and soils within the RBZ. The RBZ is also an important source to the stream of high quality dissolved and particulate organic matter which is delivered both

vertically and laterally. Forested RBZs also provide shade and evaporative cooling to streams, maintaining lower summertime temperatures critical to some biota. Factors which limit the effectiveness of the functions can be divided into internal and external. Factors external to the RBZ include watershed area and gradient, stream channel morphology, soil mineralogy and texture, bedrock type and depth, and climate. Factors internal to the RBZ include width and type of vegetation, water logging and organic content of soils, hydraulic conductivity, soil nutrient content and geochemistry. These water quality functions of RBZs and the factors which limit their effectiveness in various settings will be reviewed from the world literature.
© Cambridge Scientific Abstracts (CSA)

206. Buffer zones to improve water quality: A review of their potential use in UK agriculture.

Muscutt, A. D.; Harris, G. L.; Bailey, S. W.; and Davies, D. B.
Agriculture, Ecosystems and Environment 45 (1-2): 59-77. (1993)
NAL Call #: S601 .A34;
ISSN: 0167-8809

This citation is provided courtesy of CAB International/CABI Publishing.

207. Butterfly conservation management.

New, T. R.; Pyle, R. M.; Thomas, J. A.; Thomas, C. D.; and Hammond, P. C.
Annual Review of Entomology 40: 57-83. (1995)

NAL Call #: 421-An72;
ISSN: 0066-4170 [ARENA]
Descriptors: lepidoptera/ wildlife conservation/ protected species/ wildlife management/ ecology/ habitats/ environmental legislation/ reviews

This citation is from AGRICOLA.

208. Cadmium contamination of vegetable crops, farmlands, and irrigation waters.

Cabrera, C.; Ortega, E.; Lorenzo, M. L.; and Lopez, M. C.
Reviews of Environmental Contamination and Toxicology 154: 55-81. (1998)
NAL Call #: TX501.R48;
ISSN: 0179-5953 [RCTOE4]

Descriptors: pollutants/ food contamination/ toxicology/ literature reviews

This citation is from AGRICOLA.

209. Calibration of pesticide leaching models: Critical review and guidance for reporting.

Dubus, Igor G; Beulke, Sabine; and Brown, Colin D
Pest Management Science 58 (8): 745-758. (2002)
NAL Call #: SB951-.P47;
ISSN: 1526-498X

Descriptors: critical review/ environmental implications/ reporting guidance

Abstract: Calibration of pesticide leaching models may be undertaken to evaluate the ability of models to simulate experimental data, to assist in their parameterisation where values for input parameters are difficult to determine experimentally, to determine values for specific model inputs (eg sorption and degradation parameters) and to allow extrapolations to be carried out. Although calibration of leaching models is a critical phase in the assessment of pesticide exposure, lack of guidance means that calibration procedures default to the modeller. This may result in different calibration and extrapolation results for different individuals depending on the procedures used, and thus may influence decisions regarding the placement of crop-protection products on the market. A number of issues are discussed in this paper including data requirements and assessment of data quality, the selection of a model and parameters for performing calibration, the use of automated calibration techniques as opposed to more traditional trial-and-error approaches, difficulties in the comparison of simulated and measured data, differences in calibration procedures, and the assessment of parameter values derived by calibration. Guidelines for the reporting of calibration activities within the scope of pesticide registration are proposed.
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210. Can cows and fish co-exist.

Fitch, L. and Adams, B. W.
Canadian Journal of Plant Science 78 (2): 191-198. (Apr. 1998)
NAL Call #: 450-C16;
ISSN: 0008-4220 [CPLSAY].
Notes: Paper presented at the Symposium on the Effects of

Agriculture on the Riparian Ecosystem held 1996, Lethbridge, Alberta, Canada. Includes references.
Descriptors: cattle/ freshwater fishes/ rivers/ riparian grasslands/ water quality/ grazing/ habitats/ environmental management/ grassland management/ grazing systems/ watersheds/ productivity/ populations/ wildlife/ degradation/ literature reviews/ water pollution/ Alberta
 This citation is from AGRICOLA.

211. Capillary electrophoresis and electrochromatography of pesticides and metabolites.

Tegeler, Tony and El, Rassi Ziad
Electrophoresis 22 (19): 4281-4293. (2001);
 ISSN: 0173-0835

Descriptors: pesticide metabolites: analysis, detection/ pesticides: analysis, detection, uses
Abstract: Synthetic pesticides are important chemicals since they are widely used to control many types of weeds, insects, and other pests in a wide variety of agricultural and nonagricultural settings. This review article is aimed at describing the recent progress made in capillary electrophoresis (CE) and capillary electrochromatography (CEC) of pesticides and metabolites. The various electrophoretic systems and detection schemes that were introduced during the period extending from the second half of 1999 to the first half of 2001 for the CE and CEC of pesticides are discussed. Also included in this review article are the various approaches for trace enrichment that are involved in the analysis of dilute pesticide samples.
 © Thomson

212. Carabid beetles in sustainable agriculture: A review on pest control efficacy, cultivation impacts and enhancement.

Kromp, B.
Agriculture, Ecosystems and Environment 74 (1/3): 187-228. (June 1999)
 NAL Call #: S601.A34;
 ISSN: 0167-8809 [AEENDO].
Notes: Special issue: Invertebrate biodiversity as bioindicators of sustainable landscapes / edited by M.G. Paoletti. Includes references.
Descriptors: carabidae/ sustainability/ agriculture/ insect control/ efficacy/ farming systems/ fields/ agricultural

land/ ecosystems/ biological control agents/ landscape/ species diversity/ arable land/ trapping/ field experimentation/ colonization/ beneficial insects/ foraging/ insect pests/ habitats/ biological indicators/ plowing/ conservation/ tillage/ weed control/ burning/ green manures/ manures/ nitrogen fertilizers/ plant density/ microclimate/ seasonal variation/ phenology/ intercropping/ literature reviews/ predators of insect pests

Abstract: This review article on carabids in sustainable agro-ecosystems of the temperate Northern hemisphere presents a compilation of the available knowledge on the significance of carabids for natural pest control and the effects of cultivation methods (except pesticides) and landscape structural elements. Field carabids are species rich and abundant in arable sites, but are affected by intensive agricultural cultivation. For sampling, fenced pitfall trapping or pitfall trapping is recommended according to the type of study. Many of the assumed beneficial pest control activities of carabids are still based on laboratory feeding records. In the field, carabids have been demonstrated to reduce cereal and sugar beet aphid populations in their early colonization phase, mainly by foraging on aphids that have fallen from the vegetation. Egg predation on Dipteran eggs, e.g. the cabbage root fly, has been overestimated in earlier literature. Scattered data indicate carabid foraging on certain coleopteran pest larvae. In North America, some evidence has been found for control of pest lepidopterans. Larger carabids, e.g. *Abax parallelepipedus*, can effectively control slugs in greenhouses. Because of their spermatophagous feeding habits, certain species of *Harpalus* and *Amara* could have some potential for biological weed control. As a result of their sensitive reaction to anthropogenic changes in habitat quality, carabids are considered of bioindicative value for cultivation impacts. Carabids seem to be negatively affected by deep ploughing and enhanced by reduced tillage systems. No negative effects have been found for mechanical weed control and flaming. Carabid recruitment is enhanced by proper organic fertilization and green manuring. Intensive nitrogen amendment might indirectly affect

carabids by altering crop density and microclimate. Field carabid assemblages are not bound to a certain crop type, but shift in dominance according to the crop-specific rhythmicity of cultivation measures and changes in crop phenology and microclimate. Crop rotation effects could also be influenced by field-size dependent recolonization capability of carabids. They are enhanced by crop diversification in terms of monocrop heterogeneity and weediness as well as by intercropping and the presence of field boundaries, although corresponding increases in their pest reduction efficacy have not yet been evidenced.
 This citation is from AGRICOLA.

213. Carbon and nutrient cycles.

Delgado, J. A. and Follett, R. F.
Journal of Soil and Water Conservation 57 (6): 455-464. (2002)
 NAL Call #: 56.8-J822;
 ISSN: 0022-4561 [JSWCA3].
Notes: Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001, Myrtle Beach, South Carolina and Charlotte, North Carolina. Includes references.
Descriptors: carbon cycle/ cycling/ nutrients/ nitrogen cycle/ phosphorus/ sulfur/ soil flora/ soil biology/ soil fertility/ soil organic matter/ carbon/ crops/ nutrient uptake/ crop residues/ decomposition/ plant residues/ soil chemistry/ soil organic carbon
 This citation is from AGRICOLA.

214. Carbon distribution and losses: Erosion and deposition effects.

Gregorich, E. G.; Greer, K. J.; Anderson, D. W.; and Liang, B. C.
Soil and Tillage Research 47 (3/4): 291-302. (1998)
 NAL Call #: S590.S48;
 ISSN: 0167-1987
 This citation is provided courtesy of CAB International/CABI Publishing.

215. Carbon sequestration in soils: Some cautions amidst optimism.

Schlesinger, W. H.
Agriculture, Ecosystems and Environment 82 (1/3): 121-127. (Dec. 2000)
 NAL Call #: S601.A34;
 ISSN: 0167-8809 [AEENDO].

Notes: Special issue: Food and forestry: Global change and global challenges / edited by P.J. Gregory and J.S.I. Ingram. Paper presented at a conference held September 1999, Reading, UK. Includes references.
Descriptors: soil/ carbon dioxide/ conservation tillage/ vegetation/ abandoned land/ soil organic matter/ emission/ fertilizers/ irrigation/ biomass/ calcium carbonate/ chemical precipitation/ manures/ literature reviews/ carbon cycle/ revegetation
Abstract: A sink for atmospheric carbon (i.e., CO₂) in soils may derive from the application of conservation tillage and the regrowth of native vegetation on abandoned agricultural land. Accumulations of soil organic matter on these lands could offset emissions of CO₂ from fossil fuel combustion, in the context of the Kyoto protocol. The rate of accumulation of soil organic matter is often higher on fertilized fields, but this carries a carbon "cost" that is seldom assessed in the form of CO₂ emissions during the production and application of inorganic fertilizer. Irrigation of semiarid lands may also produce a sink for carbon in plant biomass, but its contribution to a sink for carbon in soils must be discounted by CO₂ that is emitted when energy is used to pump irrigation water and when CaCO₃ precipitates in the soil profile. No net sink for carbon is likely to accompany the use of manure on agricultural lands.
 This citation is from AGRICOLA.

216. A case for using plethodontid salamanders for monitoring biodiversity and ecosystem integrity of North American forests.
 Welsh, H. H. Jr. and Droege, S.
Conservation Biology 15 (3): 558-569. (2001)
NAL Call #: QH75.A1C5;
ISSN: 0888-8892
 This citation is provided courtesy of CAB International/CABI Publishing.

217. A case for wetland restoration.
 Hey, Donald L. and Philippi, Nancy S.
 New York: Wiley; x, 215 p.: ill. (some col.), maps. (1999)
Notes: "A Wiley-Interscience publication." Includes bibliographical references and index.
NAL Call #: QH75-.H49-1999;
ISBN: 0471176427 (alk. paper)
Descriptors: Wetland conservation/ Wetlands/ Restoration ecology/

Wetland conservation---United States--Case studies
 This citation is from AGRICOLA.

218. Catch crops and green manures as biological tools in nitrogen management in temperate zones.
 Thorup Kristensen, K.; Magid, J.; and Jensen, L. S.
Advances in Agronomy 79: 227-302. (2003)
NAL Call #: 30-Ad9;
ISSN: 0065-2113 [ADAGA7]
Descriptors: nutrient management/ soil fertility/ nutrient availability/ nitrogen/ soil nutrient dynamics
 This citation is from AGRICOLA.

219. Cattle phosphorus requirements may be lowered.
 Paterson, J.
Feedstuffs 75 (16): 11-14. (2003);
ISSN: 0014-9624
 This citation is provided courtesy of CAB International/CABI Publishing.

220. Caveat emptor: Safety considerations for natural products used in arthropod control.
 Trumble, John T
American Entomologist 48 (1): 7-13. (2002)
NAL Call #: QL461.A52;
ISSN: 1046-2821
Descriptors: arthropod (Arthropoda): pest/ insect (Insecta): pest/ Animals/ Arthropods/ Insects/ Invertebrates/ arthropod control/ natural products/ safety considerations
 © Thomson

221. Challenges and opportunities for integrated weed management.
 Buhler, D. D.
Weed Science 50 (3): 273-280. (May 2002-June 2002)
NAL Call #: 79.8-W41;
ISSN: 0043-1745 [WEESA6]
Descriptors: weed control/ integrated pest management/ trends/ cropping systems/ herbicide resistant weeds/ population dynamics/ plant communities/ weed associations/ survival/ literature reviews
Abstract: Despite several decades of modern weed control practices, weeds continue to be a constant threat to agricultural productivity. Herbicide-resistant weeds and weed population shifts continue to generate new challenges for agriculture. Because of weed community complexity, integrated approaches to weed management may help reduce

economic effects and improve weed control practices. Integrated weed management emphasizes the combination of management techniques and scientific knowledge in a manner that considers the causes of weed problems rather than reacts to existing weed populations. The goal of weed management is the integration of the best options and tools to make cropping systems unfavorable for weeds and to minimize the effect of weeds that survive. No single practice should be considered as more than a portion of an integrated weed management strategy. The best approach may be to integrate cropping system design and weed control strategies into a comprehensive system that is environmentally and economically viable. Management decisions must also be made on a site- and time-specific basis. Considering weeds in a broader ecological and management context may lead to the use of a wider range of cultural and management practices to regulate weed communities and prevent the buildup of adapted species. This will help producers manage herbicides and other inputs in a manner that preserves their effectiveness and move weed scientists toward the development of more diverse and integrated approaches to weed management.
 This citation is from AGRICOLA.

222. Challenges and Opportunities for Science in Reducing Nutrient Over-enrichment of Coastal Ecosystems.
 Boesch, D. F.
Estuaries 25 (4b): 886-900. (2002)
NAL Call #: GC96.E79;
ISSN: 0160-8347.
Notes: Special issue: Nutrient Over-enrichment in Coastal Waters: Global Patterns of Cause and Effect
Descriptors: Nutrients (mineral)/ Anoxic conditions/ Eutrophication/ Ecosystem disturbance/ Trophic structure/ Pollution effects/ Estuaries/ Bays/ Coastal waters/ Semi enclosed seas/ Marginal seas/ Pollution monitoring/ Pollution control/ Pollution legislation/ Research/ Aquatic sciences/ Marine sciences/ Coastal states/ World/ Nutrients/ Water management/ Fertilizers/ Legislation/ environmental policy/ Legislation (on water resources)/ Water policy/ Europe/ North America/ Asia/ Oceania/ ANE, Baltic Sea/ ANE,

North Sea/ MED, Adriatic Sea/ MED, Black Sea/ ASW, Mexico Gulf/ INW, Japan, Seto Naikai Sea/ Pollution Control and Prevention/ Prevention and control/ Pollution control/ Environmental action/ Water Resources and Supplies/ General Environmental Engineering

Abstract: Nutrient over-enrichment has resulted in major changes in the coastal ecosystems of developed nations in Europe, North America, Asia, and Oceania, mostly taking place over the narrow period of 1960 to 1980. Many estuaries and embayments are affected, but the effects of this eutrophication have been also felt over large areas of semi-enclosed seas including the Baltic, North, Adriatic, and Black Seas in Europe, the Gulf of Mexico, and the Seto Inland Sea in Japan. Primary production increased, water clarity decreased, food chains were altered, oxygen depletion of bottom waters developed or expanded, seagrass beds were lost, and harmful algal blooms occurred with increased frequency. This period of dramatic alteration of coastal ecosystems, mostly for the worse from a human perspective, coincided with the more than doubling of additions of fixed nitrogen to the biosphere from human activities, driven particularly by a more than 5-fold increase in use of manufactured fertilizers during that 20-year period. Nutrient over-enrichment often interacted synergistically with other human activities, such as overfishing, habitat destruction, and other forms of chemical pollution, in contributing to the widespread degradation of coastal ecosystems that was observed during the last half of the 20th century. Science was effective in documenting the consequences and root causes of nutrient over-enrichment and has provided the basis for extensive efforts to abate it, ranging from national statutes and regulations to multi-jurisdictional compacts under the Helsinki Commission for the Baltic Sea, the Oslo-Paris Commission for the North Sea, and the Chesapeake Bay Program, for example. These efforts have usually been based on a relatively arbitrary goal of reducing nutrient inputs by a certain percentage, without much understanding of how and when this would affect the coastal ecosystem. While some of these efforts have succeeded in achieving reductions of inputs of phosphorus and nitrogen,

principally through treatment of point-source discharges, relatively little progress has been made in reducing diffuse sources of nitrogen. Second-generation management goals tend to be based on desired outcomes for the coastal ecosystem and determination of the load reductions needed to attain them, for example the Total Daily Maximum Load approach in the U.S. and the Water Framework Directive in the European Union. Science and technology are now challenged not just to diagnose the degree of eutrophication and its causes, but to contribute to its prognosis and treatment by determining the relative susceptibility of coastal ecosystems to nutrient over-enrichment, defining desirable and achievable outcomes for rehabilitation efforts, reducing nutrient sources, enhancing nutrient sinks, strategically targeting these efforts within watersheds, and predicting and observing responses in an adaptive management framework.
© Cambridge Scientific Abstracts (CSA)

223. Challenges of pest control with enhanced toxicological and environmental safety. An overview.

Duke, S. O.; Menn, J. J.; and Plimmer, J. R.
ACS Symposium Series (American Chemical Society) (524): 1-13. (1993)
NAL Call #: QD1.A45;
ISSN: 0097-6156 [ACSMC].
Notes: In the series analytic: Pest control with enhanced environmental safety / edited by S.O. Duke, J.J. Menn, and J.R. Plimmer. Includes references.
Descriptors: pest control/ plant protection/ legislation/ microbial pesticides/ pesticides/ genetic engineering/ environmental protection
Abstract: Much of the increase in agricultural productivity over the past half century has been due to more efficacious and economical pest control through the use of synthetic chemical pesticides (SCPs). However, there is continued and growing social and legislative pressure to reduce the toxicological and environmental risks associated with control of agricultural pests with SCPs. Public and private sector research is being conducted to develop biorational pesticides and to replace or reduce the use of SCPs with natural product-based pesticides, biocontrol (including classical biocontrol), genetically-engineered

pest resistance, and combinations of these replacement strategies. Nevertheless, these emerging pest control technologies will likely represent only a small percentage of the pest control market by the year 2000. Therefore, methods to reduce use rates of synthetic pesticides and to develop more environmentally and toxicologically benign pesticides are also important in risk abatement. Such strategies as biorational design, development of pesticide synergists, and development of crops resistant to more environmentally safe herbicides, insects, and plant pathogens can improve the environmental quality, food safety, and allay societal fears concerning crop protection technology.
This citation is from AGRICOLA.

224. Challenging targets for future agriculture.

Kirchmann, H. and Thorvaldsson, G.
European Journal of Agronomy 12 (3/4): 145-161. (2000)
NAL Call #: SB13.E97;
ISSN: 1161-0301
Descriptors: agriculture/ trends/ prediction/ sustainability/ ecosystems/ pesticides/ water/ leaching/ soil fertility/ soil compaction/ emission/ crop quality/ biodiversity/ organic farming/ ethics/ soil degradation/ agricultural research/ health foods/ site specific crop management / cropping systems/ soil biology/ cycling/ literature reviews
This citation is from AGRICOLA.

225. Change in soil carbon following afforestation.

Paul, K. I.; Polglase, P. J.; and Khanna, P. K.
Forest Ecology and Management 168 (1-3): 241-257. (2002)
NAL Call #: SD1.F73;
ISSN: 0378-1127.
Notes: Publisher: Elsevier Science
Descriptors: Land use / Climatic conditions/ Afforestation/ Reforestation/ Soil nutrients/ Carbon cycle/ Forest management/ Pinus radiata/ Monterey pine/ Radiata pine/ Management
Abstract: Quantifying changes in soil C may be an important consideration under large-scale afforestation or reforestation. We reviewed global data on changes in soil C following afforestation, available from 43 published or unpublished studies, encompassing 204 sites. Data were

highly variable, with soil C either increasing or decreasing, particularly in young (10-year) forest stands. Because studies varied in the number of years since forest establishment and the initial soil C content, we calculated change in soil C as a weighted-average (i.e. sum of C change divided by sum of years since forest establishment) relative to the soil C content under previous agricultural systems at 10, >10 and 30cm sampling depths. On average, soil C in the 10cm (or 30cm) layers generally decreased by 3.46% per year (or 0.63% per year) relative to the initial soil C content during the first 5 years of afforestation, followed by a decrease in the rate of decline and eventually recovery to C contents found in agricultural soils at about age 30. In plantations older than 30 years, C content was similar to that under the previous agricultural systems within the surface 10cm of soil, yet at other sampling depths, soil C had increased by between 0.50 and 0.86% per year. Amounts of C lost or gained by soil are generally small compared with accumulation of C in tree biomass. The most important factors affecting change in soil C were previous land use, climate and the type of forest established. Results suggest that most soil C was lost when softwoods, particularly Pinus radiata plantations, were established on ex-improved pastoral land in temperate regions. Accumulation of soil C was greatest when deciduous hardwoods, or N₂-fixing species (either as an understorey or as a plantation), were established on ex-cropped land in tropical or subtropical regions. Long-term management regimes (e.g. stocking, weed control, thinning, fertiliser application and fire management) may also influence accumulation of soil C. Accumulation is maximised by maintaining longer (20-50 years) forest rotations. Furthermore, inclusion of litter in calculations reversed the observed average decrease in soil C, so that amount of C in soil and litter layer was greater than under preceding pasture. © Cambridge Scientific Abstracts (CSA)

226. Changes to the soil environment under conservation tillage.

Johnson, A. M. and Hoyt, G. D. *HortTechnology* 9 (3): 380-393. (July 1999-Sept. 1999)

NAL Call #: SB317.5.H68;
ISSN: 1063-0198
Descriptors: conservation tillage/ soil chemistry/ soil physical properties/ soil biology/ soil degradation/ erosion/ sloping land/ soil water content/ costs/ cultivation/ soil temperature/ soil fertility/ phosphorus/ nutrient availability/ nitrogen/ soil ph/ cation exchange capacity/ base saturation/ nitrogen cycle/ carbon cycle/ soil organic matter/ soil flora/ microbial flora/ cover crops/ losses from soil/ literature reviews
This citation is from AGRICOLA.

227. Channelization and Levee Construction of Illinois: Review and Implications for Management.

Mattingly, R. L.; Herricks, E. E.; and Johnston, D. M. *Environmental Management* 17 (6): 781-795. (1993)
NAL Call #: HC79.E5E5;
ISSN: 0364-152X
Descriptors: streams/ environmental impact/ riparian environments/ United States, Illinois/ environmental impact/ environment management/ river basin management/ dams/ rivers/ environmental effects/ resources management/ channeling/ levees/ construction/ riparian vegetation/ channelization/ levees/ mitigation/ Management/ Law, policy, economics and social sciences/ Protective measures and control/ Conservation/ Ecological impact of water development/ Structures
Abstract: The environmental impact of loss of natural stream and riparian habitat is of concern throughout the United States and Europe. Environmental impacts related to such activities as channelization of and levee construction along streams and rivers are particularly apparent in the Midwestern United States. The objective of the research presented here was to delineate the extent, relative degree of impact, and implications for management of channelization and levee construction along watercourses located in the state of Illinois. According to records maintained through the Illinois Streams Information System data base (Illinois Department of Conservation), nearly 25% of surface water resources in the state have been modified directly by channelization and/or levee construction. Reviews of agency records, elaboration of case histories, interviews with agency personnel, and

inspections of impacted sites indicated that these alterations have occurred without the benefit of effective mitigation. Although permit records may provide suggestions for mitigation to be incorporated in the design of a particular project, permits issued generally do not require even minimal instream habitat and bank stabilization efforts in conjunction with channel alteration. Information derived from policy and case study analyses suggests that institutional constraints, rather than lack of particular understanding about mitigation, provide major barriers to protecting the state's surface water resources in terms of regulatory review, policy interpretation and implementation, and project evaluation. Recommendations for environmental management efforts regarding these and similar channel alterations are elaborated from these findings.
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228. Characteristics of animal wastes and waste-amended soils: An overview of the agricultural and environmental issues.

Sims, J. T. In: *Animal waste and the land-water interface*. Boca Raton, Fla.: Lewis Publishers, 1995; pp. 1-13.
ISBN: 1566701899
NAL Call #: TD930.A55-1995
Descriptors: animal wastes/ soil amendments/ characteristics/ soil fertility/ management/ waste utilization/ pollution/ pollution control/ environmental control/ environmental impact/ waste management
This citation is from AGRICOLA.

229. Characteristics of wood ash and influence on soil properties and nutrient uptake: An overview.

Demeyer, A.; Voundi Nkana, J. C.; and Verloo, M. G. *Bioresource Technology* 77 (3): 287-295. (May 2001)
NAL Call #: TD930.A32;
ISSN: 0960-8524 [BIRTEB].
Notes: Reviews issue. Includes references.
Descriptors: waste utilization/ application to land/ soil fertility/ soil biology/ soil chemistry
This citation is from AGRICOLA.

230. Chemical mixtures: Current risk assessment methodologies and future directions.

Seed, Jennifer; Brown, Ronald P; Olin, Stephen S; and Foran, Jeffery A *Regulatory Toxicology and Pharmacology* 22 (1): 76-94. (1995); ISSN: 0273-2300

Descriptors: biphenyls/ carcinogen/ pesticides/ polychlorinated biphenyls/ toxicity

Abstract: Some of the most challenging problems that toxicologists confront are determining how biological effects of components in a complex mixture may interact, determining how these interactions affect the overall toxicity of the mixture, and determining how to incorporate this information into risk assessments of chemical mixtures. There has been considerable effort in this area since the publication of the U.S. Environmental Protection Agency's guidelines for risk assessment of chemical mixtures in 1986. This paper reviews the terminology used to describe chemical interactions and the methodologies that have been developed for conducting risk assessments of chemical mixtures. Particular attention is directed towards an examination of the applicability and validity of the methods for the assessment of risk posed by exposure to environmentally relevant concentrations of chemical mixtures. Limited, yet compelling, data are reviewed that suggest that for noncancer endpoints, adverse effects are unlikely to occur when the individual components in the mixture are present at levels well below their respective thresholds. Synergistic or antagonistic effects, not readily predicted from the mechanisms of action of the individual components, are possible when the mixture components are present at levels equal to or above their individual thresholds. Finally, synergistic carcinogenic effects have been observed in animal studies of mixtures, even at relatively low doses.
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231. Chemicals from nature for weed management.

Duke, S. O.; Dayan, F. E.; Rimando, A. M.; Schrader, K. K.; Aliotta, G.; Oliva, A.; and Romagni, J. G. *Weed Science* 50 (2): 138-151. (Mar. 2002-Apr. 2002)
NAL Call #: 79.8-W41;

ISSN: 0043-1745 [WEESA6]

Descriptors: weeds/ weed control/ phytotoxicity/ herbicides/ phytotoxins/ mode of action/ pest management/ fish culture/ cyanobacteria/ allelochemicals/ chemical structure/ structure activity relationships/ literature reviews

Abstract: Natural products represent a vast repository of materials and compounds with evolved biological activity, including phytotoxicity. Some of these compounds can be used directly or as templates for herbicides. The molecular target sites of these compounds are often unique. Strategies for the discovery of these materials and compounds are outlined. Numerous examples of individual phytotoxins and crude preparations with weed management potential are provided. An example of research to find a natural product solution of a unique pest management problem (blue-green algae in aquaculture) is described. Finally, the problems associated with natural products for pest control are discussed.

This citation is from AGRICOLA.

232. Chesapeake Bay area nutrient management programs: An overview.

United States. Environmental Protection Agency. Chesapeake Bay Program. Nutrient Subcommittee. Nutrient Management Workgroup. Annapolis, MD: Chesapeake Bay Program; Series: Chesapeake Bay Program technology transfer report; 7 p.: ill. (1996)

Notes: Printed by the Environmental Protection Agency for the Chesapeake Bay Program; "March 1996." "CBP/TRS 143/96, EPA-903-R-96-001"--Cover.

NAL Call #: TD225.C43C45--1996

Descriptors: Nutrient pollution of water---Chesapeake Bay Region---Md and Va/ Water quality management---Chesapeake Bay Region---Md and Va
This citation is from AGRICOLA.

233. Chesapeake Bay riparian handbook: A guide for establishing and maintaining riparian forest buffers.

Palone, Roxane S.; Todd, Albert H.; United States. State and Private Forestry. Northeastern Area; United States. Natural Resources Conservation Service; and United States. Cooperative State Research, Education and Extension Service.

Morgantown, WV: U.S. Dept. of Agriculture, Forest Service, Northeastern Area State & Private Forestry: Natural Resources Conservation Services: Cooperative State Research, Education, and Extension Service; Series: NA-TP 97-02 (Rev. June 1998). (1998)

Notes: Title from web page. "May 1997." Description based on content viewed May 6, 2003. Includes bibliographical references.

NAL Call #: aSB763.A115-N38-no.-97-02

<http://www.chesapeakebay.net/pubs/subcommittee/nsc/forest/riphbk.pdf>

Descriptors: Riparian forests---Chesapeake Bay---Md and Va---Handbooks, manuals, etc/ Riparian ecology---Chesapeake Bay---Md and Va---Handbooks, manuals, etc/ Water quality management---Chesapeake Bay---Md and Va---Handbooks, manuals, etc/ Buffer zones---Ecosystem management---Chesapeake Bay---Md and Va---Handbooks, manuals, etc
This citation is from AGRICOLA.

234. Citronelle ponds: Little-known wetlands of the central Gulf Coastal Plain, USA.

Folkerts, George W *Natural Areas Journal* 17 (1): 6-16. (1997)

NAL Call #: QH76.N37; ISSN: 0885-8608

Descriptors: Kaolinite/ Kaolinite dissolution/ Pond cypress/ Swamp tupelo/ Water fluctuation/ Freshwater ecology/ Habitat/ Forested depression wetland/ Dominant species/ Citronelle ponds/ Conservation/ crustaceans (Crustacea Unspecified)/ insects (Insecta Unspecified)/ Crustacea (Crustacea Unspecified)/ Insecta (Insecta Unspecified)/ Nyssa biflora (Nyssaceae)/ Taxodium ascendens (Coniferopsida)/ angiosperms/ animals/ arthropods/ crustaceans/ dicots/ gymnosperms/ invertebrates/ plants/ spermatophytes/ vascular plants/ Central Gulf coastal plain

Abstract: Citronelle ponds are forested depression wetlands occurring on relatively flat uneroded surfaces of the Citronelle Formation along the Gulf coast of the United States from Mississippi to the central Florida Panhandle. The depressions seem to have formed by the dissolution of kaolinite in the substrate and associated loss of volume. Most are temporarily flooded, typically from early winter to late spring. Soils are

usually of the Grady series. Few depressions have connections with surface or subsurface drainage. Nearly all Citronelle ponds were forested in their primeval state, characteristically supporting pondcypress (*Taxodium ascendens* Brogn.) and swamp tupelo (*Nyssa biflora* (Walt.) Sarg.) as dominants. The fauna consists of species that can tolerate water fluctuation and frequent drying and includes a large diversity of crustaceans and insects. Fishes are seldom present. Most of the ponds are isolated amid lands used for agriculture and forestry. Few remain in anything resembling a natural state. Action to preserve representative Citronelle ponds is urgently needed.

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235. Classical biological control: A critical review of recent programs against citrus pests in Florida.

Michaud, J P

Annals of the Entomological Society of America 95 (5): 531-540. (2002); ISSN: 0013-8746

Descriptors: *Ageniaspis citricola* [brown citrus aphid] (Hymenoptera): pest/ *Lipolexis scutellaris* (Hymenoptera): biological control agent/ *Lysiphlebia japonica* (Hymenoptera): biological control agent/ *Tamarixia radiata* (Hymenoptera): biological control agent/ citrus (Rutaceae): tropical subtropical fruit crop/ Angiosperms/ Animals/ Arthropods/ Dicots/ Insects/ Invertebrates/ Plants/ Spermatophytes/ Vascular Plants/ biological control/ integrated pest management

Abstract: Classical biological control is often considered a cornerstone of integrated pest management, although the introduction of exotic natural enemies can have unpredictable and wide-ranging impacts on native ecosystems. In this article, I question the wisdom of using the classical approach as an automatic first response to invasive pests. I critically evaluate some classical biological control programs recently implemented against invasive pests of citrus in Florida including: *Lysiphlebia japonica* Ashmead and *Lipolexis scutellaris* Mackauer (Hymenoptera: Aphididae) introduced against the brown citrus aphid, *Ageniaspis citricola* Logviniskaya (Hymenoptera: Encyrtidae) against the citrus leafminer, and *Tamarixia*

radiata (Waterston) (Hymenoptera: Eulophidae) against the Asian citrus psyllid. I advance the following contentions: (1) Not all invasive pests are appropriate targets for the classical approach, especially those that lack natural enemies specific to, or effective against them. (2) Some invasive pests may be effectively controlled by generalist predators within a time frame similar to that required for evaluation of introduced parasitoids. (3) The contributions of native species are often ignored when postrelease evaluations focus on introduced species. (4) Parasitism is a highly apparent phenomenon in the field, while predation is less apparent and far more difficult to quantify, an empirical disparity that may generate an undue bias regarding the perceived importance of introduced parasites relative to indigenous predators in biological control. (5) Classical programs have immediate political appeal to agricultural sectors seeking quick solutions to new pest problems, and to the government agencies seeking to respond to their demands for action. Thus, funding incentives for research may be biased toward 'rear and release' classical programs and away from other, ecologically sound approaches to pest management such as conservation biological control. I conclude that classical programs are typically employed as a reflexive response to invasive pests, often without adequate evaluation of the pest as a potential, rather than automatic, target for this approach, and without prerelease surveys to document indigenous natural enemies. A classical program may be embarked on regardless of whether or not suitable candidate species for introduction can be identified, and often without objective postrelease evaluations. The net result is a prevailing tendency to underestimate the potential ecological resiliency of established insect communities to invasive pests.

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236. Clean coastal waters: Understanding and reducing the effects of nutrient pollution.

National Research Council. Committee on the Causes and Management of Eutrophication Washington DC: National Academies Press; 428 p. (2000); ISBN: 0-309-06948-3

<http://www.nap.edu/books/0309069483/html/>

Descriptors: coastal water/ nutrient enrichment/ estuaries/ monitoring/ models/ water quality

237. Clean water and productive rangelands.

Alexander, Susan V.; Shulman, Roberta F.; Terrene Institute; and United States. Environmental Protection Agency. Region VI. Water Quality Management Branch. Washington, DC: Terrene Institute; 15 p.: ill. (some col.). (1994)

Notes: "A challenge for Southwestern ranchers"--Cover. "April 1994."

NAL Call #: SF85.35.A165A44--1994

Descriptors: Rangelands---Southwest---Water supply/ Rangelands---New Mexico---Water supply/ Range management---Southwest/ Range management---New Mexico

This citation is from AGRICOLA.

238. Climate and biological control in organic crops.

Stacey, D. A.

International Journal of Pest Management 49 (3): 205-214. (2003)

NAL Call #: SB950.A1P3;

ISSN: 0967-0874.

Notes: Number of References: 159; Publisher: Taylor & Francis Ltd
Descriptors: Entomology/ Pest Control/ biological control/ climate change/ insect pests/ IPM/ natural enemies/ organic farming/ pesticides/ elevated atmospheric CO2/ insect herbivore interactions/ natural enemies/ *beauveria bassiana*/ winter wheat/ beneficial arthropods/ species composition/ *erynia neophidis*/ *orius laevigatus*/ entomopathogenic fungus
Abstract: Organic farming has increased in popularity in recent years, primarily as a response to the perceived health and conservation benefits. While it is likely that conventional farming will be able to respond rapidly to variations in pest numbers and distribution resulting from climatic change, it is not clear if the same is true for organic farming. Few studies have looked at the responses of biological control organisms to climate change. Here, I review the direct and indirect effects of changes in temperature, atmospheric carbon dioxide and other climatic factors on the predators, parasitoids and pathogens of pest insects in temperate agriculture.

Finally, I consider what research is needed to manage the anticipated change in pest insect dynamics and distributions.

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239. Climate change and its effect on water quality and soil resources.

Ankeny, Iowa: Soil and Water Conservation Society; 2003.

(application/pdf)

<http://www.swcs.org/docs/Climate%20change-final.pdf>

Abstract: The Soil and Water Conservation Society has reviewed the literature and with an expert panel produced a report that connects climate change as a possible cause for set backs in progress, effecting water quality and preservation of soil resources. The report also gives suggestions of what needs to happen to circumvent these set backs. Suggestions include a new way for conservation planning and highlights areas where more information is needed.

240. Climate change and plant disease management.

Melugin, Coakley Stella; Scherm, Harald; and Chakraborty, Sukumar *Annual Review of Phytopathology* 37: 399-426. (1999)

NAL Call #: 464.8 An72;

ISSN: 0066-4286

Descriptors: host pathogen interaction/ disease resistance/ physiological change/ Climatology (Environmental Sciences)/ Pest Assessment Control and Management/ Epidemiology (Population Studies)

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241. Closure of earthen manure structures (including basins, holding ponds and lagoons).

Jones, D. D.; Koelsch, R. K.; Mukhtar, S.; Sheffield, R. E.; and Worley, J. W. In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.

NAL Call #: TD930.2-.W45-2002

Descriptors: Agricultural wastes---Environmental aspects---United States

242. Collaborative planning for wetlands and wildlife: Issues and examples.

Porter, Douglas R. and Salvesen, David.

Washington, DC: Island Press; x, 293 p.: ill., maps. (1995)

NAL Call #: QH76.C65--1995;

ISBN: 1559632879

Descriptors: Wetland conservation---United States---Planning/ Wildlife conservation---United States---Planning

This citation is from AGRICOLA.

243. Combining inferences from models of capture efficiency, detectability, and suitable habitat to classify landscapes for conservation of threatened bull trout.

Peterson, J. T. and Dunham, J.

Conservation Biology 17 (4): 1070-1077. (2003)

NAL Call #: QH75.A1C5;

ISSN: 0888-8892.

Notes: Number of References: 20

Descriptors: Environment/ Ecology

Abstract: Effective conservation efforts for at-risk species require knowledge of the locations of existing populations. Species presence can be estimated directly by conducting field-sampling surveys or alternatively by developing predictive models. Direct surveys can be expensive and inefficient, particularly for rare and difficult-to-sample species, and models of species presence may produce biased predictions. We present a Bayesian approach that combines sampling and model-based inferences for estimating species presence. The accuracy and cost-effectiveness of this approach were compared to those of sampling surveys and predictive models for estimating the presence of the threatened bull trout (*Salvelinus confluentus*) via simulation with existing models and empirical sampling data. Simulations indicated that a sampling-only approach would be the most effective and would result in the lowest presence and absence misclassification error rates for three thresholds of detection probability. When sampling effort was considered, however, the combined approach resulted in the lowest error rates per unit of sampling effort. Hence, lower probability-of-detection thresholds can be specified with the combined

approach, resulting in lower misclassification error rates and improved cost-effectiveness.

© Thomson ISI

244. Commercial application of enzyme technology for poultry production.

Acamovic, T.

World's Poultry Science Journal 57 (3): 225-242. (Sept. 2001)

NAL Call #: 47.8-W89;

ISSN: 0043-9339 [WPSJAO].

Notes: Paper presented at the 21st World's Poultry Congress, August 20-24, 2000, Montreal, Canada. Includes references.

Descriptors: chickens / turkeys/ production costs/ feed grains/ antinutritional factors/ enzyme preparations/ feed additives/ nutrient-nutrient interactions/ O-glycoside hydrolases/ proteinases/ phytase/ esterases/ triacylglycerol lipase/ enzyme activity/ digesta/ viscosity/ digestibility/ poultry manure/ literature reviews

This citation is from AGRICOLA.

245. Comparability of suspended sediment concentration and total suspended solids data.

Gray, John R. and Geological Survey (U.S.).

Reston, Va.: U.S. Dept. of the Interior, U.S. Geological Survey; vi, 14 p.: ill.;

Series: Water-resources investigations report 00-4191. (2000)

Notes: "WRIR 00-4191"--Cover.

"August 2000"--Cover. Includes bibliographical references (p. 12-14).

NAL Call #: GB701-.W375-no.-2000-4191

Descriptors: Suspended sediments---United States/ Water quality---United States

This citation is from AGRICOLA.

246. Comparative study of methods of preparing hydraulic-head surfaces and the introduction of automated hydrogeological-GIS techniques.

Salama, R. B.; Ye, L.; and Broun, J. *Journal of Hydrology* 185 (1/4): 115-136. (Nov. 1996)

NAL Call #: 292.8-J82;

ISSN: 0022-1694 [JHYDA7]

Descriptors: hydrology/ groundwater flow/ saturated flow/ aquifers/ surfaces/ geographical information systems/ automation/ mapping/ maps/ geology/ topography/ water table/ watersheds/ regression analysis/ saturated hydraulic conductivity/

kriging/ wells/ statistical analysis/ western Australia/ New South Wales/ hydrogeomorphic units/ hydrogeology/ reduced water levels/ geostatistics
Abstract: Construction of hydraulic-head surface (HHS) maps is the most commonly used technique for groundwater evaluation. A review of methods used for constructing HHS maps showed that, of the manual methods, the hydrogeological interpretative technique produces a better surface than the equally spaced approach. Geostatistical methods gave similar surfaces to the manual methods; they share the problem of groundwater contours intersecting surface contours and the inability to identify groundwater discharge areas. The results showed that the automated hydrogeological-GIS (geographical information system) techniques, which take into account the hydrogeomorphic and topographic controls, produced the most realistic surfaces. Groundwater contours follow the hydrogeomorphic trends, do not intersect surface contours and can properly identify areas of groundwater discharge. The major advantage of the hydrogeological-GIS technique is the ability to prepare HHS maps with a small number of data points. It is also possible to use regressions from other catchments to prepare HHS maps for catchments with similar hydrogeomorphic characteristics and elevation ranges but which have no data.

This citation is from AGRICOLA.

247. Comparison of Chlorpyrifos Fate and Effects in Outdoor Aquatic Micro- and Mesocosms of Various Scale and Construction.

Leeuwangh, P.

In: Freshwater Field Tests for Hazard Assessment of Chemicals/ Hill, I. R.; Heimbach, F.; Leeuwangh, P.; and Mattiessen, P.

Boca Raton, FL: Lewis Publishers, 1994; pp. 217-248.

Notes: Conference: European Workshop on Freshwater Field Tests, Potsdam (Germany), 25-26 Jun 1992; ISBN: 0-87371-940-9

Descriptors: pesticides/ fate/ pollution effects/ experimental research/ freshwater ecology/ aquatic communities/ literature reviews/ fate of pollutants/ aquatic environment/ literature review/ insecticides/ taxonomy/ water pollution effects/ chlorpyrifos/ aquatic environments/ chlorpyrifos/ Effects on organisms/

Effects of pollution/ Freshwater pollution

Abstract: Various micro- and mesocosms simulating the natural environment have been used to study the fate and effects of the insecticide chlorpyrifos. Literature was reviewed to observe the influence of scale, test design and meteorological conditions on the fate and effects of chlorpyrifos. The disappearance of chlorpyrifos from water is consistent in all studies, despite variation in system dimensions (9 to 450 m super(3)) and in physico-chemical and biological properties. In most studies however, the product has no effect on the physico-chemical characteristics of the water. It is possible that intermesocosm variability, especially that due to the macrophyte biomass at the time of application of the pesticide, obscures subtle effects. The primary effects of chlorpyrifos were consistent in all studies, even though wide differences were apparent in the composition of the main taxonomic groups at the time of application of the pesticide. Indirect effects of chlorpyrifos in micro- and mesocosms are much more variable, in both direction and magnitude. In some, but not all studies, phytoplankton, periphyton, rotifers, oligochaetes, some mollusc taxa and the isopod *Asellus* have shown a tendency to increase in biomass or abundance. Reductions in chlorpyrifos-sensitive invertebrate forage species resulted in transient reduced growth of endemic larval fathead minnows. The complexity of natural ecosystems and the lack of qualitative and quantitative a priori information on trophic structure can make prediction of indirect effects very difficult. In the reviewed literature there were no indications of direct or indirect effects on macrophytes, Coelenterata or Arachnida. No mention was made of other taxa.
 © Cambridge Scientific Abstracts (CSA)

248. Comparison of different techniques to measure ammonia emission after manure application.

Ferm, M. and Institutet for vatten och luftvardsforskning (Sweden).

Goteborg: IVL Swedish Environmental Research Institute; 14 p.: ill.; Series: IVL report B 1383. (2000)

Notes: Cover title. "juni 2000"
 Includes bibliographical references (p. 13-14).

NAL Call #: S654-.C66-2000

Descriptors: Ammonia as fertilizer/ Manure gases/ Ammonia--- Physiological effect
 This citation is from AGRICOLA.

249. Compensation ratios for wetland mitigation.

King, Dennis M.; Bohlen, Curtis C.; and Chesapeake Biological Laboratory. Solomons, Md.: University of Maryland, Center for Environmental and Estuarine Studies, Chesapeake Biological Laboratory; 14 leaves: 1 ill. (1994)

Notes: Subtitle: Guidelines and tables for applying the methodology described in Wetland mitigation: A framework for determining compensation ratios; Cover title. "April 1, 1994." "University of Maryland, CEES working paper UMCEES-CBL-94-10."

NAL Call #: QH76.K563--1994

Descriptors: Wetland conservation--- Mathematical models
 This citation is from AGRICOLA.

250. Competing values and moral imperatives: An overview of ethical issues in biological control.

Lockwood, J. A.

Agriculture and Human Values 14 (3): 205-210. (Sept. 1997)

NAL Call #: HT401.A36;

ISSN: 0889-048X [AHVAED].

Notes: Special issue: Ethical Issues in Biological Control / edited by J.A. Lockwood.

Descriptors: pest management/ biological control/ bioethics/ moral values/ environmental impact/ literature reviews

This citation is from AGRICOLA.

251. The complete book of pesticide management: Science, regulation, stewardship, and communication.

Whitford, Fred.

New York: J. Wiley; Series: Environmental Protection magazine series; xxiv, 787 p.: ill. (2002)

Notes: Contents note: The Evolution of Pesticide Regulations: The Shift From Benefits to Risks / F. Whitford, et al.-- Human Health Risk Assessment: Evaluating Potential Effects of Pesticides on Human / F. Whitford, et al.-- Epidemiology: Validating Human Risk Assessments / F. Whitford, et al.-- Ecological Risk Assessments: Evaluating Pesticide Risks to Nontarget Species / F.

Whitford, et al.-- Water Quality Risk Assessment: Predicting Complex Interactions Between Pesticides and the Environment / F. Whitford, et al.-- Product Development and Registration: Blending Scientific Information into Public Policy Decisions / F. Whitford, et al.-- Pesticide Labels: The Convergence of Science, Public Policy, and User Responsibility / F. Whitford, et al.-- Liabilities and Lawsuits: Understanding Regulations, Inspections, and the Courts / F. Whitford, et al.-- Environmental Site Assessments: Managing the Facility Against Contamination / F. Whitford, et al.-- Occupational Use of Pesticides: Handling Products in the Workplace / F. Whitford, et al.-- Personal Protective Equipment: Selection, Care, and Use / F. Whitford, et al.-- The Employee Bulletin Board: Where Employers Communicate Policies, Procedures, and Practices / F. Whitford, et al.-- Planning for Emergencies: Preventing and Reacting to Emergencies in the Workplace / F. Whitford, et al.-- The Insurance Policy: Protecting Yourself Against the Unexpected / F. Whitford, et al.-- Educating the Community and the Workforce About Hazardous Chemicals / F. Whitford, et al.-- Educating Your Consumer Clientele: A Holistic Approach to Pest Management / F. Whitford, et al.-- Pesticides and Risk Communication: Interactions and Dialogues with the Public / F. Whitford, et al.) -- Today's Discussions, Tomorrow's Issues / F. Whitford, et al.
NAL Call #: RA1270.P4-C65-2002;
ISBN: 0471407283
Descriptors: Pesticides Toxicology/ Pesticides Health aspects/ Pesticides Safety measures/ Health risk assessment/ Pesticides---Government policy---United States
 This citation is from AGRICOLA.

252. Components of dairy manure management systems.
 Horn, H. H. van; Wilkie, A. C.; Powers, W. J.; and Nordstedt, R. A.
Journal of Dairy Science 77 (7): 2008-2030. (1994)
NAL Call #: 44.8 J822;
ISSN: 0022-0302
 This citation is provided courtesy of CAB International/CABI Publishing.

253. Compost as an alternative weed control method.
 Ozores, Hampton Monica
HortScience 33 (6): 938-940. (1998)
NAL Call #: SB1.H6;
ISSN: 0018-5345
Descriptors: weeds (Tracheophyta)/ Plants/ Vascular Plants
 © Thomson

254. Compost utilization for vegetable and fruit crops.
 Roe, Nancy E
HortScience 33 (6): 934-937. (1998)
NAL Call #: SB1.H6;
ISSN: 0018-5345
Descriptors: orange (Rutaceae): fruit crop/ Brassica chinensis [Chinese white cabbage] (Cruciferae): vegetable crop/ Capsicum annuum [Chinese white cabbage] (Solanaceae): vegetable crop/ Daucus carota [tomato] (Umbelliferae): vegetable crop/ Hibiscus esculenta [Chinese white cabbage] (Malvaceae): vegetable crop/ Lycopersicon esculentum [tomato] (Solanaceae): vegetable crop/ Angiosperms/ Dicots/ Plants/ Spermatophytes/ Vascular Plants/ compost utilization/ nutrient uptake
 © Thomson

255. Compost utilization in horticultural cropping systems.
 Stoffella, Peter J. and Kahn, Brian A.
 Boca Raton, Fla.: Lewis Publishers; 414 p.: ill. (2001)
NAL Call #: S661-.C66-2001;
ISBN: 156670460X (alk. paper)
Descriptors: Compost/ Horticulture
 This citation is from AGRICOLA.

256. Compost utilization in vegetable crop production systems.
 Stoffella, P. J.; Ozores-Hampton, M.; Roe, N. E.; Li, Y. C.; and Obreza, T. A.
Acta Horticulturae (No.607): 125-128. (2003)
NAL Call #: 80 Ac82;
ISBN: 0567-757290-6605-986-9
 This citation is provided courtesy of CAB International/CABI Publishing.

257. Composting for feedlot manure management and soil quality.
 Deluca, T H and Deluca, D K
Journal of Production Agriculture 10 (2): 235-241. (1997)
NAL Call #: S539.5.J68;
ISSN: 0890-8524
Descriptors: corn (Gramineae)/ crop

(Angiospermae)/ plant (Plantae Unspecified)/ Zea mays (Gramineae)/ angiosperms/ monocots/ plants/ spermatophytes/ vascular plants/ animal husbandry/ biobusiness/ composting/ feedlot manure management/ miscellaneous method/ soil science
Abstract: Contemporary industrialized grain and livestock production is characterized by efficient, large-scale confined animal feedlot operations (CAFOs) and equally efficient and large-scale, but separate, grain operations. Though both are highly productive, feedlot operators have come to view manure as a waste management problem, while grain operations face declining soil quality and a reliance on commercial fertilizers to maximize yields. Neither type of operation can be considered sustainable. Cooperative on-farm composting may provide solutions to some of the problems facing our industrialized agricultural systems and render the systems more sustainable. In this paper we view cooperative on-farm composting as the combination and processing of feedlot manure with crop stover to produce a beneficial natural soil amendment and fertilizer for those fields from which the stover was taken. Cooperative on-farm composting would help protect surface and groundwater from nutrient loading, save resources, and help renew social ties within the agricultural community. Composting stabilizes nutrients, kills pathogens and weed seeds, reduces moisture content, reduces odor, and improves physical properties of manure, thereby improving its value as a soil amendment and fertilizer. Although some N in raw manure is lost during composting, the end product differs from raw manure in that it exhibits minimal N loss in storage or after field application. Composted manure can become the primary fertilizer for grain production once the cumulative N mineralization from previous applications reach steady-state. The use of composted manure improves soil quality and greatly reduces total energy consumption compared with the use of commercial fertilizer. A hypothetical example illustrates how compost applications to irrigated corn (*Zea mays* L.) could result in a net energy savings of about 3.3 million Btu/acre, which is equivalent to the energy contained in 19.4 gallons of diesel fuel/acre.
 © Thomson

258. Composting for manure management.

Emmaus, Pa.: JG Press; 77 p. (1998)
NAL Call #: S655-.C66-1998;
ISBN: 0932424198
Descriptors: BioCycle/ Manure handling/ Compost---Economic aspects/ Agricultural wastes
 This citation is from AGRICOLA.

259. Composting for the treatment of cattle wastes.

Bujang KB and Lopez Real JM
Compost Science and Utilization 1 (3): 38-40; 8 ref. (1993)
NAL Call #: TD796.5.C58
 This citation is provided courtesy of CAB International/CABI Publishing.

260. Composting manure for value-added products: BioCycle.

Emmaus, Pa.: JG Press; 85 p. (2001)
NAL Call #: S655-.C67-2001;
ISBN: 0932424228
Descriptors: Farm manure/ Manure handling/ Compost/ Organic wastes--- Recycling
 This citation is from AGRICOLA.

261. Composting module: Environmentally assured.

McGuire, Kellie. and National Pork Producers Council (U.S.).
 Des Moines, Iowa: National Pork Producers Council; 78, 7 p.: ill. (1997)
Notes: "Environmental Assurance Program (EAP)." Cover title.
 "Environmentally assured"--cover. Includes bibliographical references.
NAL Call #: TD930-.C67-1997
Descriptors: Animal industry--- Environmental aspects/ Swine--- Carcasses---Environmental aspects/ Compost
 This citation is from AGRICOLA.

262. Composting piggery waste: A review.

Imbeah, M.
Bioresource Technology 63 (3): 197-203. (Mar. 1998)
NAL Call #: TD930.A32;
ISSN: 0960-8524 [BIRTEB]
Descriptors: pig manure
Abstract: For many centuries, composting has been used as a means of recycling organic matter back into the soil to improve soil structure and fertility. The composting process has received much attention in recent years because of pollution concerns and the search for environmentally-sound methods for treating animal waste. The pig industry faces increasing problems

from waste production as intensive pig production increases and pig units become bigger. This paper reviews information on the use of composting for treating piggery waste as a means of addressing the environmental pollution concerns. Ways in which composting has been used for treating pig manure, pig carcasses and pig litter as well as factors influencing the composting process are discussed. Suggestions for possible future applications are also presented.
 This citation is from AGRICOLA.

263. Concept and Determination of Exchangeable Phosphate in Aquatic Sediments.

Aminot, A. and Andrieux, F.
Water Research 30 (11): 2805-2811. (Nov. 1996)
NAL Call #: TD420.W3;
ISSN: 0043-1354
Descriptors: phosphates/ sediment water interfaces/ sediments/ phosphorus/ hydrogen ion concentration/ estuaries/ evaluation/ literature review/ sorption/ comparison studies/ phosphorus cycle/ eutrophication/ sediment chemistry/ sediment water interface/ exchangeable phosphate/ Chemical processes/ Estuaries/ Behavior and fate characteristics/ Freshwater pollution
Abstract: Exchangeable phosphate represents a reservoir of bioavailable phosphorus, since it can be rapidly released into a water body when the soluble phosphate concentration decreases. In the absence of a clear definition we first propose to precisely define exchangeable phosphate with reference to phosphate released in extreme conditions of solid dilution. A survey of the literature indicates that a variety of methods have been developed to provide its determination. The theoretical approach behind the corresponding release experiments is presented to support an evaluation of these methods with respect to the definition given. It appears that most are not based on the rigorous application of thermodynamic principles. Therefore, we have presented an infinite dilution extrapolation (IDE) approach, both rigorous and simple, enabling reliable comparison to be made. The method is based on extraction in natural water or a soluble substitute. The effect of pH was studied. Experimental conditions for use of the described

method have been developed and various side applications are shown such as comparison of the extracting power of extractants. Results of application to estuarine sediments are briefly presented.
 © Cambridge Scientific Abstracts (CSA)

264. The concept of agricultural sustainability.

Schaller, Neill
Agriculture Ecosystems and Environment 46 (1-4): 89-97. (1993)
NAL Call #: S601 .A34;
ISSN: 0167-8809
Descriptors: agriculture/ food production/ profit/ resource management
Abstract: Sustainable agriculture has become a popular code word for an environmentally sound, productive, economically viable, and socially desirable agriculture. This paper reviews reasons for growing interest in agricultural sustainability (mainly the unanticipated, adverse side-effects of conventional farming), examines the proposed ends and means of sustainability, and discusses two issues frequently debated - the profitability of sustainable farming and the adequacy of food production from sustainable systems. The concept of agricultural sustainability does not lend itself to precise definition, partly because it implies a way of thinking as well as of using farming practices, and because the latter cannot be specified as final answers. Consequently, people's beliefs and values will continue to mold public understanding of the concept. Two different views of sustainable agriculture are held. One is that fine-tuning of conventional agriculture - more careful and efficient farming with sensitive technologies - will reduce or eliminate many undesirable effects of conventional agriculture. The other is that fundamental changes in agriculture are needed, requiring a major transformation of societal values. Those who believe that only fine-tuning is needed tend to argue that sustainable farming is inherently unprofitable. If widely adopted, it would not feed the world's expanding population as well as conventional agriculture. Those who see a need for more fundamental changes in conventional systems believe that sustainable farming, on the contrary, can be even more profitable than the

conventional, especially when the calculation of profit counts all of the benefits and costs of farming. Further, resource conservation, protection of the environment, and farming in partnership with nature - all requirements of sustainability - will enhance, not reduce, global food production. Other issues, such as the connections between sustainable farming and the rest of the food and fiber system, and the implications of sustainability for rural communities and society as a whole, have yet to be addressed significantly.
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265. Concepts and directions in arthropod pest management.

Funderburk, J.; Higley, L.; and Buntin, G. D.
Advances in Agronomy 51: 125-172. (1993)
NAL Call #: 30-Ad9;
ISSN: 0065-2113 [ADAGA7]
Descriptors: integrated pest management/ insecticides/ arthropod pests/ crop damage/ economic impact/ pest resistance/ cultural control/ biological control/ population dynamics/ selection pressure/ environmental impact/ ecosystems/ literature reviews/ economic injury level
This citation is from AGRICOLA.

266. Conceptual model and indicators for assessing the ecological condition of agricultural lands.

Hess, George R.; Campbell, C. Lee; Fiscus, Daniel A.; Hellkamp, Anne S.; McQuaid, Betty F.; Munster, Michael J.; Peck, Steven L.; and Shafer, Steven R.
Journal of Environmental Quality 29 (3): 728-737. (2000)
NAL Call #: QH540.J6;
ISSN: 0047-2425.
Notes: Publisher: AMERICAN SOC OF AGRONOMY INC, MADISON, WI, (USA)
Descriptors: Farms/ Ecosystems/ Mathematical models/ Agricultural products/ Productivity/ Environmental protection/ Societies and institutions/ Agricultural lands/ Agroecosystem/ Sustainability/ Agricultural Machinery and Equipment/ Agricultural Machinery and Equipment/ Biology/ Numerical Methods/ Agricultural Products/ Environmental Impact and Protection/ Biology/ Numerical Methods/ Agricultural Products/ Environmental Impact and Protection

Abstract: As part of an environmental monitoring and assessment effort, we developed a conceptual model for measuring and assessing the condition and sustainability of agroecosystems. An agroecosystem is a field, pasture, or orchard and the associated border areas. We focused on ecological sustainability and defined the goals for agroecosystems in terms of the values people place on them. The purpose of an agroecosystem is to produce food and fiber. Other desired outcomes can be considered as goals for the larger landscape and the rest of the world, and they sometimes function as constraints on production. Condition is defined by agroecosystem productivity and the degree to which farmers use management and stewardship practices that conserve and protect valued natural resources in the landscape and the rest of the world. An agroecosystem in good condition is productive and is managed to conserve valued resources. Sustainability is the maintenance of good condition over time. We developed indicators that link system condition and sustainability to societal values and goals. These indicators measure productivity, management practices that promote sustainability at the agroecosystem scale, and management practices that promote sustainability at landscape and global scales. Our initial efforts focused on annually harvested herbaceous crops; however, the concepts we used can be adapted to other plant and livestock systems. Our conceptual approach may be used to evaluate the effectiveness of several major programs now being implemented, including the USDA's Environmental Quality Incentive and Conservation Reserve Programs.
© Cambridge Scientific Abstracts (CSA)

267. Concrete manure storages handbook.

Pedersen, John H.; Runestad, Jay A.; and Midwest Plan Service.
Ames, IA: Midwest Plan Service, Agricultural and Biosystems Engineering Dept., Iowa State University; 70 p.: ill. (1993)
Notes: 1st ed.; "Most of this book updates and compiles information previously published by the Midwest Plan Service"--Pref. "MWPS-36." Includes bibliographical references

(p. [65]) and index.
NAL Call #: S635.P44--1994;
ISBN: 0893730823 (pbk.)
Descriptors: Farm manure---Storage---Handbooks, manuals, etc/ Concrete tanks---Design and construction---Handbooks, manuals, etc
Abstract: This handbook emphasizes planning and design of rectangular and circular concrete manure storages for depths to 14 feet. Designs for rectangular tanks include tanks with open tops, solid tops up to 16 feet wide, and slats up to 12 feet wide. Circular tanks include designs for above- and below-ground open top tanks for diameters up to 120 feet. One appendix includes information on concrete characteristics, and equations and assumptions used in designs. A section with design aids includes useful tables, conversions, and 14 illustrated data sheets to record design decisions. A chapter with example problems shows how to use the tables and data sheets.
© Midwest Plan Service (MWPS)

268. Confined animal production and manure nutrients.

Gollehon, Noel R. and United States. Dept. of Agriculture. Economic Research Service.
Washington, DC: U.S. Dept. of Agriculture, Economic Research Service; iv, 35 p.: col. ill., col. maps; Series: Agriculture information bulletin no. 771. (2001)
Notes: Cover title. "June 2001"--P. [i]. Includes bibliographical references (p. 33-34).
NAL Call #: 1-Ag84Ab-no.-771
<http://www.ers.usda.gov/publications/aib771/>
Descriptors: Confinement farms Waste disposal---United States/ Livestock Manure Handling---United States/ Poultry Manure Handling---United States/ Organic wastes as fertilizer---United States/ Farm manure---Environmental aspects---United States
This citation is from AGRICOLA.

269. Conservation implications of climate change: Soil erosion and runoff from cropland.

Soil and Water Conservation Society (U.S.).
Ankeny, Iowa: Soil and Water Conservation Society; 24 p.: ill., maps. (2003)
Notes: "January 2003." Includes bibliographical references (p. 21-22).
NAL Call #: S624.A1-S642-2003

Descriptors: Soil erosion---United States/ Soil conservation---United States/ Runoff---United States/ Precipitation---Meteorology---United States
This citation is from AGRICOLA.

270. Conservation management of freshwater habitats: Lakes, rivers and wetlands.

Maitland, Peter S. and Morgan, N. C. London; New York: Chapman & Hall; x, 233 p.: ill.; Series: Conservation biology series 9. (1997)
Notes: Includes bibliographical references (p. [207]-223) and index.
NAL Call #: QH75.M34--1997;
ISBN: 0412594102
Descriptors: Wetland conservation/ Fishery conservation/ Wildlife conservation/ Conservation of natural resources/ Freshwater fishes
This citation is from AGRICOLA.

271. Conservation of aquatic insects: Worldwide crisis or localized threats.

Polhemus, D. A.
American Zoologist 33 (6): 588-598. (1993)
NAL Call #: 410-Am3;
ISSN: 0003-1569 [AMZOAF].
Notes: Paper presented at the Symposium, "The Crisis in Invertebrate Conservation," Annual Meeting of the American Society of Zoologists and the Canadian Society of Zoologists, December 27-30, 1992, Vancouver, British Columbia. Includes references.
Descriptors: aquatic insects/ nature conservation/ endangered species/ species diversity/ legislation/ literature reviews/ biodiversity/ ambryusus amargosus
This citation is from AGRICOLA.

272. The conservation of challenge in agriculture and the role of entomologists.

Van Hook, T.
Florida Entomologist 77 (1): 42-73. (Mar. 1994)
NAL Call #: 420-F662;
ISSN: 0015-4040 [FETMAC].
Notes: Symposium: Insect Behavioral Ecology--'93. Includes references.
Descriptors: arthropods/ conservation/ sustainability/ landscape ecology/ environmental education/ legislation/ literature reviews/ biodiversity/ endangered species act
This citation is from AGRICOLA.

273. The Conservation Reserve Program: Opportunities for research in landscape-scale restoration.

Jelinski, D. E. and Kulakow, P. A.
Restoration and Management Notes 14 (2): 137-139. (1996);
ISSN: 0733-0707
Descriptors: research programs/ environmental restoration/ conservation/ agricultural land/ soil conservation/ United States/ agriculture/ cultivated lands/ land management/ Reclamation/ Environmental action/ Watershed protection
© Cambridge Scientific Abstracts (CSA)

274. Conservation tillage: An ecological approach to soil management.

Blevins, R. L. and Frye, W. W.
Advances in Agronomy 51: 33-78. (1993)
NAL Call #: 30-Ad9;
ISSN: 0065-2113
This citation is provided courtesy of CAB International/CABI Publishing.

275. Conservation tillage and depth stratification of porosity and soil organic matter.

Kay, B. D. and VandenBygaert, A. J.
Soil and Tillage Research 66 (2): 107-118. (2002)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

276. Conservation tillage and macropore factors that affect water movement and the fate of chemicals.

Shipitalo, M J; Dick, W A; and Edwards, W M
Soil and Tillage Research 53 (3-4): 167-183. (2000)
NAL Call #: S590.S48;
ISSN: 0167-1987
Descriptors: chemical: transport/ solute: transport/ chemical fate/ groundwater/ leaching/ macropore factors/ preferential flow/ water movement
Abstract: A thorough understanding of how conservation tillage influences water quality is predicted on knowledge of how tillage affects water movement. This paper summarizes the effects of conservation tillage on water movement and quality mainly based on long-term experiments on Luvisols at the North Appalachian

Experimental Watershed near Coshocton, OH, USA. Conservation tillage can have a much larger effect on how water moves through the soil than it does on the total amount percolating to groundwater. Soil macroporosity and the proportion of rainfall moving through preferential flow paths often increase with the adoption of conservation tillage and can contribute to a reduction in surface runoff. In some medium- and fine-textured soils most of the water that moves to the subsoil during the growing season (May-October) is probably transmitted by macropores. If a heavy, intense storm occurs shortly after surface application of an agricultural chemical to soils with well-developed macroporosity, the water transmitted to the subsoil by the macropores may contain significant amounts of applied chemical, up to a few per cent, regardless of the affinity of the chemical for the soil. This amount can be reduced by an order of magnitude or more with the passage of time or if light rainstorms precede the first major leaching event. Because of movement into the soil matrix and sorption, solutes normally strongly adsorbed by the soil should only be subject to leaching in macropores in the first few storms after application. Even under extreme conditions, it is unlikely that the amount of additional adsorbed solute transported to groundwater will exceed a few per cent of the application when conservation tillage is used instead of conventional tillage. In the case of non-adsorbed solutes, such as nitrate, movement into the soil matrix will not preclude further leaching. Therefore, when recharge occurs during the dormant season thorough flushing of the soil, whether macropores are present or not, can move the remaining solutes to groundwater. Thus, the net effect of tillage treatment on leaching of non-adsorbed solutes should be minimal.
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277. Conservation tillage as a tool to improve soil, water and air quality.

Tebbrugge, F.
In: Proceedings 8th International Congress on Mechanization and Energy in Agriculture. (Held 15 Oct 2002-17 Oct 2002 at Kusadasi, Turkey.) Evcim, U.; Bilgen, H.; Degirmencioglu, A.; Demir, V.; Yalcin, H.; and Ozden, K. (eds.)

Ege (Turkey) University, Faculty of Agriculture: Bornova-Izmir, Turkey; pp. 83-86; 2002.

Notes: Document no.: 975-483-560-8
This citation is provided courtesy of CAB International/CABI Publishing.

278. Conservation tillage for carbon sequestration.

Lal, R and Kimble, J M

Nutrient Cycling in Agroecosystems 49 (1-3): 243-253. (1997)

NAL Call #: S631 .F422;

ISSN: 1385-1314

Descriptors: carbon/ agriculture/ agroecosystems/ biobusiness/ burning/ carbon/ conservation tillage/ nutrient cycling/ sequestration/ soil science

Abstract: World soils represent the largest terrestrial pool of organic carbon (C), about 1550 Pg compared with about 700 Pg in the atmosphere and 600 Pg in land biota. Agricultural activities (e.g., deforestation, burning, plowing, intensive grazing) contribute considerably to the atmospheric pool. Expansion of agriculture may have contributed substantially to the atmospheric carbon pool. However, the exact magnitude of carbon fluxes from soil to the atmosphere and from land biota to the soil are not known. An important objective of the sustainable management of soil resources is to increase soil organic carbon (SOC) pool by increasing passive or non-labile fraction. Soil surface management, soil water conservation and management, and soil fertility regulation are all important aspects of carbon sequestration in soil. Conservation tillage, a generic term implying all tillage methods that reduce runoff and soil erosion in comparison with plow-based tillage, is known to increase SOC content of the surface layer. Principal mechanisms of carbon sequestration with conservation tillage are increase in micro-aggregation and deep placement of SOC in the sub-soil horizons. Other useful agricultural practices associated with conservation tillage are those that increase biomass production (e.g., soil fertility enhancement, improved crops and species, cover crops and fallowing, improved pastures and deep-rooted crops). It is also relevant to adopt soil and crop management systems that accentuate humification and increase the passive fraction of

SOC. Because of the importance of C sequestration, soil quality should be evaluated in terms of its SOC content.

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279. Conservation tillage for vegetable production.

Hoyt, G. D.; Monks, D. W.; and Monaco, T. J.

HortTechnology 4 (2): 129-135. (1994)

NAL Call #: SB317.5.H68

This citation is provided courtesy of CAB International/CABI Publishing.

280. Conservation tillage in U.S. agriculture: Environmental, economic, and policy issues.

Uri, Noel D.

New York: Food Products Press; xi, 130 p.: ill. (1999)

Notes: Includes bibliographical references (p. 111-123) and index.

NAL Call #: S604-.U75-1999;

ISBN: 1560228849

Descriptors: Conservation tillage--- United States

This citation is from AGRICOLA.

281. Conservation tillage systems and management: Crop residue management with no-till, ridge-till, mulch-till, and strip-till.

Midwest Plan Service

Ames, IA: Midwest Plan Service. (2000)

Notes: Second edition; Includes bibliographical references and index. "MWPS-45"

NAL Call #: S604 .C675 2000

Descriptors: conservation tillage/ soil erosion/ water erosion/ wind erosion/ crop residues/ costs and returns/ soil compaction/ water quality/ crop management/ nutrient management/ weed control/ disease and pest management/ pesticide application
Abstract: This publication is a resource for those interested in learning about the major benefits of conservation tillage, which include soil erosion management, water conservation, improved soil tilth, lower input costs, and labor efficiency. This edition contains 29 chapters with sections devoted to growing with conservation tillage, tillage system definitions, crop residue and irrigation water management, and water quality. Other chapters discuss residue management at harvest, estimating residue cover, crop response to tillage systems, costs and returns, soil compaction, controlled traffic, and converting CRP to crop production.

More than 60 university and industry specialists including agricultural and biological engineers, extension wildlife specialists, conservationists, entomologists, plant pathologists, weed and soil scientists, and agronomists contributed to the publication.

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282. Conservation-tillage systems for cotton: A review of research and demonstration results from across the cotton belt.

McClelland, M. R.; Valco, T. D.; and Frans, R. E.

In: Special Report - Agricultural Experiment Station, Division of Agriculture, University of Arkansas, No. 160/ McClelland, M. R.; Valco, T. D.; and Frans, R. E., 1993. 121 p.

Notes:

ISSN: 0571-0189

This citation is provided courtesy of CAB International/CABI Publishing.

283. Constructed wetlands and wastewater management for confined animal feeding operations.

Gulf of Mexico Program (U.S.) and Nutrient Enrichment Committee Gainesville, Fla.: CH2MHILL; 23 p.: ill. (1997)

Notes: Cover title. [Author:] "Gulf of Mexico Program, Nutrient Enrichment Issue Committee"--P. [4] of cover. Funded by U.S. Environmental Protection Agency, Gulf of Mexico Program.

NAL Call #: TD756.5.C662--1997

Descriptors: Constructed wetlands--- North America/ Feedlot runoff--- North America/ Agricultural pollution--- North America

This citation is from AGRICOLA.

284. Constructed wetlands for animal waste treatment: A manual on performance, design, and operation with case histories.

CH2M Hill, Inc.; Payne Engineering; Gulf of Mexico Program (U.S.); Nutrient Enrichment Committee; Alabama Soil and Water Conservation Committee; and National Council of the Paper Industry for Air and Stream Improvement (U.S.). Washington, D.C.: U.S. Environmental Protection Agency, Gulf of Mexico Program. (1997)

Notes: "Prepared for the Gulf of Mexico Program Nutrient Enrichment Committee, under a contract to the Alabama Soil and Water Conservation

Committee (ASWCC) and National Council of the Pulp and Paper Industry for Air and Stream Improvement (NCASI). "June 1997." Includes bibliographical references. *NAL Call #:* TD930.2-.C64-1997
Descriptors: Animal waste---Management/ Constructed wetlands/ Mexico, Gulf of---Nutrients
This citation is from AGRICOLA.

285. Constructed wetlands for livestock wastewater management: Literature review, database, and research synthesis.

Gulf of Mexico Program (U.S.); Nutrient Enrichment Committee; CH2MHILL (Firm); and Payne Engineering (Firm)
Washington, D.C.: U.S. Environmental Protection Agency; 1 v. (various pagings): ill. (1997)
Notes: "Prepared under contract to National Council of the Paper Industry for Air and Stream Improvement (NCASI) and Alabama Soil and Water Conservation Committee." "January 1997." Includes bibliographical references.
NAL Call #: TD930.2.C65--1997
Descriptors: Animal waste---Management/ Constructed wetlands
This citation is from AGRICOLA.

286. Constructed wetlands for pollution control: Processes, performance, design and operation.

International Water Association. IWA Specialist Group on Use of Macrophytes in Water Pollution Control.
London: IWA Pub.; xii, 156 p.: ill.; Series: Scientific and technical report (International Water Association) no. 8. (2000)
Notes: Includes bibliographical references (p. 141-149) and index.
NAL Call #: TD756.5-.C76-2000
Descriptors: Constructed wetlands/ Sewage---Purification---Biological treatment
This citation is from AGRICOLA.

287. Constructed Wetlands for Wastewater Treatment.

Sundaravadivel, M. and Vigneswaran, S.
Critical Reviews in Environmental Science and Technology 31 (4): 351-409. (2001)
NAL Call #: QH545.A1C7;
ISSN: 1064-3389
Descriptors: Reviews/ Pollutant removal/ Wastewater treatment/

Wetlands/ Technology/ Tropical environments/ Developing countries/ Biodegradation/ Biodegradation/ Tropical regions/ Water Pollution Treatment/ Artificial Wetlands/ Sewage & wastewater treatment/ Sewage/ Water quality control/ Water & Wastewater Treatment
Abstract: In the field of wastewater treatment, energy-intensive and highly mechanized technologies are giving way to nature-based technologies that utilize solar energy and living organisms. Constructed treatment wetland (CTW) technology has played an important role in bringing about the change. Wetland technology can provide cheap and effective wastewater treatment in both temperate and tropical climates, and are suitable for adoption in both industrialized as well as developing nations. Currently, CTWs are being utilized for removal of a range of pollutants and a broad variety of wastewaters worldwide. The objective of this article is to provide a comprehensive review of the CTW technology and to present the pollutant removal performance experiences gathered through the application of this technology around the world.
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288. Constructed wetlands for wastewater treatment and wildlife habitat: 17 case studies.

United States. Environmental Protection Agency.
Washington, DC: U.S. Environmental Protection Agency; iv, 174 p.: ill. (some col.), maps. (1993)
Notes: Cover title. Shipping list no.: 95-0161-P. "September 1993."
"EPA832-R-93-005." Includes bibliographical references (p. 8-10).
SUDOCs: EP 1.2:W 53/7.
NAL Call #: TD756.5.C65--1993
Descriptors: Constructed wetlands---United States---Case studies/ Sewage---Purification---Biological treatment---United States---Case studies/ Habitat---Ecology---Modification---United States---Case studies
This citation is from AGRICOLA.

289. Constructed wetlands for wastewater treatment in cold climates.

Mander, U. and Jenssen, P. D.
Southampton, UK; Boston: WIT Press; 325 p.: ill., map; Series:

Advances in ecological sciences 1369-8273 (11). (2003)
NAL Call #: QH540-.l67-v.-11;
ISBN: 1853126519
Descriptors: Constructed wetlands---Cold weather conditions/ Sewage---Purification---Biological treatment/ Sewage---Purification---Cold weather conditions
This citation is from AGRICOLA.

290. Constructed wetlands for water quality improvement.

Moshiri, Gerald A.
Boca Raton: Lewis Publishers; 632 p.: ill., maps. (1993)
Notes: Papers presented at the Pensacola conference. Includes bibliographical references and index.
NAL Call #: TD756.5.M67--1993;
ISBN: 0873715500 (acid-free paper)
Descriptors: Constructed wetlands---Congresses/ Water quality management---Congresses/ Constructed wetlands---Case studies---Congresses
This citation is from AGRICOLA.

291. Constructed wetlands in the sustainable landscape.

Campbell, Craig S. and Ogden, Michael
New York: Wiley; xiv, 270 p.: ill., maps. (1999)
Notes: Includes bibliographical references (p. 259-264) and index; Contents note: The concept of sustainable development; The nature of wetland processes / Craig Campbell -- Constructed wetlands and wastewater treatment design; Design, operation, and maintenance of constructed wetlands / Michael Ogden -- Stormwater renovation with constructed wetlands; Single-family residential systems; The pond; Wildlife considerations and management; Art, engineering, and the landscape; Examples of multiple-use constructed wetlands / Craig Campbell.
NAL Call #: TD756.5-.C35-1999;
ISBN: 0471107204 (paper)
Descriptors: Constructed wetlands---Design and construction/ Landscape architecture
This citation is from AGRICOLA.

292. Constructed Wetlands to Treat Wastewater From Dairy and Swine Operations: A Review.

Cronk, J. K.
Agriculture, Ecosystems and Environment 58 (2-3): 97-114. (July 1996)

NAL Call #: S601 .A34;
ISSN: 0167-8809

Descriptors: dairy industry/ wetlands/ wastewater treatment/ waste management/ barn wastewater/ eutrophication/ design standards/ cost analysis/ maintenance/ artificial wetlands/ dairies/ constructed wetlands/ dairy industry/ artificial wetlands/ Wastewater treatment processes/ Pollution control/ Sewage & wastewater treatment

Abstract: Animal wastewater can be a major contributor to the cultural eutrophication of surface waters. Constructed wetlands are under study as a best management practice to treat animal wastewater from dairy and swine operations. Preliminary results are promising when wetlands are a component of a farm-wide waste management plan, but they are ineffective without pretreatment of the wastewater. The feasibility of constructed wetlands varies with waste characteristics and climate. While the cost of wetland construction is low, the site must be maintained in order for the initial investment in the wetland to be worthwhile. In addition, several design iterations may be necessary before effective treatment is obtained. The design of animal wastewater treatment wetlands is still being researched and a number of the present projects will help provide recommendations for the use of constructed wetlands at animal operations.

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293. Constructing wetlands in the Intermountain West: Guidelines for land resource managers.

Olson, Richard Arnold.

Laramie, Wyo.: University of Wyoming; Series: B (Laramie, Wyo.) 1078. (1999)

Notes: Title from title page of source document. Includes bibliographical references.

NAL Call #: 100-W99-1-no.-1078
<http://www.uwyo.edu/ces/PUBS/B-1078.pdf>

Descriptors: Constructed wetlands---West---United States/ Constructed wetlands---Rocky Mountains
This citation is from AGRICOLA.

294. Control of gaseous emissions from livestock buildings and manure stores.

Hartung J and Phillips VR

Journal of Agricultural Engineering Research 57 (3): 173-189; 85 ref. (1994)

NAL Call #: 58.8-J82

This citation is provided courtesy of CAB International/CABI Publishing.

295. Control of Water Pollution from Agriculture.

Ongley, E. D.

Food and Agriculture Organization of the United Nations [Also available as: FAO Irrigation and Drainage Paper 55; ISBN 92-5-103875-9], 1996 (application/pdf)

<ftp://ftp.fao.org/agl/aglw/docs/idp55e.pdf>

Descriptors: water pollution/ water quality/ water resources/ agricultural land/ sustainable agriculture/ sustainable development/ nonpoint source pollution/ agricultural runoff/ irrigation/ fertilizers/ pesticides/ nutrient enrichment/ nitrate nitrogen/ sedimentation/ precipitation/ sediment yield/ erosion control/ environmental models/ environmental monitoring

296. Controlled drainage: Effects on subsurface runoff and nitrogen flows.

Wesstrom, Ingrid.

Uppsala: Swedish University of Agricultural Sciences; 1 v. (various pagings): ill.; Series: Acta Universitatis Agriculturae Sueciae. Agraria 1401-6249 (350). (2002)
Notes: Thesis (doctoral)--Swedish University of Agricultural Sciences, 2002. Includes bibliographical references.

NAL Call #: S419-A28-no.-350;
ISBN: 9157661618

Descriptors: Subirrigation---Sweden/ Drainage---Environmental aspects---Sweden/ Soils---Nitrogen content---Sweden

This citation is from AGRICOLA.

297. Cooling of manure in manure culverts: A method of reducing ammonia emissions in pig buildings.

Andersson, Mats.

Lund: Swedish University of Agricultural Sciences, Dept. of Agricultural, Biosystems and Technology; 40 p.: ill.; Series: Specialmeddelande 218. (1995)

Notes: "SLU-JBT-SPM--218--SE." Includes bibliographical references (p. 35-36).

NAL Call #: TH4911.A1U6--no.218
This citation is from AGRICOLA.

298. Correlating microbes to major odorous compounds in swine manure.

Zhu, J. and Jacobson, L. D.

Journal of Environmental Quality 28 (3): 737-744. (May 1999-June 1999)

NAL Call #: QH540.J6;

ISSN: 0047-2425 [JEVQAA]

Descriptors: pig manure/ odor emission/ bacteria/ literature reviews
Abstract: Malodor generation from swine manure is complicated by the involvement of many bacterial species that produce an extensive array of volatile organic compounds (VOCs). A lack of understanding of the basic manure microbiology further complicates the problem. This review covers pertinent detailed information about the indigenous bacterial genera in swine manure and their potential for producing odorous volatile compounds. It addresses not only the odorous compounds in swine manure but also the relations between bacterial species and the related compounds. It appears that volatile fatty acids may be the major odorous compounds in swine manure, and two bacterial genera, Eubacterium and Clostridium, are most likely the major contributors to these odorous acids. More research is needed to identify the bacterial species within these two genera to better understand the kinetics of malodor production by the bacteria.
This citation is from AGRICOLA.

299. Costs associated with development and implementation of comprehensive nutrient management plans: Nutrient management, land treatment, manure and wastewater handling and storage, and recordkeeping.

United States. Natural Resources Conservation Service.

Washington, D.C.: U.S. Dept. of Agriculture, Natural Resources Conservation Service. (2003)

Notes: Part 1; Title from web page viewed Sept. 30, 2003. "June 2003" Includes bibliographical references.

NAL Call #: aTD930.2-.C67-2003
<http://www.nrcs.usda.gov/technical/land/pubs/cnmp1.html>

Descriptors: Animal waste---
Economic aspects---United States/
Animal feeding---Economic aspects---
United States/ Agricultural pollution---
Economic aspects---United States
This citation is from AGRICOLA.

300. Cover crop effects on soil water relationships.

Unger, P. W. and Vigil, M. F.
Journal of Soil and Water Conservation 53 (3): 200-207. (1998)
NAL Call #: 56.8 J822;
ISSN: 0022-4561
This citation is provided courtesy of CAB International/CABI Publishing.

301. Cover crop impacts on watershed hydrology.

Dabney, S. M.
Journal of Soil and Water Conservation 53 (3): 207-213. (1998)
NAL Call #: 56.8-J822;
ISSN: 0022-4561 [JSWCA3].
Notes: Paper presented at the conference on "Cover Crops, Soil Quality and Ecosystems" held March 12-14, 1997, Sacramento, California. Includes references.
Descriptors: cover crops/ catchment hydrology/ relationships/ evaporation/ runoff/ infiltration/ evapotranspiration/ soil water/ storage/ erosion control/ tillage/ no-tillage/ experimental plots/ watersheds/ soil structure/ subsurface layers/ porosity/ reviews
This citation is from AGRICOLA.

302. Cover crops and rotations.

Reeves, D. W.
In: Crops residue management. Boca Raton, Fla.: Lewis Publishers, 1994; pp. 125-172.
ISBN: 1566700035
NAL Call #: S627.C76C76-1994
Descriptors: cover crops/ rotations/ plant disease control/ pest control/ crop yield/ weed control/ erosion control/ soil physical properties/ rooting depth/ soil water/ nutrients/ nitrogen content/ nitrogen fertilizers/ literature reviews
This citation is from AGRICOLA.

303. The cow as a geomorphic agent: A critical review.

Trimble, S. W. and Mendel, A. C.
Geomorphology 13 (1/4): 233-253. (1996); ISSN: 0169-555X
This citation is provided courtesy of CAB International/CABI Publishing.

304. Created and natural wetlands for controlling nonpoint source pollution.

Olson, Richard K.; United States. Environmental Protection Agency. Office of Research and Development; and United States. Environmental Protection Agency. Office of Wetlands, Oceans and Watersheds. Boca Raton, Fla.: C.K. Smoley; v, 216 p.: ill., maps. (1993)
Notes: "U.S. EPA, Office of Research and Development, and Office of Wetlands, Oceans, and Watersheds." Includes bibliographical references.
NAL Call #: TD223.C73-1993;
ISBN: 0873719433 (alk. paper)
Descriptors: Water quality management---United States/ Water--Pollution---United States/ Wetland conservation---United States/ Constructed wetlands---United States
This citation is from AGRICOLA.

305. Creating freshwater wetlands.

Hammer, Donald A.
Boca Raton, Fla.: CRC Lewis Publishers; 406 p., 8 p. of plates: ill. (some col.). (1997)
Notes: 2nd ed.; Includes bibliographical references (p. 343-353) and index.
NAL Call #: QH87.3.H36--1997;
ISBN: 1566700485 (alk. paper)
Descriptors: Wetlands/ Restoration ecology
This citation is from AGRICOLA.

306. Creative solutions to the animal waste problem.

Zilberman, D.; Metcalfe, M.; and Ogishi, A.
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001. NAL Call #: TD930.2-.W45-2002
Descriptors: Agricultural wastes---Environmental aspects---United States

307. A critical assessment of the sensitivity concept in geomorphology.

Brunsdon, Denys
Catena 42 (2-4): 99-123. (2001)
NAL Call #: GB400.C3;
ISSN: 0341-8162
Descriptors: erosion pattern/ geomorphology/ landform change/ landscape sensitivity/ shock

absorption capacity/ spatial change/ temporal change

Abstract: The landscape sensitivity concept concerns the likelihood that a given change in the controls of a system or the forces applied to the system will produce a sensible, recognisable, and persistent response. The idea is an essential element of the fundamental proposition of landscape stability. This is described as a function of the spatial and temporal distributions of the resisting and disturbing forces and is known as the factor of safety or the stability index. The resistance of a system is defined by the system specifications: its structure, strength properties, transmission linkages, coupling efficiency, shock absorption capacity, complexity and resilience. The disturbing forces include the steady application of energy from the specified tectonic, climatic, biotic, marine and human environmental controls. Change takes place through time and space as a normal process-response function to these specifications and involves material transport, morphological evolution and structural rearrangement. These, in turn, progressively change the system specifications, which alters the performance through time. To make progress with these issues, the nature of waves of aggression, temporal adjustments to disturbing forces, spatial interactions with structure, divergent pathways of change propagation, evolution of 'barriers to change,' effects of inheritance, decoupling, and the effects of change on system specifications all need to be understood at all temporal and spatial scales.
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308. A critical review of the aerial and ground surveys of breeding waterfowl in North America.

Smith, Graham W. and United States. National Biological Service. Washington, D.C.: U.S. Dept. of the Interior, National Biological Service; iii, 252 p.: ill. (1995)
Notes: "July 1995." Includes bibliographical references (p. 26).
NAL Call #: QH301.B5656--no.5
Descriptors: Waterfowl---North America---Breeding
This citation is from AGRICOLA.

309. Crop allelopathy and its role in ecological agriculture.

Batish, D. R.; Singh, H. P.; Kohli, R. K.; and Kaur, S.

Journal of Crop Production 4 (2): 121-161. (2001)

NAL Call #: SB1.J683;
ISSN: 1092-678X [JCPRF8].

Notes: Special issue: Allelopathy in Agroecosystems / edited by R.K. Kohli, H.P. Singh, and D.R. Batish. Includes references.

Descriptors: crops/ allelopathy/ allelopathins/ plant ecology/ ecosystems/ agriculture/ interactions/ growth/ plant development/ crop yield/ phytotoxicity/ phytotoxins/ continuous cropping/ no-tillage/ pollen/ decomposition/ crop residues/ cultivars/ weed control/ pest management/ integrated pest management/ green manures/ sustainability/ literature reviews
This citation is from AGRICOLA.

310. Crop cultivars with allelopathic capability.

Wu, H.; Pratley, J.; Lemerle, D.; and Haig, T.

Weed Research 39 (3): 171-180. (June 1999)

NAL Call #: 79.8-W412;
ISSN: 0043-1737 [WEREAT]

Descriptors: crops/ cultivars/ allelopathy/ plant breeding/ weed control/ biological control/ integrated pest management/ allelochemicals/ growth/ inhibition/ genotypes/ artificial selection/ literature reviews
This citation is from AGRICOLA.

311. Crop management for soil carbon sequestration.

Jarecki, M. K. and Lal, R.

Critical Reviews in Plant Sciences 22 (6): 471-502. (2003)

NAL Call #: QK1.C83;
ISSN: 0735-2689.

Notes: Number of References: 220;
Publisher: CRC Press Llc

Descriptors: Plant Sciences/ Animal & Plant Science/ crop rotation/ greenhouse effect/ global C cycle/ ley farming/ soil fertility/ precision farming/ organic matter turnover/ winter cover crops/ no-tillage corn/ nitrogen fertilization/ aggregate stability/ microbial biomass/ chemical properties/ agroforestry systems/ physical properties/ residue management

Abstract: Reducing emissions of greenhouse gases (GHG) from agriculture is related to increasing and protecting soil organic matter (SOM)

concentration. Agricultural soils can be a significant sink for atmospheric carbon (C) through increase of the SOM concentration. The natural ecosystems such as forests or prairies, where C gains are in equilibrium with losses, lose a large fraction of the antecedent C pool upon conversion to agricultural ecosystems. Adoption of recommended management practices (RMPs) can enhance the soil organic carbon (SOC) pool to fill the large C sink capacity on the world's agricultural soils. This article collates, reviews, and synthesizes the available information on SOC sequestration by RMPs, with specific references to crop rotations and tillage practices, cover crops, ley farming and agroforestry, use of manure and biosolids, N fertilization, and precision farming and irrigation. There is a strong interaction among RMPs with regards to their effect on SOC concentration and soil quality. The new equilibrium SOC level may be achieved over 25 to 50 years. While RMPs are being adapted in developed economies, there is an urgent need to encourage their adoption in developing countries. In addition to enhancing SOC concentration, adoption of RMPs also increases agronomic yield. Thus, key to enhancing soil quality and achieving food security lies in managing agricultural ecosystems using ecological principles which lead to enhancement of SOC pool and sustainable management of soil and water resources.

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312. Crop residue management to reduce erosion and improve soil quality: Appalachia and northeast.

Blevins, R. L.; Moldenhauer, W. C.; and United States. Agricultural Research Service.

Washington, D.C.: U.S. Dept. of Agriculture, Agricultural Research Service; Series: Conservation research report no. 41; v, 97 p.: ill. (1995)

Notes: Distributed by Conservation Technology Information Center (West Lafayette, IN); "August 1995." One folded col. map in pocket. Includes bibliographical references.

NAL Call #: A279.9--Ag8-no.41

Descriptors: Crop residue management---Appalachian Region/ Crop residue management---Northeastern States/

Conservation tillage---Appalachian Region/ Conservation tillage---Northeastern States
This citation is from AGRICOLA.

313. Crop residue management to reduce erosion and improve soil quality: North central.

Moldenhauer, W. C.; Mielke, L. N.; and United States. Agricultural Research Service.

Washington, D.C.: U.S. Dept. of Agriculture, Agricultural Research Service; v, 97 p.: ill.; Series: Conservation research report no. 42. (1995)

Notes: "November 1995." One folded col. map in pocket. Includes bibliographical references; Distributed by Conservation Technology Information Center, West Lafayette, IN

NAL Call #: A279.9--Ag8-no.42

Descriptors: Crop residue management---Middle West/ Conservation tillage---Middle West
This citation is from AGRICOLA.

314. Crop residue management to reduce erosion and improve soil quality: Northern Great Plains.

Moldenhauer, W. C.; Black, A. L.; and United States. Agricultural Research Service.

Washington, D.C.: U.S. Dept. of Agriculture, Agricultural Research Service; v, 84 p.: ill.; Series: Conservation research report no. 38. (1994)

Notes: "September 1994." One folded col. map in pocket. Includes bibliographical references.

NAL Call #: A279.9--Ag8-no.38

Descriptors: Crop residue management---Great Plains/ Conservation tillage---Great Plains
This citation is from AGRICOLA.

315. Crop residue management to reduce erosion and improve soil quality: Northwest.

Papendick, Robert I.; Moldenhauer, W. C.; and United States. Agricultural Research Service.

Washington, D.C.: U.S. Dept. of Agriculture, Agricultural Research Service; iv, 64 p.: ill.; Series: Conservation research report no. 40. (1995)

Notes: "May 1995." One folded col. map in pocket. Includes bibliographical references.

NAL Call #: A279.9--Ag8-no.40

Descriptors: Crop residue management---Northwestern States/ Conservation tillage---Northwestern States
This citation is from AGRICOLA.

316. Crop residue management to reduce erosion and improve soil quality: Southeast.

Langdale, G. W.; Moldenhauer, W. C.; and United States. Agricultural Research Service.

Washington, D.C.: U.S. Dept. of Agriculture, Agricultural Research Service; v, 53 p.: ill.; Series: Conservation research report no. 39. (1995)

Notes: "January 1995"--Cover. One folded col. map in pocket. Includes bibliographical references.

NAL Call #: A279.9--Ag8-no.39

Descriptors: Crop residue management---Southern States/ Conservation tillage---Southern States
This citation is from AGRICOLA.

317. Crop residue management to reduce erosion and improve soil quality: Southern Great Plains.

Stewart, B. A.; Moldenhauer, W. C.; and United States. Agricultural Research Service.

Washington, D.C.: U.S. Dept. of Agriculture, Agricultural Research Service; vi, 70 p.: ill.; Series: Conservation research report no. 37. (1994)

Notes: "September 1994." One folded col. map in pocket. Includes bibliographical references.

NAL Call #: A279.9--Ag8-no.37

Descriptors: Crop residue management---Great Plains/ Conservation tillage---Great Plains
This citation is from AGRICOLA.

318. Crop residues reduce soil erosion.

McGregor, K. C.; Cullum, R. F.; and Mutchler, C. K.

In: ASAE/CSAE-SCGR Annual International Meeting. (Held 18 Jul 1999-21 Jul 1999 at Toronto, Ontario, Canada.)

St. Joseph, Mich.: American Society of Agricultural Engineers (ASAE); pp. 15 pp.; 1999.

Notes: ASAE Paper No. 992045

This citation is provided courtesy of CAB International/CABI Publishing.

319. Cropland reclamation.

Dunker, R. E. and Barnhisel, R. I. In: Reclamation of drastically disturbed lands/ Barnhisel, R. I.; Darmody, R. G.; and Daniels, W. L. Urbana, Illinois: University of Illinois, 2000; pp. 323-369.

ISBN: 0-89118-146-6;

Chapter 13 in monograph.

This citation is provided courtesy of CAB International/CABI Publishing.

320. Crops and Drops: Making the Best Use of Water for Agriculture.

Food and Agriculture Organization, Land and Water Development Division.

Food and Agriculture Organization of the United Nations, 2000

(application/pdf)

<ftp://ftp.fao.org/docrep/fao/005/y3918e/y3918e00.pdf>

Descriptors: water resources/ hydrologic cycle/ water use/ agricultural land/ irrigation/ food production/ food biosecurity/ food supply/ water pollution/ drought/ floods/ sustainable development/ precipitation/ arid lands/ cropping systems/ crop management/ agricultural policy/ water management/ water conservation

321. Cryptosporidium and public health: From watershed to water glass.

Gradus, M. S.

Clinical Microbiology Newsletter

22 (4): 25-32. (2000);

ISSN: 0196-4399

This citation is provided courtesy of CAB International/CABI Publishing.

322. Cryptosporidium Contamination of Water in the USA and UK: A Mini-Review.

Lisle, J. T. and Rose, J. B.

Aqua: Journal of Water Services

Research and Technology 44 (3):

103-117. (1995)

NAL Call #: TD201.A72;

ISSN: 0003-7214

Descriptors: USA/ drinking water/ public health/ water treatment/ water quality control/ bacterial pathogens/ disinfection/ resistance/ parasites/ parasitic diseases/ human diseases/ disease transmission/ hazard assessment/ water supply/ microbial contamination/ water purification/ United States/ British Isles/ Cryptosporidium/ Cryptosporidium/ Sources and fate of pollution/ Public health/ medicines/ dangerous organisms/ water pollution/

water quality/ Freshwater pollution

Abstract: During the past 10 years the protozoan parasite *Cryptosporidium* has been recognised as a public health threat in drinking waters. Recently, the largest outbreak to date occurred in Milwaukee, Wisconsin, USA. Over 1.5 million consumers were exposed to this intestinal pathogen, of which 403 000 became ill. Many of those who were immunocompromised died. The probability of an outbreak of cryptosporidiosis occurring in drinking water systems, relative to that of bacterial and viral pathogens, is increased due to the resistant nature of oocysts to concentrations of disinfectants routinely used in drinking-water treatment. Surveys of surface and drinking waters in the USA and UK have shown *Cryptosporidium* oocysts to be present in polluted, pristine and drinking waters at concentrations that may put the consumer at risk of infection, based upon current risk assessment models. This mini-review is an attempt to present the most recent literature concerning *Cryptosporidium* in regard to outbreaks, occurrence, monitoring and detection, and regulatory implications.

© Cambridge Scientific Abstracts (CSA)

323. Cumulative impact analysis of wetlands using hydrologic indices: Final report.

Nestler, John M.; Long, Katherine S.; and United States. Army. Corps of Engineers. Wetlands Research Program (U.S.).

Vicksburg, MS: U.S. Army Corps of Engineers, Waterways Experiment Station; 19, 17 p.: ill., map; Series:

Wetlands Research Program technical report WRP-SM-3. (1994)

Notes: At head of title: Wetlands Research Program. "Prepared for U.S. Army Corps of Engineers."

"September 1994." Includes bibliographical references (p. 17-19).

NAL Call #: QH541.5.M3N47--1994

Descriptors: Wetlands--- Environmental aspects/ Hydrology--- White River---Ark and Mo/ Stream measurements---Illinois---Cache River
This citation is from AGRICOLA.

324. Cumulative Impacts to Wetlands.

Johnston, C. A.

Wetlands 14 (1): 49-55. (1994)

NAL Call #: QH75.A1W47;

ISSN: 0277-5212

Descriptors: wetlands/ United States/ environmental impact/ forest industry/ agriculture/ literature reviews/ geographic information systems/ environmental effects/ forestry/ geographic information systems/ cumulative impact analysis/ Mechanical and natural changes/ Freshwater pollution/ Effects on water of human nonwater activities/ Environmental degradation

Abstract: "Cumulative impact," the incremental effect of an impact added to other past, present, and reasonably foreseeable future impacts, was reviewed as it pertains to southern forested wetlands. In the U.S., the largest losses of forested wetlands between the 1970s and 1980s occurred in southeastern states that had the most bottomland hardwood to begin with: Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, and South Carolina. These losses were due primarily to forestry and agriculture. Other sources of cumulative impact include decrease in average area of individual wetlands, shift in proportion of wetland types, change in spatial configuration of wetlands, and loss of cumulative wetland function at the landscape scale. For two wetland-related functions, flood flow and loading of suspended solids, watersheds that contained less than 10% wetlands were more sensitive to incremental loss of wetland area than were watersheds with more than 10% wetlands. The relative position of wetlands within a drainage network also influenced their cumulative function. Geographic Information Systems (GIS) are becoming an important tool for evaluating cumulative impacts and their effects.
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325. Current pest management systems for pecan.

Reid, W.

HortTechnology 12 (4): 633-639.

(Oct. 2002-Dec. 2002)

NAL Call #: SB317.5.H68;

ISSN: 1063-0198

Descriptors: carya illinoensis/ integrated pest management/ orchards/ evaluation/ crop management/ seedlings/ low input

agriculture/ cultivars/ intensive farming/ ecology/ monitoring/ populations/ plant pests/ biological control agents / pesticides/ natural enemies/ geographical variation/ literature reviews

Abstract: Pecans (*Carya illinoensis*) are produced under a wide array of environmental conditions-from the warm humid southeastern states, to the continental climate of the central plains, to the arid climates of the American west. In addition, pecan cultural systems vary from the low-input management of native stands of seedling trees to the intensive management of single-cultivar pecan orchards. This wide diversity of pecan agroecosystems has fostered the development of innovative, site-specific approaches toward pecan pest management. Current pecan pest management programs require an intimate knowledge of orchard ecology. Growers use monitoring methods and prediction models to track pest populations. Biological control agents are conserved by habitat manipulation and/or augmented through inoculative releases. Selective pesticides are used to control target pests while conserving natural enemies. Four pecan cultural systems are described in detail to illustrate how ecological principles are applied to widely diverse pecan agroecosystems. This citation is from AGRICOLA.

326. Current strategies in nitrite detection and their application to field analysis.

Dutt, J. and Davis, J.

Journal of Environmental Monitoring

4 (3): 465-471. (2002);

ISSN: 1464-0325

This citation is provided courtesy of CAB International/CABI Publishing.

327. Current United States Department of Agriculture, Agricultural Research Service research on understanding agrochemical fate and transport to prevent and mitigate adverse environmental impacts.

Hapeman, C. J.; McConnell, L. L.; Rice, C. P.; Sadeghi, A. M.; Schmidt, W. F.; McCarty, G. W.; Starr, J. L.; Rice, P. J.; Angier, J. T.; and Harman-Fetcho, J. A.

Pest Management Science 59 (6-7): 681-690. (June 2003-July 2003)

NAL Call #: SB951 .P47;

ISSN: 1526-498X.

Notes: Number of References: 88

Descriptors: Entomology/ Pest Control/ pesticide/ herbicide/ BMPs/ environmental fate/ air quality/ water quality/ sorption/ current use pesticides/ dissolved organic carbon/ methyl bromide emission/ management model: REMM/ plain riparian system/ Nevada mountain range/ silt loam soil/ Chesapeake Bay/ water quality/ metolachlor conformations

Abstract: Environmentally and economically viable agriculture requires a variety of cultivation practices and pest management options as no one system will be appropriate for every situation. Agrochemicals are some of the many pest control tools used in an integrated approach to pest management. They are applied with the intent of maximizing efficacy while minimizing off-site movement; however, their judicious use demands a practical knowledge of their fate and effects in agricultural and natural ecosystems. Agrochemical distribution into environmental compartments is influenced by the physical and chemical properties of the agrochemical and environmental conditions, ie soil type and structure, and meteorological conditions. Agricultural Research Service (ARS) researchers working in the area of agrochemical fate have focused on accurately describing those processes that govern the transport, degradation and bioavailability of these chemicals under conditions reflecting actual agronomic practices. Results from ARS research concerning the environmental fate and effects of agrochemicals have led to the development of science-based management practices that will protect vulnerable areas of the ecosystem. The new challenge is to identify these vulnerable areas and the temporal and spatial variations prior to use of the chemical by predicting how it will behave in environmental matrices, and using that information, predict its transport and transformation within an air- or watershed. With the development of better predictive tools and GIS (Geographic Information System)-based modeling, the risks of agricultural management systems can be assessed at the watershed and basin levels, and management strategies can be identified that

minimize negative environmental impacts.

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328. Dairy farming in the Netherlands in transition towards more efficient nutrient use.

Bruchem, Jaap van; Schiere, Hans; and Keulen, Herman van
Livestock Production Science 61 (2-3): 145-153. (1999)

NAL Call #: SF1.L5;

ISSN: 0301-6226

Descriptors: nitrogen: nutrient/ phosphorus: nutrient/ farm nutrient flow: systems approach/ livestock system sustainability/ nutrient emissions/ nutrient use efficiency: animal conversion, soil uptake

Abstract: In the Netherlands, agriculture as a whole is not environmentally sustainable. It contributes to the emission of greenhouse gases (apprx15%), acid rain (apprx50%) and groundwater pollution (apprx85%). The surplus of phosphate, averaged over the area of cultivated land amounting to apprx40 kg P ha⁻¹, originates apprx30 and apprx40% from dairy farming and pigs, respectively. Nitrogen surpluses, amounting to apprx350 kg ha⁻¹, contribute to ammonia, N₂O and NO_x volatilization and nitrate leaching, levels that exceed present and future standards. Dairy farming contributes apprx55% of the nitrogen losses. Despite their genetic potential and advanced diet formulation, the efficiency with which animals convert nutrients into animal products remains rather low. A major part of the nutrients is excreted in faeces and urine. Hence, there is an urgent need for more sustainable nutrient management at higher hierarchical levels for production systems in which the inputs are tuned to the carrying capacity of the agro- ecosystem and the internal nutrients in animal manure, e.g. N and P, are used more efficiently. The paper discusses the effectiveness of management practices to reduce the nutrient losses, along with aspects of system behaviour. Nutrient flows of dairy farms are analysed and the most effective interventions identified to (1) maintain level of production while (2) reducing the nutrient losses to environmentally acceptable levels. Finally, results/projections of prototype experimental farms are discussed.

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329. Dairying and the environment.

Meyer D

Journal of Dairy Science 83 (7):

1419-1427. (2000)

NAL Call #: 44.8 J822

This citation is provided courtesy of CAB International/CABI Publishing.

330. Databases and simulation modelling in compaction and erosion studies.

Canarache, A. and Simota, C.

Advances in Geocology (35):

495-506. (2002);

ISSN: 0722-0723,

ISBN: 3-923381-48-4

This citation is provided courtesy of CAB International/CABI Publishing.

331. DDT Residues in the Environment: A Review With a New Zealand Perspective.

Boul, H. L.

New Zealand Journal of Agricultural Research 38 (2): 257-277. (1995);

ISSN: 0028-8233

Descriptors: DDT/ pesticide residues/ fate of pollutants/ soil contamination/ New Zealand/ pollutant persistence/ Sources and fate of pollution/ Land pollution

Abstract: The source, form, and fate of DDT residues in the environment are reviewed. Discussion is primarily from a New Zealand perspective, where a major use of DDT was the control of soil-dwelling pasture pests. Reasons for the persistence of DDT residues, the association between residues and soil components, and possible degradative and non-degradative losses from soils are discussed.

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332. Deactivation of the biological activity of paraquat in the soil environment: A review of long-term environmental fate.

Roberts, Terry R; Dyson, Jeremy S;

and Lane, Michael C G

Journal of agricultural and food chemistry 50 (13): 3623-3631. (2002)

NAL Call #: 381 J8223;

ISSN: 0021-8561

Descriptors: paraquat: adsorption, biodegradation, deactivation, herbicide, long term environmental fate/ soil microorganism (Microorganisms) / Microorganisms/ soil environment

Abstract: During the many years of paraquat usage, wide ranges of investigations of its environmental

impact have been conducted. Much of this information has been published, but key, long-term field studies have not previously been presented and assessed. The purpose of this review is to bring together and appraise this information. Due to the nature of paraquat residues in soils, the major part (some 99.99%) of a paraquat application that reaches the soil within the typical Good Agricultural Practice (GAP) is strongly adsorbed to soils of a wide variety of textures. This is in equilibrium with an extremely low concentration in soil solution. However, the paraquat in soil solution is intrinsically biodegradable, being rapidly and completely mineralized by soil microorganisms. The deactivation of the biological activity of paraquat in soils, due to sorption, has been investigated thoroughly and systematically. It is recognized that the determination of total soil residues by severe extraction procedures provides no insight into the amount of paraquat biologically available in soil. Consequently, the key assay developed for this purpose, namely, the strong adsorption capacity-wheat bioassay (SAC-WB) method, has proved to be valuable for determination of the adsorption capacity relevant to paraquat for any particular soil. This method has been validated in the field with a series of long-term (>10 years) trials in different regions of the world. These trials have also shown that, following repeated applications of very high levels of paraquat in the field, residues not only reach a plateau but also subsequently decline. This demonstrates that the known biodegradation of paraquat in soil pore water plays an important role in field dissipation. The biological effects of paraquat in the field have been assessed under unrealistically high treatment regimes. These trials have demonstrated that the continued use of paraquat under GAP conditions will have no detrimental effects on either crops or soil-dwelling flora and fauna. Any such effects can occur only under extreme use conditions (above the SAC-WB), which do not arise in normal agricultural practice.

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333. Declining woody vegetation in riparian ecosystems of the western United States.

Obedzinski, R. A.; Shaw, C. G.; and Neary, D. G.

Western Journal of Applied Forestry 16 (4): 169-181. (Oct. 2001)

NAL Call #: SD388.W6;
ISSN: 0885-6095

Descriptors: riparian vegetation/ woody plants/ ecosystems/ sustainability/ forest health/ forest decline/ introduced species/ invasion/ stress/ mortality/ insect pests/ plant diseases/ drought/ forest fires/ climatic change/ castor/ water availability/ groundwater extraction/ dams/ logging/ forest recreation/ grazing/ urbanization/ literature reviews/ United States

Abstract: Riparian ecosystems serve critical ecological functions in western landscapes. The woody plant components in many of these keystone systems are in serious decline. Among the causes are invasion by exotic species, stress-induced mortality, increases in insect and disease attack, drought, beaver, fire, climatic changes, and various anthropogenic activities. The latter include agricultural development, groundwater depletion, dam construction, water diversion, gravel mining, timber harvesting, recreation, urbanization, and grazing. This article examines the factors implicated in the decline and discusses the importance of interactions among these factors in causing decline. It also clarifies issues that need to be addressed in order to restore and maintain sustainable riparian ecosystems in the western United States, including the function of vegetation, silvics of the woody plant species involved, hydrologic condition, riparian zone structure, and landscape features, geomorphology, and management objectives. This citation is from AGRICOLA.

334. Defining reference conditions for restoration of riparian plant communities: Examples from California, USA.

Harris, Richard R

Environmental Management 24 (1): 55-63. (1999)

NAL Call #: HC79.E5E5;
ISSN: 0364-152X

Descriptors: plants (Plantae)/ Plants/ community composition/ floodplain landforms/ restoration cost estimation/ riparian plant communities/ stream reaches

Abstract: Currently, there is an emphasis on restoration of riparian vegetation in the western United States. Deciding on what and where to restore requires an understanding of relationships between riparian plant communities and their environments along with establishment of targets, or reference conditions, for restoration. Several methods, including off-site data and historical analysis have been used for establishing restoration reference conditions. In this paper, criteria are proposed for interpreting reference community composition and structure from the results of multivariate cluster analysis. The approach is illustrated with data from streams in the California Sierra Nevada, Central Valley, and southern coastal region to derive descriptions of reference communities for stream reaches and floodplain landforms. Cluster analysis results can be used to quantify the areas of both degraded and reference communities within a flood-plain, thereby facilitating restoration cost estimation.

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335. The Degradation of Organophosphorus Pesticides in Natural Waters: A Critical Review.

Pehkonen, S. O. and Zhang, Q.

Critical Reviews in Environmental Science and Technology 32 (1): 17-72. (2002)

NAL Call #: QH545.A1C7;
ISSN: 1064-3389

Descriptors: Organophosphorus compounds/ Agrochemicals/ Pesticides/ Reviews/ Pollutant persistence/ Environmental impact/ Public health/ United States/ Organophosphorus Pesticides/ Degradation/ Water Pollution Effects/ Water Quality Control/ Pesticides (Organophosphorus) / Water pollution control/ Public health/ Environmental protection agencies/ Decomposition/ United States/ Freshwater pollution/ Pesticides/ Sources and fate of pollution / Water Quality

Abstract: Organophosphorus pesticides (OPs) have been widely used throughout the world since the decline in the use of organochlorine pesticides in the 1960s and 1970s. They are less persistent in the environment when compared with organochlorine pesticides and thus pose less long-term health risks to nontarget aquatic organisms and humans. However, in recent years several governmental agencies,

including the USEPA, have started to reconsider the wide use of organophosphorus pesticides due to concern about their effects on the central nervous systems of humans, children in particular. This review discusses the fate of organophosphorus pesticides in the aquatic environment via processes such as adsorption, hydrolysis, oxidation, and photochemical degradation. Furthermore, the breakdown products of OPs are discussed, as new research has indicated that the products of degradation can be very harmful as well and because relatively little research has been carried out on comprehensive product identification. Recommended future research areas are highlighted.

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336. Degradation of pesticides by actinomycetes.

De Schrijver, Adinda and De Mot, Rene

Critical Reviews in Microbiology 25 (2): 85-119. (1999)

NAL Call #: QR1.C7;
ISSN: 1040-841X

Descriptors: pesticides: biotransformations, degradation/ xenobiotics: biotransformations, degradation/ actinomycetes (Actinomycetes and Related Organisms)/ bacteria (Bacteria)/ Bacteria/ Eubacteria/ Microorganisms/ biodegradation/ bioremediation/ cometabolism

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337. Degradation of Pesticides in Subsurface Soils, Unsaturated Zone: A Review of Methods and Results.

Fomsgaard, I. S.

International Journal of Environmental Analytical Chemistry 58 (1-4): 231-245. (1995);

ISSN: 0306-7319.

Notes: Conference: 4. Workshop on Chemistry and Fate of Modern Pesticides, Prague (Czech Rep.), 8-10 Sep 1993; Source: Proceedings of the 4th International Workshop on Chemistry and Fate of Modern Pesticides; Issue editors: Barcelo, D./Hajslova, J./Nielen, M.

Descriptors: water pollution sources/ fate of pollutants/ pesticides/ soil contamination/ groundwater pollution/ degradation/ aeration zone/ subsoil/

groundwater contamination/ Sources and fate of pollution/ Network design/ Land pollution

Abstract: Methods and results from degradation studies in subsoils, unsaturated zone, were reviewed for mecoprop, 2,4-D, atrazine, alachlor, aldicarb, carbofuran, linuron, oxamyl, methomyl, MCPA, dichlorprop, monochlorprop, dichlorophenol, TCA, parathion, metribuzin, metolachlor and fenamiphos. Most of the investigations were laboratory studies where small soil samples were sieved and pesticides were added in concentrations from 0.5-5 mu g/g. A few of the studies mentioned the importance of working with undisturbed samples; another few studies used isotope-labelled pesticides which made it possible to work with concentrations as low as 0.02 mu g/g. Subsoil samples were characterized according to factors as microbial activity, soil temperature, water content, oxygen content, concentration of pesticide, pretreatment of the soil and soil type, factors considered to have influence on degradation of pesticides. Chemical hydrolysis was considered to be the most dominant pathway in the degradation of aldicarb in subsoil in one of the published papers; all other investigations considered the degradation of pesticides in subsoil to be primarily microbiological. Only a few of the investigations measured the biomass or biological activity of the subsoil samples.

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338. Denitrification activity in soils amended with poultry litter.

Johnson, William F.
Fayetteville, Arkansas: University of Arkansas, 1995.
Notes: "August 1995" Thesis (Ph. D.)
NAL Call #: ArU S592.6.N5J64-1995
Descriptors: Soils---Nitrogen content/ Poultry---Manure/ Denitrification/ Nitrous oxide
This citation is from AGRICOLA.

339. Denitrification in Coastal Ecosystems: Methods, Environmental Controls, and Ecosystem Level Controls, a Review.

Cornwell, J. C.; Kemp, W. M.; and Kana, T. M.
Aquatic Ecology 1: 41-54. (1999);
ISSN: 1386-2588.
Notes: Special Issue: Coastal

Eutrophication; Publisher: Kluwer Academic Publishers; DOI: 10.1023/A:1009921414151
Descriptors: Eutrophication/ Pollution effects/ Zoobenthos/ Analytical techniques/ Dissolved oxygen/ Aquatic plants/ Sediment chemistry/ Biogeochemical cycle/ Estuarine chemistry/ Coastal waters/ Literature reviews/ Denitrification/ Estuaries/ Measuring techniques/ Reviews/ United States, Chesapeake Bay/ Ecosystems/ Literature Review/ Sediments/ Aquatic Habitats/ Coastal zone/ Nitrogen/ Nutrient loading/ Biogeochemistry/ Marine environment / ANW, USA, Chesapeake Bay/ Ecosystems and energetics/ Mechanical and natural changes/ Pollution Environment/ Methodology general/ Sources and fate of pollution / Marine Pollution/ Brackish water
Abstract: In this review of sediment denitrification in estuaries and coastal ecosystems, we examine current denitrification measurement methodologies and the dominant biogeochemical controls on denitrification rates in coastal sediments. Integrated estimates of denitrification in coastal ecosystems are confounded by methodological difficulties, a lack of systematic understanding of the effects of changing environmental conditions, and inadequate attention to spatial and temporal variability to provide both seasonal and annual rates. Recent improvements in measurement techniques involving super(15)N techniques and direct N sub(2) concentration changes appear to provide realistic rates of sediment denitrification. Controlling factors in coastal systems include concentrations of water column NO super(-) sub(3), overall rates of sediment carbon metabolism, overlying water oxygen concentrations, the depth of oxygen penetration, and the presence/absence of aquatic vegetation and macrofauna. In systems experiencing environmental change, either degradation or improvement, the importance of denitrification can change. With the eutrophication of the Chesapeake Bay, the overall rates of denitrification relative to N loading terms have decreased, with factors such as loss of benthic habitat via anoxia and loss of submerged aquatic vegetation driving such effects.

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340. Desert grassland and shrubland ecosystems.
Loftin, S. R.; Aguilar, R.; Chung MacCoubrey, A. L.; and Robbie, W. A.
In: Ecology, diversity, and sustainability of the Middle Rio Grande Basin; Fort Collins, Colo.: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, 1995. pp. 80-94.
NAL Call #: aSD11.A42-no.268
Descriptors: grasslands/ shrubs/ ecosystems/ deserts/ geographical distribution/ rangelands/ livestock/ overgrazing/ plant succession/ sustainability/ erosion/ pollution/ water quality/ surface water/ water resources/ geology/ climate/ soil/ hydrology/ plant communities/ vegetation/ wildlife/ land management/ fires/ fire ecology/ literature reviews/ New Mexico
This citation is from AGRICOLA.

341. Design and development of environmental indicators with reference to Canadian agriculture.

McRae, T.; Hillary, N.; MacGregor, R. J.; and Smith, C. A.
In: North American Workshop on Monitoring for Ecological Assessment of Terrestrial and Aquatic Ecosystems / Taller Norteamericano Sobre Monitoreo para la Evaluacion Ecologica de Ecosistemas Terrestres y Acuaticos. (Held 18 Sep 1995-22 Sep 1995 at Mexico City.)
Fort Collins, CO: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station; pp. 118-139; 1996.
NAL Call #: aSD11.A42-no.284
Descriptors: biological indicators/ agriculture/ indicator species/ agricultural land/ ecosystems/ environmental assessment/ natural resources/ spatial variation/ monitoring/ climatic zones/ simulation models/ prediction/ erosion/ resource management/ tillage/ soil degradation/ erosion control/ air pollution/ carbon dioxide/ efficiency/ literature reviews/ Canada
This citation is from AGRICOLA.

342. Design and estimation for investigating the dynamics of natural resources.

Nusser, S. M.; Breidt, F. J.; and Fuller, W. A.
Ecological Applications 8 (2): 234-245. (May 1998)
NAL Call #: QH540.E23;
ISSN: 1051-0761

Descriptors: Resource management/ Resource evaluation/ Sampling/ Land use/ Environmental monitoring/ United States/ temporal variations/ Methodology general/ Management
Abstract: Federal agencies, policy makers, and scientists have long been interested in monitoring natural resources and environmental conditions on a national and regional scale. One of the main objectives of these studies is to estimate temporal changes in the extent and condition of natural resources. In its simplest form, temporal change can be defined as the difference between population parameter values at two time points for a given population. A more complex investigation of change in an ecological system involves studying the underlying dynamics that produce an observed net change. We discuss the general problem of sample design and statistical estimation to support investigations of the dynamics of change in ecological systems, particularly when a limited number of temporal observations are available. We focus on large-scale natural resource monitoring surveys through the example provided by the National Resources Inventory (NRI), a longitudinal survey conducted by the U.S. Department of Agriculture (USDA). Sample design, data collection, and statistical methods for constructing an accessible database are outlined, with emphasis on features that support investigations concerned with temporal dynamics. An example from the 1992 NRI is presented to illustrate methods for investigating temporal changes in land use in relation to observed changes in erosion rates over time. Finally, we discuss how statistical methods developed for the NRI program can be applied more broadly to environmental monitoring studies.
 © Cambridge Scientific Abstracts (CSA)

343. Design and implementation of rapid assessment approaches for water resource monitoring using benthic macroinvertebrates.

Resh, V. H.; Norris, R. H.; and Barbour, M. T.
Australian Journal of Ecology 20 (1): 108-121. (1995)
 NAL Call #: QH540.A8;
 ISSN: 0307-692X
 This citation is provided courtesy of CAB International/CABI Publishing.

344. Design Considerations for Increased Sedimentation in Small Wetlands Treating Agricultural Runoff.

Braskerud, B. C.
Water Science and Technology 45 (9): 77-85. (2002)
 NAL Call #: TD420.A1P7;
 ISSN: 0273-1223.
Notes: Conference: 5. International Conference on Diffuse Pollution, Milwaukee [USA], 10-15 Jun 2001;
 Source: Diffuse/Non-Point Pollution and Watershed Management;
 ISBN: 1843394154
Descriptors: Norway/ Water Pollution Control/ Nonpoint Pollution Sources/ Artificial Wetlands/ Agricultural Runoff/ Sedimentation/ Optimization/ Design Criteria/ Water Depth/ Vegetation/ Data Collections/ Reviews/ Pollution (Nonpoint sources)/ Wetlands/ Runoff (Agricultural)/ Design data/ Norway/ Water quality control/ Water Quality/ Water Pollution: Monitoring, Control & Remediation
Abstract: Some suggestions to increase the sedimentation of non-point source pollution in small surface flow wetlands are presented. The recommendations are based on results from seven Norwegian constructed wetlands (CWs) after 3-7 years of investigation, and a literature review. The wetlands were located in first and second order streams. Surface areas were 265-900 m², corresponding to 0.03-0.4% of the watershed. Each CW had a volume proportional composite sampler in the inlet and outlet, in addition to sedimentation plates. The mean annual retention of soil particles, organic particles and phosphorus was 45-75%, 43-67% and 20-44%, respectively. Results showed that erosion and transportation processes in arable watersheds influenced the retention. Sedimentation was the most important retention process, and increased with runoff, because the input of larger aggregates increased. Retention of nitrogen did not follow the same pattern, and was only 3-15%. Making CWs shallow (0-0.5 m) can optimize sedimentation. The hydraulic efficiency can be increased by aquatic vegetation, large stones in the inlet, baffles and water-permeable, low dams. Vegetation makes it possible to utilize the positive effect of a short particle settling distance, by hindering resuspension of sediments under storm runoff

conditions. As a result, the phosphorus retention in shallow CWs was twice that of deeper ponds.
 © Cambridge Scientific Abstracts (CSA)

345. Design for stream restoration.

Shields, F. D.; Copeland, R. R.; Klingeman, P. C.; Doyle, M. W.; and Simon, A.
Journal of Hydraulic Engineering (ASCE) 129 (8): 575-584. (2003)
 NAL Call #: 290.9 Am3PS (Hy);
 ISSN: 0733-9429
Descriptors: Civil Engineering/ stream improvement/ design/ restoration/ gravel bed rivers/ discharge/ channels/ management/ adjustment/ stability/ geometry/ sediment/ project/ motion
Abstract: Stream restoration, or more properly rehabilitation, is the return of a degraded stream ecosystem to a close approximation of its remaining natural potential. Many types of practices (dam removal, levee breaching, modified flow control, vegetative methods for streambank erosion control, etc.) are useful, but this paper focuses on channel reconstruction. A tension exists between restoring natural fluvial processes and ensuring stability of the completed project. Sedimentation analyses are a key aspect of design since many projects fail due to erosion or sedimentation. Existing design approaches range from relatively simple ones based on stream classification and regional hydraulic geometry relations to more complex two- and three-dimensional numerical models. Herein an intermediate approach featuring application of hydraulic engineering tools for assessment of watershed geomorphology, channel-forming discharge analysis, and hydraulic analysis in the form of one-dimensional flow and sediment transport computations is described.
 © Thomson ISI

346. Detection and enumeration of coliforms in drinking water: Current methods and emerging approaches.

Rompre, Annie; Servais, Pierre; Baudart, Julia; de Roubin, Marie; and Laurent, Patrick
Journal of Microbiological Methods 49 (1): 31-54. (2002)
 NAL Call #: QR65.J68;
 ISSN: 0167-7012

Abstract: The coliform group has been used extensively as an indicator of water quality and has historically led to the public health protection concept. The aim of this review is to examine methods currently in use or which can be proposed for the monitoring of coliforms in drinking water. Actually, the need for more rapid, sensitive and specific tests is essential in the water industry. Routine and widely accepted techniques are discussed, as are methods which have emerged from recent research developments. Approved traditional methods for coliform detection include the multiple-tube fermentation (MTF) technique and the membrane filter (MF) technique using different specific media and incubation conditions. These methods have limitations, however, such as duration of incubation, antagonistic organism interference, lack of specificity and poor detection of slow-growing or viable but non-culturable (VBNC) microorganisms. Nowadays, the simple and inexpensive membrane filter technique is the most widely used method for routine enumeration of coliforms in drinking water. The detection of coliforms based on specific enzymatic activity has improved the sensitivity of these methods. The enzymes beta-D galactosidase and beta-D glucuronidase are widely used for the detection and enumeration of total coliforms and *Escherichia coli*, respectively. Many chromogenic and fluorogenic substrates exist for the specific detection of these enzymatic activities, and various commercial tests based on these substrates are available. Numerous comparisons have shown these tests may be a suitable alternative to the classical techniques. They are, however, more expensive, and the incubation time, even though reduced, remains too long for same-day results. More sophisticated analytical tools such as solid phase cytometry can be employed to decrease the time needed for the detection of bacterial enzymatic activities, with a low detection threshold. Detection of coliforms by molecular methods is also proposed, as these methods allow for very specific and rapid detection without the need for a cultivation step. Three molecular-based methods are evaluated here: the immunological, polymerase chain reaction (PCR) and in-situ

hybridization (ISH) techniques. In the immunological approach, various antibodies against coliform bacteria have been produced, but the application of this technique often showed low antibody specificity. PCR can be used to detect coliform bacteria by means of signal amplification: DNA sequence coding for the lacZ gene (beta-galactosidase gene) and the uidA gene (beta-D glucuronidase gene) has been used to detect total coliforms and *E. coli*, respectively. However, quantification with PCR is still lacking in precision and necessitates extensive laboratory work. The FISH technique involves the use of oligonucleotide probes to detect complementary sequences inside specific cells. Oligonucleotide probes designed specifically for regions of the 16S RNA molecules of Enterobacteriaceae can be used for microbiological quality control of drinking water samples. FISH should be an interesting viable alternative to the conventional culture methods for the detection of coliforms in drinking water, as it provides quantitative data in a fairly short period of time (6 to 8 h), but still requires research effort. This review shows that even though many innovative bacterial detection methods have been developed, few have the potential for becoming a standardized method for the detection of coliforms in drinking water samples. This citation is from AGRICOLA.

347. Detection and occurrence of indicator organisms and pathogens.

Baker, K. H.
Water Environment Research 67 (4): 406-410. (1995)
 NAL Call #: TD419.R47;
 ISSN: 1061-4303
Descriptors: literature review/ bioindicators/ bacteria/ Protozoa/ viruses/ pathogens/ drinking water/ wastewater/ analytical methods/ microbiological analysis/ pollution detection/ pollutant identification/ pollution indicators/ indicator species/ analytical techniques/ wastewater/ water pollution/ protozoa/ Identification of pollutants/ Freshwater pollution/ water pollution/ water quality/ Methods and instruments
Abstract: This review covers the detection and occurrence of bacterial, protozoan and viral indicator organisms and pathogens in drinking water and wastewater. In view of the continued emergence of infections

carried by water-borne routes, opportunistic pathogens and non-traditional indicators are included also.
 © Cambridge Scientific Abstracts (CSA)

348. Detection and occurrence of indicator organisms and pathogens.

Baker, Katherine H and Bovard, Debrah S
Water Environment Research 68 (4): 406-416. (1996)
 NAL Call #: TD419.R47;
 ISSN: 1061-4303
Descriptors: biosolids/ indicator organism/ pollution control/ water pollution/ water quality/ invertebrate (Invertebrata Unspecified)/ microorganism (Microorganisms Unspecified)/ protozoa (Protozoa Unspecified)/ viruses (Viruses General)/ Invertebrata (Invertebrata Unspecified)/ animals/ invertebrates/ microorganisms/ protozoans
 © Thomson

349. Detection and occurrence of indicator organisms and pathogens.

Baker, K. H. and Hegarty, J. P.
Water Environment Research 69 (4): 403-415. (June 1997)
 NAL Call #: TD419.R47;
 ISSN: 1061-4303
Descriptors: literature review/ pathogens/ pollutant identification/ monitoring/ bioindicators/ analytical methods/ risk/ water sampling/ microorganisms/ reviews/ indicator species/ pollution monitoring/ risk assessment/ *Escherichia coli*/ literature reviews/ pollution indicators/ pollution detection/ microbial contamination/ public health/ *Escherichia coli*/ Identification of pollutants/ Environmental/ Freshwater pollution/ Public health/ medicines/ dangerous organisms
Abstract: Geldrich (1996) reviewed the detection and occurrence of pathogenic organisms, including bacteria, enteric viruses, protozoa, and parasitic worms, in freshwater supplies. He summarized an enormous amount of data on the sources of these organisms, their occurrence, and their detection in water supplies. Because routine monitoring for pathogens is often unrealistic, Geldrich argued that the use of indicator organisms, specifically coliforms and fecal coliforms, should be the mainstay of

routine monitoring programs. He suggested that the lack of correlation between these organisms and pathogens such as protozoa and viruses may be a reflection of the vast difference in sample sizes used for the analysis (100 mL for coliforms versus greater than 1 L for viruses and protozoa) and recommended that the standard sample size for analysis of indicator organisms should be increased. Finally, Geldrich presented several case studies of waterborne disease outbreaks with a complete discussion of not only the source of the pathogenic organisms but also the measures that were successful in controlling the outbreaks. Gale (1996), in a review of microbial risk assessment, also addressed the difficulties in comparing densities of indicator organisms from samples of different volumes. As he noted, current information on the occurrence of pathogens in drinking water supplies is only available for sample volumes significantly larger than the amount ingested daily by any individual, and little information is available on how organisms are dispersed within these large volumes. This makes the estimation of risk to the individual consumer difficult, if not impossible, to determine. Dufour (1996) and Edberg (1996) reviewed water and wastewater microbiology. Both emphasized the importance of enzymatic and molecular techniques in the detection and enumeration of indicator bacteria. Busse et al. (1996) reviewed the techniques available for the identification of bacteria. In addition to the traditional biochemical and physiological tests, they discussed more recent chemotaxonomic approaches such as analysis of quinone system, fatty acid profiles, polar lipid patterns, polyamine patterns, whole cell sugars, and peptidoglycan diamino acids; analytical fingerprinting and cellular protein patterning; and nucleic acid techniques such as 16S rDNA (deoxyribonucleic acid) sequencing, restriction fragment length polymorphism (RFLP), macrorestriction analysis, and random amplified polymorphic DNA (RAPD). © Cambridge Scientific Abstracts (CSA)

350. Detection and occurrence of indicator organisms and pathogens.

Baker, Katherine H
Water Environment Research 70 (4): 405-418. (1998)
 NAL Call #: TD419.R47;
 ISSN: 1061-4303
Descriptors: bacteria (Bacteria): pollution indicator/ coliforms (Enterobacteriaceae): pollution indicator/ protozoa (Protozoa): pollution indicator/ viruses (Viruses): pollution indicator/ Animals/ Bacteria/ Eubacteria/ Invertebrates/ Microorganisms/ Protozoans/ Viruses/ groundwater/ microbial contamination/ pathogens/ recreational water/ water contamination/ water quality
 © Thomson

351. Detection and Occurrence of Waterborne Bacterial and Viral Pathogens.

Black, E. K. and Finch, G. R.
Water Environment Research 65 (6): 295-299. (1993)
 NAL Call #: TD419.R47
Descriptors: Literature review/ Pathogenic bacteria/ Pathogens/ Pollutant identification/ Reviews/ Viruses/ Waterborne diseases/ AIDS/ Aeromonas/ Coliforms/ Cryptosporidium/ Drinking water/ Enteric bacteria/ Escherichia coli/ Giardia/ Groundwater/ Immunoassay/ Mycobacterium/ Protozoa/ Public health/ Salmonella/ Surface water/ Wastewater/ Identification of pollutants/ Sources and fate of pollution
Abstract: The occurrence and detection of waterborne pathogens in drinking water, surface water, groundwater, and wastewater is important to world health as shown by numerous epidemics that have caused disease in humans. The most frequently reported bacteria in drinking water, surface water, groundwater, and wastewater were *Escherichia coli*, followed by the coliform group. Surveys have shown seasonal variation in bacterial pathogens in surface waters and correlations between total coliforms and other pathogenic bacteria. Surveys of river water and recreational water showed that virus levels varied throughout the year. The infectivity of viruses from lawns irrigated with wastewater was examined using an animal model. Fewer piglets exposed for 2 hr to

lawns irrigated with 40,000 50% cell-culture infectious dose (CCID50) virus particles became positive than piglets inoculated with 100 CCID50 virus particles. The survival of human immunodeficiency viruses in wastewater was less than that of polio viruses. The survival of the protozoan *Cryptosporidium parvum* was robust in all water types examined. Viable but non-culturable organisms present a problem when detecting organisms in water. Pre-enrichment and selective enrichment of samples, as well as the newer technologies of gene probes and immunoassays, improve the detection of injured and stressed organisms. Developments in gene probe and immunoassay technologies are making these detection methods more accessible to routine water analysis laboratories. Immunoassays can detect toxins produced by organisms or the organisms themselves, however, viability determination of the detected cells is not reliable. A new technology that shows promise is the combined use of conductance and immunology. Beads coated with the antigen for a specific pathogen are exposed to the organism. After a short incubation, the beads are separated, washed, and re-suspended in broth. The change in conductance of the broth is measured, and the resulting curve is specific for the organism. Characteristic substances produced by *Mycobacterium* species have been detected by gas chromatography-mass spectrometry. (Geiger-PTT) 35 001232021
 © Cambridge Scientific Abstracts (CSA)

352. Detection of endocrine-disrupting pesticides by enzyme-linked immunosorbent assay (ELISA): Application to atrazine.

Gascon, Jordi; Oubina, Anna; and Barcelo, Damia
Trends in Analytical Chemistry 16 (10): 554-562. (1997)
 NAL Call #: QD71.T7;
 ISSN: 0165-9936
Descriptors: atrazine: endocrine disrupting pesticide
Abstract: An overview of biological and toxicological effects of relevant endocrine-disrupting compounds is given. Special attention is paid to the determination of atrazine, a relevant pesticide that is considered an endocrine disrupter, by ELISA.
 © Thomson

353. Determination of odour emission rates from cattle feedlots: A review.

Smith, R. J. and Watts, P. J.
Journal of Agricultural Engineering Research 57 (3): 145-155.

(Mar. 1994)

NAL Call #: 58.8-J82;

ISSN: 0021-8634 [JAERA2].

Notes: Subtitle: [Part] I.

Descriptors: cattle/ feedlots/ odor emission/ odor abatement/ measurement/ wind tunnels/ models/ air pollution

This citation is from AGRICOLA.

354. Determining the 'health' of estuaries: Priorities for ecological research.

Fairweather, Peter G
Australian Journal of Ecology 24 (4): 441-451. (1999)

NAL Call #: QH540.A8;

ISSN: 0307-692X

Descriptors: algae (Algae)/ shipworm (Oligochaeta)/ Algae/ Animals/ Annelids/ Invertebrates/ Microorganisms / Nonvascular Plants/ Plants/ ecosystem health / environmental assessment/ mangrove leaf decomposition/ predator prey interactions/ soft sediment habitat

Abstract: 'Ecosystem health' is a relatively new concept for environmental science and management. Although at least two international journals use the term in their titles, there have been few applications of it for estuaries and soft-sediment habitats around the world. In this paper I: (i) introduce the ideas behind ecosystem health, and assess their relation with other usage such as 'integrity' or 'quality'; (ii) sketch the sorts of multidisciplinary studies that could contribute to an assessment of health of an estuary and how these must be approached in developing useful indicators; and (iii) make a case for including measurements of the rates of ecological processes in such an assessment. These rate measurements, termed 'ecoassays', focus on important processes such as decomposition, recruitment, predator-prey interactions, and the like. A case study is introduced wherein these processes were assessed in mangrove stands of estuaries around Sydney, New South Wales, by explicitly comparing the rates of herbivory and decomposition of mangrove leaves, attack of fallen wood by shipworms, and colonization

of pneumatophores by algae, as well as with more traditional estimates of 'standing stocks'. Not surprisingly, the different measures retrieved various patterns and the challenge now is to integrate these into a scheme that indicates something of value. The potential utility of such measures is discussed in relation to the various scientific and managerial requirements of environmental monitoring.
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355. Developing an invertebrate index of biological integrity for wetlands.

Helgen, Judy.; United States. Environmental Protection Agency. Office of Science and Technology; and United States. Environmental Protection Agency. Office of Wetlands, Oceans and Watersheds.

In: *Methods for evaluating wetland condition*; Washington, D.C.: U.S. Environmental Protection Agency, Office of Water, 2002.

Notes: Original title: Developing an invertebrate index of biological integrity for wetlands (#9); Title from web page. "March 2002." "EPA-822-R-02-019." Description based on content viewed April 10, 2003. "Prepared jointly by U.S. Environmental Protection Agency, Health and Ecological Criteria Division (Office of Science and Technology) and Wetlands Division (Office of Wetlands, Oceans, and Watersheds)" Includes bibliographical references.

NAL Call #: QH541.5.M3-H46-2002
<http://www.epa.gov/waterscience/criteria/wetlands/9Invertebrate.pdf>

Descriptors: Wetlands---United States/ Aquatic invertebrates---Environmental aspects---United States

This citation is from AGRICOLA.

356. Developing indicators for monitoring catchment health: The challenges.

Reuter, D. J.
Australian Journal of Experimental Agriculture 38 (7): 637-648. (1998)

NAL Call #: 23-Au792;

ISSN: 0816-1089.

Notes: In the special issue: Moving towards precision with soil and plant analysis. Proceedings of the Second National Conference and Workshops of the Australian Soil and Plant Analysis Council, November 23-26, 1997, Launceston, Tasmania. Includes references.

Descriptors: watersheds/ watershed management/ indicators/ soil analysis/ plant analysis/ monitoring/ sustainability/ literature reviews/ Australia/ catchment health indicators/ ecosystem health

This citation is from AGRICOLA.

357. Developing metrics and indexes of biological integrity.

Teels, Billy M.; Adamus, Paul R.; United States. Environmental Protection Agency. Office of Science and Technology; and United States. Environmental Protection Agency. Office of Wetlands, Oceans and Watersheds.

In: *Methods for evaluating wetland condition*; Washington, D.C.: U.S. Environmental Protection Agency, Office of Science and Technology and Office of Wetlands, Oceans and Watersheds, 2002.

Notes: Original title: Developing metrics and indexes of biological integrity (#6); Title from web page. "March 2002." "EPA-822-R-02-016." Description based on content viewed April 10, 2003. Includes bibliographic references.

NAL Call #: QH541.15.E22-T44-2002
<http://www.epa.gov/waterscience/criteria/wetlands/6Metrics.pdf>

Descriptors: Ecological assessment--United States/ Ecological integrity--United States/ Wetlands---United States

This citation is from AGRICOLA.

358. Development of alternative weed management strategies.

Buhler, D. D.
Journal of Production Agriculture 9 (4): 501-505. (1996)

NAL Call #: S539.5.J68;

ISSN: 0890-8524

This citation is provided courtesy of CAB International/CABI Publishing.

359. Development of composting technology in animal waste treatment: Review.

Haga K
Asian Australasian Journal of Animal Sciences 12 (4): 604-606; 3 ref. (1999)

NAL Call #: SF55.A78A7

This citation is provided courtesy of CAB International/CABI Publishing.

360. Development of environmentally superior technologies: Two-year progress report for technology determination per agreements between the Attorney General of North Carolina and Smithfield Foods, Premium Standards Farms and Frontline Farmers.

Williams, C. M.
Raleigh, N.C.: North Carolina State University. (2002)
NAL Call #: TD930.2 .W56 2002
<http://www.cals.ncsu.edu/agcomm/waste/report.pdf>

Descriptors: Animal waste---North Carolina---Management/ Swine---Housing---Waste disposal---North Carolina/ Water quality management---North Carolina/ Livestock---Housing---Odor control---North Carolina/ Farm manure, Liquid---Odor control---North Carolina/ Feedlot runoff---North Carolina---Measurement/ Feedlots---Environmental aspects---North Carolina

This citation is from AGRICOLA.

361. The development of improved willow clones for eastern North America.

Kopp, R. F.; Smart, L. B.; Maynard, C. A.; Isebrands, J. G.; Tuskan, G. A.; and Abrahamson, L. P.

Forestry Chronicle 77 (2): 287-292. (Mar. 2001-Apr. 2001)

NAL Call #: 99.8-F7623;
ISSN: 0015-7546 [FRCRAX]

Descriptors: salix/ clones/ genetic improvement/ plant breeding/ biomass production/ bioremediation/ streams/ stream erosion/ erosion control/ germplasm/ DNA fingerprinting/ heterosis/ literature reviews/ United States

Abstract: Efforts aimed at genetic improvement of Salix are increasing in North America. Most of these are directed towards developing improved clones for biomass production, phytoremediation, nutrient filters, and stream bank stabilization in the Northeast and North-central United States. Native species are of primary interest, but a small number of clones containing non-native germplasm are also being used in the breeding program to provide valuable traits. Parent combinations for controlled crosses are being selected with the hope of maximizing the probability of producing clones exhibiting heterosis for traits of interest, such as rapid early growth, pest resistance, general adaptability, etc. The present strategy

is to test as many parent clone combination as possible, and then repeat the most promising crosses to produce large families from which the best clones will be selected for further testing. Molecular fingerprinting technology will be applied to accelerate the rate of improvement. National and international cooperation would facilitate regional clone development and promotion of willow as a bioenergy crop.
This citation is from AGRICOLA.

362. Development of new technologies for minimization of nutrient excretion losses and odours in swine manure.

Grandhi, Raja R.; Saskatchewan. Agriculture Development Fund; and Canada. Agriculture and Agri Food Canada. Saskatchewan: Agriculture Development Fund; 13, 10 p. (2000)
Notes: "March 2000"--Cover. "102-04506"--Mounted on label. Includes bibliographical references (p. 11-12). 97000322.

NAL Call #: SF396.5-G722-2000

Descriptors: Swine---Feeding and feeds/ Swine---Manure---

Environmental aspects
This citation is from AGRICOLA.

363. Development of P-hyperaccumulator plant strategies to remediate soils with excess P concentrations.

Novak, J. M. and Chan, A. S. K. *Critical Reviews in Plant Sciences* 21 (5): 493-509. (2002)

NAL Call #: QK1.C83;
ISSN: 0735-2689 [CRPSD3].

Notes: Special issue Phytoremediation I / edited by B.V. Conger. Includes references.
Descriptors: plants/ bioremediation/ phosphorus/ nutrient excesses/ soil pollution/ livestock/ intensive husbandry/ manures/ nutrient uptake/ roots/ plant morphology/ organic acids/ plant breeding/ genetic engineering/ plant composition/ nutrient content/ literature reviews
This citation is from AGRICOLA.

364. Development of Phosphorus Indices for Nutrient Management Planning Strategies in the United States.

Sharpley, A. N.; Weld, J. L.; Beegle, D. B.; Kleinman, P. J. A.; Gburek, W. J.; Moore, P. A.; and Mullins, G. *Journal of Soil and Water Conservation* 58 (3): 137-151. (2003)

NAL Call #: 56.8 J822;

ISSN: 0022-4561

Descriptors: freshwater/ eutrophication/ soil nutrients/ water pollution/ phosphorus/ nutrient management/ soil erosion/ soil management/ nonpoint source pollution/ water quality
© Cambridge Scientific Abstracts (CSA)

365. Development of weed IPM: Levels of integration for weed management.

Cardina, J.; Webster, T. M.; Herms, C. P.; and Regnier, E. E.

Journal of Crop Production 2 (1): 239-267. (1999)

NAL Call #: SB1.J683;
ISSN: 1092-678X [JCPRF8].

Notes: Special issue: Expanding the context of weed management / edited by Douglas D. Buhler. Includes references.

Descriptors: weeds/ weed control/ integrated pest management/ population dynamics/ adaptation/ sustainability/ spatial variation/ time/ information/ rotations/ herbicide resistant weeds/ decision making/ habitats/ agricultural policy/ cropping systems/ literature reviews/ integrated weed management
This citation is from AGRICOLA.

366. Developments in aerial pesticide application methods for forestry.

Payne, Nicholas J. *Crop Protection* 17 (2): 171-180. (1998)

NAL Call #: SB599.C8;
ISSN: 0261-2194

Descriptors: aerial pesticide/ forestry/ pesticide environmental impact/ spray dispersal modeling

Abstract: Appropriate application methods play an important role in the success of pesticide use, both in relation to ensuring good efficacy and also minimising environmental impact. Scientific and technological developments pertaining to aerial pesticide application in forestry are reviewed, including developments in the design and characterization of hydraulic and rotary pesticide dispersal systems, application parameter research, use of spray dispersal modelling, and mitigation of pesticide environmental impact, including the use of buffer zones.
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367. Diagnosing causes of bird population declines.

Green, R. E.

Ibis 137 (Supplement 1): S47-S55. (1995);

ISSN: 0963-0856.

Notes: Conference: British Ornithologists' Union Conference on Bird Conservation: The Science and the Action, Shuttleworth College, Bedford (UK), 6-10 Apr 1994

Descriptors: Aves/ population decline/ diagnosis/ methodology/ Methodology general/ Birds

Abstract: The value to bird conservation of determining the causes of population declines is considered and the diagnostic methods available are reviewed, with examples. Diagnosis of the cause or causes of a decline in bird numbers is likely to be helpful in deciding the priority of conservation actions, though actions which aim to reverse the changes in external conditions which caused the decline need not be the most effective in initiating recovery. The methods for diagnosing causes of declines in bird numbers with the widest application make use of comparisons between geographical areas or time periods with different trends. Correlations between trends in numbers and measurements of external factors are examined across areas or periods or both. The danger of spurious correlations is minimized by drawing up a list of plausible causes based on studies of the natural history of the species. The effects of all of these candidates should be examined, subject to availability of data. The consistency of observed changes over time, or differences among areas, in survival rate or breeding success with the postulated demographic mechanism of the decline should be examined. Conclusions based on correlations across geographical areas between trends in numbers and external factors may be misleading if birds are able to move between the areas selected for comparison and if their pattern of settlement depends upon external factors thought to be implicated in the decline. Manipulative experiments should be carried out to test conclusions drawn from correlative studies. However, it must be recognized that the capacity of birds to move between areas means that experiments may measure effects of manipulations on settlement patterns or distribution rather than population size. Experiments that

appear well designed in terms of controls and replication may be misleading when applied to the conservation of bird populations if their geographical scale is inappropriate.

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368. Diatom indicators of stream and wetland stressors in a risk management framework.

Stevenson, Jan R

Environmental Monitoring and Assessment 51 (1-2): 107-118. (1998)

NAL Call #: TD194.E5;

ISSN: 0167-6369

Descriptors: total phosphorus/ diatom (Chrysophyta): periphyton/ Algae/ Microorganisms/ Nonvascular Plants/ Plants/ biotic integrity/ ecological risk assessment/ periphytic assemblages/ risk management/ species composition/ specific pH/ water quality

Abstract: Ecological risk assessment and risk management call for "state-of-the-science" methods and sound scientific assessments of ecosystem health and stressor effects. In this paper recent developments of periphyton indicators of biotic integrity and ecosystem stressors of streams and wetlands are related in a framework of ecological metrics that can be used to quantify risk assessment and risk management options. Many periphyton metrics have been employed in past assessments of water quality and a periphyton indices of biotic integrity has been applied by the state of Kentucky. In addition, the sensitivity of species composition of periphytic diatom assemblages has been shown to respond predictably to ecological stressors so that specific pH, conductivity, and total phosphorus in wetlands and streams can be inferred with weighted average indices. Inference of nutrient conditions by diatom indicators of total phosphorus is shown to have sufficient precision to be a valuable complement to one-time measurement of highly variable total phosphorus in streams. Quantitative indices of sustainability and restorability of ecosystem integrity are proposed, respectively, as the changes in ecological conditions that can occur without significant change in ecological integrity or changes that are necessary to restore ecological integrity.

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369. Direct and indirect water re-use.

Westerhoff, G. P.; Anderson, J.; Mancuso, P. C. S.; Rodrigues, J. M. C.; Filho, J. L.; Zachariou, M.; Rantala, P.; Bersillon, J. L.; Zanarek, A.; and Michail, M.

Water Supply 12 (1/2): IR9-1-IR9/29. (1994)

NAL Call #: TD201.W346;

ISSN: 0735-1917 [WASUDN].

Notes: Paper presented at the "19th International Water Supply Congress and Exhibition," October 2-8, 1993, Budapest, Hungary. Includes International Report and 13 National Reports. Includes references.

Descriptors: water reuse/ groundwater recharge/ irrigation water/ waste water/ Australia/ Brazil/ Cyprus/ Finland/ France/ Israel/ Italy/ Japan/ Netherlands/ Portugal/ Sweden/ UK/ United States
This citation is from AGRICOLA.

370. Disinfection resistance of waterborne pathogens on the United States Environmental Protection Agency's Contaminant Candidate List (CCL).

Gerba, Charles P; Nwachuku, Nena; and Riley, Kelley R

Journal of Water Supply Research and Technology (AQUA) 52 (2):

81-94. (2003);

ISSN: 1606-9935

Descriptors: Adenovirus (Adenoviridae): disinfection resistance, pathogen/ Aeromonas hydrophila (Aeromonadaceae): pathogen, waterborne/ Calicivirus (Caliciviridae): disinfection resistance, pathogen/ Coxsackievirus (Picornaviridae): disinfection resistance, pathogen/ Echovirus (Picornaviridae): disinfection resistance, pathogen/ Encephalitozoon intestinalis (Cnidosporidea): disinfection resistance, pathogen, waterborne/ Mycobacterium avium (Mycobacteriaceae): disinfection resistance, pathogen/ bacteria (Bacteria): pathogen, waterborne/ cyanobacteria (Cyanobacteria): pathogen, waterborne/ organism (Organisms): disinfection resistance, waterborne pathogen/ Animals/ Bacteria/ Cyanobacteria/ Double Stranded DNA Viruses/ Eubacteria/ Invertebrates/ Microorganisms/ Organisms/ Positive Sense Single Stranded RNA Viruses/ Protozoans/ Viruses/ Contaminant Candidate List [CCL]/ drinking water

Abstract: In 1999, the United States Environmental Protection Agency developed a list of emerging waterborne microbial pathogens that may pose a risk in drinking water. This review deals with the disinfection resistance of microorganisms on the Contaminate Candidate List or CCL. Current disinfection practices in the United States appear to be capable of dealing with most of the microorganisms on the CCL, with the exception of *Mycobacterium avium* and adenoviruses. *Mycobacterium avium* is more resistant to most disinfectants than other waterborne bacteria and adenoviruses are the most resistant waterborne microorganisms to inactivation by ultraviolet disinfection. The microsporidium, *Encephalitozoon intestinalis*, shows significant resistance to inactivation by chemical disinfectants and further research on additional species of microsporidia appears to be warranted.
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371. Dissolved and water-extractable organic matter in soils: A review on the influence of land use and management practices.
Chantigny, M. H.
Geoderma 113 (3/4): 357-380. (2003)
NAL Call #: S590.G4;
ISSN: 0016-7061
This citation is provided courtesy of CAB International/CABI Publishing.

372. Distinguishing Human From Animal Faecal Contamination in Water: A Review.
Sinton, L. W.; Finlay, R. K.; and Hannah, D. J.
New Zealand Journal of Marine and Freshwater Research 32 (2): 323-348. (1998);
ISSN: 0028-8330
Descriptors: Pollution detection/ Domestic wastes/ Agricultural runoff/ Sewage/ Pollutant identification / Literature reviews/ Feces/ Contamination/ Water Pollution/ Animal Wastes/ Water Analysis/ Water Pollution Sources/ Fecal coliforms/ Humans/ Microbial contamination/ Statistical analysis/ *Rhodococcus coprophilus*/ *Bacteroides fragilis*/ *Bifidobacterium*/ New Zealand/ *Bifidobacterium*/ *Bacteroides fragilis*/ *Rhodococcus coprophilus*/ human wastes/ Methods and instruments/ Sources and fate of pollution/ Freshwater pollution
Abstract: Management of faecal

contamination of water would be improved if sources could be accurately identified through water analysis. Human faeces are generally perceived as constituting a greater human health risk than animal faeces, but reliable epidemiological evidence is lacking. United States waterborne disease data suggest that human-specific enteric viruses account for over half the documented outbreaks. However, in New Zealand, where there is a high grazing animal:human ratio (increasing the relative importance of water-transmissible zoonoses), it seems prudent to assume that human and animal faecal pollution both constitute a risk to human health. Irrespective of the relative risks, the ability to identify sources would assist in overall management of microbial water quality. Faecal streptococci do not appear to provide reliable faecal source identification. Human and animal sources, respectively, may be distinguishable by two tests on *Bifidobacterium* spp. - growth at 45 degree C in trypticase phytone yeast broth and sorbitol fermentation. Different species of *Bacteroides* tend to be present in humans and animals, but poor survival in water is a problem. Phages of the *Bacteroides fragilis* strain HSP40 appear to be human specific, but low counts in effluent in some countries, including New Zealand, may limit their usefulness. Different F-RNA phage subgroups appear to be associated with human and animal faecal sources. The actinomycete *Rhodococcus coprophilus* has potential as a grazing animal indicator but it is persistent, and existing culturing techniques are time consuming. The development of DNA-based techniques, such as polymerase chain reaction (PCR), may assist in the assay of some microbial faecal source indicators. Various faecal sterol isomers offer the possibility of distinguishing between human and animal sources, and even between different animals. Washing powder constituents such as fluorescent whitening agents, sodium tripolyphosphate and linear alkyl benzenes, offer useful human source identifiers. It is unlikely that any single determinand will be useful in all situations, but statistical analysis of appropriate "baskets" of microbial and chemical determinands offers the possibility of identifying and apportioning human and animal

faecal inputs to natural waters.
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373. Distribution of major herbicides in ground water of the United States.
Barbash, J. E. and National Water Quality Assessment Program (U.S.). Sacramento, Calif. U.S. Dept. of the Interior, U.S. Geological Survey, 1999. 57 p.
Notes: "National Water-Quality Assessment Program"--Cover.
NAL Call #: GB701-.W375-no.-98-4245
<http://ca.water.usgs.gov/pnsp/rep/wrir/984245/>
Descriptors: Pesticides---Environmental aspects---United States/ Herbicides---Environmental aspects---United States/ Water---Pollution---United States
This citation is from AGRICOLA.

374. Do created wetlands replace the wetlands that are destroyed?
Hunt, Randall J. and Geological Survey (U.S.).
Madison, Wis.: USGS; Series: Fact sheet (Geological Survey (U.S.)) FS-246-96. (1998)
Notes: Title from caption. Includes bibliographical references.
NAL Call #: QH76.H86-1998
<http://wi.water.usgs.gov/pubs/FS-246-96/index.html>
Descriptors: Wetlands---United States/ Wetlands---Wisconsin/ Wetland conservation---United States/ Wetland conservation---Wisconsin/ Wetland ecology---United States/ Wetland ecology---Wisconsin
This citation is from AGRICOLA.

375. Do organic farming practices reduce nitrate leaching.
Kirchmann, H. and Bergstrom, L.
Communications in Soil Science and Plant Analysis 32 (7/8): 997-1028. (2001)
NAL Call #: S590.C63;
ISSN: 0010-3624 [CSOSA2].
Notes: Special issue: Potential use of innovative nutrient management alternatives to increase nutrient use efficiency, reduce losses, and protect soil and water quality/edited by J. Delgado. Proceedings of the Annual Conference of the Soil and Water Conservation Society held Aug. 8-11, 1999, Biloxi, Mississippi. Includes references.
Descriptors: organic farming/ nitrate nitrogen/ leaching/ rotations/ nitrogen

fertilizers/ animal manures/ soil fertility/ nutrient uptake/ farming/ nitrogen content/ crops/ literature reviews/ conventional farming

Abstract: Agriculture is a contributor of nitrate to natural waters and there is concern about the excess nitrogen burden loadings from agriculture on natural waters. Agricultural practices that reduce nitrate leaching from arable land are needed. It is postulated by certain groups that organic farming practices reduce nitrate leaching among other environmental benefits. The objectives of this paper are: (1) to compile, summarize and critically analyse information about NO₃-N leaching from farming systems that were managed according to organic farming principles; (2) to compare NO₃-N leaching from organic farming systems with that from conventional systems. This review consists of several parts. The available literature on leaching of NO₃-N from organic farming and conventional farming systems was analysed. Leachable amounts of NO₃-N in soils from two types of farming systems were compared. Finally NO₃-N leaching from animal manure versus inorganic fertilizer was examined. In all studies we found in the literature, both the sequence and type of crops grown, and the input intensity of N was different in organic and conventional systems. Organic farming systems had on average a lower N input and more legumes in rotation. Average leaching of NO₃-N from organic farming systems over a crop rotation period was somewhat lower than in conventional agriculture. If the different input intensities of N between organic and conventional systems were taken into account and corrected for, no differences in leaching losses between systems were found. However, a proper comparison of leaching between the two types of systems should take the yield into account. Attempting to do this in this review, we found only two studies which provided data for this. In both studies, specific conditions of the soil- a high organic matter content resulting in a high N mineralization at one site and a heavy clay texture resulting in very small leaching losses at the other site- did not enable us to come up with a clear-cut answer. Nevertheless, we could not find any evidence that nitrate leaching will be reduced by the introduction of organic farming practices, if the goal is to

maintain the same crop yield levels as in conventional farming systems. Reduction of nitrate leaching is not a question of organic or conventional farming, but rather of introduction and use of appropriate counter- measures. This insight should guide our thinking when developing environmentally friendly and sustainable cropping systems. This citation is from AGRICOLA.

376. Do U.S. Environmental Protection Agency water quality guidelines for recreational waters prevent gastrointestinal illness? A systematic review and meta-analysis.

Wade, T. J.; Pai, N.; Eisenberg, J. N. S.; and Colford, J. M. Jr. *Environmental Health Perspectives* 111 (8): 1102-1109. (2003)
NAL Call #: RA565.A1E54;
ISSN: 0091-6765
This citation is provided courtesy of CAB International/CABI Publishing.

377. Does low biodiversity resulting from modern agricultural practice affect crop pollination and yield.

Richards, A. J. *Annals of Botany* 88 (2): 165-172. (Aug. 2001)
NAL Call #: 450-An7;
ISSN: 0305-7364 [ANBOA4]
Descriptors: agriculture/ biodiversity/ pollination/ crop yield/ environmental impact/ foods/ crop quality/ intensive production/ habitat destruction/ pesticides/ transgenic plants/ genetic engineering/ herbicides/ literature reviews
Abstract: This Botanical Briefing examines the hypothesis that modern agricultural practice affects natural biotic pollination to the extent that crop yields suffer. Few staple foods depend on animal pollination and relatively few other crops are totally dependent on animal pollination. However, there are many crops of local economic importance whose yield or quality may be enhanced by good pollinator activity: studies of these deserve more attention. Amongst those cases already documented, intensification and habitat loss are the most frequent causes of pollinator impoverishment reducing crop yield. As yet there is no clear example of low crop yield resulting from the effect of pesticides or transgenic plants on pollinators, and only one example involving

herbicides, although each of these agents can affect populations of crop pollinators. This citation is from AGRICOLA.

378. Drainage Design for Water Quality Management: Overview.

Guitjens, J. C.; Ayars, J. E.; Grismer, M. E.; and Willardson, L. S. *Journal of Irrigation and Drainage Engineering* 123 (3): 148-153. (1997)
NAL Call #: 290.9 AM3Ps (IR);
ISSN: 0733-9437.
Notes: DOI: 10.1061/(ASCE)0733-9437(1997)123:3(148)
Descriptors: Hydrodynamics/ Water Quality Management/ Subsurface Drainage/ Model Studies/ Design Criteria/ Solute Transport/ Water quality control/ Agricultural runoff/ Pollution control/ Drainage/ Simulation/ Control of water on the surface/ Prevention and control/ Freshwater pollution
Abstract: Drainage design for water quality management in irrigated areas requires use of hydrodynamic models the delineate flow paths of subsurface water moving to drains. Use of only traditional drainage design equations for protection against water logging and salinization are inadequate for water quality management; these equations should be coupled with mechanistic models that account for transport and chemical changes in the vadose and saturated zones that replace those associated with a leaching fraction, or requirement concepts. Drainage designs should now make use of hydrodynamic and chemical models that simulate flow and transport of water and chemical constituents from infiltration to drainage discharge. Management should be able to manipulate the models prior to implementing steps aimed at controlling the quantity and quality of drainage discharge.
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379. Drainage manual: A water resources technical publication: A guide to integrating plant, soil, and water relationships for drainage of irrigated lands.

United States. Bureau of Reclamation. Denver, Colo.: U.S. Dept. of the Interior, Bureau of Reclamation, xviii, 321 p.: ill. (1993)
Notes: "Revised reprint 1993"
Includes bibliographical references and index.

NAL Call #: TC970.D73--1993

Descriptors: Drainage---Handbooks, manuals, etc/ Irrigation---Handbooks, manuals, etc

This citation is from AGRICOLA.

380. Drainage of irrigated lands: A manual.

Ritzema, H. P.; Kselik, R. A. L.; Chanduvi, Fernando.; and Food and Agriculture Organization of the United Nations.

Rome: Food and Agriculture Organization of the United Nations; viii, 74 p.: ill.; Series: Irrigation water management training manual no. 9. (1996)

Notes: "M-56."--T.p. verso. Includes bibliographical references (p. 73-74).

NAL Call #: S621.R58--1996;

ISBN: 9251037795

Descriptors: Drainage/ Irrigation---Management

This citation is from AGRICOLA.

381. Drainage principles and applications.

International Institute for Land Reclamation and Improvement.

Wageningen, Netherlands:

International Institute for Land Reclamation and Improvement; 1125 p.: ill., map; Series: Publication (International Institute for Land Reclamation and Improvement) 16. (1994)

Notes: 2nd ed.; Includes bibliographies and index.

NAL Call #: 54.9--ln8-no.16

Descriptors: Drainage

This citation is from AGRICOLA.

382. Dynamic cropping systems: An adaptable approach to crop production in the Great Plains.

Tanaka, D. L.; Krupinsky, J. M.; Liebig, M. A.; Merrill, S. D.; Ries, R. E.; Hendrickson, J. R.; Johnson, H. A.; and Hanson, J. D.

Agronomy Journal 94 (5): 957-961. (2002)

NAL Call #: 4-AM34P;

ISSN: 0002-1962

This citation is provided courtesy of CAB International/CABI Publishing.

383. Dynamics and availability of the non-exchangeable NH₄-N: A review.

Scherer HW

European Journal of Agronomy 2 (3): 149-160; 115 ref. (1993)

NAL Call #: SB13.E97

This citation is provided courtesy of CAB International/CABI Publishing.

384. Dynamics of leaf litter accumulation and its effects on riparian vegetation: A review.

Xiong ShaoJun and Nilsson, C.

Botanical Review 63 (3): 240-264. (1997)

NAL Call #: 450 B6527 DNAr;

ISSN: 0006-8101

This citation is provided courtesy of CAB International/CABI Publishing.

385. Earthen manure storage design considerations.

Wright, P.; Grajko, W.; Lake, D.; Perschke, S.; Schenne, J.; Sullivan, D.; and Tillapaugh, B.

Ithaca, N.Y.: Natural Resource, Agriculture, and Engineering Service, Cooperative Extension; Series: NRAES 109; ix, 90 p.: ill., map. (1999)
Notes: Includes bibliographical references (p. 90).

NAL Call #: S675-.N72-no.-109;

ISBN: 0935817387 (pbk.)

Descriptors: Farm manure---Storage/ Earth construction

Abstract: Earthen manure storages are becoming more common for economic, environmental, and management reasons, but there is a lack of information about safe, environmentally sound, practical designs. This book was written to meet the needs of producers, engineers, and design professionals who are seeking information about designing, constructing, and managing earthen storages. It covers environmental policies (both existing and pending legislation); design standards and planning documents (such as nutrient management and waste management plans); manure characteristics; storage planning (determining size and location, loading and unloading methods, on-site soils investigations, and regulations); storage design (stability and drainage issues, types of liners, and safety); construction (quality assurance, earthwork, topsoil placement, seeding, and documentation); management (maintaining the structure, clearing drains, and manure management); and liability. A lengthy appendix provides guidelines and calculations for soil liners; other appendixes provide pump information, cost estimate information, and addresses for helpful organizations.

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386. Eastern Sierra Nevada riparian field guide.

Weixelman, Dave.; Zamudio, Desiderio C.; and Zamudio, Karen A. Sparks, NV: Humboldt-Toiyabe National Forest; 1 v. (various pagings): ill. (some col.). (1999)
Notes: Humboldt National Forest (Nev.) and Toiyabe National Forest (Nev. and Calif.).

NAL Call #: QH541.5.R52-W436-1999

Descriptors: Riparian ecology---California---Sierra Nevada---Handbooks, manuals, etc/ Riparian ecology---Nevada---Sierra Nevada---Handbooks, manuals, etc
This citation is from AGRICOLA.

387. Ecological approaches and the development of "truly integrated" pest management.

Thomas, M. B.

Proceedings of the National Academy of Sciences 96 (11): 5944-5951. (1999);

ISSN: 0027-8424

Descriptors: Pest control/ Biological control/ Integrated control/ Crop production/ Reviews/ Insecta/ Insects/ Control/ Agricultural & general applied entomology

Abstract: Recent predictions of growth in human populations and food supply suggest that there will be a need to substantially increase food production in the near future. One possible approach to meeting this demand, at least in part, is the control of pests and diseases, which currently cause a 30-40% loss in available crop production. In recent years, strategies for controlling pests and diseases have tended to focus on short-term, single-technology interventions, particularly chemical pesticides. This model frequently applies even where so-called integrated pest management strategies are used because in reality these often are dominated by single technologies (e.g., biocontrol host plant resistance, or biopesticides) that are used as replacements for chemicals. Very little attention is given to the interaction or compatibility of the different technologies used. Unfortunately evidence suggests that such approaches rarely yield satisfactory results and are unlikely to provide sustainable pest control solutions for the future. Drawing on two case histories, this paper demonstrates that by increasing our basic understanding of how individual pest control