
*
* ANNUAL REPORT *
* CONTROL OF LIVER FLUKES *
* IN THE *
* ROCKY MOUNTAIN STATES *
* FROM THE *
* SALT LAKE CITY, UTAH *
* OFFICE *
* BY THE *
* BUREAU OF ANIMAL INDUSTRY *
* U.S. DEPARTMENT OF AGRICULTURE *
* ZOOLOGICAL DIVISION *
* JULY 1, 1932 to JUNE 30, 1933 *
* BY *
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* JUNIOR ZOOLOGIST *

LIVER FLUKE REPORT OF THE ZOOLOGICAL DIVISION

SALT LAKE CITY OFFICE

FISCAL YEAR 1933

During the fiscal year 1933 liver fluke control has been carried on in Utah, Montana, Idaho, Arizona, Nevada and Wyoming. In addition reports have been received from Colorado and Texas. Percentage of infestation as reported by the various packing houses is as follows:

Reported by Inspectors In Charge at	State	Cattle			Sheep	
		Total Reported	Number Infested	Approx.% of Infesta.	Total Reported	Number Infested
Cudahy Pack. Salt Lake City	Utah	18,388	1,671	9%		
American Pak. Ogden	Utah	9,876	1,582	16%		
Butte	Montana	470	5	1.09%	657	0
Yellowstone	Montana	2,945	0		1,436	89
Sheridan	Wyoming	208	0		101	11*
Trinidad	Colorado	911	0		261	36
Denver	Colorado	30,590	401	1.3%	89,622	33
Total kills reported		81,776	3,659	4.4%	92,077	169

*Tape worms.

While the above table does not give a complete report for each month during the fiscal year, it will give a good estimate of the losses from liver flukes in this section as reported by the various packing houses. An attempt was made to obtain this information monthly but to date we have been unable to do so. How-

ever, we wish to thank Dr. F. G. Miller and the late Dr. W. Wright for the complete report for the year from the American Packing Company at Ogden.

The areas infested by liver flukes as reported by inspectors in charge of meat inspection in both federal and city packing houses and as found by personal investigation are as follows by counties:

Utah: Duchesne, Uintah, Wasatch, Summit, Rich, Cache, Box Elder, Weber, Davis, Morgan, Utah, Sanpete, Sevier, Piute, Garfield, Kane, Beaver and the western half of Wayne. *Utah - Shoshone & Teton*

Montana: Ravalli, Missoula, Powell, Granite, Lincoln, Flathead, Cascade (in elk only), and Beaverhead.

Idaho: Bannock, Bear Lake, Caribou, Bonneville, Cassia, Twin Falls, Blaine, Lemhi, Elmore, Ada, Canyon, Gem, Payette, Washington, Valley, Adams, Bonner and NezPerce (one ranch only found in Lewiston and that 100% infestation). *alt - Teton*

Arizona: Flukes on both sides of the watershed from Flagstaff to Springville, occurring on Indian Reservations, National Forests and private lands.

Nevada: Douglas, Lyon, Ormsley, Washoe, Esmeralda, Elko, Churchill and Plumas.

Wyoming: Carbon, Laramie, Lincoln (the heaviest infested county in that state), Uinta, Teton.

Colorado: Kit Carson, Elbert, Morgan, Weld, Larimer, Boulder, Pueblo, Custer, Huerfano, Las Animas, Costilla, Cone Jos, Montezuma, Eagle and Mesa.

Texas: Waller, Colorado, Victoria, Goliad, Matagorda, Liberty, Lamar, El Paso, Harris, Austin, Brazoria, Jackson and Refugio.

FISCAL YEAR 1933

All expenses not including salary at Salt Lake City Station

Month	Auto	Per Diem	Telephone Telegram	Requests Trans.	Others	Total Paid
July	\$145.11	\$32.00	\$1.32	0		\$227.43
August	74.48	63.00	.25	0	.20	137.94
September	0	0	0	0	0	0
October	74.48	62.00	0	0	0	136.48
November	50.12	41.00	.25	0	2.92	94.29
December	12.81 10.43*	15.00	0	0	2.79	59.98
January	0	25.00	0	2.20/	0	25.00
February	51.17	17.00	0	0	0	68.17
March	87.99	35.00	.15	0	0	99.00
April	42.22	55.00	.20	0	.30	85.70
May	60.95	41.00	.05	0	5.83	107.83***
June	91.70	76.00	0	0	3.50	171.20***
Totals	701.62	512.00	2.22	2.20	15.54	1192.03**

*reclaimed mileage

/transportation requests

**difference in last totals of vertical and horizontal columns is due to pre-audit differences.

Telephone installed in office April 2, 1933, paid in Washington.

***not paid.

CONTROL OPERATIONS

Arizona

July:

Attended the Arizona woolgrowers convention at Flagstaff, gave an illustrated talk on the liver fluke treatment and control. Made personal contact with several of the sheep men after the meeting. They feel that the fluke is not a serious parasite in Arizona due to the lack of water. They have found the fluke in their sheep but have not had any serious losses from same.

Montana

July:

Attended the Montana Veterinary Medical Association at Helena. Gave a lecture on the liver fluke, treatment and control as applied to Montana conditions. Showed a motion picture on the liver flukes in sheep.

Missoula and Ravalli Counties: Made personal contact with ranchers. A meeting was arranged at Hamilton, 53 attended. A meeting was arranged at Stevensville, 21 attended. Gave a lecture and showed the motion picture on liver flukes. No copper sulphate is being used in either valley. Some of the ranches are being drained to eliminate the snail which has proven very successful. They are using carbon tetrachloride on all flocks infested.

August:

Powell County: Made personal contact with all ranchers. Meetings held at Ovando with 65 attending. Heavy losses occurring in Ovando and Helmsville valleys in sheep. Cattle, deer and elk also infested. No copper sulphate has been used. No drainage in operation or no carbon tetrachloride used as a treatment. All have promised to cooperate as times get better for the livestock

industry.

Made personal contact with all ranchers in north eastern Missoula County. Losses were heavy in sheep. Few reported losses in cattle. All deer and elk reported infested. This territory will be hard to control as it is on private, government and Anaconda Copper Mining Company lands and is full of pot-holes, lakes and streams and heavily stocked with fish.



A flukey pasture at Ovando, Montana. Lost 700 head that pastured on land. This pasture has since been thoroughly drained. The picture below shows the results.



Granite County: Made personal contact with ranchers by auto and telephone. A meeting was held at Drummond with 19 attending. Held autopsy on a pure-bred Hereford cow at Hall, Montana, and found flukes. This is mostly a cattle country, consequently no copper sulphate or carbon tetrachloride is being used.

Lincoln County: Made personal contact with ranchers around Trego, Fortine and Eureka. All reported heavy infestation in cattle. Area will not be hard to treat. No copper sulphate being used.

Flathead County: Visited ranchers around Yakt, Montana. Cattle, deer and elk are heavily infested with the Fasciola Magna. This will be a hard area to control as it comprises privately owned lands, Anaconda Copper Mining Company and Northern Pacific lands, with very little forest service land. This area takes in the southeast corner of Lincoln County and follows the Thompson River to Thompson Falls, through Sanders County.

Utah

October:

Duchesne and Uintah Counties: Made personal contact with farmers in Duchesne County by auto. Attended field meetings where a demonstration was carried out on the destruction of snails by the use of copper sulphate treating streams, sloughs and ponds. A visit was made to the treated areas in 48 hours to observe the results. Results were 100% by direct contact but one pond was treated with the expectation of seepage water through a bank 6 feet to kill the snails, and these snails below the bank were unharmed.



Boys searching for right handed snails on Hacking place, Vernal, Utah.



Broadcasting copper sulphate on Hacking place, Vernal, Utah.

Beaver County: Made personal contact with farmers in county by auto.

Held a meeting at Greenville, Utah, 12 attending. Posted sheep for flukes and advised owners on the treatment of same. Several bands have been treated this past fall and winter with carbon tetrachloride. Advised the farmers on drainage and treating waters with copper sulphate. No copper sulphate has been used in

this county to my knowledge.

Salt Lake County: Visited farmers in county. Gathering snails and studying their habits.

Summit County: Made personal contact with farmers. Held autopsy on sheep. Treated one band with carbon tetrachloride. Made a survey of place and advised control methods.



Sheep infested with flukes. Taken 10 minutes before death. Note excited appearance. Lambert place, Kamas, Utah.



Sheep 5 minutes before death. Same as above. Immature flukes. Kamas, Utah. Lambert place. Dying without apparent struggle.



Sheep 2 minutes before death. Same as above. No visible struggle.



Diaphragmic surface of liver showing scars of immature flukes. Same sheep.



A pond with a history -- 112 sheep, lost 18 head by November 2, from immature flukes. All pastured in field on which this pond is located. Snails numerous. This pond has since been drained. All snails dead.

November:

Utah County: Personal contact with farmers. Gathered snails around vicinity of Utah Lake. No losses reported from this county.

Panguitch County: Made personal contact with farmers. Helped spread copper sulphate and advised on drainage. Three farmers have used copper sulphate on places with good success. Few will drain fields. All are using carbon tetrachloride on infested sheep.

Sevier County: Attended meetings. Gave a lecture and showed the motion picture on liver flukes and their control in the following towns with attendance as shown: Koosharem 18, Redmond 20, Aurora 6, Richfield 55, Elsinore 2, Central 6, Salina 14; and in December - Glenwood 40, Venice 17, Richfield 6, Monroe 6. Made several contacts with farmers going over their places and advising on the fluke set up.

January:

Attended the Intermountain Veterinary Medical Association meeting and the National Cattle Association meeting at Ogden. Gave three papers.

February:

Salt Lake County: Visited farms in county. Studying habits of snails in winter months.

Duchesne County: Held autopsy on sheep. Advised treatment of carbon tetrachloride for the fluke. Also advised preventative methods for same.



Altonah, Utah. Posting sheep and demonstrating flukes. Flukes prevalent.

Beaver County: Held autopsy on sheep for flukes. Assisted in treating two bands. Both bands were from Panguitch County.

March:

Left for Nevada March 22. Visited ranches at Dyer, Nevada, Esmeralda County. Advised in treatment and prevention of flukes. Returned to Reno. Personal visits to ranches in Washoe, Elko, Lander, Churchill and Humboldt Counties. Carbon tetrachloride is being used in sheep for flukes by the local men. No copper

sulphate is being used.

The "Model Dairy", owned by Messrs. C. W. Brooks and Alfred Peckham, about four miles south of Reno, consists of 260 acres with 100 to 150 head, varying at times, pure bred Holstein dairy cattle all raised on the ranch, no sheep. Four years ago they started to drain and fill in all low and swampy places, at the present time the ranch is completely drained. The cattle for the last four years have not been allowed to pasture on this land but have been fed in feed lots. I am advised by Mr. Brooks, Jr., their intentions this year are to pasture these fields. The old cattle show upon slaughter a considerable amount of calcification of the bile duct with no live flukes present, the young stock when slaughtered show no signs of fluke infestation. All the surrounding ranches in my opinion and from the data I am able to gather are highly infested with flukes.

Idaho

April:

Left official station for Pocatello, Idaho. Personal contact with ranchers in Bannock, Caribou and Bear Lake Counties. Meeting was held at Thatcher with 43 attending from the Gentile Valley. Losses are heavy in farm flocks. All are now using carbon tetrachloride. Range flocks are not involved as they are on the high and dry ranges until late fall and then on the deserts. Cattle are quite heavily infested in this valley. No copper sulphate is being used and no attempt is made at drainage.

A meeting was held at Soda Springs, Idaho, with an attendance of 19. Very few losses occurring in this county. Few are using carbon tetrachloride. Soda water is quite prevalent in Caribou County, has a Ph of 6.0 to 6.8 and is fatal

to the snails. No snails of any description can be found in soda water. Snails placed in same are dead in 30 minutes and cannot be revived, though with less time they recover without apparent injury when placed in fresh water with a Ph. of 7.2 or above. Meetings were held as follows with the attendance as stated: St. Charles 52, Dingle 72, Fish Haven 8, Paris 3, Liberty 31.

Bear Lake County is heavily infested but presents a difficult problem in drainage and treatment as the lake inlet and outlet is on the north, leaving a marshy country. Carbon tetrachloride is used on a few flukes.

May:

Salt Lake County: Visits to farms collecting snails and observing habitats, contacting farmers in regards to losses from flukes.

Davis County: Visits to farms, collecting snails.

Duchesne County: Gathering snails from fluke infested farms.

June:

Summit County: Meetings arranged but had very poor attendance. Made personal contact with farmers, three of whom are using copper sulphate on their places. They are also draining their places to cut down the cost of treating with the copper sulphate.

Caribou County: Personal contact with ranchers in Gray's Lake County, Bonneville County and the east edge of Star Valley, Wyoming. Rancher in Star Valley has set up a rotation of water and drainage to eliminate the snails. Lost all but 2 sheep out of 80 head last spring from flukes.

Left Soda Springs for Lemhi County, Salmon, Idaho. Personal contact with ranchers in county. Sent letters to all sheep men. Held meeting in Salmon. Ranchers from Lemhi, May, Tendore, Leadore and all the small towns were repre-

sented, 33 in all attended. Several expressed their wishes to use the carbon tetrachloride on sheep, drain and use copper sulphate to destroy the snails. Lemhi County is incidentally a very heavily infested county. All the small flock owners have registered complaints. It is not a difficult territory to handle according to the lay of the land. A thorough job of drainages and copper sulphate in creeks will eliminate the flukes.



Flukey sheep. Beaver, Utah. Treated 35 head with carbon tetrachloride.



A fluke infested pasture in Summit County, Utah. Drainage would prevent needless loss on this place. Cattle are raised on this farm. No sheep. Owner says sheep do not do well.

SUMMARY

Snails have been gathered and shipped to the Zoological Laboratory from all sections of the Rocky Mountains this past fiscal year. The most prevalent right handed snail being the *Fossaria Modicella* (say) which has been definitely determined by the Zoological Division to act as an intermediate host for the *Fasciola Hepatica*. *Galba Bulimoidies* of Lea has never been found in the Rocky Mountain states. Under natural conditions the *Modicella* has not been found to be infested. The habits of the *Modicella* makes it unlikely to become heavily infested as they prefer mud and on warm days will be found out of water on the moist muddy banks. The *Caperate* and *Abrussa* species are also quite common.

Drainage has proven a cheap and efficient method of eliminating the snails. Even the *Modicella* cannot stand extreme desiccation. The physa species die first but all the *lymnea* snails will also be found dead in a few days. They are unable to burrow into the mud or even in cracks for protection. I have dug in old lakes and pond beds where drainage is in effect but have never found a live snail. It is apparent that they will cover themselves in the loose mud in the bottom of ponds and creeks in the winter but never in the deep desiccated mud.

Snails have been found to live in water from a Ph of 7.2 to 8.4.

* Maps are kept in the office of the eight Rocky Mountain states. The area as reported are designated with a red pin, while the place where copper sulphate is used is designated with a blue pin. A file system is kept of reports on flukes by the counties and states as well as the owners.

* There have been distributed over 2,000 mimeographed copies of control of liver flukes in sheep, cattle and goats. Letters have been sent out to the owners of all cattle reported as flukey. - *one mimeograph*

to owners - and me as an inquiry to feeders buyers, or dealers - both have proven quite successful x

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A check has been made on all tuberculin reactors, 90% of same from the Uintah Basin have been flukey, 50% of all the reactors checked from Star Valley, Wyoming, have revealed flukes.

We check all reports on flukes from packing houses through letters or personal contact before filing same. (Cards are distributed to all government, city or state meat inspection establishments for reporting fluke infested animals.)

It is with high regard and respect that I mention the very creditable assistance of the State Veterinarians and Federal Veterinarians in charge of the various states in which I have worked, for their able cooperation in fluke control. The county agents in the counties worked have given their best cooperation. We hope we may continue to enjoy this same splendid cooperation in the future and extend our sincere thanks.

Respectfully submitted,



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