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TESTS OF DIPS AS LICE KILLERS.

INTRODUCTION.

The importance of using some preparation to rid stock, and especially young stock, of lice is much greater than farmers and stockmen as a rule seem to appreciate. At certain seasons of the year lice are very abundant on most of the farm stock and especially on hogs, calves and colts. The effect of large numbers of these parasites is to interfere with the thrift and growth of the stock as it is impossible for them to endure the irritation caused by the lice and to make the same gain as they otherwise would.

A great many farmers appreciate the necessity of using something to get rid of the lice and have gone to the expense of purchasing or constructing vats and of purchasing some of the various kinds of dips recommended to kill all forms of external parasites. In a great many instances these dips have not proven successful and the users are disappointed in their efforts to get rid of lice on their stock and especially lice on hogs.

In June 1902 Bulletin No. 53, which dealt with the common parasites of the domestic animals and the most common and effective remedies to be used against them was issued by this station. Since that time further tests have been made of various dips in order to determine the practical value of these preparations when used to rid

hogs, horses, and cattle of lice. Special mention is made of lice, as the various kinds of lice found on farm stock seem to give more trouble than all of the other forms of external parasites combined, with the exception of the cattle tick. Many inquiries are received every winter and spring asking for information as to the best and cheapest means of getting rid of lice on hogs and cattle.

CHARACTER OF PARASITES.

It is well to know something of the general character of the parasites we are trying to destroy in order to use such remedies as may be necessary to secure best results. The lice of the domestic animals is the most common form of external parasites and they are most abundant on calves and colts during the late winter and early spring months, and are found on hogs at all seasons of the year but most abundantly during the summer. There are two main groups or divisions of the lice, one group with mouth parts adapted for biting or eating such material as scales from the skin, feathers, hair, etc., and the other with piercing mouth parts adapted for getting their food from the blood of the animal by piercing the skin. The first group includes the bird lice, also some that are found on cattle and horses, while most of the lice found on cattle and horses and all that are found on hogs belong to the latter group, or those with piercing mouth parts.

Each group of animals is, as a rule, troubled with certain kinds of lice that are not found on any other group of animals. The hog louse never occurs on horses or cattle and likewise the lice from these animals are never found on hogs. While the life history of some of of the lice has not been completely worked out, still enough is known to say that in all cases the louse cements her eggs to the hair of the animal and they remain there until hatched when the young rapidly develop on the body of the animal. None of the life history of the parasite is necessarily passed independently of the animal on which the egg was hatched.

DIPS COMMONLY SOLD.

The dips most commonly sold for farm use are the coal-tar preparations, all of which form a milky or white emulsion when mixed with water in varying proportions. A number of these coal-tar dips have

been tried on hogs at the experiment station, laboratory tests have also been made with most of them. The practical results obtained in using these preparations as dips have not been as favorable as the laboratory tests would seem to indicate that they should be. In making the laboratory tests, solutions of varying strengths were made, the strength varying from one to three per cent. The lice were dipped in these solutions for varying lengths of time and then placed on filter paper where the excess of dip was absorbed. The same method was followed when kerosene emulsion was used so that the results would be comparable. In experiments with the coal-tar preparations, the solution was generally heated to 70 or 80 degrees Farenheit and it was found that the dip was more effective than when used cold.

Lice from cattle and horses were killed by the coal tar dips in from three to eighteen hours after they were dipped depending on the strength of the solutions, which varied from one to three per cent, also on the length of time they were kept in the dip. The amount of dip carried in the fine hair of horses and cattle keeps the parasites wet for a much longer time than is the case with hogs and this is partly the reason why the dip is more effective on horses and cattle than on hogs. The hair is coarse and thin on most breeds of hogs and the dip soon runs off and if the dip is to be effective, it must kill the lice in the short time the animal is in the vat or before the solution can evaporate from the skin. In the laboratory tests, where kerosene emulsion and coal-tar preparations were used, the kerosene emulsion containing five per cent kerosene was more effective than any of the coal-tar preparations when used up to a strength of three per cent.

DIPPING VAT AND WALLOWING VAT.

The dipping vat for hogs is the only form of dipping arrangement that is ussually found on the farm. The vat for cattle and necessary material to keep it in operation is too expensive for the individual farmer as he does not, as a rule, have sufficient cattle to justify the expense. But the cost of a vat and the necessary material for dipping hogs is no more than any hog raiser can afford in order to keep the hogs free from lice. Crude oil, such as may be obtained from a number of localities in Oklahoma, may be used for making the emulsion which would make the cost much less than when refined oil is used. The cost of the kero-

sene emulsion made from either the crude or refined oil is less than the same quantity of dip made from any of the commercial preparations.

For farm purposes the only use dipping is generally put to is to kill lice on hogs. Lice are so uniformly present on hogs that they are sometimes regarded as a necessary evil. There can be no question but that the presence of large numbers of lice on an animal prevents thrift and growth and this is especially true when colts and calves are badly infested. The poor, unthrifty colt or calf, if closely examined will generally be found lousy and a little attention given the stock at the right time is well repaid in their improved appearance and growth.

During the warm months of last season the dipping arrangement for hogs was abandoned and the following device was made use of. A good shed was built in the hog lot at a convenient place and a wallowing tank was constructed under it having a depth of about fourteen inches and which contained from five to eight inches of water. The ground around the vat was covered with rough concrete to prevent mud. The vat was kept partially filled with water and cleaned occasionally and at necessary intervals, a gallon or so of crude oil was poured into the vat. The hogs in wallowing would get sufficient oil on them to destroy the lice. By keeping this arrangement in operation the hogs were kept free from lice and without any unnecessary worrying or handling of the stock. For several years before, use had been made of a vat and some of the coal-tar dips and they did not give satisfaction. The work had to be continually repeated and the hogs were never free from lice.

DISINFECTANTS.

Previous experiments (Bulletin No. 62.) have shown that the coal-tar preparations are especially valuable for their disinfecting qualities. It was learned in these experiments that these preparations were especially useful in from two to five per cent solutions for washing wire cuts and wounds of any description, better and safer in fact than carbolic acid. However it must not be concluded that because a substance is a good disinfectant that it will be equally good as a dip. In the above bulletin is reported a test of the disinfecting qualities of kerosene emulsion and this test shows the emulsion to be practically worthless for dis-

infecting purposes. In the experiments where the kerosene emulsion was used as a dip to kill lice, it has proven more effective than any of the coal-tar preparations.

EFFECT ON LICE EGGS.

We have not tested any of these preparations on horses or cattle except to make up a small quantity of the dip or kerosene emulsion and apply to the animal by means of a brush, sponge, or with a spray pump. In the dipping tank used for hogs, solutions of the dip have been used varying in strength from one to three per cent. The latter strength kills most of the lice although some of the larger lice always escape the effects of the dip and it seems that the dipping does not interfere at all with the eggs or "nits" hatching. The effect of the dips and of kerosene emulsion on the eggs have been tried in laboratory experiments. When the eggs were exposed to the dips in varying strengths and for different lengths of time it was found that most of them could be hatched afterwards while dipping in kerosene emulsion usually prevented any of the eggs from hatching.

A great many hog raisers purchase dipping vats and use one or more of the commercial dips and try to get rid of the lice by dipping their hogs several times during the season. The dipping if carefully done, does not injure or worry the hogs but nearly all hog raisers who have tried this method find that dipping in the commercial dips will not get rid of the lice. There are enough of the lice not killed, together with the eggs hatching out, to keep the hogs infested all of the time, the practical outcome of the matter being to keep the lice in check but it does not get rid of them. In the results obtained from the use of the shallow wallowing vat made use of last season, it was found that all of the hogs allowed to run in the lot where the vat was located were free from lice.

KEROSENE EMULSION.

Kerosene emulsion may be made according to the following formula:

Hard soap, one-half pound.
Kerosene, (cheap grade) 2 gallons.
Water, one gallon.

Cut the soap into shavings and boil in the water until the soap is dissolved. Remove the soap solution from the fire and add the kero-

sene and churn or spray back until a thorough emulsion is made. To this emulsion add seven gallons of water and use this for spraying or dipping. This emulsion may be applied to any of the farm animals by means of a sponge, brush, or spray pump without any injury whatever and when thoroughly applied, it will rid the stock of lice. This emulsion may also be used to free poultry from lice. Place the emulsion in a vessel of convenient size and dip the fowls, being sure to get all portions of the body wet and hold them in the dip for one minute. After treating the fowls the emulsion may be used to spray the roosts and coops and in this way rid them of the mites and lice.

KILLING TEXAS FEVER TICKS.

INTRODUCTION.

The Texas fever tick causes more loss to the stockmen of Oklahoma directly and indirectly than all other parasites combined. The deaths from Texas fever, the loss of growth and development of the cattle due to the tick, and the greater loss in a commercial way on account of the quarantine restrictions all combine to make the question of getting rid of the fever tick of the greatest importance to the farmers and stockmen of Oklahoma.

It is not necessary at this time to review the large number of experiments that have been conducted to prove that the tick is the means of spreading Texas fever, but it is necessary to describe and urge the use of such means as will enable cattlemen to get rid of the tick. We know of only one kind of tick (Boophilus annulatus) that is capable of spreading Texas fever and this tick is the one that is most abundant in Oklahoma. Many think that the "dog tick" is the common tick on stock but such is not the case. It requires some care to distinguish the fever tick from the "dog tick" but if ticks are present on stock, they should be destroyed. In Oklahoma the probabilities are that it is the fever tick and not the "dog tick" that is present.

WAYS TO KILL TICKS.

There are two general plans that may be followed in getting rid of ticks and either one will prove successful if it is carefully followed out. The first plan, and the one that every farmer can adopt, is to use oil, either by dipping the stock in crude oil or by applying the oil by means of a brush or mop; the second plan is to make use of pasture rotation, that is, to change the stock from one pasture to another during the summer and fall.

USE OF OIL.

Constructing a dipping vat is too expensive for the farmer who may have from ten to thirty head of cattle on his farm. Such a stockman will devise other means of getting rid of the ticks. Several farmers in the neighborhood of Stillwater have practiced the following method of work and their farms are now free from ticks. Build a small but substantial corral at some convenient place and in this build a narrow chute that will accomodate one animal and build it so that you can examine every part of an animal that is confined in it. Collect all of the stock on the farm and examine them closely for ticks every two weeks during July, August and September. The large ticks should be picked off and dropped into a can of oil. After this is done apply crude petroleum by means of a brush or mop to every part of the animal where you can find young ticks. If there are ticks on an animal they will be found on the inside of the hind legs, in the flanks, on the belly, behind the forelegs and on the side of the neck. Go over all of these regions carefully with oil. If crude petroleum cannot be had then use the following: three gallons of kerosene, one gallon of black machine oil and one pint of oil of tar. Apply this in the same way as for the crude oil. If the cattle are carefully treated the first time, it will be light work afterwards if they are treated every two weeks. Don't expect to find small ticks on cattle by walking or riding among them but get the stock into the chute and go over them with the hand. A little carelessness will allow some of the ticks to mature and drop off and this will keep the pasture and cattle infected and there will be infection the next year. If this work is thoroughly done for three or four months during the summer and fall, any pasture or farm may be made free from ticks.

PASTURE ROTATION.

This method can be followed by any stockman or farmer who has pastures that can be free from stock for a part of the summer and fall. Keeping pastures free from stock during the late fall and winter will not help very much towards getting rid of the ticks because the eggs laid by ticks in the late fall will not hatch out until the warm weather of spring. The principle of the pasture rotation method is based upon the fact that the tick cannot develop unless it can attach itself to some animal, consequently if stock are kept out of a pasture long enough, the ticks must die out.

The pasture should be divided so that all stock (horses, mules and cattle) can be kept from a portion of it from July first until November or December. If the pasture is to be divided by means of a fence a narrow lane should be left between the used and unused portions in order to keep the ticks from passing from one portion to the other. The portion of the pasture not used during the summer and fall will be free from ticks and can be used for the stock during the winter and the next season. In the meantime the stock should be moved to a feed lot or to some cultivated field (stalk field or wheat pasture) about October first and kept there until December first when they can be turned into the pasture that has not been used during the summer and fall. The time the cattle are kept on stalk or wheat pasture (these fields would have no ticks) would allow all ticks that are on them at that season to develop and drop off and by December first the cattle would be free from ticks. The next season the infected pasture may be made free from ticks by keeping all stock off of it until July fifteenth or August first. At no time should cattle be allowed to pass from one pasture to the other until both pastures are free from ticks and cattle purchased should be closely examined before being turned into pasture and then examined a second or third time at intervals of a week or ten days. A little carelessness in such matters may render entirely useless all of the labor and money used to get rid of the ticks. There seems to be no easy or automatic way by which pastures and farms may be made free from infection but a little careful work along the line of either method outlined will give satisfactory results.

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