United States Department of Agriculture Special Page

Bulletins and Special Articles Issued by the Government, of Interest to the Northwest; Suggestions Covering a Wide Range of Activities; Results of Federal Investigations, Etc.

Chalcis-Fly--Alfalfa Seed Pest

THE alfalfa-seed destroyer, known as the chalcis-fly, does its destructive work in clover or alfalfa seeds, from the Gulf Coast to the northern limits of the United States, according to the United States Department of Agriculture's specialist, who has personally seen the widespread devastations of this pest. By harvesting severely infested crops, by cleaning fence lines and ditch banks, and by Winter cultivation the grower of alfalfa seed may help to control this insect. A new Farmers' Bulletin (No. 636) entitled "The Chalcis-Fly in Alfalfa Seed," gives the details of these methods of control, and may be had free of charge on application to the Department.

Pest Resembles Gnat.

The chalcis-fly under the microscope is a formidable-looking insect, but when seen in the field it is frequently confused with the gnat. These pests may be seen in great numbers flying over alfalfa-seed shocks and swarming over the sickle bar when the alfalfa is being cut. The eggs are so small as to be invisible to the naked eye and are deposited through the soft, green seed pods directly into the soft seeds when the pods are about half-grown. Immediately upon becoming a fly, the insect eats its way out through the shells of the infested seeds, then through the green pods. Large portions of the seeds are hollowed out in this manner, when they are still green and growing.

Recognizing Infested Seeds.

The infested seeds which still contain the living larvae of the insect may be recognized by their abnormal shape and usually by the dull brown color. Some of the infested seeds, however, retain their natural color, but they always lack the glossy appearance of normal seeds. The extent to which alfalfa seeds is damaged by the fly is not generally apparent, owing to the minuteness of the insect and because its destructive work is accomplished within the growing seeds. The alfalfa-seed grower can only estimate the percentage of his crop destroyed by opening a large number of the seed pods and observing the infested seeds.

Harvesting Infested Crops.

An alfalfa field is frequently found with such a severe infestation by chalcis-flies that the grower considers it of insufficient value to be harvested and simply drives in a herd of cows to pasture the crop. With regard to the control of the chalcis-fly for the protection of future seed production, this is a costly mistake. Observations show that many of the pods burst open, while others are trampled to the ground. Here great numbers of infested seeds offer favorable conditions for the hibernation of the chalcis-fly larvae.

These, as mature flies, will infest the seed crops the following Spring. Under such circumstances the crop should be mowed, removed from the field and stacked. It may then be used as rough fodder; and if the remaining straw is burned in early Spring the hibernating larvae will be destroyed.

Cleaning Fence Lines.

The following facts emphasize the importance of cutting the alfalfa along ditch banks and fence lines, as well as in the fields:

1. The earliest seed pods are found to develop on the isolated and vigorous growing plants found in such places.

2. The earliest pods have an especially large percentage of the seeds infested with chalcis-fly larvae.

3. The chalcis-fly larvae are able to pass completely through the first generation in the earliest pods before the regular seed fields are sufficiently advanced for oviposition.

This cutting should be done with the harvesting of each hay crop, before the seed crop is grown.

It is sometimes necessary to have two or more irrigation ditches running parallel, making it impracticable to cut the alfalfa between them. In such cases it is economy to fence the ditches and use this land as a small Summer pasture, thus preventing the development of alfalfa seed pods and the chalcis-flies.

Winter Cultivation.

In the process of harvesting the seed crop many pods containing infested seeds fall to the ground. Here they remain until the following Spring when the hibernating insects emerge. A thorough cultivation with an alfalfa cultivator, at some time late in the Fall or in early Winter, will sufficiently cover such pods and will prevent the emergence of most of the adults when the warm Spring weather arrives.

Destroying Screenings.

After the alfalfa is threshed the great mass of screenings which is left frequently contains large numbers of seeds infested with hibernating larvae. If the chaff, together with the screenings, is placed in a compost pile for three or four months, so that it will become heated and decay, most of the insect life will be destroyed. Unless it is possible to treat the screenings in this manner they should be burned before the growing season opens in the Spring.

Many of the alfalfa seed pods along check ridges and fence lines may be destroyed by burning off the weeds and alfalfa. This should be done either in the Fall or early Spring.

Planting Clean Seeds.

In purchasing alfalfa seed, farmers should insist upon having seed which has been well cleaned after threshing and should never plant the uncleaned product in new fields. In many localities much of the seed is sold both by farmers and by local dealers without first having been cleaned. The product of such seed when harvested from the late crops frequently contains a 10 to 15 per cent infestation of hibernating chalcis-fly larvae. The planting of this uncleaned seed frequently gives the chalcis-fly a start in the new field, as well as resulting in a poor stand.

Cutting the Seed Crop.

It is not an uncommon practice for the farmer to allow the seed crop to remain on the fields an excessive period in order that more of the green pods may develop. In such fields on the same plant are found ripe pods bursting open, as well as fully developed, half-grown and newly forming pods.

Observations show that many of the chalcis-flies infesting the earlier or first pods have had sufficient time to complete their life development, emerge from the seeds, and deposit their eggs into the green pods growing on the same plant upon which they themselves were fostered.

In view of this the seed crop should be so handled that the setting of pods will be as uniform as possible, and the crop should then be harvested as soon as the larger number of the pods are ripe.

Stacking Seed Crop.

It has been demonstrated that great numbers of chalcis-flies emerge from the seed pods at about the time the pods ripen and continue to emerge indefinitely. In mid-Summer most of them, however, emerge within three or four weeks after the crop is harvested. Where later seed crops are grown, it is therefore advisable to stack the early crops as soon as possible, thus preventing the free emergence offered by leaving the crop in shocks on the field.

Destroying Bur Clover.

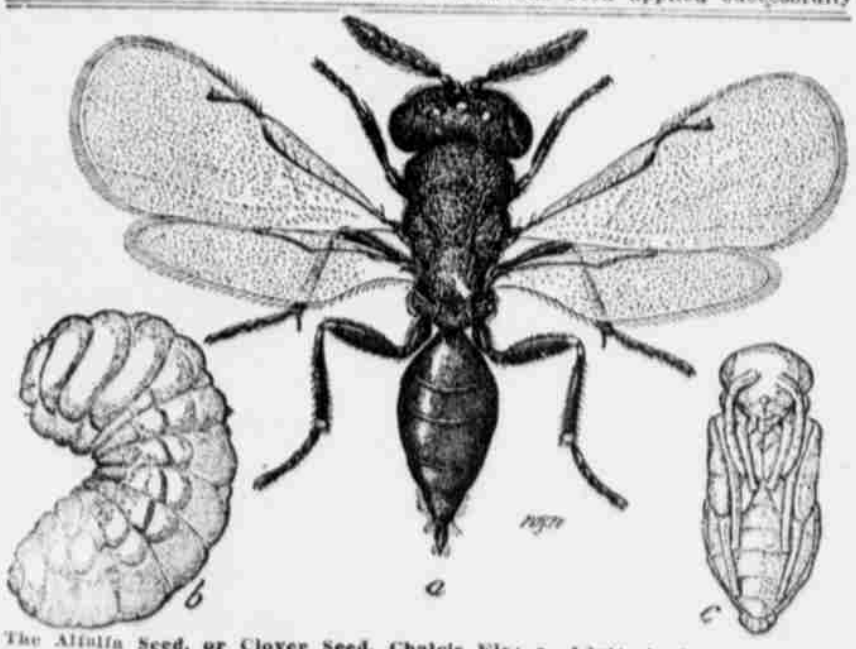
In some localities bur clover grows abundantly and matures its seed pods in early Spring. The chalcis-flies thus have already completed the development of an entire generation in the seeds of these plants before the alfalfa seed pods have developed in the fields. Under such conditions it would be well to destroy the bur clover pods by burning the fence lines in the Spring. This can frequently be done after the plants mature and before the alfalfa seed crop comes on.

Cleaning the Seeds.

Some of the alfalfa seed-growing districts have organizations among the seed growers with officers having complete charge of cleaning and marketing the seeds for the growers. The product handled through these organizations is, for the most part, well cleaned, so that nearly all of the infested seeds are removed before marketing. When done on a large scale the cost of cleaning the seed is about 40 cents per 100 pounds. In addition to removing the infested alfalfa seeds, this process removes the weed seeds, and the product will then command the highest market prices. Where it is necessary to do the cleaning on the farm, good results may be secured by using the proper sieves in a small fanning mill.

Need of Organized Efforts.

The habits of this insect, together with the general practices of alfalfa-seed growers, makes it necessary for the growers of each district to cooperate in an effort to control this destructive seed pest. While it is important that each farmer do all in his power to reduce the abundance of this insect on his own farm, the efforts of an individual are greatly hampered by the negligent habits of a neighbor. The rapid distribution from breeding centers of the chalcis-flies and the short minimum period required for the development of the adults render organized action necessary.



The Alfalfa Seed, or Clover Seed, Chalcis Fly; a, Adult; b, Larva; c, Pupa. Much Enlarged. (Original.)

Is $2,000,000 Wasted on Coast?

THE waste produced in the process of canning salmon is variously estimated to be from 25 to 50 per cent of the original weight of the fish and over $2,000,000 is the value of this waste annually on the Pacific Coast, according to the United States Department of Agriculture. In a newly published bulletin (No. 150) the Department's Bureau of Soils suggests that canneries might advantageously dispose of their waste by manufacturing it into fertilizer or fish meal for poultry or cattle feeding purposes. With a strictly by-products plant, overhead charges would disappear and a good profit should be realized on the sale of this by-product; also the sanitary condition of the cannery would be improved.

Disposal of Waste.

Salmon cannery waste is being disposed of at present by the "large-unit plant," which at first glance appears more desirable than the "small-unit plant." However, the failures in the operation of centrally located rendering "large-unit plants" have been far more conspicuous than the successes. There are many reasons to believe that the "small-unit plant" of little capacity, if run as an integral part of the cannery, might prove, financially, more satisfactory. The "large-unit plant" must haul the raw material which the small-unit would have on hand and the former also lacks demonstrated machinery to make the rendering process economical. There is the additional drawback, that the season when the plant may be operated must be short.

Finally there has been a general failure to meet the demands of the problem in this manner. Of course if the seaweed "kelp" were treated in connection with the fish scrap in a large-unit plant the results might be more satisfactory. This feature will be considered in detail in a subsequent article.

Loss of Apparatus.

The by-products plant which is just sufficient to treat the output of the cannery's waste seems the only alternative to the central-rendering station. For equipment the old-fashioned, unimproved retort cooker and hydraulic press are adequate. This is because they are the only apparatus which has been applied successfully on a small scale, rather than because they are ideal. This form of apparatus will render salmon cuttings, affording a good grade of scrap and a fair yield of oil. The total cost of a suitable apparatus should approximate $5800, which might be itemized as follows:

Retorts, two, at $350	$ 700.00
Press	550.00
Driers, two, at $600	1200.00
Engine to operate driers	350.00
Incidentals	1000.00
House	2000.00
Total	$5800.00

Running Expenses.

The running expenses of this plant may be put as follows:

Interest on investment, $6000 at 10 per cent	$ 600.00
Depreciation, at 10 per cent	600.00
Wages, one man at $100, four at $75 per month, two months	800.00
Sacks, 2300, at 10 cents	230.00
Barrels, 380, at $1.85	700.00
Coal for rendering, 10 tons at $8	80.00
Coal for drying, 12 tons at $8	96.00
Freight (from Alaska) on 120 tons scrap, at $4	480.00
Freight (from Alaska) on 380 barrels oil, 75 tons at $4	300.00
Total	$3886.00

Proceeds.

The proceeds may be estimated as follows:

Scrap, 115 tons, at $40	$ 4,600.00
Oil, 19,000 gallons, at 30 cents	5,700.00
Total proceeds	$10,300.00
Total expenses	3,886.00
Balance	$ 6,414.00

According to the above estimate $6414 are put down as profit. More strictly this should be regarded as the working margin of income over expenses. As the conditions imposed are more severe than those probably to be encountered, it is believed that this estimate is conservative.

This belief is strengthened by the fact that the estimates on the same general basis, prepared by an experienced manufacturer of fish scrap from this class of material, is 50 per cent lower than the above as concerns the running expenses and 20 per cent lower with respect to equipment. Thus, a larger capacity is prescribed than probably would be necessary, and a much shorter working day than would be required in actual practice.

Labor Problem.

In operating the supposed by-products plant, the labor problem is regarded by those packers who operate in Alaska as a serious matter. This may be the case in Western Alaska, where it may be necessary to employ the force for the by-products plant before leaving the states and to carry them on the pay roll until they return in the Fall; but in the other parts of Alaska it is difficult to see how the problem of securing three or four additional laborers could be serious.

While it is probable that in the busiest part of the season every member of the cannery force is employed, at other times there should be a sufficient number of men temporarily idle to do all the work required in the by-products plant. An additional force, if necessary, could be secured for the rush season.

Advantages of System.

There are three decided advantages possessed by this system of disposing of cannery waste. The first and most striking is that of the elimination of all costs of collecting. With

(Concluded on Page 10.)