CONTROL OF GRAIN MITES

MITES are small animals, scarcely visible to the human eye, which at times infest cereal and other food products. They are soft-bodied creatures and of a more or less pearly white colour. They may occur in various other food products, notably cheese, but this pamphlet deals with their presence in grain.

Life-history

The females lay 3 or 4 eggs per day, usually up to a total of about 30. The eggs are scattered about at random and are often attached to the grain. They require 3 or 4 days to hatch. The young mite feeds on the dust and debris associated with the grain, and usually there are 3 moults during the developmental period. The complete life-cycle requires about 17 days at a temperature of 65° F. to 70° F., and a longer period at lower temperatures. Where conditions are unfavourable, many of the young mites develop a resting stage in which they remain dormant, sometimes for long periods of time. They are able to moult into an active stage when conditions again become favourable.

Distribution

Mites have been known in food products for many years. There are only a few species which infest grain and cereal products, but they are widely distributed throughout the temperate zones.

Surveys of country elevators in Western Canada in recent years have shown that mites are frequently present in the boots and pits, as well as in other locations. When grain is taken into these elevators, the mites are distributed throughout the grain in the various bins, and, if conditions are favourable, they will increase in numbers.

Usually development takes place most rapidly in grain which carries an excess of moisture, or which, in other words, is classed as "tough" or "damp". The mites feed on the debris, dust, wheat hairs, etc., as well as to a limited extent on the germ end and in the "crease" of the kernel.

As a result of their feeding the mites give off carbon dioxide and water following digestion. The water is absorbed by the surrounding grain and the moisture content is thus increased. When this reaches a point somewhat in excess of 15·5 per cent the mass of grain starts to "heat", and if not properly handled serious losses may occur.

Published by Authority of Hon. J. G. Gardiner, Minister of Agriculture, Ottawa, 1941

Effect of Cold on Mites

Available information indicates that mites are able to withstand any of the normal temperatures likely to be encountered while the grain is in storage in elevators or terminals.

Measures to Reduce or to Avoid Losses

1. Careful examination of stocks throughout the period of storage to detect the presence of mites.
2. Careful cleaning of the boots, pits, space under the scales, the bins and distribution head of the elevator when the "house" is empty prior to receiving the new crop.
3. Cleaning the grain when received prior to placing it in bins in the elevators.
4. Cleaning the grain which is infested with mites.
5. Turning the grain which is infested with mites.
6. Shipping infested grain to a terminal elevator which is equipped with cleaning and drying equipment in cases where the grain cannot be handled properly in the country.

Sampling

In the case of the regular elevators samples may be secured:

(1) from the tops of the bins,
(2) by drawing off grain to the back hopper,
(3) from the bleeders,
(4) from the bin bottoms.

Where preliminary samples indicate that mites are present, more material should be drawn off, taking samples at regular intervals.

It is a relatively easy matter to secure samples of grain stored in elevator bins. In the case of annexes, "bull-pens" and other structures where the grain cannot be drawn off, it is necessary to use probes or other sampling devices in order to determine the condition of the grain. While in many cases the grain stored in such structures may be high-grade material carrying very little moisture, the possibility of leaks, etc., should not be overlooked. The careful elevator operator and travelling superintendent should periodically examine these stocks as well as the more accessible ones in the elevators. Much of the grain in these temporary structures may not be moved for some time, and the periodic examination represents the best form of insurance.

Grain should be taken at different points in the bins and at different levels to afford a representative sample.

Examination of the Samples

In order to locate the mites easily, the grain sample should be sifted over a screen of about 30 meshes to the inch. This will retain the grain and coarse dockage while allowing the dust and mites to pass through. The accumulated dust should then be spread out in a thin layer, preferably on a sheet of black paper. The mites are white in colour and if placed on a dark background are readily seen, particularly if the sample is examined with a magnifying glass. In cold weather the mites may be sluggish, but, if the paper is held for a short time from 6 to 12 inches above the stove, they will warm up and move more rapidly. If the dust is tipped on another paper, many of the mites will remain on the

original one, as they tend to cling to the surface beneath the dust. In cases where there are only a few mites present it may be necessary to repeat the above procedure several times in order to locate them.

If there is any doubt as to the identity of mites or any other pests found in any of the grain samples examined, the material should be forwarded to:

THE DOMINION ENTOMOLOGIST,
Science Service,
Department of Agriculture,
OTTAWA.
(Marked) Attention H. E. Gray.

The container should be a tight one, such as a tobacco can or a grain envelope, and should bear the name of the shipper. A covering letter containing all available information regarding the parcel of grain which the sample represents should be mailed at the same time. No postage is required on letters or on small parcels when addressed as above, provided they do not weigh more than 12 ounces.

The cleaning of grain prior to binning, as carried out by certain elevator companies, will eliminate any mites which may accompany the grain to the elevator. Certain cases of mites in loads of grain have been reported by elevator agents during recent years.

Where mite infestation is found in bins in the elevator, and the latter is equipped with cleaning facilities, the grain should be run through the cleaner, and the dust and debris removed therefrom should be burned. This is the most satisfactory method of treatment.

Where cleaning equipment is not available, turning the grain is the best method of control. To carry this out readily, there should be at least one large empty bin available so that the grain may be run from the one containing the infested grain into the back hopper and then re-elevated into the empty bin. In many cases one turning is sufficient to dispose of most of the mites, although in badly infested stocks it may be necessary to repeat the turning a second time to accomplish this. The rubbing of the kernels together kills the mites, and their remains can be found following the turning of badly infested stock.

In certain cases where the country point is not equipped to carry out this work, it may be necessary to ship mite-infested grain to a terminal elevator. Usually when grain reaches the point where such procedure becomes necessary, certain losses will undoubtedly be sustained. Such losses can very largely be avoided by periodic examinations followed by control measures where necessary.

Grain Stored on Farms

As large quantities of grain are at present being stored on farms, it is very important that farmers examine their grain at frequent intervals throughout the period of storage. "Damp" or "tough" grain is especially susceptible to attack by mites, and serious infestations may occur during the winter months. Farmers, therefore, should carry out regular inspection of the grain following the procedure given above. If infestations are found they should be reported to the Dominion Entomologist, Department of Agriculture, Ottawa, for further advice.

Prepared by H. E. Gray, Division of Entomology, Science Service, Department of Agriculture, Ottawa

OTTAWA: Printed by EDMOND CLOUTIER, Printer to the King's Most Excellent Majesty, 1941.