

# Canterbury Chamber of Commerce

*Agricultural Bulletin*

## PESTS OF STORED GRAIN

*Prepared by Canterbury Agricultural College, Lincoln*

BULLETIN

CHRISTCHURCH, FEBRUARY, 1935

No. 68

The February bulletin (No 68) of the Canterbury Chamber of Commerce, prepared by Canterbury Agricultural College deals with the subject of "Pests in Stored Grain," as follows:—

Pests of stored grain, such as weevils and mites, are usually found in destructive numbers only when grain has been stored for several months. Until recently it has been the custom for farmers to sell their wheat, oats, etc., soon after threshing, and consequently there have been few cases of these pests occurring in the farmers' sheds. During the last two or three seasons, however, the monthly increments in prices have induced many growers to hold their wheat for six or eight months, and as a result there have been several serious outbreaks of various pests, with considerable resultant loss to the holders. It is at this time of the year, when grain is going into store, that these outbreaks of pests can be combated, and so this bulletin is issued now, to describe the pests, and the precautions that should be taken to prevent their occurrence in serious numbers.

There are three grain pests that occur more or less commonly in New Zealand, and these will be described in turn.

### Weevils

Grain weevils are perhaps the commonest, and certainly the most destructive, of the pests of stored grain in New Zealand. The adult weevils are chestnut brown in colour, about one-eighth of an inch long, and possess, as all weevils do, a long snout. They occur in wheat, oats, biscuits, etc. The female weevil with her snout bores a hole into the grain and lays a single egg in each of many grains, laying about 20 eggs a day, and often producing a total of 200 eggs. The grub that hatches out feeds on the interior of the grain, and in time hollows it out completely. No mark of its presence is seen on the surface, the hole that the parent bores being too small to be seen. When all the inside of the grain has been eaten the grub goes into a resting stage, and afterwards changes into a beetle still within the grain. It then bores its way out of the grain, leaving a hole about the size of a pin's head, and quite plainly seen. After emerging the adult weevil itself starts to eat the grain, usually attacking broken grains, and even in this stage doing considerable damage and producing noticeable quantities of dust. After a

few days the adult weevils pair, and egg-laying again commences a new cycle.

The period covered by a generation, that is, from the laying of an egg until the egg has hatched out and developed into a weevil that is again laying eggs, is, in summertime, about six weeks. The period varies considerably with the temperature; no development takes place when the temperature is under about 60 degrees F., as it always is in winter, but with the return of spring, and especially in summer, the development proceeds apace, and the numbers increase rapidly. Moisture as well as temperature affects the rate of breeding, and lines of wheat that are out of condition are especially liable to weevil attack.

There have been numerous destructive outbreaks of weevils in grain stores in New Zealand. There is one story of a weevily town store being emptied of grain, and the weevils marching in such numbers towards another store that a hose was used to wash them off the footpath into the gutters. In another case weevily wheat was tipped out on a beach and the weevils were seen marching back towards the stores on the waterfront. Although these cases are extreme, yet there have been many serious losses from weevil attack, and no miller will accept wheat that shows any sign of weevil. This is partly because he does not wish to infect all the lines in the store and the building itself, and partly because he has to hold his wheat through the summer, when the weevil breeds most quickly, and therefore does most harm.

### Mites

Wheat mites are not insects but degenerate spiders, and in common with all other spiders possess four pairs of legs. Mites are commoner than weevils, but are much less easily seen. The mite is white in colour, and is only the size of a pin's point. It is almost impossible to see it with the naked eye, but mitey wheat is usually very dusty and if the dust is riddled out and held in bright sunlight the mites can perhaps be seen. Usually, however, a lens has to be used to make them visible. Mites attack not only wheat, but any kind of grain, as well as bran, hay, chaff, etc. Dusty corners of a chaff house, or hay stored for a long time, or the chaff on the floor of an unswept stable, are almost sure to provide mites in quantity. A case occurred last year

where a stable became so infected with mites that horses could not be kept in it. Mites are also often found in the timber of buildings, especially if they are rotten or infected with borer. Often the first sign of mites is their dropping on to floors leaving a white or brown dust that has continually to be swept up, or occasionally they are first detected by a tickling sensation on the arms or face of people coming into contact with them.

The mite does not go through a complicated life history as the weevil does. It lays 20 to 30 eggs on the surface of the grain and these eggs hatch out directly into mites again. The complete life cycle from egg laying of the parent, to egg laying of the offspring is passed through in 17 days in summer temperature, but it continues to develop, though at a slower rate even in winter. As with weevils so with mites, development is more rapid where moisture is present, and to store wheat that is at all out of condition is an invitation to attack.

The mite does not bore into the main part of the grain, but bores into the germ, and up to 50 mites can sometimes be found in the hole where the germ has been hollowed out. The mite also probably attacks the surface layers of the grain, reducing them to dust, and at the same time it produces an offensive smell, easily recognised by those accustomed to dealing with stored grain.

As in the case of weevils no miller will accept a line of mitey wheat, simply because he does not want other lines, or his store itself, to become infected.

### Book-lice of Wheat

Book-lice are not such common pests on commercial lines of wheat as the two previously mentioned, but a few cases of their attack were observed last season, and they very frequently infest samples of wheat stored in bottles as specimens. The louse is flat in shape, white and brown in colour, and about one-twelfth of an inch long. It is thus easily seen and is especially noticeable from its rapid motion which makes it quite difficult to catch.

This book-louse feeds on any kind of vegetable matter. It is common in old books, whose bindings it eats, and in dried specimens in museums. These are places where it is easily seen, but it almost certainly lives in old deposits of hay, chaff, and stored grain, so that it is likely to be found

in dirty corners of sheds and stores. It does less harm than weevils or mites, probably eating only the outside layers of the grain, but here again no miller or merchant would accept a line of wheat obviously infected, for fear of spreading the pest through his store.

There are several other pests of stored grain, but the three described are the commonest and the most injurious.

#### Mode of Infection

None of these pests comes from nowhere or from nothing. Each is produced only by breeding from eggs laid by other pests of the same kind. The eggs are so small that they can be blown about in dust, and the infection is often carried by mice, rats and birds. Wherever grain is stored, therefore, it is likely to become infested with these pests from other and older stores of grain or hay or chaff, where the pests have had time to multiply and become numerous.

But such modes of infection are relatively slow. Only a few insects or mites would be carried by such means, and although they multiply rapidly in warm weather they do so slowly during winter, and at any rate they have to be present in large numbers before their presence is noticeable and deleterious. Under local conditions this mode of infection, though certain to be effective in the long run, would never cause trouble during the eight or nine months grain is usually held.

Before serious injury can result there must be a nearer and more concentrated source of infection, and this is usually found in some old neglected bags of grain that have been undisturbed for years, lying in the same shed as that in which the new grain is to be stored. Part bags of grain, or grass seed, or chaff, or bran, and such

like feeds, are often left lying in odd corners, not used because they are too small, and not thrown away because they may come in useful. Such material is usually swarming with weevils and mites, which, when the shed is filled with new grain, rapidly spread to the new feed provided for them. In the dark and quiet of the shed and during the warm days of autumn the pests crawl all over the new stacks, and multiply rapidly for a time at least. In addition to such sources of infection, grain, etc., left in threshing machines, seed cleaners, chaff cutters, and even the dust in corners, or on unboarded floors where chaff and such litter accumulates, or hay stored in a shed left over from one season to the next, are frequently the means of providing a dense army of pests to infect new grain coming into store.

#### Means of Prevention

All the pests mentioned can be killed even when lines of grain are badly infected, but the means of doing this are usually beyond the farmers' province. Lines of mitey wheat are sometimes cleaned up by riddles and blasts, a method occasionally used being to run the mitey wheat through a threshing machine. If pests are to be killed in the store fumigation must be resorted to, carbon bi-sulphide being the material that is cheapest and most effective. To use it, however, the store must be made practically air tight, by plugging up all holes, and pasting strips of paper round doors and windows. If only part of the store is to be fumigated, air-tight tarpaulins hung over the sacks to be treated will confine the gas, but they must enclose the sacks very completely. Carbon bi-sulphide is highly inflammable and explosive, and notice should be given to fire insurance companies before it is used.

These details indicate that to clean lines of grain already infected is difficult, dangerous, and laborious. It is much easier and simpler to avoid infection.

The means of doing this have been sufficiently indicated. They are simply not to store new grain close to where old grain or hay or chaff, has been lying during the preceding summer. Collect all part bags of seed and feed, and if there is no immediate prospect of using their contents otherwise, boil them up for the pigs. Sweep out the shed thoroughly, and if the floor is not sound, spray cracks and corners with a strong solution of sheep dip. Do not use old bags which may be infected with the eggs of mites or insects for new grain, nor store such bags near new grain heaps. Infected bags will become clean if they are hung over a fence and exposed to the weather for a week or so, and they will be safer if they are used for potatoes, instead of for grain or chaff. Do not stack new grain close to old stores of chaff or hay, or even close to stables where old chaff litters the floor. Be especially careful with any grain in the least out of condition. The moisture tends to generate heat, which helps the rapid development of the pests.

If these precautions are followed grain will rarely become injuriously affected by any of the pests mentioned before it is sold in the ordinary course of farm practice. Stored grain should, however, be examined periodically, especially for excess dust, and at the first signs of infection it should be disposed of to the best advantage.

Copies of this Bulletin may be obtained from the Secretary, Canterbury Chamber of Commerce, P.O. Box 187, Christchurch.