DIAGNOSIS AND EXTENT OF DAMAGE BY THE STEM WEEVIL

J. S. TIMLIN

Entomology Division, D.S.I.R., Auckland

Summary

A general account of the type and extent of stem weevil (*Hyperodes bonariensis* Kusch.) damage to wheat and grasses is presented. Examples of host preference are discussed. It appears that short-rotation (*Lolium multiflorum* hybrid) and Italian (*L. multiflorum*) ryegrasses are more susceptible to injury and are highly preferred hosts.

INTRODUCTION

THE STEM WEEVIL, *Hyperodes bonariensis* Kusch., was first recorded from this country in 1927. Six years later its pest status on wheat crops in Canterbury was established. Then, and for some time after, its presence in pastures was thought to be of little consequence and it was not until 1958 that evidence of weevil damage to ryegrasses (*Lolium* spp.) was published.

Although no comprehensive survey has been carried out, records from widely separated areas suggest that it is now present in all the important agricultural areas in New Zealand.

As the adult weevil is only about 1/10th inch long, this small size, coupled with its cryptic coloration, makes the detection of individuals in the soil difficult. Furthermore, it characteristically "plays possum" when disturbed and this lack of movement assists concealment. The larval life is spent within the host, the grub emerging to pupate in the top ¼ in. of the soil. There are two generations a year in the South Island, and a possible third one in the North Island.

HOST PLANTS

Wheat, barley and oats are attacked, as well as most pasture grasses. However, there is a marked preference shown by the stem weevil for some species—e.g., short-rotation ryegrass (*Lolium multiflorum* hybrid) and Italian ryegrass (*L. multiflorum*).

DAMAGE

The stem weevil injures its host in two ways. The adults feed on leaf tissue but this damage is usually unimportant. It is the larval tunnelling in the stems which causes serious damage to both vegetative and reproductive tillers. It has been estimated that one larva per vegetative tiller is sufficient to kill a ryegrass plant.

CEREAL CROPS

Damage occurs mainly in November and December. In plants only a few inches high, the larvae bore into the centre of the stem eating it out and so killing the tillers. This type of damage is most severe on spring-sown wheat. Similar attacks on late tillers of more advanced crops (autumn-sown) are considered unimportant. In

older plants a condition known as "strawbreak" can cause a major loss in the crop. "Strawbreak" is due to the stem weevil larvae boring into one of the lower nodes and tunnelling completely around just beneath the surface. Stalks so attacked snap off during periods of high wind.

PASTURE GRASSES

Symptoms such as the tillers turning yellow, or the plant wilting and browning off, may indicate stem weevil attack. Generally speaking, however, the damage in permanent pastures, which carry a well-balanced mixture of grasses, is usually of an insidious nature. A systematic and microscopic search is often necessary to establish the amount of damage taking place.

Two years' sampling of ryegrass pastures in Canterbury showed the percentage of damaged vegetative tillers to be 77% and 84.3% for Italian and short-rotation ryegrasses, respectively, and 35.4% for perennial ryegrass (*Lolium perenne*).

This season in the Waikato, the sampling of adjoining paddocks on one farm revealed that the adult population levels were consistently different. The population of adult stem weevil in one paddock was very high and approximately five times greater than that in the other. This paddock had been sown in the spring (1962) for temporary pasture, the mixture being 18 lb Italian ryegrass and 2 lb white clover (*Trifolium repens*). It was overdrilled in the autumn with 14 lb perennial ryegrass and 4 lb timothy (*Phleum pratense*). The high content of Italian ryegrass was undoubtedly responsible for the population "explosion" which occurred in this pasture. Second paddock was autumn-sown (1963) with 14 lb prairie grass (*Bromus cartharticus*), 10 lb perennial ryegrass, 4 lb standard New Zealand cocksfoot (*Dactylis glomerata*), 4 lb timothy and 2 lb white clover. At no stage did it appear that the moderate weevil population existing in this pasture would reach the catastrophic proportions such as happened over the fence.

Sweep sampling for adult stem weevil was carried out on three farms in one area. Two of the farms had a history of short-rotation ryegrass sowings and carried high stem weevil populations. Pastures on the third farm were predominantly perennial ryegrass (with one paddock of Ariki ryegrass (*Lolium perenne* hybrid)), and there was little or no short-rotation ryegrass present. Here the stem weevil population was consistently low, with the new Ariki ryegrass appearing to be similar to perennial ryegrass in the degree of host resistance shown.

Maintaining ryegrass-dominant swards (particularly short-rotation) in some areas is difficult because of stem weevil attack and so new pasture mixtures have been tried out. In this way it was hoped to reduce damage. A mixture of 14 lb prairie grass, 6 lb Grasslands cocksfoot (*Dactylis glomerata* L.), 4 lb *Phalaris tuberosa*, 3 lb timothy, and 2 lb white clover was sown in one paddock. Sampling from this pasture showed a moderate weevil population compared with the samples from adjoining ryegrass paddocks. The prairie grass and *Phalaris tuberosa* were highly resistant to attack.

In this particular pasture mixture, the cocksfoot and timothy grasses suffered severely and were dying out. Normally these grasses are not subject to such severe attacks when they are included in the standard ryegrass mixtures.

CONCLUSION

As would be expected, there are marked differences in the host preference shown by the stem weevil and also there exist varying degrees of susceptibility to injury.

There seems to be little doubt that short-rotation and Italian ryegrasses are both highly preferred hosts, and also exhibit high susceptibility to attack. The inability of these species to retiller during peak attack by the stem weevil (January/February) would contribute to this susceptibility. Conversely, perennial ryegrass, which shows moderate resistance, has the ability to maintain tiller growth and this must assist considerably towards survival. Under special conditions, grasses, such as cocksfoot and timothy, may be severely damaged.

COROLLARY

There are two aspects which bear a close relationship to stem weevil damage and which should be considered. The first is that even moderate losses of grasses, particularly short-rotation ryegrass, cause an imbalance with clovers, notably in spring, thus increasing the danger of bloat. Secondly, where there is a high percentage of dead tillers and plants as a result of weevil attack, this debris assists in the build-up of *Pithomyces chartarum* (Berk. & Curt.) M. B. Ellis, the causal organism of facial eczema.

LITERATURE USED IN THE COMPILATION OF THIS PAPER

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