CONTROL OF STEM WEEVIL BY MANAGEMENT

G. J. BATTEN

Department of Agriculture, Thames

Summary

Stem weevil, *Hyperodes bonariensis*, is a serious pest of high producing pastures, but the damage caused to ryegrass (*Lolium perenne*) in particular is often not noticed because it is masked by other less affected species, or blamed on other insects or drought. The theory has been advanced that as there is no chemical or biological control at present, the farmer will have to learn to live with it by practising good pasture management to minimize the effects of damage.

INTRODUCTION

While the stem weevil (*Hyperodes bonariensis*) has received publicity for only the last six to seven years, it seems likely that it has caused pasture damage for much longer than this. In the South Auckland area, it can be rated with black beetle, *Heteronychus sanctae-helenae*, cricket, *Teleogryllus commodus*, grass-grub, *Costelytra zealandica*, army worm, *Pseudaletia separata*, and subterranean grass caterpillar, *Oxycaenus* species, as a major pest of high-producing pastures especially.

On the Hauraki Plains, there is an area of very high fertility land where perennial ryegrass, *Lolium perenne*, and a local short-rotation ecotype are valuable components of the pasture, particularly for spring production. Although they produce only about half of the annual pasture production, they contribute about three-quarters of the winter growth and about two-thirds of the spring growth. Stem weevil causes damage—severe on some properties—in this type of pasture. From the farmers' point of view, open weedy pastures necessitating weed control and re-sowing, lower pasture production and lower income, and bloat, are very serious consequences of a stem weevil attack and control measures are important.

EVIDENCE

Larvae are present from September until October, December, and January to March. Populations of twenty adults to the square foot have been found in these ryegrass-dominant pastures on the Hauraki Plains. Such populations can be built up within a few months and are heavy enough to cause pasture damage that appears in the summer.

Certain conclusions can be drawn from information available on this insect.

SPECIES

Paspalum, *P. dilatatum*, and Yorkshire fog, *Holcus lanatus*, are free from attack by this insect, but no other grasses are fully resistant although some are more tolerant. Perennial ryegrass, Arika (*Lolium perenne* hybrid) and cocksfoot, *Dactylis glomerata*, in these pastures are less damaged than short-rotation (*Lolium perenne*

× *L. multiflorum*), for instance, which needs to re-seed to last for vegetative growth may cease in dry weather. They are able to withstand damage better because an examination of the different ryegrasses shows the same number of tillers with grubs present in all varieties but a much higher percentage in short-rotation. This "resistance" of Ariki and perennial is due to much superior tiller production, especially in the summer.

PASTURES

Old pastures are not as affected as new ones because they have established better and can withstand damage better. White clover (*Trifolium repens*) dominance follows stem weevil attacks and white clover is not attacked. Paspalum and Yorkshire fog will mask damage to ryegrasses because they are unaffected, and also maintain higher soil moisture levels. Hauraki Plains pastures with these grasses present show less total effect of damage.

MANAGEMENT

Hay and seed crops push a large number of tillers to the flowering stage which are maintained at the expense of vegetative tillers, but well-managed pastures are able to tiller more and longer into the summer than flowering ones. Topping removes developing seed-heads to allow further leaf growth and new unaffected tillers will survive.

Pasture production can be influenced by the severity and frequency of grazing, owing to the light interception factor in summer, and variation in soil moisture and temperatures. Lax grazing encourages cocksfoot and red clover, *Trifolium pratense*, dominance and ryegrass suppression. Attacks by other insects can mask weevil damage. Damage is most pronounced in dry years owing to low soil moisture levels, less growth and consequent severe grazing, and the taking of hay and seed crops. Other factors discourage ryegrass tillers and encourage the effect of stem weevil damage. In fact, anything which imposes a strain on a grass plant resulting in death of tillers and inhibition of re-tillering appears to magnify stem weevil effect.

There is evidence to support the contention that encouraging ryegrasses to tiller encourages further stem weevil attacks by providing new sites for oviposition. However, it is better to have a growing plant with a proportion of damaged tillers than a dead one.

CONTROL DIFFICULTIES

Control measures have been hampered by the following factors.

There are no natural enemies. The life-cycle and habits of the insect make control difficult. Adults will move to new sites of infestation, although whether the movement is as great in the North Island as in the South is subject to investigation. Large populations can build up quickly. If generations overlap, as there is some evidence to support, then insecticidal withholding periods are difficult to fit into the farming pattern. For instance, it has been suggested that late April to early July is the best time to achieve control with DDT and the best time for closing pastures, but once the rain has washed the insecticide off the pasture it has no control value, and this time of the year is notable for its rainfall.

While trials have indicated good control with chlorinated hydrocarbons, these materials and the recommended dust formulations

are both prohibited for pasture use under the regulations. Systemic insecticides prove no value to date. Some new organo-phosphorus compounds show promise but their effectiveness in the field has yet to be demonstrated and their place in the farm management pattern calculated.

Crop rotations are of no value because of the rapid build-up of the insect. Pasture management also has its difficulties because very few of the commonly sown species appear fully resistant, although some are more tolerant, to insect attack. There is a difficulty in incorporating resistant species into North Island permanent pastures quickly because of the cost, contour and soils. Also, resistant species may not have the desirable characteristics of the susceptible ones.

CONTROL

It seems as if farmers will have to learn to live with this insect in the meantime, endeavouring by better management to minimize the damage done and its effect, because at present this appears to be the only practical solution. If a plant of short-rotation ryegrass has a larva in each of its tillers, it will die. If the plant produces new tillers, then the damage is diluted and the plant will live. Therefore the key to minimizing damage is to make each plant produce more tillers. With this in mind, the following recommendations can be made.

PASTURE SOWING

The short-rotation ryegrass content in pastures should be reduced. It has been suggested that it should be left out altogether, but the contribution it makes to late winter-early spring growth is of great value. It should certainly constitute no greater than a quarter of the total ryegrass sowing in new pasture. Resistant species are well worth including if they are suitable in other respects. Ariki ryegrass, then, is one that should be included in years to come. Some districts have evolved pastures based on cocksfoot, prairie grass, *Bromus cartharticus* and *Phalaris tuberosa*, species which are able to withstand damage, but as a pasture having the drawback of greater difficulties in management on some soils at least.

Pastures are better sown in autumn rather than spring to enable plants to become established before spring attacks commence.

GRAZING MANAGEMENT

The recovery of a plant species is as important as its susceptibility and therefore over-grazing or under-grazing must be prevented. Pastures must not be allowed to seed or to become too rank, but, on the other hand, must not be over-grazed to the extent that growth ceases. Supplementary feeding of hay, silage, or a crop could be of value to prevent over-grazing in the summer. Full utilization of pasture growth is still important as, in practice, ungrazed feed is not controlled as much as is desirable. Poaching must be avoided at all costs.

OTHER MANAGEMENT FACTORS

While it is desirable to let short-rotation ryegrass seed for regeneration, this weakens the plant and helps weevil damage. It is better to over-sow or under-sow more seed into the pasture each autumn than let it re-seed itself. Control of other insects is also important. Topdressing must be at the level to at least maintain pasture production. Dry weather, particularly in the late spring during the

activity of the first generation, discourages grass growth and enhances damage. Hay and silage crops, while necessary, also play into the weevil's hands because new tiller growth slows down while pastures are closed for cutting.

In other words, anything which will keep the plant in a growing condition to produce new tillers will dilute the damage and reduce the effect.

RESEARCH

Limited research has been carried out to study the effect that better management has on weevil damage. Nevertheless, observations from farms on the Hauraki Plains over the past five years support these recommendations. For instance, in the 1961-62 dry summer, farmers who were allegedly over-stocked entered the winter with better pastures than those who were under-stocked. Pastures closed for hay do not recover after cutting as they should do and high weevil populations are present. Farmers with the best controlled pastures have the best pastures and the least bloat. If pastures are closed for hay or even just get away in the early summer, they do not grow to the same extent in the autumn flush as ones that have been well controlled.

While this is not research in the accepted sense, there is sufficient practical evidence to support the theory that good management is even more important when the weevil is present.

The chance to conduct experiments this year was spoiled by the good pasture growing season, and efforts to demonstrate the effects of non-topping, for instance, failed because grass growth was phenomenal and plants grew anyway.

CONCLUSION

The stem weevil may be likened to a magnifying glass that exaggerates pasture growth due to poor management and adverse weather and soil conditions. As there is no chemical control, the farmer must raise his standard of pasture management to a level where grasses are growing as well as possible, for as long as possible in the summer to minimize the effect of an attack.

LITERATURE CONSULTED

- Hoy, J. M., 1960: Argentine stem weevil damage to ryegrasses in the North Island. *N.Z. J. Agric.*, 100: 79.
- Kelsey, J. M., 1958: Damage in ryegrasses by *Hyperodes griseas*. *N.Z. J. agric. Res.*, 1: 790.
- May, Brenda M., 1961: The Argentine stem weevil *Hyperodes bonariensis* on pasture in Auckland. *N.Z. J. agric. Res.*, 4: 289.
- Pottinger, R. P., 1961: Argentine stem weevil. *C.C.C. Agric. Bull.* 380.