Lucerne

LUCERNE INSECT SURVEY

K. G. SOMERFIELD

Plant Health Diagnostic Station, MAF, Lincoln

and P. A. BURNETT

Crop Research Division, DSIR, Lincoln

Summary

The results are presented of a recent survey of insects in lucerne (*Medicago sativa*) crops from the main growing areas of New Zealand. Two hundred and forty eight paddocks were sampled (North Island 90, South Island 158) between October 1975 and March 1976. Important insects obtained during the survey included: lucerne flea (*Sminthurus viridis*), blue-green lucerne aphid (*Acyrtosiphon kondoi*), *Apterothrips secticornis*, sitona weevil (*Sitona humeralis*), white-fringed weevil (*Graphognathus leucoloma*), and winter moth (*Zermizinga indocilisaria*); beneficial insects taken included: eleven-spotted ladybird (*Coccinella undecimpunctata*), *Nabis capsiformis*, *Micromus tasmaniae*, small syrphid-fly (*Melanostoma fasciatum*), and large syrphid-fly (*Melanogyna novae-zealandiae*).

INTRODUCTION

The DSIR and MAF at Lincoln have recently conducted a combined survey of the pests and diseases occurring in lucerne (*Medicago sativa*) crops. The survey commenced on 22 October 1975 and continued intermittently until 12 March 1976. The following is an account of some of the insects obtained.

Early work on pests of lucerne foliage was done by Dumbleton, Morrison, and Lowe in the 1930's and 1950's (Pottinger and Macfarlane 1967). These observations were followed by a survey of 15 North Island fields by Eyles and Cumber (Eyles 1960), and 50 fields in the South Island by Macfarlane (1970).

AREA SURVEYED

Two hundred and forty-eight paddocks were sampled (North Island 90, South Island 158). Areas visited and total paddocks for each area were: Rotorua (31), Taupo (9), Gisborne (10), Napier/Hastings (18), Wanganui/Turangi/Bulls (22), Nelson (7), Blenheim/Kaikoura (20), Canterbury (91), Otago (23), Southland (17).

SAMPLING TECHNIQUE

One hundred sweeps with a net of circular aperture (30 cm diameter) were taken at random from each paddock. The insects collected were preserved in 70% alcohol in specimen bottles. Twenty-four plants were dug from each paddock for a disease survey and any insect damage on these was recorded.

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PESTS OCCURRING IN LUCERNE

Springtails (Collembola) Lucerne flea (*Sminthurus viridis*)

This collembolan occurred in all areas sampled regardless of crop age. Its abundance in samples varied considerably, but high numbers were taken sufficiently often to warrant further investigation of its pest status.

Lucerne fleas are capable of rapid population increase; when fully grown they are about the size of a pin-head. They chew the green tissues between leaf veins, and this may cause the foliage to become whitened or yellow.

Because of the numbers of lucerne flea likely to be present in old stands establishing new stands of lucerne near these increases the risk of attack.

Bugs (Hemiptera) Potato aphid (*Aulacorthum solani*)

The potato aphid is widely distributed, although it did not occur in large numbers in the samples. It transmits lucerne mosaic virus and may be implicated in the spread of other viruses (Ashby pers comm).

Blue-green lucerne aphid (*Acyrtosiphon kondoi*).

In October 1975 the blue-green lucerne aphid was first identified in New Zealand from south Auckland. It has since been recorded from throughout the lucerne growing areas of the North Island, and more recently has been found in Marlborough and then in Canterbury.

The blue-green lucerne aphid was found at three localities during the survey; two of these were new at the time, Ngakuru (south of Rotorua) and Waverley (near Wanganui). It was also found in Marlborough later during the survey.

The blue-green lucerne aphid can cause stunting, distortion and yellowing of lucerne plants. Examination of affected plants reveals aphids clustered on stems, and frequently on leaves also. Little is known about the role of this aphid as a virus vector. It is thought that it may have a toxic saliva.

The nysius (*Nysius huttoni*) was present at most of the localities sampled, although it was not usually taken in high numbers. During hot dry weather it is often very abundant on the soil surface amongst many kinds of plants. Nysius is a polyphagous species; Pottinger and Macfarlane (1967) state that it does attack lucerne, although its pest status is not known.

The mirid *Eurystylus australis* was of widespread occurrence, although it is generally not abundant in foliage stands. Macfarlane (1970) says that it is an important sucking pest in lucerne seed fields. The potato bug (*Calocoris norvegicus*) was taken at most of the areas sampled, and *Guisardus samoanus* also occurred widely but less frequently. Pottinger and Macfarlane (1967) discuss the significance of sap-sucking Hemiptera in lucerne.

Thrips (Thysanoptera) Thrips (*Apterothrips secticornis*) and onion thrips (*Thrips tabaci*)

These were of widespread occurrence in lucerne stands. In some areas (particularly Hawkes Bay) very high numbers were taken. The most common species was *Apterothrips secticornis*.

Lucerne

Thrips are small insects, barely visible to the unaided eye. Pottinger and Macfarlane (1967) record a number of species from lucerne. Initial symptoms of damage are fine feeding marks, particularly on the underside of leaves. As infestations develop these symptoms become more apparent on the upper surface. The leaves develop a silvery appearance and may subsequently wither.

Thrips are relatively fast breeding; and because of their rasping/sucking feeding habits may transmit fungal and virus diseases of plants. Pottinger and Macfarlane (1967) state that thrips damage unopened flowers and buds causing poor development or death of these.

Beetles (Coleoptera)

Sitona weevil (*Sitona humeralis*)

This was first recorded from Hawkes Bay in September 1974, and from Little Pigeon Bay, Banks Peninsula in January 1976. It is of widespread occurrence in Canterbury. During the later part of the lucerne survey it was found on two properties near Palmerston, Otago.

Adults of sitona weevil feed on the leaves of lucerne, particularly during dull weather and at night (Esson pers comm). Damage consists of scallop-shaped chewing marks to the edges of leaves; in severe cases this may extend to the mid-rib. The larvae feed on root nodules (Allen 1974). *Sitona* weevil also feeds on other legumes, and may move from these to newly established lucerne.

White fringed weevil (*Graphognathus leucoloma*)

Larvae of this species were found feeding on the roots of lucerne during the Hawkes Bay part of the survey and damaged roots were found at several localities in this area and near Flock House, Bulls. Adults were not taken in sweep net samples (feeding occurs mainly at night and less frequently, during dull weather in daytime). In the last few years white fringed weevil has been found at localities near Blenheim, Ashburton, and more recently at McCormacks Bay, Christchurch. It is considered to be potentially capable of becoming one of the most important pests of lucerne in New Zealand. Lighter sandy or alluvial soils appear to be preferred by this weevil.

Melanophthalma sp

A small lathridiid beetle, *Melanophthalma* sp occurred at many localities. These are generally regarded as fungus feeders; Pottinger and Macfarlane (1967) state they may act as disease vectors in crops.

Moths (Lepidoptera)

Winter moth (*Zermizinga indocilisaria*)

Larvae were taken at a number of localities in Otago and at some places were abundant. Pottinger and Macfarlane (1967) state that R. A. French has reported attacks of this moth in Central Otago.

BENEFICIAL INSECTS

Several beneficial insects were taken during the survey. The following species occurred consistently at all localities sampled: eleven-spotted ladybird (*Coccinella undecimpunctata*), predatory on aphids and immature lepidoptera; the nabid *Nabis capsiformis*, a general predator on insects of suitable size; the hemerobiid *Micromus tasmaniae*, predaceous on aphids, mealybugs and psyllids; and the small syrphid fly (*Melanostoma fasciatum*) and large syrphid-fly (*Melangyna novae-zealandiae*), larvae of which are predatory on aphids and younger stages of lepidoptera. The effects of these on harmful insects in New Zealand lucerne crops does not appear to have been investigated quantitatively. Valentine (1967) gives further details of hosts of these insects.

DISCUSSION

Only the more abundant or suspected important insects taken in the survey are included in the above account, although other species were taken. Information on many of these are given by Pottinger and Macfarlane (1967) and Macfarlane (1970), who also give comprehensive bibliographies.

The survey recently completed is the first extensive one of the foliage of lucerne crops in New Zealand. Macfarlane (1970) gives the results of an extensive survey of insects in lucerne seed fields in Marlborough, Canterbury and Otago. In the present survey personnel from several scientific disciplines were present in the field at one time, necessitating the use of a sampling technique which collected insects rapidly and which could be used in a variety of weather conditions.

Little information is available on the actual economic loss caused by the main species encountered during the survey. From the numbers obtained and observations made it appears that several species are capable of causing significant damage. Further research on the biology and control of these is probably warranted. Collectively the effect of all the insects feeding on lucerne tissue is likely to be considerable.

The insects obtained in the present survey are mainly those associated with foliage because of the sampling technique used. Some (e.g. *nysius* and thrips) may affect more than one part of the plant. Others may be more selective in their feeding site, such as the blue-green lucerne aphid which occurs on leaves and stems; and yet others (such as *sitona* weevil) may feed on one part of the host as larvae (e.g. root nodules) and on another part as adults (e.g. on the leaves). Many of the foliage insects reduce the leaf area of lucerne or lower its quality. These include: lucerne flea, thrips, blue-green lucerne aphid, *sitona* weevil, white-fringed weevil and winter moth (in the Otago area).

In recent years several new pests such as *sitona* weevil and blue-green lucerne aphid have become established, emphasising the importance of minimising further introductions.

The present survey has provided information on the incidence of insects in the major lucerne growing areas of New Zealand. It has provided new locality records for some species e.g. blue-green lucerne aphid, *sitona* weevil. It showed that small species which are not easily observed in numbers without sampling equipment can nevertheless be abundant and the significance of these needs further investigations.

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