A summary of tropical grass webworm (*Herpetogramma licarsisalis*) populations on the Aupouri Peninsula, Far North 1999 - 2007

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Introduction

Severe infestations of the tropical grass webworm (TGW), *Herpetogramma licarsisalis*, were seen on the Aupouri Peninsula in March 1999. Damage to kikuyu pasture on the Aupouri and Karikari Peninsulas had been recorded in the 1970s but these were attributed to native species of webworm (also **Pyralidae**: Crambinae). The identity of the insects responsible for these earlier outbreaks was never confirmed.

Autumn and winter 1999

Kikuyu feeding damage by TGW larvae was extensive on the Aupouri Peninsula from Waiharara to as far north as Te Paki. High populations and feeding damage was also recorded in coastal areas east of the Whangaroa region.

TGW managed to survive the winter of 1999 and it was evident that a breeding population had now established on the Aupouri Peninsula. It was not known whether TGW had recently arrived from Queensland, Australia, or whether it was a resident population that had responded to climatic conditions that favoured TGW breeding in the autumn of 1999.

The most consistent and intensive monitoring of TGW populations has been undertaken at the property in Motutangi. This property was severely affected by TGW feeding damage in March 1999. As a result of the monitoring from 2000 to 2007 at this property a clear picture of population build-up of TGW populations in summer and autumn has been established. This has been aided by the use of pheromone traps since 2005 and the deployment of a temperature logger from 2000.

1999-2000

Monitoring of the TGW population at the property in Motutangi was undertaken from October 1999 to May 2000. Figure 1 (below) shows the trends in TGW larvae and pupae numbers over the summer. A distinct generation of larvae was observed in February followed by a larger population in late March and throughout April and early May. This also mirrored the timing of damage from feeding by TGW reported at other sites.

Webworm damage on the Aupouri Peninsula was not as widespread as in 1999. In 2000, warm, sheltered sites with sufficient moisture produced ideal micro-climates for webworm in localised areas such as those in the shelter of the forest at Waiharara, also Ngataki and Motutangi. At these sites the population increased to numbers high enough to cause severe damage but was not as widespread across the Aupouri Peninsula as in March 1999. In early April webworm damage to kikuyu pasture in sheltered back-paddocks was sufficiently high (70–90 larvae/m^2) to warrant a trial involving insecticidal control measures.

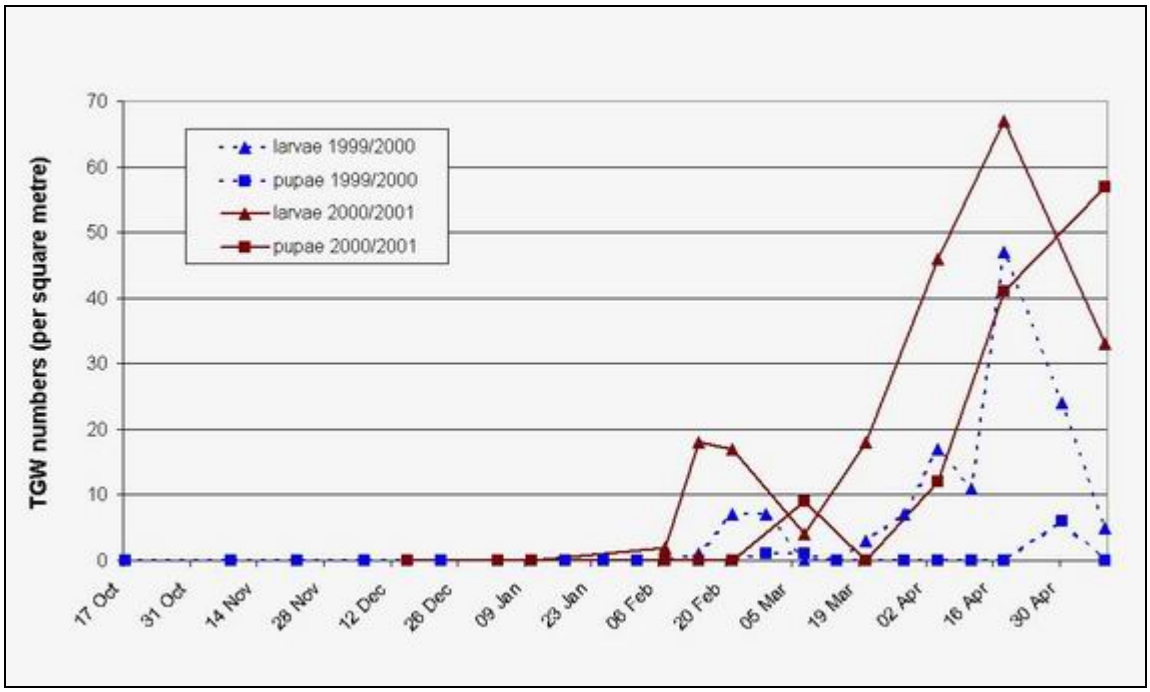

Figure 1: Trends in TGW larvae and pupae at the property in Motutangi in the 2000 and 2001 summers.

2000-2001

In November 2000 a data logger was employed to record temperatures at the Motutangi monitoring site. Temperature probes were placed in the kikuyu pasture 10cm above the soil surface to record air temperature and also within the kikuyu thatch.

Figure 1 (above) shows the same pattern of larvae and pupae peaks in 2001 as in 2000 – a marked emergence of moths in late January, followed by a larval peak in February, larval numbers building again through March with a second larger peak in early to mid April, persisting throughout May.

For a period from the second to the fourth week in February 2001 minimum thatch temperatures did not go below 18^{o}C and populations of TGW larvae were building. However minimum temperatures at Motutangi dropped again in March 2001 and TGW populations did not reach damaging levels but further north at Ngataki they reached densities of approximately 100/m^2 (feeding damage becomes visible at approximately 50 larvae/m^2). An insecticide trial was undertaken at Ngataki in April 2001 where densities were high enough to record significant damage.

2001-2002

No regular monitoring was undertaken at the Motutangi site this year so there is no TGW population information available. However the temperature logger recorded that both minimum air and thatch temperatures in December 2001 and January, February and March 2002 were higher than in the previous summer of 2001. TGW larval numbers did not reach damaging levels at this site in 2002 but numbers were sufficiently high for insecticide trials to be undertaken by AgResearch at a nearby property in Motutangi.

2002-2003

Webworm populations at the property in Motutangi were sampled on only three occasions during the 2003 summer/autumn. No adult moths or larvae were recorded on 15 January 2003. Two adult moths were seen in rank kikuyu grass on 4 February 2003 but no larvae were seen. No adults or larvae were found on 2 March 2003.

Maximum kikuyu thatch temperatures were significantly lower throughout September, October and November 2002, than those in 2001 and reached maximums of 15^{o}C compared to 28^{o}C in 2001. Kikuyu thatch temperatures in summer 2003 were also considerably lower than in 2002 with minimums often below 10^{o}C whereas in 2002 the minimum temperatures were around 17^{o}C.

It is concluded that dry conditions and cooler temperatures, especially throughout spring and early summer 2002, resulted in low TGW populations in autumn 2003 and no significant damage was recorded.

2003-2004

Prior to spring 2003 shelter trees were removed from the paddocks at the monitoring site in Motutangi. No monitoring was undertaken at this site in 2003/2004. No TGW feeding damage was recorded by the property owner.

2004-2005

Climatic conditions during the monitoring programme for the tropical grass webworm (TGW) in 2004/2005 were characterised by a cool spring followed by very dry weather in summer and autumn. Only 47mm of rain was recorded from 11 January to 3 May 2005. These conditions did not favour a build-up in webworm populations and no significant damage was recorded on the Aupouri Peninsula.

2005-2006

This was the first season that pheromone traps were available to monitor the trends in moth numbers. The moth numbers fitted the trends seen in the previous four years in larval and pupal numbers. Figure 2 (below) shows that a few moths were trapped in December and January. These were those remaining from the spring emergence of moths. This was followed by a peak in emergence in moths in late January 2006. The first generation of larvae followed in February from eggs laid by these moths. A large number of moths emerged from this generation in March with a resulting increase in larval numbers in late March and April.

Very dry conditions throughout the summer (only 45mm in all of February to the end of March) meant that the moist conditions favoured by TGW did not occur and TGW populations never reached damaging levels throughout the Aupouri Peninsula. By the time consistent rain arrived in April temperatures had begun to decline which slowed development of larval TGW and hence reduced kikuyu damage by TGW at this time.

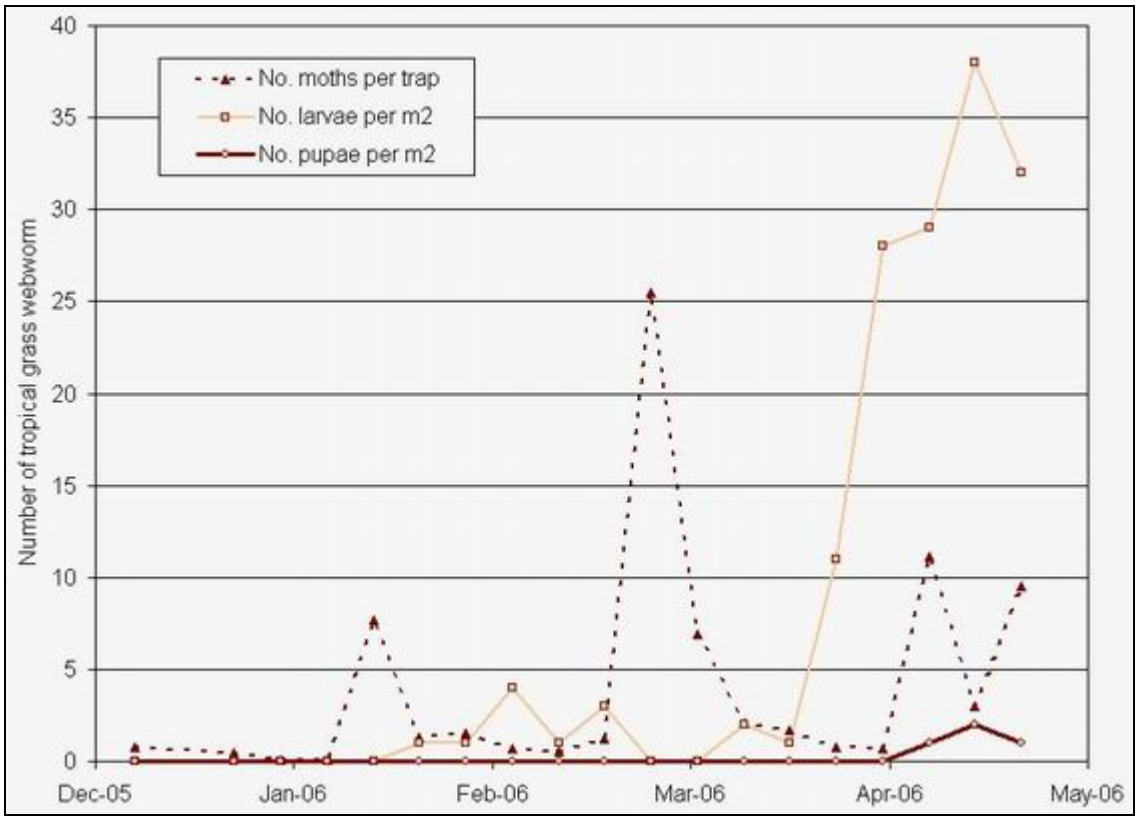

Figure 2: 2005/2006 TGW moths, larvae and pupae recorded on the Aupouri Peninsula (Motutangi, Houhora, Pukenui).

2006-2007

Again the use of pheromone traps showed similar tends to the previous years – moths emerging end of January, a small February peak in larval numbers, followed by another significant emergence of moths in early to mid March concurrent with larval feeding damage throughout March and April.

The levels of TGW infestation observed in March and April this year were the highest since the 1999 infestations. However this was confined to a few properties in Motutangi and was mainly in sheltered basins which were protected from easterly winds which were prevalent in February and March. Exposed kikuyu pasture was not affected. Over 230ml of rain fell on 6 and 7 February and resulted in some flooding in Motutangi. Kikuyu pasture which had been waterlogged retained enough moisture to sustain high populations of TGW throughout March.

Summary

Since the initial outbreak of 1999 damage from populations of larval TGW has never been as widespread. However, severe feeding damage to kikuyu pasture by TGW as high as that recorded in 1999 has occurred - in autumn in localised areas in 2000, 2001, 2002 and 2007. The years in which significant damage did not occur were characterised by either cooler temperatures and/or significant spells of dry weather at crucial stages in the TGW life cycle, particularly February and March. In addition to these climatic factors influencing TGW build-up each year, the continued presence of parasitoids attacking TGW larvae and pupae (*Meteorus pulchricornis*, *Lissopimpla excelsa*, *Pales* sp.) may now be exerting increased control of TGW.