SHORT COMMUNICATION

IDENTIFICATION OF THE SOOTY BEECH SCALE INSECT (*ULTRACOELOSTOMA BRITTINI*) ON *NOTHOFAGUS SOLANDRI* VAR. *SOLANDRI* AT COOPERS CREEK, MT.OXFORD, NORTH CANTERBURY

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SUMMARY

Markwell, T.J. (1993). Identification of the sooty beech scale insect (*Ultracoelostoma brittini*) on *Nothofagus solandri* var. *solandri* at Coopers Creek, Mt. Oxford, North Canterbury. *New Zealand Natural Sciences* 20:71-73.

Specimens of the sooty beech scale insect which produces beech honeydew were collected from trunks of *Nothofagus solandri* var. *solandri* (black beech) trees at 390 m altitude at Coopers Creek, North Canterbury. Morphological features were used to determine that the insect was *Ultracoelostoma brittini* (Morales).

KEYWORDS: Honeydew - *Ultracoelostoma* - *Nothofagus* - North Canterbury - New Zealand

INTRODUCTION

The mouthparts of sap sucking Hemiptera can penetrate plant tissue and reach the phloem or vascular bundles, allowing the insect to feed on the sap contained therein. Although rich in water and carbohydrates, phloem sap is low in protein, vitamins and minerals (Canny 1973, Peel 1974, Grant & Beggs 1989). The scale insect must process relatively large volumes of sap to gain its nutrient requirements. The waste, primarily water and carbohydrate, is excreted as honeydew.

In New Zealand beech forest, the most prominent sap suckers are the sooty beech scale insects (*Ultracoelostoma spp.*) in the bark of the trees (Oliver 1975). The honeydew produced by these insects is egested via a waxy anal tube. It forms drops on the end of the anal tube and thus, by providing nutrition for fungi, micro-organisms, birds, and insects, supports a thriving ecosystem. The sooty beech scale insect was initially regarded as a genus containing a single variable species, *U. assimile* (Maskell) (Morales *et al.* 1988). However, variation within the species had been noted for a number of years (Brittin 1936, Dumbleton 1967) and in 1991 the genus was subdivided into three separate species (Morales 1991). On New Zealand *Nothofagus* trees two similar species, *U. assimile* and *U. brittini* are found (Morales 1991). The known distributions of the two species overlap to some extent, in that both species are found in the Nelson and Buller regions. However, only *U. assimile* has been recorded in North Island of New Zealand, from Northland to the Volcanic Plateau and at Kaikoura. Only *U. brittini* has been identified in inland Canterbury (Morales 1991).

The two species differ in a number of subtle morphological features which enable identification.

A third species, *U. dracophylli* has also been differentiated (Morales 1991). This species occurs on *Dracophyllum spp.* and is found in areas where *Nothofagus* is absent or at the limit of its range, such as the Chatham Islands, Auckland Islands, Stewart Island, Fiordland and at high altitude in the Tararua ranges (Wardle 1984). *U. dracophylli* occurs on *Dracophyllum* at high altitude in Arthurs Pass,

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where no species of *Ultracoelostoma* are found on *Nothofagus* (Dumbleton 1967). *U. dracophylli* was originally thought to be a variant of *U. assimile* but has since been elevated to a separate specific status (Morales 1991).

Locality data given in Morales (1991) do not clearly indicate which species is likely to be present in North Canterbury. This region is an important honeydew area and a number of studies of the honeydew ecosystem have been carried out there (Belton 1978, Crozier 1978, 1981, Markwell 1993, Kelly *et al.* 1993). Both *U. assimile* and *U. brittini* occur in the same grid square in the Nelson region and so the presence of one species does not indicate the absence of the other.

The aim of this study was to collect scale insects from beech trees and identify which species were present in lowland Canterbury *Nothofagus* forest.

METHODS

STUDY SITE

Sampling took place during December 1992, at a study area adjacent to Coopers Creek at the base of Mt. Oxford in the foothills of Canterbury (map reference NZMS 260 L34 364713). The site is a west facing river terrace at approximately 390 m altitude. The main vegetation is *Nothofagus solandri* var. *solandri* (black beech), with a sparse, shrubby understorey. This is the site used by Kelly *et al.* (1993) and Markwell (1993) for studies of the honeydew system.

SAMPLING

Within the study site, I chose six *Nothofagus solandri* var. *solandri* and removed samples of bark down to the phloem layer. Each sample unit was approximately 10 cm^2. Bark samples were taken from trees and areas on the trees where scale insect anal threads were common. The samples were sealed in plastic bags for later identification. Motile prepupae were also collected from the trunks of other trees within the study area.

By removing the surrounding bark and the outer resinous test of the insects, I was able to extract individual scale insects from the bark samples. Cuticles of larger scale insects were pierced to enable the gut contents to be squeezed out so that the insects could be mounted on microscope slides. Specimens were mounted in lactophenol-PVA containing lignin pink.

RESULTS

There are a number of morphological features cited in Morales (1991), that can be used to distinguish the three species. The first, second and third instar specimens that I examined had simple disc pores predominantly with four loculi. The setae around the anus had pointed tips. The anal areas of the intermediate instar females were heavily toughened with dark sclerotised rings running in broken bands around the last abdominal segments. Cicatrices were common on the dorsal surface. These features are all indicative of *U. brittini*.

Prepupae of *U. assimile* have not been recorded, and so this stage is not used in keys to the genus. However, descriptions of *U. brittini* prepupae are given in Morales (1991) and so they can be used for confirmatory evidence. The prepupae that I examined had cicatrices on the head region and abdominal spiracles without obvious associated pores. The claw had a denticle and two distinct pairs of digitules.

DISCUSSION

I concluded that the sooty beech scale insect on *Nothofagus* trunks at Coopers Creek is *U. brittini*. As all specimens of *U. dracophylli* have been found on dracophyllum plants, I thought it unlikely that the sooty beech scale insect at Coopers Creek was *U. dracophylli*. The morphological evidence confirmed this assumption.

The morphological features noted all key out *U. brittini*. The quadrilocular disc pores, dorsal cicatrices and anal setae with pointed tips are all distinctive features of *U. brittini*. Although all three species have sclerotinisation of the final abdominal segments, only *U. brittini* is reported to have rings of darkened sclerotised patches around the last two abdominal segments. The presence of the two pairs of digitules on the claw of the prepupae is worthy of note. In all identified instars of *U. assimile* and *U. dracophylli*, only one pair of digitules is present, whereas all *U. brittini* instars have two or three pairs.

Although not used in the key by Morales (1991), this seems another clear differentiation between the species.

The presence of a prepupal stage is further indication that my samples were *U. brittini*. The prepupae were common on many trees throughout the study area. It seems unlikely that they were *U. assimile* or *U. dracophylli* because no prepupae have been identified from either species and yet the prepupae were obvious and present in large numbers on the trees.

The features noted in a morphological study of *U. assimile* from *Nothofagus* bark in Canterbury (Oliver 1975) conform to those of *U. brittini*. Hence the finding that *U. brittini* is present at Coopers Creek is not out of place with its known distribution. Previous work in Canterbury beech forests (e.g. Belton 1978, Crozier 1978, 1981) was carried out before the taxonomic revision of *Ultracoelostoma* was published. Further work will be needed to identify the sooty beech scale insect present in other lowland Canterbury beech forests, but at the Coopers Creek site used for several honeydew studies, the insect can be identified as *U. brittini*.

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