

Recent observations on the entry of trees by larvae of the puriri moth, *Aenetus virescens* (Lepidoptera: Hepialidae)

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Development of *Aenetus virescens* larvae involves two distinct feeding stages – mycophagy (fungal feeding) and phytophagy (plant feeding) (Grehan 1987a). The mycophagous stage occurs on the forest floor where larvae graze the fruiting bodies of polypore fungi, usually those that grow as encrustations on the underside of logs or other dead wood (Grehan 1984). After about 2-3 months the larvae then migrate to host trees where they bore into stems or branches and graze on callus tissue at the tunnel entrance for the next 1-4 years or more (Grehan 1988a, b). These ‘tree phase’ larvae complete development in at least 17 New Zealand native and two exotic angiosperm species (Grehan 1984). Larval growth and survival has been the subject of recent ecological investigations (Yule & Burns 2015, Yule & Burns 2017a, b).

Variations in the size of larvae moving to host trees indicate that the transfer can occur at more than one particular instar. The transferring instar is called a ‘transfer phase’ and is characterized by an increase in the size of the sclerotized regions (pinnacula) that also become almost black in color (Grehan 1981). The dorsal pinnacula also fuse across the midline, giving the appearance of dark stripes. Although the transfer morph was illustrated by Grehan (1981) it has never been recorded in colour or shown within the new tunnel.

Examples of the transfer phase larvae were recently extracted from host plants by Clinton Care. In addition to the dark pinnacula, the cuticle of the

transfer larvae has an olive tint, whereas the pinnacula and cuticle of the thoracic segments are paler (Fig. 1). The transfer phase morphology appears to be lost within the first moult following establishment in the host tree. The functional significance of the temporary morph has never been evaluated. It is possible that the darker coloration has a greater camouflage effect compared with the pale coloration of larvae in the mycophagous stage that remain secluded under a webbing of silk and fecal pellets. As described by Grehan (1983), the larva excavates a short tunnel and a minimal amount of bark tissue is removed around the tunnel entrance (Fig. 2). The tunnel itself turns sharply at a right angle from horizontal to vertical (Fig. 3).

The transfer morph has been recorded in *A. virescens* and in *A. cohici* of New Caledonia (Grehan 1988b), which raises the possibility that transfer morphs are also present in other *Aenetus* species. The phylogenetically important question that remains to be answered is whether the transfer morph occurs in the other specialist groups of stem boring Hepialidae, such as *Endoclita* of Asia and *Phassus* of Mexico and Central-South America.

Figure 1. Dorsal view of *Aenetus virescens* transfer larva.



Figure 2. Exposed tunnel entrance of newly established larva of *Aenetus virescens* in *Ligustrum lucidum* showing minimal removal of bark.



Figure 3. Transfer phase larvae of *Aenetus virescens* within new tunnel in *Ligustrum lucidum*.



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