Honeydew

Life blood of South Island Beech Forests

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Honeydew is the name given to the carpets of shimmering silver drops that clothe the trunks of beech trees. It is formed from sugary sap bled from within the trees by tiny scale insects. Native birds and introduced insects compete to sip the energy-rich drops, thus forming a crucial link in a complex web of life within South Island beech forests. In this article a DSIR Ecology Division research team outlines the influence of honeydew and wasps on our native trees and animals.

The spread of wasps may have seen a corresponding decline in the numbers of honeydew eaters such as tui (pictured), bellbird and kaka. The kaka studied in one area have not bred for three years, possibly because the birds are lacking the energy they need for breeding which they usually derive from honeydew. *Photo: Rod Hay. Inset:* **What we see when walking through the forest — drops of sweet tasting honeydew at the end of the insect's white anal tube.** *Photo: B Thomas.*

Buried in the bark of South Island beech trees lives a fascinating native insect, the honeydew beech scale insect. It has long piercing mouth-parts which slowly draw off sap from the sugar vessels (phloem cells) of the tree. A hollow white thread, which hangs from the capsule of the scale insect, is a waxy extension of its intestine. This "anal tube" is the insect's plumbing system, draining its wastes and unused sap to the outside. The scale insect uses only some of the sap it takes from the tree, and the rest passes through to accumulate as sugary drops on the tip of the anal tube. We call these drops "honeydew" because they taste sweet and shimmer like dew.

Honeydew-infested trees are black because a sooty mould (a type of fungus) lives on the sugar of the honeydew drops that have been blown or washed onto tree trunks. The sooty mould in turn provides a moist and energy-rich substrate for the many insects which live within it.

Friend or foe of the tree?

Many people believe that beech scale insects kill their host trees because they bleed them of their sugar. Certainly, you can find dead trees which are black and knobbled from previous infestations of the scale insect. However, the growth and seeding of trees may not always depend on the amount of sugar they have; the availability of nitrogen-rich nutrients may be more important. Overseas research has shown that honeydew dripping onto the ground probably nourishes the soil bacteria, some of which fix nitrogen from the air. More nitrogen compounds may be formed amongst the roots of infested trees, which absorb them for their own growth. Scale insects could therefore indirectly be conferring a net benefit to their host tree.

Honeydew as Food

The drops of honeydew have a high sugar content, and are an important energy source for a variety of animals living in the forest. Nectar-feeding birds, such as the tui, bellbird, kaka, and silvereye, take honeydew drops in the same way as they harvest nectar from flowers. The drops are taken to a lesser extent by a variety of other birds — even by seed eaters such as chaffinches. Lizards have also been seen feeding on honeydew.

The importance of honeydew to nectar-feeding birds is shown by the many tui and bellbirds which flock to patches of beech forest in winter from nearby pine plantations where honeydew does not occur. More birds are found in forests with more honeydew. Because the drops are rich in energy, the birds can fuel-up quickly in the short days of winter to survive the long, cold nights.

As well as sipping the drops, kaka eat the insects living in the bark and in the sooty mould on trees. These insects, together with the sooty mould and its associated sugar, are eaten also by kea, possums, rats, and even sheep.

There are many more insects on honeydew-infested trees than on nearby uninfested trees. Ants are particularly common, but small beetles, flies, bumble-bees, and particularly honey bees and wasps abound. On hot sunny days you not only smell the sweet heady scent as you approach a tree heavily infested with honeydew — you can also hear it buzzing with bees and wasps collecting drops.

Wasps, the new invaders

An important newcomer to the New Zealand forest is the wasp. The German wasp has been in New Zealand since the 1940s, and reached the South Island honeydew forests by the mid-1950s. In the late 1970s a second wasp species, the common wasp, was found to be present also. Common wasps have now spread throughout most of the bottom half of the North Island and the top two-thirds of the South Island (Fig.1). Of the honeydew forests, only those of the