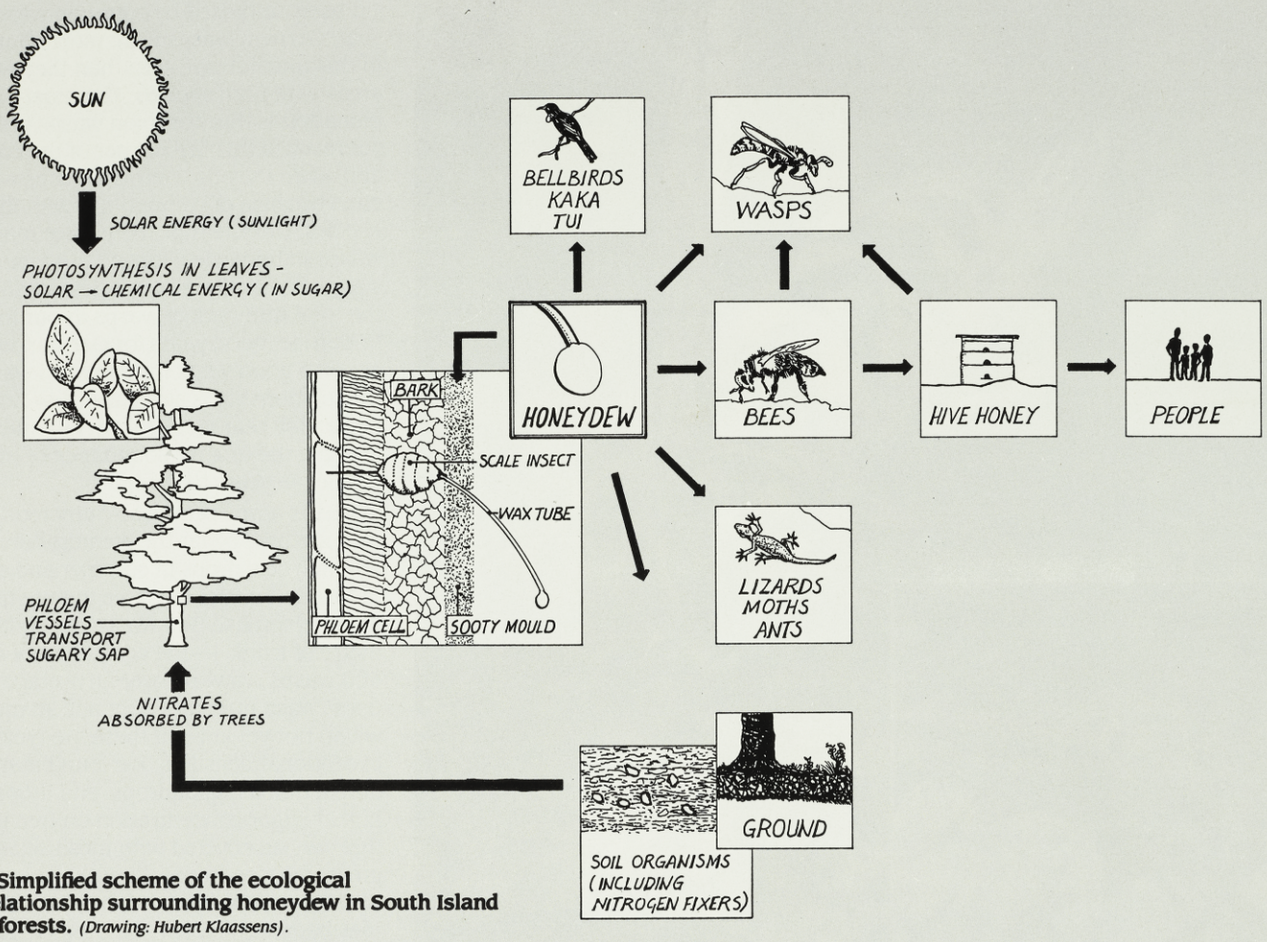

Fig.2 . Simplified scheme of the ecological interrelationship surrounding honeydew in South Island beech forests. *(Drawing: Hubert Klaassens).*

that the bees and the birds gave up gathering honeydew altogether. Our bird banding programme showed that many bellbirds and tui left our study area, at least temporarily. The next step will be to determine whether they can find enough food elsewhere to survive this shortage of their preferred food, honeydew, in late summer and autumn.

Wasps also kill many native insects to feed their developing larvae. Some of the insects would have been eaten by insect-feeding birds, so both these birds and the nectar feeders may be harmed by the competition for their food. We have heard of wasps killing chicks in the nest, and this has also occasionally been reported overseas, so the wasps could be harming our native birds directly as well. Several ecologists have mentioned the possible impact of wasps on bird populations, but so far there has been no research to prove it. The huge densities of wasps that we found lead us to suspect that their impact has been very much underestimated so far. As with the introduced mammals before them, the wasps have further altered a balance of nature established over millions of years where our plants and animals evolved in the absence of new ecological invaders.

Scientists of the DSIR Entomology Division are attempting "biological control" of the wasps by releasing a parasite which attacks the pupae of the wasp. In the long run, this may impose a new balance as wasps decline to low numbers and have less effect on our forests.

Honey Bees

Another introduced insect in our forests is the honey bee. Honeydew is the main substance in beech forests which bees use to make honey. Wild bees living in the forest build their honeycombs in hollow tree trunks, and beekeepers are putting more and more hives in the honeydew forests because the dark, strongly flavoured honey made from honeydew fetches a good price in Europe. The main commercial harvesting of honeydew by beekeepers is in the foothill forests of the Southern Alps in Canterbury.

Beekeepers pay a small levy to the Forest Corporation for using forestry roads when placing the managed hives. The honey bees, oblivious to recent restructuring of government departments, fly across the boundary to collect honeydew from patches of beech forests administered by the Department of Conservation within the mosaic of the Forest Corporation's plantation forests. Beekeeping in forests is a huge potential money earner for beekeepers and for the owners of the forests — it is claimed by some that far more money can be made from beekeeping in our native forests than from chopping them down. Research is now needed to see whether keeping extra bees in forests would significantly reduce the amount of honeydew left for native animals.

The Web of Life

Everything in ecological communities is potentially interconnected, and no plant or animal lives in isolation from other organisms sharing its community. The honeydew is a crucial link in a complex web of life within South Island beech forests (Fig.2). The beech scale insect takes its food from the tree. The tree loses some energy in the form of sugar, but may gain nitrogen; the sooty mould is nourished from honeydew drops spread on the tree trunk by rain and wind; the wasps, the bees, the birds, and other animals lap up honeydew for food; and the beech scale insect may even benefit from the increased flow of sap through it when the drops are harvested by these animals.

These complex relationships are important for the health of the forest and its inhabitants, but they are not yet fully understood. Unfortunately, cuts in government funding are now forcing DSIR Ecology Division to scale down the study of honeydew despite its economic importance and its value for conservation. The Department of Conservation has partly come to the rescue by contracting our research focusing on the impacts of wasps on endemic insects and birds.

The native species of our forests have co-evolved over millions of years and have adapted to depend upon each other. Recently, humans have cut down much of the honeydew forest, and have introduced new species which may compete with native species for honeydew. The most recent newcomers are the wasps, which probably also greatly reduce the number of native insects in our forests. This has altered the balance of nature – as yet we do not quite know how dramatically, but studies are urgently needed to find out.

Further Information

A 24-minute VHS video on DSIR Ecology Division's study of honeydew and its use by birds and insects is available from the Publications Officer, Science Information Publishing Centre, PO Box 9741, Wellington (cost $50 incl. GST).