Sweet Roots: A Trial Using Honey as a Rooting Hormone©

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The following trial was completed by me, Liza Whalley, as the recipient of this year's New Zealand IPPS Propagators Scholarship. I have been employed as assistant propagator at Taupo Native Plant Nursery for 2 years and it has been the first propagating position I have been employed in. Some help was provided by Taupo Native Plant Nursery to complete this trial.

TAUPO NATIVE PLANT NURSERY

Taupo Native Plant Nursery is a revegetation-based nursery situated in the Central North Island of New Zealand. The nursery was established in 1961 as part of the Department of Conservation, to grow and supply native plants for the first hydrodam being built on the Waikato River, at Aratiatia (Taupo). The nursery has been in private ownership since 1993, and the main focus of the business is still revegetation.

Today Taupo Native Plant Nursery produces up to 2 million seedlings annually, and over a million larger grade plants. The majority of the propagation is from seed which is collected by the nursery from all over New Zealand. Two hundred and fifty thousand cuttings are also produced annually.

WHY THE TRIALS WERE DONE

The main rooting hormone we were using in the form of a powder went off the market, so the propagation department started thinking about alternatives. It is well known that honey can be used as a rooting hormone, but I wanted to find out which honey was best. It was suggested through an IPPS member that Unique Manuka Factor (UMF)-rated manuka honey worked well on some New Zealand native plant species, so it was decided to compare a cheap, supermarket brand honey to the more expensive UMF-rated honey.

Honey creates an osmotic effect due to it being a saturated sugar solution, which means it forms strong sugar to water interactions. This lack of available water stops the growth of bacteria. Naturally honey contains about 80% sugar, with a moisture content of up to 21%. The high concentrations of sugar make honey a highly viscous solution which helps the formation of a protective layer against microorganisms.

WHAT IS UNIQUE MANUKA FACTOR?

All unheated manuka honey has a degree of antibacterial properties, although this is undetermined until it is tested. This results in its UMF rating. The UMF ratings scale starts at 1, being the lowest, and can reach potencies of up to 70 or more.

The UMF ratings are tested by using a Petrie dish of agar, inoculated by a specified bacterium. A solution of the unheated honey is placed onto the dish and the measurement is taken from the solution as to the area of bacteria it has killed. The measurement then relates to a point system, which results in the UMF rating.

Unique manuka factor-rated honey can only be sold commercially with a rating of up to 25+. For general wound care, the UMF rating is usually around 18+. I used a 15+, at a cost of $32.80 for 250 g, from the local health shop. I also purchased a multiflora blend honey from the supermarket, at a cost of around $5 for 500 g.

What I Thought Would Happen. Because of the high antibacterial properties of UMF-rated honey I thought it might work better as a rooting hormone. I decided to try it on some of our more difficult-to-root plants as well as some easier-to-propagate species.

HOW THE TRIALS WERE DONE

I ran three groups of trials over several months comparing the different hormones and different cutting mixes. The treatments were compared over several different species of New Zealand natives. All species were combined and averaged according to root growth. The species used were:

- *Brachyglottis* (Dunedin Group) 'Sunshine'
- *Coprosma acerosa*
- *Coprosma* × *kirkii* 'Kirkii'
- *Griselinia littoralis* 'Broadway Mint'
- *Myoporum laetum*
- *Olearia virgata* var. *lineata*

These were selected for various characteristics, including softwood versus semi-hardwood, rooting potential, and tomentose leaves. One hundred cuttings of each treatment per species were set using UMF honey, mulitflora honey, a commercially available hormone powder, and a control group with no treatment.

The honey solution was made up with honey and hot water (1 : 2, v/v) and then refrigerated for 24 h before use. The cuttings were placed in this solution for 30 min before setting, and were placed onto a mist bed with bottom heat.

RESULTS

When the cuttings were removed from their trays, they were separated into three groups, according to their individual root balls. These were:

- 4 or more roots from the main stem, which we classed as good
- 3 or less roots, which we classed as average
- No roots, which we classed as no take

The control group is the top line, which surprised us by having the highest average take and a low no take. These plants were very healthy considering they were the control group (Fig. 1).

Hormone powder is the second line. It showed the highest number of good roots but also the highest number of no take. This is possibly due to burning because of the strength of the hormone powder. The growth of these plants was poor compared to the other groups. We think this may have been caused by an overstimulation of the roots, so less energy was put into the vegetative growth.

Our shining star was the team we were all secretly batting for — the cheapest budget honey that we bought from the supermarket! The results shown in the third line down are that it had the lowest number of no take and a high number of good to average roots across the board.

The UMF group came in at a dismal pace and is the bottom line on the figure. It had the lowest number of good roots and a high number of no take. Although it

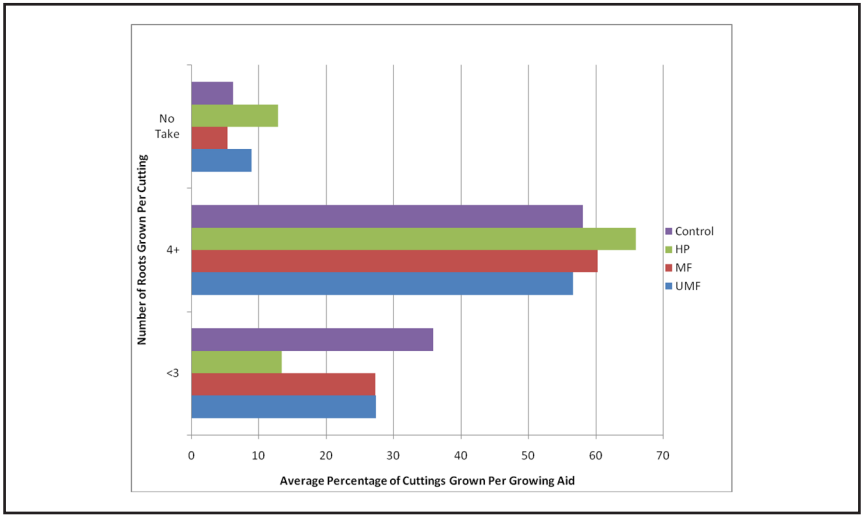

Figure 1. Number of roots on cuttings in response to hormone powder (HP), multiflora honey (MF), UMF honey (UMF), or no treatment (control).

lucked out in the root department it had the tallest, healthiest, and happiest top growth by almost three inches.

Figures 2 and 3 show the different media we used: grade 2 pit sand and cutting mix.

The results show that multiflora honey sits at a happy medium, UMF is more sporadic, and root hormone powder had the largest no take in both categories.

SUMMARY

The summary concludes basically that by using nothing or a $5 pot of honey worked better overall than using expensive UMF-rated honey or a commercially available hormone powder.

This is not where it ends. I plan to extend the trials to include:

- Some more difficult-to-root species
- Further comparisons with growing media
- Cost benefit analysis for hormone /media

Because I had a pot of UMF honey left over this is what I have come up with, in a case of waste not, want not:

Five Innovative Uses for a NZ$32, 250 g Pot of Honey. Toast spread, an addition to your First Aid kit, keeping your staff free of winter bugs, ferment it to an alcohol, and lastly, use it as a sticky, healthy face mask!

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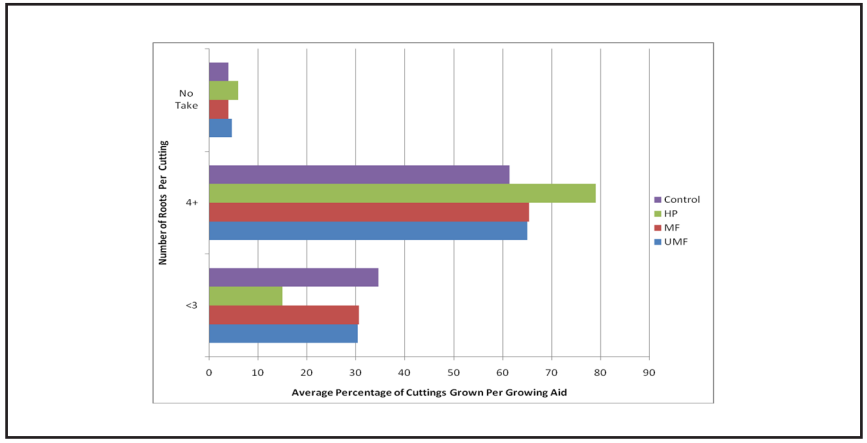

Figure 2. Number of roots on cuttings grown in sand in response to hormone powder (HP), multiflora honey (MF), UMF honey (UMF), or no treatment (control).

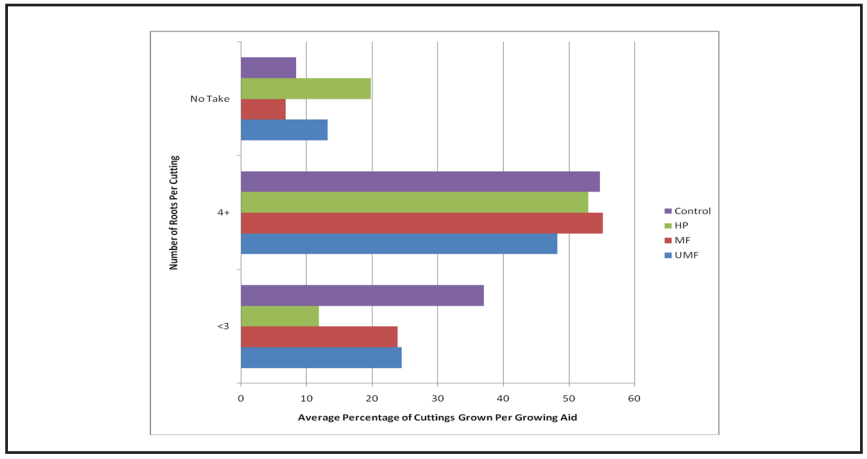

Figure 3. Number of roots on cuttings grown in cutting mix. Treatments are hormone powder (HP), multiflora honey (MF), UMF honey (UMF), or no treatment (control).