

Focus on GIA, AFB and exotic diseases

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EDUCATION

NO NUC BOX NEEDED: THE HUKERENUI SCHOOL EXPOL PROJECT

Tessa Foster, Whangarei Bee Club

Imagine if someone came up with a plan to save beekeepers heaps of time, money and effort. A group of Northland school children are doing just that.

Nestled into a north-facing ridge, about half an hour north of Whangarei, lies Hukerenui School. With only 130 students it's quite a small school, but it's a school with a big heart and a unique approach to learning.

Hands-on learning approach

Principal Bastienne Kruger describes her school as being at the heart of the community, drawing expertise and authentic learning topics from its rural setting. The school has a large lavender garden, which it uses to process essential oils and create other topical products, and owns two alpacas (with children making products from the fibre). It also grows a maize feed crop operated as "The Amazing Maize Company". The company is run by the Year 7 and 8 students, who work in conjunction with local farmers.

And the school has a number of beehives, selling its honey to the community and creating a variety of other bee products such as honey lip balm and surf wax.

Hands-on learning has great value, says Mrs Kruger. Boys, in particular, engage with areas of learning they can see value in, which is then integrated across all curriculum areas.

That approach has paid huge dividends throughout the school and brought forward student leaders through the Future Problem Solvers programme. This year's four problem solvers are each working with a class on the learning topics above to improve science knowledge.

Drawing on community expertise

All this wonderful learning could not take place without drawing people from the community whose specific skills and expertise are essential, and that's where I come in. I love bees! I am absolutely hooked on them and I get the very great pleasure of sharing this love with my daughter's year 3-4 class.



Hukerenui School Problem Solvers. Left to right: Kaia Stevens, Holly Hayes, Isla Purvis, and Ryan Barnes.

I guess it helps that I am a trained primary teacher and that the amazing class teacher (aptly named "Miss B") supports everything I do with classroom teaching. It's so cool to see our tamariki catch the bee bug. When I read their work, the amount of knowledge these seven- to nine-year-olds have gained just astounds me.

This year the class, supported by problem solver Holly Hayes, has unpacked science topics such as pollination, the importance of bees, hive set-up, bee biology, seasonal bee behaviours and the different qualities of honey. We are growing the school apiary and, to this end, will rear our own queens. It's real, hands-on learning, where every child gets into a bee suit and gets their heads in the hives. It is the most wonderful thing to see a child relax into beekeeping. After the relaxing comes the smiling as bees are minutely

examined on frames and on each other's suits ... then the excited chatter starts! The bees don't seem to mind, though.

As with most schools, funding is tight, so when faced with a school hive having mouldy outer frames, I utilised a low-cost solution I had discovered for my own hives: EXPOL underfloor insulation panels (1200 x 470 x 50). By removing the outer frames, I was able to slide the polystyrene insulation against the long walls of the hive.

The product has concertina ends, which results in a snug fit despite variations in construction. The results were quite remarkable: with the hive no longer cold and damp, the population rose to a stable winter level of three frames of brood. The increased bee activity and health was quite noticeable.

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When a small nuc hive was donated to the school in June, I used the same approach. The hive was transferred straight into a full depth super with seven frames (three with foundation wax only). This hive also thrived, drawing out wax. As the hives have grown I have been able to remove the slide on the sheltered side and add frames.

The benefits of the "No Nuc Box needed" system are clear:

- keeping bees warm and healthy through insulation and a reduction in the surface area to volume ratio via the larger hive box
- the bees still recognise seasonal cues, so don't go mad producing brood
- placement into a full depth super negates the need for a nuc box. At a cost of \$2–16 per hive for the EXPOL, this is quite a saving (buying wooden nucs costs upwards of \$60)
- less labour is involved, as colonies are not re-housed from a nuc box into a super
- if a top feeder is fitted, bees can be fed less often with the top feeder providing further insulation. There is less heat loss as hives are not opened as when using nuc frame feeders
- the polystyrene slides can be used as a platform for feeding pollen substitutes
- compared to a traditional nuc box, the hive has more frames (6–7), stores more of its own supplies and allows room for early expansion
- the AFB risk presented by reusing nuc boxes is removed
- the product is made from 25% recycled material and is recyclable.

Varroa mites have not been an issue, possibly due to good autumn control; however, two potential negatives were noted. With a higher winter population, the colonies need more feeding and in some hives, the bees removed some of the polystyrene balls and evicted them from the hive.

Looking for a solution to the breakdown of the polystyrene, a retired plastics engineer was approached. His advice was to look for some way to wrap the polystyrene. EXPOL was also contacted and asked for their input. Managing Director Mark Mischefski was quick to respond positively, concurring that wrapping the polystyrene insulation panels would be a good solution. He suggested a new product for consideration—Handy Pack polystyrene sheets, which are only 25mm



Room 2 suits up to visit our hives.

Room 2 students help problem solver, Holly Hayes, take a split from one of the school hives.



thick but twice as dense as the underfloor heating panels, making them harder for the bees to break up.

Back at school, this information was shared and many questions were raised: which plastic would be best; how would this affect the cost; how would we measure what was the best product? One of the big questions was whether it would work all year round. What we know about insulation (warm in winter and cool in summer) suggests it should, but how would we test this theory?

The idea of an experiment using the three EXPOL products was hatched. It was reasoned that wider use would be necessary for effective testing, so the Whangarei Bee Club was approached and agreed to allow the school's problem-solving team to present to its

members, asking them to assist by trialling the products in full-depth hives with their spring and early summer splits. Feedback would be provided to the school team who would, in turn, provide the products and arrange for the recycling of same. The process would be repeated for late summer/autumn splits.

Again, EXPOL was quick to come to the party, providing sufficient product to allow year-round testing of the original underfloor insulation product, the same product wrapped in plastic and the Handy Pack slides. After considering several options, unstretched pallet wrap was chosen to seal the original EXPOL slides. It was soft and flexible, allowing the slides to fit snugly into supers; it was the perfect width, reducing the workload; and it was well priced at eight cents a metre. Initial trials show that the bees do not eat the plastic wrap.



The distribution team at Whangarei Bee Club presentation day, 2 September 2017.



Problem solver, Holly Hayes, presents the No Nuc Needed Project to the Whangarei Bee Club.

This was a donated four-frame nuc two months ago: what a difference EXPOL makes!



Measuring the 'heartbeat' of the hive

In the midst of all this planning, a new and exciting option became available to the problem-solving team in the form of Hive Heartbeat Sensors. These techno wonders sit across the top of a super and provide remote monitoring of hive temperature and audio levels. The accompanying programme provides users with real-time data about the status of every hive monitored.

Using this technology, we would be able to back up the anecdotal evidence gathered from our own experiences and Whangarei Bee Club members with actual scientific data.

It was decided to conduct a year-long experiment at school using seasonal nucleus hives as follows:

- one hive with the original EXPOL underfloor product (1200X470X50) slides
- one hive with the original EXPOL slides wrapped in pallet wrap
- one hive with Handy Pack slides
- one hive with no polystyrene
- one hive with no bees (control).

Once again, we approached EXPOL and, once again, they have been "excited and encouraged" to support us. My family's small queen-rearing business will make up the balance needed; after all, my own children are benefiting from this learning.

However, many people are contributing to this project who have nothing to gain. One such couple are Matt and Sefani of Bee Real Hive Ware, who have generously agreed to provide the nuc hives we need to start this project in September. Without bees, we would not have an experiment!

I feel truly blessed to be part of a community which values learning and is prepared to look at new ways of knowing and doing! And what a community we have! Bee people, businesspeople, school people and people who just want to help kids engage in solving meaningful real-life problems ... something which, if our hypothesis is correct, could result in significant cost and labour savings to beekeepers.

I can't wait to let you know how we get on!

Photos courtesy of Hukerenui School.