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The New Zealand BeeKeeper is published eleven times per annum; February to December. All copy should be with the Editor by the 1st day of the month of publication except for December when copy should be received by **25th November.**

President's Notes

by Terry Gavin

Well, we are still waiting as these notes are being written on June 30. We hope to get a decision from Government on July 3. Today NBA canvassed all branches, on a tele-conference call with the resolution:- "That you (branch and self) are willing to accept the impact of a varroa eradication process." All branches were given the right to speak and then each branch was asked for a number in favour and against. The votes were:- For 396, Against 18 with one branch not voting but assuring us that they would abide with any decision of Government. Executive and, it appears, most members are still backing eradication.

Whatever the decision of Government, the industry will need to be involved in all decision making, in dealing with the complex issues involved with either eradication or control.

Conference is only a few days away and Poverty Bay have put together an interesting seminar with an international speaker. Unfortunately, Eve Crane is unable to be present but her addresses will be presented. Varroa will, or course, take a major place in discussions. A new addition to conference will be an innovations table for ideas and gadgets. Considerable interest has already been shown, so bring along whatever you have to add to the display, which will be judged and the winner will receive the Roy Patterson award.

Conference program is full with the afternoon of the first day set aside for discussions between MAF Biosecurity and industry members on how we handle varroa. This is going to be a complex problem and will need goodwill on all sides to lessen the impact of the greatest pest in the beekeeping world.

The "New Zealand Honey-Bee" stand at the Mystery Creek National Fielddays was well set up and was a credit to the Waikato Branch and to all who assisted. All who took the time to walk through the stand and sample the honeys were most generous in their praise. All were concerned with the varroa incursion and wished us luck. We were also pleased to have discussions with Hon Jim Sutton when he came to look at our display. He was most complimentary of the display and wished us well.

Executive held a meeting on June 28th and 29th and discussed, among other things, the report on the Pest Management Strategy by the PMS Review Committee. This committee has done an excellent job as this is the first PMS report to be developed. Executive made some suggestions and asked the committee to consider these and complete the report to be presented to the Minister. The varroa outbreak has made this report more difficult to draw up as the future is so difficult to predict. Executive is grateful to this committee for its efforts.

We had the pleasure of hosting the Industry Trustees for lunch on the second day of the meeting and fruitful discussions were held on the state of the industry and the association in relation to the trust. This trust is a priceless asset to the industry and must be preserved. I thank the Trustees for their efforts and trust they will continue in their positions.

I must note the passing of a personal friend, John Heineman, a gentleman of the highest order. John was one of the workers behind the scenes, always dependable and tolerant. John was librarian for many years and has built the library into a priceless asset. The beekeeping industry has lost another pillar of strength and he will be forever missed.

Cover photo: Courtesy of Klaus Nowottnick, Germany

Letters to the Editor

Dear Sir

To all South Island beekeepers who are seriously thinking of gearing up to supply queens, packaged bees and other hive products to the North Island, due to the varroa situation. If you have not done this before, make sure you really know who wants your products before you start investing your time and money. You may be better off putting your time and money into your own business's varroa plan. Go to your branch meetings, talk to other beekeepers, read up as much as you can, be fully informed. It's your money, your family, your business, your life, varroa could take the lot.

Trevor Corbett,
North Canterbury

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CANTERBURY BRANCH

July evening meeting:

Date: 25 July, 2000 Tuesday
Time: 7.30pm sharp
Venue: Federation Farmers NZ Building
78 Armagh Street,
Christchurch

Programme: 1) Debrief from Conference 2000
2) Varroa
3) Business left on table
4) General business

Supper/cover charge $1 per head

REMINDER: DECA COMPETENCY TEST
31 July 2000, Common Room
Rangiora High School, Rangiora

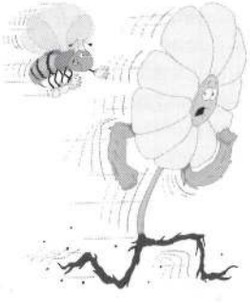
Registrations and payments have to be into Canterbury Secretary (Trevor Corbett cellphone: 025 504-567) by Friday, 14 July 2000.

Late registrations will not be accepted.

TW Corbett,
Secretary

The New Zealand **BeeKeeper**

THIS ISSUE



Why kill the queen?

I think it is safe to say that no beekeeper actually enjoys having to kill queens, but some of us are more reluctant to do so than others. Perhaps this is due to the belief that the queen is the most important bee in the colony. But is she? Before answering, let's briefly consider how the colony - queen, workers and drones - works as a whole.

What is a viable colony? If we take away the queen, then certainly the colony will not survive as a viable unit for very long, because there is no "young blood" being introduced to replace the members which die. Equally, a colony with a queen and drones but no workers will not last, because there is no-one to bring in the food that the colony needs.

What about a colony with a queen and workers but no drones? That may be the norm over the winter, but it is interesting to note that the time when a bee colony is most active is also the time when drones are present and a number of beekeepers will tell you that colonies with drones seem to work better than those without. After all, the male bee accounts for half the gene complement of his female offspring - be they queens or workers - so it would be unwise to discount him simply because he is 'merely a drone'. Even if he is not fertilising your young queens, he will be mating with someone else's and contributing to the gene pool!

From this brief overview, we can see that no honey-bee can survive as an individual - each needs the support of the other bees within the hive. Therefore, we should do everything we can to advance, or benefit, the colony and nothing which will disadvantage the colony. It is worth keeping this in mind every time we perform any manipulation upon our bees.

So, before talking about getting rid of a queen, it's as well to think about why we would keep her. There are three main factors which may influence that decision. They are:

(a) The characteristics of the queen herself

(b) The characteristics of her offspring

(c) The factors that pertain in your apiary at the time.

Taking (a) first: you may want to keep the queen because she is young, produced in the current season, particularly if she is a supersedure queen. Generally, supersedure queens will have been well-supplied with Royal Jelly from the time of hatching from the egg, so will be strong and robust. Whether from a supersedure or not, a young queen will normally be a prolific layer and should have a good brood pattern. She will be producing a lot of queen substance, which will keep her workers happy and may prevent, or at least delay, swarming.

When we come to (b), it is easier to judge the characteristics of female progeny than male - partly because drones are generally docile but also because they may drift from one hive to another.

The desirable elements in the female progeny could be classed as those which make beekeeping enjoyable rather than a battle with nature!

Thus the worker offspring should be:

(1) **Productive** - the colony that brings in plentiful supplies of food is the one which will be able to increase and have the advantage when it comes to surviving the winter.

(Remember: worker bees = food being brought in = queen well fed and able to lay = more worker bees = more food being brought in, etc.)

(2) **Disease-resistant**

(3) **Non-aggressive**

(4) **Non-following** - who has not been plagued by the one bee that accompanies you back to the car/kitchen/bee-shed?

(5) **Quiet on the comb** - it is far easier to carry out manipulations within the hive and to see what you are meant to see when the bees are not running hither and yon, distracting you!

(6) **Slow to swarm** - I prefer to use this term rather than "non-swarming". Swarming is the honey-bee's way of perpetuating the species and I would argue that the colony which makes no attempt to reproduce itself may be as undesirable as the one which is forever producing swarms.

If you process a queen whose workers have these desirable traits, it is well worth trying to breed further queens from her, both for your own colonies and the benefit of other beekeepers as well, if you are so minded.

As to (c), you may want to keep the queen as an insurance policy. Perhaps you have a colony with a newly-mated queen and you want to see what her progeny is like before deciding to keep her. Alternatively, if the older queen is still in good lay, you many want to keep her to start a second hive or to make up a nucleus.

As to getting rid of a queen, the reasons for doing so will possibly be because she, or her workers, are displaying the opposite of the desired traits mentioned above. Perhaps the queen is old and has become a drone-layer or there is a proliferation of chalk brood among her larvae, which may be remedied by changing the queen. Maybe her daughters attack the beekeeper as soon as he/she comes into sight. Or it could be that you are happy with the queens in your colonies and simply have no room, or use for, a surplus queen.

It may seem callous and clinical but sentimentality on the part of the beekeepers is not sufficient justification for keeping a queen that is not performing to the best of her ability, or one for which there is no work. When one looks at the whole of honey-bee society, it is wondrous but it can also be cruel - witness the eviction of the drones in the autumn, or the first young queen to emerge which destroys the other young queens.

Why should this be? Possibly because, going back to what was said at the start of this article, honey-bees do not exist simply as individuals but as part of a whole, their colony. Anything which does not benefit the colony, or which disadvantages the colony, is got rid of. Drones are of no use during the winter; a queen which is not producing enough young to sustain the colony is of no benefit; therefore they are disposed of.

Knowing when a queen needs to be removed from a colony and more importantly - acting upon that decision form part of the management of bees. When it comes to actually performing "the awful deed", a quick press between thumb and forefinger or under the boot is probably quicker and less painful for the queen in question than avoiding the issue of hoping the bees will do it themselves. I do not know whether queens can feel confusion or rejection when they are pushed out of their hives, but I am sure they do suffer from cold and hunger when they suddenly find they no longer have their protective cocoon of workers around them.

I hope I have not made it seem as though I am advocating that beekeepers should go about destroying queens willy-nilly, but when the need next arises, consider carefully whether the colony will do better with the queen they already have or if it would be better to replace her.

Do everything you can to benefit the colony and nothing which will disadvantage it. With those words in mind, I hope that both you and your bees will have long and productive lives.

By Ruth Burkhill

Home Sweet Home

Would you consider buying a house without ever setting eyes on it? An economist I know did just that. He simply drew up a list of desirable characteristics, gave it to his estate agent and retired to his ivory tower. As soon as his ideal home turned up he reappeared, cheque book in hand.

Personally, I trust my gut reaction to tell me when a place is right. But however you do it, choosing a new home is a complex business. And the more family members you have to please, the trickier it gets. So spare a thought for the honey-bee.

In the late spring or early summer, when food is plentiful, a hive can quickly become overcrowded. Then a mother queen will up-sticks, taking half the workers with her. This swarm of perhaps ten thousand bees will settle in a dense cluster under a nearby branch, and from this temporary resting place, several hundred scout bees set off in search of a new home. They are looking for a hollow in a tree, or a similar cavity, with a volume of at least 20 litres. It should have thick, strong walls and an opening no bigger than 30 square centimetres, at least three metres above the ground and south facing.

The scouts may find a dozen or more alternatives that more or less fit their real estate requirements, but within a couple of days they are all agreed upon a single location. Then the whole swarm lifts off, following the scouts, and the housewarming can begin.

Between them, these several hundred scouts seem to make a good decision, and very quickly. Considering that each bee has a brain about the size of a grass seed, where does this collective wisdom come from? Intriguing new research shows that bees' house-hunting tactics may be simpler than anyone had imagined. To find out how scout bees reach a consensus, Tom Seeley from Cornell University has been watching them perform elaborate waggle dances to advertise possible nesting sites to the other scouts. He concludes that the scouts reach a collective decision without comparing alternative sites and without any one bee having to co-ordinate the proceedings.

We're more familiar with the symbolic waggle dance as a way of telling other bees where to find food. In a pioneering series of experiences over half a century ago, Karl von Frisch of the University of Munich deciphered the 'language' of the dance. A worker returning from a source of nectar or pollen more than 100 metres from the hive will mark out a figure of eight on the vertical honeycomb wall. At the crossover point she dances forward, buzzing and waggling her abdomen. The angle of this waggle-run from the vertical gives the angle of the food site in relation to the Sun as seen from the hive, and the bees know how far away the food is by how long the waggle run lasts.

The first clue to how scout bees used this dance when deciding where to live came in the mid 1950s. Martin Lindauer, a colleague of von Frisch, discovered that scouts report the location of potential nest sites, using the side of the swarm as a dance floor instead of the wall of the honeycomb. He also noticed that although the scouts start out advertising several sites, all the dancing will eventually be for a single site.

He suggested that the bees were influencing one another, but until now no one could say how. The bees' limited cognitive capacity made it unlikely that scouts were directing each other to potential nest sites, comparing notes and then trying to persuade and cajole each other into opting for a unanimous verdict like members of a jury. So how do the bees decide on a new home?

To find out, Seeley and his student Susannah Buhrman tagged all 4000 bees in a swarm with a number and colour code. No one has ever tried this approach before. "People didn't take the trouble - it's a lot of work," says Seeley. "A person can label about one bee a minute." But after around 66 person-hours of painstaking work, the researchers could simply sit back and watch the swarm.

First, the scouts spend a day or so gathering information. They scour the surrounding environment for possible nest sites and then begin dancing, but do not come down strongly in favour of any one. Next comes the decision-making period. Sites advertised only weakly and briefly will soon fall by the wayside, but more popular sites can provoke a real 'debate' among the dancing bees. "Eventually," says Seeley, "all the dances being performed centre on one site. They've built a consensus."

By tracking the behaviour of individual bees, Seeley and Buhrman made a crucial discovery about how this consensus comes about. Surprisingly, although the scouts may stop and restart dancing, most bees do not switch allegiance to a different site. Instead many of the scouts simply drop out and do not dance again, so less popular sites with fewer dancers will rapidly lose all their support. "The process of building a consensus among dancing bees relies much more upon bees ceasing to dance than upon bees switching their dances to the chosen site," explains Seeley. This seemingly trivial observation means that the decision making process will never become deadlocked, with unyielding scouts dancing for two or more sites.

Even those few bees that do change allegiance - perhaps 20 per cent of the scouts - do not seem to be directly persuaded by another bee. After dancing for an unpopular site, they seem to drop out of the dance for several hours before regaining their enthusiasm and joining in with the dancing for another site. But the change of heart does not seem to come from visiting a new site. Seeley's experiments suggest that most scouts visit only one potential nest site while the swarm is house hunting.

Another study, by Kirk Visscher from the University of California, Riverside, and Scott Camazine from Pennsylvania State University, confirms that individual scouts need not actively compare potential nest sites while making their decision.

The team set up two identical nest boxes in an area of the Californian desert with no natural nest sites and then marked each dancer according to the box she first visited. From the marks the researchers pinpointed a small number of bees who visited both boxes. In some of the experiments they took away these bees, but in others they let them return to the swarm. Either way, swarms took an average of about 13 hours to reach a consensus. What's more, over 80 per cent of bees visited only one box. "These findings point in the direction of direct comparison not being a very important part of the process," says Visscher.

Using the same set-up, Visscher and Camazine showed that when bees do switch allegiance, it is because the scout bees simply pick up and copy other dances on the swarm in proportion to the total amount of dancing by other scouts for these sites. "We videotaped and transcribed all the dances on the swarm," says Visscher. "We then looked at all the dances that a bee could possibly watch after her own first dance - that is, all the dances that occurred after the time of her first dance."

They calculated how long scouts would be likely to spend following dances for each site if they simply copied dances at random, and measured how much time they actually did spend dancing for each. "The distributions were a very good match," says Visscher, "Suggesting that bees just follow dances at random as they encounter them."

If most scouts see only one potential site, and any subsequent dancing on the swarm is random, might they not end up choosing an inferior home? Seeley and Buhrman could not tell if this was the case in the study where bees were individually marked, because they focused on the swarm and did not follow the scouts out into the surrounding countryside. Instead, they tested the idea in a more controlled environment.

On the bleak, treeless Appledore Island, off the coast of Maine they gave their bees a choice of five nestboxes with identical specifications, except that one had an ample 40 litres capacity and the others a meagre 15 litres. The best site was not found first in any of the three trials, yet in all cases it was the final choice.

Seeley suspected that scout bees must adjust their dance to tell the swarm about the quality of potential nest sites. He had discovered that the waggle dance carries information about the quality of a flower patch. "It suggested the same thing might be happening here," he says. Recently, he and Buhrman found the dance indicates the quality of nest sites in a least two ways. They offered the swarming bees a choice of an excellent and mediocre nestbox and made video recordings of the dances for both.

Dances for the excellent site turned out to last longer and each dance circuit was shorter. "More waggle runs in total is the key thing," says Seeley.

Things were beginning to fall into place. Even bees that are dancing for the winning site eventually tire and stop. If they resume dancing, they need do nothing more sophisticated than copy another scout at random. As long as the highest quality sites elicit the most vigorous dancing, with the most waggle runs, a bee that starts dancing again is simply more likely to spot a bee dancing for a high quality site, and eventually the best site will get unanimous backing. "Positive feedback is the key to one site becoming the leader," says Seeley. "It's a snowballing process." Because the quality of the site shapes dancing behaviour, bees don't need to do anything complex like comparing alternative sites, all they need is knowledge of one site at a time and the ability to loose interest in that site and later follow another bee's dance to advertise a fresh site.

But how do bees know a good home when they see one? The evaluation process is still largely a mystery. Scouts can certainly take direct measurements. Using an ingenious set-up with treadmills, Seeley has shown that bees can assess the volume of a potential home. "It is based on the amount of walking they have to do to circumscribe the cavity," he says. Even so, it seems unlikely that bees are behaving like our rational economist or his estate agent, ticking off desired attributes from a real estate wish-list.

It may never be possible to show how a bee integrates all the information that it collects about a potential nest site, but Seeley believes that what's happening is more likely to resemble the gut-reaction approach - not so much calculated as instinctive. "It's almost certainly the case that somehow a scout is getting an overall sense of 'goodness', which is stimulating some part of its brain," he says. "In a lot of cases we have these gut summaries, and they are probably even more important for bees."

From a human viewpoint, it seems amazing that more than 100 individuals, especially ones with such tiny brains, can reach a consensus in a matter of hours. But Seeley points out that bees are only doing what comes naturally. They take advantage of their large numbers to investigate several alternatives simultaneously then make a virtue of the fact that no one individual could possibly co-ordinate the proceedings.

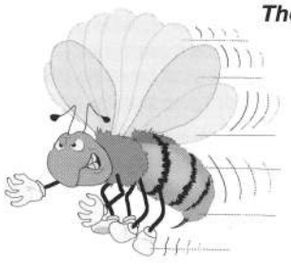
The decision-making process is highly decentralised, yet by following a few simple rules limited individuals with tiny brains combine to create a superorganism able to make sophisticated and accurate decisions. "What the whole swarm does is very amazing," says Seeley, "but when you break it down and see what each individual bee does, it's more believable."

Thomas Seeley, author of 'Wisdom of the Hive - The Social Physiology of Honey Bee Colonies' published by Harvard University Press, presented his results at the Dahlern Workshop on Bounded Rationality held in Berlin earlier this year. Results from the workshop are due to be published as a book by MIT Press in February 2000.

Further reading

Group decision making in a swarm of honey-bees, by Thomas Seeley and Susannah Buhrman, Behavioural Ecology and Sociobiology, vol 45, p 19 (1999). Collective decisions and cognition in bees, by Kirk Visscher and Scott Camazine, Nature, vol 397, p 400 (1999), Communication among social bees, by Martin Lindauer, Harvard University Press (1971).

From the New Scientist, 5 June 1999 with thanks to The South Shropshire Beekeeper



Money in bees

This story, my correspondent assures me, is absolutely true. It took place about the time honey was hovering around $1/kg.

Attending an amateur's meeting one night one of the new members was very attentive to a discussion on swarming. He interested himself in the time it took the parent hive to recover and the swarm to develop into a useable colony. Later in the evening when one of the members said that he had a couple of hives which were perpetual swarmers the new member offered to buy them at a reduced price considering their 'problem'.

About a week later an ad appeared in the local paper. "Hive for sale - bring own box". About a month later the same ad appeared and so on throughout the season which being both warm and productive lasted for about eight months. Finally word got round that the ads were coming from the new beekeeper and the sale price was $45.00! It's an odds on bet that hives which swarm regularly and often are also good breeders - they have to be.

New chum was betting on this factor to breed lots of bees - which apparently happened. Calculated the guy grossed $360.00, probably netted about $30 after deducting costs including original purchase price. He also lit the suburb up with swarms for the next season or two which as a community minded citizen he dutifully removed at a fee of $50 per swarm - probably grossing another $500! Better than trying to get 820kg from two hives in a suburban site.

Colony control of nectar foraging

What an amazing autumn the bees enjoyed last year. Warm dry weather was the rule right into December. The ivy was plentiful and prolific, and its smell filled the apiary. The hives are so heavy that I wish I had possessed the foresight to put on some empty supers and gather some ivy honey.

The colonies should be in good condition to survive the winter, provided the bees have access to water. Ivy honey granulates quickly and they will have to re-liquefy it for consumption. The over wintering bees will have fed well on ivy pollen, and their fat bodies - groups of food storage cells distributed throughout the abdomen between the various organs - will be well provisioned with the protein required for survival until spring.

I am lucky enough to have my bees near the house and so am able to visit them almost every day. Watching their activity during autumn, with no requirement to open or manipulate the hives in any way, led me to think about the way in which the activities of foragers are organised. A large amount of experimental work has been carried out recently on the collection of nectar, pollen and water. As usual, the bees have a few surprises for us, requiring a change in the traditional view of foraging organisation.

The traditional view

A colony's nectar foraging force exploits a variety of sources at any given time. Returning foragers may or may not perform waggle dances to recruit more foragers to their particular patch; some sources are advertised, others are not. Of these advertised, a few elicit vigorous dances - up to a couple of hundred waggle runs! - and so gain many recruits, while others warrant only a few waggle runs and gain few recruits.

The traditional explanation of this dancing pattern is that the food storer bees sample the incoming nectars and preferentially unload those foragers offering the highest sugar content. These foragers, realising that their nectar is among the best on offer, commence dancing to attract more foragers. Bees bringing in less concentrated nectar experience delays in offloading, realise that their load is less attractive and dance less or not at all.

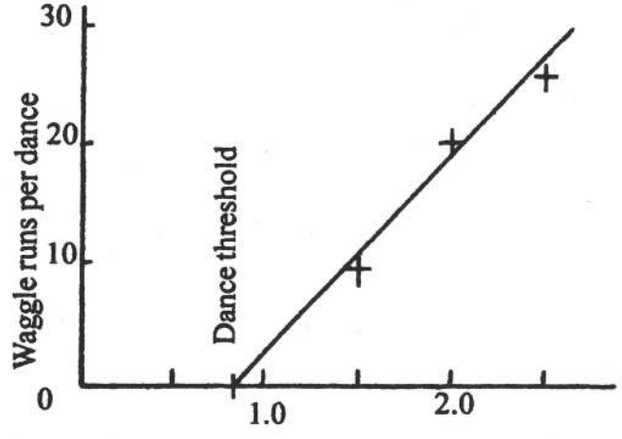


Figure 1. Syrup concentration in mol/1

There are experimental results that seem to support this view. If bees are trained to forage at a feeder supplied with various concentrations of sugar syrup, it is found that the number of waggle runs they perform increases with sugar concentration (figure 1). In addition there is a threshold concentration below which no dance is performed. This threshold varies from day to day, according to the varying number of good quality natural sources available.

Difficulties and further experiments

There is a conceptual problem with this traditional view. It places the responsibility for deciding the best sources with the food storer bees, who have never visited them, and who have only one parameter influencing them - sugar content. There are however other factors which are important in assessing a food source. Distance from the hive is very important. The further away the source, the fewer the foraging trips that can be made in a given time, reducing the over-all sugar intake. In addition, the forager uses more energy on the journey from the hive. Other factors are the density of the flowers in the forage patch, and the abundance of nectar per flower, both of which affect the time to load up, and the amount of energy used in flying between flowers. Only the foragers can assess these factors, and it is surely they who decide the source profitability.

That it is not just sugar content which decides dancing vigour is demonstrated by a simple experiment. A colony of bees is trained to forage at two sugar syrup feeders, one close to the hive, the other a distance away. The nearer feeder is supplied with weaker syrup than the further. The resulting dancing is observed, and does depend on the concentrations and distances involved. However, it is frequently observed that there is more vigorous dancing for the weaker solution.

The great concentration at the further feeder is negated by the extra effort and the time expended in reaching it. Experiments such as this lead to the conclusion that the food storers unload all foragers equally enthusiastically, and that it is the foragers who determine forage profitability and the need to dance.

If the food storers are not involved in decisions about dancing, how is the variable dance threshold explained? A second, rather similar experiment gives a clue as to how it arises:-

A colony is again trained to use two feeders. This time they are equidistant from the hive, and they are supplied with identical sugar syrup. They should be deemed equally profitable by the foragers, and the food storers should be unable to distinguish between the two sets of foragers.

A large proportion of the bees foraging at one of the feeders is then captured. Those coming in from the other feeder immediately start to dance more vigorously. The only change made has been to reduce the number of foragers returning to the hive. So what causes the change in dancing? There will now be more unemployed food storers, and a returning forager will more quickly find one, to start unloading. The bees recognise by this reduced search time that there is spare capacity among the food storers, and that it is worth while advertising for more recruits.

If, conversely, a forager returns to a hive and experiences a long delay in finding an unloading bee, she will recognise that the storer bees are over stretched, and that recruiting more foragers will be counterproductive. She will not perform waggle dances, but may move deeper in the hive and perform a tremble dance to recruit more food storers.

The change in search time for an unloading bee when the return rate of foragers is altered has been experimentally observed. The variation is sketched in figure 2, and conforms to the predictions of a very simple model in which the returning bee contacts at random from amongst the bees just inside the entrance until she locates an unemployed food storer.

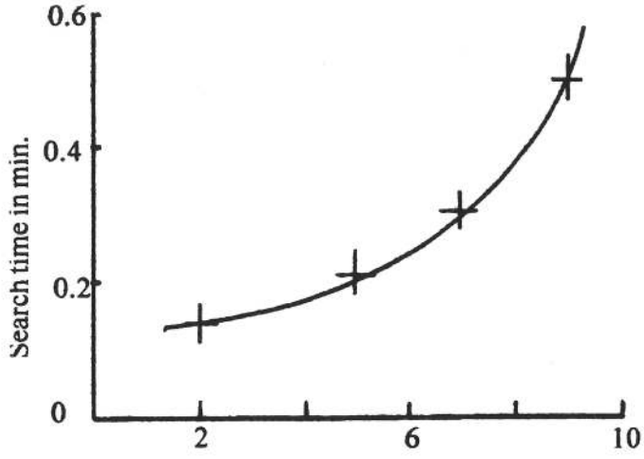


Figure 2. Forager arrival rate in bees/min.

Forage assessment and foraging efficiency

How the forager assesses the profitability of a source is a mystery. One possibility could be, by accumulated experience of a variety of different sources. The problem with this is that a bee's foraging life is short, and she will probably experience only a few sources, particularly in the light of her flower constancy. In addition, this idea predicts that novice foragers will not dance, whereas in practice they do. The best guess at present is that the assessment programme is hard-wired into the nervous system.

Another interesting aspect of foraging is the strategy foragers use to optimise their foraging. Suppose that on a typical foraging trip a bee collects a nectar load the energy content of which is G (the energy gain). During the trip, which takes time T she expends energy C (the energy cost) in flying and moving between flowers. The net energy gain to the colony is G-C. Two strategies suggest themselves which will optimise the gain to the colony - the bee of course may adopt neither!

One strategy is to work in such a way as to maximise energy efficiency; that is make the net gain per unit cost as large as possible. The second is to maximise the rate of energy gain; that is obtain as big a gain as possible in the shortest time. In symbols, the first maximises (G-C)/C; the second maximises (G-C)/T. These two possibilities are appropriate to different circumstances.

In spring and early summer forage is likely to be available for a period in excess of the bee's lifetime. Now a forager's lifetime appears to be energy limited - after expending a certain amount of energy she exhausts herself. Suppose this lifetime expenditure is L. Then she can make L/C foraging trips in her life, and so will collect a total energy of (G-C)L/C. To maximise the energy efficiency (G-C)/C.

In late summer and autumn on the other hand, the bee is likely to outlive the forage. In this case as much nectar as possible must be collected in the time available, so rate of gain (G-C)/T should be maximised.

What do bees actually do? Amazingly, the little experimental evidence there is indicates that they adopt both strategies at the appropriate times of year. How do they do it.

Water collection

The traditional view of control of foraging by the food storer bees, which we have just dismissed, very neatly explained the initiation and control of water foraging. How we are now to understand this process is the subject of next month's article.

Reference

Seeley TD. The Wisdom of the Hive, Harvard University Press 1995.

By Duncan Weaver

Draft operational plan for varroa control released

The draft operational plan for the control of varroa has been released by the Ministry of Agriculture and Forestry.

This document is the second options paper released by MAF. The draft operational plan for eradication of varroa was released earlier. Both papers were drafted by a team led by AgriQuality New Zealand Ltd, in accordance with specifications developed by the technical advisory group convened by MAF. Both papers will be used to advise Cabinet in its decision with respect to the government response to varroa. The draft operational plans for eradication and control of varroa (respectively) are available on the MAF website at www.maf.nz

MAF is accepting comments on both papers, and the National Beekeepers Association is co-ordinating responses from the beekeeping industry through its network of regional branches. NBA representatives have participated in the technical advisory group, and in the team led by AgriQuality.

The operational plan for control of varroa considers the potential ways to achieve the specified objectives of mitigating the effects of varroa on North Island beekeeping, and ensuring that the South Island remains free of varroa for as long as possible. The plan presents the options in a modular fashion, with each component costed separately.

The plan proposes two alternative programmes of surveillance to confirm the South Island's freedom from varroa, and a series of measures to protect this status. Movement control of bees, hives and equipment from North to South Islands could be maintained, with continuing publicity to alert transport operators, beekeepers and members of the public to these restrictions.

Options are also included for an eradication programme in the event that mites are found in the South Island. The extent and cost of an eradication programme for a South Island incursion would depend upon how early the find was made, and where and when it was located.

The plan discusses various options for immediate control of varroa in the North Island, including two versions of a co-ordinated treatment strategy in those areas known to be currently infected. Co-ordinating treatments through a management agency is considered as a first year option to achieve maximum impact on current varroa populations. The pros and cons of co-ordinated treatment are considered, and balanced against allowing beekeepers to make their own decisions with regard to managing treatments.

A pest management strategy is discussed as a possible vehicle for administering a control programme over the longer term. The plan includes a proposal for New Zealand-based research activities because overseas control methods may not be directly applicable here. This is due to differences in New Zealand beekeeping practices, climatic and floral conditions, honey-bee strains, and the interaction of bee viruses present in New Zealand with varroa.

The goal of the research programme would be to produce a sustainable control strategy that minimises cost, chemical use, and the development of resistance in mites and residues in the products that are being produced.

The plan discusses an extension programme to help lessen the impact of the mite on New Zealand beekeeping, and on the horticultural and agricultural industries that rely on honey bees for pollination. Proposed activities within this extension programme include:

An initial training seminar for professional apiculturalists (using an overseas expert);

Production and distribution of a varroa control booklet to all registered beekeepers;

Queen breeding courses for South Island beekeepers to help them produce their own queens now that North Island queens are not available;

A variety of short courses presented over a seven year period that are tailored to the various circumstances facing beekeepers in relation to varroa;

An on-going group extension programme for sharing of experiences and information on varroa control.

Production and distribution of a New Zealand varroa control manual once New Zealand-based research is completed; and encouragement of the use of pollination hive quality assurance services to ensure mite impacts do not result in reduced production of horticultural crops.

Copies of both operational plans (eradication and control) are available from the MAF website http://www.maf.govt.nz/Standards/anbio/OperationalPlanvarroa.pdf, or from:

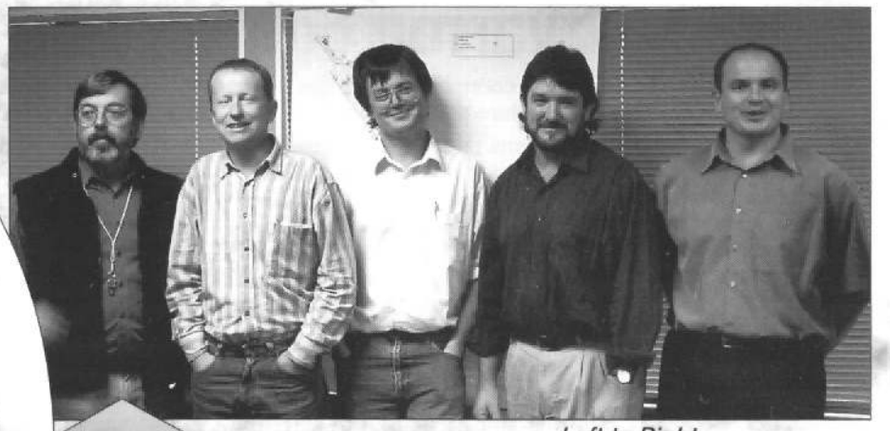
Lucy Martinez
MAF Biosecurity Authority
PO Box 2526
Wellington
Email: Martinezl@maf.govt.nz

This is also the address for submissions to either or both papers.

For further information contact: Gita Parsot, MAF Communications, telephone: 04 498-9806, or Lin McKenzie, National Beekeepers Association Executive Member, 025 357-970.

Round-up of the Bay of Plenty Field Day

Dr Denis Anderson
Bee Pathologist



Left to Right:-
Cliff van Eaton, Chairman; Andrew Matheson, Dr Mark Goodwin, Dr Denis Anderson and James Driscoll

BBQ Lunch

Dr Mark Goodwin

Andrew Matheson

Round-up of the Bay of Plenty Field Day

Graeme Cammell and Dr Mark Goodwin

Marketing

by Bill Floyd

I write this column from Louisville Kentucky (where we've been matching NZ Greenshell mussels to Jack Daniels whisky). Tomorrow we move on to Minneapolis for a special conference organised by the USA government to define and develop standards for organic aquaculture.

Both projects have given us considerable insight into some key marketing issues that are relevant to New Zealand honeys and hive products.

(Plus NZ manuka honey and Jack Daniels whisky and New Zealand Greenshell mussels go so well together I reckon it could be a hugely successful commercial product in the future! ..but keep that confidential!)

Ahhh....the future. By the time this is printed we should know if its E or C: Eradicate or Control. There has certainly been robust debate. The rights and wrongs and compromises that will create the final solution are beyond me: Sandee and I see Floyd Marketing's job to take whatever the decision is and make a successful strategy develop around it.

And we have some magnificent advantages going for us! Despite a drop in the world commodity honey price, New Zealand honey price positions are looking healthy.

The latest New Zealand retail sales survey is completed and is published in this *BeeKeeper.*

Honey sales are up and honey prices are up. And we are seeing a continuing swing to varietal, decommoditised honeys. (But the increasing sophistication of jams is a real threat: honey packers are going to have to increase their focus on quality and innovation and both brand and varietal differentiation!

And the NBA's research programme is starting to show some incredible commercial opportunities. Two years ago we realised that the potential value of honey was far in excess of what beekeepers get now: but significant research was needed. And New Zealand couldn't afford that research and/or we just didn't have the people with the right technical skills to believe in the projects.

So we took some ideas off shore and the results are staggering.

The National Honey Board's Sports Energy Project was developed from a concept proposed by the New Zealand Honey Research Unit. The results for the second stage of that research are just in and have been republished in this issue of the *BeeKeeper.*

Wow!...the significance is mind-boggling in terms of its commercial potential. Enjoy the read! (The latest Press Release is in this issue of the *BeeKeeper.*)

I've had feedback on the Holmes Show coverage of New Zealand manuka honey and the Australian 'takeover' due to their more enlightened government approach.

As soon as we're back we'll be targeting the Ministry of Health: its time for the legislation to get real!

The Waikato Field Days were an outstanding success: great work Waikato...and especially Fiona O'Brien! (Fiona has done a report in this issue of *New Zealand BeeKeeper.*)

And that's all from me (short column due to travel).

My favourite honey — bit gimmicky but great fun to eat — a selection of American Honey Straws. Honey flavoured with lime and cherry and raspberry and pino colada and... too many flavours to list — my favourite — the Pino Colada! Can't wait to get back to New Zealand and make an alcohol smoothie with Rata Honey and Pino Colada... I suspect it will taste absolutely b..... delicious!

Look forward to seeing many of you at Conference.

New study suggests honey may increase recuperation after workouts

Natural sweetener may be an ideal complement to protein supplements

Orlando, June 22, 2000. A research study presented today at the annual National Strength and Conditioning Association meeting suggests that combining honey with a protein supplement may boost post-workout recuperation and favour better blood sugar maintenance after exercise. Protein supplements are widely used to increase one's intake of dietary protein, which increases among individuals engaged in intense activities such as weight training, running, step aerobics and many competitive sports. Previous studies have shown that a combination of carbohydrates with a protein supplement can boost muscle energy recuperation and may favour better response to training.

"We were pleased to find that powdered honey promoted favourable changes in post-exercise markers of metabolism equal to that of the current standard, maltodextrin," says Dr. Richard Kreider, lead investigator of the study and Director of the Exercise and Sport Nutrition Laboratory at the University of Memphis. "We also found that the group receiving honey as the carbohydrate source did not display the typical drop in blood sugar 60 minutes after taking the other forms of carbohydrates. These findings support our previous study on honey."

The current study involved a group of 39 weight trained athletes both male and female. Subjects underwent an intensive weight lifting workout and then immediately consumed a protein supplement blended with either sugar, maltodextrin or honey as the carbohydrate source. Only the honey group maintained optimal blood sugar levels throughout the two hours following the workout. Additionally, subjects taking honey showed favorable changes in a hormone ratio that indicates a positive muscle recuperative state.

"Our data suggest that honey functions well in all of the aspects associated with post-workout recuperation and energy repletion. In addition, honey appears to stand out as perhaps a better source of carbohydrate to ingest with post-workout protein supplements. These findings support our previous study presented at the annual experimental biology meeting in April," added Dr. Kreider. "In addition to promoting muscle recuperation and glycogen [carbohydrates stored in muscle] restoration, honey-protein combinations also seem well suited to sustain favourable blood sugar concentrations after training."

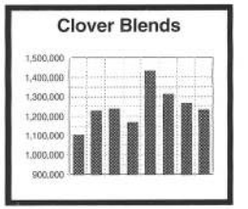
This study is the second of a series of studies funded by the National Honey Board at the University of Memphis Exercise and Sport Nutrition Laboratory. Located in Longmont, Colorado, the National Honey Board is a non-profit organisation that develops research and consumer information programs to increase the demand for honey. The study was done in collaboration with IMAGINutrition, a nutritional research and technology think tank located in Aptos, California.

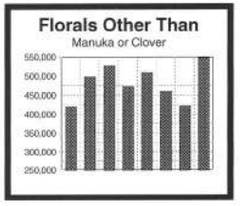
NEW ZEALAND SUPERMARKET HONEY RETAIL SALES DATA

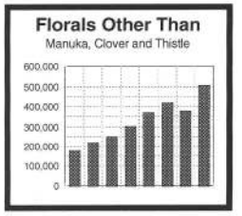
From Scantrack Barcode Analysis provided by ACNielsen Research Company.

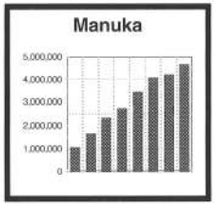
DATA MATRIX BLOCKS OF GRAPHS SHOWING VARIOUS

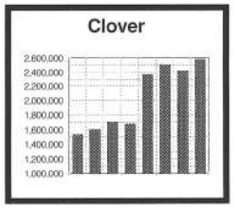
	1993	1994	1995	1996	1997	1998	1999	2000
Total No. of Products	186	211	229	268	283	285	283	285
Branded Sales	$8,193,856	$9,010,774	$10,138,634	$10,449,700	$11,743,328	$12,426,775	$12,468,109	$13,169,555
Clover	$1,535,598	$1,603,432	$1,703,084	$1,677,316	$2,363,926	$2,503,200	$2,412,233	$2,573,461
Clover Blend	$1,102,233	$1,227,031	$1,236,140	$1,167,827	$1,431,272	$1,310,717	$1,265,359	$1,229,970
Manuka	$1,041,629	$1,623,876	$2,312,085	$2,713,834	$3,414,152	$4,054,114	$4,186,835	$4,663,690
Manuka Blend			$4,183	$19,924	$6,234		$86,538	$135,574
Borage	$8,775	$9,471	$9,414	$13,252	$30,560	$70,557	$52,899	$49,248
Honeydew	$608		$6,480	$33,387	$33,214	$17,220	$17,092	$25,350
Kamahi	$18,192	$24,167	$28,557	$31,185	$42,761	$35,339	$31,225	$51,040
Pohutukawa	$99			$722	$4,526	$297	$731	
Rata	$84,507	$101,436	$108,416	$98,898	$111,637	$158,743	$145,848	$193,959
Rewarewa	$29,877	$33,643	$33,859	$50,116	$59,715	$64,075	$63,684	$69,517
Tawari		$969	$3,059	$13,284	$34,768	$26,862	$19,660	$40,915
Thistle	$242,200	$278,086	$277,052	$172,203	$138,266	$40,690	$45,766	$43,399
Vipers Bugloss	$36,839	$49,615	$60,141	$59,844	$53,214	$46,134	$45,988	$73,661
All Floral Excl. Cvr & Manuka	$421,096	$497,387	$526,978	$472,891	$508,661	$459,917	$422,893	$547,089
Florals Excl. Cvr,Man & Thist.	$178,896	$219,300	$249,926	$300,688	$370,395	$419,227	$377,128	$503,689
Comb	$59,079	$71,798	$67,900	$96,603	$120,783	$112,411	$46,732	$116,034
Other - Honey & Fruit/RJ/Pollen	$5,243	$4,222	$10,532	$20,716	$70,683	$245,523	$142,238	$36,001
Controlled Label	$4,043,589	$3,855,484	$3,509,664	$3,781,850	$4,345,412	$4,846,536	$4,708,903	$4,347,216
Total Sales	$12,237,445	$12,866,257	$13,648,298	$14,231,550	$16,088,740	$17,273,310	$17,177,012	$17,516,771











New Zealand Supermarket Honey Sales
MAT Year to 21st May. 1996 - 2000

Dollar Sales					
	1996	1997	1998	1999	2000
Branded Sales	$10,434,982	$11,743,328	$12,426,775	$12,468,109	$13,169,555
Controlled Label	$3,781,849	$4,345,412	$4,846,536	$4,708,903	$4,347,216
Total Honey Sales	**$14,216,831**	**$16,088,740**	**$17,273,310**	**$17,177,012**	**$17,516,771**

Kilo Sales					
	1996	1997	1998	1999	2000
Branded Sales	1,936,211	1,954,140	1,915,851	1,902,712	2,038,574
Controlled Label	867,004	922,532	969,668	893462	819,702
Total Honey Sales	**2,803,214**	**2,876,672**	**2,885,519**	**2,796,174**	**2,858,277**

Unit Sales					
	1996	1997	1998	1999	2000
Branded Sales	3,497,503	3,566,169	3,559,203	3,590,884	3,847,989
Controlled Label	1,516,720	1,622,575	1,730,577	1,583,647	1,445,371
Total Honey Sales	**5,014,223**	**5,188,744**	**5,289,781**	**5,174,530**	**5,293,360**

Price Per Kilo					
	1996	1997	1998	1999	2000
Branded Sales	$5.389	$6.009	$6.486	$6.553	$6.460
Controlled Label	$4.362	$4.710	$4.998	$5.270	$5.303
Total Honey Sales	**$5.072**	**$5.593**	**$5.986**	**$6.143**	**$6.128**

Mystery Creek Fielddays

New Zealand's Largest National Agricultural Show 14-17 June 2000

During 'Fielddays week', visitors from New Zealand and overseas 'swarm' to Mystery Creek, Hamilton. The site becomes a small tent city on 30 hectares of property for 900 plus exhibitors, 130,000 visitors, using 500,000 litres of water per day, 1.5MW of power through 18kms of cables under the Fielddays site and 18 cellphone transmitters ensuring thousands of cellphone calls can be made and received in site. Yes it all happens there. Visitors consume about 65,000 cans of coke, 12,000 mince pies, without the tempting delights of all the free tastings on offer.

This year the theme was 'Festival of Food - from pasture to plate' and so was borne the idea for the New Zealand Honey industry to become involved in promoting the value of bees, how bees relate in the pasture to plate theme, and other bee related products. A simple but yet effective name was chosen for our site - 'The New Zealand Honey Bee', and care and attention was given to making visitors welcome in our site with a very warm and friendly New Zealand Honey-Bee character.

Within our display we had four honey tastings areas, using different tastes and textures as a base for the varieties that were used. We covered other topics, such as

- Extraction - with a three frame extractor,
- Bee biology - using a sealed exhibit hive, (with the correct Agriqual Movement control permit),
- Honey and medicine - with reference to Waikato university site (very close to our site),
- Kids Korner - Large fun poster, pottles of pollen and small blocks of wax,
- A large wax wall that received wonderful greetings of wow!
- With the discovery of Varroa - an opportunity was also taken to display information, and for people to see Varroa under the microscope.
- Live Bee exports - using the packages from two different companies,
- Pollination - Map of New Zealand showing the different Horticultural/Agricultural areas,
- Trees and plants for bees - Well groomed exit to our site styled with these,
- Honey and cooking - Recipe cards given, targeting all members of the family, with a marinade, smoothies, hot/cold drinks,
- And a free prize draw - with 13 different sized gift packs of bee related products.

We also made use of the seminar time available in the exhibition area for Dr Mark Goodwin to explain the impact of Varroa on 'The New Zealand Honey Bee' and for Dr Peter Molan to inform about the honey industry research unit at the University of Waikato. Both generating interest.

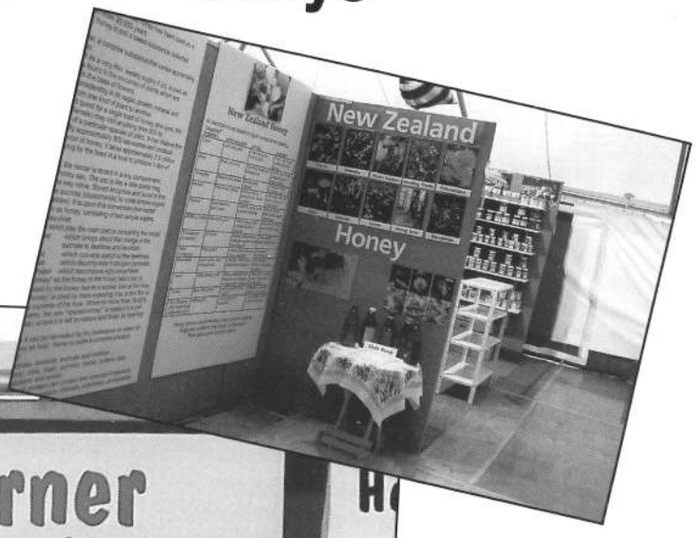
We had three companies, Comvita, Honey and Herb, and Waikato Honey products, as our 'Product Champions' and this was an opportunity for them to promote their products into the New Zealand market like never before. This was not an opportunity to sell, but to brand their product in today's market place, promoting their retail and distribution channels. For example with Comvita, we all pass their products down the supermarket isle, and it was now their chance to make us want to stop!! And choose to buy their product.

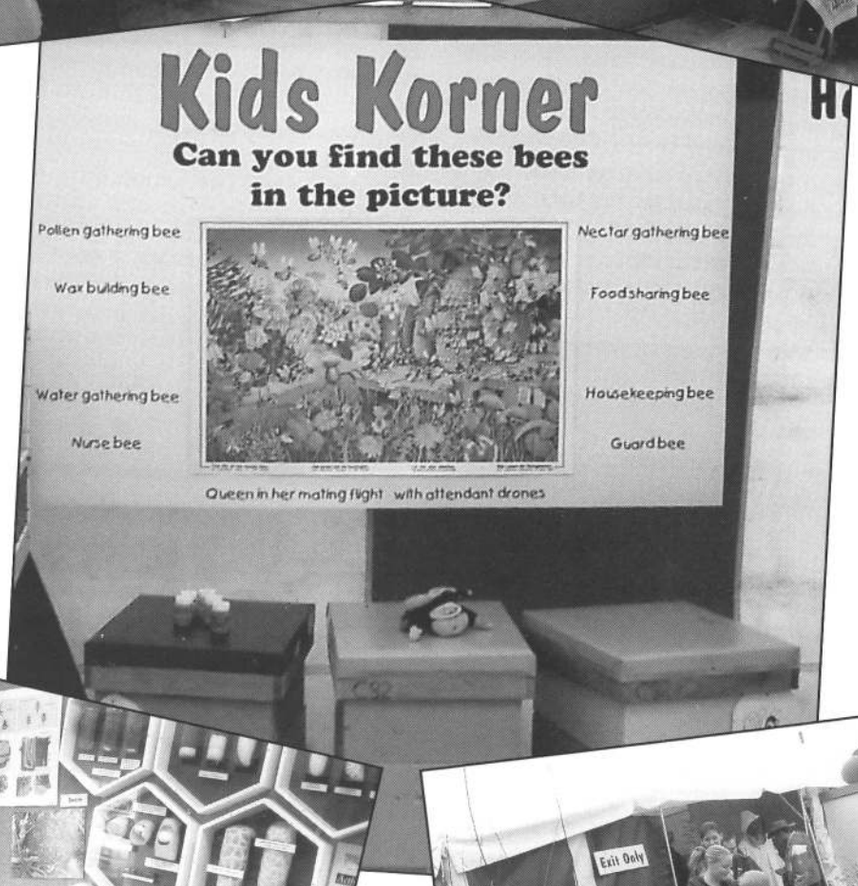
The following is taken directly from the Waikato Times of the 16/6/2000. At the Fielddays you need 'only to follow your nose. It should lead you to the pavilion where beef and lamb chips are gently frying. Dip them in apricot or plum sauce and chew away (one day one of the exhibitors spotted one of our 'Honey-bee' crew with their distinctive yellow 'Honey-Bee' Ribbon and proudly announced that if dipped in honey the chips would have a delicious sweet taste. Good on ya Aria Farms!)... Wash it down with a slug of Rongopai wine while you catch a cooking demo before dessert. It's honey - sticks dipped in Rewarewa or Comb the perfect energy boost for a trek down to Hort research where there's apples, kiwifruit and mandarin slices going begging."

On any given day we had beekeepers from across New Zealand lending a hand and without the help from volunteers this site would not have been successful. It is with credit that the Waikato Branch organised this event, especially after assistance with the Varroa checking had drained a lot of time from businesses. Perhaps it gave us the life we needed in keeping positive in today's environment. The difference is that once again the industry has sparked interest from New Zealanders, and may the follow on be a larger consumption of bee related products.

Written by Fiona O'Brien
Co-ordinator 'The New Zealand Honey Bee'

Mystery Creek Fielddays





Mystery Creek Fielddays

Frank reflects

by Frank Lindsay

While some of our AgriQuality staff continue to man the Response Office in Hamilton, beekeepers have been digesting the proposed scenarios for control or eradication and putting in submissions. For those in the proposed eradication zone, the dreadful wait continues while outside it, life continues fairly much as normal. While the weather remains mild, some apiary work is going on, cleaning up around the sites and generally preparing everything for the next season. Others are completing projects around the house to keep their minds occupied.

And what a wonderful autumn we experienced this year. Up to this month, the coastal strip where most of my hives are located had been warm and sunny, (16-18 Deg C) which allowed the bees to fly and bring in sources of late nectar normally excluded to them. The summer's off again; on again conditions have confused a lot of plants and trees tricking them into flowering again completely out of season. The pink flowering Eucalyptus leucoxylon roseaa has flowered for months and on a sunny day the trees hum with bees.

This late flow caused a compaction of the brood nest down into the bottom super but in some hives stimulated brood rearing. Even now, most hives have between two and four full frames of brood in them (plus the odd patch of drone brood) and so far are not showing signs of going into a cluster. It's a real pleasure checking these hives in summer clothing, changing rotten woodware, doing the final disease inspection and wintering them down. (I'm a bit late with this work).

How different the situation is just 10 kilometres inland. Frosty mornings have curtailed all but a dribble of bee activity, brood rearing has ceased, and bees have formed into a tight cluster for the winter. I have been giving a little additional top ventilation to those hives not in direct sunlight to reduce moisture from under the crown/split board. Hives should be dry inside but not have so much ventilation that they have to consume additional stores to keep warm.

I also had a few hives tipped over since my last visit (a few months ago). No real damage as all my hives are strapped with nylon cords against the wind and animals rubbing. However it was noticeable in one of these hives that the bees had completely vacated the first 15cm (6 inches) of comb nearest the ground. Too damp and cold for them to survive there and the reason why my hives are sitting on pallets off the ground.

With all the intense interest in mites, a lot of beekeepers are taking a little more interest in what goes on inside the hive.

Hives form a nice warm environment, have a plentiful number of food sources on hand and therefore are very attractive to a lot of other insects and where there is little vegetation, these become the focal point where insects gather and breed.

At this time of the year, you often see praying mantis egg casings on the outside of hives. A sign that there is plenty of food around.

When you first lift the lid of a hive, its interesting to see what's made its home on top of the split board. Cockroaches are common in bush areas and migrate into most of my hives. They make their home in the cracks and crevices away from the bees and feeding on the debris the bees drop during the night. Several of my hives have the odd large black (with cream edging) pacific cockroaches that launch themselves off the top of the crown board as soon as the hive is opened. Their speed is incredible. Often too quick for my hive tool!

In some apiaries, spiders seem to take over under the lid. Different apiaries, different spiders (mostly female). All have a place in nature except the Australian white tail, which can give you a nasty bite if it falls into your gumboots, so I generally dispatch them.

Just recently a lot of hives in our area have started to harbour tiny ants under the lids. No matter how many you squash, they return, that is until you put wet grass or green walnut leaves under the lid (thanks to an old American Beekeeping Magazine for the suggestion).

In some areas, a little parasitic wasp builds mud chambers under the hive roof in which they put paralised spiders for their larvae. Good in the garden but why do they pick on the lovely little green spiders.

At this time of the year you will also see the odd queen wasp and ladybirds hibernating under the lid. Unfortunate queen wasps have no place in my apiaries and don't last very long.

During the late summer evenings you can often spot the odd wax moth sitting outside of the hive, waiting to go in once activity at the entrance dies down. More often you will notice the silk tunnels their larva make in the outside frames of honey supers or in stored combs. During spring you sometimes see the odd tunnel between the capping and the larvae underneath or open topped pupa cells in a brood comb, the result of the bees clearing out wax moth larvae.

It is not until all the bees are shaken off a frame that you notice our little pollen mite. These eight legged mites should not be confused with the varroa, which is a lot larger. I use them to break down dry clogged pollen frames during the winter; (I never completely clean the storage shed of pollen residue). Sometimes you can see the tiny red whirligig mite crawling over the supers looking for things to eat such as a small creatures like spider mites which live on vegetation.

These and the bees make up some of the living organisms that form part of the natural world of the beehive. Keep your eyes open, you might spot something new.

At this time of the year beekeepers are well into their winter duties. Sorting frames and woodware, scraping off propolis. Dark and heavy frames should be put aside to be melted down. As a general rule, I recycle the wax in frames I can't see the light through when held up to the sun. These are put into a pile for melting down using a steam chamber or held over for the solar wax melter. This takes a bit of will power to stick to your guns and melt them when you are faced with a shortage of honey boxes during a good flow.

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Winter is the time to plan your next year's operation. I realise with the mite problem hanging over our heads that this might be a little difficult right now. However while sitting in front of the fire during the evening, how about working out your "cost of production". Everybody's will be different as each has different parameters. Some travel long distances; some make their own gear while others buy in replacements. Do you write off the cost of supers in ten years and frames over five years? Depends how you look after them.

What dollar value should we put against our time? Hired a tradesman lately and got a shock at the bill. Some of us are still valuing our time at $10 per hour. Remember most beekeepers are qualified in the ways of the world and are jacks of all trades; Fencing, welding, cabinet making (well, simplified), mechanic, food processor, etc. Most professionals charge out their time at $40.00 per hour. Try using this figure and get a shock at what your honey business is returning. Then half the hourly rate to give a fairer indication.

Evaluate your return on each apiary. Those where you have to add a few hives each year because of die-outs may not be worth it. Good hive sites produce a surplus of hives, ie nucs taken off to prevent swarming develop to full size hives on their own while all hives produce a good honey crop most years.

Most beekeepers (small and large) do not put enough time into their paper work. Time spent planning, examining mistakes, is well worthwhile. Each activity should be broken down so all costs and expenditures are known. If you have the facts, it's easier to argue a case for a pollination price increase than doing it off the cuff. I look after a few hives for a vegetable/fruit grower who is always spraying. These bees build up well in the spring and secure a good pollination for him but bee number dwindle around December and these hives never produce much of a surplus. This year I moved a nuc three kilometres away and it produced two full depth supers of honey while the full size hives that remained produced only one. I gave him a copy of Dr Mark Goodwin's Surfactant Report but it has made little difference. Some people are hard to educate.

All costs associated with beekeeping have gone up during the last 12 months (fuel, packaging, replacement gear and now sugar) and now the mite situation should set everybody

thinking. It's difficult to reduce costs if you have no idea where all your profit comes from. If the mites cannot be eradicated from New Zealand, where are you going to get that extra $10-20 per hive, per year for mite strips or the equivalent.

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One of our older hobbyist beekeepers has given up and passed on a few books to me.

One is a little gem. Written by an Englishwoman MM Hooper titled "Common Sense Beekeeping". (Cost price 2/6 so it's very old).

Here is what she says about gloves:

GLOVES in apiary work have aroused much controversy. Their use is often quite thoughtlessly condemned, while beekeepers continue to wear them and apologise for so doing. In days when such delicate operations as removing a human appendix are carried out by gloved hands apology seems uncalled for. What matters is not so much the gloves as the hands within them! Some hands should never essay to handle bees whether gloved or not, but the right sort of sensitive, gentle hands, will handle bees correctly whether gloved or not - or perhaps it is more nearly the truth to say that many sensitive hands will handle bees all the better for being gloved. The trouble is often not fear of stings, in fact gloves really impervious to stings are too clumsy for apiary use, but a sensitive intolerance of the "tickle" of tiny legs crawling or little wings fanning on a bare skin.

Some skins are harder and less sensitive than others and as the important point is the confidence of the operator the matter is one to be decided by the individual. If the wearing of gloves gives confidence many stings will be avoided by wearing them, the thinnest of kid gloves often serve this purpose, and thick clumsy cloves should not be adopted, while hands that drop frames should take some practice on empty hives till the necessary skill is acquired.

Useful Maxims for Beekeepers

A swarm of bees in May bee-man much astray.

Destroy not the circle.

When the swarming instinct has been aroused, satisfy it.

Do your spring feeding, and your spring cleaning, in the autumn.

Give room, comb room, in advance of the needs of the bees.

The best packing for bees is bees.

Never destroy a good queen till you are sure you have a better.

The greatest danger to bees is the beekeeper.

A super in time may save nine - swarms.

Surplus bees bring surplus honey.

Don't buy a swarm - it contains an old queen.

Don't sell a swarm - it contains your honey harvesters.

The entrance of the hive is the mirror of the stock.

Bees regard a sealing as a ceiling.

Busy bees bring bending branches.

Could Pseudoscorpions from South African beehives control our varroa?

Sometime last year Mr Mark Hale, a South African beekeeper, posted a message on Bee-L (an international computer mailing list with nearly 1000 subscribers), in which he said that when their hives contained several dozen pseudoscorpions, Varroa mites were causing no problems. Varroa was first recorded in South Africa in 1997, and where pseudoscorpions are present in good numbers, control measures are not necessary.

My immediate reaction was that researchers would leap to investigate this story, because if pseudoscorpions were indeed controlling Varroa, perhaps they could be introduced to hives in other countries?

I saw no further messages on Bee-L, but immediately Varroa was confirmed present in New Zealand on 11 April, I posted a message asking for contact from researchers who may be working on South African pseudoscorpions. Mark Hale replied saying to my surprise that I was the only person who had responded to him. As far as he knew, no researcher had investigated or was investigating the phenomenon. He said other beekeepers had reported that they too had witnessed the invasion of hives by Varroa, followed by an increase in pseudoscorpions and a virtual disappearance of Varroa. Mark forwarded to me a report of such an experience written by Mr Eddy Lear and published in the April 2000 issue of 'Southern Beekeeping Newsletter'.

Since then I have endeavoured to obtain as much published information as possible, and have made every effort to locate researchers who may be able to pass on first-hand information.

Pseudoscorpions are small spider-like creatures with a pair of scorpion-like nippers, but no stinging tail. They are about 2-6 mm long, there are thousands of species in the world, and New Zealand has at least 70 species. The usual habitat is decaying plant material where the prey are all kinds of little creepy creatures such as insect larvae, springtails and mites. Nowhere in the world do pseudoscorpions cause problems to people. Pseudoscorpions are not closely related to real scorpions and are called 'pseudo-' (meaning 'false') -scorpions because of their superficial resemblance to real scorpions.

Several species of pseudoscorpions have been recorded in hives in Europe and North America, and one of these, *Chelifer cancroides*, does occur in New Zealand, but from bird nests. There are no suggestions that in Europe this pseudoscorpion eats Varroa, but, interestingly, some reports dating from around the 1920s speculated that perhaps it ate acarine mites. I have been unable to find anything more about this speculation.

At least two other species of pseudoscorpions were recorded from South African beehives around the turn of the century. One of these, *Ellingsenius sculpturatus* (Fig 1), is widespread in southern Africa, and appears to live right among the bees as it travels with them in swarms by clinging onto hairs etc. Mark Hale has also seen the pseudoscorpions living among the bees in hives with the bees ignoring them. A study was started about 80 years ago, but was abandoned by 1922 owing to pressure of other duties (Whyte 1922) and nothing more was published. Since then, as far as Mark and I have been able to determine, there has been no research. A second species, *E. fulleri*, was originally named from Cape Province, and more recently has occurred in Spain, Mozambique, Cyprus and Iran, but there are no further data and I know of no reports from these areas of Varroa being controlled by pseudoscorpions.

The reports from beekeepers and inquiries from Mark and myself have stimulated interest in the possible interactions of pseudoscorpions and Varroa, but as at a few days ago we have still not found any South African researchers studying pseudoscorpions and Varroa. It is clear that the recognition of the presence of Varroa and the reports from beekeepers have been so recent that no researchers have yet 'geared up' to investigate the reality of the situation. However the information does suggest that at least one species of pseudoscorpion is living in beehives there, where historically it has preyed upon small creatures such as several species of mites, and small larvae of wax moths, flies and beetles. When Varroa invaded South African beehives, it appears that to pseudoscorpions this mite became just another food source.

So the position is that we have substantial reports from South African beekeepers that pseudoscorpions are eating and controlling Varroa so well that no measures are used against them, but little is known about the pseudoscorpions, and there are no scientific studies yet underway.

On 4 May I wrote to the Minister of Agriculture asking if he wanted me to pursue this possibility for Varroa control. On 8 May his Private Secretary replied saying that the matter fell within the portfolio of the Minister for Biosecurity, so my letter was being referred to the Hon Marian Hobbs. There has not yet been a response.

If we are to discover whether South African pseudoscorpions are actually controlling Varroa, the most expeditious way to do this is to send a researcher over from here. While awaiting a response from the Hon Marian Hobbs, with the support of the National Beekeepers Association of New Zealand and a beekeepers' 'farmer group' I have applied for funding from Agmardt to spend a couple of weeks in South Africa to obtain on-the-spot data.

If indeed Varroa are being eaten and there appears to be no harm to honey bees, the next step would be to consider applying to ERMA (the Environmental Risk Management Authority) for permission to import pseudoscorpions to quarantine here at Lincoln for further study. Their life cycle would have to be elucidated, and also their interaction with our honey-bee genotypes which of course differ from those in South Africa. If all appeared to be the way we wanted it, and permission was obtained for field release, the next step would be to inoculate pseudoscorpions into hives in the field. A pseudoscorpion breeding facility could be established to make them available to all comers as soon as possible.

If all went well our Varroa would be controlled biologically and without chemicals, and at no further cost. Because pseudoscorpions ride on bees, they would spread from hive to hive, so even feral colonies in remote areas would ultimately have them.

A full scale Research Programme, as outlined here, could be run at different levels, but a couple of hundred thousand dollars each year for several years would probably be sufficient to run the Programme at a level that should see substantial results in a few years.

If a decision is made not to attempt eradication of Varroa, or even if eradication is attempted and fails, control using Apistan and perhaps other methods will have to be initiated. As pseudoscorpions became available, chemical control could be phased out. If pseudoscorpions didn't work as hoped, chemical control would continue until other Varroa control methods were developed.

Under this scenario, the cost is minimal compared to spending $55 million on an eradication attempt that in the opinion of many will fail. Also no hives need be killed, and if all goes well, eventually we will revert to chemical-free beekeeping. If pseudoscorpions prove to have no promise, all we will have lost is $10-15,000.

A word of caution: a pseudoscorpion of a different species that lives in bee colonies in the Belgian Congo was seen to apparently cause the death of a bee when the two were confined in a container (Vachon 1954). The author emphasised that the situation was artificial, but the observation points out the need to ascertain exactly how pseudoscorpions will interact with our bees before field release is contemplated.

Acknowledgements

Mark Hale has been unstinting with his help, and has provided most of the recent information on pseudoscorpions in South Africa.

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Barry Donovan,
Donovan Scientific Insect Research

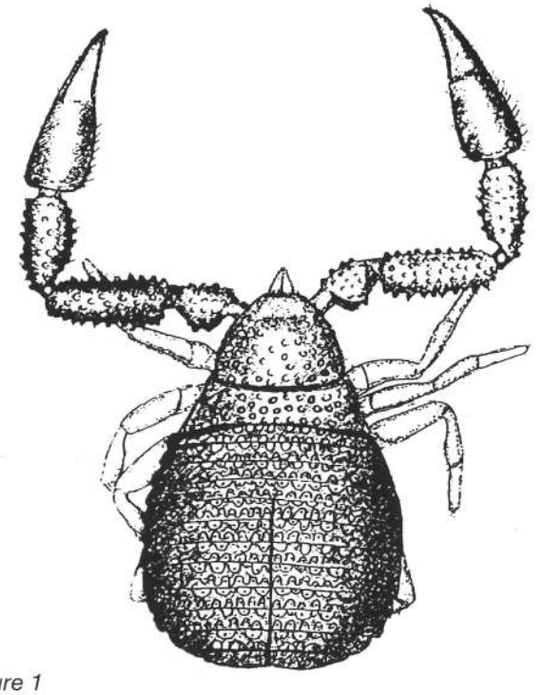


Figure 1
The pseudoscorpion Ellingsenius sculpturatus from a South African beehive (length about 6.5 mm) (from Hewitt and Godfrey, 1929).

Recent work on Varroa mites

Denis Anderson brought us up to date with his recent work on Varroa mites.

He described how the mite that has been known as Varroa jacobsoni for the last 96 years actually consists of 18 different mites that belong to two, but possibly five, different species. Denis arrived at this conclusion after studying DNA from so-called 'Varroa jacobsoni mites' that were infesting different populations of Apis cerana throughout Asia. He has now redefined the species 'Varroa jacobsoni' as consisting of Varroa mites that are natural parasites of Apis cerana (Asian bees) in the Malaysia-Indonesia region. He assigned a new species name, Varroa destructor, to Varroa mites that are natural parasites of Asian bees on mainland Asia. He is in the process of determining the taxonomic positions of a further three distinct mites that are natural parasites of Asian bees on islands in the Philippines.

Denis also explained that when he studied the DNA from Varroa mites on Apis mellifera (the European honey-bee) in 32 different countries(worldwide), he only found two different but closely related mites, and both of these belonged to the new species Varroa destructor. So the mite that devastates European honey-bees worldwide (including New Zealand) is now to be known as Varroa destructor, not Varroa jacobsoni. Denis also talked about the ramifications of these new findings.

Denis also mentioned that these findings have been recently published in the scientific journal 'Experimental and Applied Acarology (2000, Volume 24, pages 165-189). He has also published a recent review on genetic variation in Varroa mites in the scientific journal 'Apidologie' (2000, Volume 31, pages 281-929). This latter paper can also be downloaded from http://www.edpsciences.com/docinfos/INRA-APIDO/

Denis is presently working to discover the trigger mechanism that allows for Varroa destructor, but not other species of Varroa, to reproduce on Apis mellifera. He suggests that they could have resistant strains of Apis mellifera in three to four years.

If we have to live with Varroa, Denis believes that an Integrated Pest Management Strategy (IPMS) will be the best option for the New Zealand situation. When asked, Denis said that we could live with Varroa.

The Marketing of our honey

A critical view

First of all, this of which I am about to write is not going to be an article of doom and gloom, as we have many fine people in our industry trying as they do to work out some sort of living against almost impossible odds.

On the other side of the coin we have a few big operations doing their best to takeover the whole of the retail outlets by viciously cutting the prices on one another. So that the only people getting any benefit from all this fighting are the retailers.

Some of us will remember the fate of the firm, Wilson Neil who tried to run the handling and retailing of our honey in a business like manner.

I think for the most part, most of the packers only want a fair return for their efforts and to see that those people, the bulk producers who do their best to keep the whole show on the road can also get some sort of a living out of it. But the packer to keep going has to compete with the price cutters and so the rot sets in with the screws being turned ever more tightly on the unfortunate bulk suppliers.

Today we have the ridiculous situation of delicately flavoured clover honey with just a touch of colour being worth no more than $2.10-$2.30 per kilogram.

Manuka honey in bulk $3.80 to $4.00 per kilogram, with some Manuka selling for up to $22.00 per kilogram in some shops.

This to me says only one thing, something is definitely wrong with our whole marketing setup, and if it carries on like this people will be forced out of the industry, and we won't be only worried about the 'Varroa Mite' closing us down but will find that the retailers will be happy enough to get their honey supplies off shore if necessary.

There is talk of the bulk prices being even lower next year, and at the same time one reads of a one billion dollar extra pay out, over and above their normal trading profit, for much of the farming industry.

The kiwi fruit industry, meat, wool and all dairy products are on the up and up, while we try to survive at the subsistence level. It certainly says something for some form of organised marketing.

For the whole of the last fifty five years that I have been in this industry, there has always been a reluctance to sell our product at near something what it is worth.

If one was to sit down and work out the cost of production, the packaging costs and transport into the retail outlets, like any other successful business would do, you are immediately accused of price fixing.

How many old-timers can remember the huge shifts upward in the price of sugar or fuel with the warehouses stuffed full of food containing sugar, going up with it, but honey no "Oh goodness me no," we much stay the same, and carry the extra costs. Perhaps that is why as you drive along the highways and byways of our country you see so many weary looking hives that have never had a coat of paint since they were assembled, and some of them look as though they had just come from the backyard of Steptoe & Son.

Apart from what the bank manager might think, it doesn't do anything for the image of beekeeping with the general public.

There's another thing I would like to mention before I go on to what is right with our industry, and this is, that there appears to be huge numbers of hives being brought out into the open, since it has been known that unregistered hives will be treated the same as feral hives, and compensation if any will figure largely in their decision to come out into the open. To us facing a huge increase in our apiary levy, it is nothing short of thieving, "if it is true" and you are prepared to let someone else pay to keep the show on the road.

On the bright side, there are the people who do their best to get our surplus honey overseas. The scientists and others who do such a good job in trying to promote our products.

The Department of Agriculture whose members though rather thin on the ground are most helpful when called upon.

The younger members of our industry who run retail outlets at their apiaries. These shops are full of well presented package honey, and a wide range of by-products.

It all helps to inform and create an interest in our industry.

The service the beekeeper can call on in the ordering of woodware. Queenbees, comb foundation and many other items that usually arrive in first class condition.

It all helps in the day to day running of our industry, and it is such a great pity that we have never been able to have a sensible marketing organisation that's profitable and fair to all.

I hope that one or two people will reply to this as it would be good to get other points of view.

Stuart Tweeddale,
RD5
Taihape

Dried Apricots

In the last BeeKeeper's Journal there was the usual page of recipes and other gastronomic delights, but for a taste of something once tried, never forgotten, have our readers ever tried apricots and old pig snouts? Perhaps I should explain:-

When I was seventeen and lived in Taranaki the government was offering one shilling bounty on wild pig snouts. Those were in the days when a gallon of petrol cost one shilling and sixpence. My friends and I decided to get some of this big money and at the same time get some weekend sport, so we pooled our resources and bought a Model T Ford in good order for five pounds. As I worked at the local garage it was my job to drive the Ford and keep the thing in running order. The pigs were naturally most reluctant to part with their snouts, but we had three good persuaders on our side, they were one pig finder and two pig holders.

After a few months we became very successful. We hunted over a large area from Mt Messenger to Whangamomona on the abandoned ex-servicemen's farms. Some of the men who had survived the World War 1 trenches were given land up the river at Whangamomona to develop as farms. From 1918 to 1932 they cleared their land, built houses and sowed grass seed. In 1932 the great depression started and any man who had borrowed money from the banks for developing his farm and could not maintain his mortagage repayments was forced to walk off his farm. Unfortunatley this applied to most of the original ex-servicemen's farms in that district. We hunted on these farms about eight years later when the grass had reverted back to bracken fern and this attracted mobs of pigs. As a youth I wandered about these empty homes with portraits and photos still on the walls and understood just how bitter these defeated men must have felt at what had happened to them and their families.

We all carried knives and I carried my then new 0.22 rifle to deal with any boar that could injure us or our dogs. Only on one occasion did a pig get the better of us. My friend rushed in on a bailed sow with his knife in his right hand to stick the pig, he reached down to pull a holder out of the way with his left hand but the sow saw his hand and crunched his thumb. I shot the pig and took it's snouth and then took my friend, Roy, to the doctor in a hurry. Sadly Roy was killed at the Battle of Casino a few years later.

A younger man that I knew saw that I was making a bit of money during the weekends so he decided to have a go himself and made quite a success of it. He used to work a night shift in town and on cold nights wore his old hunting jacket to work. On one particular night he grabbed a handful of dried apricots and put them in his pocket. Half way to work he was happily chewing away on his dried apricots when he found he was chewing something very tough that tasted absolutely revolting. He realised to his horror that he was chewing an old pig's snout. It is a pretty safe bet that it was one snout that the government did not have to pay out a shilling on.

Perhaps some of our readers can dream up a recipe that uses some of our rich caramely flavoured Rewarewa honey mixed with stewed dried apricots. It should go down very well provided you do not think of pig snouts while you are eating it.

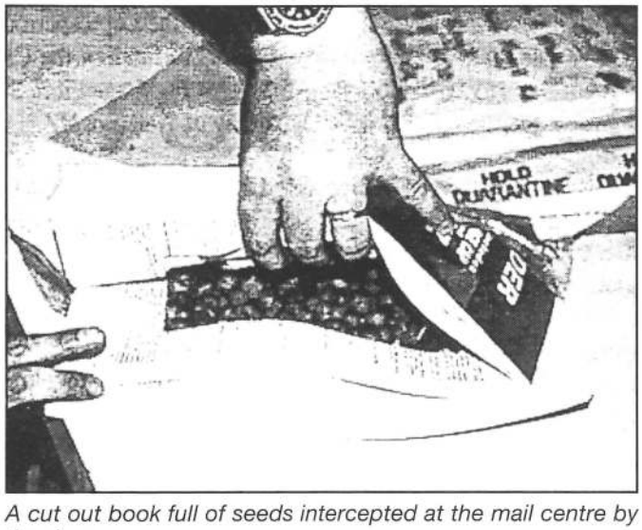
Ron Mossop

Dogs — front line defence for bee mites

NSW Agriculture has been supplying bees in mailing cages to train dogs to detect bees at the various international airports in Australia for some years. I had the opportunity to hand deliver the last batch of caged bees to two operators at Mascot and view the dogs in action.

They are termed 'detector dogs' and are being used by Quarantine to assist in the detection of illegal bee imports into Australia amongst other things. If any one has travelled through our major international airports then the chances are you have seen a Beagle sniffing passenger luggage. These are termed 'passive dogs'. Behind the scenes are some rather energetic and highly mobile dogs that AQIS refer to as 'active dogs'. Between these two lots of dogs an incredible range of products that are of high risk to Australian Agriculture have been located in incoming baggage and post parcels.

The dogs are trained to sniff out more than 30 different items of quarantine concern. All AQIS Detector Dogs are trained to detect: fresh fruit and vegetables, meat, both fresh and processed, including canned meats, plant materials, eggs, birds, reptiles and bees.



A cut out book full of seeds intercepted at the mail centre by the dogs.

'Active' response dogs are also trained to detect soil, seeds and cheese.

For airport work, AQIS only recruits beagles that are between one and three years old, have a very friendly and outgoing temperament, are not upset in noisy and stressful environments and they must be very fond of food!

Because of the death of John Heineman the Library will be closed until further notice

Rest in peace

For the 'active' dog program, working in mail centres, private couriers and behind the scenes at international airports, AQIS has no particular breed requirements, and the dogs are generally medium sized who are very determined 'retrievers' - when playing with a stick for example, these dogs generally don't let go even in quite rough play.

The two dogs we saw in action were originally from the RSPCA. They were a Rottweiler cross cattle dog named 'Lupe' and a Labrador named 'Yella', both were very friendly dogs.

The 'handlers' of the two dogs, Lynn Keller and Alix Stikkelorum have to be as active as their dogs. They are responsible for the well being, ongoing training of the dogs and simply keeping up with their dogs while in action.

Foreground; 'Yella' and Lynn Keller. Background; Alix.

'Yella' and handler Lynn Keller in action at the airport mail centre.

Only a handful of dogs tested make the grade each year, so they have to be rather special to join the team. 'Yella' was the only one out of his group of six dogs to make the grade.

Quarantine dogs stay in kennels with other detector dogs in a happy and friendly atmosphere supervised by AQIS handlers. It's not possible to send the dogs home with their handlers because the home atmosphere - particularly cooking smells in the kitchen - would most likely upset their highly specialised scent detection training.

Doug Somerville, NSW Agriculture Goulburn

RECIPES

Fresh Vegetable Salad

Raw couliflower
Artichoke hearts
Asparagus spears
Tomato wedges

Dressing:

1/2 cup honey
1 cup salad oil
1/2 tsp salt
1/3 cup pizza-flavoured ketchup
1/2 cup vinegar
2 tbsp fresh chives, chopped.

To Prepare Salad

Arrange slightly cooked or raw vegetables in individual servings on crisp lettuce. Add dressing just prior to serving. Serve with hot biscuits and honey.

To Prepare Dressing

Place all ingredients in a quart jar with lid. Shake well. Alternate - place all ingredients in blender container and blend on high speed for five seconds.

Lemon Glazed Turkey Roll

1 boneless turkey roll
2 tsp freshly grated lemon peel
1/2 cup fresh lemon juice
1/3 cup honey

Barbecue boneless turkey roll according to package directions. Combine lemon peel, lemon juice and honey and brush sauce over turkey roll about 30 minutes before turkey is done. Continue barbecueing and basting frequently until done.

Honey-Glazed Baked Ham

1 ham
1 cup (or more) honey
Orange slices

Place ham, fat side up, on rack in an open pan. Do not add water. Do not cover. Bake in a preheated 325°F oven, according to timetable below. Remove rind from ham. Score fat into diamond shapes. Pour honey over ham to cover well. Return to oven and bake for 15 to 20 minutes longer or until brown. Garnish with orange slices.

BAKED HAM TIMETABLE

Size of Ham	*Total Time*	*Minutes per Pound*
5-6 lbs	2-21/2 hrs	22
8-10 lbs	21/4-3 hrs	20
10-12 lbs	3-31/2 hrs	18
12-15lbs	31/2-4hrs	17
16-18 lbs	4-41/2 hrs	15

Cranberry Relish

1 lb raw cranberries
2 whole oranges
1 1/2 cup honey

Put cranberries and orange through food chopper. Add honey and allow to stand several hours before serving. Will keep several weeks in refrigerator.

Luscious Fruit Salad

3 cups diced pineapple, apple, pears, or other drained fruit
3 tbsp honey
1/2 tsp salt
1 cup sour cream
1 cup miniature marshmallows

Mix ingredients, chill before serving.

Lemon Nut Yams

1/2 cup melted butter or margarine
1/3 cup lemon juice
1/4 cup honey
2 1-lb cans Louisiana yams, drained and halved lengthwise, or six medium Louisiana yams, cooked, peeled and halved lengthwise.
1 medium lemon, sliced
1/2 cup chopped walnuts.

Combine all ingredients and cook over low heat about 15 to 20 minutes, stirring occasionally. Yam mixture may be placed in a lightly geased shallow 1 1/2 quart casserole and baked at 350°F for 30 minutes if desired.

Honey Biscuits

2 cups flour
4 tsp baking powder
1/2 tbsp salt
1/3 cup shortening
2/3 cup milk
1/4 cup butter
1/4 cup honey

Sift flour, baking powder and salt together into a mixing bowl. Cut in shortening until mixture resembles cornmeal. Add milk gradually, blending until well combined. Place dough onto floured surface and pat into a 1/2 inch thick rectangle. Cream butter with honey and spread a portion of this mixture on dough. Roll up as jelly roll then cut into one inch thick slices. Arrange on baking sheet with 1/2 inch space between each biscuit. Spread remaining honey-butter mixture on top of each biscuit. Bake in a 350°F oven for 12 to 15 minutes. Cinnamon may be added to honey-butter mixture. Chopped raisins, nuts and/or candied fruits may be sprinkled over biscuit dough before rolling, if desired.

Pumpkin Pie

1 9-inch pastry shell, unbaked
1 1/2 cups cooked pumpkin
1 cup honey
1 tsp cinnamon
1/2 tsp mace
1/2 tsp ground cloves
3 eggs
1 cup milk
1/2 cup cream
1/2 tsp salt

Mix together pumpkin, honey, spices, eggs, milk, cream and salt. Beat well and pour into unbaked pastry shell. Bake at 400°F for 45 minutes or until knife inserted near centre comes out clean. Serve with whipped cream topped with one teaspoon honey.

IMPORTANT DATES FOR 2000

BRANCHES SEND YOUR MEETING DATES IN FOR 2000. NO CHARGE.
MAGAZINE Copy/advertising deadline 1st of month. EXCEPT for DECEMBER issue.
DEADLINE **25 NOVEMBER**

COMING EVENTS...

ANY IMPORTANT EVENTS COMING UP - LET US KNOW

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The site is at 681 Cashmere Road,
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Contact: Mr Lindsay Moir
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We meet on the first Saturday in the month September - April, (execpt January) at 1.30pm. The venue is at our Club hive in Roslyn, Dunedin.
Enquires welcome to Club Secretary, Dorothy, phone: (03) 488-4390

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For application forms and meeting dates contact
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Convener Arnold Esler.
Phone: (06) 379-8648

WELLINGTON BEEKEEPERS ASSOCIATION
Meets every second Monday of the month (except January) in Johnsonville. All welcome.
Contact: James Scott, 280 Major Drive, Kelson, Lower Hutt.
E-mail: JLscott@clear.net.nz

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