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September 2002

# The New Zealand BeeKeeper

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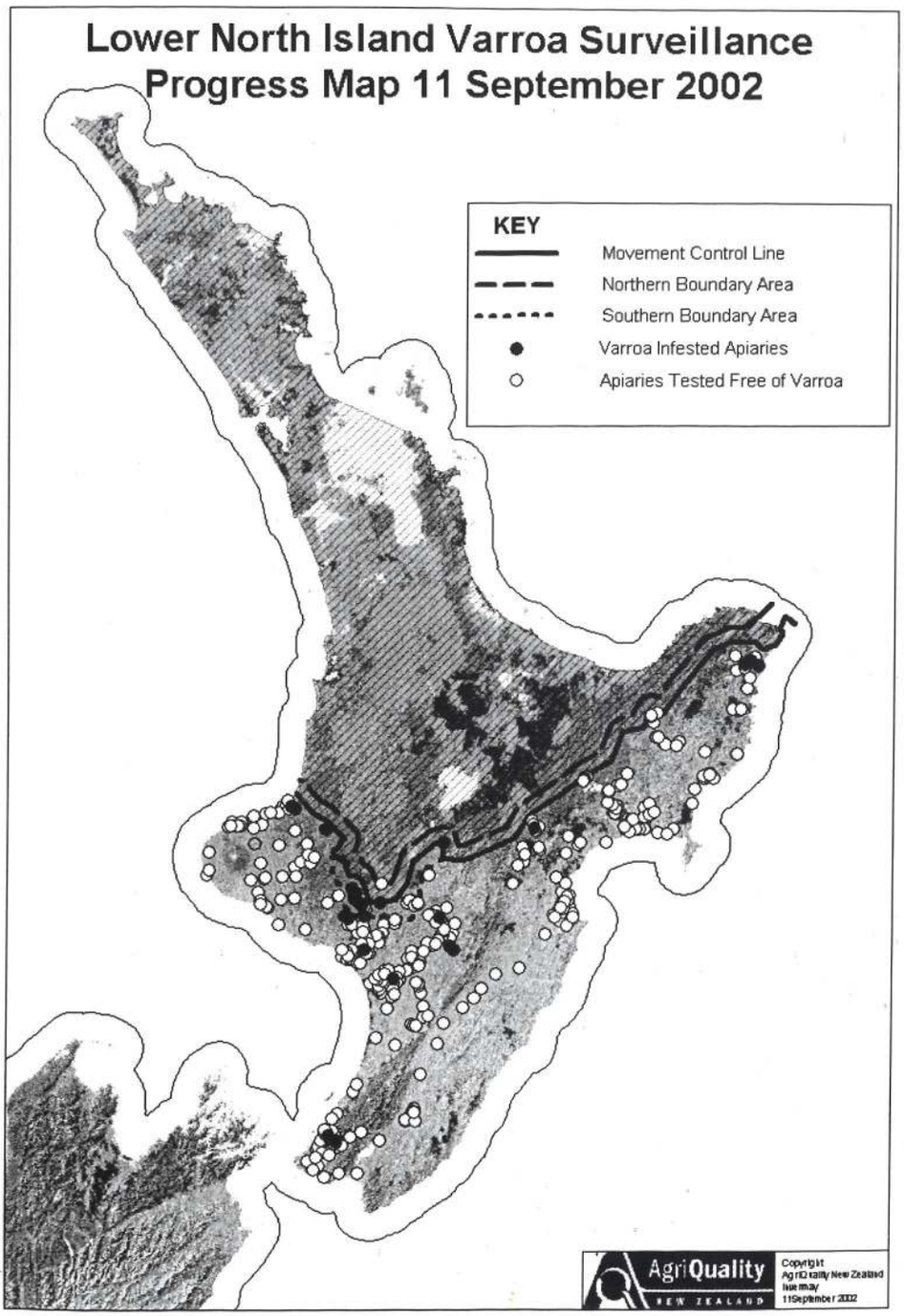


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# African hive beetle attacks US colonies – NZ on alert

Just when you think we know all of the pest and diseases affecting honeybees, another pest sticks its head into the spotlight. In May 1998, beekeepers in the United States noticed a small, brown-black beetle and its larvae attacking their hives and honey crops.

The beetle was eventually identified as the little-known *Aethina tumida* or Small Hive Beetle (SHB), a native of tropical and sub-tropical Southern Africa.

Little is known about the SHB, and until its discovery in Florida, there was only one paper in the literature describing it.

The SHB is a dark brown to black coloured beetle, about twice as long as it is wide, and measures 5.5mm by 3mm. However, if nutrition is poor during development, it may only be half this size. The larva are pearly white and up to 2cm in length.

**Distribution**

The beetle is a native of South and Central Africa. In the four years since its discovery in Florida, the SHB has been spread by migratory beekeepers to most states, although it is not established in all these states. As the beetle is found in tropical and subtropical Africa it is thought that its natural range may be limited and the beetle may not be able to become established in the northern states.

The rate of natural spread is unknown, but the SHB is a strong flyer, and unlike varroa, does not rely on the bees to spread from colony to colony. In fact, an adult female beetle may visit several colonies in her lifetime, laying eggs in all of them.

The movement of colonies of infested bees, beekeeping equipment, package bees, queens, infested fruit or potently infested soil also assists spread.

**Biology**

The beetles feed predominately on honey and pollen, and may also eat brood and at times dead bees. Their location within the hive varies considerably, depending on the temperature. In warm and hot conditions they are found at the extremes of the hive such as under the lid, on outside frames, on the insides of the supers or on the bottom board. In cooler conditions, they will move into the cluster to keep warm. Their ability to self-thermo regulate in cool conditions appears to be non-existent.

An important feature of the adult beetle is they will always run away from light and can move very fast within beehives. Larvae however, move towards light and will come out of comb cells in a seething mass when frames are removed.

**Life cycle**

An adult female beetle can lay up to 200 eggs per day and may lay upwards of 2000 in her lifetime. She must mate prior to each egg-laying event, and mating is thought to take place mostly within the hive. For the adult to produce eggs, they need a protein source. Research at Beltsville Bee Laboratory in Maryland, shows that egg production is best with a good supply of pollen and honey. SHBs will produce eggs on a diet of brood and brood food but not as prolifically as on diets that include pollen.

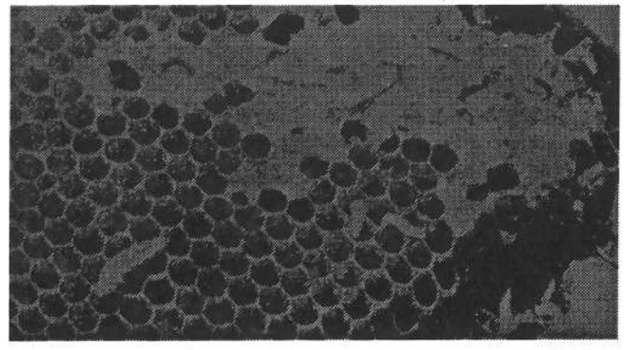
SHBs feeding on honey only are unable to produce eggs (Jeff Pettis unpublished data).

The eggs are laid in the cracks and crevices within the hives, or at the base of empty cells, and hatch after 24 hours. The larvae feed on pollen, honey, brood-food and brood, leaving a layer of slime over the combs. The slime seems to act as a bee repellent. Once the larvae have fully developed they leave the hive and burrow into the ground in front of the hive to pupate. Sometimes, before leaving the hive, the larvae will all group together in a large mass on the bottom-board. The reason for this is unclear, although it may be they are waiting for the right conditions for pupation.

The adults emerge from the ground after pupation, which takes between 15 to 30 days, depending on soil temperatures. The adults then fly until they are attracted to another colony of bees.

The SHB can also complete its life cycle on fruit, such as melons, although this only occurs if a colony of bees is not found.

The longevity of SHBs is determined by their egg-laying activity. SHBs that lay eggs will live between 30 – 60 days, while SHBs in the laboratory and fed only honey, may live for 11 months or more. Beetles can survive for up to four days without a food source in favourable condition (Jeff Pettis unpublished data).



Greater wax moth larvae bottom left and small hive beetle larvae, centre right.

**Ground conditions**
For larvae to pupate, they need to make a small chamber under the ground. If the ground is too heavy, hard, compact or dry and they are unable to achieve this or cannot escape the ground after pupation, they may die. The SHB seems to prefer loose sandy or silt soils.

Soil temperature is critical for pupal development and survival. The warmer the soil temperature, the faster the pupation. With cold soil temperatures the SHB larvae will not pupate and may die. At a soil temperature of:

- 10°C eggs will not hatch and larvae dies
- 20°C pupation takes approximately 30 days, and 50 % die
- 30°C pupation takes approximately 15 days, and 5% die

(Jeff Pettis unpublished data).

**Relative humidity**
For eggs to develop and hatch, the relative humidity must be above 50%. Below this the eggs die.

**Effects on the colony**
In heavy infestations, the beetle may kill a bee colony, although it is unusual for strong colonies to become heavily infested. In strong colonies, beetle numbers are generally kept in check, but weaker colonies can succumb. One of the biggest economic effects of the SHB is the damage caused to honey crops after they are removed from the hives.

Once the honey supers are harvested, they must be extracted within 48 hours or the crop will be ruined. With no bees to protect the combs, the beetles lay in them. The eggs then hatch 24 hours later and the larvae start to feed on the honey and any pollen in the combs. The larvae leave slime over all the frames, tainting the honey and making it unusable.

SHB larvae feed on bee brood, pollen and honey, which may weaken the colony, and the slime the beetle produces seems to act as a bee repellent. In heavily infested colonies the bees may abscond.

**Treatment**
*Chemical Treatment*

An insecticide called Coumaphos has been given an emergency use permit for the control of SHB in the United States. It is unlikely to be given full registration, as Coumaphos is an organo-phosphate and for this reason would be unlikely to be registered in New Zealand either. Coumaphos is available in strips, which may be placed in a small dish with a loose-fitting lid. The dish is placed on the bottom-board where the beetle may climb into the dish and contact the strip. This method is not widely used.

Hive dross and Small Hive Beetle larvae on the ground.

The most common method of control is to spray the ground outside the hives with a soil insecticide to kill the larvae as they burrow into the ground to pupate.

*Management Techniques*
Beekeepers can practice a range of management techniques to lessen the effects of the SHB, such as

- Continually removing and extracting frames of honey from the hives to prevent damage. This method is common practice in Africa.
- Extracting honey within two days of it being removed from the hive, to prevent SHB eggs from hatching.
- Storing supers of honey before extraction provided
  - The supers are stacked to allow air movement
  - Fans are employed to move air though supers, to reduce the temperature and humidity.
  - Dehumidifiers are used to decrease the relative humidity below 50%.
- Storing brood boxes and extracted honey supers by
  - Stacking them with top and bottoms screened to allow airflow
  - Stacking them on their sides to allow airflow.
- Reducing hive entrances to allow the bees to prevent too many beetles entering the hives. This can be effective but hives can overheat and the cure may be worse than the condition.

*Pheromone Lure*

Alonso Suazo-Calix of the USDA is currently investigating what attracts SHB to beehives. The hope is to make a pheromone trap to detect and control the beetle.

**Surveillance**
Current surveillance techniques are to inspect the hives for the beetle. The best method is to:

- Invert the lid and quickly place the top super in the lid.
- Remove the hive mat and look on the top bars and the hive mat for adult beetles, running away from the light.
- The light will force the beetles into the lid under the super.
- After two minutes, bump the box and inspect the lid.

- Continue to remove the boxes and bump into a lid or hive mat and look for beetles.
- Inspect the bottom board.
- Remove frames and look for beetles and larvae

**Summary**
The Small Hive Beetle would most likely do well in the warmer and drier parts of New Zealand and could have a significant impact on New Zealand beekeeping. For this reason, the SHB has been classified as an Unwanted Organism in New Zealand, meaning if any one suspects the presence of the SHB they are required to report it to the Ministry of Agriculture and Forestry (MAF). Make contact by calling the MAF Exotic Disease and Pest Emergency Hotline, phone ( 0800 80 99 66).



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# Varroa mite advances south

**Dr R.M. Goodwin**
**HortResearch, Ruakura**

It is time to decide what you are going to do this spring for varroa control if you are in the upper North Island. Unfortunately, there are also decisions to be made in other parts of New Zealand now the mite has reached Wellington.

In spring, and any other time of the year, the most important thing to know is how many varroa are in your hives. Beekeepers I've talked to all say the biggest problem with this is the time it takes. To put it into perspective, however, you need to be as aware of your hives' varroa numbers as you are their honey stores. Would you stop assessing your hives' need for extra food because it took too much time? The same principle applies to sampling.

Most beekeepers are careful to always know their hives' honey stores. In the spring, they know when their hives need feeding and when they can be left. Varroa needs similar attention. You need to know, or be able to provide a good guess, how many varroa are in your hives at any time in any season, and when you need to treat them. Getting the feeding or varroa levels wrong can result in dead or damaged colonies.

Years of experience help beekeepers make good decisions when feeding hives. It is hoped we can quickly build up the same level of skill with varroa control.

New beekeepers tend to feed more syrup than needed, not willing to risk giving too little. As they become more experienced, they reduce the syrup levels to meet what the colonies actually need. Varroa control will be the same.

Most beekeepers will initially treat more than they need then, with experience, treat only when it is required. Unfortunately, there will always be some beekeepers who do not feed nor treat when they should, with consequent losses.

**Upper North Island**

Beekeepers with varroa-infected hives, now almost all beekeepers north of the varroa control line, have to decide if and when to treat this spring. In making these decisions there are two conflicting pressures. The first is to treat early to play safe. However, treating too soon may result in varroa getting to damaging levels again before the honey crop can be removed.

Treating late in the spring may result in colonies being damaged, with the end result of a lower honey crop. The best way to make a decision is to sample hives in early spring to determine actual mite levels. This will tell you if the treatments can be safely delayed.

So at what level can varroa be ignored? We still do not have a good feel for this in New Zealand. Our best guess is that if there are 10 mites on 300 bees, a hive should be treated. The easiest sampling methods are the sugar shake method, using an Apistan® strip in a jar of 300 bees, or a sticky board and Apistan® or Bayvarol® strips in a whole hive for 24 hours.

The advantage of the sugar shake and Apistan® strip in a jar methods are you do not need to return to the hive the next day. The Apistan® strip in a jar method is described in the May 2002 *New Zealand Beekeeper*, and other methods are in the *Control of Varroa* handbook.

**Lower North Island**

New varroa finds in the lower North Island put beekeepers here in a similar position to those in the upper North Island two years ago. They must start looking for the mite.

The finds that are a long way south of the line have mostly been confined to the odd varroa on a sticky board. It is not expected varroa in these areas will reach high levels this spring, but they could in hives close to the line. All beekeepers should check apiaries for varroa this spring, though, even if they don't think they have any. Beekeepers close to the line who know their hives have varroa will need to ensure mite levels do not get too high this spring.

So how quickly will varroa spread in the lower North Island? Experience in the far north suggests that even if the line stays in place, varroa will probably spread faster than it did north of the line because there are more sites it can be spread from and many further introductions will occur over the next year. In two years, most hives south of the current line will be infected and will need treatment to survive.

**South Island**

The presence of varroa close to Wellington has increased the probability of it getting to the South Island. When it gets there, which it will sooner or later, government will need to decide whether to try and eradicate it. The decision will be based on a number of issues.

- How long will it be before the next introduction to make eradication feasible?
- How expensive will it be?
- And how much do beekeepers, farmers and other stakeholders want it to happen?

The cost and likely success of an eradication attempt will depend on how far varroa has spread when it is found. Therefore, the more surveillance South Island beekeepers do for themselves, the greater the chance an eradication attempt will be made, and the longer it will be before you have to live with varroa.

So, being vigilant over what other people are doing and whether you have varroa in your hives is very important.

We don't know where varroa will first arrive in the South Island. It probably will not be in Marlborough. If it is transported in goods from the North Island, in vehicles or by mail, it could be introduced anywhere. Prime candidates would be Christchurch and then Dunedin. Be vigilant wherever you live.

# A pot full of honey...

A major supermarket chain has asked suppliers of products to declare compliance with the new labelling requirements of the Food Standards Code by December this year.

The same questionnaire also asks packers when they will have a HACCP (hazards at critical control points) based food safety programme in place. An HACCP-based, risk management programme (RMP) will meet these needs and supermarkets have indicated they expect all suppliers to be working towards this goal.

The NZFSA is currently developing a template programme to assist packers meet this requirement and ensure the fitness of their products.

The following information has been prepared to assist honey packers meet the new labelling requirements. It applies to a standard, retail pack of honey – although the warning requirement for honey when combined with royal jelly and sold as a food is emphasised. (See the disclaimer below.)

If you are making nutritional claims (e.g. "Low in fat") then requirements become more complex and you should seek further advice. It can be obtained from:

- the Food Standards Australia New Zealand (FSANZ) website;
  http://www.foodstandards.gov.au/foodstandardscode/
- the FSANZ help line – 0800 441 571;
- your local health protection officer at a local district health board;
  http://www.nzfsa.govt.nz/processed-food-retail-sale/general/food-safety-coordinators.pdf
- specialist advice from a lawyer or a food labelling consultant.
  http://www.nzfsa.govt.nz/processed-food-retail-sale/general/food-safety-consultants.pdf

**Standard Description and requirements**

**Food Identification Requirements**

The name honey must appear along with a lot or batch number (does not have to be part of the label per se) and the name and address of the packer.

**Mandatory Warning and Advisory Statements**

The presence of Royal jelly, if sold as a food, must be declared on the label and be accompanied by the following statement:

"This product contains royal jelly which has been reported to cause severe allergic reactions and in rare cases, fatalities, especially in asthma and allergy sufferers."

And, in late-breaking news, FSANZ is to review warning statement requirements for pollen and propolis (if sold as a food).

(Note that the New Zealand Food Standard 2001 may continue to apply for some time – watch this space!)
http://www.nzfsa.govt.nz/policy-law/food-standards/regulation-of-food-in-nz/NZFoodStd2001.pdf

**Labelling of ingredients**

Not required for a single ingredient food such as honey.

**Date marking**

Not applicable to products with a shelf life of more than two years. If optionally applied, use "Best before". See format requirements for further detail.

**Directions for use and storage**

Not applicable to a pot of honey

**Nutrition information requirements**

A key change as honey will require a nutrition information panel. See the table below to see the suggested format. Also, consult the Nutrition Panel Calculator provided by FSANZ at:
http://www.foodstandards.gov.au/mediareleasespublications/nutritionpanelcalculator/
It is recommend you consult the industry guide published here:
http://www.foodstandards.gov.au/mediareleasespublications/factsheets/industryfactsheetsfsc/nutritioninformation1615.cfm

**Legibility requirements**

Labelling must be legible, prominent and in English. Warning statements must be minimum 3mm.

**Characterising ingredient**

Not applicable for a single ingredient food. However, if honey is blended then the percentage of the stated type must be given e.g. Manuka Blended Honey (contains not less than 20% manuka honey)

**Substances added to food**

Not relevant to honey.

**Contaminants and residues**

Set maximum levels for certain substances in certain foodstuffs – no labelling implications.

**Microbiological limits for foods**

Not applicable.

**Food product standards**

Honey is to contain not less that 60% reducing sugars and not more than 21% moisture.

Example of a blank nutrition information panel:

**NUTRITION INFORMATION**
Servings per package: (insert number of servings)
Serving size: g (or mL or other units as appropriate)

| | Quantity per Serving | Quantity per 100 (g or mL) |
|---|---|---|
| Energy | kJ (Cal) | KJ (Cal) |
| Protein | g | G |
| Fat, total | g | G |
| - saturated | g | G |
| Carbohydrate | g | G |
| - sugars | g | G |
| Sodium | Mg (mmol) | Mg (mmol) |
| (Insert any other nutrient or (or biologically active substance to be declared) | g, mg, µg (or other units as appropriate) | g, mg, µg other units as appropriate) |

### Example of a NIP for a 500g pot of Liquid Honey[1]

**NUTRITION INFORMATION**

| Servings per package: 100 Serving size: 5g | Quantity per Serving | Quantity per 100 (g or mL) |
|---|---|---|
| Energy | 70 kJ (Cal) | 1401 kJ (Cal) |
| Protein | 0 g | 0.3 g |
| Fat, total | 0 g | 0 g |
| - saturated | 0 g | 0 g |
| Carbohydrate | 4 g | 82.1 g |
| - sugars | 4 g | 82.1 g |
| Sodium | 0.7 mg | 14 mg |

### Example of a NIP for a 200g pot of Comb Honey[1]

**NUTRITION INFORMATION**

| Servings per package: 40 Serving size: 5 g | Quantity per Serving | Quantity per 100 (g or mL) |
|---|---|---|
| Energy | kJ | 1596 kJ |
| Protein | 0 g | 0.1 g |
| Fat, total | 0 g | 0 g |
| - saturated | 0 g | 0 g |
| Fat, total | 0 g | 0 g |
| - saturated | 0 g | 0 g |
| Carbohydrate | 4.7 g | 93.7 g |
| - sugars | 4.7 g | 93.6 g |
| Sodium | 27.3 mg | 546 mg |



[1] Values obtained from the Nutrition Panel Calculator and reproduced with thanks to Food Standards Australia New Zealand. http://www.foodstandards.gov.au/mediareleasespublications/nutritionpanelcalculator/

# USA IMPORTS

MAF wishes to bring to NBA members attention the following important document. It is a proposal from the United States Department of Agriculture to allow importation of New Zealand honeybees and honeybee semen into the U.S. It is likely there will be opposition to this proposal from some parts of the U.S. beekeeping industry.

MAF urges NBA members and other stakeholders to make submissions, as detailed in the following document, to facilitate the ability of New Zealand honeybees and genetic material to access the U.S. market.

**Closing date is 18 November 2002. Submissions must be made in the correct manner; see section under ADDRESSES: first page. Please note the requirements for comment in email form to be in the context of the email not as an attachment.**

The Animal and Plant Health Inspection Service of the United States Department of Agriculture wishes to inform you that we have published a proposed revision to the Bee Regulations in the Federal Register for your review and comment.

The docket was published in the Federal Register today, 19 August 2002. The Federal Register notice (Docket No. 98-109-1) is available for public comments through November 18, 2002.

Public hearings will be held regarding this proposed rule on the following dates and locations:
22 October 2002, Kailua-Kona, HI
24 October 2002, Fresno, CA
29 October 2002, Beltsville, MD

The proposed regulations would combine the existing honey bee regulations (7 CFR 322) and the "pollinator regulations" (7 CFR 319.76) (the pollinator regulations cover the introduction of exotic bee diseases and parasites through the importation of bees other than honeybees, certain beekeeping byproducts, and used beekeeping equipment). The revision proposes to allow importation of honeybees from Australia and honeybees and honeybee semen from New Zealand into the U.S. Under the proposed regulations importations from Canada would require an export certificate verifying that the bees were of Canadian origin. These revisions would modernize the language of the regulations and make them current with respect to international standards for trade in honey bees (OIE). Additionally, the Federal Register notice announces that revisions have been made to the New Zealand Honeybee Pest Risk Assessment that was published before varroa was discovered in New Zealand.

USDA Press Release can be found at:
http://www.aphis.usda.gov/lpa/press/2002/08/beeregs_ppq.html

Comments can be submitted via email to:
regulations@aphis.usda.gov

pdf and txt copies can be downloaded at:
http://www.aphis.usda.gov/ppd/rad/webrepor.html

Pest Risk Assessments for Honeybees from New Zealand and Australia can be found at:
http://www.aphis.usda.gov/ppq/pra/honeybees/

## Beekeepers stand to lose if trials let out of the lab

# GE technology 'flawed', scientist says

Little information is reaching the public regarding genetic engineering (GE), a process also known as GM or genetic modification, writes Tauranga-based scientist DR ROBERT ANDERSON. Even less is known about evaluating the effects of GE-crops on bees.

"Biotechnology industries have shown little inclination to support broad-based educational programmes that provide genuine insight to potential consumers about products, particularly those based on GE-technology," Dr Neil Macgregor of Massey University told the Royal Commission on Genetic Modification last year.

The biotechnology industry, which funds most of GE research, is secretive and evasive. Since commercialisation of GE crops began in the mid-1990s, the industry's main strategy has been to deny the possibility of crop contamination and other environmental hazards. The findings of the royal commission did little to allay the fears of beekeepers with conclusions such as leaving "the Ministry of Agriculture and Forestry to develop a strategy to allow continued production of GE-free honey". (1)

Abundant information from Canada and Britain on the futility of maintaining honey supplies free of GE-pollen, made the commission's conclusion disingenuous, more particularly considering the recommendation that "for the time being there be no change to the liability system". (2)

For farmers and beekeepers, this was a slap in the face. Who picks up the tab when our honey becomes contaminated? Will beekeepers become liable for spreading pollen? UK Honey Packers will not buy honey from beekeepers who have hives within six miles (9.5km) of any GE crop. The acknowledged forage range of bees is around 5km, however bees have been found to forage at 13.5 km. (3)

Physicians and Scientists for Responsible Genetics (PSRG) (4) and many international scientists communicated the risks of this formidable technology to the commission. The conclusions exemplify that much of the evidence was either ignored or sidelined, seemingly to protect the biotech industry. The commission was not held under oath, nor did it subpoena vital evidence. The claim of GE proponents that it was a "robust examination" is untrue. Again quoting Dr Neil Macgregor, "the commission was powerless to apply any scientific rigour or even judge the veracity of the evidence presented." I recommend to readers the excellent report by legal advocate, Steven Druker. (5)

**So what are the concerns scientists warn us of?**

Basically, GE technology is seriously flawed. (6) Scientists can remove a gene accurately using the "biochemist's scissors" (known as restrictor enzymes). But there it stops. It is not possible to accurately place a gene into a plant genome and accurately predict the outcome. The industry's claim that "GE is a precise science" is untrue. Witness the ANZFA booklet for consumers which categorically states: "Newly introduced genetic material is normally inserted into a random location."

Furthermore, it is seriously misleading to maintain, as many proponents do, that "we put a gene into the plant." (7) A whole cassette of virus and bacteria genes are cobbled together: a promoter to "drive" the gene and, to ensure the plant takes up the required gene, an antibiotic marker gene (see Fig 1). From this combination several possible hazards can arise.

A GE plant that will express an insecticide to kill insect pests - for example, a gene coding for a protein[1] that kills the corn borer - will also contain a signal to force the plant to make the protein,[1] a start signal called a promoter, and a stop signal, the terminator. This forms a simple 'expression cassette', as shown in *Fig 1.*

**FIG 1**

[1. A protein that generates the toxin from *Bacillus thuringiensis.*]


The use of antibiotic marker genes has now been recognised, even by the industry itself, as possibly increasing the antibiotic resistance of bacteria (see later note on American foulbrood) and it is to their credit that they are trying to eliminate their use. If the antibiotic marker gene was able to transfer from the GE plant and enter another bacterium, that bacterium could become antibiotic-resistant.

Recent research undertaken on behalf of the UK Food Standards Agency showed that gut bacteria in humans took up genetically engineered organisms (GEOs) from GE food (see also Kaatz' bee research further on). This could render commonly-used antibiotics useless against diseases attacking humans and livestock, including honeybees.

Growing antibiotic resistance worldwide is of grave concern. Antibiotics are the crown jewels of medicine. Without them medicine will be put back to the dark ages. (8)

By 1982, fewer than 10% of all clinical *Staphylococcus* cases could be cured using penicillin, representing a dramatic shift from the almost 100% penicillin susceptibility in 1952.

There are also dangers associated with the promoter used in GE technology. The majority of GE-crops contain the Cauliflower Mosaic virus promoter (CaMV). Two problems arise with this promoter. The first is a "hot spot" enabling recombination to form other bacteria/viral combinations. The second is that it may well prove hazardous to human consumption. The biotech industry says that we consume CaMV naturally with our *Brassicas*, so "why worry?"

The naturally-occurring virus is host-specific to the *Brassica* family – quite different to the "modified version" used by the genetic engineer. Professor of Genetics, Dr Joe Cummins, has said: "Probably the greatest threat from genetically altered

crops is the insertion of modified viruses and insect genes into crops."

Laboratory experiments have shown that genetic recombination can recreate highly virulent new viruses from such constructs. The CaMV is potentially dangerous. It is a "pararetrovirus" and multiplies by making DNA from RNA messages. It is very similar to the Hepatitis B virus and related to HIV. These modified viruses are capable of causing human and animal diseases of enormous power.

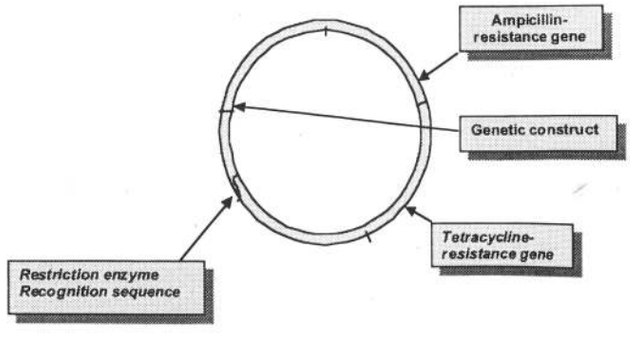
The British public have clearly stated they do not want to eat GEFs, yet oilseed rape honey (OSRape), imported from Canada by the UK Honey Packers, 70% derived from Aventis GE-OSRape, has been marketed in the UK. Aventis claims that the gene which detoxifies the plant when it is sprayed with Roundup® herbicide – the "PAT" gene – is destroyed when the honey is processed at a temperature of 38°C. This has been shown to be untrue. (9)

The PAT gene originates in the Cameroon, coming from a soil bacterium (*Streptomyces viridochromogenes*) which has never been part of the human or animal food chain. Aventis' 14-day feeding trial on rats, using the extracted protein from oilseed rape, was never completed and no histological data on the state of the rats' internal organs was ever presented. The Streptomyces group includes plant as well as human and animal pathogens.

Aventis' recent admission of impurities in their UK GE rapeseed trials demonstrates their claim "this is a precise science" as nonsense. The incident has caused severe embarrassment to Aventis and the UK Government. Nearly three percent of the seed carried an additional gene (nptll) which encodes for antibiotic resistance to neomycin and kanamycin. Contrary to industry and government claims, this antibiotic resistance gene can also provide resistance to the vital antibiotic gentamycin used in life threatening illnesses such as meningitis. Aventis's conclusion that "there is no risk to human health" in reference to Kanamycin is also wrong. It is still used in medicine and there is a real risk here for cross-reaction to occur between kanamycin and other antibiotics. This happened in several countries where the cholera pathogen was found to have gained resistance to tetracycline, ampicillin and several other related antibiotics. (10)

Bacteria are great survivors and adept at picking up plasmids, having multiple antibiotic-resistance. (See note on "epidemic of plasmids." Fig. 2, further on.)

**Fig 2**




Very often several cassettes are joined (or stacked) together, and the whole construct is then spliced into a *plasmid. [fig 2]* This parasitic piece of DNA can then be incorporated into a bacterium and will multiply the construct millions of times.

After running single-dose 45-minute exposure trials on larval development, Novartis claimed "there are no measurable detrimental effects of ingestion of Bt protein containing pollen on larval honey bee development." Pollen is pre-digested by nurse bees in their hypopharyngeal glands to make it digestible for larval honeybees. (11)

Larvae older than three days receive this brood food containing some unprocessed pollen, (12) but it is not known if it is digested and the Bt-toxin released in the larval gut. The Swiss team peer reviewing these trials say exposure trials should be carried out for the entire bee life-cycle and that an acute toxicity test of 45 minutes exposure is not sufficient to support the company's conclusion. The US Environmental Protection Agency accepted these tests as scientific evidence that Bt crops were harmless to non-target insects and accepted these flawed test procedures for approvals of other Bt crops.

**Impact of GE-crops on honeybees**

The French government research institute, INRA, indicated that pollen from some GE-crops shortens the life-span of adult bees and also leads to some learning dysfunctions that could result in the disorientation of foraging bees.

There are six genes inserted into OSRape, including the gene Barnase, a male sterility gene lethal to all cells in which it is expressed unless a specific inhibitor (barstar) is also present. The OSRape grown in Scotland, (13) the F1 hybrid OSRape, removes this inhibitor to produce a male sterile OSRape. After the cell divides, meiosis takes place. The only viable pollen is the one containing barnase which confers male sterility. This pollen will spread that male-sterility attribute. (14)

Barnase is a dangerous gene known to be harmful, if not lethal, to all cells, animals and humans. Barnase has been shown to cause kidney damage in rats. (15) If NZ chooses to grow this crop there are three possible scenarios of concern to beekeepers. (16)

- Should the bee pick up the gene barnase, the barnase could poison the bees directly.
- The barnase gene could be transferred to the bees and, when expressed, kill the cells.
- If it gets into the germ cells of bees and is expressed, it could render the bees sterile.

The bacteria used to smuggle the new genes into the OSRape is *Agrobacteria Tumefaciens,* commonly used in GE technology. Recent research has shown that human cancer cells, along with neuron and kidney cells, were transformed with the Agrobacterium T-DNA. (17)

One preparation of *Bacillus thuringiensis* (Bt) [var. *tenebrionis*], reported to be specific for certain beetles, caused significant mortality in domesticated bees. (18) Another study on Protinase Inhibitors (PI's) showed that ingestion of serine PIs is harmful to honeybees. (19)

In June 2000, a vital research disclosure involving honeybees was announced by the German researcher, Professor Hans-Hinrich Kaatz of Institut fur Bienenkunde (Institute for Bee Research), Jena University. He showed that GE material from canola (the PAT gene) had crossed the species barrier and was positively identified in bacteria resident in the guts of honeybees. This is the process known as horizontal gene transfer. Biotechnologists persistently trivialise this danger. The commission declared it unproven (20), but it does occur.

Rings of DNA, known as plasmids, conferring antibiotic-

resistance, are frequently "taken up" in the soil and elsewhere. Dr Tom O'Brien, whose Harvard Medical School laboratory toiled for the World Health Organisation (WHO) to catalogue the world's plasmids, declared in 1992 that what the world faced was not so much an antibiotic-resistance crisis as an "epidemic of plasmids."

(It is interesting that the journal, *Nature*, refused to publish Kaatz' excellent paper. After being "heavied" by industry, *Nature* also removed Dr Chapela's paper revealing that Mexican corn races are contaminated by transgenic DNA. Dr Arpad Pusztai warned of the dangers of GE-foods and caught the full force of those aiming to discredit findings not conducive to biotech interests. The vilification of scientists courageous enough to "be counted" has reached horrifying proportions. Many in the industry who would like to speak out are afraid to do so for fear of retaliation.)

Canadian researcher Mark Winston attempted to retrieve results of research that assessed the effects of GE-crops on honeybees. Although the Canadian government acknowledged research had been conducted, it refused to provide any information. Its refusal was attributed to such research being confidential and owned by the biotech corporations which funded the studies.

**Conferring antibiotic-resistance**

Antibiotics are not usually used in NZ against foul brood disease, but an interesting scenario has developed in the US where beekeepers are becoming increasingly afflicted with a strain of antibiotic-resistant American foulbrood (AFB). This resistance may well have arisen from GE-crops. Before the arrival of antibiotics, this infection was probably the most serious bee disease in the world.

For some 40 years, tetracycline was used effectively against AFB. In 1996 resistance to this antibiotic was confirmed in Argentina and the Midwestern states of Wisconsin and Minnesota, since when it has spread to at least 17 other American states and parts of Canada. Why? From the mid-1990s, Round-up Ready® crops were extensively planted in the US, Canada and Argentina. It is possible that a tetracycline antibiotic marker gene may have been used in these early transgenic crops. Biotech companies are reluctant to supply such detail.

With antibiotic marker genes, cross-resistance between antibiotics is well known. Resistance to one antibiotic may cause resistance to some or all of the members of that family. (21) For example, kanamycin is a member of the family of aminoglycoside antibiotics. Cross resistance between kanamycin and other aminoglycosides – including streptomycin, gentamycin and tobramycin – is perfectly possible.

Pathogenic bacteria frequently develop multiple drug resistance transmitted on a single plasmid. The cholera pathogen (*Vibrio cholerae*)(22), for instance, was found to have a plasmid resistant to tetracycline, ampicillin, chloramphenicol, kanamycin, gentamycin, sulphaethoazole and trimethoprim. The latest GE corn/maize crops use Ampicillin, a common wide-spectrum antibiotic used in medicine. (23)

Hence the sudden tetracycline-resistance, found by beekeepers in 1996 in two geographically isolated countries,

should not cause undue surprise. Was the common thread between these areas - the US and Argentina - the widespread planting of GE-crops containing a tetracycline-resistant gene?

The important issue here is that it is now well documented that bacteria enter plants via the root systems. Once there, feeding insects could ingest and then transfer the bacteria to other plants. Ann Clark, Professor of Plant Agriculture at the University of Guelph, said, "This was a significant issue for spatial movement of GE rhizospheric bacteria, as it meant that GE bacteria cannot be contained - even though they move very, very little in the soil itself."(24)

Dr Hachiro Shimanuki, until recently the research leader of one of the top US bee research laboratories, claimed he was unaware of any attempts to analyse the resistant AFB for genetic pollution by GE-crops. It would seem an obvious line of research to look for this gene in the gut of these bees – unless you did not want to find it.

**Could GE solve our varroa problem?**

It has been mooted that GE could be used to help eradicate the varroa mite. Dr Robert Mann, retired senior lecturer in biochemistry at the University of Auckland and a beekeeper, said: "This is pure fantasy, and highly implausible. Nothing better than vague science-fiction notions exist for GE to control varroa, and it is very doubtful that permission would be granted for genetic tampering with bees."(25) We must hope he is right.

The dangers in gene-tampering with honeybees parallel those being advocated for possum control. There are far safer and more efficient methods. For example, a study by the US Department of Agriculture (26) showed it is possible to find varroa-tolerant strains of honeybee. Its experimental population survived for nearly five years with a mean annual infestation rate of between six and seven percent. The obvious problem to maintaining this stock would be feral colonies that do not possess this resistance. (27)

Other useful research is the sequencing of the varroa's gene bank (28) which could speed up studies of the parasite and its effect on honeybees. US entomologist Dr Jay Evans from the Bee Research Laboratory says the varroa mite's scientific classification remains uncertain and maintains that, "while several related mite species are potential honeybee pests, it now appears that only one has made this leap".

Dr Evans has decoded the sequence for most of the roughly 14,500 nucleotide base pairs making up Varroa mite mtDNA. Once complete, he and his team will look for sections along the ring-like molecule that can be used as genetic markers. Markers are sequences of the nucleotide bases linked to traits of interest, such as virulence and pesticide resistance. By identifying these markers, the team hopes to help explain the subtle differences seen among varroa mites.

An Australian team's earlier mtDNA analysis suggested the mite's current name of *Varroa jacobsoni* should be changed to *V. destructor*, signifying an entirely new species. There also seems to be variation within *V. destructor* itself in terms of its impact on honeybees, an observation noted by Lilia de Guzman and Thomas Rinderer, researchers at America's ARS Honey Bee Breeding Laboratory at Baton Rouge, Louisiana. Varroa's destructiveness is also partly due to its ability to develop resistance to our chemical pesticides.

**Natural genetic resistance or genetic engineering?**

Natural resistance is seen to be the safest and most cost-effective solution to the mite problem. Scientists in the US (29) have had success with a hardy breed of honeybee from the Primorski region of Russia. Primorski has high mite-infestations which appear to generate a natural genetic resistance that could be bred into NZ honeybees. The Interpretative Summary of the research findings were:

> "Russian honey bees (ARS Primorsky stock) were evaluated in 1999 and 2000 in Iowa, Louisiana, and Mississippi for resistance to the parasitic mite, *V. destructor*. Populations of mites grew more slowly in Russian colonies than they did in domestic colonies. In 1999, Russian colonies averaged about half the number of mites found in domestic control colonies. In 2000, Russian colonies had an average mite population growth of 2.5 fold compared to a 17.3 fold increase predicted from growth models derived for domestic colonies. Hence, in all trials, ARS Primorsky honey bees showed strong resistance to *V. destructor*. Differences within and between queen lines indicates good potential to further increase this resistance through selective breeding." (30)

The process could also be sped up by artificial insemination, although some difficulties exist using this approach. As HortResearch Ruakura scientist Dr Mark Goodwin correctly said, "it can be done by artificially inseminating queen bees with the sperm of a single drone which carries the gene, so they can pass the varroa resistance to their offspring. But the process requires a very steady hand, a large microscope and a very small needle."

Dr John Harbo, a scientist with the US Department of Agriculture, maintained that, "when varroa first arrived here [the US], scientists regarded the idea of resistance-breeding programmes as akin to breeding sheep to resist wolves. But the bee mite's growing resistance to chemical controls has hastened the need to find another way to fight it." He went on to say the USDA's research programme could be effective within five to 10 years, which is good news for New Zealand scientists, who can then build on the methods the US found to be successful.

Dr Harbo said scientists would know the process of spreading genetic resistance has worked when wild bee colonies, wiped out by varroa, begin to return and commercial hives survive without being treated.

**The pollen issue**

Concerns recently voiced at the consultation session held at the National Beekeepers' Association (NBA) Conference (July 17, 2002) represent very real fears. It is essential the Ministry of Agriculture and Forestry and/or government do not undermine the strategy of maintaining NZ honey supplies free of GE pollen.

There may also be GE contamination of honey from Honeydew. Honeydew, the excrement of aphids, is a sweet liquid collected by the honeybee then mixed with the rest of

the honey inside the hive. Insecticide genes inserted into GE-plants have been taken up by aphids feeding on GE-plants. (31)

INRA have demonstrated that proteins in the sap of GE-plants containing the CaMV promoter were recovered in the honeydew after ingestion by aphids. (32)

Dr Ann Clark has followed the issue of microbial movement into plants via their roots. (31,33,35) Scientists demonstrated that transgenic microbes could enter through the root system and then move up to the leaves of all 16 tested monocot and dicot species (including corn, wheat, oats, broccoli and beans) via the plants vascular system. The authors demonstrated that biting and sucking insects could then ingest and transfer the bacteria to other plants. For example, GNA lectin has been shown to be taken up from transgenic tobacco plants by plant-feeding aphids (34) and been detected in honeydew (of M. *persicae*). These results should have been carefully tested using toxin-expressing plants (not just the purified toxin in vitro) before the commercial release of insect-resistant GE-crops.

Oilseed rape is a high-yielding nectar source. When UK beekeepers asked if it was legal to sell honey and/or pollen derived from GE OSRape crops, the UK government replied: "After rigorous assessment it was decided that honey and/or pollen derived from such a crop was not part of that crop. It was therefore not a novel food, it was safe to eat and legal to sell."

The UK government has always assured beekeepers, "there is so little pollen in honey and therefore insignificant amount of GE material that it can be disregarded." This is not true. (35) UK government scientist Dr H Rogers said: "Bee-transmitted incorporation into honey is a major route of entry into the food chain ... DNA isolated from pollen and flower samples after incubation in honey demonstrated that it was still possible to amplify fragments of inserted sequences even after 10 months in honey ... honey could easily be consumed within 48 hours whilst the pollen is still capable of transcribing and translating a foreign gene within its genome ... it can be concluded that a transgenic plant, expressing a toxic foreign protein product in the pollen, would carry a HIGH risk of transferring such a protein, in a functional state, to the insect and human food chain ..."

The UK government told beekeepers "the amount of pollen in honey was so small, 0.001 pico grams, that it could be discarded. There is therefore no GE-material in honey." Yet scientists in one study found typical honey samples contained approximately 20,000 to 80,000 pollen grains/10 grams. Based on the levels of transgenic protein revealed in the study, a consumer would be consuming approximately 30-500 pico grams of transgenic protein in every 500g pot of honey. (36)

The British Beekeepers Association (BBKA) has concerns that the six-mile exclusion zone will be unworkable if commercial planting of GE-crops goes ahead. (37) Its chairman, Glyn Davies, organised a conference in which all those concerned can put their views to UK ministers. They also hope to arrange meetings with the organic food and health groups in the near future.

The UK reports should act as salutary warnings as pressure to plant GE-crops in New Zealand grows. One edited version reads:

*"Honey produced in the UK has remained GE-Free because beekeepers who wish to sell their honey to*

*the British Honey Importers and Packers Association have been required to move their hives at least six miles [9.6km] from any GE-crops. The normal flying distance of a honeybee is three miles [4.8km], doubling this distance should ensure all honey will therefore remain GE-free. Twenty-seven GE-test sites thus prevent beekeepers from using just under 8000 sq. miles [12800sq km] of the UK!*

*Many beekeeping associations including numerous individual beekeepers have been highly critical of GE crops. The Government sees this as an obstacle to the commercialisation of GE-crops and wants the GE-free honey standards scrapped."*

It is interesting to note that Britain's National Pollen Research Council – which provided the data showing pollen can be spread further than Government estimates – was not allowed a representative at the conference organised by DEFRA (Department for the Environment, Transport and the Regions). (37) Also, small beekeepers – who largely oppose GE-crops – had no opportunity to express their views at the meeting, nor were consumer organisations, the health and whole food trade and organic farmers' associations represented.

Critics say participants were carefully chosen and the conference was designed to reach the conclusion that the six-mile hive exclusion zone should be abandoned. The UK Government has stated the amount of GE material in honey is so small it should be dismissed, totally contradicting the views of most beekeepers and their customers. A major concern in the UK is the British Government may repeat the strategy, set up rigged conferences and committees throughout the whole GE-crops national debate, thus silencing the voices of opposing scientists and experts.

We should not underestimate the NZ government in this respect. When Minister of Science Pete Hodgson makes remarks such as: "Our scientists can now insert a gene accurately," the lack of real GE knowledge becomes only too obvious. Such ministers are keen to see this technology firmly in place as part of their "knowledge wave". The fact that NZ honey and bee products have fetched premium prices and are world-famous seems to be of little consequence as we plunge into this age of genetic engineering biotechnology.

In reference to the points made at the NBA conference – e.g. (point 1.3), "How far is far enough? Three kilometres is too low as a separation distance. A 13.7 km radius (not diameter) around a GE-crop would be required. You can't fence bees..." – may I suggest that rather than imposing this regime on beekeepers, it would be more sensible to avoid planting transgenic crops. They are not needed and there is a rapidly-shrinking world market for them.

We could leave the final word to Professor Liebe Cavalieri, Head of Environmental Science at State University New York:

> "I've come to believe that the potential power of genetic engineering dwarfs that of nuclear power and that society shouldn't be carried away with fantasies promised by biotechnology promoters."

If genetic engineering adversely effects farming it would be grave indeed. If it effects bees it would be devastating.

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- Dr Robert Anderson holds a combined honours degree in physics and chemistry from the UK, together with a

PhD in science education. At Waikato University, he lectured in physics, laboratory technology and nuclear medicine. Maintaining an apiary of around 100 hives in the Cambridge-Waikato district for some years, he spoke by invitation on GE at the annual beekeepers' conference in Gisborne. Robert is the author of *Exploding the Myth of Genetic Engineering, Exploding the Myth of Irradiated Foods, and Exploding the Myth of EMR.*. He has co-authored *Exploding the Myth of Vaccination* and contributed to the book *Designer Genes* (The NZ guide to the issues and facts about GE). He is also published widely here and overseas in magazines.



# GE brings unfair returns

I see that there is great concern regarding the genetic modifications (GM) issue. For me, the only solution seems to be that the crops just shouldn't be grown. Even the United States Department of Agriculture has admitted, in a new report, that the crops just do not justify their growth in terms of better returns or needing less use of agrochemicals. This being the case, agronomists in the United Kingdom should not be able to argue that it is important to keep up with developments in the US.

If commercial growing occurs in the UK, beekeeping would have to come to a stop in many areas if a "no go area" in a 9.5km radius from GM crops had to be observed. However, such a measure would be subject to abuse anyway. We must get away from the idea that all beekeepers are honourable people - there are rogues amongst us, like in all other walks of life. Some were known to ignore the standstill order on bee movements and take their colonies out of restricted areas. The other problem, of course, is that there are many hobby beekeepers who do not move their bees - ever. They might not have the facilities for doing so or might not be able to do so because of the great physical activity involved. I would be most unhappy if I was, under these circumstances, forced out of beekeeping.

It is interesting that particular people are seeking to dump GM products into problem countries like Zimbabwe, just as pharmaceutical companies have with outdated drugs. Unfortunately, when a nation's population is starving or desperate for drugs, as beggars they cannot afford to be choosers. What a sad, sad world we are living in.

• John Phipps
Editor, *The Beekeepers Quarterly* (Britain)



# 1080 unlikely honey contaminant, experts say

A recent inquiry looked at the possibility of honey being contaminated with sodium monofluoroacetate, also known as 1080.

Apiculture experts advise me that bees are not likely to forage in cereal-based or carrot baits. Incidents reported in the past of bee deaths and honey contamination have been associated with fruit-lured pesticides, prompting the Department of Conservation and the Animal Health Board to seldom use such baits.

Those two organisations have also added a bee repellent to pastes and have operational procedures in place, minimising any risk of bee product contamination. There is also an interest in protecting nectivorous birds from poisoning – further reinforcing the move away from fruit lures.

The application of 1080 requires Medical Officer of Health (MOH) consent. The Ministry of Health has published model conditions to assist an officer determine the suitability of pesticide use. The conditions state *"Paste (jam) baits containing 1080 must not be laid within 4km of beehives without three months prior notice to all registered beekeepers in the operational area.*

*"Poison baits (containing 1080) containing a bee repellent approved by the Pesticides Board may be laid near beehives in accordance with conditions set by the Pesticides* Board."

A specific inquiry related to how beekeepers should complete the harvest declarations for products from an apiary site proximal to the application of 1080. The relevant part of the declaration is question (b) asking:

*"From your knowledge of the bee foraging area, have any potentially harmful pesticides or agricultural compounds been used on, or affected, any of the flowering crops or other nectar sources in that area?"*

Given the above information the answer is 'No' unless fruit/jam lures have been applied. If they were, you should have been notified and had sufficient opportunity to remove hives from the affected area.

**- Glen Neal**
**Senior Advisor (Risk Management)**
**Animal Products Group**

# US Customs uncovers dirty Chinese honey

Washington: Bulk imports of Chinese honey contaminated with low levels of chloramphenicol (CAP), a potentially harmful antibiotic and unapproved food additive, were discovered by the United States Customs Service (Customs) and the Food and Drug Administration (FDA).

The contaminated honey was detected during an investigation into a widespread scheme to evade payment of US anti-dumping duties on bulk imports of Chinese honey.

In an effort to evade the duties, the honey allegedly was illegally trans-shipped through third-party countries on its way from China to America. By August 28, more than 50 containers of bulk Chinese honey had been detained at US ports.

Some of the bulk honey in the containers tested positive for chloramphenicol, an antibiotic usually used to treat life-threatening infections in humans when other alternatives are not available. Use of chloramphenicol is limited because the antibiotic is associated with a rare, but potentially life-threatening side effect, idiosyncratic aplastic anaemia.

The probability of this reaction occurring in the general population through food contamination is thought to be very low but for people susceptible to the side effect, exposure to chloramphenicol can be serious. As a protection, food and animal feed products containing chloramphenicol are illegal in the United States.

During the investigation, Customs and FDA agents executed search warrants on businesses and residences in Los Angeles, Newark, Tampa, and other locations. Australian Customs, Royal Malaysian Customs, and Royal Thai Customs executed warrants in their home countries.

"This investigation should serve notice that US Customs will not tolerate unfair trading practices, especially those that pose potential health risks to the American public," said US Customs commissioner Robert C. Bonner. The case also highlighted the co-operation between US Customs and FDA and authorities in Australia, Thailand, and Malaysia, he said.

The scheme was uncovered during an investigation into dumping, a practice that occurs when merchandise manufactured outside the United States is sold in the United States at a price below production cost, or below the price sold in the foreign home market. Foreign manufacturers and or/importers may dump products on the US market to gain market share because of political or social concerns or to maximize profits/minimise losses in production.

In September 2000, several US honey producers filed an unfair trade case alleging dumping of honey imports from China. In May 2001, the US Commerce Department issued a notice of preliminary determination, requiring US Customs to collect anti-dumping duties on imports of natural bees honey from certain Chinese companies. The duty rates increased between 34% and 184%.

The US Customs Attaché in Bangkok, Thailand, subsequently received information that certain honey exports from China were allegedly being illegally trans-shipped through Thailand, en route to the United States. The purpose of the alleged trans-shipment scheme was to circumvent payment of anti-dumping duties on Chinese honey imports to the United States.

In June 2002, US Customs Attachés in Bangkok and Singapore launched an investigation and began working with their law enforcement counterparts in Australia, Malaysia, and Thailand with assistance from Royal Thai Customs, Royal Malaysian Customs, and Australian Customs officials and several domestic US Customs offices.

Customs agents found US-bound Chinese bulk honey was allegedly being trans-shipped through Australia, Mexico, Malaysia, Thailand, Vietnam, and other nations to evade the US anti-dumping duties. Customs officers in Los Angeles drew samples of bulk Chinese honey from several detained containers that had arrived at the local port and a laboratory analysis found the samples contained chloramphenicol.

Customs then stopped all suspect bulk imports of honey for the FDA to test for the presence of chloramphenicol. Levels in honey at one part per billion can be detected.

**– Bee Culture Magazine**

# US beekeeper offers Kiwis hope over varroa

By James Ryan

For beekeepers battling the deadly varroa honey bee mite, an American beekeeper touring New Zealand brought a sobering but positive message: The battle ahead is long and hard, but the mite can be beaten.

Discovered in New Zealand in 2000, the varroa mite has now spread two-thirds down the North Island with mites also recently found in Wellington.

Missouri apiarist Sharon Gibbons, who's been fighting the mite for the past decade, noted beekeepers here were depressed about the mite's impact but said they were better prepared for the battle than their counterparts in the United States were at the same stage 10 years ago.

"There's going to be major changes here and they're going to be very frustrated for a while because, the point they are at now, they have too much cross-contamination from either beekeepers who are trading or existing feral population that have the mite," Ms Gibbons said.

In Missouri, Ms Gibbons runs a family beekeeping business comparable in size to the average commercial operation in New Zealand. She has pioneered a range of innovative management strategies for hive management and product marketing and, as a member of the USA National Honey Board, she has observed general industry trends.

The Ministry of Agriculture and Forestry's Sustainable Farming Fund and the Honey Trusts funded Ms Gibbons visit to New Zealand and between August 28 and September 4 she held workshops in Hastings, Wanganui, Nelson, Christchurch, Timaru and Balclutha. Beekeepers who attended were told that, over time, varroa levels and the subsequent levels of treatment needed had reduced in the United States.

"I've seen three years now where I don't have to treat as much, I'm seeing a lower mite level, our business has grown, and the one real positive that I gave [NZ beekeepers] is that our honey production per hive has gone up dramatically - it has gone up, oh, I'd say 40 to 50%."

She attributed the increase in production partly to the mite having wiped out the entire wild bee population, reducing competition for nectar.

As a result, farmers and horticulturists were clamouring for pollination, paying premiums for the service, while others had taken up beekeeping themselves.

Out of 700 beekeepers working in the industry 10 years ago, only 300 remained. Many of those who had left did not treat their hives for the mite and, as a result, their bees all died, she said. A US Department of Agriculture varroa resistance breeding programme has now turned the tide against the pest.

It uses Russian bees that attack pests such as American foulbrood and varroa, carrying them out of the hive and disposing of them.

"We call them hygienic bees and if the bee can groom itself and bite the tick or try to remove it, that's what we want, and that's the type of bee we're breeding and we're having some success with it," Ms Gibbons said.

**- www.newsroom.co.nz**

# How *Varroa* Mites Find A Bee

**By Hannah Goodwin**

Hannah Goodwin

I did this project for my intermediate school science fair. I wanted to find out how *varroa* finds a bee when they have no eyes and can't see them.

The first thing I did was find out what way up a *varroa* lands when it falls off a bee. I dropped *varroa* from a height of 50 cm and then looked to see which way up they were. 62% of *varroa* fell on their backs, 34% on their sides and only 4 percent fell the right way up. Once they landed some of the *varroa* turned themselves the right way up. Once they were in a comfortable position they stopped moving and were very still.

The next thing I did was a test to see if they react to light. I put 14 *varroa* in a circle drawn on a piece of paper and put it in a dark cupboard. I put another 14 *varroa* on another piece of paper with circle under a light. The *varroa* in the dark didn't move at all and only one of the *varroa* in the light moved out of the circle. This means that they do not show any reaction to light.

The next thing was to see if they could see or smell bees. I put some dead bees next to some *varroa*. None of the *varroa* moved. This means that they do not find bees by smell or sight.

The last thing I tried was to see if they find bees by vibration. I put *varroa* on a sheet of paper on top of a speaker. When the sound was turned on they started to move around. Then I put the *varroa* on the sheet of paper on top of a jar of bees they started to move even more when the speakers were on. When I took them off the bees they stopped moving again.

When I touched them with a paint brush they most often clung on to it.

This means that *varroa* do not move around trying to find bees. They stay still until they feel vibration. They then start to move around and when a bee touches them they will cling on.

# *Late beekeeper's passion remembered*

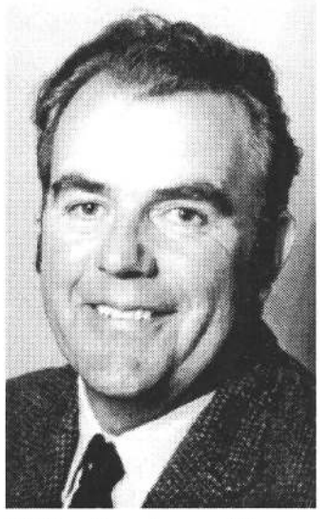
The Waikato lost one of its long-standing beekeepers, Philip Reed, after a long illness with prostate cancer.

Born in 1931 in Launcester, Cornwall, Phil was the son of a horticulturist/farmer and the youngest of 11 children. Their mother died when he was 6 years old and uncles and aunts brought him up until his father remarried.

As a boy, Phil tried his hand at raising silk worms and several other exploits to earn some pocket money. Unbeknown to his father, he also became an accomplished snooker play and would skip school to play on the tables. He was caught out when his father saw his photo in the local newspaper – reporting his ascension to snooker champion of the village.

Phil first developed an interest in bees through his father, who kept a few hives to pollinate his horticulture crops. From this early introduction, Phil later decided to take up beekeeping as a career but first he worked in a meat works, on a fishing boat, a sea mail courier and then entered the engineering trade.

At 23, Phil married Pam and they came to New Zealand in 1955 under the immigration scheme. At the end of his contract with the maintenance department of the Raglan County Council at Ngaruawahia, they moved to Papakura to work at Lees Marine and later at Stevenson's quarry.



Philip Reed . . . Always willing to share his beekeeping knowledge with anyone.

It was while working for Stevenson's Phil decided to keep bees as an extra income and the eventual hope of beekeeping full time. In his spare time, he increased his hive numbers and used the family basement to make up gear, storing it in kitset form in readiness for the new venture.

In the early 1970s, Pam, Phil and their sons, Roger and David, moved to Ohaupo, south of Hamilton. They purchased a beekeeper's property from the late Gordon Swetman and ran a successful beekeeping business for several years.

In 1979, the Reed family returned to England but after an unsuccessful attempt to purchase a beekeeping supplies business, returned to New Zealand two years later and started beekeeping again in the Waikato. Phil continued beekeeping until shortly before his death in November last year.

Eighteen years earlier in 1983, after 29 years of happy marriage, raising two sons and establishing the beekeeping business, Phil's wife Pam had died suddenly. Phil eventually married again and he and new wife Nida completed the house that Phil and Pam had partly finished building at Tuhikaramea Rd.

Nida helped run the hives as Phil's illness worsened and later nursed him with loving care until his death.

A regular participant at the National Beekeeper Association's Waikato branch meetings, Phil could always be recognised by his distinctive accent. Beekeeping was his passion in life and he loved talking to others about all aspects of it. He took a keen interest in the hobbyist beekeepers club, donating two hives, giving talks and helping members with the practical aspects of keeping bees. Phil was also willing to share his beekeeping knowledge with anyone new to the industry.

At home, Phil enjoyed listening to jazz music, was a keen follower of soccer and an All Whites supporter.

**– Bill Bennett**

# *From the colonies*

## Canterbury

September branch meeting:
7pm, Tuesday, September 24 in the Alpine Room, Hornby Workingmen's Club, Christchurch.
Guest speakers are:

- Kim VanVuuren, discussing "Varroa Control Costs and the Impact on South Island Beekeepers Report" and
- Internal business will include the Restructuring of the National Beekeepers Association.

## Southland

It has been a long, wet winter but not too cold, hence hives are opening up strong in bees but some light in feed.

Beekeepers have been busy doing their first round checks and feeding hives where the ground is dry enough to get to the apiary sites.

There is very heavy flowering of blossom on trees. Could this be a sign of coming unsettled spring weather? The days the bees are out, they are collecting lots of gorse and pussy willow pollen.

Varroa Surveillance is nearly completed. Beekeepers could help the surveillance programme by having their registration numbers on the side of a hive in their apiaries. A black crayon is all that is needed and it doesn't take long at all. Under the Biosecurity Act, it is an offence not to have the registration number displayed at an apiary site.

**- Andy Booth Drummond**

## Southern North Island

Spring Field Day (wet or fine ) Saturday, October 5, 2002.

**Venue: St. Mary's Church Hall, Raetihi**

Directions: Turn off Sate Highway 4 into the main street of Raetihi (Seddon St), or if travelling via Waiouru take S.H. 49 and the Ohakune-Raetihi Road. Continue along Seddon St. through the shopping centre. The hall is on the left just before the sale yards.

There will be something for both commercial and hobbyist beekeepers. For any hobbyists who want to look through a hive during the talks experienced beekeeper with hives in Raetihi will offer assistance.

Charge: $5, or $12 per family (all welcome)

Programme

| | |
|---|---|
| 9.45am | Tea or coffee |
| 10.15 | Introduce guest speakers. Housekeeping matters. Collect lunch (buns and soup $1, extra buns 30cents). |
| 10.20 | Paul Bolger, MAF varroa co-ordinator – "Varroa spread and updated boundaries". |
| 11.00 | HortResearch, Ruakura – "Varroa management" |
| Noon | Byron Taylor – his role in Agri Qual and American foulbrood |
| 12.30pm | Lunch |
| 1.30 | Russell Berry, Arataki Honey – "Bee-keeping with varroa" and "propolis mats" |
| 2.00 | Visit hives on Ameku Rd. Neil Farrer and others will demonstrate different types of screen boards, counting mites on sticky and corflute boards. Discuss when treatment should occur. Count mites using different methods e.g. icing sugar, soapy water wash, strip in jar. |
| 2.20 | Peter Lyttle, N.Z. Beeswax and the agent for MiteGone – "MiteGone" talk, while two other people apply it to a hive. (Pads soaked in water instead of formic acid) |
| 2.40 | Russell Berry – "Apistan and Bayvarol strips" talk, while people demonstrate how the strips are inserted into hives. |
| 2.45 | Vaughan Kearns, at the mill, Ameku Rd – "Timber in beekeeping woodware" talk, with examples. |
| 3.00 | Back at church hall, Frank Lindsay will discuss his trip to Alaska. |

The workshop will finish with an optional walk past the hives up the hill, where mountain views and the Raetihi area are worth seeing.

Accommodation is available for people who book in advance. A light evening meal can also be provided ( $10 for rice and curry).

**– May Ann**

## Whangarei.

A new beekeeping club has been formed after a public meeting was called by Terry Gavin last November, mainly driven by his concern about varroa.

Since then, the club has held regular monthly meetings with anywhere between 10 to 30 people attending. The club does not have a fixed abode at present but we have worked in with the commercial beekeepers (NBA Northland branch) for some of our meetings.

The Bee Club ( Whangarei )meets on the first Saturday of the month (except January), with a 10am (rain or shine) start. Members are asked to arrive early.

For more information, contact Peter (09) 437-5320, Val (09) 435-0945 or Arthur (09) 438 4-283

**– Bryan Taylor**

## Letter to the Editor

# Scientists on shaky ground

The genetic engineering (GE) debate is mostly conducted on the one hand by scientists employed by large international cartels, the main concern of which is to make the biggest profit possible; and on the other hand by opponents of GE whom we are told by our scientific politicians, wish to "go back to the stone age". People such as myself are "piggy in the middle."

Some years ago, scientists produced the perfectly safe drug Thalidomide. We all know what the results were. The motive for the production of this drug was profit.

Scientists have also produced, among other boons for mankind, the "one season only" runner bean. The root system dies off at the end of the season. Good profits for the seed producers - bad economy for gardeners. Obtain heirloom seed - the resultant crop tastes better, lasts longer on the vine, and the roots re-sprout over a period of years.

Recently, there was a move to introduce a "Roundup" resistant strain of corn. Again, good profits for the company. It may not in the long term, however, be good for growers.

These are just a few examples of what scientists have done for humanity over the last few years. Their employers laugh all the way to the bank.

I have not yet found a system of education to make my bees keep clear of modified crops. They just don't understand.

Unless a lot more independent scientific research is carried out in enclosed conditions, GE should not be allowed into the country. The GE people are telling me and my bees what is good for us. We have no say in the matter.

If things go wrong with their experiments it may well be GE that sends us back to the politicians' stone age.

**– Neale Braithwaite**
**Featherston**

# MAF Update

## Southern North Island surveillance results

Since late May, varroa surveillance has been underway in the lower North Island. MAF contracted AgriQuality New Zealand to organise the testing of all the hives in approximately 450 target apiaries, selected on the basis of a range of risk factors. These factors include:

- Proximity to the Movement Control Line;
- Proximity to major transport routes from the upper North Island;
- Shared ownership with hives in Infested Zone.

There are approximately 4000 apiaries containing 50,000 hives in the lower North Island..

Testing was carried out by a combination of hive owners, Authorised Persons and AgriQuality staff.

As at 2 September, results were available from the sampling of 428 apiaries, which equates to 95% of the original 450 target apiaries.

Of the 428 apiaries tested, 25 (6%) are positive for varroa.

Because the sampling was targeted rather than random, it is not possible to use this information to calculate the actual prevalence of varroa in the lower North Island. The location of these positive and negative test results can be seen on the cover of this magazine.

Of these infested apiaries, 16 are within 20 km of the movement control line, four are in Wellington, three are in the Manawatu, and Wanganui and Taihape have one site each. The three Manawatu sites are all owned by the same beekeeper. It appears that bees from a single infested site south of the line were moved to other sites within the same operation, spreading varroa to those sites.

The four Wellington finds are within 6 km of where a log containing a varroa-infested feral colony was detected in January. It is possible that all four finds were the result of spread from this log, although this cannot be proven. While three of the sites contain low mite numbers (<10/hive) one site contains a single colony which gave 800 mites on the stickyboard. At this time of year, that suggests a true population of around 1600 mites. According to most varroa population models, this is within the reproductive capacity of varroa in the time available, assuming brood was present continuously, and some drone cells were present.

All infested sites south of the movement control line have been treated and placed under restricted place notices.

## Movement Control Recommendation

The Varroa Management Group (a MAF/NBA committee) had difficulty in agreeing on what decisions should be made in light of these results. The key issue is whether retaining a movement control line would slow the spread of varroa within the lower North Island, in light of the spread that has already taken place. After considerable discussion, the VMG made the following recommendations, which the NBA will consult the beekeeping industry on:

1. The existing movement control line (with minor modifications where appropriate) will be retained until 30 April 2003. At this point all movement controls within the North Island will be removed, unless there is some form of long-term management programme in place (or close to being implemented), which has the ability to impose and maintain movement controls. The existence of a management programme does not guarantee that the Line will be retained.
2. The Northern Boundary Area (10 km strip) immediately north of the MCL will be removed, along with its specific permitting conditions.
3. Minor modifications to the existing MCL will be considered by the VMG where this can be done without significantly increasing the southward spread of varroa, to facilitate access to apiaries by beekeepers north of the MCL.
4. Some elements of the beekeeping industry support the establishment of an additional movement control line separating the Hawkes Bay-Wairarapa areas on the east coast from the western regions of the North Island. To seriously consider implementing such a line, MAF would require evidence that the proposers of such a line have identified and consulted all affected parties within the beekeeping industry, and can show a very high level of support from them. Beekeepers in the affected regions should be advised of the potential for undetected varroa infestations to be present in areas currently considered by beekeepers to be 'varroa-free'.
5. Treatment of varroa-infested hives in the Buffer Zone will be the responsibility of the hive owner. The Varroa Management Group may impose restrictions on or around infested apiaries detected south of the MCL if considered appropriate.
6. The VMG may make recommendations to beekeepers in the lower North Island on voluntary adoption of practices to slow the spread of varroa.

## Correction to ballot result article

The July 2002 issue of this magazine carried an article giving the results of a ballot on the continuation of the Commodity Levies (Bee Products) Order 1996. The interpretation of the requirements of the Commodity Levies Act 1990 was not entirely accurate. MAF Policy advises:

*"The Commodity Levies Act 1990 requires that more than half of the participants in the support referendum vote in support of the levy proposal; and where voting in the support referendum was conducted on the basis of the number of bee hives controlled, that the total number of hives controlled by supporters was more than half of the total number of hives controlled by all participants in the referendum."*

In other words, the ballot is decided by the votes of those who participate, and not by eligible voters who choose not to vote.

## Access to US market for live bees

The Animal and Plant Health Inspection Service (APHIS) of the United States Department of Agriculture (USDA) has recently published a proposed revision of US bee regulations, which would permit the importation of live bees (queens and packages) from Australia and New Zealand. The USDA is accepting submissions on this proposal until 18 November 2002. MAF will make a submission in support of access for NZ bees. New Zealand beekeepers are also invited to make submissions on the proposed revision. More information is contained on page ??. Please note that only submissions made in accordance with the guidelines provided by the USDA will be accepted for consideration.

NZ Beekeeping Web Page:
www.beekeeping.co.nz

Subscribe to mailing list:
www.beekeeping.co.nz/contacts/nzbkpr.htm

More information:
nickw@beekeeping.co.nz

# BRANCH CONTACTS AND MEETINGS

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Call: Mary-Anne (06) 855-8038

**AUCKLAND BRANCH**
24 Andromeda Crescent, East Tamaki
President: Brian Alexander
Phone/Fax: (09) 420-5028
Secretary
Chas Reade
Mobile: 025 772-502
Fax: (09) 634-4376

**AUCKLAND BEEKEEPERS CLUB INC.**
PO Box 214, Waimauku, Auckland
President: Ian Anderson
Phone: (09) 480-8327
Email: ianderson@clear.net.nz

**NORTH CANTERBURY BEEKEEPING CLUB**
Meets the second Monday of April, June, August and October.
Contact: Mrs Hobson
Phone: (03) 312-7587

**SOUTH CANTERBURY BRANCH**
Peter Lyttle
Phone: (03) 693-9189

**CANTERBURY BRANCH**
Meets the last Tuesday of every month.
February to October.
Field Day November.
Contact: Trevor Corbett
Phone: (03) 314-6836

**CHRISTCHURCH HOBBYIST CLUB**
Meets on the first Saturday each month, August to May, except in January for which it is the second Saturday.
The site is at 681 Cashmere Road, Commencing at 1.30pm.
Contact: Linda Gardner
205 Trents Road
RD 6 Christchurch
Ph: (03) 344-1977

**DUNEDIN BEEKEEPERS CLUB**
Meets on the first Saturday in the month September - April, (except January) at 1.30pm.
The venue is at our club hive in Roslyn, Dunedin.
Enquiries welcome to club secretary, Dorothy, Phone (03) 488-4390

**FRANKLIN BEEKEEPERS CLUB**
Meets second Sunday of each month at 10.00am for cuppa and discussion and at 10.30am open hives.
Secretary - Liz Brook
187E Clarks Beach Road,
R.D. 4, Pukekohe
Phone: (09) 232 1111
Mobile: 025 720 761
Fax: (09) 232 1112 Email: liz@pageset.co.nz

**HAWKE'S BAY BRANCH**
Meets on the second Monday of the month at 7.30pm,
Arataki Cottage , Havelock North.
Phone: Ron (06) 844-9493

**MARLBOROUGH BRANCH**
contact Will: (03) 570-5633

**MANAWATU BEEKEEPERS CLUB**
Meets every 4th Thursday in the month at Newbury Hall, SH 3, Palmerston North.
Contact: Joan Leckie, Makahika Rd,
RD 1 Levin
Phone: (06) 368-1277

**NELSON BRANCH**
Phone: Michael (03) 528-6010
**NELSON BEEKEEPERS CLUB**
Contact: Kevin
Phone: (03) 545-0122

**OTAGO BRANCH**
Peter Sales
Phone: (03) 472-7220
Fax: (03) 472-7221

**POVERTY BAY BRANCH**
Contact: Barry (06) 867-4591

**WANGANUI BEEKEEPERS CLUB**
Meets on the second Wednesday of the month.
Contact Secretary: Neil Farrer
Phone: (06) 343-6248

**NORTH OTAGO BRANCH**
Bryan O'Neil
Phone: (03) 431-1831

**SOUTHERN NORTH ISLAND BRANCH**
Contact: Frank
Phone: (04) 478-3367

**SOUTHLAND BRANCH**
Contact: Don Stedman
Ph/Fax: (03) 246-9777

**TARANAKI AMATEUR BEEKEEPING CLUB**
George Jonson
195 Carrington Street
New Plymouth
Email: honeyhouse@clear.net.nz
Phone: (06) 753-3320

**WAIKATO BRANCH**
Contact Tony: (07) 856-9625
Annette: (07) 366-6111

**WAIRARAPA HOBBYIST BEEKEEPERS CLUB**
Meet 3rd Sunday each month (except January) at Kites Woolstore, Norfolk Road, Masterton at 1.30pm.
Convenor: Arnold Esler.
Phone: (06) 379-8648

**WELLINGTON BEEKEEPERS ASSOCIATION**
Meets every second Monday of the month (except January) in Johnsonville. All welcome.
Contact: John Burnet,
21 Kiwi Cres, Tawa,
Wellington 6006. Phone: (04) 232-7863
Email: johnburnet@xtra.co.nz