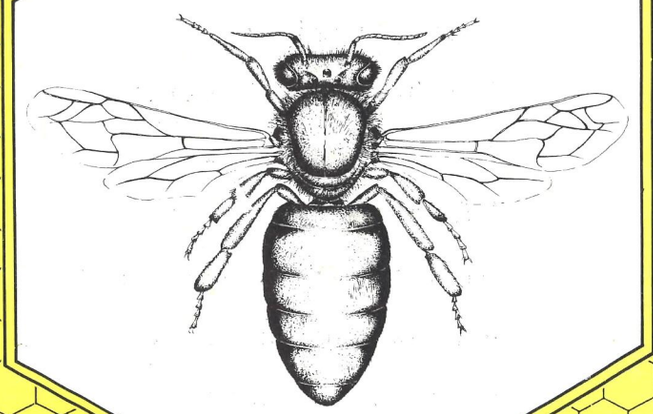

beelines

Number 31 May 1987

MAF Nelson Andrew Matheson Apicultural Advisory Officer

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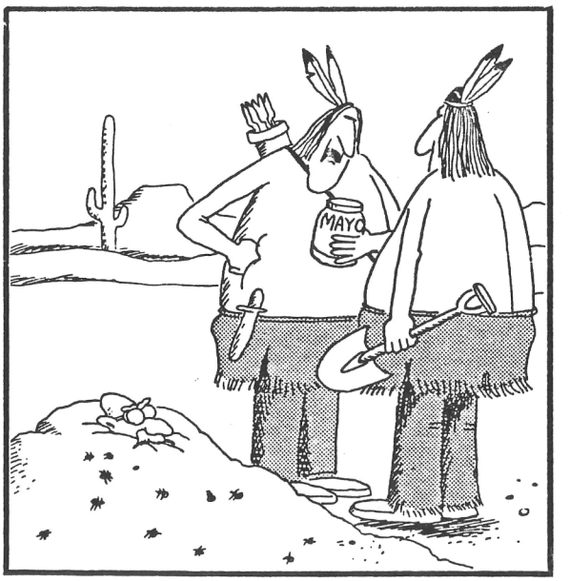

"You fool! 'Bring the honey,' I said ... This isn't the same thing!"

The season has again been a patchy one, proving once more the uncertainties of beekeeping. The biggest smiles seem to be on West Coast faces, where despite there being only patches of rata and patches of good weather a fairly consistent 8 tonne crop resulted (in central areas at least). Further down the Coast crops were quite a bit smaller. Having hives strong for whenever the flows come is important.

In Marlborough things were not too bright, with crops ranging from around 2.5 tonnes per hundred downwards. Pollination hives in Nelson mostly gathered a reasonable surplus, with honey hives up to the 2.5-3 tonne mark.

Ted Roberts reports that overall, the southern North Island will come out at less than 2 tonnes per hundred. Again, this was patchy - from over the 4 tonne mark in places down to less than one.

Beekeepers are on the verge of making some important decisions which will have profound consequences for your future in the industry.

* Marketing strategy. What is a marketing strategy? What is marketing, for that matter? Some beekeepers react negatively at the mere mention of a "marketing strategy" - does it have to do with the return of an HMA, or price controls, or price cutting?

Marketing is about matching what you produce and how you sell it, to what the consumers want. Your executive is commissioning various specialists to assist with developing a strategy to better market New Zealand honey. This season has shown us that we can't afford to let our honey marketing be completely at the whim of overseas agricultural policy. Think about marketing, take part in the seminar on this subject at the Christchurch conference, and support the NBA executive in developing a workable strategy.

* Pollination industry. The pollination industry in Nelson has really come a long way in the past 3 years or so, in marketing itself as a professional group. Marketing in this case has meant finding out what the consumer wants, and providing it - hives of known quality, a system to give growers peace of mind about that quality, beekeepers acting in unison and not pulling in different directions.

All this stands to be lost if beekeepers lose sight of what the growers want, and how the industry can work together to provide it.

In this issue we talk about the recent MAF/DSIR wasp survey, what's happening in the beekeeping industry, some research on a new and economical way of feeding fumagillin, the latest on half-moon disorder, and a look forward to pollination in the future.

This month we have an index for the past four issues of *Beelines*, which means it's a year since I started producing the magazine. It also means that it's time to subscribe for another year's supply of up-to-date beekeeping news, science and practice.

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THE GREAT NEW ZEALAND WASP SURVEY

All of you with 50 hives or more will have received a sampling kit for the joint MAF/DSIR wasp survey. The replies are coming in from this, and we're very pleased with the quality of information on the questionnaire forms. Well done. We would appreciate getting your forms and samples in as soon as possible, so please put some time aside for that shortly.

I'm working on this survey with Dr Henrik Moller of DSIR's Ecology Division in Nelson. We want to establish:

* the distribution and relative abundance of the German wasp (*Vespula germanica*) and the "common" wasp (*V. vulgaris*).

* the economic impact of wasp predation on beekeeping.

* the effect of *V. vulgaris* invasion on changing the types of wasp damage that beekeepers face, and altering the overall level of it.

Readers of the *Apiarist* magazine have received a sample form with the last issue. We'd appreciate as many of those back as possible, with each sample containing about 20 wasps **from one locality.**

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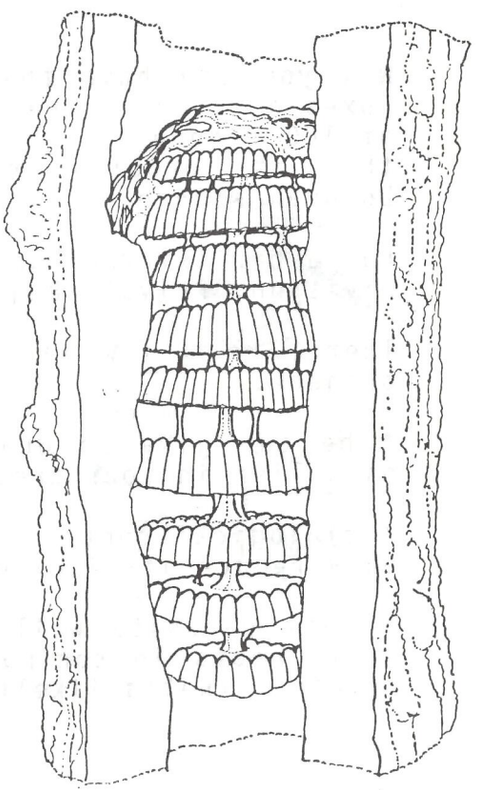
We haven't been certain up until now whether the new wasp species, *V. vulgaris*, would attack bees or beehives in New Zealand, as they hadn't been reported during so in other countries. I went out to apiaries early this autumn to check on this and, sure enough, I found *V. vulgaris* inside hives robbing honey and chopping up live bees at the entrance. I reported this to Barry Donovan at DSIR Lincoln, who up until then hadn't seen or heard of this species preying on bees or hives. Other reports have also come in about the common wasp as a beekeeping pest.

So, it's important that we find out more about *Vespula vulgaris*, the common wasp. Please send your wasp samples and survey forms as soon as possible to:

Wasps (Freepost)
DSIR Ecology Division
Private Bag
Nelson

It's a Freepost service - no need for a stamp.

There is a proper time for idleness, as well as for industry, and either may be justified.

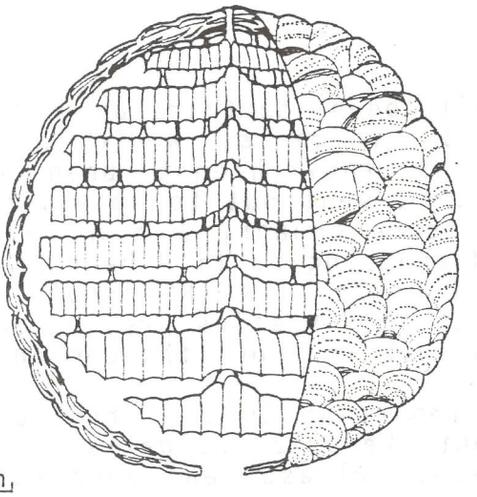


Wasp nest in a hollow tree trunk.

FIGHTING WASPS - WITH WASPS

Biological control might reduce wasp numbers permanently, if a programme at DSIR Lincoln is successful. Dr Barry Donovan, of DSIR's Entomology Division, has introduced a small wasp which is parasitic on both the German wasp and the "common wasp". The parasite has the rather tongue-twisting name of *Sphaecophaga vesparum*.

The parasite has been released in the Christchurch area. No detailed studies have yet been made of its spread, but Barry tells me of one accidental discovery of the parasite in a nest of German wasps 5 km from the original release site, only 18 months after they were liberated.



5 cm

Now you can have the chance to try the parasite in your area. Boxes of cocoons are available for sale - $150 (plus GST) per box of 100 cocoons. This is an excellent way of trying to alleviate the wasp problem in your area, as well as supporting Barry Donovan's ongoing research in this area.

For other information contact : Dr Barry Donovan, DSIR Entomology Division, Private Bag, Christchurch.

There are a few warnings, though, that Barry sounds about this project:

* he can give no guarantee that the parasite will successfully establish in your area.

* biological control will never wipe out a pest species, but can only reduce its incidence.

* this parasite will probably be more effective at eliminating small nests in spring than tackling those giant nests we get in autumn. That's likely to be more useful for beekeepers, but you

won't see any dramatic (and rewarding) sights like monster nests being eaten out by rampant parasites.

Could you get hold of a few parasites and breed them up yourself? It would save on the number of boxes of cocoons you have to buy to cover your beekeeping area. Well, beekeepers aren't known as do-it-yourselfers for nothing, and I've certainly been asked that question. However, it's not that simple I'm afraid.
Sphaecophaga has a rather kinky life cycle, with females producing 5 different types of offspring which emerge in anything from 10 days to three years. You have to feed these cultures fresh wasp comb every 10 days, and tend them daily. They have to be kept in constant-temperature facilities, which at Lincoln cost $1,000 a month to run. So no, I suggest you leave that part of it to the experts.

The Australians have *Sphaecophaga* under quarantine in Victoria, and plan to release it soon. The scientist in charge of that project says that a reduction in wasp levels of about 20% is about as much as he could hope for.

****

MAF'S NEW BEEKEEPING SCIENTIST

A new apiculture and pollination scientist is starting with MAF next month. He's Mark Goodwin, whom you already know (second-hand at least) through his work on kiwifruit pollination which I wrote up for *Beelines*. As part of his Ph.D., Mark looked at the timing of pollen release by kiwifruit flowers, and the effects of feeding sugar to pollination colonies.

Mark will be based at Ruakura, near Hamilton, and will carry out beekeeping research as well as pollination studies. I'm sure you'll join with me in welcoming Mark to his new job.

This scientist position is jointly funded by the National Beekeepers' Association and the NZ Kiwifruit Authority.

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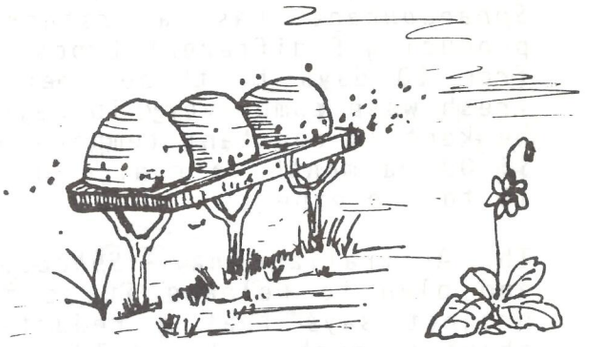
COMING UP IN YOUR FUTURE

The NBA executive met recently at Flock House to review its beekeeping industry plan. Also contributing were Peter Bray, Nick Wallingford, and MAF apicultural advisers.
This industry planning system is for **you**, so that opportunities

can be realised in advance, and problems prevented by forward planning. The details will be coming out to branches soon, but here's a selection:

* Develop a honey marketing strategy for New Zealand honey. Marketing doesn't mean selling, promoting or price-cutting. It means tailoring what you produce to the consumer's requirements.

The executive has commissioned several consultants to help with developing this strategy, and half of the seminar at the Christchurch conference this year will be on marketing. Remember the motto of the NBA? It's "Better beekeeping, better marketing".



* Education and training.

The executive will be taking steps to improve the audio-visual material in the NBA library, and encourage an adequate supply of beekeeper trainees.

* Publicity and public relations

The NBA sees a need for material to promote the NBA itself and the beekeeping industry in general, as well as for a more detailed information package about the beekeeping industry. Outside groups may be contracted to prepare this material.

* Bee disease inspection

It's aimed to have a fully-funded bee disease inspection service in place by next spring. This will involve raising funds from hive levy payers to contract MAF to carry out inspections to a pre-determined level.

* Quarantine measures

The existing quarantine handout material is to be improved and updated.

* Branch effectiveness

Often willing members are reluctant to become branch secretaries, because they don't know what's involved. Existing secretaries sometimes have trouble working out what has to be done by when, and how to do it. The NBA executive will prepare a resource kit to help branch secretaries, and plans to hold a short training session for potential office-holders at the 1988 conference.

Laziness prolongs life, at any rate for bees.

****

EX-PRESIDENT LEAVES EXECUTIVE

Ian Berry, a valuable member of your NBA executive, is standing down from the position this year. I'm sure that a lot of beekeepers don't realise how much effort Ian has put into the NBA, as he's not one to make a great song and dance about his contribution.

I would rank the most important event of Ian's three years of NBA presidency as being the adoption of a strategic planning approach. This means the industry now looks out to the opportunities and possible problems in the future and tackles them in advance, instead of waiting to adopt "management by crisis".

Ian left the president's chair a year ago, but has stayed on the executive to contribute from his experience, including continuing as the NBA representative on the Pesticides Board.

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MARKET INFORMATION

* Bulk prices for export honey range from $1.60 through $1.85 to $1.90 per kg excluding drums. Local honey is $1.55-$1.75.

* Wholesale prices for 500 g are $1.60 - recommended retail prices are mostly in the range $2.03-$2.10 (GST inclusive).

* Gate sales (FYO) average $3/kg including GST - other prices I've heard range from $2.75 to $3.35 (GST inclusive).

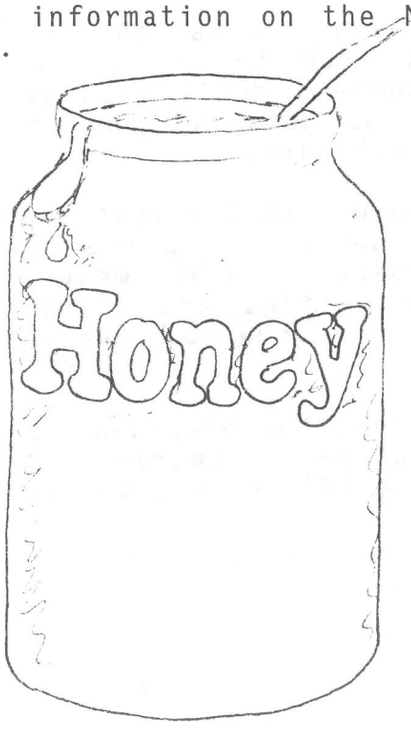
* While wax exports can fetch $5.10-$5.50 per kg f.o.b., local processors are paying $4.30-$4.80.

*I've heard of contract extracting prices in the range of 12-18 c/kg of honey. Per super prices are $2.20-$2.60 for, say, 200 boxes or more, and $5.50 for small lots. There is a wide range of charges for this service, because it's difficult to work out what your costs are. Do you just want to cover the extra running costs and generate a profit, or do you expect the other beekeeper to cover some of your capital costs too?

* All prices in this section are plus GST, unless otherwise

indicated.

* Export sales are slow. (For more information on the North American market, see the next article).



* There is a very important book out on honey markets. Called "Honey : a study of major markets", it is published by the International Trade Centre UNCTAD/GATT (Geneva, 1986, 167 pages). This book introduces world honey-trading patterns and discusses characteristics of the major markets, including uses of honey, tariffs and names of importers. The countries discussed in detail are; Belgium/Luxembourg, France, West Germany, Italy, Netherlands, Spain, Switzerland, United Kingdom, USA, Japan, Hong Kong, Saudi Arabia, Kuwait, Denmark.

No honey exporter can afford to be without this book. If you move very smartly you may be able to order a copy through the NBA executive secretary, who is making up a bulk order. This will save you time and money. Cost is $US 35; about $NZ 62.

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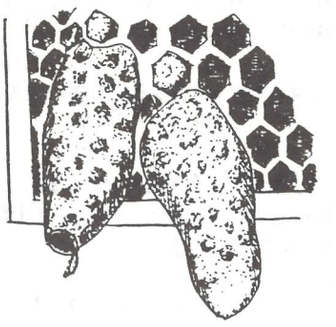
CANADIAN BEEKEEPERS AFFECTED BY LOW PRICES

Beekeepers in Canada had an average to below average crop in 1986, but the prices offered for their honey have steadily declined over the past few months. Many are finding it hard to sell their crops.

The main reason for this is seen as being the US agricultural policy and the honey "loan" programme administered by the Commodity Credit Corporation. Now I put the word "loan" in inverted commas because the CCC programme seems to be a Claytons loan, you know, the loan you have when you're not really having a loan. It's supposed to work like a guaranteed price scheme, so farmers know for sure what they'll get for produce, but has ended up as a supplementary minimum price scheme whereby the government supplements the real market returns to the farmer with a bonus or subsidy.

It works like this : beekeepers in the US receive a loan from the

government (at the rate of $US 0.64 per pound, or $NZ 2.47 per kilogram, for white honey), and offer their honey as collateral. Once they've received the money they can buy their honey back from the government, which has tens of thousands of tonnes of it in warehouses and doesn't really want any more. Beekeepers previously didn't buy their own honey back, but bought imported honey at much lower prices (so they received government subsidies to buy foreign honey). Now, though, the US government has dropped the buy-back price to $US 0.40 per pound ($NZ 1.54 per kg). A lot more honey is being bought back at this level, because it is so close to the current world price.



So now you understand free trade. It's really simple isn't it? You sell your honey to the government for 64 c per pound, and buy it back for 40 c. (Can you remember countervailing duties being slapped on our lamb exports a few years ago because of SMPs?)

The effect "north of the border" has been that Canadian beekeepers are finding it very hard to sell honey to US packers, who are now getting most of their honey at 40 c ($NZ 1.54/kg) from the buy-back programme. The outlook for the next couple of years is more of the same.

(Details from Saskatchewan *Beelines* no 81, March 1987).

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PACKAGING RULES CHANGE

New legislation came into force on the 1st of April, which does away with the idea of standard sizes for honey containers. In the past you had to sell honey in sizes of 250, 500 or 900 g, 2 kg or any multiple of 1 kg thereafter. Glass, though, was exempt from that requirement.

I think that it was necessary to force people into standard metric-sized containers, otherwise the unscrupulous few might have exploited the psychological price advantage of 1 pound containers versus 500 g, 8-ounce versus 250 g, and so on.

But it seems we've outgrown those days. The Weights and Measures Act 1987 (1987/15) is a very simple piece of legislation - easy to read and only a few pages long. One of those pages is needed just to list the whole raft of acts and regulations it supersedes.
The requirements of the new act are:

* you must use metric measurements on products and in advertising.

* you may only use imperial measurements as well as metric if your goods are also exported to, or imported from, a country that doesn't use metric measurements. In this case the imperial measure must not be in bigger type than the metric information.

* weights must be marked on the top or side of containers in legible figures and letters.

* scales still must be tested and stamped by an Inspector of Weights & Measures (though automatic, self-loading machines seem to be exempt).

* the maximum penalty for offences is $2,000, plus $100 per day for continuing offences.

A few snippets from overseas - I read recently in a British beekeeping journal of beekeepers' concern that they might soon have to start packing honey in metric sizes, because of EEC requirements. And isn't it funny that one of the most "imperial" countries in the world is the USA?

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HALF-MOON DISORDER - WHAT'S NEW?

Half-moon disorder has been talked about a lot in the past couple of years. Denis Anderson, the honey bee pathologist at DSIR in Auckland, has been investigating this condition. What he's found out has given us quite a bit more understanding about it.

There are four key symptoms of HMD:

- Multiple eggs	A large number of cells contain more than one egg. Often these eggs are not deposited independently, but rather they are 'stuck' together side by side or end on end.
- Position of eggs	Eggs are often deposited on the walls of cells. The eggs may be found on the top, bottom and side walls of cells, from the bottom to the lip of the cell.
- Half-moon larvae	Larvae 1-4 days old may die in a 'C' shape. These dry out to scales which also lie in a 'C', sickle, crescent or 'half-moon' shape in the cell (hence the 'half-moon' symptoms show a slight resemblance to European foulbrood symptoms).

Larvae of all ages are affected by HMD. Some larvae die after their cells have been capped, and these cappings may become dark, sunken and perforated by nurse bees. The colour of dying larvae varies from colony to colony. Some may be an 'off-cream' colour, some brown, while others may be black. However, many dying larvae first turn a 'yellowish' colour, then become brown. the tracheae of many dying and dead larvae often become prominent.

The dried scales of dead larvae are easily removed from their cells. In affected colonies many larvae of all ages may be removed from their cells by nurse bees, which gives a spotty brood pattern.

- Drone brood

Drone brood can often be present in worker cells. It is not known whether larvae which die in the 'half-moon' shape are actually drone larvae which have been neglected by nurse bees, but this would undoubtedly have accounted for some larval death.

However, half-moon queens aren't old girls that have turned into drone-layers. They are normally less than one year old, and have full spermathecas.

Half-moon is not a "disease". You can't transfer it between colonies by moving combs, but you can by shifting the queen across. Denis thinks that it's a queen-related problem which is heritable to some extent, that is it can be passed from the queen to her offspring. It could be showing up in New Zealand queens because of a restriction in the gene pool from which breeders are selected.

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FUMIGATION WARNING

Anyone who is still using methyl bromide for fumigation would be well advised to take extreme care with the gas. The latest report of the National Poisons Information Centre contains a rather frightening report on a methyl bromide poisoning.

A previously-well man inhaled an unknown quantity of methyl bromide, and initially had difficulty breathing and felt very lethargic. When driving home he vomited, became incontinent and ran off the road twice. At home he suffered a serious epileptic-

type seizure and stopped breathing.

Fortunately, there was someone nearby who was able to resuscitate him. Twelve days of hospitalization was needed before his co-ordination and muscular control improved sufficiently.

Don't skimp on safety precautions when using this (or any other) fumigant!

****

SOME PEOPLE ...

It's just as well for our industry that there aren't more people around like Sir Richard Burton (not the actor, but an African explorer of Victorian times). He had a fear of honey. His wife said, in his biography, that he "could not sit in the room with honey and knew even if it was kept in the most secret drawer or cupboard". I suppose the technical term for this would be "mellissophobia".

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HONEY EXPORTS

Latest figures for the 8 months July 1986 to February 1987.

Commodity	Tonnes	Average f.o.b. price ($/kg)	Number of countries
Comb honey	166	$5.16	11
Bulk honey	281	$2.59	8
Honeydew	282	$2.15	2
Retail honey	109	$3.87	23
Beeswax	38.5	$6.29	8

The total f.o.b. value of that produce was $2,853,184.

****

LOOKING AFTER YOUR BREEDERS

Most beekeepers that I know of keep their breeder queens in small hives, usually just single-deckers. There seems to be a general

assumption that a queen will live longer if her egg-laying rate is kept down and she isn't "worn out".

There may also be good scientific reasons for confining breeder queens. I recently came across an article by G D Bilash and two Soviet colleagues, who looked at the relationship between:

* egg-laying rate
* egg weight
* queen quality

They found that when queens laid fewer eggs, the average weight of eggs increased. They showed that queens reared from heavier eggs were heavier and had more ovarioles. And we know, of course, that queens with more ovarioles are more productive than their slimmer sisters.

So it certainly seems a good idea to restrict breeder queens to a single brood box to reduce their laying rate, at least while you're grafting from that hive.

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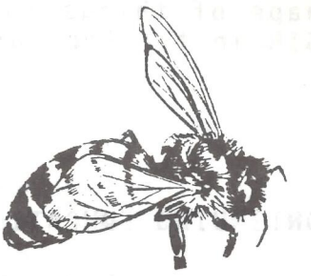

KIWIFRUIT - 2001

The kiwifruit orchard of the future might have no bees, no spray pollination and no male vines, according to scientists who have found self-fertile flowers capable of producing export fruit.

Almost all kiwifruit vines are either male or female. That's fairly easily understood, but of course with kiwifruit things are never simple. Male flowers produce viable pollen, and have ovaries that are not fertile. Female flowers have fertile ovaries but their male "bits" produce pollen that's not viable.

Now you can imagine two ways of having self-fertile flowers- either a male flower develops fertile ovaries, or a female flower becomes capable of producing viable pollen. No females with fertile pollen have been found, though these would be difficult to detect. Flowers with fertile ovaries on a male vine are easily noticed, as they set fruit on an otherwise fruitless vine.

Such fruiting males are infrequent, but not rare. Usually only a few flowers on the vine set fruit, and the fruit are usually less than 30 g even when well pollinated.

DSIR has a breeding programme which aims to produce completely self-fertile vines with exportable fruit . They have started off breeding from a few "male" vines that have produced particularly large fruit - one was up to 81 g and contained more than 800 seeds.

These plants mature earlier than Hayward, and if developed would overcome "pollination problems". Development of a commercial self-fertile cultivar is some years away yet, but it could be the shape of things to come. This work was reported by Alan Seal of DSIR in the February 1987 *New Zealand Kiwifruit*.

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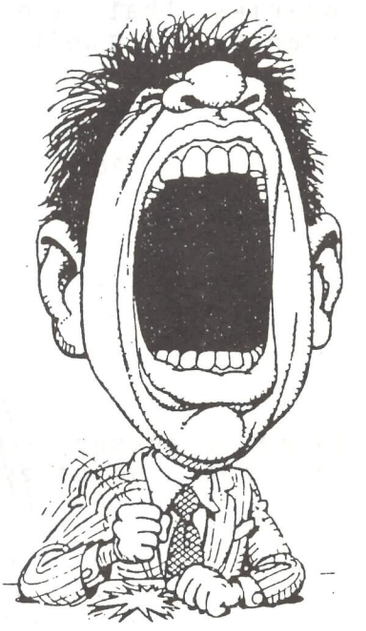
CONTINUING EDUCATION COURSES FOR 1987

The last issue of *Beelines* contained a list of courses being offered by the Waikikamukau Community College. Because of the large amount of interest shown, further courses have been scheduled for the second term.

BUSINESS AND CAREER

- "I made $199 in real estate".
- Money can make you rich.
- Packaging and selling your child.
- Career opportunities in El Salvador.
- How to profit from your own body.
- The underachiever's guide to very small business opportunities.
- Looters' guide to cities.
- Operate your own public toilet.
- Understanding Irish jokes.



HOME ECONOMICS

- Cultivating viruses in your refrigerator.
- Burglarproof your home with concrete.
- Sinus drainage at home.

- Basic kitchen taxidermy.
- 1,001 other uses for your vacuum cleaner.
- The repair and maintenance of your virginity.
- How to convert a wheelchair into a dune buggy.
- What to do with your conversation pit.
- Ratana and the art of chainsaw maintenance.
- Convert your garage into an abattoir.

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MICROWAVING CRYSTALLISED HONEY

Whether you want to revive a whole pot of crystallised honey or melt down a few tablespoonfuls of very thick honey, you can use your microwave oven to good effect and produce pourable, liquid honey in next to no time for serving with waffles or crumpets.

To soften a small amount of thick honey, place about 30 ml (2 tbls) in a small bowl and microwave it, uncovered, at 100% (high) for 10 seconds or until the honey is thin and easy to pour. To revive a whole 500 g jar of honey which has hardened or has started to crystallize, remove the lid and microwave at 100% for 1.5 to 2 minutes, stirring once after one minute. As microwave energy is attracted to sugars, the honey will heat up very quickly, so care should be taken that it does not boil over.

The precaution of stirring the honey should not be taken lightly. Microwaves operate first on the outside of the honey and unless the unmelted core is broken up at least once with a fork or knife, you will witness the amazing sight of honey boiling around the edges of a solid core. Another precaution; plastic honey jars will distort badly when microwaved. And another: whatever you do, don't try melting beeswax in a microwave oven. Small droplets of water trapped inside it will boil - very explosively. You'll then spend the next hour frantically scraping off a thin coating of beeswax from the entire inside surface of the oven. At least one beekeeper has been banned from the kitchen for life.

(From the *South African Bee Journal* 58(3):69, 1986).

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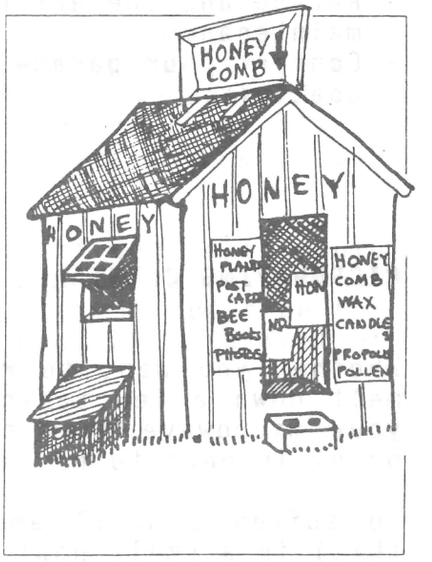
It is usually the industrious bees that we notice - not the lazy ones sitting in the hive.

PROMOTIONAL MATERIAL

Your NBA executive has made significant advances over the past couple of years in providing promotional material for beekeepers. There is a stockist in each island holding a large range of items you can use to increase awareness of your industry.

So if you're serious about helping the beekeeping industry and promoting honey sales, how about doing your bit? Contact Jan Chisnall (Maungatai, RD Greta Valley) or Jaqui Ashcroft (P O Box 641, Havelock North). The latest *New Zealand Beekeeper* lists some of the items for sale (at cost) while the Spring 1986 issue contains a bigger list.



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BEE LEGAL, BEE REGISTERED

I must admit I've got yet to see one of these posters in a public place! How about it folks, have you done your bit? Extra copies of the posters are available from me.

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SO THAT'S WHY IT HURTS

I'm sure many of you know the old saying about a bee's sting- it's only 2 mm long and is the same temperature as the environment round you; the other half a metre and hundred degrees are all in the mind!

Bee venom is pretty potent stuff. A dose contains as little as half of one millionth of a litre (0.5μl) of venom, containing 50 millionths of a gram (50μg) of dry ingredients.

Most of the active ingredients are proteins: melittin (50%), and the name of that one suggests it has something to do with bees, phospholipase A (12%), apamin (3%), another bee-related name, "mast cell degranulating factor" (3%) and hyaluronidase (3%). Other components are histamine (1%), dopamine (0.5%) and norepinephrine (0.5%).

It seems that melittin is responsible for the sharp pain you feel when being stung. It causes repeated stimulation of a particular type of unsheathed nerve fibre in your skin (which is what we call "pain").

The subsequent swelling around a bee sting is unrelated to melittin, except in those few hopeless folk allergic to this substance. Instead the swelling seems to be due to the phospholipases and hyaluronidase in the venom.

In fact it seems that only the acutely painful melittin is aimed at mammals, and otherwise the venom components are relatively non-toxic (assuming, of course, you're not allergic). One unfortunate person in Africa is reported to have survived over 2,000 stings in a 4-hour period.

Now isn't that comforting next time you're stung?

(This information was reported in an article called "Sting like a bee! The ionophoric properties of melittin", in the March 1985 issue of TIBS).

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TRADE TABLE

Airborne Honey have a small laboratory, and can test your honey samples for colour ($5.50), moisture ($5.50), and pollen content ($38.50). They hope to be able to do HMF and diastase checks in the future. Contact Peter Bray at P O Box 28, Leeston, phone (03243) 569. They also have a small testing kit, made up of three coloured standards, for $27.50 plus postage.

* Ceracell Foundation Ltd (P O Box 58 114, Auckland, phone (09) 274 7236) have imported an electronic pollen moisture tester from Italy. Put a small quantity in the machine, press a button for the product you're testing and there's your answer. No heat, no smell, no waiting, and it could be yours for about $NZ 900.

* Bee blower, petrol driven. Contact Chris Budgen, RD 3 Motueka or phone (0524) 88 453.

* Steve Olds of Tecpak Plastics (P O Box 713, Dunedin; phone (024) 30 691) tells me that he's making a new range of clear, see-through honey pottles with screw tops.

Now you might think that screw tops are prone to coming loose and leaking, but remember that Tecpak are the ones who came up with the Saf-a-pak lid! So they've solved the problem with the screw top too, by way of a cunning locking device in the lid.

The price depends on volume, but is about 25 c per unit with label printed on.

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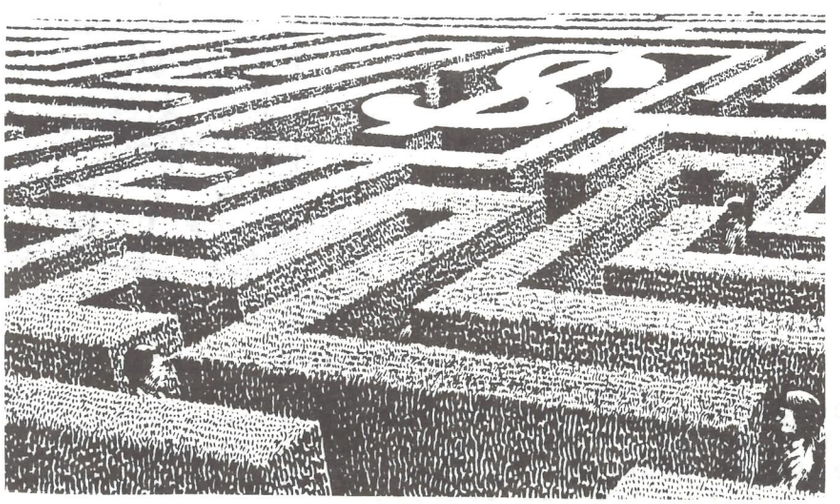
POLLINATION - THROUGH A CRYSTAL BALL

A recent article by Cam Jay looks at what might lie ahead for pollination beekeepers and growers of crops, to make the business of pollination easier.

Cam Jay was in New Zealand 3 years ago, and with his wife Doreen studied honey bee behaviour in kiwifruit. He has had a wealth of experience studying pollination of other crops, such as coconuts in Kenya, beans in Britain, and clover in Canada. The article reviews the whole subject of how honey bees might be attracted to crops and kept there.



Crop management is one way of increasing bee visitation. Spraying sugar syrup on crops really increases the number of bees present, but most bees collect the syrup rather than nectar or pollen from the crop. Products like "Beeline" have the same result.

Two areas of crop management show some promise. Pollen odours attract bees, and it is possible that spraying them onto crops would help to maintain bees on the target crop. Another type of odour attractive to bees is the Nasanov pheromone - used by worker bees to attract disorientated bees to the hive entrance, and swarms to temporary landing places or new nesting sites. Foraging worker bees expose their Nasanov glands when feeding on sugar syrup in dishes or when collecting water, and this attracts further workers to the site.

Some of the components of the Nasanov gland are easily synthesized and already available, so it's possible that their use might soon become part of pollination management.

Another problem with attracting bees to a crop, and keeping them there, is the presence of competing nectar and pollen sources. It's only occasionally possible to remove floral competition, so other means will have to be devised to reduce the problem. One possibility is to spray the competing source with a repellent. We're familiar with repellents like benzaldehyde and phenol (carbolic acid), used on fume boards for removing honey, but these don't last long enough to be used on crops. Other chemicals, including honey bee alarm pheromones, have been tried with some success. It will be a while, though, before suitable chemicals are found that are economic to apply.

Colony management is the other main important area to consider when improving pollination. We know much of this already:

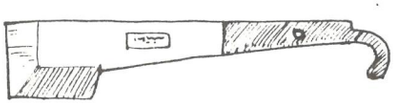
- preparing a colony with the correct balance of nectar and pollen gatherers for the crop;

- timing the movement of bees to the crop;

- paying attention to placing the colonies near the crop, and at the right distance apart;

- on some crops (e.g., lucerne), replacing pollination colonies with fresh ones when bees begin to forage too much outside the target crop.

Pollen dispensers give varied results. These are devices that dust outgoing bees with pollen of the target crop, to increase their efficiency at pollinating and maybe even to "direct" them to that plant species. Some people claim an increased yield for some crops when dispensers are used, but others say they're not effective.



In the long term we might see advances in breeding bees for particular crops, and breeding crop plants to be more attractive to bees. However, such advances are very difficult and costly to make.

Progress we're most likely to see next will be in the use of chemicals, particularly synthetic bee pheromones, to attract honey bees to target crops, and repel them from species we don't want them to visit.

Reference : Jay, S. C. 1986. Spatial management of honey bees on crops. *Annual Review of Entomology* 31:49-65.

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PETS THAT LAST FOREVER

For the sentimental at heart - a new addition to your memorabilia. On the mantlepiece alongside your bronze-dipped baby shoes, you can now place your beloved (and dead) pets.

Freeze-drying pets is the latest fad among American pet lovers. Taxidermists are now using the same process that gives us instant coffee to make pets that last forever, and pet-owners just love it. Taxidermists are being deluged with requests to freeze-dry everything from cats to dogs, canaries and even goldfish.

In the past, animals were preserved by stitching the animal's skin over a mould of the body. Now, with the new technique, the animal's organs are taken out and soaked in preservative, then the taxidermist re-inserts them and, working from family snaps, wires the animals limbs into a characteristic pose. After this, the pet is frozen and dried in a vacuum chamber for up to six months.

The cost of a freeze-dried cat? A mere $500.

(From the NZ Microbiological Society March 1986 newsletter).

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PUBLIC RELATIONS

How's this for improving beekeeper/farmer relations? Some beekeepers hold an open day at their honey house, for all the land owners on whose properties they have apiary sites. It gives the farmers a chance to see how a honey house works, pick up their "site honey", do some honey or mead sampling, as well as just getting to know the beekeeper better. On a Friday afternoon

it would tie in with their trip to town. Might also force the annual shed clean up too.

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THE VALUE OF HONEY BEES TO NEW ZEALAND

How much is beekeeping worth to the country? We all "know" that other people benefit from our industry much more than beekeepers do. Pollination, it is usually claimed, is worth many times the value of the bee products sold.

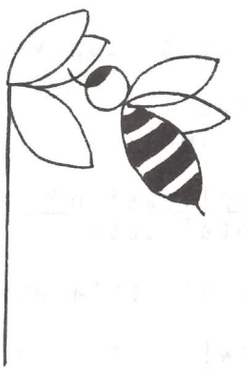
But how much is pollination worth? How much of our horticultural production are bees responsible for? What about the clover that bees pollinate - what is it worth to our pastoral industries?

In response to a request from the NBA executive, I recently tried to calculate how much beekeeping contributed to New Zealand's economy. Production figures aren't easy to get for many of the commodities looked at, so I've used export figures in most cases.

Horticulture

The crops listed below rely on honey bee pollination to produce commercial crops. Sure, other pollination agents are involved, but without managed honey bees production is probably just not economically viable.

Crop	Annual export value ($ million f.o.b.)
Kiwifruit	$295
Apples and pears	$117
Berryfruit (fresh and frozen)	$34
Stonefruit	$5
Citrus	$3
Misc. sub-tropicals	$1
	$455



These figures include fresh and some frozen fruit exports, but don't include the value of further-processed products such as juices or canned fruit.

Vegetable and seed crops

Squash is the most important vegetable which needs pollination. Last year $36 million worth of this crop was exported. Many other vegetables don't need to be pollinated, but arise from seeds for which pollination is necessary. Much of this seed is imported to New Zealand, except onion seed, so I've included only the value of our onion exports in this category : some $8 million annually.

Most vegetable seed crops require pollination ($1 million per year exported), and honey bees contribute to the production of at least $9 million worth of clover seed annually.

Total for vegetables and seed crops : $54 million per year.

Pasture legumes

So far, this calculation has been relatively easy. It's more difficult trying to estimate what our pasture legumes are worth in the way of nitrogen-fixing.

Although clovers are perennial, seeding is still necessary to maintain an adequate seed reservoir to sustain the clover content in pasture, particularly in harsh environments where winter kill is significant.

It is estimated that clovers fix an average of 185 kg/ha of nitrogen per year in New Zealand pastures. Using this figure an estimate can be made of the replacement cost to farming, if this nitrogen had to be applied artificially.

Area of improved pasture in New Zealand	9.4 million ha
N-fixation by clovers (average)	185 kg/ha/yr
Total nitrogen fixing	1.74 million tonnes/yr
Urea equivalent (46% N)	3.78 million tonnes/yr

Cost to apply urea

urea	$416/tonne
freight	$16/tonne
application	$30/tonne
total cost	$462/tonne

Total replacement cost of nitrogen $1,746 million/yr

Wow! It's obvious that honey bees are most important to New Zealand because they pollinate the legumes on which our pastoral systems depend.

Bees and bee products

How does this pollination value stack up against the direct income from honey, queens, wax and the like? Well, we've run up a "credit" of $2,255 million per year so far, and it's obvious that beekeeping won't come anywhere near that.

A United States researcher called McGregor came up with a ratio of 100:1, that is pollination being worth 100 times as much as

beekeeping's direct products. A more recent analysis by Marshall Levin, also of the US, calculated a figure of 143:1.

How much does beekeeping generate in direct income in New Zealand? Taking fairly conservative figures, again:

Honey : average 9,100 tonnes per year at $2,005/tonne f.o.b.
= $18,245,000 per year

Wax surplus to the industry's requirements : average of 154 tonnes per year at $4,900/tonne = $754,000.

Bees : In 1985-86 export of live bees totalled nearly $0.7 million f.o.b. This was made up of 16,480 1 kg - equivalent packages and an additional 25,700 queen bees.

So, the total value of bees, honey and beeswax averages approximately $19.7 million per year. The pollination benefits are 113 times as much as the value of bees and bee products.

That's a pretty impressive figure. How much do beekeepers get back as pollination fees? Last year, according to MAF figures, 89,760 colonies were hired out for pollination, at a total of $6.1 million in fees. Over 80,000 hives went into kiwifruit.

Honey bees provide a vital pollination service to New Zealand agriculture and horticulture. This has been the main justification for much of the support provided by government agencies to the beekeeping industry, as it is recognised that an adequate population of honey bee pollinators can only be maintained in the context of a thriving beekeeping industry. Of course, the industry's tangible products (honey and beeswax) are worth only a fraction of the value of the pollination service provided.

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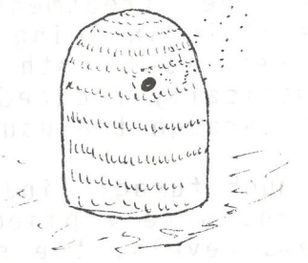


A NEW WAY OF SUPPRESSING NOSEMA DISEASE

Nosema seems to be one of those diseases we discuss a lot, but do little about. I suppose the main reason for this is the lack of reliable field symptoms - despite all the good, scientific evidence of nosema's effects on honey production, if we can't clearly see nosema and its consequences we remain unconvinced.

There are standard recommendations for controlling nosema disease - feeding fumagillin to suppress the active stages of *Nosema apis*, the organism responsible, and regular comb replacement or fumigation to remove the spore stages.

Drug feeding is usually recommended as follows : two doses of fumagillin in sugar syrup are fed in autumn to reduce the level

of spores in faeces deposited in the hive over winter. This is followed by two more doses in spring to suppress any nosema disease caused by faecal contamination. One dose, for a full colony, is normally 4.5 grams of Fumidil-B per 3.8 litres of 2:1 syrup. Without fumagillin treatment, nosema disease peaks in spring (September and October) and affects the brood-rearing capabilities of the colony.

Even though fumagillin is recommended for controlling nosema disease, we know that most beekeepers either don't use it, or don't follow up autumn treatments with the vital spring ones. This is partly because of the lack of field symptoms I mentioned above, but it's also due to the problems of syrup feeding. Not everyone is set up for using syrup, and it's hard to convince yourself that you need to poke litres and litres of syrup into hives that may already be bursting with honey.

A simpler and cheaper method of administering fumagillin in spring could be useful. I know that a lot of beekeepers have asked me about alternative ways of feeding the drug. Fumagillin doesn't always work when fed in pollen supplement patties, or in candy to large colonies. A recent issue of *American Bee Journal* reports two studies of applying fumagillin mixed with dry icing sugar. One experiment was carried out in British Columbia, and the other in Alberta.

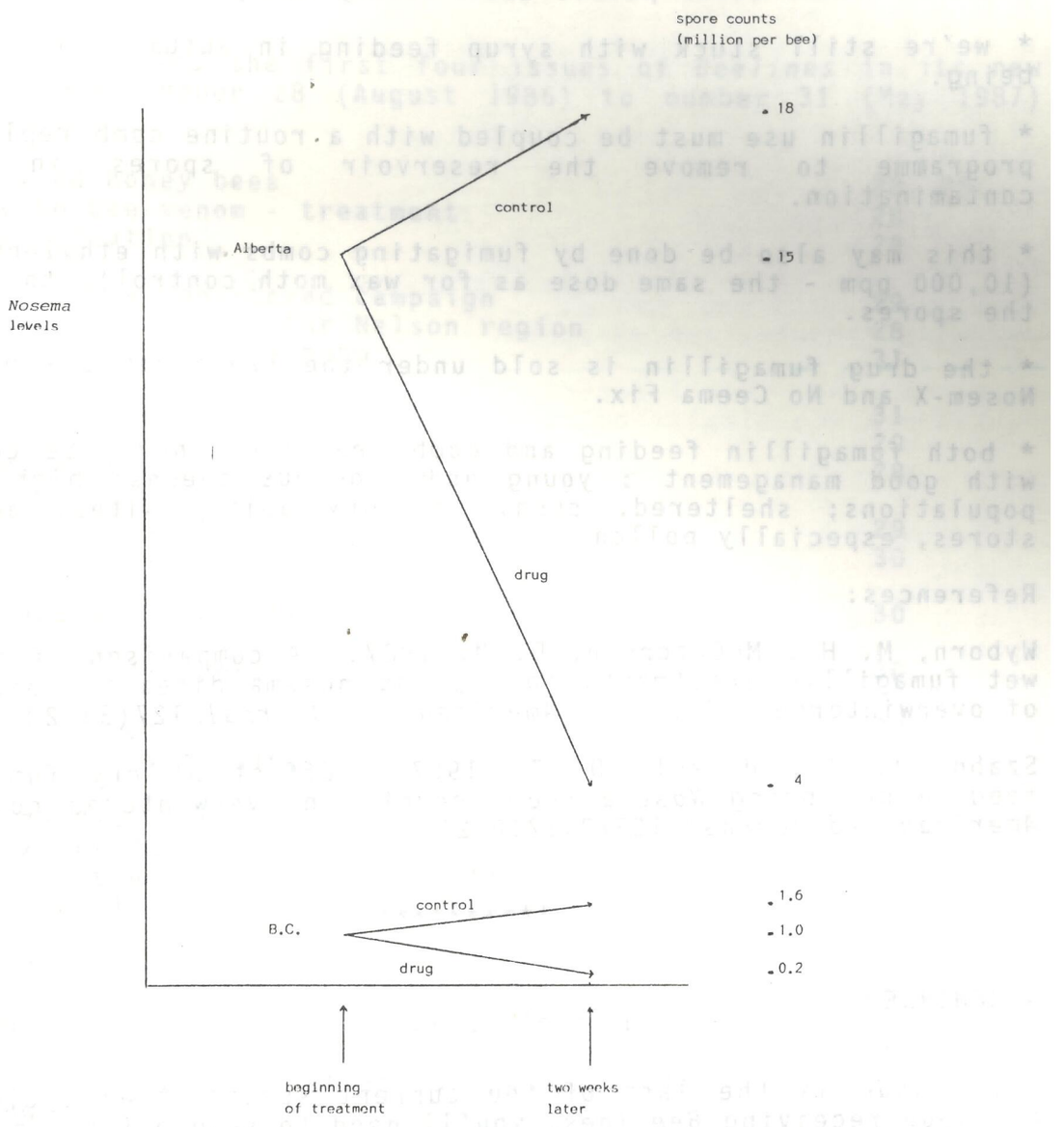
Both studies started out by feeding the standard autumn dose of 200 mg of fumagillin in sugar syrup to each colony. In spring the nosema levels were very different : less than one million spores per bee in BC, but an average of 15 million per bee in Alberta (this is why autumn feeding on its own can be a waste of time).

Then the treatments were applied : fumagillin in syrup, fumagillin in icing sugar, and no fumagillin. The diagram shows the results : both dry feeding and syrup feeding of fumagillin dramatically reduced *Nosema* levels, while the untreated colonies went through the usual spring peak.

How much fumagillin? In the BC trial three doses, each of 100 mg, were applied. The first treatment dramatically reduced *Nosema* levels, the second did little, and the third did nothing. In the Alberta experiment, which you'll remember started with the massive spore count of 15 million per bee, they used only 42 mg of fumagillin. Yet this reduced the spore level to 4 million. That's still a high level, and the authors concluded that 100 mg probably would have eliminated *Nosema*, at least to below economic levels.

How much and what sort of sugar? Both studies used ordinary icing sugar. The BC team put in 3.2 kg per hive, but only so that those colonies would receive as much sugar as the ones being fed syrup. They report that other researchers have successfully used smaller quantities - down to 50 g. The Alberta scientists administered one part Fumidil-B to five parts icing sugar, and 12

Effects of feeding fumagillin and dry sugar on *Nosema* levels



level teaspoons of this mixture gives 100 mg of fumagillin. They spooned it onto a square of paper resting on the top bars of the second brood box.

So what changes will this all mean to us in New Zealand? Remember that spring feeding of fumagillin must be coupled with autumn feeding for best results. But now we know that dry-sugar feeding of fumagillin is OK **for spring**. It will be a lot easier (and cheaper) for some beekeepers than syrup feeding. Give each hive 100 mg of fumagillin - reducing this dose may make the whole exercise a waste of time.

Remember these other points about using fumagillin:

* we're still stuck with syrup feeding in autumn for the time being.

* fumagillin use must be coupled with a routine comb replacement programme to remove the reservoir of spores in faecal contamination.

* this may also be done by fumigating combs with ethylene oxide (10,000 ppm - the same dose as for wax moth control), to destroy the spores.

* the drug fumagillin is sold under the brand names Fumidil-B, Nosem-X and No Ceema Fix.

* both fumagillin feeding and comb treatment should be combined with good management : young and vigorous queens; high autumn populations; sheltered, sunny and dry apiary sites; adequate stores, especially pollen.

References:

Wyborn, M. H.; McCutcheon, D. M. 1987. A comparison of dry and wet fumagillin treatments for spring nosema disease suppression of overwintered colonies. *American Bee Journal* 127(3):207-209.

Szabo, T. I.; Heikel, D. T. 1987. Effect of dry fumagillin feeding on spring *Nosema* spore counts in overwintered colonies. *American Bee Journal* 127(3):210-211.

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A REMINDER

This issue is the last of the current subscription cycle. To continue receiving *Beelines*, you'll need to send off the enclosed form with your money. Please do this as soon as possible, and definitely before the end of July, so we know where we stand with printing the next issue.

If you've enjoyed *Beelines*, then tell another beekeeper. They'd probably appreciate their own copy, and the more subscribers we get, the more we can keep prices down to you. If there's some parts of *Beelines* you haven't enjoyed, then tell me. I'm always keen to find out exactly what you, the reader, wants.

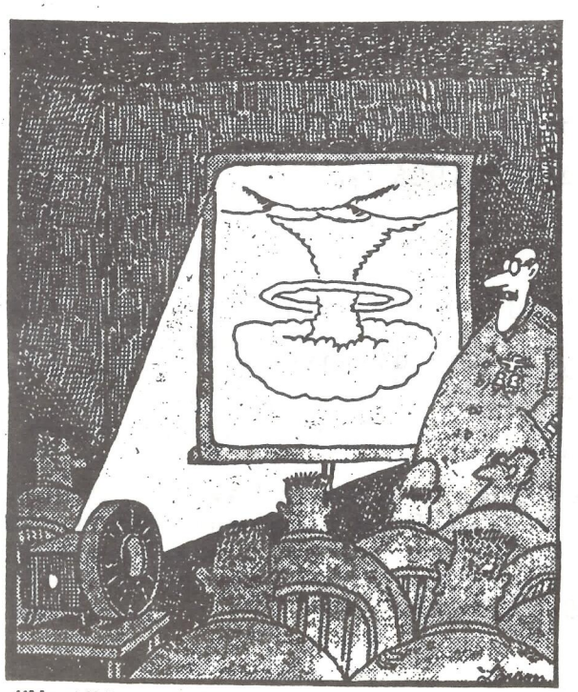
For my part, I've certainly enjoyed writing the first four editions of the new-look *Beelines*, and look forward to producing future issues.

Andrew Matheson

Andrew

INDEX FOR *BEELINES* 28-31

This index covers the first four issues of *Beelines* in its new format, from number 28 (August 1986) to number 31 (May 1987) inclusive.



"Now this next slide, gentlemen, demonstrates the awesome power of our twenty megaton ... For crying out loud! Not again!"

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