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The New Zealand BeeKeeper is published eleven times per annum; February to December. All copy should be with the Editor by the 1st day of the month of publication except for December when copy should be received by 20th November.

Notes from the Executive

I have been on the executive now for just over a year and have found that there is still a lot of unrest in the beekeeping arena, especially in PMS, marketing, running of the executive, hive versus apiary site levies, etc. I started beekeeping in 1960, when we had the seals levy and the HMA and a lot of beekeepers in those days did not like the system. They then got together and tried to come up with a fairer system for all those concerned. But to me there was still some beekeepers in certain areas who were able to escape paying levies.

I have read and listened to a lot of people talking about the hive levy versus the apiary site levy. We all had our chance to say or do something about it when the group came around each area to discuss the levy system. We all listened to what they had to say and when the time came to vote, the majority voted for the apiary levy. Then we sat down and did the sums to see what it was going to cost and didn't like the figures we came up with. Some beekeepers came up with figures they liked, a lot found that it was going to cost them more and as with most things when it starts to cost more we complain. Contrary to what most people think the executive are working hard to make sure the apiary site levy is fair to everybody. Now is the time we have to make this system work to everyone's advantage. I don't like it, but it is the system we voted for and now have.

Tony Taiaroa

Taking the sting out of bee attacks

I was taught that if stung by a bee, I should not pull the sting out by grasping it, but rather should gently scrape it off.

The idea seemed to be the more you pinched the sting, the more venom went into your flesh.

But this, modern work has shown, is yet another myth. It seems that when a honey-bee stings you, several of the bee's parts accompany the sting and the venom sac. You are also getting a large segment of the bee's abdomen, and several other small bits and pieces, and for good measure, the end of the bee's digestive tract. How a bee gets along without all these bits and pieces is not disclosed, but I presume the poor thing perishes fairly soon or else, a little unlikely perhaps, rapidly regenerates its missing parts.

The sting itself has several barbs on the prongs, and these serve, as they keep on contracting, to push the sting further and further into the flesh. It is superficially reasonable to conclude that squeezing the sting, as in pinching it to drag it out, will release even more venom into the flesh. However, recent investigations show it ain't necessarily so.

Some enterprising enthusiasts got volunteers who consented to be stung. A series of honey-bees were grabbed as they flew out of their hive, each bee being grasped by its wings and pressed against the volunteer's forearm.

Various manoeuvres on the volunteers, like pinching or squeezing or scraping the sting, were carried out, the size of the weal on the skin was measured, recorded and analysed.

And of course it turns out that there is not much difference between scraping and pushing and heaving as judged by the size of the weals. So if you do get a bee sting, get the sting out as fast as possible.

It is also useful to know if you are attacked by a swarm of bees, scarper as fast as you can. I would have thought that unnecessary advice. I certainly cannot see myself standing around saying "stuff off bees" or whatever impolite equivalent you might select. One reason for scarpering is that a substance called an alarm pheromone is released from the loss of the bee's sting, and this attracts other bees to the site.

Therefore, if stung, pull out the sting and buzz off rapidly if there are other bees around.

Acknowledgement,
The Evening Post

Library News

From Ag.Research

Clover Root weevil - a threat to New Zealand pastoral farming industry. 1997, 13pp, New Zealand.

Information about another introduced pest which somehow got past the border security service. It being a serious threat for pasture, attacking clover, implies that this will also mean a setback for beekeeping which to a large extent depends on white clover.

Front cover...
Nectar being transferred as part of the honey-making process.

Otago, Southland Branch Combined Field Day

Date: Saturday 14 February 1998

Venue: Telford Rural Polytechnic, Balclutha.

Watch this space for a full programme of events, when they become available.

The New Zealand **BeeKeeper**

THIS ISSUE

Letters to the Editor

Dear Sir

The net cost of producing *The NZ BeeKeeper* magazine has risen dramatically in the last two years.

The NZ BeeKeeper magazine will always be 'subsidised' to some degree by the organisation. We do not expect our magazine to run at break-even or profit because of the relatively small numbers of members involved.

Some costs are directly associated with the production and distribution of the magazine, such as production, printing and distribution (including postage). The one direct source of income is advertising. The difference between the income and expenditure is the amount of 'subsidy'. A fairer description would be that this is the net cost to the NBA.

The net cost is what should concern the NBA Executive and our membership. Rather than arguing about how much of the NBA's income should be credited to the magazine, dealing with the net figures allows the NBA to compare costs over the years.

The graph provided tells a clear story of the increased net cost to the NBA for the magazine.

The figures for pre-1994 included the editorial costs. For 1994 to 1997, that cost is part of the administrative service contract. If it were included, the increased net cost to the NBA would be even greater than the graph indicates.

For 1997 production and distribution costs have risen with the increase in membership. This increase, however, is 'marginal'. That is, the cost of writing and obtaining articles, typesetting and the costs of obtaining the advertising have all remained the same. The unit cost of production for each copy goes down the more copies are printed.

A frightening aspect of the magazine has been budget expectation to financial outcome. In 1996, the budget for magazine gross expenditure was set at $32,500. The actual amount turned out to be $55,141 - 70% over budget! If any other aspect of the NBA's operations been so clearly outside of budgetary authority it would have resulted in serious criticism, and rightly so. Why should the magazine be treated differently when it comes to financial accountability?

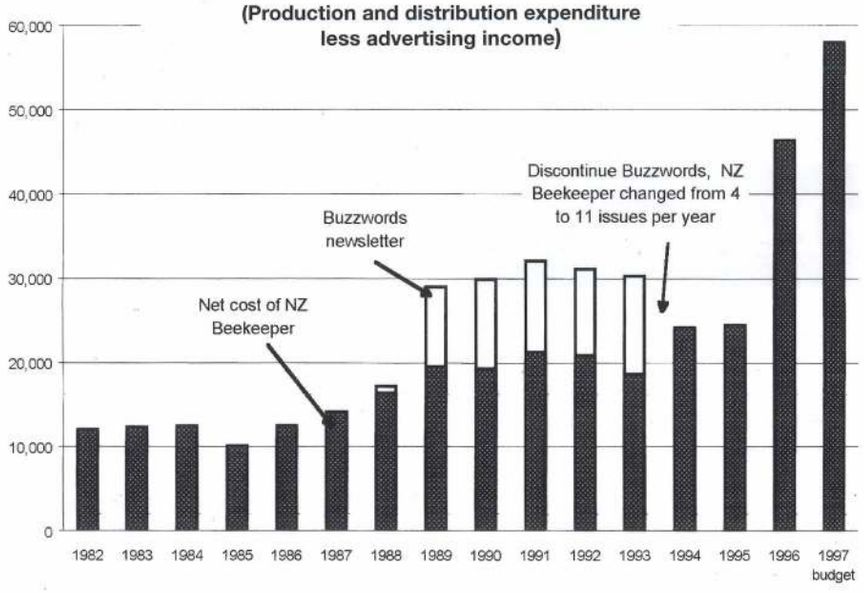
Before the criticism comes from others, allow me - *I was President for that financial year!* I still feel bad about that outcome, perhaps worse than others on the Executive who should feel more directly accountable and responsible. Instead, beekeepers are told that the 'quality' of the journal made it all acceptable!

We do have much to be proud of with our magazine. The Editor is to be congratulated on being able to produce the magazine monthly, when the quantity of NZ Beekeeper-sourced material (as opposed to reprints or various sorts) is so small. I do not believe, however, that we can continue to afford the magazine with the cost structure, size and frequency of printing as it currently is.

Yours faithfully

Nick Wallingford,
Ordinary Member of the NBA

Net Cost of *NZ BeeKeeper* Magazine



Dear Sir

Following the generous international acceptance of my first book *The Immigrant Bees 1788 to 1898 (A Cyclopaedia on the Introduction of European Honey-bees into Australia and New Zealand)* in 1995, I am pleased to announce the forthcoming publication of my second book, *William Charles Cotton, Grand Bee Master of New Zealand, 1842 to 1847.* This work covers the story of Cotton's beekeeping activities in New Zealand.

Acclaimed for his 1842 work *My Bee Book*, Cotton added to his contributions to British beekeeping throughout his residence of six years in the North Island of New Zealand. His colonial beekeeping activities, shared with settler and Maori alike, are revealed in all their fascination. Through his written word while in New Zealand, Cotton provided the key to the mystery of whether or not he achieved his aim to ship bees from England in 1842.

This work was inspired by the fascinating contents of his eleven priceless journals held within the Dixson Collection, State Library of New South Wales, Sydney. I've spent many intensive hours deciphering his handwriting within the journals which were compiled between 1841 and 1848. As each volume was completed, Cotton sent it back to England in order to keep his family informed of his activities. His tales will generate much reading pleasure for both the beekeeper and lover of history. Relevant illustrations from the journals significantly enhance the text.

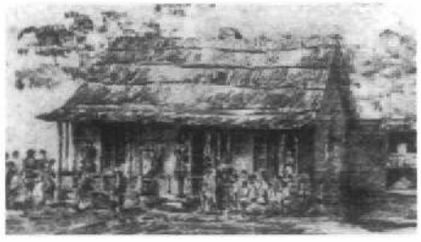
William enjoyed a bathe in the sea, rowing, sailing, walking, horse riding and always took delight in his favourites, the bees. He taught both white settlers and Maoris to adopt the gentle craft of beekeeping. He utilised many styles of hives, was a keen observer and experimenter and was not without a sense of humour. Amidst the joy of his beekeeping his life was touched with periods of tragedy. Dubbed the 'Grand Bee Master of New Zealand' in 1845 by Mrs Henry Williams of Pahia, Bay of Islands, his winged friends sometimes had the better of him **"they were swarming again. We all followed them, Mr Davis, Mr C Davies, Hutton, WM Watts and myself over all the Bishop's paddocks, over which they coursed just like a pack of beagles. They then lead us thro' a knee deep swamp, and all of a sudden, mounted in the air, and we saw no more of them".**

Share the exuberant experiences of a man on a mission, one aim being to spread his knowledge of beekeeping. His

Letters to the Editor

New Zealand beekeeping adventures have never before been revealed so fully as depicted in this book. Find a comfortable spot and enjoy a most pleasant journey back to the 1840's.

The book will be A5 size, softcover (sea blue) 'perfect bound', 150 pages, 40 thousand words, containing 34 illustrations (15 from his journals, 10 from *My Bee Book* and 9 supporting) with table of contents, detailed index and bibliography. Included is a translation of his Maori beekeeping work *Nga Pi (The Bees)* and fourteen thousand words taken from his New Zealand journals and letters.



Cotton's house and attached apiary, Auckland, 1845

Chapters include:

Some Biographical Background
His Plan to Bring Honey-bees to New Zealand
Plymouth to Sydney
A beekeeper with bees, 1842
Culture Shock
James Busby and three hives of bees, 1843
The Bishop and the Baron
A Beekeeper with Bees, 1844
Unanswered Questions and Other Peoples' Bees
Auckland, 1844
A Love and a Disability
'The Great Cotton' octagonal hive
Bee Matters amidst the Maori Wars, 1845
The Maoris, New Zealand's first commercial beekeepers
The Commonwealth of Bees
Auckland and Wellington, 1846
Farewells and a Legacy
Obituaries
Nga Pi (The Bees)

As a potential New Zealand customer, I offer you the special price of $AUD37.00 including Airmail. Australian and international prices will be in excess of this figure. Cheques or money orders should be made payable to "Peter Barrett". A handsome hand crafted cloth bound edition is available for an additional $28.00, again a special price for New Zealanders.

Subscribers who pay by 15 November 1997 will have their name and supplied details (e.g. city and/or affiliated association) published in the Subscribers List. the first 100 copies will be numbered and signed by the author. This remarkable book will be available for delivery mid December 1997, the 150th anniversary of Cotton's departure from New Zealand. This edition is sure to become a sought after collectors' item.

Yours faithfully Peter Barrett

Dear Sir

On behalf of the International Biotherapy Society, I am pleased to invite you to the Third International Conference on Biotherapy. The Conference will be held in Jerusalem, on May 24-27, 1998, at the Conference Center of Ma'ale Hachamisha.

The first two international conferences held on Porthcawl, South Wales, UK in 1995 and 1996 under the name First and Second World Conference on Biosurgery, were extremely successful, and we plan to continue the tradition established there for the exchange of information and ideas pertaining to the treatment of human diseases using living invertebrates such as fly maggots, leeches and bees.

The programme will highlight the most recent and exciting developments in the fields of biotherapy. The main subjects of the Conference will be the use of:

- Fly maggots for the treatment of wounds, i.e. in diabetic feet and pressure ulcers.
- Medicinal leeches for plastic surgery and peripheral venous and arterial diseases.
- Bee venom therapy for chronic diseases such as arthritis, rheumatism and multiple sclerosis.

The clinical aspects of treatment with these organisms, as well as the scientific aspects of the healing effects will be discussed. The Conference will consist of oral and poster presentations.

We are expecting physicians and scientists, including experts in dermatology, plastic surgery, diabetes, orthopaedics, geriatrics and medical entomology from all over the world.

Enclosed is a copy of the first announcement of this Conference and we would be pleased if you could advertise it in your newsletters.

Yours sincerely

Dr Kosta Y. Mumcuoglu, President, Department of Parasitology, Israel

Dear Sir

Queen Rearing and Royal Jelly Systems

Further to Murry Reid's comments in the last *NZ BeeKeeper* journal we are delighted to respond as follows:

Apian Technology have a 20 year marketing agreement for these units internationally from Royal Jelly New Zealand Ltd.

The New Zealand Distributor is Ceracell Products Ltd of East Tamaki, Auckland: phone (09) 274-7236.

Because of overseas demand we have developed a 'Hobbyist kit; that allows the beekeeper with a few hives to make their own Royal Jelly or rear their own queens from the one package.

Any queries may be directed to: Apian Technology Ltd, phone (09) 416-6171 or Fax: (09) 416-7173.

Noel Johnson, Manager

Dear Sir

When reading through my notes for Beginners and Others as they appear in the latest *NZ BeeKeeper* (Oct 1997) I really did get somewhat upset. I always endeavour to spell out the material of this column in such a manner that it is clear and simple the way it should be for the Beginner Beekeeper. And of course make sure that whatever is quoted is factual and accurate.

Now once again part of my article is mucked up and makes no sense whatsoever. This is not a very good thought when the journal is read by a goodly number of knowing apiarists here as well as overseas.

I certainly will appreciate a correction in the November issue and a statement that the error was not made by the author of the article.

As it has been printed 21st line from the top of page 7:

"Also the bees from the stronger colony will produce more brood per bee than is the case in larger colonies etc. etc" (that is just plain rot).

Then six lines down printed is "the brood next to the top etc"

Reading from what I submitted, the way it should be:

"Also the bees from the stronger colony will produce more honey per bee during a flow and moreover consumes less during a dearth.

However smaller colonies will produce more brood per bee than is the case in larger colonies. This can often be observed when comparing the wintered over nuc (top) with its parent colony. The brood nest of the top seems to expand at a faster rate than the one below, it is catching up."

Second line in, 2nd column the word attitude should be latitude.

You also omitted at the end to note ref: Bee World Vol. 78 No.1; Breeding the H.B. by Broth. Adam; *NZ BeeKeeper* Vol. 28 No.1

Sincere apologies John. This certainly wasn't your error. Ed

Letters to the Editor

Dear Sir

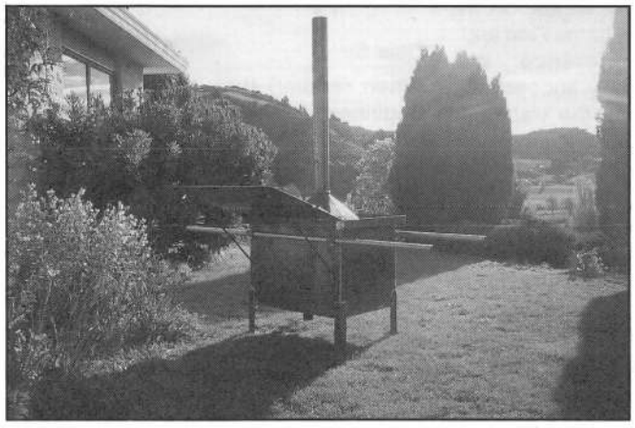
I rang previously concerning the waxing baths that I make up in my spare time. As these baths work well, I would like to advertise in *The NZ BeeKeeper* magazine and forward these photos as they may be of some use for photo advertisements. The chimly stock is too long in the photo as it only needs to be 400mm long instead of 1000mm, but this has been corrected.

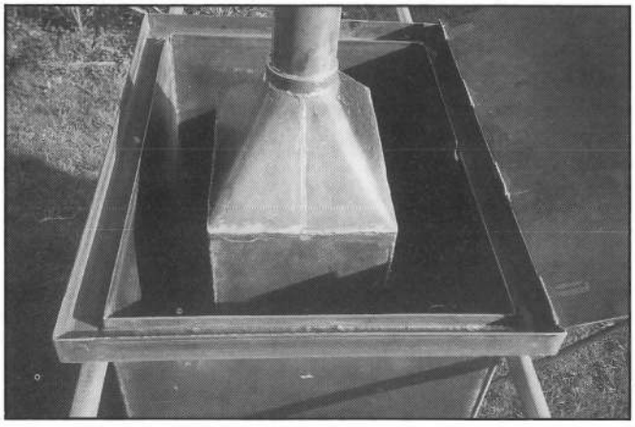
These photos show handles which are optional and some have a drain plug or valve for draining the tank which is also optional. As these are approved by MAF regulations I stay with the measurements, but any alterations or new ideas would be accepted.

I do not have any in stock but make these to order as required. Assuming material prices stay the same the price works out to be $1355.75.

Regards

R C Hunter, Nelson





Diary Now!! 1998 Conference

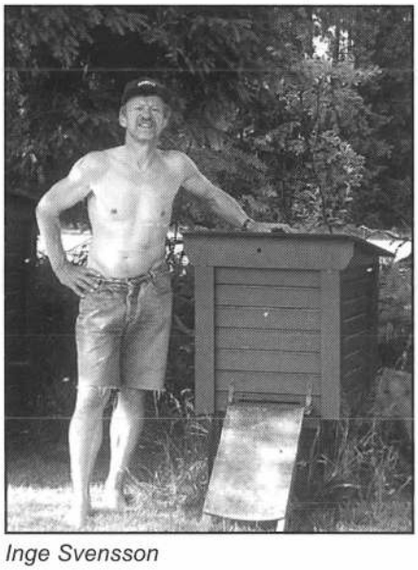
1998 NBA Conference is being Hosted by the Far North and Northland Branches. It will be held at the "Quality Resort", Waitangi (Bay of Islands).

Dates:
Specialties meetings, Monday 20th and Tuesday 21st, Conference Wednesday 22nd and Thursday 23rd of July.

Hotel Phone number:
(09) 402-7411
Fax: (09) 402-8200.

Branch contact details on the inside the front cover of the magazine.

To *The New Zealand BeeKeeper*



Inge Svensson

Hello. I'm a sixty-one year old beekeeper from Sweden who wishes to come in contact with other beekeepers in New Zealand. I have over 30 years of experience in beekeeping and even as a teenager I was active within beekeeping.

The photo portrays me next to my first hive which I bought, second-hand being fourteen years old.

Please, I would be very grateful if the magazine could help me to find some interesting beekeepers in New Zealand who are interested in having a pen-pal in Sweden. I'm most interested in learning about your fauna of, for instance, flowers and your different breeds of bees.

My address is as follows:

Inge Svensson
Skogslund, Galtas
568 92 Skillingaryd
Sweden.

Dear Sir

I am an amateur beekeeper in South Africa and have the intention of immigrating to New Zealand.

I would like to be able to correspond with beekeepers, or any other interested parties, to find out about the beekeeping trade and employment opportunities in the beekeeping industry, or any other employment opportunities.

I have 200 hives which I have been operating on a part-time basis for the last three years, while working for a agricultural pump company.

If anybody would like to communicate with me please contact me at the address below.

Regards

Mr Craig Campbell
PO Box 488
Hilton, 3245
South Africa.

DECEMBER ADVERTISING IS NEEDED BY THE 20TH OF NOVEMBER PLEASE RUSH IT IN NOW.

Notes for beginners and others

John Heinman

I was disappointed when reading the Beginner's column in last month's *BeeKeeper*. Some errors had sneaked in between the article leaving my typewriter and its printing. As a result of that some part of it made no sense and must have confused readers. Please take note of the corrections I have requested the Editor to make in this issue.

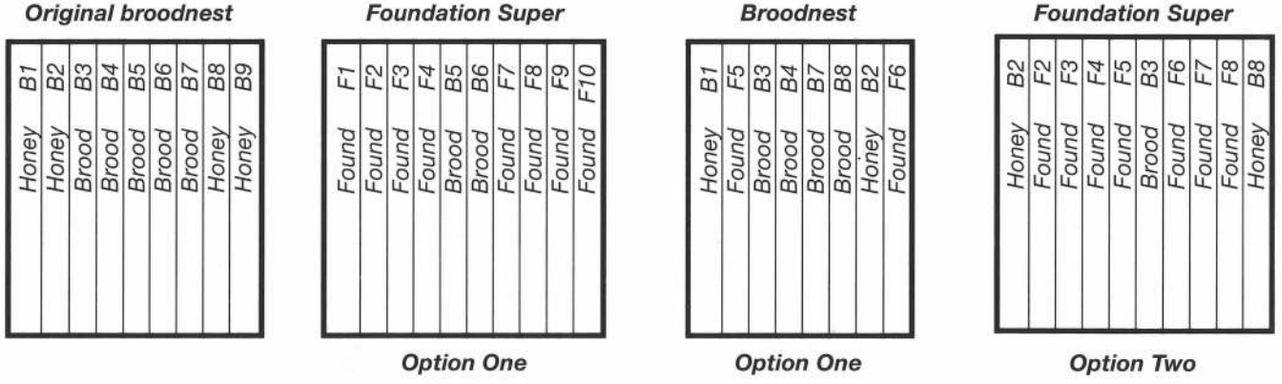
And now we are into the second half of November, the moment of truth is getting close or has already arrived. Are we going to have a good honey flow this year, will the weather be favourable and are the colonies in the right condition to take full advantage? A great deal is beyond our control but if luck is with us as far as that goes then the beekeeper's good management during the spring months will now pay dividends.

As long as not enough nectar is gathered to sustain the colonies watch the stores, honey as well as pollen. As said before too many colonies fall by the wayside each year at the last minute through starvation. What a waste that is when one sums up what has been spent on feeding and labour plus now the loss of a potential crop.

Only strong qualities will bring a return. If need be unite, don't hesitate if you aim for some surplus honey as a reward for your endeavours.

Even if no nectar is gathered at this stage hives may start to grow out of their pants, extra space must be provided so that the colonies do not become congested. If that happens it may well lead to swarming. Give them that extra super.

Many a beginner beekeeper or those making increase in hive numbers have to work with supers fill with foundation as drawn combs are at a premium. The bees are frequently reluctant to enter and work a super containing comb foundation only. They can be coaxed along by giving them some bait combs. Lift a few combs, two or three, containing honey and/or brood and place these into the centre of the extra super or into the centre and sides. Replace these combs from the brood nest with the frames holding foundation. Place them to the sides of the broodnest but not next to the outsides of the brood box. So if the brood box holds nine combs, the numbers two and perhaps three and number eight will be foundation. It will be best to keep ten frames in the extracting super as all the foundation has to be built out, wider spacing will result in the building of bridging comb.



Be careful not to bring up the queen when raising brood combs, especially not when an excluder is in use. Just shake the bees off the combs first.

The same procedure can be followed when working with drawn comb.

Sometimes double supering is practiced, that is two extracting supers are given at once. Maybe one goes on holiday, is pressed for time or there is a real bonzer of a flow. Then do not raise brood into the very top super. It could be just far enough away from the broodnest and the queen to give the bees in that top super ideas about putting on some queen cells. It is also not a good practice to put foundation in amongst brood and so split up the broodnest.

When the bees build out a super with foundation they work from the centre to the sides. At times, especially during a light flow or towards the end of the season they are often reluctant to finish the outside combs. It helps to move these towards the centre, exchanging for finished ones.

During a good steady flow a strong colony will build out foundation and fill a box in an amazing short time but if there is a dearth they will just look at it and even start gnawing holes in the foundation.

It is also swarming time. Notwithstanding the best kind of husbandry a swarm may still issue or one may arrive at your place from elsewhere. It pays to have a decoy hive in your apiary. Preferably a super with some combs. If not available any old box will do, but make it attractive by fastening in an odd piece of comb or plaster a little molten beeswax on the inside. And of course there must be an entrance. If a swarm enters this temporary home it will be okay for a few days till you are ready to transfer it into a permanent dwelling (hive). Feeding it would not be needed for a few days for a swarm carries a supply of food, full stomachs before they take off.

Usually it is pretty simple to hive a swarm. Dump the cluster into a super with some dry combs, to be filled with the correct number after the bees settle down. Or shake them down in front of their new home and watch them walking in.

However on the odd occasion a swarm can be very reluctant to claim their new home, they cluster in front on the ground or hang on the outside of the box. Next morning they may still be outside. Reason? Perhaps the queen has been lost. People have tried to coax them along by putting a comb with some honey in the box. Still no good. What will do the trick is a comb with brood. I just about guarantee that that will solve the problem.

DECEMBER ADVERTISING IS NEEDED BY THE 20TH OF NOVEMBER PLEASE RUSH IT IN NOW.

A very successful Southern North Island Field Day

by Bruce Bycroft

More than 80 beekeepers gathered at (invaded?) Kevin and Marjorie Kibby's Waireka Honey Centre north of Himatangi for the Southern North Island Branch Field Day on 27 September. The weather was fine and warm enough to be outside all day for hive inspections and plenty of other activities. The high hobbyist turnout was most encouraging.

Branch President Peter Ferris welcomed everyone before James Driscoll discussed American Foulbrood and how to identify it. He also had some infected frames courtesy of Frank Lindsay (not from his hives of course), so that those who had not seen it before could have some "hands on". James made the point that AFB is a 'beekeeper's disease', in that it is spread largely by hives not being inspected regularly and then swapping wet supers between hives.

Several commercial beekeepers showed groups some hives courtesy of Merv Farrington and covered spring check topics such as disease inspection, looking for the queen, requeening, checking pollen and nectar supplies and cleaning burr comb propolis off hive gear. A couple of hives with pollen traps, belonging to Alan Richards, initiated discussion on the merits or otherwise of collecting pollen.

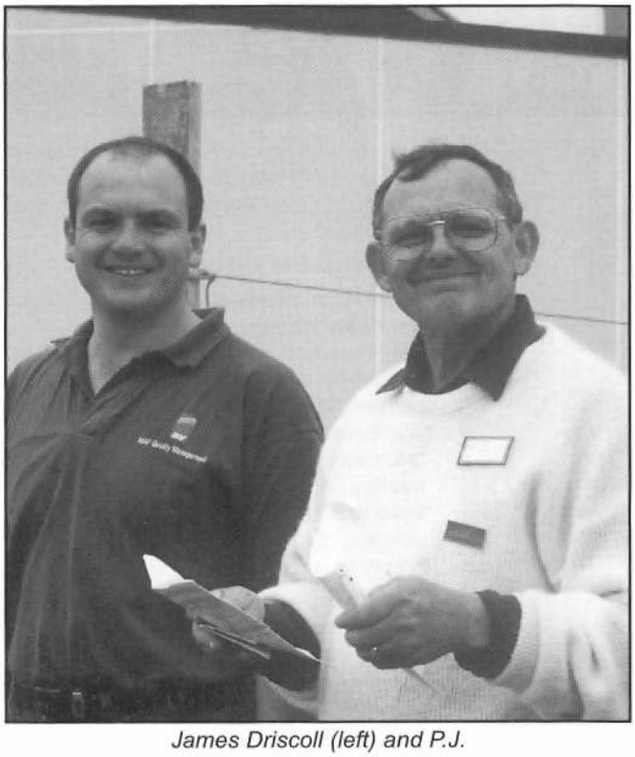
Teams of up to five beekeepers from each of Taranaki, Wellington, Wairarapa, Wanganui, and the Manawatu took part in the first leg of a competition which is to continue through the season. Teams were required to: clean up a box of frames, mark two 'queens' (actually Robin McCammon's high quality drones) and light a smoker, all in five minutes. Points were:

Wairarapa	17
Wellington	14
Wanganui	13
Taranaki	11
Manawatu	11

Bruce Bycroft preparing to write this article

James Ward explaining what he requires for live bee export

Some of the visitors



James Driscoll (left) and P.J.

Smoker lighting competition

Merv Farrington talking about what you need to do for spring

After lunch (which included a sausage sizzle), Leo Austin from Austin Associates, Lower Hutt, spoke about opportunities for funding small businesses into export, using hard business networks. He believes that small businesses can collaborate for mutual benefit, without losing their individual identity. The concept is supported by Tradenz and the Business Development Board. Leo spoke to a number of beekeepers later in the day, presumably about export opportunities.

Shaking bees for export was covered by James Ward from Kintail Honey, Dannevirke. The two markets are Korea and Canada, with the majority going to Canada. Bee quality is important. Packages sent must include young bees and no drones. Importation requirements are less stringent for Canada, as they are required later in our autumn and there will be less brood in the remaining hive to take it through winter. Shaken bees must have plenty of ventilation and must be kept cool. Prices are around $13/kg. A display of photographs of the process of shaking bees, getting them into export packages and onto the plane was supplied by Mary-Ann Thomasen.

Many thanks to Kevin and Marjorie for inviting the branch to hold this successful field day at their premises. A special thanks to the field day sub-committee for all their hard work in organising such a varied programme. Thanks also to the Manawatu Beekeeper's Club for their input and to speakers who took the time to share their knowledge with the branch members.

Special thanks to Frank Lindsay for the photos.

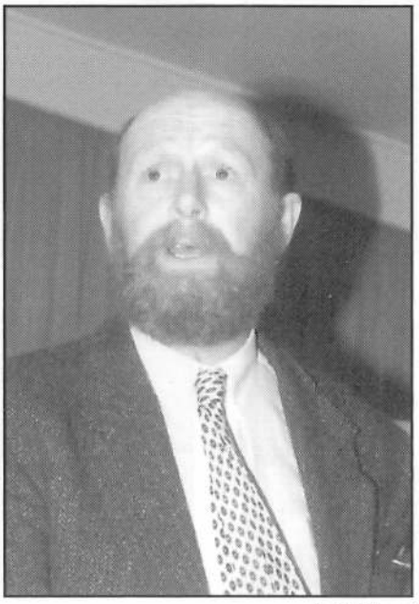
Marketing

- ***Marlborough's "McKenzie Country" on film***
- ***American beekeepers find their own 'manuka' honey.***
- ***Manuka standards***
- ***Being successful doesn't make a blind bit of difference***
- ***1997/98 crop forecasts***
- ***Innovation Award profiles***
- ***Honey Research Unit Report on various New Zealand honeys***
- ***And my favourite honey(s) this month***

• Marlborough's "McKenzie Country" on film

We often take this beautiful country for granted.... and it's often only when you see a film-makers presentation of it that you're reminded of just how lucky we are.

John Moffit is a film-maker ... he's also a Nelson beekeeper... and so a logical choice for Marlborough comb honey exporter Rod McKenzie who wanted a video for his export customers. The resulting film is very, very good! Incredible scenery .... the incomparable Marlborough of course ... coupled with subtle, golden, delightful cameos of



Bill Floyd

honey-bees and comb honey and our very professional but friendly beekeepers (the McKenzies).

Quite delightful to watch. A pity that some honeybrands don't create the same sort of promotional resource for supermarket point-of-sale presentations: why do most brands only seem to think in terms of price when they think of brand promotion!

Good one Rod and John!

• American beekeepers find their own 'manuka' honey

The concept of nutraceutical honeys achieved its present international credibility through Peter Molan's work at Waikato's Honey Research Unit. "Nutraceuticals" are foods that make you healthy , as opposed to most foods that keep you healthy. Another word gaining usage is "pharmafoods" .... another play on pharmaceutical.

And New Zealand Manuka is arguably the international honey icon for hive-based pharmafoods. The success of manuka has spurred many other countries to look into their own honey varieties .. and the Americans have now 'discovered' soybean honey. This honey has been found to be high in natural flavanoids and caratenoids... making it a potentially important antioxidant.

But the big problem facing soybean honey producers is:"standards!" A Discussion paper on the issue, from America, says how not all soybean

honeys are created equal ... and setting definitions and standards will be important. It goes on to say how the NZ industry is having similar problems with manuka honey. Which, you'll agree, is a very clever way of introducing the next para....

• Manuka standards

Good to see that the newly created HoneyJag is to look at developing standards for export honeys. As the Marketing Committee of the NBA we've reached a 'bit of an' impasse on some of the critical issues. It may be that a more focused group, separate from the mainstream of the industry, will be a better 'entity' to create and drive the Standards concept.

And as the Standards will then have been created by the actual users of them (the packers and the brands) they will be more readily taken on board and become the norm. As producers we need Standards; but we don't need to drive the definitions of those (or fund them) if another group can do so and we're confident they will meet our market objectives in terms of consumer confidence.

Will keep you informed.

• Being successful doesn't make a blind bit of difference

I hope that heading came out as lighthearted as I intended! Wasn't that compelling TV last month with Bryce Hooten's interview on TV...along with hundreds of thousands of other viewers I cringed as Bryce ran his fingers in and around clustered honey-bees (I'm sure we all sat anticipating the stings) and admired his tenacity and achievements. Great publicity for the beekeeping industry and for the Hooten's brand: would be interesting to see your sales chart after that. Congratulations on your Award Bryce!

• 1997/98 crop forecasts

I've predicted low crops and the opportunity for rising prices. I see others have suggested that won't be the case at all (I think I'm the one that's being referred to by the pessimists as an 'industry spokesperson"). My comments are made in good faith .... you producers have to decide.

I'd certainly suggest you took MAF's advice from last month's *BeeKeeper*. Definitely an article worth reading twice!

• Innovation Award profiles

Our last two profiles will be in next month's *BeeKeeper*.

• Honey Research Unit Report on various New Zealand honeys

We've reproduced Peter Molan's latest research findings in this month's *BeeKeeper*. Heavy reading for the non-academic .... but persevere .... the results are simply excellent for some honey types that haven't had much publicity to date. (Wish I produced Penny Royal, rewarewa or Honeydew ... there's the potential for some manuka-type successes for those honey types on the horizon!)

• And my favourite honey(s) this month

Mary Anne and Frank Lindsay sent the Advisory Service a complete selection of honeys for our sampling regimen. I was very impressed with the supporting information.. and their obvious knowledge about their honey crops. But even more impressed with their creaming techniques! I know that honey consistency is a very personal thing ... but I like my liquid to really flow and my creamed honeys to stay still: not keen on a creamed that stills flows around the knife.

(MP and Parliamentary Speaker Doug Kidd did a honey tasting with me once ...he's a devout honey consumer....and Doug commented that his pet hate was eating breakfast on the move ... always honey'd toast... but having the honey slide off onto the carpet.... I gave Doug some good firm honeys ... he's still enjoying them.)

But back to the Lindsays! Their creamed honeys are soft and gentle... but not runny! Superb texture....creamed but not oily! And now to the flavours. I've singled out three honeys from the group sent.Pashire and Gum: got that kamahi type butteriness that I really enjoy...not a sweet honey...rounded flavours... and 25% gum but that gum presence is pleasant (certainly not harshly intrusive like some aus honeys). ...Pashire... that got me reaching for a manual. Clover and Catsear ... didn't enjoy as much.... the Catsear has a sharper, slightly acrid flavour for me...still a nice buttery mouthfeel though. And my favourite: Clover/Blackberry....absolutely delicious... with the Blackberry adding a spritzy zing to the flavour and that berry-nice aftertaste. A most enjoyable mini-sampling ... who said blends had to be boring.

And that's all for this month "may the flow be with you" (sorry Luke Skywalker)

Regards

Bill Floyd, Marketing Committee

A Voyeur in the park

As you might have guessed from the title this column is about that second most common subject of conversation SEX. If you're not sure of the most common subject of conversation, just ask any beekeeper's spouse, they'll soon tell you.

"Silently, silently, whisper who dares,
The weather forecast's on and he is saying his prayers,
He listens religiously, at each break of day,
Then completely ignores it and goes on his way."

Who put that poem in there? I suspect the beekeeper's spouse, come typist, who is somewhat inclined towards sarcasm. Anyway to get back to the subject of sex, no doubt most of you know that a virgin queen takes off on her mating flight/flights and mates on the wing of a number of drones, the exact number of which I'm unsure of, but years ago they used to think it was two or three and now it seems to be 10 or more, so perhaps our more promiscuous lifestyle is affecting the bee's behaviour, although I suppose there is always the slight chance that it's simply more sophisticated research techniques.

This spring however the virgins have gone out and mated in cold wet windy miserable conditions, the only conditions available - in the whole of September we only had one really nice day. I doubt if we got better than 10% of our queens successfully mated in the hives that we divided, or put brood into, or accidentally killed the queen in, so I am very thankful that we did our requeening in the autumn. But all miserable things must come to an end eventually and October while not perfect has been far superior weather wise than September and yesterday I took the day off to relax and recover from working too many days getting hives ready for apple pollination and too many nights spent shifting them into the orchards. For lunch we went with some friends, along with our children and their children for a picnic in a local part. The park is basically a grassy gully with a few trees that run up a couple of hundred metres with houses on either side. As we walked down into the gully I noticed immediately the number of bees in it and thought someone must have a hive down there or a swarm and you could hear them humming very loudly like you can when there's a gum tree in flower just crawling with bees, but there was no hive no swarm and no tree full of bees. Then all of a sudden about five metres off the ground a knot of bees flew past fast in close formation, they were very close together, flying in a ball, I only saw them for a few seconds but they looked too big to be ordinary bees. I may be wrong but I'm convinced in my own mind about what I saw and that was a mating flight with a bunch of drones chasing a virgin, something that I've never seen before in 25 years of commercial beekeeping. Just goes to show doesn't it, take your kids to the park and get exposed to a flagrant display of public sex, in the middle of the day no less - must take the kids to the park more often.

Peter Berry

Anton, our new colleague

Anton has finally arrived at our company's branch in Kaiserslautern. After being sped up by the particle accelerators at CERN/Geneva and then having his software shot up into orbit by Space Shuttle/Spacelab he thudded down at Kaiserslautern, directly into our company.

Now he is fighting with his computer, trying to get the settings right.

By the way: For four years now he has also been a beekeeper (meaning the really tiny ones with 6 legs, not the ones with two long ones) in his spare time. One frequently asked question is "Why do beekeepers apply smoke to bees?".

Anton told us:

To be not too scientific: For millions of years the main danger to bee colonies has been bears. They not only take the honey, they also destroy the honeycomb and the brood more or less completely. For this reason, bees attack a bear by any means.

So far, so good. But we beekeepers are not bears, and we have to tell them that. So how can the bees distinguish between a bear and us? Some beekeepers (shape, belly, how they walk, monologue murmur) look somewhat like a bear So we have to tell them, that we are not a bear, but how? Just talking does not work I tried it myself.

One needs another form of communication. Maybe we can learn from the red indians: use smoke signals to tell them, that we are not a bear; or have you ever seen a bear giving smoke signals? You can tell your kids this when they under age of three or two. And if you give smoke signals to the bees, they understand you and they don't attack you.

But how and why does it work? I don't know. Maybe you have an explanation? I still think that, from the bee's "worm's-eye view" it must look like a smoke screen. Therefore, taking honey from bees is a bit like a honey bank robbery.

Anton, the honey robber, is now working in Kaiserslautern. Anyway, sweet girls like to taste Anton's bees' sweet honey. And they get it!

Welcome, you honey robber.

Honey Fusion

Crystallised honey must be liquefied in order to be sold and/or stirred to cream honey prior to retailing. Liquifying can be done only by applying heat. Most beekeepers have their specific way to do this, here is mine.

Since honey contains valuable enzymes and enzymes are proteins it must not be heated above 42 deg C so temperature control is a prerequisite.

As the heat source for this I use a so-called freeze guard which has an adjustable temperature range from 5 to 40 C as well as a thermostat.

The honey container is put on top of three bricks, and the heater is placed between the bricks.

The heat compartment comprises boards of Styropor(TM)/Styrofoam(TM)/ polystyrene which are held in place by adhesive tape. After usage this can be dismantled and stored somewhere for the next time or taken for other usage.

To check the temperature, a thermometer with a remote temperature sensor and a digital display is used.

This composite with heater manufacturer's must be observed.

This honey heater is a minimal solution for part-time beekeepers, as are the majority here in Europe, including myself.

This proposal is not new, but deadly cheap. For an economical beekeeper like myself, everything must work perfectly, and should cost (almost) nothing.

As one can see from fig. 1, the plastic bag needs to be partly cut out at one side to create an evaporation area. For the plastic bag I used something like a deep freeze bag from the kitchen. For the reservoir for the formic acid (FA) a flat sponge (from the kitchen sink) is used. If the sponge is too large for the bag, it needs to be cut back somewhat. The sponge should have some extra space in the bag.

During transport the still dry sponge remains in the bag (fig. 2).

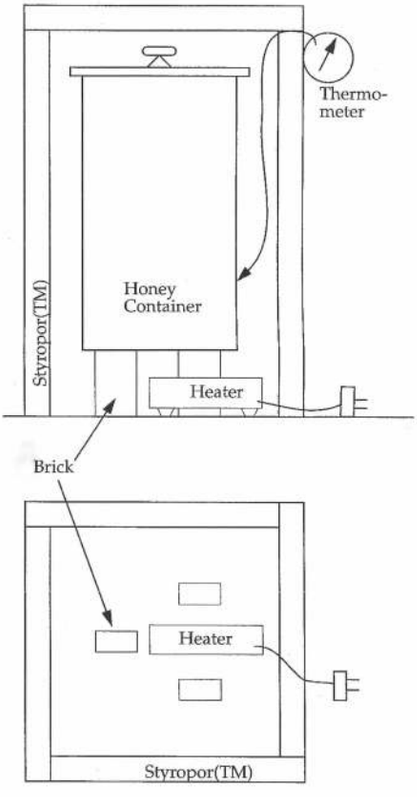
Once on site, moisten the sponge (fig. 3) with plain water. This prevents a shock of evaporated acid in the air at the start of application. This was a contribution from the bee's girl friend named Evmarie.

After having positioned the sponge, the required amount of FA can be poured behind the sponge (have a quick one) (fig. 4). This also helps to prevent a shock at the beginning.

Here all rules and regulations for the handling of acids apply, as specified by the acid manufacturer: goggles, gloves, water canister. The dealer will explain it to you. And you ask me whether I follow these rules strictly? Don't ask!

Honey Heater

(Flat bed)

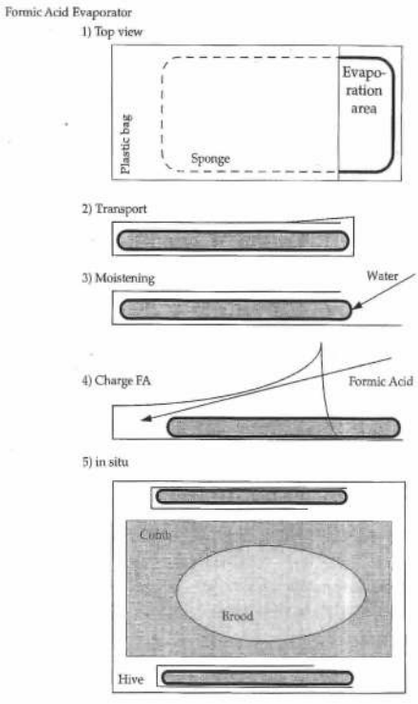


Formic Acid Evaporator

(in Plastic Bag)

The amount of FA can be arbitrarily adjusted within certain ranges. How much is needed depends on the specific requirements on site. Some experimenting can help you judge this.

The evaporation rate can also be adjusted via the adjustable surface of the evaporation area (fig 1).



The evaporation rate depends not only on the exposed evaporation surface, but also on the hive's volume, the number of bees in the hive, and the internal temperature and humidity.

Beekeepers' literature states that the optimal evaporation rate is 8 to 10 gr per day for a duration of 10 to 14 days. This sums up to 80 to 140 gr FA of a grade of 60%.

How large the evaporation area ought to be is not simple to answer.

The FA evaporator should be applied in the hive either from the top or from the bottom, but never top and bottom at the same time (fig 5). Otherwise the bees can't do a bunk.

To do this, the cover is taken off and the evaporator is put on-top of the frames. This way one can position the evaporator exactly above the brood.

This way, the distribution of the FA concentration is quite even across the hive. It is certainly better distributed than with an evaporator mounted in a frame which is installed by exchanging a regular frame. By installing such a frame evaporator in the middle of the brood, one disturbs the brood. And when a frame evaporator is inserted, another frame has to be taken out. Where do you put this one then? Frame evaporators are certainly a good intermediate solution.

Such flat bed evaporators are simpler to apply and also simpler to remove. Sometimes I just leave this type of flat bed sponge evaporator in the hive until the following spring; this saves work and avoids one more disturbance of the bees. Up to now, the bees thanked it with no loss of a swarm, at least not due to the Varroa.

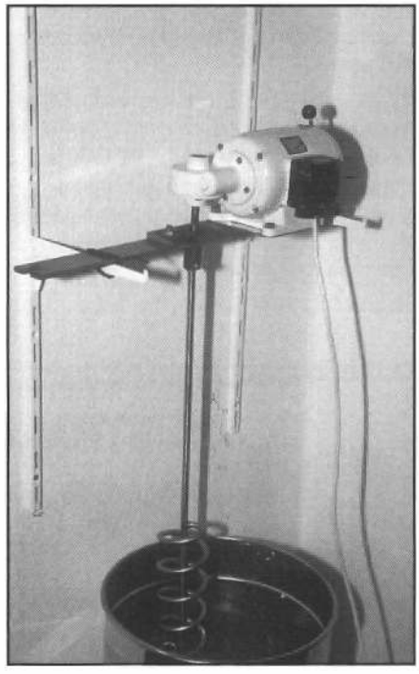
Cream Honey Stirrer

A beekeeper can make a name for himself, as you already know, by delivering a high and as well a constant honey quality.

Honey quality consists of different properties none of which should drop below a certain level at any time. How to obtain a proper spreading property with a minimum of effort is shown here.

A good spreading consistency can be obtained either by using expensive equipment or a lot of (cheap) labour.

For the small beekeeper as are the majority here in Europe, expensive equipment or a lot of manual work are good reasons to keep stirring honey to an absolute minimum. A simple and cost effective way of stirring would be, as everywhere in economic life, the solution. Here is mine.



As one can see from the photo, I use the same driving force to power the stirring spiral as I use for the honey extractor.

On the wall are shelf rails with adjustable bars to which the motor is fixed. Below the motor, the holder for the stirring spiral and the spiral itself need a small hole drilled for a splint (not a nail, please) to be put through to fix them.

As shown in the photo, the fixing of the motor and the covering of the honey container are not totally solved. This still can be improved.

Using a timer clock and running the equipment under supervision should also be considered.

There is no copyright or patent pending on this. When stirring is complete, the shelf can be used for other purpose. Dual use is dual fun.

Anton G. Branz, Sigeloring 46, D-67661 Siegelbach, Germany

The 'Sisters' Lament

The horse and mule live 30 years
And nothing know of wines and beers;
The goat and sheep at 20 die
And never taste of Scotch or rye.

The cow drinks water by the ton
And at 18 is mostly done,
The dog at 15 cashes in
Without the aid of rum or gin.

The cat in milk and water soaks
And then at 12 short years — it croaks;
The modest, sober, bone-dry hen
Lays eggs for nogs, then dies at 10.

All animals are strictly dry,
They sinless live and swiftly die;
But sinful, ginful, rum-soaked men
Survive for threescore years and ten..

Pssstt ——
And some of them, the mighty few,
Stay pickled till they're 92 - !

Rae RJS

Israelis raise huge 'superbees'

Yad Mordechai, Israel

An Israeli kibbutz has succeeded in raising a strain of super bees five times larger than normal for use in pollinating hothouse flowers and vegetable crops, officials at the facility have said.

The "bombus terresta" strain of bees has never before been domesticated for commercial use, said a spokesman at the Yad Mordechai kibbutz.

Beekeepers at Yad Mordechai in southern Israel succeeded in accelerating the reproduction of the bombus terresta and plan to export thousands to Japan and South Korea.

Insects do what protests could not

by David Bruce

Oamaru: Insects have wiped out a genetically engineered rape-seed trial crop in North Otago, achieving what environmental protesters could not.

However, the crop on a Hilderthorpe farm, just north of Oamaru, was replanted last week.

In December last year a protest organised by Greenpeace NZ wanted the "Round Up Ready" canola (rape seed) crop destroyed and the trial stopped.

The half-hectare site was replanted last week because springtail insects had wiped out the first seeds, genetically engineered to resist Monsanto's Round Up herbicide.

Oamaru environmentalist Lorraine Adams, involved in last year's protest, went out this week to check on how rape-seed was growing.

She was surprised to find no sign of the crop, and what appeared to be freshly-worked ground.

Miss Adams contacted Greenpeace in Auckland who checked with Pacific Seeds, the Waikato-based company in charge of the contract to grow the crop for a Canadian company, to find out what had happened.

Greenpeace's campaign director, Stephanie Mills, said yesterday Pacific Seeds told her the crop had been wiped out by springtail insects.

The crop had been replanted and treated with an insecticide to kill the infestation - which Ms Mills found rather ironic because one of the aims of the genetically engineered seeds was to reduce the amount of herbicide and insecticide needed.

Ms Mills has contacted the interim assessment group at the Ministry of Environment which approved and was overseeing the trial.

The Ministry did not know that the initial crop had been destroyed and replanted, she said.

Other rape-seed crops in North Otago were flowering and did not appear to have been affected by the insect.

"Obviously this was not predicted and we want further information, particularly about the relationship between the insect and the crop" she said.

Pacific Seeds' sales manager, Neil Rampton, confirmed springtail had wiped out a substantial proportion of the seeds which meant the crop had to be replanted.

This was done on January 21 and he hoped it could still be harvested in spite of the late sowing.

The first crop had been due in late March or early April. Because the weather and ground were warmer, the growing time was shorter and harvesting was now expected in late April, he said.

The crop is being grown under strict conditions imposed by the Ministry. These include a buffer crop around the rape-seed, erecting shade cloth tents over the crop to stop birds and insects entering, hand-harvesting the seed, monitoring a 2km circle around the crop before and after planting and harvesting, ensuring no other rape-seed crops in the area were flowering at the same time and monitoring the site for four years.

Seeds would be returned to Canada, the rape-seed rubbish burnt and any new growth killed with herbicide.

Mr Rampton said these conditions would still be rigidly observed by the company.

Acknowledgement, Otago Daily Times

BeeFax

Vol. 3, No. 1 November 1997

EU REQUIRES RESIDUE PROGRAMME

Over recent years, the European Union (EU) has begun setting maximum permitted levels (MRL's) for various residues found in food products offered for sale in EU member states. The move is a measure aimed at ensuring food safety within the EU. Residues for which MRL's have been set fall into groups such as antibiotics, insecticides, heavy metals, and such things as growth-promoting hormones.

These MRL's are already enforced within the EU for trade between member states. However, in a recent Directive (96/23/EC) they are now also to be applied to countries wishing to export products into member states.

New Zealand honey exporters have recently been made aware of this new Directive by their European importers. It must be emphasised, however, that the new requirement is not peculiar to honey, or to New Zealand. The Directive also applies to a number of products, including meat and seafood, from any country exporting the products to EU countries.

The EU Directive requires a national residue monitoring programme to be set up for each product in each country wishing to export to the EU. In our case, we need to put in place such a programme for honey. The meat and seafood industries in New Zealand are also setting up similar programmes.

The EU requires that the programme include a sampling and testing component, and a traceback and follow-up for any sample found to exceed the MRL in order to determine why the limit was exceeded.

According to the Directive, the residue monitoring programme must be carried out under the direct supervision of the MAF Regulatory Authority (MAFRA). The MAFRA is regarded by the EU as the recognised body in New Zealand for such programmes.

The NBA and Dr. Jim Edwards of the MAFRA are currently developing the residue plan for honey. Once the plan is completed, it will be submitted by the MAFRA to the EU for approval, and then implemented. The MAFRA will be required to report annually to the EU on the results of the programme.

Because New Zealand has a Bilateral Veterinary Agreement with the EU, our honey exports to member countries can continue in the meantime using current certificates (but not any new certificate requiring a residue testing programme to be in place). If difficulties are encountered by honey exporters, the MAFRA will arrange for the Veterinary Counsellor at the New Zealand Embassy in Brussels to intervene to facilitate clearance under the Bilateral Agreement.

It is hoped that once the residue plan is in place and we can sign the new certificate, export certification of honey to EU countries will become harmonised under the Veterinary Agreement, and we will finally be able to get away from area freedoms of various sorts for different EU member countries.

- *Ted Roberts, Apiculture Export Certification Manager*

HOW WE DO SURVEILLANCE

If you're a beekeeper with an apiary in one of the main centres, or in various provincial towns, your beehives may be visited during the spring by a MAF Qual inspector. And if you've watched the inspector, you may have noticed that the work he/she carries out looks a bit different than the normal check for American foulbrood. That's because the inspection is part of the Honey Bee Active Surveillance Programme, and the inspector is looking for signs of an exotic bee disease.

The Honey Bee Active Surveillance Programme is a contract MAF Quality Management has with government to provide an early-warning of incursions of exotic pests and diseases. New Zealand is currently free of a number of maladies which plague beekeeping in most other parts of the world, including European foulbrood, varroa mite, tropilaelaps mite and tracheal mite.

Each year MAF Qual inspects 500 apiaries throughout the country looking for these pests and diseases. The apiaries are chosen for their proximity to risk areas (eg., ports, rubbish dumps and tourist spots). The apiaries are therefore usually in built-up areas, and often involve the inspection of hobbyist hives. A total of 38 localities are included in the inspection programme, and range from big cities such as Auckland and Wellington, to

tourist centres like Mt. Cook and Queenstown. Lists produced by the computerised Apiary Register are essential in identifying the apiaries in these areas to be inspected.

When the inspector opens up a hive in the target apiary, the first thing he/she does is to find the queen. This might seem a strange way to go about a hive inspection, but in fact it makes good sense when you realise that the inspector has to take a sample of 400 adult bees from the hive.

When the queen is found, the frame she is on is set aside. The inspector then shakes several frames of bees into the up-turned lid, knocks the bees to one corner, and then scoops up enough bees to fill about half of the 600g PET sample jar (just slightly bigger than the clear plastic jars beekeepers often use when packing honey).

The bees in the sample jar are immersed in saturated salt solution, and a code (including the beekeeper registration number, the apiary number, and a hive number) is written on the bottle label. The bees in the jar are then sent to MAF Qual's Invermay Animal Health Laboratory where they will be visually analysed for the presence of varroa, tropilaelaps and tracheal mites.

Next, the frame with the queen is put back in the hive and the hive is given a thorough examination for European foulbrood. The inspector looks for corkscrew-shaped larvae in the cells, and larvae with a yellowish discolouration and prominent tracheae. These symptoms are similar to those associated with Halfmoon Disorder, so in any case where symptoms are found, the inspector takes a sample and sends it to Invermay for microscopic analysis and possible plate culturing.

In each case, regardless of whether EFB symptoms are present, the inspector will also take a sample of 3 larvae approximately 72 hours old (c-shaped, but filling the contents of the cell). These samples are being used to establish a background population of larvae for a research project which is developing a PCR test for detecting EFB in bees and bee products (see March 1996 *BeeFax* for an article on PCR technology written by Robert Rice).

The last activity the inspector carries out would really look strange to the casual observer, and even to the seasoned beekeeper who has spent years working hives. The inspector finds a patch of capped drone brood, and inserts the tines of a cappings scratcher into the side of the brood cells. A cappings scratcher is a device with sharp, thin, steel prongs that is normally used to remove cappings missed by mechanised uncappers.

In this case, however, the scratcher makes an excellent device for removing large numbers of drone pupae for inspection for varroa and tropilaelaps mites. Both mites show a preference for drone brood for rearing their young.

It generally only takes about 3-4 insertions of the cappings scratcher to remove the 100 drone pupae required for this part of the inspection. Needless to say, if any mite-like material is found in any of these drone pupae, a sample is collected and sent to Invermay for further analysis.

BROOD PHEROMONES AND ROYAL JELLY

The term "pheromone" is now a part of modern beekeeping vocabulary, and research on pheromones has changed the way we view bee behaviour and colony management. However, you could be forgiven for being a bit vague on the actual meaning of "pheromone", since it has only recently been added to many popular dictionaries. So to give it its proper definition, a pheromone is a chemical given off by one individual that controls the behaviour of another of the same species.

Researchers are continuing to find out more about the pheromones produced in beehives. Royal pheromone, or "queen substance", was one of the first of these substances to be identified. Much of the work on royal pheromone was done by French researchers, and now another, Dr. Yves Le Conte, has identified what he calls "brood pheromone."

Like royal pheromone, brood pheromone is a "primer" chemical. That is, it indirectly results in changes in other individuals by influencing chemical changes, in this case hormonal production of the endocrine system of bees. It is brood pheromone, for instance, which helps cause 3 day old larvae developing from fertilised eggs to either become queens or workers.

Brood pheromone keeps workers from developing their ovaries, something originally thought to be totally controlled by royal pheromone. Brood pheromone also helps worker bees recognize queen cells, as well as stimulating the development of hypopharyngeal glands in workers. It is these hypopharyngeal glands that produce royal and worker jelly used to feed larvae.

Brood pheromone is a mixture of 10 simple fatty aliphatic esters. These are emitted by the brood in large amounts as the cells are capped, and in different concentrations varying with the age of the larva. Evidence has been found for specific actions for three of these chemicals. Methyl stearate produced the best acceptance of queen cups, methyl lineolate caused more royal jelly to be deposited in queen cups, and methyl palmitate produced heavier larvae.

This is all very nice for the scientists, but the obvious question is does this research have any practical applications? Well, with a bit more work it may be possible to find a recipe so we can use these chemicals to increase the acceptance of queen cell cups and the amount of royal jelly produced for harvesting by the beekeeper.

The findings also suggest that banking queen bees in broodless colonies, as is sometimes advocated, is not such a good idea. You need lots of young bees with well developed hypopharyngeal glands to produce the royal jelly that will be fed to the queen bees. And since brood pheromone is instrumental in stimulating the

development of these glands, the presence of uncapped brood in these colonies would seem to be essential.

Reference: Sanford, T (1997.)*APIS* 15(8)

- Murray Reid, AAO, HAMILTON

ARTHRITIS, DRUGS AND BEE VENOM

Arthritis is an inflammatory disease of the joints, the consequence of which is often intense pain, restricted movement and disfigurement. Arthritis is a leading cause of disability in humans (and animals). The causes of arthritis are many, but the basic ones are injury, and wear and tear as joints age or are abused. The result is inflammation and thickening of joint linings, erosion of cartilage, brittle bones, and fused joints.

In arthritis, an inadequate supply of oxygen kills tissues, impairing the body's filtering system (lymph system). This leads to an accumulation of dead cells that further impair circulation, causing narrowing of blood vessels and finally bony overgrowths in the joints (eg, spurs).

Typically, treatments such as exercise, massage, and heat therapy have been used to aid in the control of arthritis, as these treatments improve circulation and the flow of oxygen to the affected joints. Modern therapies include the use of anti-inflammatory drugs, including non-steroidal drugs (such as tylenol, ibuprophen, and mortin) and steroids (such as cortisone, prenisone, and dexamethasone).

Both types of drugs are known for their side-effects. The non-steroidal drugs often cause irritation to the stomach (gastric system), while the steroidal drugs, particularly after extended use, can cause serious affects to glands such as the adrenal and pituitary glands. Other complications caused by steroidal drugs include impotence, edema, excessive hair growth and cardiac irregularities.

During the pass few years, several new non-steroidal anti-inflammatory drugs have been developed that relieve pain and reduce the swelling in joints affected by inflammation. These new drugs include ibuprofen, fenoprofen, naproxen, ketoprofen, sulindac, piroxicam, suprofen and tolmetin. However, as a beekeeper you should think very carefully about the use of anti-inflammatory drugs. Reports are beginning to emerge that some or all these drugs can lead to the loss of a person's immunity to bee stings.

On the other hand, bee venom therapy is often described as a cure-all for arthritis. This may be an over-exaggeration. However, there is some scientific basis to support such claims. Bee venom is a mixture of proteins (enzymes and peptides) with some unique activities.

The enzymes in bee venom are hyaluronidase and phospholipase A. These enzymes break down the tissues at the site of the sting, allowing the venom to spread quickly, and ultimately leading to cell death around the sting puncture.

The three major peptides in bee venom are melittin, apamin, and peptide 401. Melittin and apamin stimulate the body's adrenal and pituitary system to produce cortisol, the body's own natural steroid. These natural steroids do not produce the medical complications of the synthetic steroids. Peptide 401 is truly amazing, since as an anti-inflammatory agent it is 100 times more effective than cortisone.

Bee venom is another example of the potential value of hive products in addition to honey. As science continues to investigate the properties of these products, it becomes more and more likely that beekeeping in the future will be about harvesting raw products for the pharmaceutical industry, not just simply whipping off another box of New Zealand's favourite breakfast spread.

- Robert Rice, AAO, LINCOLN

GET A BILL OF SALE

Anyone who is buying used hives or beekeeping equipment should insist on receiving a "Bill Of Sale". And if the transaction involves very much money at all, you should also insist on receiving an "Affidavit Of Title".

A Bill Of Sale is a written document signed by the seller which shows that the seller has transferred ownership of specific materials to the buyer. An Affidavit Of Title is a written statement, signed and sworn to by the seller, which shows that he or she is the lawful owner of the goods they are selling, and that there are no liens or outstanding debts on the goods.

An Affidavit Of Title is desirable because:

- Swearing to a false affidavit is a serious offence, so the buyer should feel confident that there will be no future problems over ownership,
- Buyers may need written proof of their ownership when they resell the hives (this is very important if the boxes are branded),
- Written proof may also be needed for tax claims, if the goods are to be offered as security, or for administering orderly disposal of an estate.

So long as a Bill Of Sale contains the necessary information and the seller's signature, it is legal, and it does not have to be written in any special form. A Bill Of Sale scribbled out on the back of a used envelope, if it has all the required information and the seller's signature, is adequate. A letter from the seller with the necessary information and his or her signature is also acceptable. However, a properly drafted legal document is best.

The seller and buyer of used hives and equipment when the transaction involves a lot of money would be well advised to have a lawyer prepare a contract and a Bill Of Sale for them. For transactions involving less substantial moneys, where the buyer and seller are not willing to hire a lawyer, the seller and buyer can write up their own documents or use a draft "generic" form

available from MAF Quality Management (contact your local AAO for details).

When using a generic form be sure that no spaces are left blank (draw a line through any spaces that are not used), and pay close attention to accurately filling in the blank spaces. Alternatively, use the form as a guide to rewrite your own Bill of Sale.

A Bill of Sale should contain the following basic items: 1) the date of transaction; 2) a usable, specific description of the items transferred; 3) a statement that the seller owns the items; 4) a statement that the seller has transferred ownership and possession to the purchaser; the name of the purchaser; and, 5) at the bottom, the signature of the seller.

When describing the goods for sale, give a complete description. For example, the words "20 hives of bees" is inadequate, and such descriptions have led to problems in the past. A better description would be as follows:

"20 hives of bees made up as follows --

- 15 hives of bees, each containing two full depth brood boxes
- 5 hives of bees, each consisting of one full depth brood box
- Each hive contains a 4 or 7 litre division board feeder
- Each hive contains a floor board, a solid inner cover and telescopic lid covered with galvanised iron
- Each brood box contains a minimum of 9 drawn combs, unless it contains a feeder, in which case it will contain a minimum of 6 drawn combs
- 40 full depth boxes with 8 drawn combs per box
- 30 three-quarter depth boxes with 8 drawn combs per box
- 20 queen excluders
- Some of the boxes may bear the brand X030."

Other points that should be covered include:

- Whether the sites are part of the transaction (subject to landowner's permission), or whether the hives are sold subject to removal, and who is to remove them.
- If the hives are sold with a honey crop on them, a minimum amount should be specified. Problems have risen in the past when a "box of honey" was verbally guaranteed on each hive, but when the season didn't produce a box of honey, the agreement, according to the seller, was meant to mean whatever was on the hives!
- Method and time of payments and penalty clauses for default of payments.

It is also essential that you include in your Bill of Sale a provision for loss of hives infected with American foulbrood. Too many buyers (and even some sellers) have been burnt (literally!) by not putting this important detail into writing. Some of the options exercised in the past include:

- As is where is, with the buyer taking all the risks. Obviously this option would reflect the history of the hives, or the price paid, or the desire to acquire the sites and so on.
- If purchased during the winter, then the seller may agree to replace or refund diseased hives up until 30 September or some other agreed date. The issue of validating any disease found also needs to be included. The seller may accept the buyer's word, may wish to view the infected hive personally, or arrange for a third party to inspect the hives under claim.
- If purchased during the spring, then liability could be limited to the buyer's inspection, or MAF inspection, etc.

- Murray Reid, AAO, HAMILTON

POR-15 RANGE OF PRODUCTS

POR-15 Rust Preventative Paint is an anhydrous rust killer and paint, which should have plenty of uses in the honey house. It doesn't contain water, and in fact uses moisture present in the air, or on the surface being painted, to cure.

The distributors of POR-15 claim it is the best rust killer and preventative paint around, as it dries to a rock-hard ceramic-like finish that won't crack or peel, even on flexible surfaces. It is extremely effective as a metal filler and has excellent spreadability -- a little goes a long way. One litre will cover 9.2m^2. It can be applied directly to rusty surfaces but obviously the cleaner the surface the better.

If you want to apply Rust Preventative Paint to smooth metal surfaces, aluminium or galvanised steel, you need to use Metal-Ready, a pre-paint cleaner and etcher. You'll also need POR-15 Solvent for cleaning up, thinning and for spraying.

If you only want a small amount to try, then POR has a starter kit for $16, (plus $3.50 p&p) which includes a 120 ml screw top jar of Rust Preventative Paint, in silver or black, (enough for 1.1m^2), 240 ml of Metal-Ready, 2 paint brushes and a pair of rubber gloves. Or you can buy the TOR-15 Six-Pack for $56.50 (plus $4 p&p). The jars are 120 ml, but you can order silver or black or a combination.

POR-15 Rust Preventative products are available from Permanent Painted Coatings, 1 Tiki Place, PO Box 1923, Palmerston North, (06) 355 1180, fax 355 1545 or 0800 428 282. Write or phone for their catalogue.

- Murray Reid, AAO, HAMILTON

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Today's random thought is about cashing in.

by Ham Maxwell

The other day I unloaded some more honey on to the public at large. Now there is nothing new in this, as I have been doing this for some time, but this time I was selling from a new site. The last foray into the hives produced nothing but Manuka Honey, and it would not come out of the comb. Finally I converted it to cut comb honey, and set forward to the selling venue. By direct selling to the public one gets a lot of feedback, good in the main, but sometimes a real smart-alec looms over the horizon. Mostly they simply display their ignorance by simply opening their mouths, and this day the sample model who appeared at the stall was, according to him, an ex-beekeeper, and considered himself an expert.

Well, he surely knew a thing or two about beekeeping, even managing to hold an intelligent conversation initially. Then he spotted the cut comb honey, raised an eyebrow and flatly declared "that was no way to sell honey". When asked why he asserted the public knew very little about bees and honey and "would never fall for that lot". As he was saying this he was interrupted by people wanting to buy the cut-comb honey. This failed to stop him expressing his opinions however and he continued on in the same vein.

Now I am usually patient and polite to people I have only just met, but this character was beginning to get up my nose just a little. Having one's products rubbished in front of the customers is to my way of thinking, going just a little too far.

A polite reminder that his remarks were not helpful was simply overlooked. In the interim the sales of cut-comb honey were steady and in short order stocks were used up. As I began to fold up the stall he still was there mouthing on and becoming a really proverbial pain. I finally rounded on this jerk and reminded him that whilst he was jawing on about cut-comb honey the public at large were busy buying it up as fast as they could and cleared the stock. This was because someone in the beekeeping industry took a long hard look at what the public wanted and brought into being sufficient advertising punch to awaken the interest of the public. The special properties of Manuka Honey received particular mention, and the response proved to be overwhelming. The evidence of this was right in front of his eyes if he cared to look at the empty shelf.

To say he got a little upset with my remarks was to underscore the situation, and he maintained that the only way to sell honey was to heat it and then pot it up. He knew this was right because he always did this to his honey and he always sold it that way. The public clearly were not in a position to be able to know the best way to use honey and he was. He did not like wax with his honey and no-one else did either. When asked where his honey stocks were he was evasive and suddenly remembered he was due back at the beer tent to meet a mate of his.

The organiser of the stalls came over just as I was leaving and thanked me for taking part in the fair, and hoped it had been worthwhile for me. "Oh". he said. "see you met out local nark, we had to stop him from selling here because he proved to be too troublesome and argumentative. When people wanted creamed or comb honey he roundly abused them and we received so many complaints we lowered the boom on him".

With beekeepers like that our association has a hard road to hoe in getting the advertising message across. My sales showed that the recent messages about Manuka Honey had got across to the public, they benefited and I also gained from the sales. I am quite happy to support the newly recommended levy to promote honey on the local market as the locals have obviously heard the messages so far.

Report on the research project:

Finding New Zealand honeys with outstanding antibacterial and antifungal activity

Carried out under the direction of Dr. P.C Molan at the University of Waikato with funding from AGMARDT and the Lottery Grants Board

The research grants were used to employ a research technician for one year to test a large number of samples of New Zealand honeys to determine their antimicrobial activity. The commencement of the project was deferred until 26 March 1996 because of a slow response from the country's beekeepers to requests to supply samples of honeys for the survey. There was also a break in the period of employment of the technician mid-1996 to allow time for more samples to be provided. Thus the project was not completed until 9 June 1997.

Summary of project and findings

In this study, 179 mono-floral New Zealand honey samples from 27 different plant sources (excluding Manuka) were tested for antimicrobial activity against the wound-infecting organism *Staphylococcus aureus*, the gut-infecting organism *Escherfchia coli*, the thrush-causing yeast *Candida albicans*, and the fungus *Trichophyton mentagrophytes* var. *mentagrophytes* which causes fungal skin infections in humans and animals. Previous studies with Manuka honey had shown that about half of the samples of this variety tested had a unique type of antimicrobial activity additional to the hydrogen peroxide that is usually generated in honey. The present study was undertaken to determine whether there are any types of honey additional to Manuka that also have non-peroxide antibacterial or antifungal activity, and to determine if any honey types characteristically have exceptionally high hydrogen peroxide activity. This was done to find if there are any other New Zealand honeys besides Manuka which could be of value for medical and veterinary treatment of infections.

No honey types were found that showed any non-peroxide antibacterial or antifungal activity. Nor were any honey types found that showed any antimicrobial activity against *Candida albicans*. But three types of honey were identified as having outstanding hydrogen peroxide activity: these were Penny Royal, Rewarewa and Beech Honeydew, which are harvested in significant quantities by New Zealand's beekeepers.

A summary of the results from testing the honeys is presented in the following tables. The agar well diffusion assay used for all the other species of micro-organism could not be used for *E. coli*; a turbindmetric assay to determine minimum inhibitory concentrations of each honey was used instead. For ease of comparison of results, the inverse of the minimum inhibitory concentrations (ie the number of times a honey could be diluted and still retain antibacterial activity) is shown in the tables for activity against *E. coli.*

Background

Honey is becoming recognised in modern medicine as an antibacterial agent, but the potency of its antibacterial activity varies widely. Manuka honey has been found to have a high potency, and to have a unique type of antibacterial agent present. As a result of this it is in high demand world-wide for its outstanding antibacterial properties.

Beekeeping is an industry of marginal profitability, and the prices obtained for honey fluctuate a lot. A wide sector of New Zealand's agricultural industry depends on there being a stable industry to provide pollination for pasture and crops. Therefore it is of importance to explore new marketing opportunities for honey.

When honey is sold as a medicine rather than as a food its value is markedly increased. The price obtained by New Zealand beekeepers for manuka honey has more than doubled as a result of research work showing its potential as a medicine. But there are limits to the quantity of manuka honey that can be produced, so the present project was undertaken to find if there are other New Zealand honeys that have outstanding antimicrobial activity and thus have the potential for medical use.

Experimental procedure: materials used

Collection of honeys

Honey samples were obtained from commercial and hobbyist apiarists throughout New Zealand. These samples were collected during the 1995-96 and 1996-97 flowering seasons. All samples were specially selected to be as close to mono-floral as is practicable, and the floral source of each honey was identified by the apiarist supplying it. Identification was based on local knowledge of the flowers in bloom at the locality

Hawke's Bay beekeepers can't find AFB!

Hawke's Bay Inspection Day
Saturday the 1st of November

The local branch held a great day with 38 members appearing to make up ten teams of inspectors. They inspected 188 hives on 62 apiaries sites and only found one suspect hive, a brilliant effort by all the teams.

A special thanks to Laine and Chris (mainly Laine) Robinson for the barbecue and refreshments they prepared for all the teams, they were really appreciated.

of the hive at the time that the honey was produced, and was confirmed by the flavour, aroma and colour of the honey. None inactive of the samples were manuka honey. Where possible, information regarding secondary floral sources and hive location were also obtained from the apiarist.

The floral sources included in the survey were considered to be:

BA Barberry *(Berberis vulgarisi* L. Family: *Berberidaceae)*

a turbidimetric assay to determine minimum inhibitory concentrations of each honey was used instead. For ease of comparison of results, the inverse of the minimum inhibitory concentrations (*i.e.* the number of times a honey could be diluted and still retain antibacterial activity) is shown in the tables for activity against *E. coli.*

Tested against *Staphylococcus aureus*

Floral type	No. of samples tested	Proportion of samples without activity†	Mean antibacterial potency of active samples*
Rewarewa	14	none inactive	16.9
Honeydew	16	none inactive	14.5
Penny Royal	13	3/13 inactive	18.4
Kamahi	14	5/14 inactive	13.7
Kanuka	5	3/5 inactive	27.9
Buttercup	3	none inactive	17.1
Eucalpytus	1	none inactive	16.8
Blue Mint	2	none inactive	15.1
Red Gum	1	none inactive	14.5
White Rata	2	none inactive	13.4
Rata	6	3/6 inactive	11.4
Borage	3	1/3 inactive	10.2
Clover	11	6/11 inactive	10.1
Inkweed	1	none inactive	9.1
Tawari	4	2/4 inactive	8.9
Maori Jasmine	1	none inactive	8.5
Pohutukawa	1	none inactive	8.2
Blackberry	1	none inactive	7.1
Willow	2	none inactive	5.0
Nodding Thistle	34	29/34 inactive	6.7
Barberry	2	all inactive	n.d.
Flax	1	all inactive	n.d.
Hangehange	1	all inactive	n.d.
Ling Heather	1	all inactive	n.d.
Thyme	18	all inactive	n.d.
Towai	2	all inactive	n.d.
Vipers Bugloss	1	all inactive	n.d.

* Expressed as equivalent % phenol: n.d. = non-detectable levels of activity, where the activity is ≤4% phenol.
† *i.e.* proportion with non-detectable levels of activity.

Tested against *Escherichia coli*

Floral type	No. of samples tested	Proportion of samples without activity†	Mean antibacterial potency of active samples*
Penny Royal	13	2/13	6.0
Honeydew	18	4/18	5.0
Rewarewa	22	5/22	4.8
Kanuka	6	none inactive	5.8
Kamahi	14	6/14	4.3
Buttercup	3	none inactive	5.8
Maori Jasmine	1	none inactive	8.9
Blue Mint	2	none inactive	4.3
Eucalpytus	1	none inactive	4.3
Flax	1	none inactive	4.3
Inkweed	1	none inactive	4.3
Ling Heather	1	none inactive	4.3
Red Gum	1	none inactive	4.3
Vipers Bugloss	1	none inactive	4.3
White Rata	2	none inactive	4.3
Tawari	4	1/4	4.3
Pohutukawa	8	6/8	4.3
Clover	11	10/11	4.3
Nodding Thistle	34	32/34	4.3
Barberry	2	all inactive	n.d.
Blackberry	1	all inactive	n.d.
Borage	3	all inactive	n.d.
Hangehange	1	all inactive	n.d.
Rata	6	all inactive	n.d.
Thyme	18	all inactive	n.d.
Towai	2	all inactive	n.d.
Willow	2	all inactive	n.d.

* Degree to which honey can be diluted and still be antibacterial (*i.e.* the inverse of the minimum inhibitory concentration): n.d. = non-detectable levels of activity, taken as being equal to the greatest dilution factor of artificial honey that still gives antibacterial activity *i.e.* 3.6.
† *i.e.* proportion in which the concentration of honey required to inhibited growth was the same as artificial honey.

Tested against *Trichophyton mentagrophytes* var. *mentagrophytes*

Floral type	No. of samples tested	Proportion of samples without activity†	Mean antibacterial potency of active samples*
Honeydew	19	none inactive	4.2
Penny Royal	11	2/11	3.0
Rewarewa	22	9/22	2.8
Kamahi	14	6/14	3.8
Pohutukawa	7	3/7	2.3
Buttercup	3	1/3	3.7
Kanuka	6	1/6	0.1
Maori Jasmine	1	none inactive	5.0
Eucalpytus	1	none inactive	4.5
Blue Mint	2	none inactive	0.3
Ling Heather	1	none inactive	0.5
Clover	11	10/11	3.6
Barberry	2	all inactive	n.d.
Blackberry	1	all inactive	n.d.
Borage	3	all inactive	n.d.
Flax	1	all inactive	n.d.
Hangehange	1	all inactive	n.d.
Inkweed	1	all inactive	n.d.
Nodding Thistle	34	all inactive	n.d.
Rata	6	all inactive	n.d.
Red Gum	1	all inactive	n.d.
Tawari	4	all inactive	n.d.
Thyme	18	all inactive	n.d.
Towai	2	all inactive	n.d.
Vipers Bugloss	1	all inactive	n.d.
White Rata	2	all inactive	n.d.
Willow	2	all inactive	n.d.

* Antifungal activity is expressed as the diameter of the clear zone of inhibition, with the 10 mm diameter of the well in the agar subtracted: n.d. = non-detectable levels of activity, where there was no clear zone observed around the well in the agar.
† *i.e.* proportion with non-detectable levels of activity.

BL Blackberry (*Rubus frutizosus* Family: *Rosaceae)*

BM Blue Mint (*Mentha x piperita*)

B Borage (Borago officinalis Family: *Boraginaceae*)

BU Buttercup *(Ranunculus repens* L. or *Ranunculus sardous Crantz*. Family: *Ranunculaceae)*

CL Clover (*Trifolium repens* L., or *Trifolium pratense* L. Family: *Forbaceae)*

EU Eucalyptus (*Eucalyptus* species)

FL Flax (*Phormium tenax* J. R. & G. Forst Family: *Agavaceae*)

HH Hangehange (*Geniostoma ligustrifolium* A.Cunn. Family: *Loganiaceae*)

HD Honeydew (from Beech, *Nothofagus solandri* (Hook. f.) Oerst. Family: *Fagaceae*)

I Inkweed (*Phytolacca octandra* Family: *Phytolaccaeceae*)

KA Kamahi (*Weinmannia racemosa* Linn f. Family: *Cunoniaceae*)

K Kanuka (*Kunzea ericoidesi* (A. Rich.) J. Thompson. Family: *Myrtaceae*)

MJ Maori Jasmine (*Parsonsia capsularis* Family: *Apocynaceae*)

N Nodding Thistle (*Carduus nutans* L. Family: *Asteraceae*)

PR Penny Royal (*Mentha pulegium* L. Family: *Lamiaceae*)

PO Pohutukawa (*Metrosideros excelsa* Sol. ex Gaertn. Family: *Myrtaceae*)

RAT Rata (*Metrosideros robusta A.* Cunn. Family: *Asteraceae*)

RE Rewarewa (*Knightia excelsa* R. Br. Family: *Proteaceae*)

TA Tawari (*Ixerba brexiodes* A. Cunn. Family: *Cunoniaceae*)

T Thyme (*Thymus vulgaris* L. Family: *Lamiaceae*)

TO Towai (*Weinmannia sylvicola* Sol. ex A. Cunn. Family: *Cunoniaceae*)

WR White Rata (*Metrosideros perforata* (J. R. & G. Forst) A. Rich, or *Metrosideros diffusa*

Hook. f. Family: *Myrtaceae*)

WL Willow (*Salix fragilis* L. Family: *Salicaceae*)

(The code shown for each source was used for identifying the samples obtained for this project, and is used in the tables in this report showing the results of the survey.)

All honey samples were stored in the dark at 4°C in airtight glass or plastic containers.

Artificial honey, a sugar solution prepared to be of the same osmolarity and pH as honey, was prepared by adding gluconic acid lactone (Sigma, G4750) to sterile distilled water until pH 3.8 was achieved (after allowing time for hydrolysis of the lactone to occur). To 17.5 ml of the gluconic acid solution, 40 g fructose, 36.2 g dextrose and 2.8 g sucrose were added. The solution was heated to 50°C to dissolve the sugars.

Microbial cultures

Freeze dried cultures of *Staphylococcus aureus* ATCC 9144, *Escherichia coli* ATCC 25922 and *Candida albicans* ATCC 10231 were obtained from the Communicable Disease Centre, Porirua. Cultures of *Trichophyton mentagrophytes* var. *mentagrophytes* and *Epidermophyton floccosum* were obtained from the Microbiology Department, Waikato Hospital, Hamilton. (These cultures were bench specimens identified by the technicians at that department.) The freeze dried cultures were reconstituted in Trypticase Soy Broth (BBL, 30 g in 1l distilled water) and incubated overnight at 37°C. The two bacterial cultures were then stored on Protect Bacterial Preservers beads (LabSupply Pierce) at -20°C. On the day prior to an assay being performed, one bead per culture was placed in Trypticase Soy broth and incubated overnight at 37°C. The *C. albicans* and fungal cultures were sub-cultured and stored on agar slopes, the *C. albicans* onto Potato Dextrose (Difco) slopes and the T. *mentagrophytes* var. *mentagrophytes* and *E. floccosum* onto Sabouraud 4% Dextrose Agar (BDH, 65 g per 1l distilled water) slopes.

Phenol standard solutions of 1, 2, 3, 4, 5, 6, 7, 8, 9, 10% (w/v) in distilled water were prepared. New standards were prepared monthly.

Experimental procedure: methods used

Preparation of honey samples

Samples for all the assays were prepared as follows. All honey

sample solutions were prepared aseptically. They were handled away from direct sunlight, and not left exposed to the laboratory lights for longer than the minimum time needed to handle the solutions. Each honey sample supplied was thoroughly mixed prior to samples being weighed out from it. Samples for total activity testing were made up to the required concentration (v/v) with sterile distilled water. Samples for non-peroxide activity testing were made up to the required concentration (v/v) with catalase solution. The catalase solution was prepared by adding 20 mg catalase (Sigma, C-10) into 10 ml of sterile distilled water. The catalase solution was sterilised by passing it through a 0.2 um Minisart microfilter. The honey solutions were mixed using sterile orange sticks.

Assays against *S. aureus* and *C. albicans*.

Into large square plates (Nunc Bioassay Dishes - 243 x 243 x 28 mm) was poured 150ml molten agar that had been cooled to 45°C and inoculated with 100ul of an overnight culture of *S. aureus* or *C. albicans*. The cultures had an optical density of the 0.5 at 540 nm. Nutrient Agar (BBL) was used for *S. aureus*, and Potato Dextrose Agar (Difco) for *C. albicans*. The plates were poured on a level surface immediately after mixing and left to set.

Table 1: Total antibacterial activity of honey samples tested against *S. aureus*. The results are reported as the concentration of phenol (% w/v) with equivalent antibacterial activity. The mean values of six determinations are show, with the standard deviation (SD): n.d. = activity not detectable (≤4% phenol).

Honey	Mean Activity	SD	Honey	Mean Activity	SD	Honey	Mean Activity	SD
BA87	n.d.	0	KA24	n.d.	0	PR17	n.d.	0
BA88	n.d.	0	KA25	n.d.	0	PR19	9.03	0.09
BL1	7.14	1.41	KA26	n.d.	0	PR20	n.d.	0
BM1	14.11	0.55	K28	n.d.	0	PO3	8.23	2.86
BM2	16.10	0.72	K29	n.d.	0	RAT 3	11.28	0.54
B3	n.d.	0	K30	27.11	2.12	RAT4	11.97	1.63
B4	7.25	0.21	K31	28.60	2.26	RAT5	n.d.	0
B5	13.22	1.67	K32	0	0	RAT6	10.86	0.60
BU5	9.98	1.88	K33	n.d.	0	RAT7	n.d.	0
BU6	17.72	1.37	LH17	n.d.	0	RAT8	n.d.	0
BU7	23.57	2.24	MJ1	8.49	0.59	RE9	13.97	1.93
CL26	9.79	0.79	N4	n.d.	0	RE10	13.81	2.22
CL27	14.20	1.70	N5	n.d.	0	RE11	19.71	1.45
CL28	n.d.	0	N6	n.d.	0	RE12	21.80	2.44
CL29	13.88	0.24	N7	n.d.	0	RE13	22.38	3.33
CL30	5	1.52	N8	n.d.	0	RE14	20.02	1.32
CL31	n.d.	0	N9	n.d.	0	RE15	20.09	1.95
CL32	n.d.	0	N10	6.59	0.13	RE16	16.26	1.30
CL33	n.d.	0	N11	n.d.	0	RE17	20.43	0.82
CL34	n.d.	0	N12	n.d.	0	RE18	17.74	1.29
CL35	n.d.	0	N13	n.d.	0	RE19	17.39	1.09
CL36	7.81	0.07	N14	n.d.	0	RE20	8.57	2.03
E1	16.76	2.12	N15	n.d.	0	RE21	12.53	4.34
FL1	n.d.	0	N16	n.d.	0	RE22	11.42	2.22
HH1	n.d.	0	N17	6.89	0.34	RG1	14.53	2.22
HD3	21.18	2.41	N18	7.22	0.32	TA9	n.d.	0
HD4	25.62	1.89	N19	n.d.	0	TA10	10.12	0.71
HD5	24.51	2.67	N20	n.d.	0	TA11	n.d.	0
HD6	15.06	1.49	N21	n.d.	0	TA12	7.66	0.21
HD7	16.25	0.48	N22	n.d.	0	T14	n.d.	0
HD8	20.61	0.78	N23	n.d.	0	T15	n.d.	0
HD9	17.93	5.14	N24	n.d.	0	T16	n.d.	0
HD10	8.05	0.42	N25	n.d.	0	T17	n.d.	0
HD11	13.23	3.06	N26	n.d.	0	T18	n.d.	0
HD12	9.23	0.13	N27	6.23	1.06	T19	n.d.	0
HD13	6.97	0.19	N28	6.68	0.76	T20	n.d.	0
HD14	13.01	2.31	N29	n.d.	0	T21	n.d.	0
HD15	9.01	0.80	N30	n.d.	0	T22	n.d.	0
HD16	10.76	1.85	N31	n.d.	0	T23	n.d.	0
HD17	11.80	1.76	N32	n.d.	0	T24	n.d.	0
HD18	8.48	1.18	N33	n.d.	0	T25	n.d.	0
HD19			N44	n.d.	0	T26	n.d.	0
HD20			N47	n.d.	0	T27	n.d.	0
I1	9.12	0.54	N48	n.d.	0	T28	n.d.	0
KA13	10.09	1.15	N49	n.d.	0	T29	n.d.	0
KA14	10.55	1.45	PR7	15.22	2.14	T30	n.d.	0
KA15	13.93	1.22	PR8	15.03	1.96	T31	n.d.	0
KA16	14.70	1.11	PR9	20.26	1.58	TO3	n.d.	0
KA17	12.62	2.13	PR10	22.06	1.58	TO4	n.d.	0
KA18	18.87	2.60	PR11	19.93	2.97	VB4	n.d.	0
KA19	n.d.	0	PR12	20.72	2.68	WR3	14.19	1.28
KA20	13.89	1.30	PR13	22.43	2.16	WR4	12.64	0.93
KA21	10.43	1.11	PR14	20.44	2.48	WL1	4.82	1.57
KA22	18.30	1.41	PR15	18.68	0.77	WL2	5.07	1.13
KA23	n.d.	0	PR16	n.d.	0			

Sixty-four wells were cut into the agar using a cooled flamed 8mm cork borer. Following a quasi-Latin square grid template, the wells on the template were numbered randomly 1-16, allowing four duplicates of each number. On each plate 12 samples of honey (100ul of a 25% v/v honey solution per well) were tested in duplicate for total activity and in duplicate for non-peroxide activity. Blanks of water and catalase were used. Phenol standards were placed in the remaining wells.

The plates were incubated for 18 hr at 37°C and were then placed over the template. Using vernier callipers, the diameter of the clear zones of inhibition were measured both horizontally and vertically; the mean of the two measurements was then recorded. All measurements were recorded without any reference to the identity of the sample in the well.

The mean diameter of the zone was squared. A standard graph was then potted of % phenol against the square of the mean of the zone diameter. A best fit straight line was fitted and the equation of the line was used to calculate the equivalent concentration of phenol with the same activity as each honey sample. Each honey was re-tested in duplicate twice more on separate days, with new sub cultures and with fresh solutions of honey being prepared each time. The mean and standard deviation of the six estimated equivalent phenol concentrations for each sample were calculated.

Antibacterial assay against *E. coli*.

It was intended that the agar well diffusion assay method be used as for *S. aureus* and *C. Albicans*. However the zones of inhibition were very difficult to measure due to secondary larger zones around some of the wells. This occurence was thought to arise from the fast growth rate of the organism. This would

also mean the ratio of growth rate to honey diffusion (and phenol diffusion) though the agar would be different from that of the slower growing *S. aureus* and *C. albicans*.

It was decided to instead measure the minimum inhibitory concentration of the honeys with *E. coli* using a turbidimetric method in microtitre plates. The assays were performed in duplicate for each honey sample and repeated twice on separate days, with new sub-cultures and with fresh solutions of honey being prepared each time. A 150 ul volume of sterile double strength Trypticase Soy Broth was added to the wells of a sterile 8 x 12 Nunc Microtitre plate. To the first well of eight rows was added 150 ul of 50% (v/v) honey solution. This was then serially diluted along each row by mixing the well contents of the first well (with an autopipette) taking 150 ul of the solution and adding the next well and so on along the row. The 150 ul from the last well was discarded. The addition of 10 ul of an overnight culture of *E. coli* (optical density of 0.5 at 540 nm) to each of the wells gave final honey concentrations of 23.4,11.2,5.6,2.8 and 1.4% (v/v) respectively. For each microtitre plate controls of inoculated broth with no honey (to determine the uninhibited rate of growth of the culture) were also included.

The plate was incubated at 37°C for 6 h. (Initial trials indicated this was the incubation period required for uninhibited growth to first become observable). The wells were then viewed visually for growth. The lowest concentration in which no visible growth occurred was assigned as the minimum inhibitory concentration for that honey sample. The mean minimum

Table 2: Minimum inhibitory concentrations (MIC) for honey samples tested against *E. coli*. The honey concentrations are shown as % (v/v), testing being done in steps of 23.4, 11.2, 5.6, 2.8 and 1.4%. Non-detectable inhibitory activity (n.d.) is reported where there was no inhibition seen at a concentration of 23.4%. The mean values of six determinations are show, with the standard deviation (SD)

Honey	Mean MIC	SD	Honey	Mean MIC	SD	Honey	Mean MIC	SD
BA87	n.d.	0	K29	11.2	0	PO9	n.d	0
BA88	n.d	0	K30	23.4	0	PO10	23.4	0
BL1	n.d.	0	K31	23.4	0	RAT 3	n.d.	0
BM1	23.4	0	K32	11.2	0	RAT4	n.d.	0
BM2	23.4	0	K33	23.4	0	RAT5	n.d.	0
B3	n.d	0	LH17	23.4	0	RAT6	n.d	0
B4	n.d.	0	MJ1	11.2	0	RAT7	n.d.	0
B5	n.d.	0	N4	n.d.	0	RAT8	n.d.	0
BU5	23.4	0	N5	n.d.	0	RE9	23.4	0
BU6	23.4	0	N6	n.d.	0	RE10	11.2	0
BU7	11.2	0	N7	n.d.	0	RE11	n.d.	0
CL26	n.d.	0	N8	n.d.	0	RE12	n.d	0
CL27	n.d.	0	N9	n.d.	0	RE13	23.4	0
CL28	n.d.	0	N10	n.d.	0	RE14	23.4	0
CL29	23.4	0	N11	n.d.	0	RE15	23.4	0
CL30	n.d.	0	N12	n.d.	0	RE16	23.4	0
CL31	n.d.	0	N13	n.d.	0	RE17	23.4	0
CL32	n.d.	0	N14	n.d.	0	RE18	23.4	0
CL33	n.d.	0	N15	23.4	0	RE19	23.4	0
CL34	n.d.	0	N16	n.d.	0	RE20	11.2	0
CL35	n.d.	0	N17	n.d.	0	RE21	23.4	0
CL36	n.d.	0	N18	23.4	0	RE22	23.4	0
E1	23.4	0	N19	n.d.	0	RE23	23.4	0
FL1	23.4	0	N20	n.d.	0	RE24	n.d.	0
HH1	n.d.	0	N21	n.d.	0	RE25	23.4	0
HD3	n.d.	0	N22	n.d.	0	RE26	23.4	0
HD4	11.2	0	N23	n.d.	0	RE27	n.d.	0
HD5	23.4	0	N24	n.d.	0	RE28	n.d.	0
HD6	23.4	0	N25	n.d.	0	RE29	23.4	0
HD7	23.4	0	N26	n.d.	0	RE30	23.4	0
HD8	23.4	0	N27	n.d.	0	RG1	23.4	0
HD9	23.4	0	N28	n.d.	0	TA9	n.d.	0
HD10	23.4	0	N29	n.d.	0	TA10	23.4	0
HD11	n.d.	0	N30	n.d.	0	TA11	23.4	0
HD12	23.4	0	N31	n.d.	0	TA12	23.4	0
HD13	23.4	0	N32	n.d.	0	T14	n.d.	0
HD14	23.4	0	N33	n.d.	0	T15	n.d.	0
HD15	n.d.	0	N44	n.d.	0	T16	n.d.	0
HD16	11.2	0	N47	n.d.	0	T17	n.d.	0
HD17	23.4	0	N48	n.d.	0	T18	n.d.	0
HD18	n.d.	0	N49	n.d.	0	T19	n.d.	0
HD19	23.4	0	PR7	23.4	0	T20	n.d.	0
HD20	23.4	0	PR8	n.d.	0	T21	n.d.	0
I1	23.4	0	PR9	n.d	0	T22	n.d.	0
KA13	23.4	0	PR10	11.2	0	T23	n.d.	0
KA14	23.4	0	PR11	11.2	0	T24	n.d.	0
KA15	23.4	0	PR12	11.2	0	T25	n.d.	0
KA16	23.4	0	PR13	11.2	0	T26	n.d.	0
KA17	23.4	0	PR14	23.4	0	T27	n.d.	0
KA18	23.4	0	PR15	23.4	0	T28	n.d.	0
KA19	n.d.	0	PR16	23.4	0	T29	n.d.	0
KA20	23.4	0	PR17	23.4	0	T30	n.d.	0
KA21	n.d.	0	PR19	23.4	0	T31	n.d.	0
KA22	23.4	0	PR20	23.4	0	TO3	n.d.	0
KA23	n.d.	0	PO3	n.d.	0	TO4	n.d.	0
KA24	n.d	0	PO4	23.4	0	VB4	23.4	0
KA25	n.d.	0	PO5	n.d.	0	WR3	23.4	0
KA26	n.d.	0	PO6	n.d	0	WR4	23.4	0
K28	23.4	0	PO7	n.d.	0	WL1	n.d.	0
			PO8	n.d.	0	WL2	n.d.	0

Table 3: Total antifungal activity of honey samples tested against *Trichophyton mentagrophytes* var. *mentagrophytes*. The results are reported as the diameter (mm) of the zone of inhibition, which includes the 10 mm diameter of the well in the centre of the zone. Non-detectable activity (n.d.) is reported where there was no zone seen around the 10 mm well in the agar.

Honey	Mean Activity	SD	Honey	Mean Activity	SD	Honey	Mean Activity	SD
BA87	n.d.	0	K28	12.6	0.91	PO9	n.d.	
BA88	n.d.	0	K29	12.3	1.1	PO10	13.43	0.88
BL1	n.d.	0	K30	12.03	1.64	RAT 3	n.d.	0
BM1	10.62	0.72	K31	13.6	0.97	RAT4	n.d.	0
BM2	10.05	0.37	K32	n.d.	0	RAT5	n.d.	0
B3	n.d.	0	K33	11.8	0.51	RAT6	n.d.	0
B4	n.d.	0	LH17	10.51	0.52	RAT7	n.d.	0
B5	n.d.	0	MJ1	15.01	1.1	RAT8	n.d.	0
BU5	10.2	0.83	N4	n.d.	0	RE9	10.75	0.45
BU6	n.d	0	N5	n.d.	0	RE10	n.d.	0
BU7	17.2	1.61	N6	n.d.	0	RE11	14.67	0.72
CL26	n.d.	0	N7	n.d.	0	RE12	12.00	0.53
CL27	n.d.	0	N8	n.d.	0	RE13	12.32	0.81
CL28	n.d.	0	N9	n.d.	0	RE14	11.80	0.51
CL29	n.d.	0	N10	n.d.	0	RE15	10.2	0.17
CL30	n.d.	0	N11	n.d.	0	RE16	n.d.	0
CL31	13.63	0.51	N12	n.d.	0	RE17	13.74	1.80
CL32	n.d.	0	N13	n.d.	0	RE18	n.d.	0
CL33	n.d.	0	N14	n.d.	0	RE19	n.d.	0
CL34	n.d.	0	N15	n.d.	0	RE20	10.52	0.50
CL35	n.d.	0	N16	n.d.	0	RE21	13.22	0.61
CL36	n.d.	0	N17	n.d.	0	RE22	10.62	0.37
E1	14.52	0.70	N18	n.d.	0	RE23	12.8	0.57
FL1	n.d.	0	N19	n.d.	0	RE24	n.d.	0
HH1	n.d.	0	N20	n.d.	0	RE25	16.43	1.28
HD3	12.54	0.71	N21	n.d.	0	RE26	16.75	1.60
HD4	18.7	1.64	N22	n.d.	0	RE27	n.d.	0
HD5	12.34	0.46	N23	n.d.	0	RE28	n.d.	0
HD6	13.28	1.29	N24	n.d.	0	RE29	n.d.	0
HD7	11.67	0.57	N25	n.d.	0	RE30	n.d.	0
HD8	20.24	1.28	N26	n.d.	0	RG1	n.d.	0
HD9	16.95	0.48	N27	n.d.	0	TA9	n.d.	0
HD10	12.26	0.59	N28	n.d.	0	TA10	n.d.	0
HD11	13.8	0.72	N29	n.d.	0	TA11	n.d.	0
HD12	14.5	0.46	N30	n.d.	0	TA12	n.d.	0
HD13	12.5	0.81	N31	n.d.	0	T14	n.d.	0
HD14	18.05	0.71	N32	n.d.	0	T15	n.d.	0
HD15	12.12	0.71	N33	n.d.	0	T16	n.d.	0
HD16	12.52	1.59	N44	n.d.	0	T17	n.d.	0
HD17	14.2	0.56	N47	n.d.	0	T18	n.d.	0
HD18	12.18	0.77	N48	n.d.	0	T19	n.d.	0
HD19	15.57	0.91	N49	n.d.	0	T20	n.d.	0
HD20	13.15	0.27	PR7	12.43	1.11	T21	n.d.	0
HD21	13.98	0.71	PR8	10.32	0.73	T22	n.d.	0
I1	n.d.	0	PR9	14.08	0.56	T23	n.d.	0
KA13	n.d.	0	PR14	14.83	1.32	T24	n.d.	0
KA14	n.d.	0	PR15	13.63	0.50	T25	n.d.	0
KA15	13.76	1.67	PR16	10.62	0.74	T26	n.d.	0
KA16	13.6	1.28	PR17	12.33	1.07	T27	n.d.	0
KA17	12.75	0.77	PR19	n.d.	0	T28	n.d.	0
KA18	13.34	0.67	PR20	n.d.	0	T29	n.d.	0
KA19	n.d.	0	PR21	12.01	1.61	T30	n.d.	0
KA20	13.22	0.61	PR22	16.40	0.67	T31	n.d.	0
KA21	n.d.	0	PO3	n.d.	0	TO3	n.d.	0
KA22	15.55	1.10	PO4	13.15	0.5	TO4	n.d.	0
KA23	n.d.	0	PO5	12.09	0.65	VB4	n.d.	0
KA24	n.d.	0	PO6	n.d.	0	WR3	n.d.	0
KA25	10.73	0.5	PO7	11.54	0.52	WR4	n.d.	0
KA26	17.8	1.61	PO8	11.31	0.32	WL1	n.d.	0
						WL2	n.d.	0

inhibitory concentration was then calculated from the six assays. The antibacterial activity of honey samples which did not inhabit growth of *E. coli* at the highest concentration assayed (23.45%, v/v) was designated non-detectable as artificial honey in this method of assay against *E. coli* was found to cause inhibition (due to the effects of osmolarity and/or acidity) at a concentration of 28.1% (v/v) but not at 23.45% (v/v).

Assay of antifungal activity

It had initially been intended to screen the honey samples for antifungal activity against *Epidermophyton floccosum*. However numerous attempts to get usable lawns of growth of this species, in a repeatable manner for the large number of assays and repetitions of assays required, were not successful. Several cultures of this fungus were obtained from the Microbiology Department, Waikato Hospital, but a similar problem was found with all cultures. It is not understood why this occurred, as in previous research in our laboratory using this organism similar problems were not experienced. An alternative species of dermatophyte was therefore used, *Trichophyton mentagrophytes* var *mentagrophytes*.

Cultures of the dermatophytes were grown on Sabouraud agar slopes for six days, then washed with sterile physiological saline to obtain a suspension. The suspension was adjusted, by the addition of more saline, to an absorbance of 0.1 at a wavelength of 660 nm, measured against a saline blank. From the suspension, 1.5 ml was aseptically transferred onto 30 ml of solidified Sabouraud agar in a 100 cm x 100 cm square Petri dish. The inoculum was evenly spread over the plate with a cooled flamed glass spreader. The plates were loosely covered and left to dry at room temperature for 3 h.

Sixteen wells were cut into the agar with a cooled flamed 10 mm cork borer, following a square grid on which numbers were randomly assigned to each well. To each of these wells, 100 ul of a 40% (v/v) honey solution was aseptically added. The plates were incubated at 28°C for 72 hours. At 24 hour intervals during the incubation, any solution remaining in the wells was removed, and 100 ul of the appropriate freshly prepared honey solutions were added to the wells.

The diameters of the clear zones of inhibition were measured twice using vernier callipers, each measurement being at right angles to the other. Zones in which growth occurred but was less dense than that outside of the zone, i.e. showing partial inhibition, were not included in the measurements. In wells in each agar plate were also included, as controls, sterile distilled water and sterile catalase solution. Also included in a well on each plate was a standard honey (manuka honey, code M61) of known antimicrobial activity (both total and non-peroxide activities). The use of a honey standard instead of a phenol standard as in the other assays was necessary because phenol is not an effective antifungal agent. Each honey assay was assayed six times, twice on each of three days, with a different sub-culture used each time and freshly prepared honey solutions each day. The antifungal activity of each honey sample was then recorded as the mean of the six determinations. The values were to have been normalised with reference to the standard honey, but no variation was seen in the zone diameter with this honey from assay to assay.

Results

Candida albicans

The initial assays of honey samples of a range of floral sources against the yeast *C. albicans* indicated that this organism is not inhibited by the antimicrobial activity of honey. In some instances growth of the yeast surrounding the wells was observed to be of a greater density than on other areas of the plate, indicating that growth of *C. albicans* is enhanced by the sugars present in the honey. On the basis of the results of these first assays it was decided not to continue testing against this organism until studies on the fungal and bacterial species had been completed.

Staphylococcus aureus.

None of the honey samples tested were seen to have any non-peroxide activity. The results for total antibacterial activity are shown Table 1.

Escherichia coli

None of the honey samples tested were seen to have any non-peroxide activity, there being the same amount of growth seen as in the control (catalase solution without honey) in all of the honey solutions at the highest concentration tested, 23.4% (v/v). The minimum inhibitory concentrations (MIC) for total antibacterial activity are shown Table 2. Not detectable (n.d.) refers to honey samples where the MIC is above 23.4% (v/v). Above this concentration osmotic effects and/or acidity are involved.

Trichophyton mentagrophytes var. mentagrophytes

None of the honey samples tested were shown to have any non-peroxide antifungal activity. The antifungal values for total activity are shown in Table 3.

Conclusions

There was no observation of any non-peroxide activity against any of the species of micro-organism in any of the samples of honey tested. Although testing at higher concentrations of honey may have revealed such activity it would be at such a low level that it would be of no significance for possible therapeutic usage.

There is some evidence in the results of there being sub-detectable levels of non-peroxide activity present in some of the honeys, as there are some cases where there is proportionally more activity against one species of micro-

organism than against another. These suggest that there may be sub-detectable levels of non-peroxide activity working synergistically with hydrogen peroxide activity. But again this is of no significance for possible therapeutic usage as the increase in activity is small, and it does not appear be consistent characteristic of particular floral sources.

There were no honey types found that showed any potential for treating *Candida albicans*. infections (thrush).

Three types of honey can be clearly seen to have outstanding hydrogen peroxide activity: these are Penny Royal, Rewarewa and Beech Honeydew. These have the potential to be marketed as therapeutic honeys: all are harvested in significant quantities by New Zealand's beekeepers, though the amount of Penny Royal honey produced in some seasons may be low if climatic conditions are unfavourable.

Although some samples of other floral sources showed good activity it cannot be concluded on the basis of the data in hand that they are useful marketing as therapeutic honeys. In some cases a large proportion of the samples had no detectable activity, and in other cases the number of samples obtained was too low for there to be any firm conclusions about the value of that floral type. A larger number of samples may have revealed that these floral sources do not constantly give honeys with high activity. Also, there is no absolutely reliable way of identifying the floral source of a honey produced by bees free to forage, so it must always be expected that a number of samples will be mis-identified.

Acknowledgements

The experimental work and data handling in this project were carried out by Nicolette Brady, who was also responsible for producing much of this report

The assistance of the many beekeepers who provided and identified honey samples is gratefully acknowledged.

RECIPES

Spiced Banana Layer Cake

½ cup shortening
1 cup honey
2 eggs
2 cups whole wheat flour
2 teaspoons baking powder
½ teaspoon baking soda
½ teaspoon cinnamon
¼ cup honey
¼ cup milk
1 teaspoon vanilla extract
½ cup mashed ripe banana (1 large or 2 small bananas)

Banana Cream Filling

1 cup whipping cream
2 tablespoons honey
2 ripe bananas, sliced

Prepare cake layers. Grease and flour the bottoms of two 9-inch round cake pans. Preheat oven to 350 degrees. Cream short ening; continue creaming while adding 1 cup honey in a fine stream. Add eggs and beat until well blended. Stir together dry ingredients. Stir 1/4 cup honey, milk. and vanilla into mashed banana. Add banana mixture allernately wilh dry ingredients to creamed mixture, beginning and ending with dry ingredients. Pour batter into pre pared pans and bake 25-30 minutes, until cakes test done. When layers are cool, either wrap individually to freeze or serve at once. Fill and frost with Banana Cream Filling just before serving. To prepare Banana Cream Filling, whip cream until stiff. Sweeten to taste with honey. Spread half of whipped cream over one layer of Spiced Banana Layer Cake; cover with half of banana slices. Top with second layer of cake; frost with whipped cream and garnish with remaining banana slices. (Variations: Place all of the sliced bananas between the layers. Sprinkle the frosted top layer with toasted coconut or flaked. toasted almonds.)

Honey Baked Pears

8 pear halves
¼ cup lemon juice
½ cup honey
1 teaspoon ground cinnamon
2 tablespoons butter

Arrange the pears in a shallow buttered baking pan. ,Pour the lemon juice and honey over them. Sprinkle with cinnamon and dot with butter. Bake at 350 degrees. Serve hot with cream or ice cream. *Yield: 8 servings.*

Cheesecake Pie

Crust

¾ cup graham cracker crumbs
¼ cup honey
¼ cup melted butter or shortening

Filling

1 package (8 ounces) cream cheese
1 cup small-curd creamed cottage cheese
½ cup honey
2 eggs
2 tablespoons flour
½ tablespoon salt
1 tablespoon grated lemon peel
1 tablespoon lemon juice
1 teaspoon vanilla extract dash of ground nutmeg

Topping

1 tablespoon sugar
1 cup sour cream
½ teaspoon vanilla
¼ cup cracker crumbs

Prepare Crust: Combine ingredients and press against bottom and sides of a well-buttered 9-inch pie plate. Refrigerate for at least an hour. Prepare Filling: Combine cheeses in mixer or blender until smooth. Add remaining ingredients and mix well. Pour into chilled crust; bake at 350 degrees 30-35 minutes, or until a knife inserted in the centre comes out clean. Remove from oven. Prepare Topping: Raise oven tempera ture to 475 degrees. Combine sugar, sour cream and vanilla; spread over baked pie. Sprinkle crumbs over top and heat 5 minutes. Cool. Then chill several hours before serving. *Yield: 6-8 servings.*

Fruited Honey Muffins

1 cup whole bran cereal
1 cup raisins
1 cup honey
1 cup milk
1¼ cups whole wheat flour
2 teaspoons baking powder
2 teaspoons cinnamon
⅛ teaspoon nutmeg
2 eggs, slightly beaten
¼ cup vegetable oil
1 tablespoon grated lemon peel
1 cup finely chopped nuts (optional)

Grease well 18 large muffin cups. Preheat oven to 400 degrees. In a large bowl, combine bran, raisins, honey and milk. Set aside. Mix together flour, baking powder and spices. Fold eggs and oil into bran mixture. Stir in dry ingredients until moistened, but do not beat. Add lemon peel and nuts. Fill muffin cups ⅔ full. Bake 20 minutes or until done. Loosen edge of muffins with spatula. Serve hot. (Note: These freeze well.) *Yield: 18 muffins.*

Honey Carrot Bread

1 cup honey
1 tablespoon vegetable oil
1 cup finely grated raw carrots
1 cup hot water 2 eggs, slightly beaten
2½ cups whole wheat flour
teaspoon salt
2½ teaspoons baking powder
½ teaspoon baking soda cup coarsely chopped walnuts

Grease a 9x5x3 inch loaf pan. In a large bowl, combine honey, oil and carrots. Pour on hot water. Stir to mix, then cool. Add eggs. Combine flour, salt, baking powder and soda. Fold into carrot mix ture, mixing only until dry ingredients are moistened; do not beat. Stir in nuts. Pour batter into prepared pan. Let stand 5 minutes while preheating oven to 350 degrees. Bake 1 hour or until the loaf tests done in the center. Cool on a rack 10 minutes; remove loaf from pan and conlinue to cool on the rack. When cool, wrap well in foil or plastic wrap and let stand in a cool place 12-24 hours before serving. One level teaspoon of honey weighs approximately one ounce. One cup of honey weighs twelve ounces. One pound of honey measures 1-1/3 cups. *Yield: 1 loaf.*

Honey Stuffed Apples

1 cup honey
6 medium-sized cooking apples
1⅓ cups honey
½ cup water
⅓ cup red hot cinnamon candies or ¼ teaspoon ground cinnamon
⅔ cup raisins
½ cup ground coconut

Peel and core apples. In a 10-inch skillet or large saucepan, blend together honey, water, red hots or cinnamon. Bring to a boil; boil 10 minutes or until red hots have dissolved. Add apples and cook until fork tender, but not soft, turning and basting often to cook evenly. Place apples on serv ing platter or individual dishes. Plump raisins by soaking in a cup of hot water; drain after 5 minutes. Mix raisins and coconut and spoon into centers of apples. Pour cool;ing syrup over apples. Serve with cream or ice cream. *Yield: 6 servings.*

Moisture level and colour of honey

by Bob Cox and Bill Huser

'Iowa State Apiarist, Des Moines, IA and Sioux Honey Association, Sioux City, IA

Refractometers: How to calibrate and use them properly

From a recent incident at last summer's State Fair honey judging event it became evident that something was lacking in the accurate use of hand-held refractometers. We had exhibitors saying that they were getting different moisture percentages than we measured at the time of judging. After inquiring of other beekeepers owning hand-held refractometers, it was clear that not everyone used or calibrated them the same. Dadant and Sons, the supplier from which our refractometer was purchased, was called for help. A bottle of calibration fluid and a new thermometer to replace the broken one was ordered. We thought, "now we'll get a clear answer with the instructions that come with the calibration fluid." However, these instructions were unclear.

Later, we had a discussion and exercise in calibrating refractometers at our annual meeting in November. One of the authors, Bill Huser, a chemist for Sioux Honey Association, was involved and felt that the instructions were unclear and needed some clarification. An appointment was made to meet at the Sioux Honey Association's laboratory in Sioux City where there are several table-top models of refractometers with which to check out the hand-held models. From our discussion and experience with the refractometers, we would like to share some important points to keep in mind when operating and calibrating a hand-held refractometer.

Determining the Moisture Level of Your Honey

A large number of beekeepers determine if honey is ripe or thick enough just be sticking their finger in it or turning a jar upside down and watching the speed at which the bubble of air rises to the top. This method will give some valuable information if you have a great deal of experience to interpret your observations. An instrument used in years past was a hydrometer to determine the specific gravity of a honey sample. However, this instrument is now seldom used.

The most commonly used instrument today for determining the sugar content or conversely, the moisture content of honey and syrups is the refractometer. What the refractometer measures is the "refractive index" which is the ratio of direct light to refracted light (the light shining through the honey). Any liquid bends (or refracts) the light much the same way a prism works. A change in temperature changes the refractive index of a liquid. This is an important factor to keep in mind when using a refractometer.

There are two types of hand-held refractometers commonly in use (see Figure 1). There is an older model that is no longer available. The older one is the better of the two, having two glass prisms and an adjustment ring which, when properly adjusted, gives you a clear line to read the moisture level. It is calibrated by inserting a special piece of glass instead of honey. The newer model often has a fuzzy line causing inaccurate readings and is not as high quality an instrument. Additionally, the instrument is calibrated with a special fluid which costs about $50 per bottle. If you have one of the older models, hang onto it!! One supplier recently told me that a similar instrument today would cost over $900.

To determine the moisture level of your honey sample open the hinged prism (see Figure 2) and place a drop of honey in the centre of the glass piece. Close the door and pointing the end with the honey toward a bright light source, look into the eyepiece. Turn the eyepiece to focus so that the numbers and marks are clear. What you should see when looking into the eyepiece is portrayed in Figure 3. To determine the moisture level read the scale where the dark field meets the light field. In other words, where the line falls on the scale gives the moisture level. The scale in Figure 3 is reading 18.6%. Notice that there are two scales visible. The scale on the left reads even tenths of a percent (e.g. 18.0, 18.2, 18.4, 18.6, etc) and the scale on the right reads odd tenths of a percent (e.g. 18.1, 18.3, 18.5, 18.7, etc). If the line does not line up on a mark on the left scale, then determine which line on the right it lines up with. The clearer the honey, the better line you'll get. The problem comes with a sample that does not give you a clear line. Any honey crystals, air bubbles, wax or dark coloured honey will give you a fuzzy line and an inaccurate reading.

All of this is pretty straightforward and simple so far. However, temperature affects the reading of a refractometer. That's why a thermometer is located on the side of the instrument. If you look into the eyepiece, you'll notice that under the two scales it says, "20°C" on the newer models and "25°C" on the older ones. That means that the "0" point on the thermometer is set for 20°C or 25°C, respectively. As the temperature goes up (away from the thermometer bulb) you subtract a tenth of a percent to the moisture level for each mark on the scale.

The thermometer allows you to adjust up to plus (+) or minus (-) 1% to the moisture level. On this thermometer one tenth of a percent moisture is approximately equal to one degree centigrade with honey samples. Table 1 gives a comparison of Centigrade and Fahrenheit temperature scales. For example, 20°C is about 68°F or room temperature. The refractometer is best operated at this temperature. The desk model has water running through it to keep it at 68°F. Be careful not to let the hand-held instrument get hotter than 90°F or the thermometer may burst and you're out about $50. Also do not carry your refractometer around in the truck. Any sharp jarring can separate the fluid in the thermometer and again render it useless.

Fig.1 - Two common models of hand-held refractometers used to determine the moisture level in honey. The older model is the one on the left.

Make sure that the sample of honey (in a container with a tight fitting lid) to be tested and the refractometer have been in the same room for an hour or so before attempting to measure the moisture level.

Again, the closer the room temperature to 68°F the better. If the honey is in a large container such as a 60 lb. pail or 55 gal. drum, it should be left overnight.

Be careful not to handle the instrument excessively before reading the moisture level because you may warm it up above the room temperature. The temperature on the refractometer's thermometer should be the same temperature as the honey to be tested. Never submerge or run hot water over the instrument to clean it between honey samples. Use a small piece of sponge kept in a small bowl of water at room temperature to clean honey off the prism and then gently dry with soft cloth or tissue paper.

How the Calibrate the Refractometer

Now, after making a large purchase, i.e. $300 refractometer or $50 bottle of calibration fluid, how do you make sure that it reads accurately? If you have the older model, the procedure is simple. Place the calibration glass ("Test Piece B") with a drop of bromo-naphthalene where you would normally place the honey and it should read 18.6% regardless of the temperature. If not, use a small precision screwdriver to adjust the larger set screw on top of the instrument nearest the eyepiece until it reads 18.6% moisture.

If you have the newer model, you must use the calibration fluid ("Standard Liquid LB") and it is a little more complicated, because the reading varies with the temperature unlike the calibration glass. It is best if you can find a room that is 68°F, the refractometer's thermometer should read "0" and the instrument should read 18.6%. If it does not read 18.6, adjust the set screw as explained previously. If the temperature is not 68°F, use the following method to make the calibration.

Use a thermometer to determine the room temperature. Look up the temperature on Table 1 and the refractometer should read the same percent moisture as on the table. For example: If the room temperature is 77°F (25°C), your refractometer should read 19.4%, with the calibrating fluid. If not, adjust the set screw until it reads the percent moisture listed on the table for the room temperature.

Honey Colour Graders

Honey is graded by colour from water white to dark amber. Honey grading by colour is a little more difficult than determining the moisture percent. Colour is a matter of perception, of subjective interpretation. Honey colour has different dimensions and no two people see a particular colour the same.

Two instruments are used to determine the proper colour class of honey: the Lovibond® and the Pfund honey graders. The more affordable Lovibond® grader has six different coloured glasses mounted on a wheel with which to compare

Table 1 Temperature conversion and standard liquid LB readings

Degrees Fahrenheit	Degrees Centigrade	Percent Moisture
59	15	17.9*
61	16	18.0
63	17	18.2
64	18	18.3
66	19	18.5
68	20	18.6
70	21	18.8
72	22	18.9
73	23	19.1
75	24	19.2
77	25	19.4
79	26	19.6
81	27	19.7
82	28	19.9
84	29	20.0
86	30	20.2

** Underlined values are those on LB Standard Liquid Bottle.*

Table 2 Comparison of Lovibond® honey classes and Pfund honey grader readings

COLOUR CLASS LOVIBOND®	Pfund grader readings
WATER WHITE*	8 mm and below
EXTRA WHITE*	16 mm - 9 mm
WHITE*	34 mm - 17 mm
EXTRA LIGHT AMBER	35 mm - 49 mm
LIGHT AMBER	50 mm - 85 mm
AMBER	86 mm - 113 mm
DARK**	114 mm and above

** Often these three classes are lumped together to form the "white" class.*

*** "Dark Amber" according to USDA standards; just "Dark" according to the Pfund grader.*

the honey sample. The honey sample is placed in a glass cell that comes with the instrument and the cell is placed in the holder. The cell gives you a standard thickness of honey that you are looking through for the comparison. The instrument is held up to a light and the test glasses are rotated, like a Viewmaster®, to compare with the honey sample. The different colour classers are shown in Table 2, along with the Pfund grader scale. The colour of the sample will fall between two of the test colours. The honey is graded at the darker colour. For example, if the colour of the honey sample is in between extra light amber and light amber, the sample is graded as light amber.

Be very careful when handling the glass cell for the honey sample. It is made of optical quality glass and is very expensive (about $50). Only use a soft cloth or tissue paper to dry the cell.

The Pfund grader is more difficult to use because the technician is comparing the honey sample to a continuous colour gradient from water white to dark. The advantage of this instrument over the Lovibond® is the greater precision possible. The adjustment knob is turned to move the sample back and forth to compare with the colour gradient. When you get a good match in colour, you read the scale in millimetres.

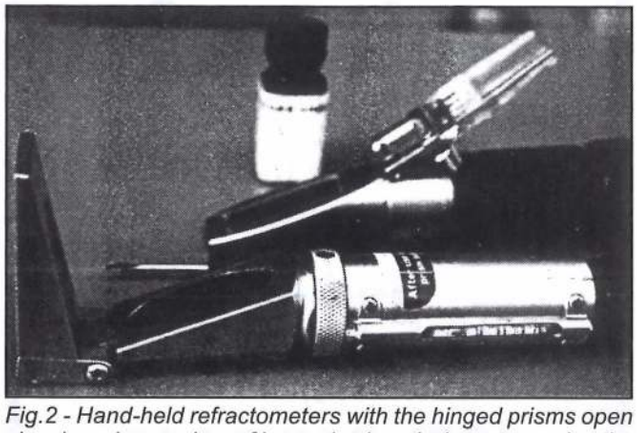

Fig.2 - Hand-held refractometers with the hinged prisms open showing where a drop of honey is placed when measuring the moisture level of honey and where the test glass or fluid is placed for calibrating the instruments.

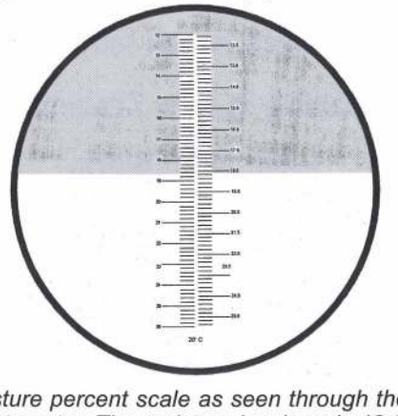

Fig.3 - Moisture percent scale as seen through the eyepiece of the refractometer. The moisture level reads 18.6%.

Diary these dates...

SCHOOL TERMS 1998

Primary

First Term

Commences	Wednesday	28 January	1998
Ends	Thursday	9 April	1998

Second Term

Commences	Monday	27 April	1998
Ends	Friday	3 July	1998

Third Term

Commences	Monday	20 July	1998
Ends	Friday	25 September	1998

Fourth Term

Commences	Monday	12 October	1998
Ends	Wednesday	16 December	1998

(or to a day in December which ensures that the school has been open for instruction for 394 half days).

Secondary and Composite Schools

First Term

Commences	Tuesday	3 February	1998
Ends	Thursday	9 April	1998
		(Easter Sunday 12 April)	

Second Term

Commences	Monday	27 April	1998
Ends	Friday	3 July	1998

Third Term

Commences	Monday	20 July	1998
Ends	Friday	25 September	1998

Fourth Term

Commences	Monday	12 October	1998
Ends	Friday	11 December	1998

(or to a day in December which ensures that the school has been open for instruction for 380 half days).

SCHOOL HOLIDAYS 1998

Primary

Term 1:	10 April 1998	to	26 April 1998
Term 2:	4 July 1998	to	19 July 1998
Term 3:	26 September 1998	to	11 October 1998
Term 4:	17 December 1998	to	either last week of January 1999 or first week of February 1999.

Secondary and Composite Schools

Term 1:	10 April 1998	to	26 April 1998
Term 2:	4 July 1998	to	19 July 1998
Term 3:	26 September 1998	to	11 October 1998
Term 4:	12 December 1998	to	either last week of January 1999 or first week of February 1999.

PUBLIC HOLIDAYS 1998

New Year's Day	Thursday	1	January	1998	ANZAC Day	Saturday	25	April	1998
& Day Following	Friday	2	January	1998	Queen's Birthday	Monday	1	June	1998
Waitangi Day	Friday	6	February	1998	Labour Day	Monday	26	October	1998
Good Friday	Friday	10	April	1998	Christmas Day	Friday	25	December	1998
Easter Monday	Monday	13	April	1998	Boxing Day	Monday	26	December	1998

ANNIVERSARY DAYS 1998

Wellington	Actual Date	22 January	1998	-	Observed Monday	19 January	1998	
Hawke's Bay	Actual Date	1 November	1998	-	Observed Friday	23 October	1998	
Nelson	Actual Date	1 February	1998	-	Observed Monday	2 February	1998	
Auckland/Northland	Actual Date	29 January	1998	-	Observed Monday	26 January	1998	
Taranaki	Actual Date	31 March	1998	-	Observed Monday	9 March		1998

T.I.P.

The optimist is the kind of person who believes a housefly is looking for a way out.

T.I.P.

Tomorrow is always the busiest day of the week.

T.I.P.

When you get kicked from the rear it means you are in the front.

T.I.P.

The Camel never sees its own hump, but that of its brother is always before its eyes.

T.I.P.

If it wasn't for the last minute nothing would get done.

T.I.P.

I don't know the key to success, but the key to failure is trying to please everybody.

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If you have not received your copy of "The Apiarist of New Zealand" in the last few weeks, it may be because you ticked the box on your MAF return that requested that your name not be passed onto a third party for direct mail purposes. However, we'd love to send you one, so please contact us now and we'll get one in the mail promptly.

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EXECUTIVE MEETING DATES

DECEMBER - 2nd and 3rd - CHRISTCHURCH
MARCH 98 - 3rd and 4th - AUCKLAND

MAGAZINE Copy/advertising deadline 1st of month. EXCEPT for DECEMBER issue. DEADLINE 25 NOVEMBER

COMING EVENTS...

NELSON BEEKEEPERS CLUB
SPRING '97

WE'VE GOT SOMETHING FOR EVERYONE IN OUR SPRING PROGRAMME - SO GET THOSE DIARIES OUT FOLKS.

BEGINNER'S FIELD DAY: MAF Apiary Inspector Dave Gruebar, will give a disease presentation and go through a hive. Focused mainly on the beginner but there may be items of interest for everyone. WHERE: Industrial Therapy Unit, Ngawhatu, Pete and Kevin's place. WHEN: 10am, Saturday, 18th October. Tea and coffee available - bring a picnic lunch.

SUBS DUE FOR THOSE WHO PAID IN '96: Please pay treasurer Pete Rees at Industrial Therapy Unit, Ngawhatu. Amount $10.
CLUB CONTACT: Pete and Kevin, Ngawhatu, 546-1422. Nigel Costley, 13 Brook St, 548-3121 or ph/fax 548-3101.

CANTERBURY BEEKEEPERS CLUB
NOTICE OF MEETINGS

OCTOBER EVENING MEETING. DATE: Tuesday, 28 October 1997. TIME: 7.30pm sharp.
VENUE: Burnside Cricket Club, Avonhead Rd, Christchurch.

NOVEMBER FIELD DAY. DATE: Sunday, 9 November 1997.
VENUE: Tom Penrose's place, North Loburn, (see map and advertisment in October issue).

AUCKLAND BEEKEEPERS CLUB INC. — SECRETARY - Terry Buckley Ph: (09) 415-9853

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Phone: (03) 312-7587

SOUTH CANTERBURY BRANCH
Phone: Noel
(03) 693-9771

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
These are held on the first Saturday each month, August to May, except for January on which the second Saturday is applicable.
The site is at 681 Cashmere Road, commencing at 1.30pm.
Contact Peter Silcock
Phone: (03) 342-9415

DUNEDIN BEEKEEPERS CLUB
We meet 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
Meet second Sunday of each month at 10.00am for cuppa and discussion.
Secretary — Yvonne Hodges,
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Phone: (09) 294-7015
All welcome — Ring for venue.

HAWKE'S BAY BRANCH
Meets on the second Monday of the month at 7.30pm.
Cruse Club Taradale.
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MANAWATU BEEKEEPERS CLUB
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Palmerston North.
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Phone: (06) 368-1277

NELSON BRANCH
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(03) 528-6010

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

WELLINGTON BEEKEEPERS ASSOCIATION
Meets every second Monday of the month (except January) in Johnsonville. All welcome.
Contact: Shauna Tate, 6 Martin Street, Porirua East.

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