Hivelights

CANADIAN HONEY COUNCIL

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2000 CHC Board of Directors

President, Merv Malyon
Manitoba Beekeepers Association
Box 9 Site 30 RR3
Brandon MB R7A 5Y3
ph. 204-725-1479

Vice President, David MacMillan
Ontario Beekeepers Association
RR2
Thornloe ON P0J 1S0
ph. 705-563-8222

Executive Director, Wink Howland
Saskatchewan Beekeepers Association
Box 55 RR 3
Yorkton SK S3N 2X5
ph. 306-783-7046

Executive Secretary, Heather Clay
Suite 236, 234-5149 Country Hills Blvd NW
Calgary AB T3A 5K8
ph. 403-208-7141

Chris Alen
Alberta Beekeepers Association
921 Smelter Ave
Medicine Hat AB T1A 3N6
ph. 403-527-6898

Blaine Hardie
British Columbia Honey Producer's Association
4035 Robson Rd
Duncan BC V9L 6G7
ph. 250-746-4389

Denis Pellerin
Fédération des Apiculteurs du Québec
808, rang 8
Tingwick QC JOA 1LO
ph. 819-359-2966

Paul Vautour
Maritime Beekeepers Association
488 Cape Breton Rd
Saint Phillippe NB E1H 1W2
ph. 506-388-5127

John Pedersen
Bee Maid Co-op
Box 579
Cutknife SK S0M 0N0
ph. 306-398-2793

Canadian Honey Council (CHC)

members include

* Beekeepers
* Researchers
* Co-op Honey packers
* Bee supply establishments

CHC is the national link between provincial beekeepers associations, government agencies and the Canadian Association of Professional Apiculturists

CHC's role is to

* provide leadership
* serve as an advocate
* serve as a focus for information and communications
* provide liaison between beekeepers, government & industry
* raise national awareness of honey bees and pollination
* lobby on behalf of beekeepers in areas of national concern
* promote research through the Canadian Bee Research Fund

CHC partners with the Canadian Association of Professional Apiculturists to provide valuable research information and professional beekeeping advice.
Our partnership with CAPA provides

* Canadian Bee Research Fund
* Annual research symposium
* CHC is also a member of the worldwide Apimondia association.

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Calgary AB T3A 5K8

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CANADIAN HONEY COUNCIL ◆ CONSEIL CANADIEN DU MIEL

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OFFICERS OF THE CANADIAN HONEY COUNCIL

Canadian Beekeepers Association 1940-1972

	President				Secretary		
1940-41	William R. Agar	Brooklyn	ON	1940	W.T Patterson	Winnipeg	MB
1942	Sam M. Deschenes	Montreal	QC	1941-48	Roy M. Pugh	Tisdale	SK
1943	J.W. Braithwaite	Brandon	MB		"		
1944	P.C. Colquhoun	Maple Creek	SK		"		
1945	Allan T. Brown	Peterborough	ON		"		
1946	W.E. Phillips	Dauphin	MB		"		
1947-49	Frank Garland	Winnipeg	MB		"		
1949-51	J.N. Dyment	Smithville	ON	1949	W.G.LeMaistre	Edmonton	AB
1952	Peter Kowalski	Edmonton	AB	1950-59	Roy M.Pugh	Tisdale	SK
1953-54	W.H.Turnbull	Vernon	BC		"		
1955-56	H.C. Allen	Toronto	ON		"		
1957-58	Sid J. Lye	Oakville	MB		"		
1959-65	Victor Mesley	Kemptville	ON	1960-62	R.M.McKay	Ottawa	ON
1966-67	Earl J. Burnett	Roland	MB	1962-69	John E. King	Ottawa	ON
1968-69	Robert. Asher	Brooks	AB		"		
1969-71	Lou Truscott	Creston	BC	1969-71	Hank R. Taylor	Ottawa	ON

Canadian Honey Council 1972-2000

	President				Secretary		
1971-72	Don F. Peer	Nipawin	SK	1971-72	Hank R. Taylor	Ottawa	ON
1972-74	Robert Bird	New Westminster	BC	1972-75	Frank R. Garland	Winnipeg	MB
1974-76	Jack M. Smith	Beaverlodge	AB	1975-82	Fred Rathje	Bassano	AB
1976-78	Gerry Paradis	Falher	AB		"		
1978-80	Tom Taylor	Nipawin	SK		"		
1980-82	Howard Bryans	Alvinston	ON		"		
1982-84	Merv Abrahamson	Pelley	SK	1982-85	Bob Douglas	MacGregor	MB
1984-86	Jerry Awram	Hines Creek	AB	1985-98	Linda Gane	Nipawin	SK
1986-88	Dale Hansen	Farmington	BC		"		
1988-93	Roger Congdon	Cottam	ON		"		
1993-95	Barrie Termeer	Rollyview	AB		"		
1995-99	Wink Howland	Yorkton	SK		"		
	President				**National Coordinator**		
1999-00	Merv Malyon	Brandon	MB	1998-00	Heather Clay	Calgary	AB

MINUTES OF THE 59th ANNUAL MEETING OF THE CANADIAN HONEY COUNCIL February 3 - 6, 2000, Saskatoon SK

The 59 th annual meeting of the Canadian Honey Council opened at 1.30 PM, Thursday 3 February 2000 at the Radisson Hotel, Saskatoon SK.
President Merv Malyon invited members and guests to enjoy the progam of speakers slated to give presentations on research results and issues affecting beekeepers. Reports are in Section II.

BUSINESS MEETING Saturday 5 February 2000
Present: Merv Malyon, David Macmillan, Wink Howland, Blaine Hardie, Chris Alen, John Pedersen, Denis Pellerin, Paul Vautour,
Executive secretary Heather Clay

MINUTES OF THE 1999 MEETING
Motion: Moved by Dave MacMillan, seconded by Wink Howland to accept the minutes of the 1999 meeting as printed in the proceedings. **CARRIED**
There was no business arising from minutes.

Resolutions from 1999 — Merv Malyon

Progress of 1999 resolutions.

1. Publishing of National Honey Survey Statistics Canada ☑
The CHC met with personnel in the Statistics Branch and successfully lobbied to resume publishing annual statistics.

2. Request for Border closure ☑
The Federal Minister of Agriculture agreed to border closure and the proposal was gazetted 22January 2000 for a term of 5 years.

3. Naming of the African Small Hive Beetle as a pest ☑
The Department of Agriculture and Agri-Food Canada has acknowledged our request and the paperwork is in progress. Ontario has named the beetle in its provincial act.

4. Implementation of the Good Management Practices code ☑
The Canadian Food Inspection Agency will not only use the GMP but will expand on it for the Canadian Honey Grading Regulations.

5. Pesticide use and bees ☑
The CHC met with the Pesticide Management Regulatory Agency, Ottawa and got agreement for a national safety awareness plan an acknowledgement of the problem with pollinators and pesticides and a move towards better labeling.

6. Federal Research positions We tried but got a no. ☒
The CHC met with the head of the Research Branch in Ottawa and lobbied for maintaining current and creating new apicultural research positions within Agriculture Canada. The Department has lost 1,000 positions and offered to assist with partnering through an NSERC grant. Guess that was a no unless we pay the salary.

7. Nectar secretion as a selection criteria in new plant varieties. ☑
The CHC approached the seed companies AgrEvo, Proven Seed, Zeneca to remind them about the benefits of nectar secretion for attracting pollinators. This is long term goal and we have taken the first step.

8. Meaningful standard of honey import inspections ☑
The CHC met with CFIA and got assurances that inspections would be increased on imported honey, especially from countries with a poor record of compliance.

9. Honey analog use ☑
The CFIA listened to our problem and developed a test to detect honey analog to a level as low as 7% blend. They will continue to monitor the situation. One packer was fined $25,000 for selling an adulterated product and we feel this is a positive outcome.

10. Alternatives to Lorsban for Lygus bug we are still trying ☐
The cost of safer alternatives like Dylox are keeping the cheaper and nastier Lorsban on the market. PMRA could not help us on this issue. Fortunately the lygus bug problem was not serious in 1999 and spraying of Lorsban was not a serious concern.

1999 FINANCIAL STATEMENT Wink Howland

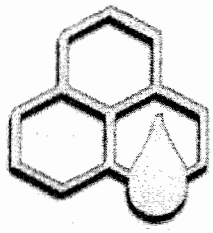
The financial statement Appendix 1 was presented to the delegates.
Motion: Moved by Wink Howland /Paul Vautour to accept the 1999 financial statement as presented. **CARRIED**

Motion: Moved by Wink Howland/ John Pedersen that Jack MacKay be appointed auditor for the year 2000. **CARRIED**

PRESIDENTS REPORT — Merv Malyon

The president discussed issues that directors took to Ottawa in April 1999, including environmental assessment fees, the small hive beetle and AFB resistance. He recommended that the national association is the best vehicle for dealing with these problems and beekeepers should bring concerns to the CHC.

Motion: Moved by Paul Vautour/ John Pedersen to accept the President's report as presented. **CARRIED**



NATIONAL COORDINATOR'S REPORT

Heather Clay

Beekeepers across the country have shown incredible support for the CHC by renewing their membership and affirming the need for an active national association. After an active campaign to encourage members to join CHC the number of members has doubled and the dollar value of membership increased from $10,000 in 1998 to nearly $20,0000 in 1999. This is a very direct and positive effect on the operation of the CHC as we get back on track helping to address beekeeper issues. We closed the year at break even instead of the projected deficit.

At the end of March the CHC executive, consisting of Merv Malyon, Dave MacMillan and myself attended meetings in Ottawa. The import fee issue was of major concern to beekeepers importing package bees and queens from Australia and New Zealand. The CHC approached the Minister of Environment, the Minister of Agriculture & Agri-Food (AAF) and the President of the CFIA to settle the problems that arose over the issue. We were successful in having the CFIA reduce the Environmental Assessment fee from $150 to $40 and we expect that the fee will be eliminated as soon as the Environment Department sorts out their problem in classifying honeybees. Those who were charged the higher fee in 1999 should be reimbursed or credited with the difference in the fee. The CHC is continuing to negotiate for elimination of the fee because we consider it is unnecessary and was imposed because of an oversight in the listing of honeybees.

At the CFIA advisory committee we discussed many issues from unpasteurized honey, labeling honey for floral sources to the problems of transgenic pollen in canola honey. This forum is a useful avenue for bringing industry concerns to the notice of the regulatory bodies. GMOs and honey have increasingly become a concern to packers exporting to Europe. We hope to work with CAPA and government to determine our industry response.

One item which interests Ontario and Eastern beekeepers is the recommendation to allow the use of a 330g, 250 ml size honey jar. This size jar is easier and cheaper to purchase and adds another level of choice for the consumer. It is legal to use in Ontario but not for interprovincial trade. The CHC has gained exemption for this container for a two year period starting in January 2000.

The African Small Hive Beetle is another concern for beekeepers. The CHC approached the Minister to have this beetle named as a pest under the Animal Health Act. Brian Jamieson of AAF assured us that the request is still in progress. We also sought to keep the border closed to imports from the USA and with CAPA's support we achieved this for a five year period commencing January 2000.

While in Ottawa, Merv Malyon, Dave MacMillan, Doug McRory and I visited the head of the AAF Research Branch, Dr. Morrisey and the Director General of the Western Region, Dr. Dorrell, to discuss our concerns about the loss of research. They understood our concerns and promised assistance where they can, but considering they have lost 1,000 positions in their research branch the chance of any new positions is very slim. The suggested Agriculture/NSERC/industry research grants but this is limiting and costly. We will have to look to our industry to help fund any research.

We also met with personnel from the Pesticide Management Regulatory Agency (PMRA) to discuss the problems of misuse of application of pesticides. With the increase in canola acreage this is going to be a bigger issue than ever. The PMRA has agreed to the need for a national awareness strategy, to work on better labeling and where possible enforcement of non-compliance. Unfortunately most provinces regulate the aerial applicators and they have very low budgets for enforcement. We will continue to monitor the situation and make our concerns known.

The CHC lobbied the CFIA to continue sampling for adulterated honey. A prosecution was obtained in Quebec where Labonte was fined $25,000 for adulterated honey. This is a very positive move and we applaud the CFIA for persisting in this case.

As a result of our active lobbying the CFIA has decided to recognize honey as a commodity on its own. In the past only one person has been assigned on a half time basis to the honey industry. We now have a full time Honey Specialist, John McCool, with sole responsibility for honey. We congratulate the CFIA on this move and look forward to working together in the future.

In fall the CHC participated with a government consultant to determine the potential value of a colony of honeybees in the event of eradication

and compensation by the government. It was an interesting exercise and with input from the Provincial Apiarists, we produced a model that can be used for determining the value of a colony in a particular year and geographical region. The final value agreed on and submitted for approval was $250 per colony.

It came as a shock to us to learn that Kerry Clark was reassigned to another area of work within the BC Ministry of Agriculture and Food. The CHC wrote to the Minister of Agriculture about this short sighted decision, particularly since Kerry was working on a research project funded co-operatively by the Canadian Bee Research Fund. This unilateral decision to remove an important researcher from our apiculture research program is a serious challenge to the concept of government partnering with industry. We also protested the loss of the Fairview Apiculture Technician course in Alberta and we participated in a review of the Beaverlodge research station. It appears that decisions are often made before consultation with industry and there is little that can be done after the fact.

Apimondia 99 is over but the effect will ripple through our industry for years. This was an event of huge proportions for beekeeping in Canada. It has put us on the international beekeeping map, not only for the quality of research that we were able to demonstrate but the quality of our products. We extend our congratulations to the Apimondia organizing committee for doing an exceptional job.

The importance of world trade was driven home by the large number of inquiries at the Canadian Honey Council booth for the names of Canadian suppliers of honey. The CHC has a web site www.honeycouncil.ca which lists suppliers and this proved to be a wonderful marketing tool. The web site also has information on Canadian apiculture, a section on Canadian books and publications as well as a page for CAPA. There is information on honey, pasteurization, infant botulism, pollination and bees, including proof that a bee flies 50K miles to gather a pound of honey. All the research reports for the Canadian Bee Research Fund have been uploaded to the site. Visitors to the web site have increased from 1 or 2 per day to 15-20 per day so the word is getting around.

Our Canadian Honey Council exhibit won second prize at Api Expo. There was a lot of tough competition but the interesting design of our booth and the colorful display of products grabbed everyone's attention. The exhibit booth was designed by Dale Willard of Duck Mountain Design, Manitoba. Each of the provinces contributed to the Trading Post display area of our booth and enthusiastic volunteers helped us look after the customers many of who were international visitors.

Several promotional items were made available this year. The products include a new lapel pin with our gold logo on a blue background, T-shirts and a very popular brass wind chime ornament with our bear logo in the centre and four bees flying around it. As well there is a redesigned recipe brochure, an up dated teacher's kit in English and French and Canadian Honey posters. Order forms are now on the internet at our web site, http://www.honeycouncil.ca.

The last year was very active and time consuming as I got the CHC files organized and archived. I did a time management study of this position dividing the tasks into liaison, communication, meetings, finance, promotion and administration. A conservative estimate of the time involved for all the tasks was 2600 hours of which I was paid for 1300 hours. The directors of the CHC now have the job of deciding which jobs are important and which can be out-sourced or eliminated. It should be an interesting year ahead.

Motion: Moved by Chris Alen / Wink Howland to accept the Executive secretary's report as presented. **CARRIED**

FEDERAL GOVERNMENT REPORTS

CANADIAN FOOD INSPECTION AGENCY COMPLIANCE PROGRAM — John McCool

CFIA was hampered by Y2K problems which prevented the production of a compliance report. McCool discussed the work of the CFIA advisory committee. The members of the committee are John McCool (CFIA), Merv Malyon (CHC), David MacMillan(CHC), Wink Howland (CHC), David Sugarman (Billy Bee) Paul Belisle (Bee Maid), Jean Marc Labonte (Labonte), Kenn Tuckey (CAPA) and Doug McRory (CAPA)
The team has been working on honey labeling issues, especially the term unpasteurized, floral source and GMOs. A small container of 250 ml size has been given experimental exemption for use for 2 years

HONEY INSPECTION PROGRAM — Jim Muir

CFIA is concerned with the issues surrounding the term pasteurization of honey and they are working towards a more accurate definition.

MARKET & INDUSTRY — Dave Pearen

Trends in beekeeping for the 1999 season are

presented in Appendix 2 and 3. Honey imports from China have decreased and overall the market looks good for honey.

ANIMAL HEALTH **Brian Jamieson**

A report was presented on the border closure issues. The US border closure ban has been extended for 5 years from 22 January 2000.

The Asian bee *Apis cerana* was found in the port of Brisbane Australia on two occasions in 1999. It is not expected that this will be a cause for concern and it will not affect the importation of honeybees from Australia this year.

CAPA REPORTS

CAPA President **Cynthia Scott Dupree**

Fluvalinate tolerant varroa in the USA has become a big concern as it has become widespread throughout the USA. Recently the small hive beetle has become a problem in Florida and CAPA is monitoring the situation. Border closure is recommended to maintain the health of our industry while we determine more effective integrated pest management. Coumaphos although illegal in the USA is being used without regulation and this may become a big problem for Canada. CAPA will form a honey survey committee to discuss with CHC and government, some alternatives to the data collection problems of Statistics Canada. CAPA is concerned that our industry will become marginalized if we lose our status in agriculture.

CAPA CHEMICALS COMMITTEE John Gruszka

Members of the Chemicals Committee: John Gruszka, Chair; Medhat Nasr; Doug McRory; Rhéal Lafrenière; Stephen Pernal.

With the recent move of Kerry Clark from his apiculture position to another posting within British Columbia Agriculture, the Chairmanship was taken over by John Gruszka and two new members, Rhéal Lafrenière and Stephen Pernal were added to the committee.

The following are the major issues of the past year:

1. Small Hive Beetle

The Small Hive Beetle (SHB) has been of concern since it was first found in Florida. It has spread via migratory beekeeping and the shipment of packages and queens to various parts of the United States. There is speculation that the Small Hive Beetle is already in California and it is known to have been spread to (e.g. New York and Minnesota) states which border onto Canada.

While there is concern that SHB may soon be found in Canada, it is not yet known what impact it will have in northern climates. Marla Spivak (personal communication) indicated that SHB was found two years ago in southern Minnesota and appears to be able to winter within the winter cluster. However, in the ensuing two years, the Beetle levels have not increased to any significant degree in the infested hives and are certainly not causing the kinds of problems as they are in the southern United States. This begs the question as to how severe a pest it will be in northern latitudes.

The second concern is one of a registered chemical control. I have been in contact with David Latter, who is working behalf of Bayer to have Coumaphos registered in Canada. Mr. Latter informs me that the Coumaphos technical formulation has been submitted to the Pest Management Regulatory Agency (PMRA) for screening of the chemistry of Coumaphos. This application was made in May 1999. Once this step has been completed, the next step will be to apply for registration of the Coumaphos formulation in Canada or possibly to apply for a minor use permit for the use of the Coumaphos strips currently used in the United States.

This review may take some time. In June of 1999, PMRA issued a document indicating that they were about to re-evaluate the use of all organophosphates in Canada. According to the re-evaluation document, "Pending completion of the re-evaluation of organophosphates, no new submissions for major new uses of organophosphates will be considered. In addition, all new products, registration renewals and amended registrations that are granted subsequent to publication of this announcement will expire no later than December 31st, 2000. All subsequent new products, registration renewals and amended registrations will be for a period not exceeding one year until this re-evaluation is complete. The future registration status of products containing organophosphates will depend on the outcome of the review."

2. Formic Acid Gel Packs

There are two products which are market ready and need approval. One is from Nod Industries from Ontario and the other is for the U.S. product Apicure. Nod Industries apparently has an application for its formic acid product under review

with PMRA in Ottawa and has had for some time. The U.S. product, Apicure, has been registered for use in the United States. Application to PMRA for use in Canada has yet to be done.

Every effort will be made between now and spring to determine the status of these products and insure that their use is legitimate in Canada and available for the coming season in Canada.

3. Skunk Control

The Manitoba Beekeepers Association, working with Medivet Pharmaceuticals of Alberta, is attempting to obtain a registration for the use of strychnine for skunk control by beekeepers. The MBA has taken a lead role in this issue and has contacted Federal Government authorities who indicate that they will explore the possibilities. The Chemicals Committee will assist wherever it can to see if strychnine can be registered for skunk control and be used by beekeepers across the country.

4. Fluvalinate-Resistant Varroa Mites

Reports from the United States indicate that the fluvalinate-resistant Varroa mites are spreading in the United States. What was first found in Florida has now also been reported in Texas and California. Again the likely spread is migratory beekeeping. The reports are becoming increasingly negative in that more hives are becoming involved and the mortality levels are increasing significantly.

So far, there have been no reports anywhere in Canada that Apistan is not controlling Varroa mites. However, the Committee feels that a proactive stance should be taken in regard to this problem in Canada and that sampling should begin in earnest to insure that Apistan is still effective in Canada.

5. Antibiotic-Resistant Foulbrood

This is another serious problem which is spreading in the United States and is currently reported to be found in 16 States in the U.S.A. This is a serious concern for Canadian beekeepers in that many provinces in Canada no longer perform the same level of inspection of bee hives for foulbrood as 20 years ago.

The Committee suggests that we undertake an initiative to insure that antibiotic-resistant AFB is not already widespread in Canada and to devise a strategy to insure that antibiotics continue to work for the industry.

CAPA IMPORT COMMITTEE — Doug McRory

In 1999, there were two successful imports of Buckfast eggs directly from Buckfast Abby in England to Canada. The first was to Ontario and the second to Nova Scotia. The Ontario Buckfast Breeders assisted with the Nova Scotia import and shared some of that stock. The Buckfast Breeders now have a good foundation of stock to build their breeding program in Canada. In the future, they may be interested in bringing Varroa resistant stock if their colleges in Europe are successful in adding this trait to the Buckfast Bees there.

In 2000, the Import Committee has received a request to import queen bees from France for genetic evaluation for Varroa resistance and a request to import eggs and semen from the USA from the Russian Bee Project being conducted by Dr. Rinderer, for evaluation for Varroa resistance. Dr. Gard Otis will carry out the French project and Dr. Medhat Nasr will carry out the Russian bee project. The committee carefully reviewed each application and after intense scrutiny, CAPA recommends to CHC and CFIA that the proposed imports of queen bees from France to test for Varroa resistance and the proposed import of eggs and semen from United States to test for Varroa resistance be accepted and approved. These stocks will be released to Canadian beekeepers if they prove to be useful genetic material.

CANADIAN BEE RESEARCH FUND — Mark Winston

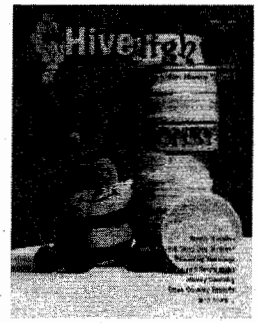
Since the CBRF started two years ago over $150K has been donated by beekeepers and industry. Approximately $67,000 has been committed towards the endowment fund and $58,300 has been distributed towards six research projects across the country. The Weston Foundation has made a significant contribution to the CBRF and this has been extremely important in allowing the long term endowment to increase.

The CBRF objective is to raise $1 million over a ten year period. To reach that goal, it is suggested that each beekeeper donates $0.25 per hive annually and that each provincial association contributes 10-15% of funds raised annually to support research within each province.

Reports of CBRF funded research are presented at the annual Research Symposium and can be read online at http://www.honeycouncil.ca or found in Hivelights.

HIVELIGHT REPORT — Heather Clay

Fran Kay has resigned from publishing Hivelights. Alternatives will be sought for the February issue and a options will be investigated to include all the provincial associations in a national publication.



BYLAWS REPORT — John Pedersen

No further changes are suggested.

PROVINCIAL REPORTS

Maritime Beekeepers Association — Paul Vautour

Prince Edward Island beekeepers number around 50 and the island remains free of varroa and tracheal mites. Its borders are legally protected against importation of honeybees but the fear remains that the Confederation Bridge and the pressure to bring in bees for blueberry pollination may facilitate the importation of the mites.

According to Statistics Canada, New Brunswick has approximately 280 beekeepers with 8,000 colonies. The number of beekeepers is likely closer to 400 because there are 180 members of the NBBA. The increase in colonies each year for the past decade is a result of more nucleus colonies being raised for crop pollination under the New Brunswick Wild Blueberry Pollination incentive program sponsored by the provincial government. Honey production was variable around the province, overall it was a good crop.

Nova Scotia has approximately 450 beekeepers with approx. 17,000 colonies. The average yield per colony was above average at 32 kg (70 lb.) per colony. Despite the drier than normal season, there was an above average honey crop. This has resulted in a surplus of honey for some beekeepers.

Pollination of lowbush blueberry continues to require large numbers of honeybee colonies. Last season, about 13,500 colonies were used to pollinate this crop. Alfalfa leafcutting bees are used by several blueberry producers and the numbers of hectares pollinated by this bee remains stable. There is still some resistance or uncertainty among some producers about using ALB's and this is stifling any further growth in adoption.

A computer program for calculating honey bee stocking rates has been developed by Dick Rogers and is available on CD for both WIN and MAC. The program, Bee$Pay, is currently being updated and the new version should be available in early spring 2000.

Fédération des Apiculteurs du Québec — Denis Pellerin

The average crop in 1999 was 100 lb. per colony but there were big variations around the province. Beekeepers once again had labour problems and difficulty in recruiting experienced workers. Last year there was a preoccupation with Genetically Modified Organism concerns and Quebec beekeepers will be watching for decisions from our industry in this regard. Aerial spraying was done on sweet corn and leguminous vegetables that caused losses of bee colonies. Quebec will support any resolution to deal with pesticide sprays and honeybees.

A research program that was to be conducted by the province was not done. Beekeepers are concerned about the lack of government support for their industry. The adulterated honey issue which involved a Quebec packer caused a drop in sales of honey for everyone. This angered the beekeepers who produce a quality product but sales are beginning to climb again.

Ontario Beekeepers Association report — David MacMillan

Some areas had drought, some did not get a goldenrod flow and other areas produced well. Despite the variability the average crop was 130 lb. which is way above the 90 lb., 10 year average. Tracheal mites are a continuing problem and catching some beekeepers unawares. Ontario had 85,000 hives kept by 3,600 beekeepers in 1999.

Over 800 colonies were killed by Furadan sprayed on the sweet corn crop. Labeling the pesticide to prevent spraying when corn blooms and sheds pollen could help. This resolution has been raised for CHC to pursue.

Prices on the store shelves are holding although recently Presidents Choice was offering 500g. containers for $2.29 and other stores had prices as low as $2.47. This is a rumour that loss of export markets has caused honey to be held on inventory. Price may not improve for a while.

Small hive beetle (SHB) is a concern as the pest has been found in New York state. The province

has named the beetle as a reportable pest under the Ontario Bee Act. It was decided to quarantine the apiary if SHB is found.

The OBA employed Medhat Nasr during 1999 and kept the HTM breeding program going. However the continuity of his research is always a concern when funding is not certain. New funding is expected in March but as always with the government, there are no guarantees that the program will be continued.

Manitoba Beekeepers Association Report
Merv Malyon

The crop of 1998 was exceptional at 230 lb and the 1999 crop was good with 180 lb average. There are 92,000 colonies in the province and the 10 year average is 155 lb. Per colony. No EFB has been found for 2-3 years. The warmer spring and milder fall seasons experienced over the last few years is suspected of contributing to a higher incidence of tracheal mites. Bears and skunks are reported to be a problem. The Manitoba Beekeepers Association wants to pursue the registration of strychnine for control of skunks. This resolution has been brought to the CHC for support in this endeavor. There may be a possibility in partnering with outfitters for the control of Bears. There is a compensation program in Manitoba for loses due to bear damage. On any given quarter (land description) the first claim is accepted with no restrictions but for the second claim the beekeeper has to show that precautions were taken such as electric fencing

Saskatchewan Beekeepers Association
Wink Howland

Saskatchewan beekeepers enjoyed one of the best crop years in history, with yields averaging well in excess of 225 pounds per colony, and a total crop of about 23 million pounds. Although the summer was cool in Saskatchewan, there was sufficient moisture to keep crops growing, particularly in the hay areas, where the hay came back into bloom quickly after the initial cut. It was cool enough to keep the canola in bloom for a few extra days as well. The bees took full advantage of the flying time they were given, and thus the record was achieved. There has been a substantial increase in the number of farmers growing borage crops and several beekeepers have been able to extend both their season and their incomes through pollination of this crop. A specialty market is developing for borage honey, and since it is a nectar that is produced later in the year, it is possible to harvest a fairly pure crop of borage honey and to identify it as such. Hopefully it will demand a bit of a premium.

The infestations of varroa and tracheal mites in Saskatchewan have continued to gradually increase, but for the most part, the province remains mite free. In those areas where the mites are present, aggressive treatments have kept them in control, and has certainly contributed in slowing down the spread. In some operations where tracheal was quite endemic, it is now difficult to find the mites. Most of these operators are treating the mite with formic and achieving good results.

The number of colonies being operated in Saskatchewan increased in 1999, although the number of colonies imported from Australia and New Zealand appears to be down slightly. This can be attributed to the increased success beekeepers are having in producing nucs and improving their queen replacement techniques. It was interesting to see, at the recent convention, a number of advertisements by beekeepers selling nucs. The prices asked for these seemed to be consistent and in the range of $100 for a five frame unit. Most of the units were being advertised as containing Saskatchewan reared queens - a very positive sign.

Saskatchewan has enjoyed a very mild and storm free winter to date. If there is a problem, it will be with moisture as there is little snow cover in much of the province. The north central regions of the province have a much more normal snow cover than those areas south, and will not be as greatly affected if the spring is dry. However, as we all know, spring rains can convert drought worries to big smiles in very short order.

The low honey prices are certainly a concern. The large Saskatchewan crop offset some of the difficulties experienced in trying to profit from 70 cent honey, but it's questionable if beekeepers can hold out for too long a period should prices stay in that range and the harvested crops drop into the 150 pound range. We would certainly hope that we see some improvement in the months to come.

Alberta Beekeepers Association Chris Alen

There are 707 beekeepers keeping 210,000 colonies of honeybees. This represents approximately 40% of the colonies in Canada. A long cold wet spring and dry conditions in the major producing area of the Peace River caused a poor crop of 100 lb. average.

Pollination is an important source of income for many in southern Alberta. Around 55,000 colonies are used in canola pollination and they

only get 40 lb. honey per colony on average. The price for canola pollination is $110-$115 per colony.

Bear compensation has been cut in Alberta. This together with loss of income from a poor crop and losses due to canola spraying has beekeepers looking for compensation through the Whole Farm Insurance program (AIDA in other provinces). However the application fee is $600 which is lost if the applicant does not qualify and it is not clear whether beekeepers are included in the program.

BC Honey Producers Assoc. Blaine Hardie

1999 was the worst crop production year in over forty years of beekeeping for most of the province of BC with the exception being the Caribou Region which had average or above average production. The provincial average was 54 pounds per colony with the number of beekeepers going down to 2357 and the number of colonies going up to 47,615. The honey yield was 2,571,000 lbs. with an estimated value of $4,561,000. The average retail price was $2.04 per lb. The province does not keep statistics on the number of dollars generated in the pollination of cranberries, apples, raspberries, blueberries etc.

This past summer especially on Vancouver Island the wasps were a problem for many beekeepers. Some weaker colonies were totally destroyed by wasps.

There seems to be a slight increase annually in the number of AFB infected colonies which should be of some concern to the industry. The good news is that even though both varroa and tracheal mites are pretty well province wide the beekeepers are monitoring and treating very well.

The Northwest corner of the province appears to be mite free and we have a "gentleman's agreement" not to move or ship mite infested bees into that area.

Our 1999 annual general meeting in Kamloops had about one half of the normal attendance. It was the feeling that most beekeepers blew their budget on attending Apimondia in Vancouver. Everyone agreed that Apimondia was a huge success.

The two questions that were asked from the floor of the AGM about CHC were: 1. Where is the refund on the import permits and 2. What is happening with the honey analog problem and to make sure it remains high profile on the agendas it is a very important issue to maintain pure Canadian honey.

Motion to accept the delegate reports moved by Wink Howland/ John Pedersen. **CARRIED**

FRED RATHJE AWARD Wink Howland

The Fred Rathje award was made following the banquet at the combined SBA, CHC and CAPA convention. This year the recipient was

John Gruszka,

Saskatchewan Provincial Apiarist.

John has been extremely busy in the beekeeping industry for over 20 years. In the early years of his employment as Provincial Apiarist in Saskatchewan, he, along with a number of assistant inspectors, traveled to almost all beekeeping operations within the province, completing inspections, dispensing advice and helping beekeepers to do their job better. John's straightforward and clear explanations helped set many beekeepers on an improved path. As he became better known, John soon became Saskatchewan's information source on all aspects of beekeeping.

John's reputation had been solidly established by the time mites began to appear in the US. Prior to border closure, he worked hard at helping beekeepers improve their outdoor wintering of bees, particularly to protect themselves should the border become closed to imports. When it became apparent that mites were becoming widespread in the U.S. and that border closure would slow their spread to Canada, John attempted to sell support of border closure within Saskatchewan. Despite extreme criticism from some quarters, the reasonableness with which John presented his arguments supporting closure, convinced the vast majority of SK beekeepers to support his stance. The wisdom of his advice is still being proven in SK, as we still enjoy relatively low mite infestation levels.

John brings a high level of professionalism and integrity to his work and cares passionately about

what he does. It was truly rewarding to the awarding committee, to see John rendered speechless when he was named as this year's award recipient. John, who is usually very vocal, and is almost never at a loss for words, expressed more to the audience by his speechlessness, than could ever have been conveyed in words. Congratulations John Gruszka, as a very deserving recipient of the Fred Rathje award, and as the first recipient in the new millenium.

Motion to accept the Rathje report moved by Wink Howland/ John Pedersen. **CARRIED**

2000 RESOLUTIONS

1. Moved by Dave MacMillan/ Blaine Hardie
   BE IT RESOLVED that the Canadian Honey Council opposes the use of fat-free and cholesterol-free wording on labeling of honey. **CARRIED**
2. Moved by Dave MacMillan/ Wink Howland
   BE IT RESOLVED that Canadian Honey Council pursues with the Canadian Food Inspection Agency the removal of the federal registration requirement for the interprovincial movement of honey. **DEFEATED**
3. Moved by Dave MacMillan/ John Pedersen
   BE IT RESOLVED that Canadian Honey Council supports Ontario's request that the aerial application of Furadan be banned. **CARRIED**
4. Moved by Dave MacMillan/ Wink Howland
   BE IT RESOLVED that Canadian Honey Council supports the efforts of Bayer Co. Ltd. to register CheckMite (Coumaphos) in Canada. **CARRIED**
5. Moved by Dave MacMillan/ John Pedersen
   WHEREAS current label wording on insecticides restricts spraying on "blooming" crops, and
   WHEREAS some pesticide applicators fail to recognize that corn "blooms",
   BE IT RESOLVED that the Canadian Honey Council supports that the words "or shedding pollen" follow the word "bloom" on all insecticide use labels. **CARRIED**
6. Moved by Dave MacMillan/ Blaine Hardie
   WHEREAS varroa mites are a serious problem for the beekeeping industry, and
   WHEREAS genetic resistance to varroa mite appears to have been found in bees in France,
   BE IT RESOLVED that the Canadian Honey Council supports the University of Guelph's initiative to import, under strict Federal quarantine procedures, bees from collaborating researchers in France.
   Motion by Dave MacMillan and Blaine Hardie that the word bees be replaced with the words queen and attendants. **CARRIED**
7. Moved by Dave MacMillan,/ John Pedersen
   BE IT RESOLVED that the Canadian Honey Council supports the Ontario Beekeepers' Association's resolution to import Russian eggs and semen from the U.S. **CARRIED**
8. Moved by Chris Alen/ Wink Howland
   BE IT RESOLVED that the Canadian Honey Council petitions the Canadian Food Inspection Agency to expand the export certificate to include floral source, bee repellent residue and antibiotic residue all for the current price of $150.00, the certificate will still be voluntary.
   Moved by John Pedersen, seconded by Paul Vautour that this motion be tabled for further discussion. **TABLED**
9. Moved by Chris Alen/ Wink Howland
   BE IT RESOLVED that the Canadian Honey Council presses for Minor Use Registration for chemicals to control the African Small Hive Beetle.
   Moved by Chris Alen, Wink Howland that the word minor use be deleted.
   BE IT RESOLVED that the Canadian Honey Council presses for registration for chemicals to control the African Small Hive Beetle. **CARRIED**
10. Moved by Wink Howland/ Chris Alen
    WHEREAS the chemical Imidacloprid "Gaucho" has been registered for experimental use in Canada and
    WHEREAS the same chemical when used in Europe has led to suspected honeybee loss.
    BE IT RESOLVED that the Canadian Honey Council urge Bayer to set up some experiments using isolated sites and employing honeybees to determine whether there are any adverse effects.
    AND BE IT FURTHER RESOLVED that Agriculture and Agri-Food Canada co-operate with the Canadian Honey Council to oversee such experiments
    Moved by Wink Howland/ Chris Alen that the resolution be tabled for rewording. **TABLED**
    Moved by Wink Howland / Chris Alen that the amended motion reads
    WHEREAS the registration of the chemical Imidacloprid "Gaucho" has been accomplished on the basis of research provided by the registering company Bayer and
    WHEREAS there is considerable concern in Europe that this chemical has been suspected as a causative agent for the depopulation of honeybee colonies.
    BE IT RESOLVED that Canadian Honey

Council pursues independent testing of this product by Agriculture and Agri-Food Canada and the Canadian Association of Professional Apiculturists research community to evaluate the effect of this product on honeybees.

AND BE IT FURTHER RESOLVED that Agriculture and Agri Food Canada co-operate with the Canadian Honey Council to ensure the results of experiments be made available.

CARRIED

11. Moved by Wink Howland/ Dave MacMillan

WHEREAS the Federal Government has indicated that it is willing to consider a five year extension to the border closing regarding the importation of honeybees from the continental United States, and

WHEREAS resistance to Fluvalinate, Small Hive Beetle infestations, which are prevalent in portions of the United States, and are not currently problems in Canada, therefore

BE IT RESOLVED that the Canadian Honey Council supports the Federal Governments initiative to institute a five year period.

Motion withdrawn by movers because a five year closure was announced in the Canada Gazette 22 January 2000. **WITHDRAWN**

12. Moved by Wink Howland/ Chris Alen

WHEREAS beekeepers who are registered with the Canadian Food Inspection Agency are required to fill out a new application each year and submit the required fee, therefore

BE IT RESOLVED the Canadian Honey Council asks the Canadian Food Inspection Agency to change its procedure to one of where the registration information is retained on file and the CFIA merely bill the beekeeper on a yearly basis. **CARRIED**

13 Moved by Chris Alen/ Wink Howland

WHEREAS the risks associated with tracheal and Varroa mites being imported into beehives in Alberta, BC and other parts of Canada has changed, and the shortage of quality genetically naturalized queens continues to be the greatest management problem facing Canadian beekeepers;

BE IT RESOLVED that queens from the Continental US be allowed for import beginning in 2001 under a stringent protocol process developed by all stakeholders of the Canadian beekeeping industry.

John Pedersen withdrew from vote on advice of his board. **DEFEATED**

14. Moved by Chris Alen/ Dave MacMillan

BE IT RESOLVED that the Canadian Honey Council works with the provincial beekeepers associations, federal and provincial governments to develop a program to expedite access to the foreign Workers Recruitment Program. **CARRIED**

15. Moved by Merv Malyon,/ John Pedersen

BE IT RESOLVED that the Canadian Honey Council allocates the funds received from the Apimondia99 Organizing Committee in the following ways:

1) $20,000 to be used for Canadian Honey Council activities.
2) The balance, including present and future payments, to be transferred to the Canadian Bee Research Fund.

Motion by Dave MacMillan/ Wink Howland that the resolution be split into two. **CARRIED**

15.1. Moved by Dave MacMillan/ Paul Vautour

BE IT RESOLVED that the Canadian Honey Council allocates $50,000 of the funds received from the Apimondia99 Organizing Committee, for Canadian Honey Council activities. **CARRIED**

15.2. Moved by Dave MacMillan/ Paul Vautour

BE IT RESOLVED that the Canadian Honey Council allocates the balance of the funds received from the Apimondia99 Organizing Committee and future payments, to the Canadian Bee Research Fund. **CARRIED**

16. Moved by Merv Malyon/ Blaine Hardie

BE IT RESOLVED that Canadian Honey Council indicates its support for the Manitoba initiative to have Strychnine registered for Skunk control. **CARRIED**

17. Moved by Merv Malyon/ Dave MacMillan

WHEREAS the presence of honey residue in used drums may pose a risk associated with the transmission of antibiotic resistant American Foul Brood.

BE IT RESOLVED that the Canadian Honey Council pursues regulations that would require honey drums to be washed before return or importation into Canada.

Moved by Merv Malyon seconded by Dave MacMillan that the motion be amended to read:

WHEREAS the presence of honey residue in used drums may pose a risk associated with the transmission of antibiotic resistant American Foul Brood and African Small Hive Beetle.

BE IT RESOLVED that the Canadian Honey Council pursues regulations that would require honey drums to be washed and clean before domestic return or international importation into Canada. **CARRIED**

18. Moved by Merv Malyon/ Chris Alen

BE IT RESOLVED that the Canadian Honey Council continues its efforts to have the African Small Hive Beetle named under the Animal Health Act. **CARRIED**

19. Moved by Paul Vautour/ Wink Howland

BE IT RESOLVED that the Canadian Honey Council makes plans to hold the next annual meeting in conjunction with the New Brunswick Beekeepers Association in 2001. **CARRIED**

20. Moved by Paul Vautour/ Chris Alen
BE IT RESOLVED that the Canadian Honey Council expresses its gratitude to the Saskatchewan Beekeeper's Association for hosting the excellent convention that we just had. **CARRIED**

21. Moved by Wink Howland/ John Pedersen to accept a further resolution **CARRIED**
Moved by Wink Howland/ John Pedersen
WHEREAS African Small Hive Beetle may be imported into Canada in drums of honey
BE IT RESOLVED that the Canadian Honey Council approaches the appropriate authorities to address the concern of African Small Hive Beetle in drums of honey. **CARRIED**

FINANCE COMMITTEE REPORT Merv Malyon

The finance committee presented a budget (Table 1) which included increases in payroll to support the cost of maintaining a national office on a 35 hour a week basis. The budget was prepared without consideration of the monies to be received from Apimondia and may be adjusted in the future.
Motion Moved by John Pedersen/ Dave MacMillan to adopt the proposed budget subject to periodic review by the executive committee. **CARRIED**

Table 1. Proposed Budget For Years 2000/2001

INCOME	1999	2000	2001
Memberships	19,705	17,000	18,000
Delegate Fees	27,000	28,000	28,000
Interest	581	500	500
Hivelights Advt.	7,849	7,000	7,000
Promotion Mtls.	1435	1500	300
Ann. Mtg. Reg.	0	4,000	1,000
Miscellaneous	30	975	800
Total Income	56,600	58,975	55,600
EXPENSES	**1999**	**2000**	**2001**
Ads/ promotions	1,637	1,600	1,600
Audit – CHC	1,204	1,300	1,300
Annual Mtg.	1,729	500	500
Bank Charges	91	100	100
Hivelights	8,827	8,800	8,800
Awards	339	175	175
Memberships	1,137	1,250	1,250
Supplies/Post	3,013	3,100	3,300
Office	1,200	1,200	1,200
Other (Apimondia)	134	507	
Phone & Fax	1,419	2,500	2,500
Travel	2,875	4,500	4,500
Honorarium	3,000	2,000	2,000
Payroll	29,033	39,600	39,600
Total Expenses	56,145	66,625	66,825
Net Surplus	$405	($7,650)	($11,225)

ELECTIONS: Scrutineers were Doug McRory and Peter Keating. Nominations were provided by the Nominating Committee.
Doug McRory called for further nominations from the floor, there being none John Pedersen/ Blaine Hardie moved that nominations cease. **CARRIED**

President:
Merv Malyon was elected by acclamation.
Vice President:
David MacMillan was elected by acclamation.
Executive Member:
Wink Howland was elected by acclamation.

CAPA proposed that a meeting in 2002 should be considered with AIA and AAPA and AHP at a combined meeting in Niagara Falls.
Motion by John Pedersen/ Wink Howland that the executive pursue this option. **CARRIED**

ADJOURNMENT
The meeting was adjourned at 1.00 PM Sunday 6 February 2000.
Motion to adjourn the meeting by John Pedersen/ Wink Howland **CARRIED**

APICULTURE RESEARCH SYMPOSIUM
Friday 4 February 2000

APIMONDIA 99 — Don Dixon
Chair Canadian Organising Committee

The Canadian Apimondia '99 Organising Committee is pleased to present this report to the Annual Meetings of the Canadian Honey Council and the Canadian Association of Professional Apiculturists.

The Canadian Apimondia Organising Committee was created as a joint working group of the Canadian Association of Professional Apiculturists and the Canadian Honey Council. In addition, two other individuals worked to support the Congress deserve special recognition; Fran Kay for her work on publicity and the production of the souvenir program and Heather Higo for chairing the committee that coordinated the work of the volunteers.

The work of the Canadian Organizing Committee for the Apimondia '99 Congress of the International Federation of Beekeepers' Associations, which was held during September 12-17, 1999 at Vancouver, is drawing to a close. The Canadian Apimondia '99 Organizing Committee was formed in 1992 to organize the 36th Congress of Apimondia, on behalf of the Canadian Association of Professional Apiculturists (CAPA) and the Canadian Honey Council (CHC).

The Congress was a tremendous success with approximately 3000 registered guests representing virtually every country where honeybees are kept. There were more than 400 presentations related to every aspect of beekeeping imaginable. ApiExpo, the commercial display of beekeeping equipment and services was the largest such display ever held in the Americas with approximately 90 displays occupying some 130 booths. The Congress Proceedings were available at the Congress and additional copies are now available from the CHC at a cost of approximately $15.00 each.

Publicity for the Congress was widespread with beekeeping journals and newsletters throughout the world headlining this important world beekeeping event in Canada. The following quotation taken from the November, 1999 edition of the American Bee Journal is representative of the enthusiastic response to the Vancouver Congress;

"The Apimondia '99 Convention in Vancouver was a spectacular success. The 3,000 beekeepers attending often characterized their experience in superlatives: best organized; most beautiful location; friendliest people; perfect weather; best program and most interesting ApiExpo. The Canadian cast responsible for the tremendous success includes hundreds of volunteers, some of whom spent several years planning and organizing Apimondia '99."

The Apimondia Organising Committee: (L to R) **Don Nelson**, Research Scientist, AAFC, Beaverlodge, Alberta, **Cynthia Scott-Dupree**, Professor, U of Guelph, **John Gruszka**, Provincial Apiarist, Saskatchewan Department of Agriculture, **Don Dixon (Chair)** Provincial Apiarist, Manitoba Agriculture and Food, **Mark Winston**, Professor, Simon Fraser U, **Paul van Westendorp**, Provincial Apiarist, BC Ministry of Agriculture and Food, **Merv Malyon**, Commercial Beekeeper, President, Canadian Honey Council.
Missing: **Jean-Pierre Chapleau**, Commercial Beekeeper, Quebec, **Gard Otis**, Professor, U of Guelph.

The Canadian Organizing Committee met just before the Canadian Honey Council Annual Meeting at Saskatoon during February, 2000 to begin winding down the work of the committee and prepare a final report to CAPA and CHC. Although there are still a few details left to resolve, the Organizing Committee believes that they are close enough to the end of their work that they can announce the financial results of the Congress. The Committee is very pleased to announce that they expect a financial surplus from Apimondia '99 of approximately $400,000. Under the original agreement between the Organizing Committee and CAPA and CHC any surplus resulting from Apimondia '99 would be divided equally between CAPA and CHC. The Committee further approved the release of the 1st payment on the surplus of $175,000. to both CAPA and CHC for a total transfer of $350,000. The final payment of the remaining surplus will be made once all of the

outstanding obligations of the committee are met, sometime during 2000.

The Apimondia '99 Organizing Committee wishes to extend a most sincere thank you to all of the Official, Plenary and Symposium Sponsors as well as to the more than 100 volunteers, without whose support the Congress would not have been possible.

IPM Development of Parasitic Mites

Medhat Nasr [1]

The development and marketing of parasite mite resistant honey bee stocks was a key goal in our 1999 research.

Breeding and Evaluation

1 Maintenance of honey bee tracheal mite (HBTM) resistant honey bees.
Ontario bee breeders selected 221 colonies as potential breeders from offspring of the 1998 HBTM resistance program. Emerging workers were tested using HBTM bioassay and the top 25% with lowest prevalence of HBTM were selected for future HBTM resistant stock.

2. Breeding and amalgamation of the hygienic trait into HBTM resistant stock.
Most of the 15,000 queens produced in the HBTM hygienic bee program were used to requeen colonies across Ontario. Selected breeder queens were used to mass produce HBTM resistant hygienic bees for Ontario beekeepers.

3. Evaluation of hygienic honeybee stocks in removing varroa mites
The efficacy of hygienic bees in removing varroa infested pupae and in damaging varroa mites was determined in 18 colonies. Results showed that the average ratio of immature mites to fallen adult mites was 33.3 ± 17.37 (mean ± sd). The average ratio of damaged adult mites to the fallen adult mites was 21.91 ± 9.36 (mean ± sd). The average removal of freeze killed pupae was 76.41 ± 23.8 (mean ± sd). The correlation between the ratio of immature varroa mites to fallen adult mites and the percent of removed freeze killed pupae was 0.53 ($n = 18$, $P<0.01$). The correlation between the damaged adult mites to the fallen adult mites with the percent of removed freeze killed pupae was 0.22 and it was not significant.

IPM Program Evaluation

1. Efficacy of application of IPM on mite control
Colonies from 15 different operations were sampled for HBTM. The percentages with no detectable HBTM in spring and summer were 59% and 55% respectively. Colonies heavily infested with HBTM were in operations where Mite Wipe pads were only used for 1-2 applications instead of the recommended 3.

2. Evaluation of Ontario honey bee queens
Seventy-five queens were tested for HMTM and nosema as well as total sperm count. Results showed 3 queens with HBTM, 2 with nosema. The queens with nosema and one with HBTM originated from the same queen producer. The average number of sperm per queen was 3.9 ± 1.5 million (mean ± sd). Queen producers in Ontario queens were found to have healthy queens.

3. Efficacy of Single Application "MiteAway" in combination with essential oils on varroa mites.
Formic acid was found to be more effective against varroa mites. A small modification in removing the pads from perforated vegetable bags 15 days after treatment and placing the pads on the spacers for the rest of the treatment period, significantly increased the efficiency of the fall treatment.

4. Testing wintering systems
Different wrapping methods for winter protection were tested. Providing protection assisted colonies to conserve food consumption. The western wrap method was effective in all areas but required the longest installation time (20 mins for 4 hives). The cardboard and tar-paper methods were less effective. For handling time and consistent temperature control the VanDussen wrap method was found to be best.

Factors involved in the French Bee Malady

H.W.Schmidt [2], R. Schmuck [2]

Introduction

French beekeepers have accused Gaucho®, a seed dressing compound protecting sunflowers against damage caused by wireworms and aphids, being responsible for the disorientation of forager bees, for lower honey-yields, for decreasing the strength of bee colonies leading occasionally to complete loss of whole colonies and a reduced fitness of bees. Although the bee safety of Gaucho was already proved according to the existing guidelines and was accepted by the authorities this statement was investigated by

- Field trials with seed dressed sunflowers,
- Feeding with contaminated sugar syrup,
- Analysis of residues in bees, pollen and nectar.

[1] Ontario Beekeepers Association, Guelph, ON.

[2] Bayer AG, Crop Protection, Germany

Results of field trials

Sunflower seeds were treated with Imidacloprid (active ingredient (ai) in Gaucho) 0.7 mg ai per grain and planted with 71,000 plants per hectare amounting to 50 g ai/ha. For comparison an isolated field was planted with untreated sunflowers in a distance of 6 km to exclude the exchange of honeybees. 9 weeks after planting the sunflowers began to flower and 6 beehives were placed in the middle of each field. The foraging activity was high **(Fig.1)** and reached 120 bees per 100 heads without a difference between treated and untreated sunflowers. The number of returning bees, entering the hive within 2 minutes, was slightly higher in the Gaucho-field **(Fig.2)**. More bees in the latter field carried pollen loads. Only 3 % of the pollen originated from sunflowers. The main pollen sources have been maize and wild mustard growing in the neighborhood. The 6

Fig. 1. Foraging activity bees on 100 sunflower heads

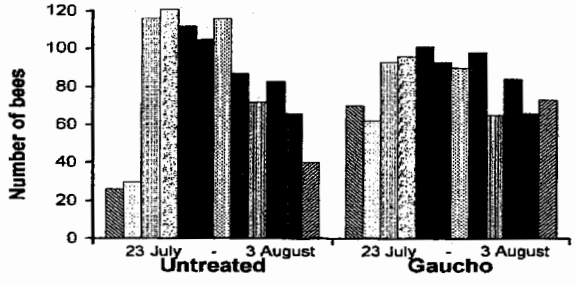
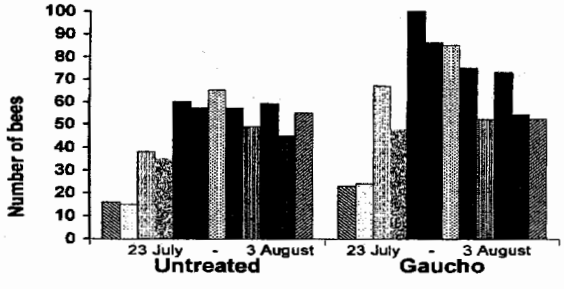


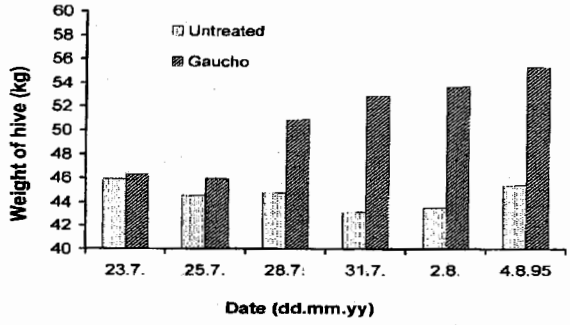
Fig. 2. Bees returning from sunflowers



beehives on the untreated field maintained their weight more or less constant with 99 % after 12 days **(Fig.3)**, whereas the 6 beehives on the Gaucho field increased their weight to 119 % gaining 9 kg during the flowering period.

In none of the 3 tunnel and 8 field tests conducted in sunflowers treated with Gaucho a detrimental effect on the honeybees could be observed. The abnormal behavior of the bees as it was reported by the French beekeepers could not be reproduced. Even field trials conducted by official governmental institutions did not confirm that Gaucho causes

Fig. 3. Weight of hive on sunflower average of 6 colonies



Feeding experiments with complete beehives under field conditions

In a next series we conducted feeding tests to determine the minimum concentration, which triggers any reactions of the bees. Imidacloprid was mixed in 50 % sugar syrup at a concentration of 20 µg/Liter = 20 ppb and was offered in 150 m distance of a beehive consisting of 10 combs. The number of bees turning up at the feeder and the amount of collected syrup did not differ from a beehive, to which uncontaminated sugar syrup was offered **(Fig.4; 5)**. Marked bees were seen repeatedly at the feeder and no unusual behavior

Fig. 4. Bees visiting food source with 20 ppb Imidacloprid

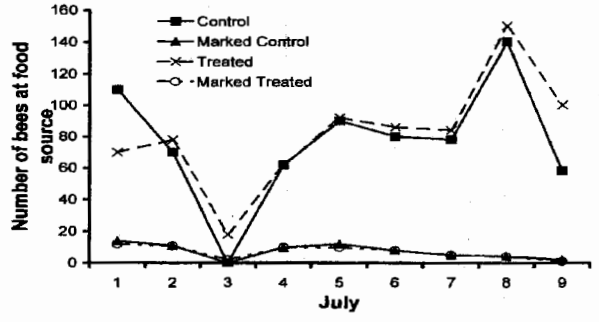
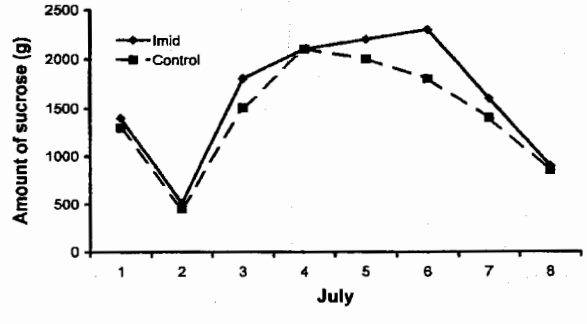


Fig.5. Daily amount of ingested sucrose with 20 ppb Imidacloprid



was observed. This leads to the conclusion that bees do not realize a concentration of 20 ppb Imidacloprid.

When in a follow up experiment 50 ppb Imidacloprid in sugar syrup was offered, the bees initially turned up at the feeder in large numbers. However after 1 hour their number decreased and they avoided the contaminated food **(Fig.6; 7)**.

Fig. 6. Feeding 50 ppb Gaucho, bees at feeder day 3

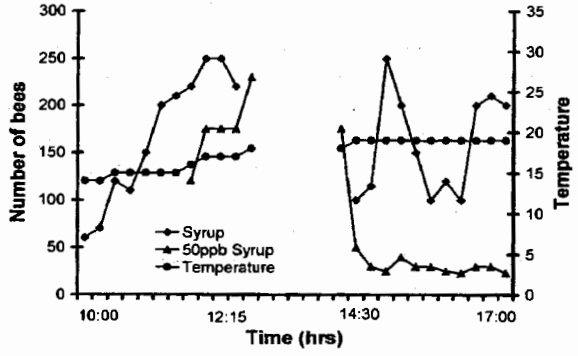
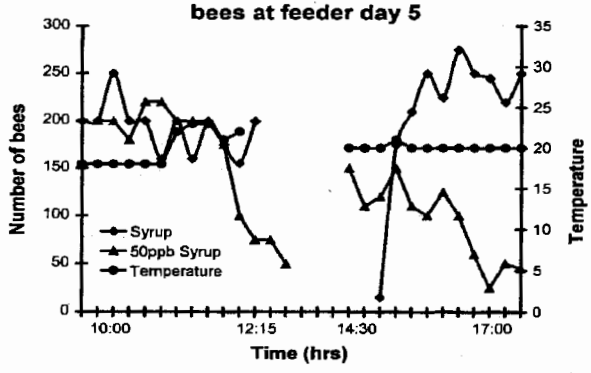


Fig. 7. Feeding 50 ppb Gaucho, bees at feeder day 5



This reaction was reversible. At the next day or already in the afternoon the bees appeared again at the feeder and collected contaminated syrup for one hour only. That means that bees realize Imidacloprid at a concentration of 50 ppb, but they are not harmed, because the effect is transient. The bees had transferred 4.8 kg of this food into the hive. A follow up observation for three months did not reveal any abnormalities. With this method the claim of the French beekeepers of a loss or disorientation or disappearance of bees was not confirmed.

In a series of very fine feeding experiments Prof. Kirchner (University of Konstanz, Germany) analyzed the dancing pattern of the bees under the influence of Imidacloprid. Bees performing the waggling dance gave the correct direction (no angel deviation) of the feeder up to 100 ppb (highest offered concentration). They gave the correct information of the distance up to 20 ppb. The motivation of performing the waggling dance (the recruitment activity) was somewhat reduced at 20 ppb and the frequency of trembling dances (the inhibition of recruitment) did slightly increase at 20 ppb. This does not mean that the bees are harmed. The bees detect Imidacloprid at concentrations of 20 ppb and higher. However the detection threshold is not identical with the response threshold. The recognition of 20 ppb is not expressed in any change of the foraging activity, behavior, orientation, longevity, breeding performance or population strength.

Residue findings in sunflowers dressed with Gaucho

Based on the findings of the controlled feeding experiments a concentration of 20 ppb can be considered as a no-adverse effect concentration for honeybees. The residues found in sunflower blossoms (from Argentina), nectar (from bees), honey (from France) and bees (taken from sunflower heads) are always below 10 ppb, which is the limit for the quantification of Imidacloprid residues.

Analysis conducted by independent French institutes did also not find quantifiable residues. It is important to note that there is a gap between concentrations being necessary to trigger a reaction of the bees and the amount being available in the sunflowers. This leads to the conclusion that Gaucho used for seed dressing in sunflowers cannot be responsible for the effects as reported by the French beekeepers.

Other factors for the French bee malady

Since the symptoms of the French bee malady as they are described by the French beekeepers could not be reproduced in field and feeding experiments it is possible that other factors besides the seed dressing with Gaucho may be involved. It has been observed, that at the time of flowering aphids colonize the sunflowers. Imidacloprid is an aphicide and aphids are ten times more sensitive to this active ingredient than honeybees. This kind of biotest indicates that no active substance is biologically available, at the period when the bees are exposed. Bees showing the French bee malady appeared in regions, where sunflowers have not been planted and were Gaucho has not been used. When there is no link with the use of Gaucho, then no causative connection exists. Diseases, pathogens and parasites can weaken the bees. The infection of the concerned beehives with varroa-mite or with viruses has not been thoroughly investigated. The state of health of the bee colonies suffering the French bee malady was almost unknown. There

are closed similarities between the appearance of diseases and the described symptoms. The participation of these completely different causes in the reduction of honey-yields and in the loss of bees remains an open question.

Conclusion and Summary

When bee colonies have been exposed to sunflowers being seed dressed with Gaucho 0.7mg ai/kernel under real agricultural field conditions, the results did not show negative influence. There have not been indications of a depopulation, of decreased honey yield or of disorientation. These results have been confirmed in the 1998 Research Program of the French Ministry of Agriculture.

From the controlled feeding experiments with sugar syrup containing Imidacloprid it can be deducted that 20 ppb (= µg/Liter) can be considered as having no adverse effect. To obtain effects showing a reaction of the colony higher concentrations are necessary. Residues in this range have, however, not been found in sunflower blossoms, nectar, honey and bees. Only non-quantifiable traces below 10 ppb have been reported in chemical analyses.

According to these findings a causative participation of Gaucho in the French bee malady can be excluded. There are positive prospects that the seed dressing of canola with Gaucho will not harm or influence the beehives. To confirm this, a tent test has already been conducted in Saskatchewan and a large field test is scheduled in the season 2000.

CANADIAN BEE RESEARCH FUND PROJECT REPORTS

Apiculture Research Symposium Friday 4 February 2000

Evaluation of Indoor Winter Treatments for Varroa Control

Don Nelson [1] and Kerry Clark [2]

Summary

During two seasons of indoor wintering (1997 and 1998) non varroa mite-infested colonies were treated twice at approximately two week intervals with oxalic acid (20 ml of 2%), lactic acid (50 ml of 15%), formic acid (40 ml of 65%), thymol powder (20 g), Apistan (1 strip) and in 1997 mineral oil (25 ml) and wintergreen (25 ml) to evaluate the effect on bee mortality. In 1998 varroa infested colonies were selected and wintered indoors to evaluate the effectiveness of oxalic acid (20 ml of 2%), lactic acid (50 ml of 15%), mineral oil (25 ml), thymol (20 g dissolved in ethanol and applied to florist foam).

Dead bee counts during the treatment period for mineral oil in 1997 were three times greater than the control and twice that of the other treatments under the test conditions. The ratio of dead bees counts for the first measurement after treatment divided by the count before treatment ranged from 0.5 to 7.6 in 1997 and from 1.1 to 33.3 in 1998.

In varroa infested colonies seven of the sixteen colonies died during the wintering period or were dead when first checked after they had been moved outdoors in the spring. Of the remaining nine colonies varroa counts using Apistan and sticky boards were only obtained for 5 colonies. The range of mite levels for these ranged from 26 to 114 mites. None of the treatments appeared to give reasonable control.

Introduction

This project evaluated the impact on bees and the control potential of oxalic acid, lactic acid, thymol and formic acid applied to indoor wintered colonies with and without varroa mites.

Apistan use in a wintering facility would be unsuitable because of the temperature and access for timely removal. The extended use of Apistan (longer than 45 days) throughout the winter is not recommended and might contribute to fluvalinate tolerant varroa. Alternatives, including some organic acids and essential oils have shown potential (Calderone and Spivak, 1995; Kraus & Berg, 1994; Sammataro *et al.*, 1998) and their efficacy might be increased when varroa are more vulnerable during the winter when brood is minimal. However, their application usually requires an appreciable amount of labor and repeated applications. It is sometimes difficult for a commercial beekeeper to fit the required schedule into a summer management schedule. Thus, it would be an advantage to apply treatments in late fall or winter when the beekeeper is less busy. Application during the winter would also take advantage of minimal sealed brood, most mites would be on adult bees, leaving them more vulnerable to any treatment (Nelson, 1999).

Methods and Materials

The non varroa mite-infested colonies at Beaverlodge were prepared in June by placing 2-3 frames of bees and brood into a standard super and placing a queen cell in each (Nelson 1997b). The colonies developed over the summer, were

[1] AAF Canada, Box 29, Beaverlodge, AB
[2] BC MAF, Dawson Creek, BC

prepared for wintering indoors (Nelson, 1997a) and moved into a wintering building the third week of October at 5°C for the studies in 1997 and 1998. Two applications of each treatment were administered: in 1997 - 14 November and 5 December, and in 1998 - 24 November and 4 December.

In 1997and 1998, at Beaverlodge, twenty-four, single chambered colonies were placed into the following six treatment groups:
1) 40 ml 65% formic acid applied to an absorbent pad on the top bars
2) 20 ml 2% oxalic acid drizzled between frames with a large syringe
3) 50 ml 15% lactic acid drizzled between frames with a large syringe
4) one strip of Apistan hung between the middle frames
5) 20 g thymol powder in a Petri dish - top bars (1997); 20 g thymol powder dissolved in ethanol, absorbed by 3" diameter florists foam and after evaporation of alcohol placed on the top bars (1998) through a hole in the inner cover.
6) untreated control colonies.

As well, wintergreen and mineral oil (25 ml) were applied to each of two colonies in 1997 only. All treatments were applied through a 4 inch diameter hole in an inner cover, which had a ½" rim. Dead bees were caught in a tray attached to the entrance board of each colony and emptied approximately every three days. Estimations of adult bees were made the following spring (May 13/98) and (May 20/99) by removing each frame from the super and giving a value between 0.0 and 1.0 for a rating on each frame side and these ratings were summed to total frames of bees.

In 1998 varroa infested colonies were selected during the summer with various infestation levels and placed in treatment groups with some high and low levels in each group. These colonies were wintered indoors in Farmington, BC. The treatment doses and application methods were similar to those described above. Application of treatments occurred on 26 November and 10 December. Spring mite levels were obtained by placing a sticky board on the bottom board of each colony for 3 days with Apistan in the colony.

Results and Discussion - 1997

Table 1 shows dead bee counts (bees/day/colony) for the treatments. All counts were similar except for the mineral oil group, which was substantially higher. After some treatment applications, notably the formic acid treatment, some agitation was noticed (bees crowding the entrance), but this was for a limited time period. Very little of the thymol evaporated from the petri dish during the period. This is probably due to the cool temperatures and the lack of air circulation in the petri dish.

Table 1. Mean dead bee counts and adult population

Treatments	Bees/colony/day 10 Nov - 31 Dec/97	Frames of adult bees May 13/98
Control	7.0 (4)*	10.7 (4)*
Oxalic	10.5 (4)	8.4 (4)
Lactic	10.5 (4)	9.5 (3)
Thymol	13.3 (4)	7.8 (4)
Apistan	10.7 (4)	10.6 (4)
Formic acid	11.6 (4)	6.0 (4)
Wintergreen	12.3 (2)	13.4 (2)
Mineral Oil	26.8 (2)	5.6 (2)

* (n) number of colonies

Table 3 shows the dead bees counts before and after each application. There does not seem to be any alarming bee mortality after the first application on 14 November, as bee counts are up slightly for 3 treatments and down slightly in the other three. However, after the second application (5 December) there is generally an increase with a substantial increase in the oxalic treatment. It is not clear why this increase occurred after the second application.

Table 2. Mean dead bee counts and adult population

Treatment	Bees/colony/day 10 Nov-10 Dec/98	Frames of adult bees May 20/99
Control	1.7 (4)*	6.3 (4)*
Oxalic	2.6 (4)	5.8 (4)
Lactic	7.7 (4)	6.0 (3)
Thymol	14.7 (4)	4.7 (3)
Apistan	3.8 (4)	4.0 (4)
Formic acid	15.8 (4)	4.0 (4)

* (n) number of colonies

Table 3. Mean dead bee counts before and after the 1997 treatment.

Treatment	Before: Nov.13/97	After: Nov.16/97	Before: Dec.4/97	After: Dec.7/97
Control*	21.9	18.8	16.0	7.5
Oxalic	16.8	41.3	13.5	103.5
Lactic	14.0	39.8	10.8	57.8
Thymol	19.8	29.0	22.8	32.5
Formic acid	32.0	23.0	32.0	73.0

* 4 colonies
Treatments applied on Nov. 14 & Dec. 5/97

The adult populations in the spring following treatment were quite variable (Table 1). The effect of mineral oil on the dead bees count may have impacted the colony populations. However, with limited number of colonies, there was considerable variation within a group.

Results and Discussion - 1998

Table 2 shows the dead bee count (bees/day/colony) for the treatments. In general the dead bee counts were lower than during the treatment period in 1997. There is no apparent reason for this difference, other than based on the spring colony strength, it appears that colonies were small in 1998 than in 1997. However, there are two treatments (thymol and formic) which have much higher counts than the others.

Table 4 shows the dead bee counts before and after each of the two treatment applications. Two treatments, lactic and thymol, show substantially increases after the 1st application on 24 November compared to the 'before' count. After the second application (4 December) treatments of lactic and formic showed substantial increased bee mortality.

Table 4. Mean dead bee counts before and after the 1998 treatment

Treatment	Before: Nov.22/98	After: Nov.25/98	Before: Dec.1/98	After: Dec.7/98
Control*	5.5	19.7	8	9
Oxalic	6.7	13	7.8	25.3
Lactic	5.6	88.5	12.5	69
Thymol	10.3	190	29.5	93
Apistan	14.2	19.8	16.3	18.5
Formic acid	12.5	19.6	10.7	362
* 4 colonies Treatments applied on Nov. 24 & Dec. 4/98				

The adult populations (Table 2) the following spring were quite uniform, but lower than the previous year.

Table 5 shows the mite infestation data for colonies treated during the winter of 1998. Unfortunately the colony mortality was high in each treatment group so very few comparisons could be made. However, looking at the spring mite count on sticky boards it is evident that neither lactic, oxalic or mineral oil had a substantial effect on reducing the mite levels.

Acknowledgements

The authors wish to acknowledge a grant from the Canadian Bee Research Fund and Garfield Weston Foundation, use of colonies by Van Han Apiaries and the technical assistance of Paul Gatien.

Table 5 Summary of Varroa Infested Colonies Treated with Various Compounds - 1998

Colony no.	Treatment	% infestation in the summer	Spring mite count on sticky boards	Inspection April 14/99
82	Lactic	13	na	dead
70	Acid	5.2	60	3 frames bees
71	15 %	3.7	58	4 frames bees
74		1.2	na	dead
75	Mineral	12.	na	dead
87	Oil	14.1	44	4 frames bees
48	25 ml	2.1	na	dead
69		1.5	26	3 frames bees
79	Oxalic	16.6	na	dead
49	Acid	4.0	na	5 frames bees
32	2 %	2.2	114	7 frames bees
47		1.3	na	4 frames bees
76	Thymol	9.3	na	2 frames bees
03	20 g	5.4	na	2 frames bees
61		3.7	na	dead
12		1.6	na	dead
Colonies moved outside 5/April/99 na - not available				

References

Calderone,N.W., and M.Spivak. 1995. Plant extracts for control of the parasitic mite *Varroa jacobsoni* (*Acari: Varroidae*) in colonies of the western honey bee (*Hymenoptera: Apidae*). J. Econ. Entomol. 88(5):1211-1215.

Kraus, B. and S. Berg. 1994. Effect of lactic acid treatments during winter in temperate climate upon *Varroa jacobsoni* Oud. and the bee (*Apis mellifera L.*) colony. Experimental. and Applied Acarology 18:459-468.

Nelson,D.L. 1997a. Nuclei Production and Management in Western Canada. Proceedings of the International Apiculture Congress; Antwerp, Belgium. Sept. 1-6/97.

Nelson, D.L. 1997b. Indoor Wintering in Western Canada. Canadian Honey Council Research Symposium, Jan/97 Winnipeg, MB. NRG Pub. 97-01

Nelson, D.L. 1999. Population Dynamics of Indoor Wintered Colonies. Proceedings, 36th International Apiculture Congress. Sept. 12-17/99, Vancouver, Canada

Sammataro,D., G.Degrandi-Hoffman, G.Needham, and G.Wardell. 1998. Some volatile plant oils as potential agents for varroa mites (*Acari: Varroidae*) in honey bee colonies (Hymenoptera: Apidae) Amer. Bee J. 138:681-685.

Membrane-gel delivery of formic acid vapors, and a new, alternate treatment for honey bee mites with an environmentally friendly approach using menthyl formate

R.S.Daniels[1], D.Nelson[2], (Institutional Collaborators: R.E.L.Rogers[3], K.MacKenzie[3]), (Industrial Collaborators: C.Poncipe[4], V.Ragucci[4] and R.Stevens[5])

Project Goals

This project had two goals: 1) to manufacture, develop and test a new membrane introduction device for the safe, effective and inexpensive delivery of formic acid vapors; and 2) to synthesize and test the efficacy of two new miticides: menthyl formate and thymyl formate. Laboratory work with the membrane introduction device was successful and so too was preliminary fieldwork where the target permeation of 10 grams per day was achieved. An interprovincial study (Alberta, Saskatchewan and Nova Scotia) conducted in October 1999 showed 5 grams per day permeation over the 28-day study. Serendipitously, this work has also resulted in the development of some unique and safe packaging approaches for formic acid.

Membrane Introduction of Formic Acid Vapors

The focus of our work with formic acid was to take earlier work[1] one-step further and have a final product ready for commercial production. A premise of this study was that the safest formic acid introduction system would be one that provides a physical barrier to separate the beekeeper from the formic acid. In addition to using a barrier introduction approach for formic acid (membranes from BarrierMed, FL), a gel formulation of formic acid (BetterBee Co., Greenwich, NY) was used ubiquitously in this work for added safety. Figure 1 shows the packaging materials and the critical permeation membrane.

Under controlled laboratory conditions, it was a simple matter to calculate the permeation area necessary to obtain 10 grams of formic acid vapour permeation per day (121 square inches at 28 °C). In-hive temperatures vary as a function of the time of year and position inside the hive and for this reason we have collected in-hive temperature data for our fieldwork.

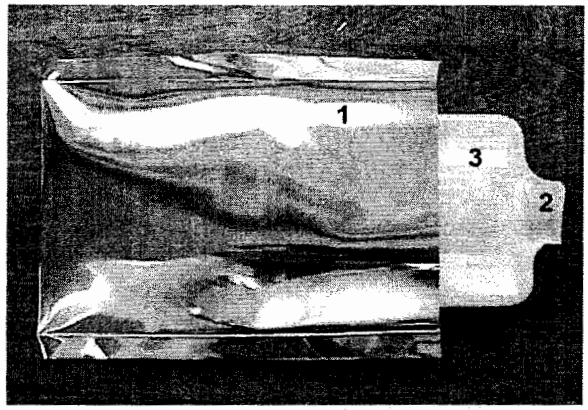


Figure 1. Formic acid permeation prototype membrane and packaging: 1) outer metallized PET pouch, 2) permeation membrane, and 3) inner PET pouch that does not permeate formic acid.

Figure 2 shows preliminary results for the formic acid permeation at one of the three provincial field-testing sites. Each of the four membranes was placed in a different hive. As a consequence of lower than expected temperatures, lower permeation was observed compared to what had been expected (10 grams per day). The membranes (Fig. 1) were placed in the upper hive body of a two-body standard Langstroth hive, on top of the frames.

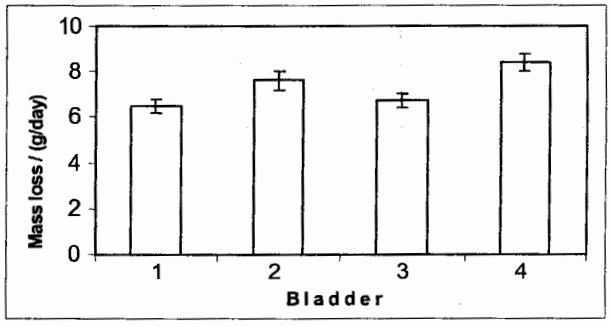


Figure 2. Formic acid permeation for four different membranes in different hives at the Regina apiary. Values shown are the average over the first 14 days of a 28-day study.

We believe this barrier-method formic acid delivery approach, combined with a gel formulation of the formic acid (BetterBee Co., Greenwich, NY), to be the safest approach to date for introducing formic acid into honey-bee hives. It is also an approach that is capable of achieving 10 grams of formic acid permeation per day averaged over a 28-day treatment period.

Synthesis and Miticidal Activity of Menthyl and Thymyl Formates

Formic acid and essential oils have been used separately to control mite-related troubles in honeybee colonies. As many essential oils are

[1] Department of Chemistry, U of Regina, Regina, SK
[2] AAF Canada, Box 29, Beaverlodge, AB
[3] Kentville Agricultural Center, Kentville, NS
[4] BarrierMed Glove Co., Lake Mary, FL
[5] BetterBee Co., Greenwich, NY

alcohols, e.g. thymol and menthol, a chemist would be interested in chemically combining and testing the synthetic products of formic acid and several essential oil alcohols: menthyl formate and thymyl formate.

Menthyl formate and thymyl formate both belong to the class of compounds known as esters. In general, esters are far less biologically harmful than the acids from which they are made. Esters are also known to decompose, reverting to the original alcohol and acid from which they are made. Therefore, it would seem beneficial to have beekeepers work with the relatively harmless ester, and to devise a device that would assist in the decomposition of the ester to the acid and alcohol. It would be especially serendipitous if the esters themselves had some miticidal activity prior to decomposition.

Summary
The syntheses of both menthyl formate and thymyl formate were attempted successfully. Menthyl formate had a very pleasant fragrance; not surprisingly, considering that menthyl formate has been previously used in perfumery. Thymyl formate, although not terribly offensive, was a respiratory irritant at high vapor concentrations.

Work on the formic acid membrane introduction device was successful in both the laboratory and preliminary field tests where the target permeation of 10 grams formic acid per day was achieved. Permeation rates achieved over the first 14 days of the 28 day study averaged 5 grams per day in interprovincial study (Alberta, Saskatchewan and Nova Scotia) completed in October. Serendipitously, this work has also resulted in the developed of some unique and safe packaging approaches for formic acid. Synthesis of the esters, menthyl formate and thymyl formate was done and tests of their miticidal activity found thymyl formate to have some activity.

We look forward to future collaborations with the beekeeping community and other industries that may bring our membrane formic acid gel delivery device into the market place. This would provide beekeepers with an extremely safe method of mite control for their colonies. The essential oil/formate esters may have useful miticidal properties, and we would look forward to continuing to study thymyl formate and other esters for this purpose.

Reference

R.S. Daniels, A. Hamid, R.E.L. Rogers, K. MacKenzie, Membrane-barrier delivery of formic acid, a chemical used for mite control on honey bees (*Apis mellifera*), Journal of Apicultural Research, 38 (1-2): 63-69, 1999.

Acknowledgements
Canadian Bee Research Fund and the W. Garfield Weston Foundation; Agriculture and Agri-Food Canada; Saskatchewan Beekeepers' Association; Nova Scotia Beekeepers' Association; Nova Scotia Department of Agriculture and Marketing. Beekeepers: Don Amirault (Nova Scotia), Alvey Halbgewachs (Regina), Larry Hartwig (Regina) and Garnet Hall (Estevan). Research assistant: Laelie Snook (Regina). Field Assistance: Katherine Williams and Walter Wojtas (Nova Scotia).

A SEMIOCHEMICAL-BASED TRAPPING SYSTEM FOR THE PARASITIC MITE *Varroa jacobsoni*

Mark L. Winston [1], Keith N. Slessor [2]

Objectives of project
The overall goal of this project is to develop an attractant-based trapping system to use against the varroa mite, a parasitic species that is causing considerable damage to the beekeeping and pollination industries world-wide. Our approach is to identify attractants that the mite uses to orient to brood and/or adult bees, and to design and test a trap based on using these odours to attract the mites. The specific goals of the research are to 1) develop an appropriate bioassay for chemical identification, 2) test brood and adult bees for attractiveness in the bioassay to determine the primary target for extraction and identification of attractants, 3) identify and synthesize the attractive compounds produced by bees, 4) develop and manufacture preliminary trap designs, and 5) test traps in hives for effectiveness and compatibility with commercial beekeeping.

Progress made to date
1) Bioassay: We developed an easy-to-use petri dish bioassay, in which a mite is placed in the center of a dish and allowed to choose between either a target and a blank, or two target choices. We developed methods of rearing large numbers of mites in colonies, catching the mites and bringing them into the laboratory, and preserving them alive for a few days to allow rapid access to mite populations for tests. The first studies determined the environmental conditions under which the mites would orient properly, and indicated that tests should be run at hive temperatures (30-35°C), and in the dark. Then, we used this bioassay to test attractiveness to worker and drone brood and adults, and determined that nurse bees, followed by worker larvae, were the two most attractive life stages of bees. These

[1] Depart. of Biological Sciences, SFU, Burnaby, B.C.
[2] Depart. of Chemistry, SFU, Burnaby, B.C.

results indicated that our primary focus for extracting and identifying compounds should be from adult nurse bees, although we also are working with brood-produced odors.

The initial bioassay was useful for testing whole bees as orientation cues, but proved inadequate for testing extracts, apparently because the odors were quickly dispersed throughout the dish, making it difficult for mites to orient. Consequently, we developed an airflow assay using a Y-tube method in which mites are given two choices, one a potentially attractive source and the second a blank. The mites orient well in this assay, moving up the airflow towards attractive sources and not orienting to blanks. For example, nurse bees attract 80-95% of mites, with most of the remaining mites generally not orienting.

2) Extraction and chemical identification: Once the bioassays had indicated the life stages we wanted to focus on, we moved on to developing chemical identification procedures. We have been using a method called SPME, in which a fiber traps odorants coming from nurse bees or larvae. Then, we can identify the substances trapped on the fiber, synthesize the principal components, and test combinations of attractive chemicals. As our research season ends in October, we are poised to test a blend of compounds that we hope will be attractive to the mites.

3) Trap designs: We developed eight different trap types, each of which includes a central attractant board coated with a sticky substance, and various materials that provide complex physical orientation cues for mites, similar to what they would face in a bee hive. The materials used include plastics, metal, and various fibers, all of which are resistant to damage from bees chewing at them and provide a barrier between the sticky board and the bees, but also through which mites can orient. Each of the traps could be mass-produced at competitive prices, an important consideration if these traps are ever to become commercially useful. This component of the project was conducted in close collaboration with our industrial partner, IPM Technologies.

4) Trap testing in hives: The traps initially were put into hives for one week to determine their compatibility with beekeeping, as well as whether mites could be trapped on the sticky surfaces. A few of the designs were not appropriate, but at least five of the traps worked well in hives. Further testing suggested one design was superior to the others, and we will be testing these traps with synthetic attractants next spring.

This project also has made significant contributions to the training of scientific personnel in Canada, and we have been reporting results to the scientific and beekeeping communities. Specifically, one postdoctoral fellow, five undergraduate students, two graduate students, and a research assistant have worked on the project, each contributing a significant amount to the research but also developing their own research and technical skills.

Results from the project to date have been presented at a number of international meetings, including the Entomological Society of America (November 1998), and Apimondia (September 1999). We also submitted one manuscript to an international scientific journal (Journal of Apicultural Research).

Participation and contributions of each team member

- Mark Winston (Principal Investigator): Oversee biological aspects of the project, interact with IPM technologies, hire personnel, develop bioassays and testing procedures, work on trap design, meet regularly with the research group
- Keith Slessor (Principal Investigator): Oversee extraction procedures and synthetic chemistry, participate in bioassay development and trap design, hire personnel, meet regularly with the research group
- Stephen Pernal (Postdoctoral Fellow): Develop and conduct airflow bioassays, perform extractions, test traps in hives, oversee research design and activities of undergraduate students
- Heather Higo (Senior Research Assistant): Maintain colonies, provide -infested colonies as a mite source, oversee daily assignments for undergraduate students, meet regularly with the research team
- Scott Baird (Graduate Student): Chemical identification of nurse bee and larval odors, chemical synthesis of odorants for testing
- Monique Ledoux, Mikel Lefler, Shannon Apland (Undergraduate students): Develop petri dish bioassay, test worker and drone larvae and adults, determine best environmental conditions for mite orientation, conduct tests in Y-tube assay
- Hien Ngo, Ryan Falk, Kum-Hung Poon (Undergraduate and graduate students): Assist part-time in all aspects of bioassay development and extractions
- IPM Technologies: Develop commercially viable trap designs, provide prototype traps for testing, assist in bioassay design, meet regularly with SFU personnel

We deeply appreciate the support of the Canadian Bee Research Fund and the Garfield Weston Foundation, and are pleased with the progress of the project. We look forward to the final year of research, which we hope will yield results leading to a functional varroa trap.

Assistance
This was a three-year project (1997-2001), and the first part of the project was funded in part by the CBRF, through a grant from the W. Garfield Weston Foundation. With the help of the seed money provided by the Weston Foundation, we obtained additional funding from an industrial partner, IPM Technologies Canada, and also a substantial grant from the Natural Sciences and Engineering Research Council of Canada, for a total budget of $255,000 spread over four years.

The efficacy of Apiguard against varroa and tracheal mites, and its effect on honey production: Year 2.

Heather Mattila [1] and Gard Otis [1]

Apiguard, a thymol-based miticide, showed promise as a control agent against varroa and tracheal mites (HBTM) in a 1998 study conducted at the University of Guelph. The more effective formulation tested that season reduced varroa populations by an average of 77.5% and reduced TM levels to 11% of the pre-treatment levels, while having no effect on adult or larval bee survival. While not statistically significant, honey production during the 21-day treatment period decreased 30%. Effects on honey may have resulted from treating colonies during the primary honey flow in July. Analysis of honey collected during treatment with Apiguard in 1998 showed significant thymol residues. The more effective formulation tested had significantly lower residues than the less effective formulation (mean 1.54 vs. 2.63 ppm, respectively), while no residues were detected in untreated colonies (limit of detection < 0.03 ppm). Residues of thymol were sufficiently high to alter the taste of the honey. These results were summarised in *Hivelights* (Vol. 12, No.3).

A second study was conducted in 1999 in order to re-evaluate this formulation of Apiguard as a control for varroa and HBTM. The duration of treatment was increased to 30 days with the intention of improving efficacy in mite control. The initiation of Apiguard treatments was changed to late May to reduce the overlap between the treatment interval and honey flow. Honey production was monitored during treatment and for the rest of the season to estimate the long-term effect of early Apiguard application. We hoped these changes would result in improved varroa control and a reduced effect on honey production.

Methodology
Single brood-chambered colonies (n = 35) of approximately equal strength were requeened at the end of April with Italian queens imported from New Zealand. Bees moderately infested with varroa (mean 11 mites/100 bees) and HBTM-infested bees (mean prevalence of 65% in trachea and mean abundance of 5.2 adult HBTM/bee) were introduced to each colony to achieve equal mite infestation. Colonies were divided into an Apiguard treatment group (n = 18) and a control group (n = 17). A package of Apiguard was inserted above the brood frames in colonies in the treatment group on May 19 (day 0). The first package was replaced with a second on June 2 (day 14). Apiguard was removed from the colonies on June 18 (day 30) and all colonies were treated with Apistan at that time. Varroa mite drop was recorded every 3-4 days on sticky boards on the bottom boards throughout the Apiguard and Apistan treatment periods. HBTM prevalence and abundance before and after treatment were determined from worker samples taken on day 0 (before Apiguard was applied) and on October 14 (day 142) when TM levels had stabilised in the overwintering bee population. Honey production was estimated from May 19 (day 0) to September 29 (day 133) by determining the weight difference between full and empty honey supers.

Results
The mean efficacy of Apiguard against varroa (or the percentage of varroa that dropped onto sticky boards during the Apiguard treatment) was 76.2% in treated colonies, compared to 23.5% natural mite mortality in control colonies over the same period. Efficacy of Apiguard against varroa was not significantly different from that observed in the 1998 trials. Fig. 1 illustrates the proportion of total mite drop during the Apiguard and Apistan treatment period for both treatment groups.

A comparison of pre-treatment HBTM prevalence and abundance indicated that HBTM levels were approximately equal between treatment groups prior to the application of Apiguard (treated and control groups, respectively; prevalence: 5.0% vs. 4.1% of tracheae infested, abundance: 0.5 vs. 0.4 adult HBTM/bee). Post-treatment HBTM prevalence also did not differ significantly between treated and control groups: 26.8% of tracheae were infested in treated groups compared to

[1] Department of Environmental Biology, U of Guelph, Guelph, ON

38.4% in control colonies. Post-treatment HBTM abundance did not differ significantly between treatment groups either: the mean was 1.3 adult HBTM/bee in treated colonies and 2.1 adult HBTM/bee in control groups. To account for the change in HBTM levels between pre-treatment and post-treatment sampling, an after/before ratio (R) was calculated for prevalence and abundance. With these ratios, a value of R > 1 indicates that mite infestation levels had increased between sampling dates. The calculated R-values were not significantly different between treatment groups for either HBTM prevalence or abundance (treated vs. control groups, respectively; prevalence: mean R: 7.2 vs. 12.9; abundance: mean R: 3.6 vs. 8.7). These numbers indicate that although HBTM infestations were slightly lower in fall in colonies treated with Apiguard than in control colonies, HBTM populations had increased dramatically in all colonies between May 19 and October 14. Of the 14 Apiguard colonies still present when post-treatment samples were taken, only 2 colonies had experienced a decrease in HBTM prevalence and 3 showed a decrease in abundance.

Honey production during the 30 days of Apiguard treatment was significantly reduced in treated colonies compared to control colonies (7.3 kg vs. 11.9 kg, respectively), but when the honey yields for the entire season were compared, there was no significant difference in honey production between the treatment groups. Apiguard treated colonies produced 43.7 kg of honey during the 1999 season compared to 52.3 kg in untreated colonies. Although yield decreased 38.7% during treatment, the majority of honey was produced outside of the treatment period: 77.2% and 83.3% of production occurred after treatment ended in treated and untreated colonies, respectively.

Conclusions

Efficacy against varroa mites was moderately good, but well below what is required to reduce their populations to levels suitable for bee colony management. Despite efforts to improve efficacy by increasing the duration of the treatment period, varroa mortality was almost exactly the same as in our 1998 trial. We did notice that worker bees had often emptied the Apiguard trays of the thymol-gel material within 7-9 days. Although we were advised that sufficient thymol concentrations remained in the colony to continue control during this period, we suspect that some varroa may have been able to survive and invade new brood cells, thereby contributing to the moderate level of control.

We were surprised by the apparent lack of effective control of HBTM, which contrasted with the positive results we had obtained in 1998. The same formulation that resulted in the reduction of HBTM prevalence in overwintering bees to 11% of the pre-treatment population in the 1998 season allowed an average increase of 720% in HBTM prevalence in the 1999 season. Perhaps earlier treatment provided sufficient time for HBTM populations to rebuild before the overwintering bee population was established. In 1999, the colonies were requeened with stock imported from New Zealand that was thought to be highly susceptible to HBTM, in contrast to Australian stock used in 1998 which may have been considerably more resistant. This difference in the stocks undoubtedly affected the ability of the HBTM populations to recover after the Apiguard treatments.

Apiguard does affect honey production and residues of thymol in honey if applied during the honey flow. The earlier timing of treatment in 1999 successfully avoided major honey flows and therefore minimised the negative effect of Apiguard on yield. Although we conducted no chemical analyses in 1999, the earlier treatment almost certainly reduced thymol to levels sometimes found in natural honey.

It is difficult to choose an appropriate time to treat with Apiguard. Earlier application did not effectively control either varroa or HBTM, yet it avoided treatment during the major honey flow, thereby reducing potential effects on honey yield and thymol residues. Treatment later in the season during the honey flow, as in our 1998 trial, increased control of HBTM, but thymol residues were relatively high in the honey. The best solution to maximise the benefits of Apiguard may be early treatment in May followed by a second treatment immediately after the main summer honey flow, thereby reducing varroa and HBTM populations to levels that are adequate for hive management, yet avoiding the main honey flow and minimising effects on honey quantity and quality.

Acknowledgments

We would like to thank Paul Kelly and David Servos for bee management and data collection; Peter Vichos and John Cartwright, beekeepers, for providing mite-infested bees; and Max Watkins, Vita (Europe) Ltd. for the Apiguard and advice on the treatment. Funding was provided by the OMAFRA bee project with the University of Guelph, OMAFRA Food Systems 2002, the Canadian Bee Research Fund, and Vita (Europe) Ltd. Residue analyses were conducted by the University of Guelph Laboratory Services Division.

BOTANICALS FOR MITE CONTROL AND NOVEL MEANS OF ADMINISTERING THEM FOR GREATER EFFICACY AND SAFETY

Peter G. Kevan [1]

Essential oils are secondary plant compounds which are used for the natural protection of these plants from pests and pathogens. This protection is provided through antifeedant and toxic properties. Several research reports show that essential oils have antimicrobial, fungitoxic, insecticidal and miticidal effects on various pathogens and pests under laboratory and field conditions.

In honey bees essential oils have been used for treating disorders, including parasitic mite infections and American Foul Brood. Laboratory and field tests have shown that they are 50% to 95% effective against varroa mites and tracheal mites. They also show minimal contamination of wax and honey in field trials. They are usually used in bee hives as fumigants, or mixed with sugar syrup for ingestion by bees. The most common formulation used against tracheal mites is menthol crystals (50g/hive). Microencapsulated menthol is a new formulation which can be added to honey bee feed. It showed promising results for protecting bees from tracheal mites. For varroa control, the most commonly used essential oils are thymol, eucalyptus, and wintergreen. These oils are applied singly or as a mixture of different compounds to improve efficacy. Applied as fumigants, the effectiveness of thymol and other essential oils against varroa mites depends greatly on temperature, time of the year, colony strength, and brood area. Due to the inconsistency and unreliability of essential oils for mite control, they cannot be used alone. However, their use does fit well into Integrated Pest Management (IPM) programs for alternating use with other control measures. New efficient methods for applying these oils and finding the right time of the year for application to bee colonies are required to produce reliable effective control of mites.

In this review, over 40 published scientific papers were reviewed. The complete review will be submitted to *HiveLights* in a beekeeper friendly format for publication. at a later date. This is especially important because of the recent body of information published since the review was completed.

[1] Department Environmental Biology, U of Guelph, Guelph, ON

Essential Oils and their Toxicity to Honeybees

The following oils were hand fed to honey bees to determine their toxicity to honeybees: pinene, oil of wintergreen, thymol, clove oil, cinnamon oil and Neem oil. Neem oil underwent preliminary testing but more work needs to be done, and is planned, with this material.

Methodology

Three hours prior to each feeding trial, bees were collected from honeybee colonies in commercial apiaries and brought to the laboratory in cages. The bees were kept at room temperature, without food to make them hungry.

Botanical oils and their effectiveness in the control of Varroa mites (V), Tracheal mites (T), and American foul brood (AFB)

Lemon grass oil	V	T	AFB
Thyme oil (thymol)	V	T	AFB
Rosemary oil	V		AFB
Oregano oil	V		AFB
Fennel oil	V		
Sage oil	V		
Catanga oil	V		
Garlic	V		
Piper (pepper)	V		
Lemon oil	V	T	AFB
Eucalyptus oil	V		AFB
Mint oil (menthol)	V	T	AFB
Camphor oil	V		AFB
Linalool	V	T	
Neem	V	T	
Tobacco	V		
Cinnamon	V		AFB
Nutmeg	V		
Carvacrol		T	
Terpineol		T	
Pluegone		T	
Cineole		T	
Savory			AFB
Lavender oil			AFB
Cumin oil			AFB
Wintergreen oil	V		

The feeding solutions were prepared by dissolving various concentrations of the oils to be tested in 99.9% ethyl alcohol. Appropriate concentrations (see below) for detailed study of LD_{50} (the concentration of material required to kill 50% of the test animals) were determined on the basis of toxicity of three initial concentrations, 10ppm, 100ppm, and 1000ppm. Solutions were stored in the freezer prior to use and kept on ice during the experiments, except when be actually fed to the bees. The preparation resembled a liquid sandwich of sugar syrup, the oil in solution in alcohol, and another layer of sugar syrup in Hamilton syringes. This way, the sugar syrup (50%) induced the bees to start feeding and to

continue to do so on the otherwise unpalatable alcohol and oil solution. Each liquid sandwich comprised 5 ul of 50% sugar syrup, 10 ul of the compound dissolved in alcohol and 5 ul more of 50% sugar syrup.

Bees were held between the thumb and forefinger during feeding. In most cases, the bee extended its proboscis with the intent of feeding. When the proboscis was not extended, the needle point of the syringe was used to unfold it. This would induce the bees to begin feeding in the normal way. Often, bees would feed on the syrup but would stop feeding before the entire 20 µl had been consumed. In these cases the proboscis would be forcibly re-extended and the process of feeding would slowly continue.

For each concentration of each essential oil, four cages, each with 20 bees, were fed the liquid sandwiches. In addition, four cages of 20 bees were fed 50% sugar syrup (20 µl) and four cages of 20 bees were fed 99.9% ethyl alcohol sandwiched between sugar syrup (5 µl sugar syrup, 10 µl ethyl alcohol and 5 µl sugar syrup). Sugar syrup control cages and ethyl alcohol control cages were fed each time a feeding trial was conducted.

Essential Oils were fed at the following concentrations:

Cinnamon oil: 10ppm, 50ppm, 100ppm, 150ppm, 250ppm, 300ppm, 400ppm, 500ppm and 1000ppm.
Clove oil: 10ppm, 50ppm, 100ppm, 250ppm, 300ppm, 400ppm, 500ppm and 1000ppm.
Neem oil: 10ppm, 100ppm and 1000ppm.
Pinene: 10ppm, 50ppm, 100ppm, 250ppm, 500ppm, 750ppm, 1000ppm, 1500ppm, 2000ppm and 3000ppm.
Thymol: 10ppm, 50ppm, 100ppm, 125ppm, 150ppm, 200ppm, 250ppm, 500ppm and 1000ppm.
Oil of wintergreen: 10ppm, 100ppm, 250ppm, 500ppm, 750ppm, 1000ppm, 1500ppm and 2000ppm.

Bees were fed 50% sugar syrup for three days following the feeding trials. During this time the number of dead bees was monitored at 24, 48 and 72 hours.

Preliminary results

Control cages that were fed sugar syrup had an average of 2 dead bees over 72 hours. Bees fed the ethyl alcohol sandwich without any oils had an average of 3.5 dead bees over 72 hours. Thus, the physical effects of force feeding were minimal and the ethyl alcohol we used had little toxicity for the bees. The following is a list of the approximate LD_{50}'s for each of the oils tested together with menthol from a previous experiment:

Cinnamon - 150 ppm **Clove oil** - 200 ppm
Pinene - 1500 ppm **Thymol** - 100 ppm
Oil of wintergreen - 500 ppm.
Neem oil - from 100 ppm to 1000 ppm (the bees did not take well to being fed neem oil)
Menthol - unable to cause mortality with highest doses administered (Kevan *et al.*,1999, Canadian Entomologist)

Conclusions

Establishing the toxicity of these potentially useful botanicals is an important step to understanding dosage response, and the risks of administering these materials orally to bees for their protection against mites. Although a given compound may be efficacious against mites, if its toxicity to bees is high then there is great risk in using it. Materials such as thymol may continue to be useful as fumigants and in topical application, but would have to be used with care as an oral medicament. Pinene, on the other hand, may be valuable in killing mites on and in the bodies of honeybees by its relatively low toxicity to bees when they ingest it. In Phase I of this research we were unable to proceed with toxicity trials against mites and microencapsulation because matching funds are still pending (proposal submitted to NSERC in April, 1999: copy provided to Honey Council). In Phase II of this research we will continue our work on the toxicity of the botanicals to mites and investigate the potential for microencapsulated formulations being used as medicaments.

Acknowledgements

Collaborators: Dr. M. Nasr, Ontario Beekeepers' Association, Ms. S. D. Kevan, Enviroquest Ltd, Cambridge Ontario, and Local commercial beekeepers.

Reporting Activities

Nasr, M. & P. G. Kevan. 1999. Diseases and parasites, eradication or management: what strategy for honey bee health? *Bee World* 80: 53-54

Nasr, M. & P.G. Kevan. 1999. IPM for diseases and parasites in honeybees. *Pest Managt. News* 10 (4): 3.

Skinner, A. J., M. E. Nasr & P. G. Kevan. 1998. Impacts of tracheal mites on the thermoregulation and overwintering of honey bees. Presented at *Entomological Society of America Annual Meeting*, Las Vegas, Nevada. (8 - 12 November, 1998) and *Entomological Society of Ontario Annual General Meeting*, Sudbury, Ontario (October 1998).

Kevan, S. D., M. E. Nasr, & P. G. Kevan. 1999. Feeding menthol to honeybees (Hymenoptera: Apidea): entry and persistence in haemolymph without causing mortality. *The Canadian Entomologist* 131: 279 - 281.

Appendix 1:

1999 Financial Statement

Consolidated Balance Sheet as at October 31, 1999
(Unaudited)

	1999	1998
Current Assets		
Cash Short-term investments	21,570	23,757
Accounts receivable		602
Inventory	2,986	
Accrued interest receivable	71	
Prepaid expenses		53
	24,627	24,412
Fixed Assets net book value – note 3		
Equipment	845	1,055
	$25,472	$25,467
Liabilities		
Current Liabilities		
Bank overdraft	508	
Accounts payable - note 4	3,636	3,336
Deferred income		1,000
	4,144	4,336
Members' Equity		
Reserves for Future Expenditures		
Capital reserve	5,440	5,440
Project reserves		5,289
	5,440	10,729
Unappropriated Retained Earnings	15,888	10,402
	21,328	21,131
	$25,472	$25,467

Consolidated Statement of Income

For the year ended October 31, 1999 (Unaudited)

	1999	1998
Revenue		
Membership fees	46,705	35,560
Annual meeting		3,165
Donations - Canadian Bee R. Fund	1,080	400
Hive lights	7,849	5,908
Interest	581	265
Promotional materials	1,435	601
Other	30	1
	57,680	45,900
Operating Expenses		
Advertising & promotion	1,637	
Annual meeting	1,729	7,151
Apimondia committee	507	2,000
Awards and donations	339	155
Bank charges	91	68
Canadian Bee Research Fund - Admin.		375
Canadian Bee Research Fund - Donations	1080	400
CAPA meeting		64
Hive lights	8,827	8,246
Insurance		55
Memberships and subscriptions	1137	1,304
Office	3,013	1,498
Other	134	
President's honorarium	3,000	2,000
Professional fees	1,204	1,100
Rent- building	1,250	200
Rent- equipment		324
Telephone	1,419	2,757
Transfer Research Fund to Projects		1,002
Travel	2,875	1,594
Wages and benefits	29,033	10,616
	57,275	40,807
Net Income Before Amortization	405	5,093
Amortization	210	264
Net Income for the Year	$195	$4,829

Appendix 2:

1999 Financial Statement

General Fund Balance Sheet as at October 31, 1999
(Unaudited)

Current Assets	1999	1998
Cash		16,948
Cash Short-term investments	15,241	
Accounts receivable		677
Inventory	2,968	
Accrued Interest receivable	56	
Prepaid expenses		53
	26,810	14,416
Fixed Assets net book value - note 3		
Equipment	844	1,054
	$19,127	$ 18,732
Liabilities		
Current Liabilities		
Bank overdraft	473	
Accounts payable - note 4	3,634	3,3336
Deferred income		1,000
Due to Fred Rathje Memorial Fund		4,863
	4,107	9,199
Members' Equity		
Unappropriated Retained Earnings	15,020	9,533
	$19,127	$18,732

General Fund Statement of Income

For the year ended October 31, 1999 (Unaudited)

	1999	1998
Revenue		
Membership fees	46,705	35,560
Annual meeting		3,165
Donations - Canadian Bee R. Fund	1,080	400
Hive lights	7,849	5,908
Interest	417	258
Promotional materials	1,435	601
Other	30	1
	57,516	45,893
Operating Expenses		
Advertising & promotion	1,637	
Annual meeting	1,729	7,151
Apimondia committee	507	2,000
Awards and donations	175	
Bank charges	91	68
Canadian Bee Research Fund - Admin.		375
Canadian Bee Research Fund - Donations	1,080	400
CAPA meeting		64
Hive lights	8,827	8,246
Insurance		55
Memberships and subscriptions	1,137	1,304
Office	3,013	1,498
Other	134	
President's honorarium	3,000	2,000
Professional fees	1,204	1,100
Rent- building	1,250	200
Rent- equipment		324
Telephone	1,419	2,757
Travel	2,875	1,594
Wages and benefits	29,033	10,514
	57,111	39,650
Net Income Before Amortization	405	243
Amortization	210	264
Net Income for the Year	195	5,979
Unappropriated Retained Earnings beginning	12,934	3,404
Prior year's adjustment	(3,398)	150
Transfer from Projects Fund	5,289	0
Unappropriated Retained Earning, end of year	$ 15,020	$ 9,533

Appendix 3:

Estimates of the Number of Beekeepers, Colonies of Bees, Production of Honey and Value in Canada [1]by province [2], 1998 and 1999 with Five-year averages, 1993 – 1997

Province and Year	Beekeepers number	Colonies number	Honey Production Total '000 lbs.	tonnes	Value '$'000
Prince Edward Island					
Average 1993 – 1997	72	76	75	34	118
1998	35	1,015	127	58	145
1999 P	35	1,360	102	46	
Nova Scotia					
Average 1993 - 1997	486	12,300	743	337	1,116
1998	450	16,500	908	412	1,445
1999 P	440	17,500	1,255	524	
New Brunswick					
Average 1993 - 1997	492	5,720	329	149	485
1998	275	5,560	445	202	525
1999P	275	8,230	453	205	
Québec					
Average 1993 - 1997	729	28,744	2,976	1,350	5,132
1998	312	29,797	4,665	2,116	6,565
1999 P	315	29,800	3,942	1,788	
Ontario					
Average 1993 - 1997	4,300	83,000	8,008	3,632	8,720
1998	4,000	81,000	10,530	4,776	9,302
1999 P	4,400	85,000	11,050	5,012	
Manitoba					
Average 1993 - 1997	817	81,400	12,461	5,652	11,326
1998	855	88,000	20,240	9,181	17,200
1999 P	855	92,000	16,560	7,511	
Saskatchewan					
Average 1993 - 1997	1,410	86,500	15,369	6,971	13,680
1998	1,450	91,000	21,840	9,906	17,475
1999 P	1,450	91,000	20,020	9,081	
Alberta					
Average 1993 - 1997	747	166,400	23,979	10,877	21,308
1998	730	205,000	38,335	17,388	34,000
1999 P	725	205,000	20,500	9,299	
British Columbia					
Average 1993 - 1997	2,424	44,136	3,475	1,576	4,667
1998	2,393	45,742	4,506	2,044	6,827
1999 P	2,357	47,615	2,571	1,166	
Canada					
Average 1993 - 1997	11,477	508,964	67,415	30,579	66,551
1998	10,500	563,614	101,595	46,083	93,484
1999 P	10,852	577,505	76,353	34,633	

[1].Figures compiled by Statistics Canada from provincial data with the exception of NB and PEI where data are collected through a Statistics Canada mail survey.

[2] Does not include Newfoundland

Note: 1 Pound = 0.453 kilogram; 2,204,000 pounds = 1 metric tonne.

P Preliminary

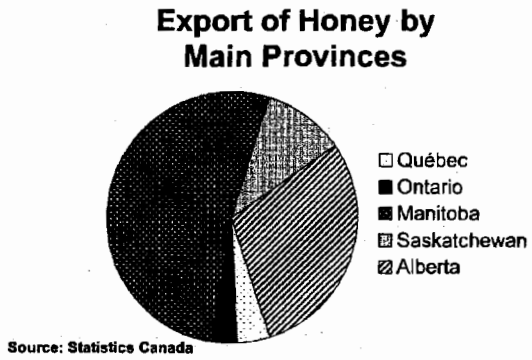
Appendix 4:

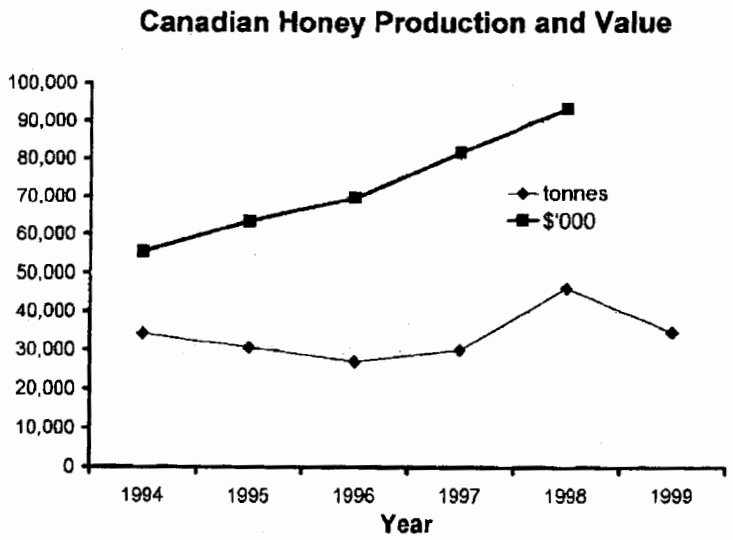
Export of honey from Canada [1], by province, Quantity and Value, 1998 and 1999 with Five-year averages, 1994 - 1998

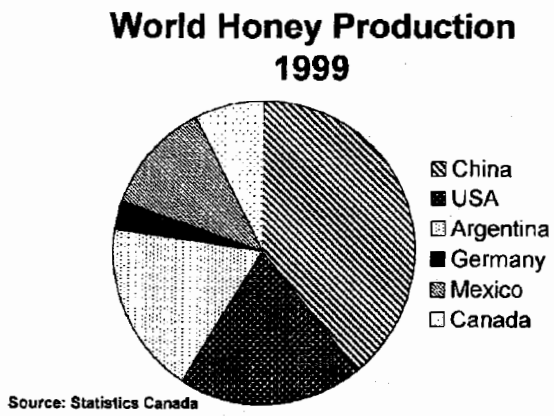
Province and Year	Quantity of Honey (tonnes)	Value of Honey ($'000)
Québec		
Average1994 - 1998	1,070	2,308
1998	643	1,458
1999	624	1,228
Ontario		
Average 1994 - 1998	1,601	3,649
1998	330	980
1999	465	1,085
Manitoba		
Average 1994 - 1998	3,917	9,971
1998	5,318	13,702
1999	7,594	16,510
Saskatchewan		
Average 1994 – 1998	685	1,487
1998	623	1,330
1999	1,537	2,833
Alberta		
Average 1994-1998	3,129	76376
1997	4,160	10,256
1998	4,316	8,755
Canada		
Average 1994 - 1998	10,566	$25,352
1998	11,208	$28,341
1999	14,715	$30,964

[1] Source Statistics Canada

Note: 1 Pound = 0.453 kilogram; .2,204,000 pounds = 1 metric tonne







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1950	C.B. Gooderham	Ottawa	ON
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1965	Roy M.Pugh	Tisdale	SK
1965	Frank Garland*	Winnipeg	MB
1973	F.L. Rathje*	Bassano	AB

Fred Rathje Award

This award was established as a memorial to Fred Rathje, a honey buyer and plant manager at Bassano, AB.
Fred was secretary of the Canadian Honey Council from 1975 to 1982. He took great pride in adding fun to all the conventions and meetings that he attended.

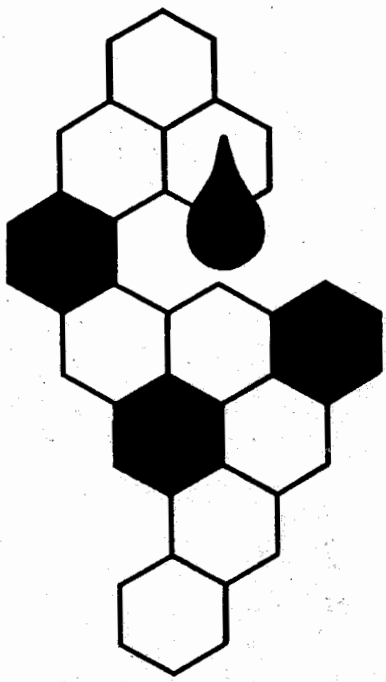
This fund was set up in 1984 as a dedication to his memory.
It is awarded annually to a person who has made a significant positive contribution of innovative, creative, and effective effort for the betterment of the bee industry of Canada during the previous year.

- 2000 John Gruszka (Saskatchewan)
- 1999 Doug McCutcheon (British Columbia)
- 1998 Jean Pierre Chapleau (Quebec)
- 1997 Merv Malyon (Manitoba)
- 1996 Lorna and Jack Robinson (Ontario)
- 1995 Gordon Kern (British Columbia)
- 1994 Kerry Clark (British Columbia)
- 1993 Linda Gane (Saskatchewan)
- 1992 Babe and Charlie Warren (British Columbia)
- 1991 Gerry Paradis (Alberta)
- 1990 Cam Jay (Manitoba)
- 1988 Don Dixon (Manitoba)
- 1987 John Corner (British Columbia)
- 1986 Gerry Smeltzer (Nova Scotia)
- 1985 Paul Pawlowski (Alberta) First year of the award

Canadian Honey Council
Conseil canadien du miel
Suite 236, 234-5149 Country Hills Blvd
Calgary, AB T3A 5K8

To:

60th Annual Meeting of the Canadian Honey Council is to be held in Moncton, New Brunswick (February 1 – 4, 2001) in co-operation with the Maritime Beekeepers Association.



www.honeycouncil.ca