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February 2005
Vol 18 # 1

HiveIrghts

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Join the CHC and support beekeeping in Canada

CHC is the national organization of the beekeeping industry. It is the vital link between beekeeper associations, governments and provincial apiculturists. Beekeepers in business can claim CHC membership and travel to the annual meeting as eligible business expenses for tax purposes.

Editor ..... Heather Clay
Design and Production ..... Rudy Gelderblom

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CANADIAN HONEY COUNCIL
Suite 236, 234 -5149 Country Hills Blvd. NW
Calgary, AB T3A 5K8
chc-ccm@honeycouncil.ca
www.honeycouncil.ca
(403) 208 7141

HiveLights

February 2005 Vol 18 #1

This beautiful photo is the work of Luke Marshall, a Calgary photographer with an interest in bees. He is looking for sponsorship for his book proposal see page 25.

Note that the colour of the spine on our magazine has changed once more to match the international queen code for colour marking.

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CHC Activities

Heather Clay, National Coordinator CHC

Oxalic Acid Project

Over half of 2004 was spent gathering, reviewing and preparing the documentation required by the Pest Management Regulatory Agency (PMRA) for the registration of oxalic acid.

The good news is that the documentation has been submitted to the PMRA for review. The package of 15 binders and 2 CDs with electronically hyperlinked data and references, weighed in at 16 lb. It was a huge relief to hand the box to Canada Post for express delivery to Ottawa.

The hard work is done but we are only half way there. Although we have been told the process will be fast tracked, it could be at least one year before oxalic acid is registered. The final date depends on how much time is lost in responding to PMRA questions. Each time there is a request for more information, the process is delayed. A rapid reply is not always possible when data is required, so we may end up waiting longer than the anticipated period.

Other countries have recognised the value of oxalic acid for the treatment of varroa mites. It has been registered for use as a pesticide for varroa control in Austria, Switzerland and New Zealand. It is approved for use as an organic control agent for varroa in the European Economic Community. The European Agency for Veterinary Medicines has reviewed oxalic acid and recommended that it be registered for use against *Varroa destructor* in the European Union. The United States Environmental Protection Agency has reviewed oxalic acid and concluded that "the use of oxalic acid pesticide products will not result in unreasonable adverse effects to human health or the environment". The New Zealand government registered oxalic acid for varroa mite control on behalf of their beekeepers. They concluded that "there is no significant increase in residues in honey above those found naturally and there is little if any human or environmental health risk to approval in New Zealand of this concentration of oxalic acid for varroa mite control."

Many beekeepers have asked why the Canadian Honey Council is involved in this process instead of government or the companies that manufacture and distribute the chemical. It is a very good question. None of the companies that produce oxalic acid is interested in the expensive registration process. Fees can run to six digits just to have the application reviewed by PMRA, not counting the research required to provide data for efficacy and residues. The PMRA operates on a user pay basis and they assume that the company registering the chemical will profit from future sales. There is no process currently in place for facilitating the registration of low risk pesticides. The CHC is a not for profit organization and we are not in a position to recoup costs from sales of oxalic acid. The only reason for registering the product is to make it a legal treatment for beekeepers to use in their bee colonies and to provide safe guidelines for its use and application. This is a different situation for the PMRA. Several organic and environmental groups are watching this process with interest. In the meantime the PMRA has set up a pesticide risk reduction unit and will be consulting with our industry at the 64th annual CHC meeting in Saskatoon. This is very positive news and we are pleased to have some input into the issue of future registration of low risk pesticides.

CBISQT

The steering committee of the Canadian Bee Industry Safety Quality Traceability (CBIST) program met in Edmonton to review progress and determine the future direction of the program. Albert Chambers, Canadian Federation of Agriculture attended the meeting and explained the model for a multi commodity third part audit system called Certifarm. The CHC is interested in this concept but it requires buy in from several other commodities to make it affordable. We are waiting to see if there is interest from other groups before we move towards this type of audit system. There should be more information available on this at the next CBISQT meeting in Saskatoon. (see page 24 for update on CBISQT)

CHC - CCM
Delegates 2005

Canadian Honey Council
Board of Directors

PRESIDENT Wink Howland,
Saskatchewan Beekeepers Association
Howland's Honey
Box 55 RR #3
Yorkton SK S3N 2X5
ph. 306-783-7046
fax 306-786-6001
whowland@accesscomm.ca

VICE PRESIDENT
Alain Moyen, Fédération des Apiculteurs du Québec
Les Joyaux de la ruche s.e.n.c.
15651 Petite Cote des anges
Mirabel QC J7N 2G5
tel : 450-475-1065
fax: 450-475-1066

EXECUTIVE DIRECTOR
Paul Kittilsen, Maritime Beekeepers Association
RR 1
Debert NS B0M 1G0
ph. 902-662-4072
pl.kittilsen@ns.sympatico.ca

EXECUTIVE DIRECTOR
Ed Nowek , British Columbia Honey Producers Association
5011 Bella Vista Rd
Vernon BC V1H 1A1
ph. 250-542-8088
beeworld@junction.net

NATIONAL COORDINATOR
Heather Clay
Suite 236, 235 - 5149
Country Hills Blvd NW
Calgary AB T3A 5K8
ph 403-208-7141
fax 403-547-4317
chc-ccm@honeycouncil.ca

DIRECTOR John Van Alten
Ontario Beekeepers Association
Dutchmans Gold
Carlisle ON L0R 1H2
tel: 905-689-6371
fax; 905-689-7730
info@dutchmansgold.com

DIRECTOR Ron Rudiak,
Manitoba Beekeepers Association
Sunnybrook Bee Farm
Steinbach MB R5G 1N2
ph. 204-326-3763
manbeekr@mb.sympatico.ca

DIRECTOR Barrie Termeer,
General Delivery
Rollyview AB T0C 2K0
ph 780-986-3040
fax 780 986-3040
btermeer@telusplanet.net

DIRECTOR Grant Hicks,
Alberta Beekeepers Association
Box 181
McLennan AB T0H 2L0
ph 780-324-3688
fax 780-324-3712
djhicks@telusplanet.net

President's Report

Wink Howland, CHC President, Yorkton, SK

February 2005, will mark the 10th anniversary of my position as the CHC delegate from Saskatchewan and I will be stepping down at that time. It has been a long and rewarding relationship. Like any organization, what you receive is in direct proportion to what you give, and I have received a lot. I have been given the opportunity of attending meetings from one end of this country to the other, and to talk with beekeepers, listen to research papers, and to tour in those areas. My beekeeping has been helped by this involvement, as had my understanding of this vast and complex country of ours. Thank you to the SBA and to my fellow delegates, for the wonderful trip.

Those of you reading this magazine, are already supporters of the CHC, and obviously recognize the importance of having a strong national organization and therefore strong national voice, particularly when dealing with government and government legislation. The ongoing dialogue and interaction with CFIA, PMRA, Health and a number of other federal government departments, is only possible through a national organization. The information available through the CHC national website is invaluable to our industry, and who, but a national body, would maintain that site? Each day, our National Co-ordinator, Heather Clay, deals with enquiries from the world, asking about our industry. Who would perform that task if we had no National organization? The need for Council is so apparent to me, that I have a great deal of difficulty in understanding the level of support that Council has received from individuals. I recently completed an analyses of membership in CHC by provincial association members. On average, only 25% of provincial association members hold membership in CHC. I am personally pleased that the support in Saskatchewan is 67%, but if SK is removed from the mix, CHC membership by province drops to less than 20% for the rest of the associations. That is difficult for me to understand.

At Council this year, I will be attempting to convince the delegates to approve a bylaw change that would re-structure the voting process. I believe that a re-structuring in the manner which I am proposing, will have a beneficial effect on membership, and will give members a greater feeling of participation in the politics of the CHC. I propose to value membership in the CHC financially, and to recognize that financial contribution in terms of the voting power it brings to the province. Since memberships are structured around the size of the operation of the members, those beekeepers operating large commercial operations will have 4 times the influence of hobby members, whose investment in membership is 1/4 that of the large commercial. Those provinces operating more bees and having greater numbers of beekeepers, will have a larger

voice at the voting table. I will briefly describe what I envision.

	BC	AB	SK	MB	ON	QC	Mar	Total
2004 CHC Members	59	64	94	46	88	18	32	401
Delegate	1 (80)	1 (80)	1 (80)	1 (80)	1 (80)	1 (80)	1 (80)	7 (560)
Basic ($50)	41 (41)	39 (39)	45 (45)	15 (15)	55 (55)	5 (5)	19 (19)	219 (219)
Small Comm ($100)	13 (26)	6 (12)	20 (40)	13 (26)	18 (36)	5 (10)	7 (14)	82 (164)
Large Comm ($200)	5 (20)	15 (60)	28 (112)	16 (64)	13 (52)	3 (12)	6 (24)	86 (344)
Total Delegate Votes	167	191	277	185	223	107	137	1287
% age by province	0.1298	0.1484	0.21523	0.1437	0.1733	0.083	0.1064	1

Current memberships in Council are valued at $50.00 basic, $100.00 small commercial (less than 500 colonies), and $200.00, large commercial (over 500 colonies), and a provincial delegate fee of $4,000.00. All CHC memberships would be weighted, and would be used to determine the voting power of the provincial delegate. Membership figures would be taken from the membership at the end of the fiscal CHC year. Each basic member would be accorded 1 vote; each small commercial member would receive 2 votes; each large commercial member would receive 4 votes; and each provincial delegate would receive 80 votes. For the purposes of easy calculation, an association with 10 CHC memberships in each class, plus a provincial delegate, would receive 10 + 20 + 40 + 80 votes, for a total of 150 votes, all carried by the provincial delegate. In an attempt to illustrate how this would work, I've provided a chart which is based on the actual CHC membership as of October 31st, 2004. If this system was adopted, the votes carried to the annual meeting by each delegate, are reflected in the total delegates vote column. These votes would be tallied when controversial issues came to the floor and unanimity could not be established.

The fact that every vote would have a bearing in determining the position of the CHC in areas of controversy, should be important to every member of an association, and therefore it would be in the interests of that association, to encourage membership in the CHC so as to maximize their voting strength. Council would benefit, the associations would benefit, and the individual members would benefit. The system would be simple to administer and there would be no additional costs for the associations. Although it is impossible to expect 100% membership in CHC, if each province could raise their membership support level to the 65% experienced in SK, it would mean an additional $40,000.00 of revenue to Council, and would ease the current struggle for funding that is ever present.

As outgoing CHC President and Saskatchewan delegate, I would like to again thank my SBA members for the support and direction they have given me during my 10 years. I would also like to thank the many provincial delegates I have worked with over that period. Their input has positively affected the directions taken by our industry, and they are to be commended for their work. The CHC needs good leadership and I know that good leaders will continue to come forward to serve. And lastly, I would like to thank the National Co-ordinators, for their leadership and guidance. I thank Linda Gane for introducing me to the intricacies of the CHC, and to Heather Clay, for her continuing and prodigious efforts, to make the CHC vibrant, alive, and important. Thank you all!

Provincial Reports

Québec

For Québec Beekeepers the season was not what we expected. The Montréal region made a bit of honey, a little under average. Areas outside of Montréal yielded well below average, some as low as 20 – 30 pounds/hive.


Alain Moyen

The Québec Federation of Beekeepers held their annual meeting on the 26 of November 2004 with a good turn out. This year the annual meeting concentrated on getting the pulse of the membership. We needed to know if we were on the right page.

A couple of plenary sessions were held in small groups. Then each group gave a report on their discussions. The question was, what are the needs of beekeepers for the immediate and long term future? The answers were very similar amongst all the groups. They ranged from the need for a provincial apiarist, to having serious research programs implemented. There was some talk of having possibly a commission to give us the tools to achieve these goals. There was also talk of having a system that would assure beekeepers of a base price for honey.

The response of beekeepers showed that the Federation didn't drop the ball but there are major challenges if we are to keep this industry alive and prosperous in the 21st Century.

Ontario

Another beekeeping year has come and gone and it is time to begin preparations for 2005. Most hives went into the winter quite heavy as we had good weather for feeding and in some areas a substantial goldenrod and aster flow.

The OBA Annual convention was held in Kingston Dec. 3 and 4.

The OBA membership viewed a video which was the result of an Offshore labour committee consisting of Human Resources & Skills Development of Canada, Ontario Ministry of Agriculture and Food, OBA members and their employees, and chaired by Stevens Associates. The video will be used to familiarize potential beekeeper employees of the work expected during the course of a beekeeping year. The committee achieved its goal of being eligible for offshore workers under the Caribbean Commonwealth and Mexican Seasonal Agricultural Workers Program [CC/MEX]. This is good news to Commercial Beekeepers who experience a labour crunch in September every year when school starts and their summer help disappears.


John van Alten

OBA members were introduced to Dr. Ernesto Guzman, Associate Professor at the University of Guelph, formerly of Mexico's Agricultural research service. We have eagerly awaited his arrival and are looking forward to working with Dr. Gusman as he begins his research here in Canada.

Also on the convention agenda was Dr. Katrina Brudzynski of Brock University speaking on the Therapeutic Properties of Propolis and Anti Bacterial properties of Honey.

Sometimes beekeepers are the hardest converts to exploring the possibilities of some of these products.

Commercial Beekeepers seem to be holding honey at the present time , as the prices being offered for bulk honey don't seem to coincide with price on the store shelf. Producer/packers are indicating that they don't plan on decreasing the price in the near future as the product seems to be selling well at retail.

Manitoba

After harvesting a smaller than expected honey crop Manitoba beekeepers are being impacted by the low world prices now being offered for high quality white honey. Prices today are approaching the cost of production, leaving the beekeeper with little or no profit. It's difficult to be optimistic when poor returns are combined with high prices for imported package bees, a cool and wet season and treatment resistant bee diseases and pests.


Ron Rudiak

In an effort to contain rising costs, Manitoba Agriculture is seeking joint funding to maintain services to the industry. One of the services identified for cost recovery is the honey bee disease inspection program. This long established program provides a valuable service to beekeepers by identifying disease problems and provides information on current strategies for dealing with bee diseases and pests. The Manitoba Beekeepers' Association recently approved a resolution to support this cost recovery request.


Wink Howland

The 2005 MBA Convention is scheduled for February 7 - 8 at Canad Inn (Polo Park). The program will include presentations on the control of pests and diseases in honeybee colonies, and some treatments which may be useful for resistant diseases. The CFIA and Honey Council will give presentations on food safety. Full information about the convention program and a registration form is available on the Manitoba Beekeepers' Assoc. website www.manitobabee.org/bulletins.shtml.

Saskatchewan

Poor weather conditions contributed to a below average crop in our province last year and honey prices have continued to decline. At present, most honey in our province remains unsold, while beekeepers hold on and hope for an improvement in price. It's creating a tougher financial climate on the prairies, and it is fortunate that two years of above average prices preceded this one, as most beekeepers are able to hang on without experiencing too much hardship. It is certainly good to have the "Crop Advance" program in place!

The good prices of the previous years resulted in Saskatchewan beekeepers trying to operate additional colonies, but I anticipate a slight reduction in those colony counts for next year, unless there is a turn around in the price. Perhaps the changes to the legislation allowing queen importation from the U.S., will allow beekeepers more flexibility in adjusting their colony counts to meet their need. I do not know how many queens were imported this year, but I suspect that it was not a great number given the lateness of the change in legislation. We will likely see larger imports in the coming year, provided the stock is available.

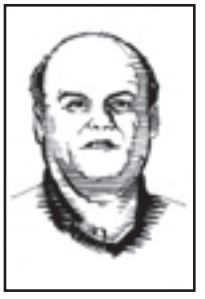
In Saskatchewan, at our recent Fall Business meeting, a resolution was passed asking that CFIA seek mandatory registration of all honey plants. There were few dissenters. Council has spent a great deal of time this year, dealing with the COFFs program. CFIA has indicated to Council, that under WTO/NAFTA regulations, we cannot impose any rules on honey being imported, that don't apply to our own industry. CFIA has further suggested, that should all commercial plants involved in packing honey be registered and inspected by CFIA, that we could make the same demands of countries exporting to Canada. The cost of basic registration is cheap — only $100.00 — but perhaps the cost of raising ones standards to a registration approval level is not so cheap. I feel that mandatory registration should precede registration under

the next level of food safety programs. We are producing food, and we should be doing it in a proper environment and meeting the minimum standards of safe production. How can we demand that of other countries, if we don't demand it from our own producers.

Saskatchewan has taken the next step in its move to form a commission. A draft incorporation document was drawn up and presented to the membership. The SBA Board was given a positive mandate to proceed to the next phase, which is having the document pass through the legal department of government to ensure its wording and structure is legal. Once that has been completed, a final ratification by the commercial beekeepers in Saskatchewan will be sought, following which the commission will become a living entity. Our Board has been pleased by the overwhelming support given this proposal, by the general membership. This has happened, even in a year where incomes are down, and that is a very positive indicator for the future development of the commission.

Alberta

The short white honey crop in North America, might have led one to believe that stable to stronger prices might follow. Unfortunately this has not been the case. Obviously the high prices of the past two years were not a result of the natural balance of the market place, and today's prices may just be reflecting the natural price placement in the global market. The price bubble was useful in terms of replacing aged equipment, but where should managers be looking for future price indicators? For arguments sake, let's say that Argentinian beekeepers are receiving $.50(US) a pound. If the middlemen in the Argentinian export scene were removed, then their honey might be $.58 delivered to a U.S. port. We have heard this fall that Chinese producers cost is less than $.25 (US) per pound. Are these scenarios indicative of where we might expect future prices to swing? Can Canadian beekeepers continue to compete with this type of competitive pricing? Will a sound Farm Food Safety programme be sufficient to exclude off shore honey from competing in the Canadian marketplace? If the U.S. producers do not continue to fight the dumping of honey into their marketplace, and do not institute a Farm Food Safety programme, does it really matter that Canada has such a standard in place? The U.S. colony count is currently about half of what the historical high for colony numbers has been. Many U. S. beekeepers were obviously unwilling to make the financial sacrifices necessary to stay in bees. Can Canadian producers expect that this scenario may follow in our country?


Grant Hicks

The Commission issue was not supported at the ABA AGM, and will be dealt with by province wide ballot in January. Most people who supported this issue were probably at the AGM but the resolve to push the resolution through did not materialize. This failure indicates that the same fifty to one hundred members who have carried the ABA financial load will continue to do so. Under the commission format, this same group would have continued to contribute the lion's share of the revenue, however, the commission format would have aligned our industry with other commodities, which presents a better image with the provincial government. The per hive funding basis would have been the definitively equitable manner in which to fund the industry. This initiative may yet pass, but if it doesn't, ABA registration fees will have to escalate!

Alberta beekeepers are supportive of the Farm Food Safety initiatives that are currently under development. We have a superior product that is integral to the retailing of honey in North America and want to defend that placement in the market.

Bee Maid Report

Bee Maid Honey Ltd. is the marketing arm of the Manitoba Cooperative Honey Producers Ltd. and the Alberta Honey Producers Cooperative Ltd. Bee Maid Honey Ltd. is North America's largest single source honey marketer, proudly packing 100% pure Canadian honey.


Barrie Termeer

The BeeMaid delegate to the Canadian Honey Council is Barrie Termeer replacing his predecessor Neil Specht. Barrie's beekeeping roots began with his father's beekeeping operation in Ontario where he attended the University of Guelph, majoring in Entomology / Apiculture. He and his wife Julie operate a large commercial beekeeping operation based out of Rollyview, Alberta. Barrie is a past president of the Canadian Honey Council and has been very active in the Alberta Beekeepers Association regarding honeybee importation issues.

Directors from the two honey producer Coops form the board of Bee Maid Honey Ltd. At the annual meeting in December, Bill Bygarski Jr. was re-elected Chair of the Board of Directors for Bee Maid Honey Ltd., and Vice Chair of the Manitoba Cooperative Honey Producers Ltd.

Cleta Dieken ,Vegreville, Alberta was elected Vice-Chair of Bee Maid Honey Ltd. and Chair of the Alberta Honey Producers Honey Cooperative Ltd.

Phil Veldhuis was re-elected Executive Member of Bee Maid Honey and Chair of the Manitoba Cooperative Honey Producers Ltd.

Other directors on the Beemaid board are: Elmer Zumwalt, Beaverlodge, Margaret Smith, St. Andrews, MB, Lorne Peters, Kleefield, MB, Otto Boettcher, Prince Albert, SK, Clem Dubeau, St. Lina, AB and Peter Gunning, Peace River, AB.

Plants for bees - Thistles in Canada

Common Name

Canada Thistle
Bull Thistle
Scotch Thistle

Scientific Name

Cirsium arvense (L.) Scop.
Cirsium vulgare (Savi) Tenore
Onopordum acanthium L.

Native Range:

All of these thistles are considered pests, not only in Canada but throughout North America and in much of the rest of the world. The most widely distributed thistle in Canada, the Canada thistle, *Cirsium arvense*, is not originally from Canada at all. It was first introduced to North America in the 1600's from southeastern Europe and by the late 1700's laws were being enacted in New England (USA) to control this pest. Canada thistle is considered to be one of the most tenacious and economically important agricultural weeds.

Bull thistle, *Cirsium vulgare,* native to Europe, western Asia and North Africa, as with Canada thistle has become a global pest.

Bull thistle (*Cirsium vulgare*)

Scotch thistle, *Onopordum acanthium,* originally came from Europe. Despite this thistle being the national symbol of Scotland, it prefers the summer-dry warmer Mediterranean climate.

Canadian Distribution:

Canada thistle is found in all provinces and territories of Canada. It is highly adaptable and tends to be an early colonizer on disturbed sites. Not all thistles in the Cirsium genus are such adaptable, widely distributed pests. The Pitcher's thistle, *Cirsium pitcheri,* is an endangered native species found in Ontario on Manitoulin Island and around Lake Huron.

Bull thistle has a wide distribution in the US and is found in most Canadian provinces. It is generally less common on the prairies.

Scotch thistle has a more limited distribution in Canada, being found mostly in the more southern regions along the US border.

Description:

All of these thistles are herbaceous members of the aster family (*Asteraceae*). The Canada thistle is a perennial herb, the bull thistle a biennial and the Scotch thistle an annual or biennial. The Scotch thistle is the largest, growing to 2 to 3 m in height while the Canada and bull thistles generally manage only 0.3 to 1 m. The bull thistle can occasionally reach 2m in height.

The Canada and bull thistles have deep horizontally spreading root systems while the Scotch thistle has a large fleshy taproot system.

Four varieties of *C. arvense* have been recognized based on variation in leaf characters, texture, segmentation, and spinyness. The stems are slender, green, and freely branched. The leaves are alternate, sessile (no stalk), and deeply lobed. The leaf margins have stiff yellowish spines. The plants are dioecious (plants are either male or female) with many relatively small (1 to 2 cm) purple flowers heads (up to 100/plant).

C. vulgare is distinguished from the other thistles by the covering of short, sharp prickles on the upper, dark green surface of the leaf blade, these prickles (apart from the obvious spines along the margins and tips of the lobes) make the surface harsh to the touch. The bracts (modified leaves below the flower) have spines on the bull thistle but not on the Canada thistle (see photos). It is bisexual with purple flower heads larger (3.5 to 5 cm) than those of the Canada thistle. There can be up to 400 flower heads on a plant, although generally less than 100.

O. acanthium is coarse, many-spined and is highly branched. The stems of this plant are relatively thick with 'wings' of ribbon-like leaf material. The leaves are oblong and prickly being toothed or slightly lobed along the margins. They are sessile, with the lower leaves measuring up to 30cm. They are covered with cottony hairs that give the plant a grey-green colour. If a plant is biennial, in the first year of its growth, only the basal rosette of leaves will be present. The flower heads are purple in color and measure 2.5 to 5cm in diameter. All of the bracts are tipped with flat, pale, orange-colored spines.

Canadian Habitat:

Thistles tend to populate disturbed sites, particularly open non-forested spaces such as verges of roadways, over grazed fields, etc.

Ecology

Canada thistle grows in most soil types but does poorly in wet, waterlogged soils. It is most common in disturbed sites (i.e. road and rail rights of way, fields and riparian zones) with little shade. Flowering occurs when day length reaches 15 hours. The blooming period is longer in the north than in the south. In Canada blooming occurs

Canada thistle (*Cirsium arvense*)

from mid-June to October, generally July through mid-September.

Herbivores tend to avoid *Cirsium spp.*, this encourages its spread in managed rangelands, especially when over grazed.

Bull thistle forms short-lived populations as an early colonizer species. It dies out after a few years as other species recover. Flowering occurs from mid to late summer, but inflorescences (flowers) can be seen until the 1st frost or snowfall in autumn. Individual flowers last for a few days depending on relative humidity. A single plant may flower from 1 to 6 weeks, and a population can flower for up to 5 months. The blooming period can occur from June to September but July to September is most common.

Scotch thistle tends to grow larger in cooler climates but has a corresponding lower germination rate. They can flower from July to October but tend to have a shorter flowering season than most of the other thistles.

Methods of Reproduction and Spread:

Canada thistle has a complex system of roots that can survive our winters and give rise to vegetative (asexual) propa-

Abstract of Progress Report for 2004

Integrated Management of Oxytetracycline-Resistant American Foulbrood Disease in Honey Bees

Stephen Pernal and Adony Melathopoulos
Agriculture & Agri-Food Canada, Beaverlodge, AB.

Oxytetracylcine (OTC)-resistant American foulbrood (rAFB) poses a serious threat the Canadian beekeeping industry. Resistant strains of *Paenibacillus larvae* subsp. *larvae* (the causative agent of AFB) have been identified from British Columbia, Alberta and Manitoba with intermediate levels of susceptibility being found in other provinces. We are actively working on three objectives to provide Canadian beekeepers with new tools by which to manage OTC-resistant AFB: (1) evaluating different formulations of alternative antibiotics to maximize their efficacy while minimizing residue deposition in honey; (2) developing rapid and sensitive techniques to monitor AFB spores for the detection of OTC-resistance and disease hazard; and (3) selecting for increased levels of hygienic behaviour in commercial beekeeping operations.

Efficacy and Residues with Alternative Antibiotics

We are continuing to make progress toward our objective of ensuring adequate efficacy using the alternative antibiotics lincomycin and tylosin to treat AFB, while minimizing residue risk. In 2004 we conducted spring and fall experiments to evaluate drug efficacy and examined residues for fall-applied treatments.

In our efficacy experiments, infections of AFB were established by inserting single frames containing rAFB scale into the centre of the brood nest of colonies. After approximately three weeks, these frames were removed leaving 100 - 200 infected cells in the remainder of each colony. These infections were severe and if left untreated would result in eventual colony death. In our spring experiment, nine treatments were used: four contained lincomycin, four contained tylosin and one group was left untreated. Analogous treatments for each drug were used, with colonies receiving a total of 600 mg of active ingredient (a.i.). Drugs were formulated either as sugar dustings or as pollen patties and were applied in three weekly applications of 200 mg of a.i. or as a single application of 600 mg. Irrespective of drug, our experiment showed that all treatments reduced the incidence of AFB symptoms three weeks after initial application, however those treatments formulated as sugar dustings were far superior at suppressing disease symptoms than pollen patties. Moreover, drugs applied as three consecutive applications of 200 mg a.i. provided better control than single applications of 600 mg. Colonies treated with pollen patties became as severely infected as untreated colonies by mid-summer, and are unlikely to survive the winter.

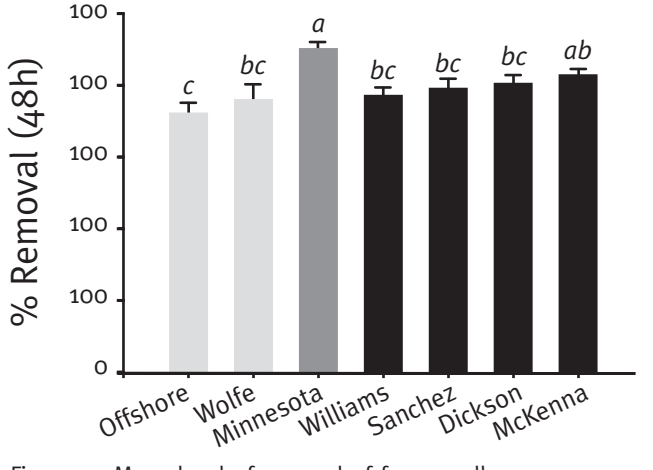


Figure 1. Mean level of removal of frozen cells among colonies headed by F2 queen stock selected by co-operating producers (Williams, Sanchez, Dickson and McKenna) versus three benchmark stocks [offshore, Wolfe (Peace River unselected) and University of Minnesota]. For each colony, the results of two consecutive 48 h freeze-killed brood assays were averaged and arcsine transformed prior to analysis. Presented are the untransformed data. The percentage of cells removed differed among breeding stocks ($F = 5.38$, $df = 6, 343$; $P < 0.001$). Different letters above each bar indicate significant differences among means. (Tukey-Kramer HSD, _=0.05)

Our fall drug efficacy experiment consisted of colonies infected in a manner similar to the spring experiment, however only one dusting treatment was evaluated per drug, this being the tri-weekly application of 200 mg of a.i. Three different doses of tylosin and lincomycin were applied as pollen patties, in weekly applications of 200, 600 and 1000 mg a.i., for a total of 600, 1800 and 3000 mg of total antibiotic. Similar to the spring trials, this experiment demonstrated that all treatments suppressed the incidence of disease symptoms three weeks after initial application, but that treatments receiving a total of 600 mg of lincomycin in pollen patties did not have symptoms reduced to the same extent as the same dosage of the drug formulated as a sugar dusting. Nevertheless, all dosages of tylosin pollen patties were as effective as the 600 mg sugar dusting. A definitive evaluation of treatment success will be made during spring inspections of these colonies.

An experiment was also conducted to detect the presence of tylosin and lincomycin residues in honey resulting from fall-applied treatments, employing the same formulations as

the spring efficacy experiment, but at 1.5X the dose structure (for regulatory approval). Colonies were treated during the first three weeks of September and were sampled each week thereafter until being prepared for winter. Colonies will be sampled again in the spring to determine residue levels after wintering. Residue profiles are being analyzed by LC-MS/MS.

Honey/Adult Bee Sampling

Similar to previous years, 14 co-operating producers from Alberta submitted honey samples to our laboratory for determination of the relative risk of AFB within their operation. In addition, each co-operator was asked to fill out a survey which outlined the number of colonies they inspected and the number of colonies found with visible symptoms of AFB. The honey samples were incubated on a selective microbiological medium for Paenibacillus larvae subsp. larvae (the causative agent of AFB). We determined the number colony forming units growing per plate; this number serves as a relative indicator of the number of spores per gram of honey. Samples of honey received from producers also permitted testing for oxytetracycline-resistant strains of AFB.

In 2002 and 2003, both the number of honey samples in which AFB spores were detected, and the average number of spores per gram of honey, had gross relationships with the disease history of honey bee operations. We found that the average number of spores per gram of honey was higher in operations with greater clinical incidence of disease, and that these numbers could be affected by major changes in the management of disease within such operations.

Isolates of P. l. larvae from honey samples were also used to carry out antibiotic resistance tests to tetracycline. In 2003, nine producers were confirmed to have highly resistant strains of AFB present in their operations; four of these producers had >90% of their isolates characterized as highly resistant, while the remaining producers had 72%,45%, 43%, 25% and 25% of their isolates classified in the same manner, respectively.

In 2003, we expanded our survey to include 19 producers from Manitoba. This allowed us to assay spore loads from honey as well as adult bees sampled within the same beekeeping operations. Moreover, the standardized disease inspections conducted by the Province of Manitoba permitted a more consistent disease rating standard against which our spore results could be compared.

Unlike the Alberta samples, we found that the proportion of samples in which spores could be detected was not a reliable indicator of disease status, however the average number of spores per gram of honey was more

directly related to the disease history of a beekeeping operation. By contrast, the viable numbers of AFB spores from the digestive system of adult bees proved to be a sensitive technique with which to detect the presence of AFB. Bee samples, consequently, may prove more useful in identifying the level of actively cycling infections of AFB within an operation.

Antibiotic resistance testing for Manitoba producers showed that the average zone of inhibition for most samples was large (indicating susceptibility to oxytetracycline), however one beekeeping operation had an average zone that was < 30 mm, indicating that it harboured highly resistant strains. Another producer was found to have two of twelve isolates highly resistant to the drug, even though the average inhibition zone for all strains cultured was > 30 mm. These are the first discoveries of antibiotic resistance from these beekeeping operations and are highly novel in being detected directly from honey samples.

Reporting of the 2004 data will occur after sample processing is complete this winter.

Hygienic Behaviour Selection

Our ongoing four-year trial has investigated whether the frequency of hygienic behaviour in prairie honey-producing operations could be increased using standard open-mated breeding practices used in Western Canada. To test this hypothesis we co-operated with four large commercial beekeeping operations in Alberta's Peace River District to select, propagate and mate their queen stock over successive generations.

To determine if the frequency of hygienic behaviour had increased over generations, the trait was compared among our co-operator's selected stock and against three benchmark stocks:

(1) queens from a participating Peace River beekeeper (Wolfe) that had never selected for hygienic behaviour;
(2) queens from commercial offshore stock widely used in Alberta; and
(3) queens purebred for hygienic behaviour from the University of Minnesota. This evaluation was rigorously designed to uncouple the genetic and environmental components of the hygienic behaviour expressed by colonies headed by the daughters of each generation's selected breeder queens.

Selection appears to have increased the naturally high levels of hygienic behaviour in our Peace River queen stocks. Evidence for this can bee seen by the fact that three of our four co-operator's F2 generation queens (Sanchez, Dickson and McKenna) had higher average levels of hygienic behaviour than the unselected Peace River stock (Wolfe) (Fig. 1). Although individual comparisons among unselected and selected Peace River stocks are not statistically different, we expect that continued selec-

gation through aerial shoots. Limited spread and reproduction occurs through seed. The bull and Scotch thistles do not reproduce vegetatively but when biennial have a limited ability to recover from vegetative damage.

Bull and Scotch thistle reproduce only sexually by seed, some of which can survive up to 20 years in the soil.

Honey/Pollen Potential:

Canada thistle has fragrant flowers that are attractive to honeybees and are considered a good source of nectar and pollen. Small numerous flower heads produce abundant nectar. Because of its wide distribution it is probably the greatest contributor of the thistles to the honey crop. It provides a light honey, sometimes called water-white, that granulates to a fine texture and has a mild flavour. *C. arvense* is considered a class 3 (51 to 100 kg/ha) plant for honey production.

Little has been documented on the honey production of bull thistle. It probably has similar nectar properties to Canada thistle and likely contributes to an often mixed harvest of thistle honey. Scotch thistle has little importance in Canada for honey, however in Australia, in regions where it is common, it can produce 29 kg/hive.

Another 'thistle' genus that is found less commonly but is present across much of southern Canada is the nodding thistle, *Carduus nutans* L. The common name comes from the large flower heads (up to 7.5 cm) that bend over (or nod) under their own weight, they are also known as musk thistle. Although not considered a prolific honey producer in Canada, it is considered a good source in parts of New Zealand and Australia. It is often sold as a specialty honey due to its floral bouquet and slow crystallizing properties.

A 'thistle' with yellow flowers rather than the more common purple to pink is the sow thistle, *Sonchus spp.* Two species found in Canada that contribute to the honey crop, particularly in the Maritimes and central Canada, are *S. arvensis* L. and *S. asper* (L.) Hill. They produce an amber honey.

A plant genus that is sometimes referred to as 'thistle' but more commonly as knapweed or corn flowers is the *Centaurea spp.* The honey from one species, the star-thistle or St. Barnaby's thistle, *C. solstitialis* L., is sold in the US as a specialty honey. The genus can generally produce 51 to 100 kg/ha of dark amber honey. It is common in the southern interior of BC and is a significant source in these regions. In Australia a mean honey yield of 24 kg/hive is expected. The genus is considered an excellent source of pollen.

Probably the most famous of the thistles for honey production is the great globe thistle (*Echinops sphaerocephalus* L.). It has been reported to produce up to 1500 kg/ha but 200 to

tion efforts will further increase these margins. A collective comparison of all selected Peace River stock indicates that it is more hygienic than the stock being purchased and bred from outside the region (Offshore).

The highest level of hygienic behaviour among the sources of Peace River selected stock was seen from the co-operating producer McKenna. McKenna's stock expressed hygienic behaviour at level statistically greater than the offshore benchmark stock and similar to the purebred hygienic queens from the University of Minnesota, further suggesting that continued selection increases hygienic behaviour.

We are scheduled to assess the third generation of selected progeny (F3) in May 2005. Our results to date suggest selection has increased the level of hygienic behaviour among our co-operators' and, consequently, we expect the F3 generation to exhibit higher levels of hygienic behaviour compared with offshore or unselected Peace River benchmark queen stock.

Acknowledgements: We thank the Canadian Bee Research Fund, Alberta Crop Industry Development Fund, Matching Investment Initiative Program (AAFC), Medivet Pharmaceuticals Ltd., Bee Maid Honey, the Alberta Beekeepers' Association and all cooperating beekeepers for supporting this research.

Evaluation of Varroa and Tracheal Mite Tolerance in Selected Honeybee Lines and Attempted Correlation of Tolerance with DNA Markers.

Albert J.Robertson, Saskatchewan Beekeepers Association, Saskatoon, SK

The objective of this research is to identify productive honeybee genotypes with tolerance to varroa and tracheal mites and to correlate the resistance to DNA Markers. Progress towards this goal has been made, by establishing an isolated apiary designated "Saskatraz", containing 35 colonies with different origins and diverse genetics. Twenty of the colonies originate from 14 different experienced queen breeders in Saskatchewan and Manitoba, fifteen of the colonies originate from varroa and tracheal mite tolerant Russian lines obtained in the past four years through the USDA labs, Baton Rouge, La. USA via the Ontario Beekeepers Association. The Russian lines were crossed with Canadian colonies by three different queen breeders and reselected for performance under Saskatchewan conditions prior to selection for Saskatraz. Colonies were screened for varroa and tracheal mites throughout the summer and fall. Low levels of varroa were found in 60% of the colonies in September, but after repeated testing no tracheal mites were detected. All colonies were treated with Apistan to normalize varroa mite populations and all colonies were infected with tracheal mites on October 15, 2004. No further treatments with miticides will be made, and natural selection will identify resistant genotypes. Colonies were sampled where possible for DNA analyses by removing drone pupae prior to emergence. All colonies will eventually be genotyped with twenty new microsatellite DNA markers which distinguish Russian and Canadian honeybees.

Future experiments will deal with correlating molecular markers with colonies showing mite tolerant phenotypes. Distribution of genetically marked honeybee breeding stock with mite tolerance would financially benefit commercial beekeepers by decreasing dependency on chemical treatments, by protecting against varroa mites with resistance to current treatments and by protecting high quality Canadian honey from chemical contamination.

500 kg/ha may be more realistic.

All of the thistles discussed here are classified as weeds, some more noxious than others. It is not advisable (or in some regions legal) to plant or even encourage a noxious pest such as Canada thistle on any property. However, if present, even when a management strategy is put in place it can take many years to reduce the population. During this time the beekeeper could include the thistle in their overall harvest strategy.

Other Notes:

Cirsium comes from the Greek 'cirsos' meaning swollen veins for which the thistle was considered a remedy. The shoots and roots have been consumed by some people in Russia and by first nations people in North America. Many of these thistles have ancient herbal and/or medicinal uses identified.

The milk thistle (*Sylibum marianum* (L) Gaertner) is being studied for its medicinal properties and cultivation potential in the prairies. One day beekeepers may be able to harvest honey from this nutraceutical crop.

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A BEEKEEPER PARADISE

Kathleen Cooper and Peter Hardie, CUSO

Peter Hardie with nuc

Imagine a place with over 4,000 species of wild flowering plants, many of which bloom all year round. Think of an agricultural system based on small-scale; subsistence gardening that uses virtually no chemicals. Add to this, year round temperatures between 21 and 33° C., no foulbrood, no *Varroa destructor*, no medications used or needed, and 1.35 million square kilometres of protecting ocean surrounding you. Then throw in a gentle strain of Italian bees that can produce up to 100kg of tropical rain forest honey per year without any supplemental feeding, and you have the Solomon Islands, a potential beekeepers' paradise of more than 900 islands scattered approximately 1,500 kilometres off the northeast coast of Australia.

This is where 2 New Brunswick beekeepers have spent the last two years as CUSO volunteers partnering with the Solomon Islands Honey Producers Cooperative Association (SIHPCA) to help develop beekeeping as a sustainable rural livelihood. Two years ago Kathleen Cooper of Cap Pêlé, New Brunswick had no idea what her beekeeping hobby of the past 18 years would lead her to. Likewise, her partner, husband, and New Brunswick beekeeper for 30 years, Peter Hardie could not have guessed that the two of them would end up teaching beekeeping in the South Pacific. Responding to a CUSO advertisement in the New Brunswick Beekeepers' Association newsletter, the couple found themselves living and working in a tropical paradise on the other side of the globe. Nor would the two of them have predicted how much their project would have evolved and grown over those two years.

So why would CUSO want to get involved in developing beekeeping as a small-scale rural livelihood? "To do no harm" is a relatively safe place to start when assessing any development project. Honeybees are able to produce something of value from unused resources without destroying anything, and while at the same time increasing the quantity and quality of many fruits, vegetables, seeds, and nuts. So, from the point of view of "development" it is at least a benign activity. If the beekeeper is also able to produce food, enjoy the activity, and earn some income, without messing anything up, then perhaps beekeeping is an appropriate activity to try and encourage. So when the SIHPCA approached CUSO asking for some help in developing the beekeeping industry in the Solomon Islands, CUSO said yes and went looking for some Canadian beekeepers willing to help.

New beekeepers at the Rural Training Centre

ERS'

ie, CUSO Volunteers, Solomon Islands.

The couple was a little doubtful at first, that they would have much to contribute in such a different situation to what they were used to in Canada, but learned quickly that it was the same animal, *Apis mellifera* (ligustica), and that the bees behaved in much the same way as they do in Canada. Cooper and Hardie did however have to adapt to differences in how the bees are managed. Cooper says that,"Seasonality for sure is the biggest difference and although there are seasons here they are far more subtle than at home and we are still learning these subtleties as they relate to honeybees. Honey is produced 12 months of the year from a myriad of different trees and flowers, some of which bloom continuously, others briefly, still others intermittently. In Canada we manage our bees for one or two big honey flows, then pack them up for the winter. Here, you try and keep them strong all year, replace queens frequently (they wear out fast), hope the rains don't last too long, try and keep them from swarming, and harvest honey often."

A number of species of ants attack the hives

Although most farmers use standard Langstroth hives, they are often hand made, from chain saw milled timber, and do not always fit together well, resulting in bees coming and going from many different openings. The availability and price of bees wax foundation causes problems, and frames, and comb are often poorly spaced, and not always easy to remove, making manipulations, and honey extraction difficult. Regular, and frequent hive inspection is not generally practised, and propolis is produced in quantity, so as a result the term "moveable frame" doesn't always apply. "Bee equipment is made from some of the most amazing hardwoods, Vassa (vitex), aqua, and even rosewood, and the boxes are heavy even when not full of honey." says Hardie. "I'd love to take one of these hives home to Canada to use as a coffee table." Roads are rare and in poor condition, and transport in general is difficult at best so beehives are rarely moved from one place to another, and migratory beekeeping is non-existent. Everything in rural/bush areas must be carried on your back.

Hardie describes another learning experience, "We arrived with all of our own preconceptions, prejudices, truths, and myths and have spent some time here unlearning them. For example in Canada, we generally work with our bees in late morning or afternoon when things have warmed up a bit. We had assumed the same would be true in the Solomon's. We were quite dismayed to find initially that the bees here were

Assessment of the Varroa Mite and Asian Bee Incursion in the Solomon Islands

Denis Anderson, Principal Research Scientist, CSIRO Entomology, Canberra, Australia

The varroa mite (*Varroa sp.*) and Asian honey bee (*Apis cerana*) were discovered in the Solomon Islands on 17 March 2003 on Guadalcanal Island. The discoveries were made by Kathleen Cooper and Peter Hardie, Canadian CUSO volunteers, and Father David Galvin, a Roman Catholic Priest, beekeeper and member of the Solomon Islands Honey Producers Cooperative Association (SIHPCA). As a result the Australian Centre for International Agricultural Research (ACIAR) funded a visit by Dr Denis Anderson to assess the bee and bee-mite situation in the Solomon Islands and suggest research that might assist the situation.

Samples of worker bees were gathered from 11 feral colonies of A cerana from Guadalcanal

Kathleen Cooper (front) Denis and Margaret Anderson, travel to Savo island apiaries.

quite defensive, and we were getting stung quite frequently. In one of the first beekeeping courses we conducted, we asked participants what sorts of things they did to avoid getting stung, and were surprised, but relieved when one beekeeper suggested that the bees were easier to work with in the mornings. We tried this of course and have found that Solomon Island bees are a pleasure to work with in the mornings before the sun gets too strong but get a little grumpy in the afternoon when the sun gets hot, and who could blame them."

One of the equipment innovations from the Solomon Islands that Hardie and Cooper are planning to incorporate into their beekeeping operation back in Canada is the use of hive stands. Hives in the Solomon's are usually kept 2 to 3 feet off the ground on various types of hive stands. This is done mainly to evade the Cane toads (*Bufo marinus*), which are voracious predators that would very quickly destroy a colony placed at ground level. The stands are also helpful in the control of termites, and a number of species of ants that attack the hives, when the hive stand legs are treated with grease or oil to prevent the ants getting to the hives. "We don't have to worry about these pests in Canada, but for the past two years I have noticed that my seasonal, and pesty lower back aches have disappeared. It's a real pleasure to work with the bees while standing upright."

Part of Kathleen's original placement in the Solomon Islands was as a Life Skills teacher at Airahu Rural Training Centre on the Island of Malaita. As the other part was as a Honey Industry Advisor to the Solomon Islands Honey Cooperative, and as CUSO's mandate includes the promotion of gender equity, and women's livelihoods, it quickly became obvious that beekeeping could be considered one of the "Life Skills" she taught her young female students. Peter's placement was intended to be as a Honey Production Advisor to the Honey Cooperative, but as the broad mandate for this position was to promote beekeeping and honey production, it was easy to say yes when he was asked to teach beekeeping to the agriculture students at the same Rural Training Centre.

The two knew that you can't teach beekeeping without bees so a couple of starter hives were donated, and transported to the Centre and things have grown from there. These two hives were split to become 20, and the Centre is now raising queens, and selling nucleus hives to other beekeepers, as well as producing honey. The carpentry department is now making all of the wooden equipment, and Kathleen's Life Skills Department is making bee veils and selling them all over the country. A graduate from Peter's class at the centre is now employed as a beekeeping technician on a honeybee research project, and another student is looking after a recently started honeybee enterprise at a Farmer's Training Centre.

From these small beginnings a program has developed in cooperation with the Solomon Islands Association of Rural Training Centres and Peter and Kathleen have developed a beekeeping curriculum for rural training centres, and have visited many of these schools to help get their honeybee projects up and flying. To date, 12 Rural Training Centres in 8 different provinces are keeping honeybees, and have beekeeping as part of their Agriculture and/or Life Skills Programs. In addition to the bees being used as training tools they are also generating much needed income to help support the severely under-funded centres. To support and sustain these beginnings, honeybees are now being kept at the Rural Training Centre Teachers College and the couple is also teaching teachers how to teach beekeeping.

As part of the Honey Coops' mandate to provide farmer training, Hardie and Cooper have logged thousands of kilometres by twin otter, coastal steamer, motorized canoe, 4-wheel drive truck, tractor, dug-out canoe, and on foot, visiting beekeepers and conducting introductory, and advanced beekeeping training to farmers in villages throughout the Solomon Islands. "We've been incredibly lucky", says Kathleen, to be able to visit so many remote, and incredible places." Some might consider it travelling rough, and certainly after a couple of weeks of sleeping on straw mats, in leaf houses, and eating wholesome, though unvarying village food, the two are always happy to get back to their home, where the luxury of a shower, bed, gas stove, and electricity are greatly appreciated. To date they have conducted over 30 workshops, and provided training to approximately 500 cur-

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rent, or future beekeepers. All of the oral parts of the trainings are conducted in Pidgin, with most of the written materials provided in English.

The couple "team teach" during their workshops, taking turns with various topics, and making sure there is at least as much practical, hands-on demonstration, and practise, as there is theory. "It really helps having another teacher to trade-off with, and to play off of," says Kathleen, a teacher by profession. "And I think it helps keep the farmers, (many of whom have had very little formal education) entertained, and involved. Teaching in pidgin has been a challenge, but again the farmers are far less reticent about participating when the common language is used. It has also been interesting how the dynamic of a husband and wife partnership, both in the classroom, and in the bee yard, plays out in a very male dominated culture", says Peter, "and adding some humour to the issue with references to fat lazy drones, and the female workers seems to work well, particularly when there are both men and women in the class."

All this is not to say that their time in the Solomon Islands has not been without disappointments and setbacks. In New Brunswick before leaving to take up their post, the couple's initial research into beekeeping in the Solomon Islands informed them that there were no Varroa mites, or Asian bees (*Apis cerana*) in the country. After fighting this pest back home in Canada, it was a relief knowing that varroa was not a problem to be dealt with in their new home. However, this belief was to be short lived. In March 2003, shortly after arriving in the Solomons, the pair was visiting a rural training centre on the island of Guadalcanal whose hives were in serious decline, with only a few weak colonies surviving. Due to their ample experience with varroa in Canada it was easy for the couple to spot the small reddish brown creatures and their fantasy of a pest free beekeeping paradise crashed. They also discovered a number of feral colonies of what appeared to be *Apis cerana* (Asiatic Hive Bee) that had colonised the abandoned hives of the *Apis mellifera* (European honey bee). These Asian bees also had mites, and samples of both the mites and the Asian bees were collected and sent to New Zealand for identification. Dr. Mark Goodwin of the New Zealand Ministry of Agriculture then sent the samples on to Dr. Denis Anderson at the Australian Centre for International Agriculture Research in Canberra, a world expert on Varroa mites for positive identification. Dr. Anderson verified the Apis cerana identification, and identified the mite as being *Varroa jacobsoni*, not *Varroa destructor*.

The Solomon Islands Ministry of Agriculture immediately established a quarantine, prohibiting the movement of any bees or used bee equipment, and began a country-wide hive inspection program, and Hardie and Cooper found themselves wearing yet another hat as they inspected beehives on behalf of the Ministry of Agriculture during their travels. The Ministry of Agriculture also requested some assistance from both New Zealand and Australia to help deal with this invasion, and the Commonwealth Scientific Industrial Research Organization (CSIRO) sent Dr. Anderson to the Solomon's to do some preliminary investigations that will hopefully lead to some longer term research on both the Asian bee and its' parasite.

"The mite is not the problem in the Solomon Islands," says Dr. Anderson. "This species of mite, (*Varroa jacobsoni*), cannot reproduce on the European honeybee, so its population never increases to the point where it will hurt the bees." This is good news for beekeepers in the Solomon Islands, however the die off of honeybees on Guadalcanal and Savo remains to be explained. Dr. Anderson believes the answer to this mystery may be the Asian Bee, which has found a new home in the Solomon Islands. "This Asian bee is a tropical species that is very aggressive, swarms readily, and frequently, spreads quickly, and is better suited to the climate, and ecology of the Solomon Islands than the European bee." Explains Dr.

- Varroa mites first became a problem on the European honey bee (*Apis mellifera*) when that bee was introdu-ced to Asia some 40-50 years ago.
- Two Varroa species, *V. jacobsoni* and *V. destructor,* are each made up of several strains.
- Only two strains of *V. destructor* have become pests of the European honey bee (*Apis mellifera*) worldwide, the Korea and Japan genotypes.
- The Korea genotype of *V. destructor* is the most widespread and common. It is found on *A. mellifera* in the UK, Europe, the Middle East, Africa, Asia, Canada, North and South America and New Zealand. The Japan genotype has only been reported on *A. mellifera* from Japan, Thailand and the Americas.
- *Varroa jacobsoni* lacks the ability to reproduce on *A. mellifera* brood and is relatively harmless to that bee.
- All Varroa mites reproduce only in capped drone cells of Asian honey bee (*A. cerana*) colonies. If there are no *A. cerana* drone cells available for the female mites to reproduce in, they will often enter worker brood and try to reproduce there. However, they are unable to produce eggs or offspring in the worker brood. This reproductive strategy is the main reason why all Varroa mites are relatively harmless to their Asian bee hosts.

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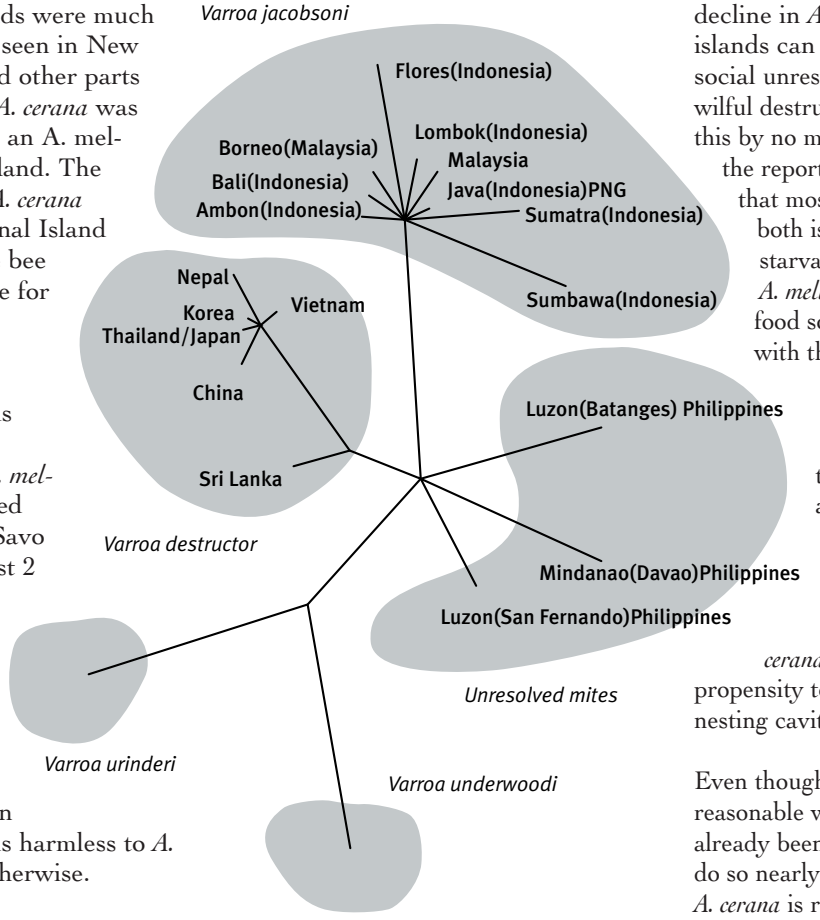
and Savo Islands. No colonies of A. cerana were found or reported on Kolombangara or Malaita Islands. Subsequent DNA analysis by the Commonwealth Scientific Industrial Research Organization (CSIRO) laboratory, Canberra showed that the bees were the Java strain of *A. cerana* and the mite was the Java strain of Varroa jacobsoni. The Java strain of *A. cerana* is known as the natural host of the Java strain of *V. jacobsoni*, which is native to Indonesia. The mite is also known to be harmless to the European honey bee (*A. mellifera*), as it lacks the ability to reproduce on that bee (Anderson, 1994; Anderson & Sukarsi 1996; Anderson & Trueman, 2000; Anderson, 2000).

Most feral *A. cerana* colonies inspected on Guadalcanal and Savo Islands were located in wooden hives that had previously housed healthy *A. mellifera* colonies. Nevertheless, other feral colonies were commonly observed in cavities in buildings and in limestone outcrops. The densities of *A. cerana* colonies on both islands were much higher than normally seen in New Guinea, Indonesia and other parts of Asia. A swarm of *A. cerana* was observed moving into an A. mellifera hive on Savo Island. The high density of feral *A. cerana* colonies on Guadalcanal Island also indicates that the bee has been present there for at least 3-4 years.

The Ministry of Agriculture and Lands (MAL) suggest that perhaps up to 2000 *A. mellifera* colonies have died on Guadalcanal and Savo Islands during the past 2 years. Local authorities assumed that the mites caused the *A. mellifera* colony losses. However, the subsequent identification of the mite as the Java strain of *V. jacobsoni,* which is harmless to *A. mellifera,* suggested otherwise.

Approximately 3% of the worker cells inspected in *A. mellifera* colonies on Guadalcanal Island contained female *Varroa jacobsoni* mites, but these were not reproducing (no drone cells were present in the colonies). It was obvious that these mites had spread from the *A. cerana* colonies into the *A. mellifera* colonies but could not reproduce on the *A. mellifera* brood. This behaviour is consistent with reports for this mite in Indonesia and New Guinea (Anderson, 1994; Anderson and Trueman 2000).

A. cerana appears to be restricted to just a small region of the Solomon Islands, but this needs further confirmation. During this visit, the bee was observed on Guadalcanal Island and nearby Savo Island, but not on the slightly more distant Malaita Island nor on the far western island to Kolombangara. This distribution suggests that the bee did not arrive in the Solomon Islands by island-hopping from New Guinea, but rather that it arrived by some other means, most probably as a swarm on a boat or ship that arrived at the main shipping terminal of the capital city, Honiara.

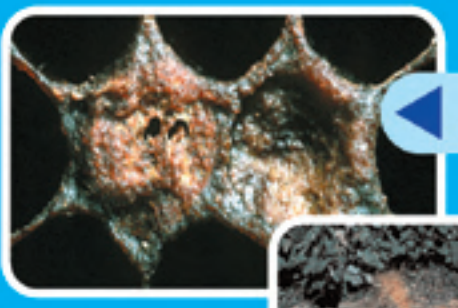


The strain of *A. cerana* now in the Solomon Islands (and the Java strain of *V. jacobsoni* that it is carrying) could only have originated from the far western regions of Indonesia or from New Guinea. Of the two, New Guinea, which borders the Solomon Islands, would seem the most likely origin. The Java strain of *A. cerana* (carrying the Java strain of *V. jacobsoni*) was first introduced to the western half of New Guinea (Irian Jaya) from Java during the late 1970's as part of an Indonesian transmigration program. Since then, the bee has been in a 'rapid expansion phase' spreading throughout the entire island of New Guinea and to some offshore islands. Since the late 1990's swarms of the bee have also been intercepted on ships arriving at Australian ports from New Guinea, the latest in mid-May 2004.

It is likely that some of the recent decline in *A. mellifera* colonies on both islands can be attributed to the human social unrest, either through neglect or wilful destruction of colonies. However, this by no means explains the extent of the reported losses. It is concluded that most of the *A. mellifera* losses on both islands can be attributed to starvation caused by the inability of *A. mellifera* to compete for available food sources (nectar and pollen) with the newly arrived *A. cerana.* The climates of Guadalcanal and Savo Islands are similar to Java the native home of the *A. cerana.* Both islands also contain many coconut plantations that offer both a food source and small nesting cavities. These conditions are ideal for *A. cerana,* which is renowned for its propensity to swarm and utilize small nesting cavities.

Even though *A. mellifera* can also survive reasonable well in such conditions (as has already been demonstrated), it doesn't do so nearly as well as *A. cerana.* As well, *A. cerana* is renowned for its aggressive robbing of honey and pollen from *A. mel-*

EFB



AFB

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European Foulbrood (EFB) is a bacterial brood disease caused by several agents the main being the bacterium *Melissococcus pluton*. It occurs most frequently in the spring or early summer during brood rearing and is thought to be caused by stress in the colony and lack of pollen. Symptoms can be variable which makes EFB difficult to identify with certainty; frequently disappearing once there is a nectar flow. But EFB can seriously affect brood development and needs to be identified in a colony as soon as possible.

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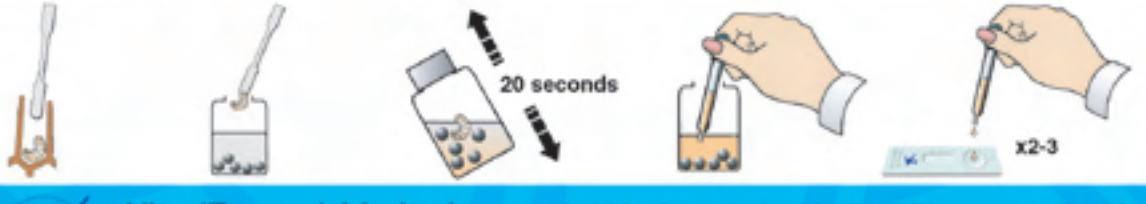

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Anderson. "It may be that the Asian bee is just out-competing the European bee on Guadalcanal and Savo, and while in its' colonizing phase at least, is using up all of the available resources."

Apis cerana is kept quite successfully in many countries in Asia and Asia Pacific, but unfortunately it seems that in the Solomon Islands, the Java strain is quite defensive, and swarms readily and frequently. It never produces any amount of surplus honey, making it an unfavourable alternative to the European honeybee.

Although the discovery of the Varroa mite and the Asian honeybee was a major blow to the fledgling industry, Cooper and Hardie remain hopeful that Apis cerana can be contained on the islands where it is now located long enough for measures to be put in place to slow the spread of this pest, and to initiate research into how to control, and or live with this new arrival. They managed to attract some funding from the European Union, Aus Aid, and CUSO, to implement an *Apis cerana*, *Apis mellifera* interaction study that is beginning to show some positive signs.

In the meantime, in their adopted home province of Malaita, an island not yet invaded, the couple has encouraged some spin-off businesses that have sprung up from the increased interest in beekeeping. As previously mentioned, Kathleen's life skills students are making and selling bee veils. As well a local machinist is now producing smokers and hive tools, and 3 local woodworkers are building woodenware. This equipment had been previously imported from New Zealand and Australia at prohibitive prices, and it really didn't take much effort to get these small businesses going. Wax foundation is still a problem, and the couple would love to hear from any beekeepers with small scale, low-tech ideas for making your own foundation.

Most villagers in the Solomon Islands live outside of the cash economy, so start up costs, although not exorbitant, are still beyond the reach of most farmers. Aid donors, unfortunately, are reluctant to fund truly small-scale projects; so getting started in a small way can be a challenge.

One idea that the couple has borrowed from a long-time Solomon Island beekeeper, Father David Galvin is a lend-a-hive program. Although this project is very small, it has managed to help groups with basically no resources get started in beekeeping. After training a community or village group of novice beekeepers, Peter and Kathleen lend them some practice beehives. Their introductory beekeeping course contains a session on building wooden bee equipment and the group is expected to build basic hive parts as they practice beekeeping with the borrowed colonies. When the group and the bees are ready, Hardie and Cooper return to the village and teach them how to divide the colonies, and raise new queens. The group is left with some hives of their own and the loaned hives are taken back, and lent to another group. Small beginnings, but in a country where most beekeeping is on a small scale, with very few operations of more than 100 hives, and most with less than 10, it seems to work.

Can beekeeping contribute to local food security, and a sustainable rural livelihood in the Solomon Islands, and elsewhere? Can the development of the art and science of bee farming (apiculture) in the Solomon Islands take place without doing any harm? Can the mutualism that exists between bee and flower extend to, and include the rural community? Do Canadian beekeepers have anything to offer beekeepers in the "developing" world? So far, the answer to these questions seems to be a qualified "yes".

Honey Substitute

Heather Clay, National Coordinator, CHC

Cargill recently announced the introduction of a honey like product which is a low cost substitute for honey. They claim that their unique honey product matches the sweetness, taste, color and mouthfeel of USDA Grade A Honey. Their low cost alternative is recommended as a 1:1 replacement for honey in new or reformulated products. Sauces made with the honey extender are said to balance the richness of honey with the "sassiness" of spices, according to Anne Mollerus, innovation manager, Cargill Sweeteners North America. Advertisements for the product claim that Likewise™ is an all-natural sweetener blend. The National Honey Board requested more information about Likewise™ . Ms Mollerus would not disclose the percentage of honey in the product but did say that honey followed corn sweeteners. on the list of ingredients. The NHB reports that she said that Cargill did extensive research on existing honey standards before coming out with this product. According to the company, sensory studies comparing a honey barbecue sauce made with the new product to a barbecue sauce made with 10% honey showed no statistically significant difference between sample sauces.

We share the NHB concern that low cost alternatives should not be allowed to use the name honey for marketing purposes The Canadian Honey Council will bring this issue to the attention of the Canadian Food Inspection Agency and push to protect the name of honey.

CBISQT survey
preliminary results

Rudy Gelderblom IT Consultant CBISQT steering committee

The Canadian Honey Council committee for On Farm Food Safety, with funding assistance from Agriculture Agri-Food Canada, has been working on developing a national strategy for safety and traceability in the beekeeping industry. In June 2004 the Canadian Bee Industry Safety Quality and Traceability program (CBISQT) was initiated. We have a target launch date of 2006.

The CBISQT steering committee is comprised of commercial beekeepers representing all regions of Canada. They have taken on the huge task of designing a system that is user friendly, affordable and meets the technical standards set by the Canadian Food Inspection Agency. The CFIA standards are based on international ISO standards so there will be international acceptance of our program.

The new program needs to fit in with current beekeeper management practices and record keeping. Our goal is to have the CBISQT program be as little disruptive as possible and yet provide a level of management that provides acceptable safety and traceability. In order to identify what is common practice a survey was initiated in the fall of 2004.

The survey was designed to determine the size and variety of enterprises and to assess current and future needs of beekeepers. Over 5,500 survey forms were mailed out in a co-operative effort by each of the provincial beekeeper associations. More complete results will be available after the annual meeting in Saskatoon, but here are some preliminary observations regarding the returns.

We estimate that surveys reached about half the beekeepers in the country. In all likelihood the majority of those we missed are hobbyists and smaller operations. Bigger operations tend to be members of various organizations and on more mailing lists, so we probably reached a greater proportion of mid size and larger operations. Of the surveys sent out a little better than 10% were returned, which compares with the average returns on surveys.

Even with the possibly skewed proportion of large to small operations, the majority of beekeepers who responded keep fewer than 50 hives, about 60% nation wide. Which suggests that the actual proportion is even larger. About 36% keep between 50 and 1000 hives; roughly equally divided into those keeping less than 300 and those keeping more than 300 hives. 4% of beekeepers reported more than a 1000 hives.

Albert Chambers, CFA and Heather Clay at CBISQT steering committee meeting

We were particularly interested in the kind of records people were keeping and whether beekeepers would be able to track a given lot of honey and mount an effective and selective recall should this be required. Almost 20% of the respondents keep no records whatsoever. It is easy to imagine that if you only have 6 hives and they are all in one yard and you did all your extracting on one day in August, the records you need to maintain to track where your honey came from are minimal. Once you have more than a few yards, it gets more complicated and some 66% of beekeepers do keep paper records and the remainder (14%) keep either a fully electronic record system or a hybrid system where paper records are transcribed to a database or spreadsheet at a later date.

The survey results indicate that many would switch from paper records to either computerized records or a hybrid system if some suitable system presented itself, but on the whole the majority still prefers paper records. Comments on the surveys indicate that field trials performed by beekeepers with laptops and handheld PDAs had been, on the whole, unsatisfactory. Evidently pressing tiny buttons with gloves or hands gummed with honey and propolis can present problems. Never mind the weather.

We were uncertain as to how many beekeepers would have internet access, so we opted for a mailed-out survey rather than a web based form, fearing we would not reach a large portion of beekeepers if it turned out very few had internet access. A web based form, of course, would have suggested that all beekeepers have internet access…. In fact, 30% reported no access at all. 46% of respondents have dialup access to the internet and a somewhat surprising high 25% reported high speed or cable modem access.

In spite of some vociferous comments to the contrary, overall beekeepers reported a willingness to adopt some form of food safety programme along with some form of record keeping and auditing system, provided the system was simple enough and took into account the nature of the operation, i.e. small beekeeper versus large commercial enterprise.

These results have a bearing on what final form the program and the record keeping system we hope to bring forward will take. We encourage beekeepers to participate in the process of developing a program whenever the opportunity presents itself.

In a New light

Luke Marshall, Image Exploration, Calgary, AB

As a photographer I believe in the power of images. Beekeeping is a beautiful and interesting practice, one that easily captivates the imagination of anyone who comes in contact with it. There is something about bees and the mystery of what goes on inside a hive that sparks an interest in many people, prompting them to ask questions in an attempt to understand the process. There is no other medium out there that can help with this understanding in a more interesting and meaningful way than photography.

Many books on the subject of beekeeping exist, but the majority lack images, leaving the average person, who may just be interested in learning about the subject, with only half of the information. Photographs are essential to the understanding of bees and beekeeping as they are able to illustrate aspects of the industry and process in a way that words cannot. A person who is simply reading about beekeeping cannot fully appreciate the beauty, variety and intensity of it.

To many outsiders, bees and beekeeping are mysterious and misunderstood subjects. The industry doesn't enjoy the same media attention as others in Canada. such as logging, ranching and even maple syrup. To me, this is a tragedy. Beekeeping is more intricately beautiful and inherently interesting than any other industry. None is more worthy of a photograph and yet beekeeping remains under exposed in this area.

Many people are afraid of bees and find these tiny creatures bothersome or scary. This can likely be traced back to the fear of a bee sting and the alien looks of the insect. Once viewed in a softer light it is evident that these are beautiful creatures with a lot to offer humankind. Seeing a bee gathering nectar from a canola flower in the evening light, minding her own business, easily contradicts the thought of swarms of bees attacking people and dispels other negative images seen on television or movies.

Working in the beekeeping industry has given me a great respect for beekeepers. The hard work and commitment shown in this tight knit community is something to be shared with, and envied by the rest of the world. Photographs are able to bring emotion and a sense of being there to the telling of this story, which words cannot. People can only truly understand a subject such as this when they get the chance to see it for themselves.

I am currently writing several articles on the subject of photographing beekeeping as well as proposal for a coffee table/photographic book about beekeeping in Western Canada. I would appreciate any questions, comments and/or support from beekeepers and others in the industry. I am very interested to hear about any project ideas as well as any unique projects that may already be underway.

Image Exploration
Tel: (403) 220-0402
Luke_marshall@yellowknifehost.com

lifera colonies, whereas *A. mellifera* rarely rob from *A. cerana* colonies. Hence, the existing environmental conditions on Guadalcanal and Savo Islands have given rise to high densities of the newly arrived *A. cerana* and, because that bee has been able to exploit the conditions better than resident *A. mellifera,* and also rob the honey and pollen collected by *A. mellifera,* many of the *A. mellifera* colonies have simply died through starvation. Such events are likely to be repeated on other islands of the Solomon Islands as *A. cerana* spreads.

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