VOLUME 158 NO. 11 NOVEMBER 2018

American Bee Journal

The Beekeeper's Companion Since 1861

What in the World is this Bee Gadget?

Varroa-Free in Newfoundland & Labrador, Canada

DURHAM, NH
New England's
First Bee City USA

Dadant Publications

Volume 158 • No 11 • $4.99

www.americanbeejournal.com

VARROA-FREE
in Newfoundland & Labrador, Canada

by PETER ARMITAGE

Portland, Bonavista Bay
Newfoundland and Labrador

The province of Newfoundland and Labrador (NL) is the newest member of the Canadian federation having joined in 1949. While its land mass is about the same as California's, its population is relatively small with approximately 530,000 citizens. The island portion of the province juts out into the northwest Atlantic, and because of this, its climate is influenced by two oceanic currents. These are the northward flowing warm Gulf Stream originating out of the Gulf of Mexico which influences the south and west coasts of the island, and more importantly, the southward flowing cold Labrador Current, originating out of the Davis Strait, which affects the northeast coast, but also has an overall effect on the strength of the Gulf Stream as it approaches eastern Canada (see Figure 1). Climate and the effects of glaciation combine to create the ecosystems in which our beekeeping activities are embedded; long, cold winters, very short summers, and ecosystems heavily dominated by black spruce (*Picea mariana*) and balsam fir (*Abies balsamea*) boreal forests peppered with extensive marshlands.

It is because of these climatic and landscape characteristics that beekeeping is relatively new in NL, compared to the rest of North America. While our first attempts at beekeeping date as far back as 1929, nothing significant in the way of apiculture developed here until the 1970s. As of September 2018, there were about 700 honey bee colonies in the province managed by approximately 130 beekeepers.[1]

During the last decade, beekeeping has taken off as both a hobby craft and commercial activity, with seven beekeepers having a "commercial" focus and managing approximately 20-100 production colonies each. Colony numbers like this would make these sideliner operations elsewhere in North America. However, the provincial government defines a commercial operation as 20+ production colonies. There may be only one beekeeper in the province who obtains a substantial portion of his income from apiculture, including value-added products.

In addition to offering pollination services, NL beekeepers sell honey, beeswax, pollen, and value-added products directly to local restaurants, health food and speciality stores, and to the general public through farmers' markets and craft fairs. The Newfoundland and Labrador Beekeeping Association was formed in November 2014 to represent the interests of all beekeepers. They have a broad mandate, which includes the promotion of effective beekeeping practices, education of its members and the general public, protecting the health of NL bee stocks and wild pollinators, expanding apiculture, etc.[2]

ORIGINS OF OUR HONEY BEE STOCK

Modern-day apiculture in the province owes its origins largely to the pioneering efforts of one person - Wally Skinner - who started beekeeping in 1974 in the western part of the Island of Newfoundland (Hicks, 2014). Mr.

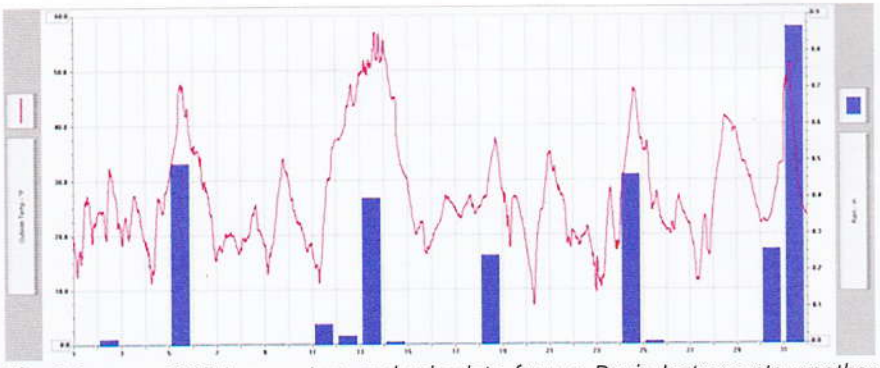

Fig. 1 *January 2018 temperature and rain data from a Davis Instruments weather station located at a Bonavista Bay apiary. Erratic weather is common on the east coast of Newfoundland. Rain = blue bars; temperature = red line.*

Skinner, and his daughters, Alison Van Alten and Andrea Skinner, have played the primary role in shaping the genetics of our bees.[3] Until recently, Andrea and her partner Paige Marchant, co-owners of the Newfoundland Bee Company, were the main purveyors of nucleus colonies (nucs) and queens to other beekeepers in the province.

Wally Skinner first purchased honey bees from the neighboring province of Nova Scotia in ca. 1974 (Hicks, 2014: 13). The Nova Scotian bees were derived from packaged bees imported from the United States,[4] likely Carniolans with some Buckfast genetics from Weaver Apiaries of Texas, which were being used for pollination on the John L. Bragg blueberry farm operations in Nova Scotia.

Skinner began over-wintering his bees after 1985, which is when the provincial government imposed stringent import restrictions due to concerns about tracheal mite infestations in the United States (CAPA, 1985; Hicks, 2014: 13).[5] Henceforth, the Skinner family imported queens and eggs to the province under government permit. Mr. Skinner purchased queens from Nova Scotia as well as from the now retired Silas Thompson, who was based in central Newfoundland. Thompson obtained his bees from other parts of Canada (Quebec, Ontario and Nova Scotia) as well as from Australia and New Zealand (Hicks, 2014: 14). In the mid-2000s, the Skinners imported eggs derived from Ontario bee stock as well as the Ontario Russian bee breeding program with the view to enhancing the disease resistance of their strain.[6] Finally, the family imported 10 Hawaiian queens in 2008 (Williams, 2010: 3).

Several NL beekeepers use modified Langstroth hives with "warm" orientation of the frames, upper entrances, vent holes in the inner covers, and vent boxes © Ian Hussey

On the eastern side of the Island, Gerard Smith of G & M Family Farm started selling nucs and queens in 2015 and his stock derives mostly from the Skinner strain, although he purchased some bees from another pioneering beekeeper, Aubrey Goulding, several years ago. Goulding started beekeeping in 1984 and obtained bees from New Zealand and Nova Scotia (Hicks, 2014: 13). He sold nucs intermittently over the years, but has not been a major supplier to other beekeepers in the province.

The NL strain of honey bees has many desirable traits: it is winter hardy and the bees are very gentle; its numbers build gradually in the spring, but it is an explosive breeder when the weather improves; and it is economical in its consumption of winter stores, yet it is also a good honey producer. The genetics of this strain are a bit of a "smorgasbord" having an *Apis mellifera ligustica* base, but with some Carniolan, Buckfast, and Russian Primorksy ingredients mixed in.

Our Special Health Status

What distinguishes NL from most of Europe and the rest of North America is the good health of our bees, and their freedom from the pathogens, pests, and diseases that plague apiculture elsewhere. Thanks to the Island of Newfoundland's isolation from mainland North America and the prudent policies of the provincial government with its importation restrictions, the province is free of *Varroa destructor* mite, tracheal mite (*Acarapis woodi*), small hive beetle (*Aethina tumida*), greater wax moth (*Galleria mellonella*), lesser wax moth (*Achroia grisella*), and American foulbrood (*Paenibacillus larvae*). Recent molecular testing (Polymerase chain reaction) by the National Bee Diagnostic Centre (NBDC) at Beaverlodge, Alberta, informs us that NL bees are free of several viruses normally vectored by varroa, such as Acute bee paralysis virus, Chronic bee paralysis virus, Deformed wing virus, Israeli acute paralysis virus, and Kashmir bee virus, however, some colonies have tested positive for Sacbrood virus, and Black queen cell virus is ubiquitous.

NL bees have also tested positive for *Nosema apis*, *Nosema ceranae*, and

European foulbrood (EFB). While no beekeeper has ever reported EFB symptoms, at least two have experienced outbreaks of nosemosis or high *Nosema* spore counts that required medication (fumagillin fungicide). Chalkbrood has also been observed in the past, but it was never considered a serious problem and did not turn up in recent molecular testing.

NL's honey bee stock was not tested systematically for pathogens, pests and diseases until 2010 (see Shutler, et al., 2014). However, the 2016 sampling conducted by the provincial apiarist and tested at the NBDC now serves as the baseline for monitoring, and colony management. This sampling and testing was part of the Canadian National Honey Bee Health Survey, "a four year, nation-wide initiative established to index honey bee health" (NBDC, 2016: 1).[7]

Forage and Annual Cycle

Despite not having varroa and a number of other pests and pathogens, NL's biggest challenge is its spring weather and short growing season. May and June can be very cold and wet months. This seriously limits the daily flying time for NL bees which need at least 46°-54° F and sunshine to fly in search of nectar and pollen. The climatic challenge is reflected in NL's honey production which is probably in the range of 30 to 120 lbs. per colony per season, with an average of maybe 40 lbs. depending on location and year.[8] This challenge is also reflected in queen rearing and mating; it is difficult if not impossible to mate virgin queens before the middle of June, and nucleus colonies thus are not available for sale until the middle of July.

In addition to low spring temperatures and humidity, the forage abundance, distribution, and phenology also impose limitations on apiculture. The Island of Newfoundland's primary forage species, according to seasonal progression from theoretical "spring" in early April to frost in October, are mountain alder (*Alnus crispa*) and speckled alder (*Alnus rugosa*), pussy willow (*Salix discolor*), mountain maple (*Acer spicatum*) and red maple (*Acer rubrum*), mouse-ear hawkweed (*Hieracium pilosella*), common dandelion (*Taraxacum officinale*), white clover (*Trifolium repens*), fireweed (*Chamaenerion angustifolium*), lance-leaved goldenrod (*Solidago graminifolia*) and rough-stemmed goldenrod (*Solidago rugosa*), and bog aster (*Oclemena nemoralis*).

Spring inspection © P. Armitage

Where my apiaries are located in Lethbridge-Portland, Bonavista Bay, many of these species are found exclusively on disturbed landscapes such as roadside margins, lawns and gardens, and woodland areas that have been opened up as a result of domestic firewood harvesting. The agricultural landscape in this region is dominated by hay fields for dairy cows most of which are seeded with 70% Timothy-grass (*Phleum pratense*), 15% red clover (*Trifolium pratense*), and 15% white clover. Unfortunately, red clover is of little value to honey bees because of the large size of the flower's corolla, and farmers "take their hay off" (mow their fields) just before the white clover blossoms.[9] The prime value of these hay fields for bees is the abundance of dandelion (nectar, pollen) in June and hawkweed (pollen) in September.

In general, many apiaries in NL are surrounded by black spruce and balsam fir forest offering little nectar or pollen of value to honey bees. That is why NL beekeepers are interested in augmenting the "wild" forage with other species that are easy to plant, easy to maintain, and provide maximum nectar and pollen value to the bees, for example, borage (*Borago officinalis*), purple tansy (*Phacelia tanacetifolia*), and white clover.

Hive Designs and Colony Management

With the exception of a handful of top-bar hive enthusiasts, the majority of NL's beekeepers are using some type of standard, North American Langstroth configuration. However, a dozen or so beekeepers are following the lead of Gerard Smith in adopting a version of the "D.E. Hive" designed by David Eyre in Ontario.[10] This design uses standard Langstroth deeps, in combination with a large landing board, bottom board, vented inner cover, vent box, and telescoping outer cover with large rims. The frame orientation is "warm" not "cold," which means that frames run parallel to the front entrance not perpendicular. There is no end of debate in British beekeeping circles about these two frame orientations. In the end it may boil down to personal preference. I like working my hives from the back which is my primary reason for adopting the warm approach. The vent box can be used to enclose top feeders during the warmer months or filled with insulation to facilitate hive heat retention during the late fall, winter and early spring.

Red maple (Acer rubrum) in flower, May 14, 2016 © P. Armitage

Whether beekeepers are using this hive design or not, most recognize the need for good hive ventilation, and for this reason, lower entrances are left open, upper entrances are provided, and inner covers are shimmed or otherwise vented to allow humidity to escape the hive. We take very seriously the adage that "it is not the cold that kills bees, it's the humidity." Condensation freezing on the inside of covers, melting, and then dripping onto the cluster is what kills bees during the cold season here in NL.

In general, beekeepers here leave upper entrances open to allow bees to egress/ingress for cleansing flights when snow accumulates above the lower entrances, which it often does throughout the province. Entrances must be screened with ¼ in. mesh to prevent the insectivorous pigmy shrew (*Sorex hoyi*) from eating sluggish, clustered bees. They eat the bees on the outside of the cluster, primarily devouring the thorax. Beekeepers keep an eye out for lots of heads and abdomens on the snow in front of the hive, sure evidence of a shrew feasting inside. Honey is taken off at the

This apiary has a 7,000 volt electric fence and barbed wire to deter moose and black bears © P. Armitage

end of August or early September and then colonies are fed 2:1 sugar syrup until the end of October, so that they can maximize their winter honey stores. As a rule of thumb, colonies should have at least 120 lbs. of honey stores (in two Langstroth deeps) in order to survive the winter and early spring.

For winter protection, we wrap hives with black roofing felt (tar paper), "bee cosies," or some other wind proofing, insulating material. The Island of Newfoundland can be an extremely windy place with wind velocities sometimes exceeding 60 mph, which means that hives must be weighted down with heavy rocks or concrete blocks or secured with ratchet straps. Recently, two beekeepers built indoor wintering sheds that control temperature and humidity, in order to reduce winter-spring mortality.[11]

With our cold and erratic springs, we start supplementary feeding with pollen substitute, fondant, and dry sugar in March when queens resume egg-laying. Liquid sugar syrup is only used again later in the spring when temperatures rise sufficiently.

The Future

In theory, pollination income from blueberry, cranberry and canola producers on the Island of Newfoundland could contribute significantly to the economic viability of commercial beekeeping operations in the province, when mixed with income from the sale of honey, pollen, beeswax, nucleus colonies and value-added bee products. However, the opportunities for growth in commercial beekeeping appear limited, unless the amount of land in blueberry, canola, and cranberry production increases significantly, and/or other aspects of beekeeping can be developed and marketed in innovative ways.[12]

Nonetheless, NL beekeepers are optimistic they can overcome such challenges in order to significantly expand the number of beekeepers and colonies in the province during the next 10 years. Much of this expansion will be in the form of small-scale beekeeping, based in urban and suburban parts of the province. These beekeepers are the market for NL's commercial operators, who sell beekeeping equipment, nucs, and queens. Increasingly, they will contribute to the growth of apiculture through their small-scale honey production and sales at local farmers' markets, craft fairs, and other small retail outlets. Collectively, NL beekeepers hope to improve not only their domestic market share of bee-related products but also offer various products for export nationally and internationally.

In the absence of pollination contracts, growth in NL's apicultural industry is likely to depend on value-added honey products like honey-based syrups, mead, cosmetics, and honey that is either organic or close to it. Currently NL honey is 100% free of miticides and antibiotics, and probably GMO pollen as well. Live bee exports such as queens and certified varroa-free packages may also be development options for NL's apicultural industry in the future.

Whether NL beekeepers achieve their apicultural goals will depend in part on their ability to maintain their current honey bee health and pest-free status particularly with respect to varroa. The track-record elsewhere in Canada is not good. Either because of migratory beekeeping practices (pollination services) or the ill-considered, illegal importation of bees, varroa and other pests crossed national and international borders and spread rapidly throughout honey bee stocks, despite mandatory inspections, quarantines, import restrictions and other defensive measures. Can we learn from the failures of beekeepers and apicultural management elsewhere? Only time will tell.... Wish us luck!

A close-up with hives in the warm orientation.s the author prefers. © Peter Armitage

Acknowledgements

Many thanks to Detlef Bieger, Catherine Dempsey, Barry Hicks, Andrea Skinner, Gerard Smith, Karen Youden-Walsh, and Steve Walsh for their comments on a previous draft of this article. All errors of fact and omission are entirely the responsibility of the author. Author correspondence (English or French) – Peter Armitage, Box 113, RR#1 Portland, NL, Canada, A0C 1V0, email – armitage_peter@bellaliant.net

References

Canadian Association of Professional Apiculturists (CAPA). 1985. Annual Meeting Minutes. Saskatoon, Saskatchewan, November 18-19, p.9.

Hicks, B.J. 2014. "The History and Present Status of Honey Bee Keeping in Newfoundland and Labrador." *The Osprey* 45(3): 11-14. **http://nlbeekeeping.ca/data/documents/Hicks2014-BeeKeepingNL.pdf**

National Bee Diagnostic Centre (NBDC). 2016. National Honey Bee Health Survey. **https://www.gprc.ab.ca/research/initiatives/nbdc/projects/current/nat_survey.html**

Ramsay, J. 2015[1987]. *Plants for Beekeeping in Canada and the Northern USA*. Revised edition, printed by Printorium Bookworks, Victoria, B.C.

Shutler, D., K. Head, K. L. Burgher-MacLellan, M. J. Colwell, A. L. Levitt, N. Ostiguy, G. R. Williams. 2014. "Honey Bee *Apis mellifera* Parasites in the Absence of *Nosema ceranae* Fungi and *Varroa destructor* Mites." *PLOS One* 9(6): E98599. Doi:10.1371/journal.pone.0098599.

Williams, G. R. 2010. 2009 Newfoundland and Labrador Honey Bee Disease Survey. Report to Forestry and Agrifoods Agency, Government of Newfoundland and Labrador. February. **http://www.faa.gov.nl.ca/publications/pdf/honey_bee_disease_09.pdf**

Endnotes

1 Currently, there is only one beekeeper operating in Labrador.

2 Visit the Association's website for more information about its mandate and activities. **http://www.nlbeekeeping.ca**

3 Wally Skinner personal communication with Peter Armitage, 10 January 2017. See also Hicks (2014). Nowadays, Alison Van Alten is based near Guelph, Ontario, where she is the owner-operator of the Tuckamore Bee Company, an important supplier of queens, queen cells and nucleus colonies in Ontario. See **http://www.tuckamorehoney.com/**

4 See Al Flemming's beekeeping biography. "Al thinks he has got some good bees: mainly Carniolans with some Buckfast genetics from Weaver Apiaries of Texas that pre-date Nova Scotia's flirtation with Brother Adam's bees, and the residue of Philip Bishop's rigorous selection" **http://www.nsbeekeepers.ca/profilesDetail.php?3**

5 Prior to importation restrictions in the 1980s, it was common practice for Canadian beekeepers to kill off their colonies in the fall and rebuild stocks the following spring using packages imported from elsewhere in Canada or the United States.

6 Ontario imported them from the U.S. See **http://www.chathamdailynews.ca/2010/06/18/russian-honeybees-found-to-have-greater-resistance-to-disease** and **http://www.ontariobee.com/outreach/2004Research**

7 "The purpose of this project, the first of its kind in Canada, is to document the prevalence, intensity and distribution of pests and pathogens in Canadian apiaries. This information will help ensure that Canada, as a country, has robust data to establish a bee health database – similar to other leading beekeeping countries in the world....The information generated by the Canadian National Honey Bee Health Survey will play a central role in developing regional colony health management practices and will provide the best opportunity to identify exotic organisms before they establish themselves with Canadian bee populations; maintenance of health bee populations will allow for a sustainable apiculture industry" (NBDC, 2016: 1).

8 Data on honey production have not yet been compiled systematically in the province. These estimates are based on conversations with two experienced beekeepers, one commercial.

9 "The corolla of the red clover flower is longer than the honeybee's tongue, and only a small amount of N [nectar] is accessible unless it is stolen by way of holes previously made near the base of the blossom. The holes are often made by insects collecting N or P [pollen], but not usually by the honeybee" (Ramsay, 2015: 65). Dairy farmers want nourishing forage for their cattle, and the protein content in white clover is highest just before the plant flowers.

10 See **https://www.beeworks.com/mod-kit-details/**

11 Indoor wintering sheds are used extensively in other Canadian provinces (e.g., Quebec).

12 In 2011, the Island of Newfoundland had about 1,062 acres in blueberry and 190 acres in cranberry production. Canola was first harvested in 2016, on 30 acres of land. See 2011 Census in Agriculture, **http://www.statcan.gc.ca/pub/95-640-x/2011001/p1/prov/prov-10-eng.htm**, and Government of NL news release, "Province's First Canola Field Surpasses Expectations." 23 Sept. 2018. **http://www.releases.gov.nl.ca/releases/2016/exec/0923n04.aspx**

Peter Armitage is a small-scale beekeeper based on the Bonavista Peninsula on the Island of Newfoundland in Canada, and is a board member of the Newfoundland and Labrador Beekeeping Association. **http://www.nlbeekeeping.ca/** To pay the bills he works as a consulting anthropologist in Indigenous communities across northern Canada. Originally from British Columbia, he was introduced to beekeeping in the 1960s by his late step-father, Dave Laidman, and beekeeping pioneer, Leo Fuhr, both residents of Vernon.