

Apiculture in Newfoundland and Labrador, Canada¹

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The province of Newfoundland and Labrador (NL) is the newest member of the Canadian federation having joined in 1949. While its land mass would easily cover much of western Europe, its population is relatively small with approximately 530,000 citizens, and therefore, comparable to Luxembourg. However, the Island's climate is vastly different from that of western Europe because its location in the northwest Atlantic is influenced by two oceanic currents: the northward flowing warm Gulf Stream originating out of the Gulf of Mexico which influences the south and west coasts, 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; ecosystems heavily dominated by black spruce (*Picea mariana*) and balsam fir (*Abies balsamea*) boreal forests peppered with extensive marshlands.

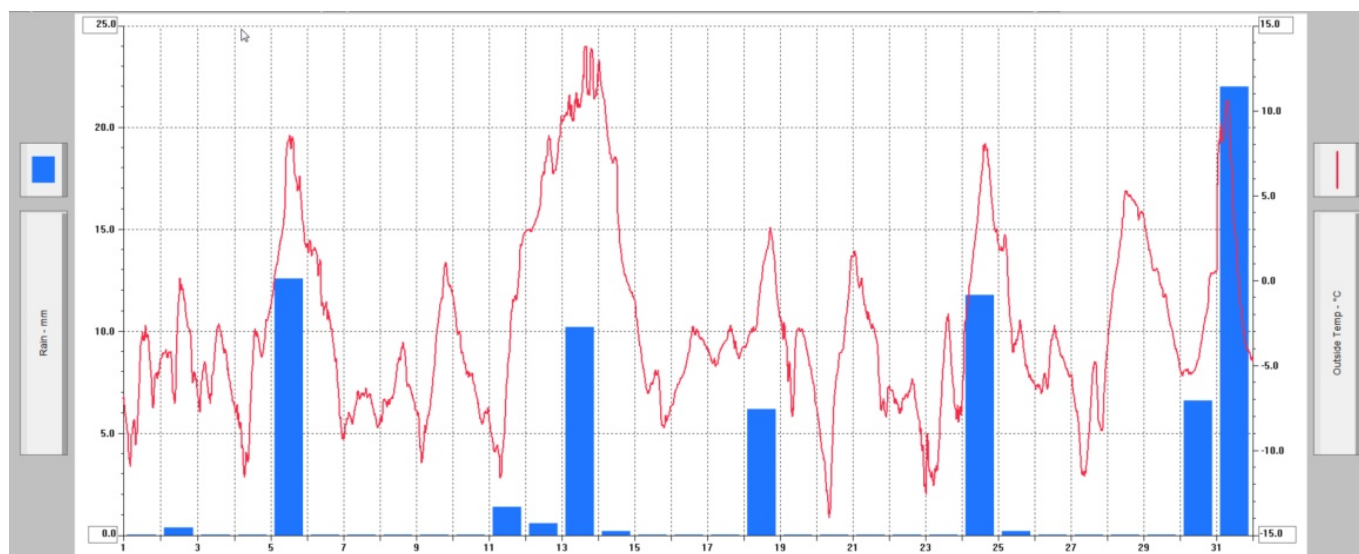


Figure 1. January 2018 temperature and rain data from a Davis Instruments weather station located at a Bonavista Bay apiary. Erratic weather is common on the east coast of Newfoundland. Rain = blue bars; temperature = red line.

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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 February 2018, there are about 500 honey bee colonies in the province managed by approximately 50 beekeepers.² During the last decade, beekeeping has taken off as both a hobby craft and commercial activity, with seven beekeepers having a commercial focus. 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, with 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.³

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 side of the Island of Newfoundland (Hicks, 2014). Mr. Skinner, and his daughters, Alison Van Alten and Andrea Skinner, have played the primary role in shaping the genetics of our bees.⁴ 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 neighbouring province of Nova Scotia in ca. 1974 (Hicks, 2014: 13). The Nova Scotian bees were derived from packaged bees imported from the United States,⁵ 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 import restrictions due to concerns about tracheal mite infestations in the United States (CAPA, 1985; Hicks, 2014: 13).⁶ Henceforth, the Skinner family imported queens and eggs to the province under government permit. Mr. Skinner purchased

² Currently, there is only one beekeeper operating in Labrador.

³ Visit the Association's website for more information about its mandate and activities.

<http://www.nlbeekeeping.ca>

⁴ 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/>

⁵ 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>

⁶ 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.

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.⁷ Finally, the family imported 10 Hawaiian queens in 2008 (Williams, 2010: 3).

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 a winter hardy and very gentle bee; 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 (KBV), 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.

⁷ 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>

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 is part of the Canadian National Honey Bee Health Survey, "a four year, nation-wide initiative established to index honey bee health" (NBDC, 2016: 1).⁸



Photo 1. Spring inspection (photo courtesy P. Armitage)

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 8°-12° C. 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 five to seventy kilograms per colony per season, with an average of maybe twenty-two kilograms depending on location.⁹ 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.

⁸ "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).

⁹ 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.

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*).



Photo 2. Red maple (*Acer rubrum*) in flower, May 14, 2016 (photo courtesy 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.¹⁰ The prime value of these hay fields for bees is

¹⁰ "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.

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.¹¹ 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.” 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.



Photo 3. This apiary has a 7,000 volt electric fence and barbed wire to deter moose and black bears (photo courtesy 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

¹¹ See <https://www.beeworks.com/mod-kit-details/>

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.

Upper entrances are left open to allow bees to egress/ingress for cleansing flights should snow accumulate above the lower entrances. Entrances must be screened with 6.4 mm mesh to prevent the insectivorous pigmy shrew (*Sorex hoyi*) from preying on sluggish, clustered bees. Honey is taken off at the 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 55 kilograms of honey stores (in two Langstroth deeps) in order to survive the winter and early spring. Hives are wrapped 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 100 kph, 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.¹² Supplementary feeding starts in March, when queens resume egg-laying, with pollen substitute, fondant, and dry sugar being used. Liquid sugar syrup can be used once again when temperatures increase later in the spring.

The future

In theory, income from the provision of pollination services to 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.¹³

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 hobby 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,

¹² Indoor wintering sheds are used extensively in other Canadian provinces (e.g., Quebec).

¹³ Currently, the Island of Newfoundland has about 430 hectares in blueberry, 200 hectares in cranberry, and 12 hectares of land in canola production. See 2011 Census in Agriculture. <http://www.statcan.gc.ca/pub/95-640-x/2011001/p1/prov/prov-10-eng.htm> (accessed 13 Mar. 2017); also 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>

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 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!

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