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April 19, 2017

Re. Environmental Registration 1890, Glovertown Cranberry Farm, Mega Healthy Cranberry Farm

Please note our comments and questions concerning a proposal by Mega Healthy Cranberry Farm (the 'Proponent') to establish and operate an 81 hectare cranberry farm within the Town of Glovertown, east of Angle Brook and south of the TransCanada Highway.

The mandate of the Newfoundland and Labrador Beekeeping Association (NLBKA) includes:

- the protection and preservation of Newfoundland and Labrador honey bees, in particular their current status as free of diseases and pests such as *Varroa destructor*; and
- the protection of bee ecosystems in the province including that of native/wild pollinators.

The last point is particularly relevant in the context of the Mega Healthy Cranberry Environmental Assessment (EA) registration because we recognize that our honey bee stocks do not live in a wasteland devoid of other living creatures. We manage them in an ecological context that includes indigenous, wild pollinators and the angiosperm plant species they depend on. They often share the same flowers in common bee pastures, and are capable of transmitting various pathogens, pests and diseases back and forth, especially among the honey bee (*Apis mellifera*) and bumble bee (*Bombus* sp.) species (see Colla, et al., 2006; Fürst, et al., 2014; Graystock, et al., 2013a; Graystock, et al., 2013b; Graystock, et al., 2015; Manley, et al., 2015; and McMahon, et al., 2015).

The NLBKA is a member of the Newfoundland and Labrador Federation of Agriculture, an umbrella organization representing various agricultural sectors including the NL Cranberry Association and NL Horticulture Producers Council Inc., in addition to the NLBKA. We are eager to commence discussions with the latter two organizations about ways to enhance or supplement blueberry and cranberry pollination in the province without having to import the exotic, managed *Bombus impatiens* bumble bee species from

Nova Scotia or New Brunswick. As sister agricultural organizations, we support them in their goals to expand their industries sustainably into the future. However, this cannot be done at the expense of managed and unmanaged pollinator populations in the province.

We have reviewed the Proponent's EA registration document and have the following comments and questions.

1. Cranberries are not wind pollinated. They are angiosperms that co-evolved with various pollinator species such as bees. The Proponent has not provided information concerning its pollination requirements.

a. Does the Proponent expect to meet these pollination requirements using local, wild pollinators?

b. If so, has the Proponent inventoried these pollinators to determine if they are able to meet its cranberry pollination requirements?

c. How much pollinator habitat will be retained adjacent to the cranberry bogs and associated agricultural lands?

d. Has the Proponent considered habitat enhancement for wild pollinators around the cranberry bog in order to enhance pollination?

We note that previous research has shown that improving pollinator habitat around agricultural lands can be of benefit to honey bees and wild pollinators and hence crop production (see Blaauw and Isaacs, 2014; Carvell, et al., 2006; Garibaldi, et al., 2014; Kennedy, et al., 2013; Morandin, et al., 2007; Pywell, et al., 2006; Pywell, et al., 2005; Rundlöf, et al., 2008; Wratten, et al., 2012).

e. If the Proponent does not expect to use wild pollinators, what is its alternative?

f. Related to 'e', does the Proponent expect to use managed pollinators to meet its pollination requirements? If so, please explain.

2. The proponent proposes to use a number of agricultural chemicals in the cranberry operation including the herbicides Devrinol, Callisto, and Roundup, insecticides Sevin and Diazinon, and the fungicides Bravo and Ridomil.

a. Given that the Proponent must rely upon insect pollination in order to produce crops, has it considered the lethal and sublethal toxicity of these chemicals to honey bees, bumble bees and other wild pollinators in the Glovertown region?

For overviews of the problem of chemical poisoning of bees see CAPA (2013), Goulson, et al. (2015), Morse (1997), Mussen (2015), and Pettis, et al. (2013). Although we have not researched the potential toxicity of all of the chemicals listed by the Proponent at least one of them – the carbamate insecticide Sevin – has a poor reputation in the apicultural industry as a harmful toxin to honey bees. We note moreover, that the Government of Newfoundland and Labrador banned the cosmetic use of carbaryl (Sevin) on lawns in the province in 2011 (see Hon. Ross Wiseman new release, July 14, 2011).

> Carbamate insecticides can initiate aggressiveness, erratic movements, eventual inability to fly, stupefaction as if the bees were chilled, paralysis, moribundity, and death. Queens often cease egg laying and the bees begin to supersede her before she resumes oviposition. Most of the poisoned bees die at the colony. Contamination of pollen loads in the hive can lead to daily deaths of recently emerged worker bees for up to a month following exposure of foragers to the chemicals. Dead bodies of very young bees can be seen on the ground in front of the hive for weeks (Mussen, 2015:891).

Famous in apicultural circles, former Cornell University bee biologist, Roger Morse,

> observed the effects of Sevin applied for gypsy moth control to over 73,000 acres of woodland, over several days, where 21 colonies of honey bees were distributed in five apiaries with the spray plot. Although no colony was killed, those within the plot lost an average of 20,000 bees each, whereas check colonies three and a half miles away lost only about 3,000 bees during the 47-day spray and post-spray period. Higher than normal losses of honey bees continued within the spray area for up to three weeks following the applications as bees in the hives consumed the contaminated pollen that had been collected. Worker honey bees collecting pollen contaminated with Sevin are not affected immediately, and they live long enough to carry contaminated pollen loads back to the hive, where the pollen is stored. In the experiment described above, the insecticide was applied in late May and early June in New York state; by fall, the colonies, which were returned to the Ithaca, New York, area that usually has a fall goldenrod honey flow only, had recovered enough to produce as much honey as the check colonies. Summer or fall applications of the same insecticide to a flowering crop or weeds might well result in colony deaths because the bees would not have time to rebuild their populations. In my experience, colonies are rarely killed as a result of a single application of a pesticide in the spring of the year that contaminates the flowers from which they collect pollen. However, multiple applications of an insecticide in the spring often lead to the death of colonies because of the greater accumulation of the chemical (Morse, 1997:552).

More controversial is the potential toxicity of herbicides such as glyphosate (aka Vision, Roundup). There is some evidence that glyphosate can have lethal or sublethal effects on honey bees as well as wild pollinators (see Balbuena, 2015; Colopy, 2015; Morse, 1997).

b. Has the proponent considered an Integrated Pest Management (IPM) plan that will minimize the use of agricultural chemicals and thereby reduce potential harm to wild pollinators and managed honey bee stocks in the area? No IPM plan is mentioned in the registration document.

For an overview of IPM related to cranberry production in Massachusetts, see Sandler and DeMoranville (2008). With respect to IPM and pollinators in that state, MacKenzie advises that,

> [i]rrigation scheduling during bloom should be carefully planned as watering and wet beds could limit bee foraging. Thus, timing irrigation during periods when bees are least likely to be active such as late evening or early morning is a good practice. A good integrated pest management program should be followed to ensure that controls are applied only when necessary. Judicious use of pesticides, especially insecticides, is important. Applications should be made either before or after bloom if at all possible. In addition, when there is a choice, products that are least hazardous to bees should be used. Dust formulations should be avoided. Applications made in late evening after bees have finished foraging or early morning before bees have started foraging are recommended. Irrigation has been used as a method to 'wash' down chemical applications. In certain circumstances, it may be necessary to cover or even move bees to prevent pesticide poisoning (MacKenzie, 2008:148).

c. No information is provided concerning the local beekeepers whose colonies may be affected by the use of agricultural chemicals. The proponent should work with current and future local beekeepers to ensure that the risk of chemical poisoning of honey bees is reduced to the greatest extent possible.

The above questions and comments are offered constructively and in good faith. The NLBKA is prepared to meet with the Proponent at a mutually convenient time to review these questions, find answers and solutions to problems before they arise. In the meantime, we would appreciate receiving more information about the proposed cranberry operation particularly as it relates to possible impacts on managed and unmanaged pollinators.

Sincerely,

Catherine Dempsey

Catherine Dempsey,
President

c.c. Nancy Sweetapple, Tony Mulrooney, Mega Healthy Cranberry Farm
Lloyd Warford, Cranberry Association of Newfoundland and Labrador
Nathan Dennis, NL Horticulture Producers Council Inc.
Paul Connors, NL Federation of Agriculture

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