From:	Ross Little
To:	Pest Review
Cc:	"Linda Newstrom-Lloyd"
Subject:	Emailing: Submission to RPMS 2017_NewstromLloyd (003)
Date:	Monday, 3 July 2017 10:47:20 AM
Attachments:	Submission to RPMS 2017_NewstromLloyd (003).docx

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This submission is to accompany that of Ross Little as explained therein, Ross Little.

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Submission to RPMS 2017_NewstromLloyd (003)

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To Accompany the Submission of Ross Little from Trees for Bees.
Submission to Regional Pest Management Strategy 2017.

Submitted by Dr. Linda Newstrom-Lloyd, Botanist for Trees for Bees

Research Project MPI SFF 404868 *Strategic planting for pollination and honey.*

1. **Part and Page Number:**

Part 2. 6.4. Plants to be managed under a sustained control programme.

Gorse p.52-54.

Rule 6.4.14:ofr

This submission is to provide data from the Trees for Bees program to support the well-considered submission by our Chairman Ross Little. It is based on full time research from September 2009 to the present, consisting of 7 years of observations and fieldwork on the role of bee plants in providing nutrition for bees from pollen and nectar sources in New Zealand.

2. **Support/Oppose: Trees for Bees** opposes the inclusion of Rule 6.4.14.

Reasons:

Gorse is a keystone plant that provides pollen to the honeybees at critical times when there is little else flowering in the South Island and most of the North Island. After 7 years of Trees for Bees field work, we have not been able to find another plant species that can provide the abundance and quality of pollen that gorse provides in the autumn, through winter and in the very early spring before the willows blossom. This problem is more serious in the South Island than the North Island because the South Island has much less diversity of native or exotic species that will provide pollen for the bees at these times. One candidate replacement plant is five finger (*Pseudopanax arboreus)* but it has proven to be difficult to grow primarily because it is a favourite browse plant for deer, possums, and other animals. It is also less tolerant to harsh conditions than gorse. The most critical issue is the timing of gorse flowering when there are almost no other quality alternatives. For example, winter early spring flowering *Viburnum tinus* is very low in protein content of the pollen so it is not a good substitute plant.

Sandrey (1985, p. 15) investigated the importance of gorse to the beekeeping industry when biological control of gorse was first being considered in New Zealand. Suggestions were made about moving the apiaries to better sites and feeding artificial substitutes of supplements but neither

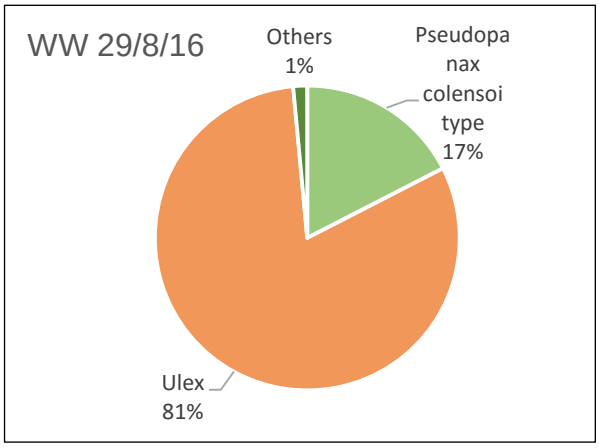
of these solutions are satisfactory. In the first place, because there are few places where sufficient flowers of any other plant species are available, the beekeeper will not be able to find any apiary sites to move to unless they find large populations of five finger. Artificial feed is not a substitute for fresh natural pollen because bee health is best supported by their natural food (Di Pasquale et al. 2013, DeGrandi-Hoffman et al. 2015). Pollen substitutes and supplements are already overused in New Zealand due to the overstocking and overcrowding issues in the beekeeping industry (Newstrom-Lloyd 2017), therefore it is essential to conserve and replace as much natural pollen as possible to support bee health for pollination services.

When gorse is removed or the flowers of gorse hedgerows are cut off before flowering, the bees are deprived of a traditional pollen source that has historically sustained bees over winter and provided good reliable population build up in early spring. In addition, in the autumn a good supply of pollen from gorse has traditionally helped to produce robust young bees that are capable of surviving through the winter months. Weak unhealthy or old aged bees are less able to survive through the winter. In very early spring, the bees that do survive are the workforce to go out to forage for pollen to provide nutrition for the new brood emerging. It is critical that the brood get a good start so that the spring build-up of the bee colony can progress once the willows flower. It is important to ensure no gaps in flowering with consequent population crashes so that colonies are able to reach peak population size in time for summer pollination services (primarily the seed industry in Canterbury as well as horticulture) and for honey harvesting which sustains the bees and the beekeeper's livelihoods.

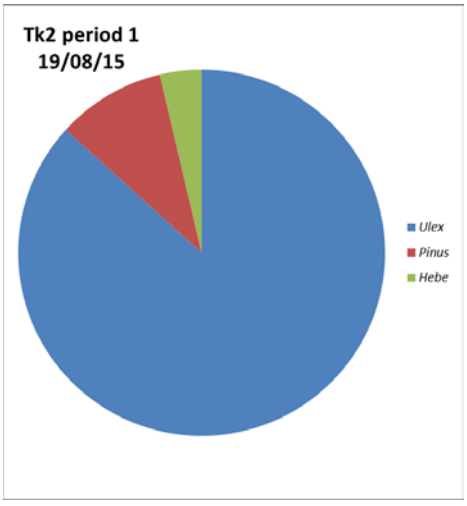
If there were other plants that could play this bridging role as well as gorse to get bees through autumn and winter to spring, then reduction or elimination of gorse would not be detrimental. In our research on pollen collection by bees in the South and North Islands, we have found that gorse plays a major role in bee survival and reproduction at these critical times because few plants are in flower from autumn through winter except for the northern regions of the North Island.

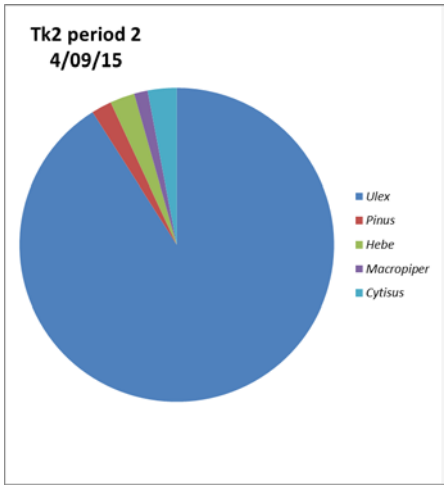
Data to show the magnitude of the importance of gorse in early spring is presented in the form of pie charts which demonstrate the percentages of the main pollen sources identified as shown below. In the charts, trace sources with pollen individually less than 2% of the total are aggregated as "Others". We do not have data for Canterbury but we estimate that the results for the major role of gorse pollen in August and September in Canterbury would be more pronounced than the North Island due the dearth of alternative pollen sources for spring build up. This estimate is supported by numerous reports from South Island beekeepers.

The first chart from the King Country in the North Island, for the end of August, shows an early spring pollen harvest dominated by *Ulex* (gorse) at 81% of the pollen collected by the bees.

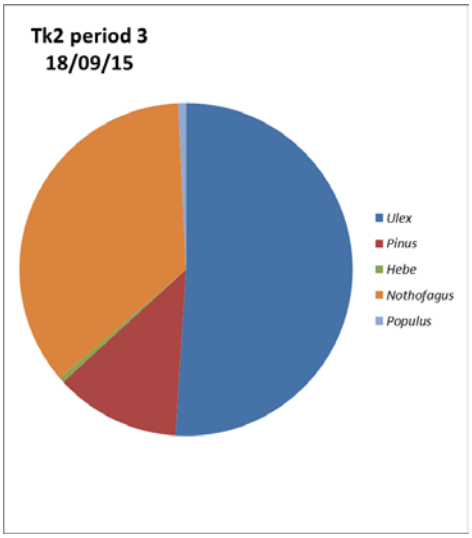


The second and third charts from Rangitukia near Tikitiki, East Coast, in the North Island, for August and September, shows an early spring pollen harvest dominated by *Ulex* (gorse) at very high percentages of the pollen collected by the bees.





The fourth chart from Rangitukia near Tikitiki, East Coast, in the North Island, for the end of September, shows that other plant pollen primarily beech and pine are starting to be collected by bees. However the September pollen harvest is still dominated by *Ulex* (gorse) at very high percentages of the pollen collected by the bees. Pine pollen is very poor nutrition for bees as it only has 7% to 9 % protein in the pollen which is too low for the bees who need a minimum of 16 to 20% protein. Gorse has > 16% protein. We do not have data on *Nothofagus* (beech) pollen.



3. <u>Decisions requested.</u>

We seek the deletion of Rule 6.4.14, or if this submission is rejected, the provision of efficient and well-publicised Exemption processes for the situations for beekeeping pollen dearth.

References:

DeGrandi-Hoffman G, Chen Y, Rivera R, Carroll M, Chambers M, Hidalgo G, de Jong E 2015. Honey bee colonies provided with natural forage have lower pathogen loads and higher overwinter survival than those fed protein supplements. *Apidologie*. DOI: 10.1007/s13592-015-0386-6.

Di Pasquale, G., Salignon, M., Le Conte, Y., Belzunces, L. P., Decourtye, A., Kretzschmar, A., Suchail, S., Brunet, J.-L., & Alaux, C. (2013). Influence of pollen nutrition on honey bee health: Do pollen quality and diversity matter? PLOS ONE, 8, 1–13. DOI: 10.1371/journal.pone.0072016

Goulson D, Nicholls E, Botias C, Rotheray EL 2015. Bee declines driven by combined stress from parasites, pesticides and lack of flowers. *Science* 347: 1255957. http://DOI:10.1126/science.1255957

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Sandrey R. 1985. Biological Control of Gorse: An Ex-Ante Evaluation. Research Report No. 172 November 1985, Agricultural Economics Research Unit, Lincoln College, Canterbury, New Zealand. 113 pp.