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BEES GIVING LIFE

APICULTURE NEW ZEALAND

SUBMISSION

TO:	The Environmental Protection Agency
FROM:	Apiculture New Zealand
SUBMISSION ON:	APP203853 Introduction of *Pauesia nigrovaria* to control giant willow aphid
DATE:	2 September 2019

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The following submission is presented by Apiculture New Zealand on behalf of its Science and Research Focus Group. Members of the **Apiculture NZ Science and Research Focus Group** include:

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1. Apiculture NZ represents the interests of beekeepers and honey bees in New Zealand. Beekeeping in New Zealand is now one of New Zealand's fastest growing export enterprises and presently supplying the world with very high value honey products. The industry also plays a critical role in providing pollination services to the New Zealand Horticulture and arable seeds sector. It is therefore very important that New Zealand protects this resource by ensuring the safety and health of the honey bees.

2. Apiculture NZ fully supports the application to release the parasitoid wasp *Pauesia nigrovaria* as a biological control agent for the giant willow aphid (*Tuberolachnus salignus*).

3. The giant willow aphid is a devastating exotic pest species that has negatively impacted the health of bees and honey production in New Zealand since its discovery here in 2013. These negative effects include:
    a. the decline in health of willow trees that are an important source of pollen and nectar for bees in spring;
    b. the production of giant willow aphid honey dew which is attractive to bees but forms unusable 'cement honey' and produces an excess of fructose in the honeydew which can have a negative impact on exports and;
    c. the increase and strengthening in wasp pollutions also attracted to the giant willow aphid honey dew.

    More detail on these issues are listed below.

4. Willows are a valuable source of pollen and nectar for bees in the spring as they build up strength for the major honey flow. Giant willow aphids have been observed to reduce the vigour and strength of willows, in some cases leading to their deaths.

5. When the giant willow aphid feeds on the willow sap, it ingests sucrose, the sugar made by the willow. The giant willow aphid breaks down the sucrose (a disaccharide) into glucose and fructose (both monosaccharides). To avoid osmotic stress, the giant willow aphid synthesizes the less soluble trisaccharide melezitose which contains two glucose and a fructose molecule. The honeydew created by the giant willow aphid now contains a mixture of sugars including glucose, fructose, melezitose and a trace of sucrose. When the bees collect this honeydew and take it back to the hive, it is put into a comb where it is dehydrated to ~18% moisture before it is capped. If there is a lot of melezitose, this will crystallize to make a solid crystalline mass termed 'cement honey'. These are the crystals we see left in the combs after the liquid portion has been spun off during extraction. Those melezitose crystals also block filters during the extraction process. Bees are unable to digest melezitose.

    5a. Melezitose is a well-recognised indicator of honeydew honey, so if it is found in multifloral honey, as can occur when bees make 'cement honey' late in the season, that honey is considered mislabeled.

5b. Additionally, the excess fructose levels in honeydew honey could appear to be due to augmentation with high fructose corn syrup. Commercial shipments have been rejected on these grounds.

5. Giant willow aphid honey dew is also an attractive source of food to the Common and German wasps who use it to strengthen their hives. This then creates a hazard for honey bees, as the wasps grow stronger and become more effective in raiding honey bee hives. According to Landcare Research's NZ Colony Loss Survey 2018, 9.2% of all losses are caused by wasp attacks.

6. Options for sustainable control of giant willow aphids in New Zealand are limited. The use of chemicals is both undesirable and impractical as aphids are widespread through New Zealand, in both urban and rural areas. Specifically, there is a valid concern that systemic insecticides applied by injection or soil application pose unacceptable risks to other organisms, since insecticides ingested by GWA would be expelled in honeydew prior to death and could harm honeydew feeders, including bees and native birds.

7. A judiciously conducted biological control programme offers a safe and sustainable solution. Scion's host testing trials and behavioural assessments of *Pauesia nigrovaria* have shown positive results in the control of giant willow aphids. This control option is preferable to chemical control methods which would need to be applied widely and could negatively affect bees and therefore honey production.

8. Additionally, this research has indicated the *P. nigrovaria* presents minimal or no risk to non-target species, humans or the New Zealand environment.

9. Based on the positive results of Scions trials and assessments, the Apiculture NZ Science and Research Focus Group is in favour of the release of *P. nigrovaria* as a biological control agent for the giant willow aphid.

10. Apiculture NZ Science and Research Focus Group would like to reserve the right to be heard at a Public Hearing for the consideration of introducing *P. nigrovaria* APP203853. We will confirm our attendance after our consideration of the EPA's Evaluation and Review Report for this application.