Environmental Protection Authority
Te Mana Rauhī Taiao

Decision

February 2019

Date	25 February 2019
Application code	APP203631
Application type	To import for release and/or release from containment any new organism under section 34 of the Hazardous Substances and New Organisms Act 1996
Applicant	Scion
Date application received	18 September 2018
Date of Hearing	22 January 2019
Date of Consideration	22 January 2019
Considered by	A decision-making committee of the Environmental Protection Authority (the Committee)[1]: • Dr Louise Malone (Chair) • Dr Kerry Laing • Dr Ngaire Phillips
Purpose of the application	To release a parasitoid wasp, *Eadya daenerys*, as a biological control agent for the Eucalyptus tortoise beetle (*Paropsis charybdis*)
The new organisms approved	*Eadya daenerys* (Ridenbaugh, 2018)

[1] The Committee referred to in this decision is the subcommittee that has made the decision on the application under delegated authority in accordance with section 18A of the Act.

Summary of decision

1. Application APP203631 to import for release the parasitoid wasp, *Eadya daenerys*, was lodged under section 34 of the Hazardous Substances and New Organisms (HSNO) Act 1996 (the Act). The aim of the application is to enable the release of the wasp as a biocontrol agent for the Eucalyptus tortoise beetle, *Paropsis charybdis*.

2. The application was considered in accordance with the relevant provisions of the Act and of the HSNO (Methodology) Order 1998 (the Methodology).

3. The Committee has **approved** the application in accordance with section 38 of the Act.

Application process

Application receipt

4. The application was formally received for processing on 18 September 2018.

Purpose of the application

5. The applicant, Scion, applied to the Environmental Protection Authority to import for release the parasitoid wasp, *Eadya daenerys*, as a biological control agent for the Eucalyptus tortoise beetle (*Paropsis charybdis*).

Public notification

6. Section 53(1)(ab) of the Act requires that an application under section 38 of the Act must be publicly notified by the Environmental Protection Authority (EPA) if the application has not been approved under section 35.

7. The application was publicly notified by placing a notice on the EPA website on 2 October 2018.

8. In accordance with section 53(4) of the Act, letters or emails were sent notifying the Minister for the Environment, the Ministry for Primary Industries (MPI), the Department of Conservation (DOC), and other government departments, crown entities, and local authorities who have expressed an interest in being notified about applications for non-genetically modified new organisms. Māori organisations, non-government organisations and stakeholders who have expressed an interest in being notified about applications for non-genetically modified new organisms were also directly notified. All these parties had an opportunity to comment on the application in accordance with section 58(1)(c) of the Act and clause 5 of the Methodology.

9. Section 59(1)(c) of the Act requires an application to be open for the receipt of submissions for 30 working days from the date of public notification. The submission period closed on 14 November 2018.

Submissions from members of the public

10. The EPA received 27 submissions during the public notification period.

11. Twenty-one submitters supported the application. Five submitters opposed the application and one submitter was neither for nor against the application.

Comments from MPI and DOC

12. In accordance with section 58(1)(c) of the Act, the Ministry for Primary Industries (MPI) and the Department of Conservation (DOC) were advised of, and provided with the opportunity to comment on, the application.

13. MPI did not make any comment or submission on the application.
14. DOC had no objections to the release of *E. daenerys* and noted that host testing showed that adverse impacts on native beetles would be limited.
15. The Committee is satisfied that the submission from DOC has been considered in making this decision.

Reports providing advice to the Committee

16. The EPA Staff Assessment Report was provided under section 58(1)(a) of the Act. It was published on the EPA website and the applicant and submitters were informed of its availability on 2 October 2018.
17. Ngā Kaihautū Tikanga Taiao (NKTT) elected not to prepare a report on the application.

Hearing

18. Section 60(c) of the Act requires that a hearing be held if a person who has made a submission stated in that submission that he or she wishes to be heard. Eight submitters indicated they wished to be heard.
19. Section 59(1)(d) of the Act requires that the hearing commence not more than 30 working days after the closing date for submissions. The hearing was held on 22 January 2019 at the Terrace Conference Centre, 114 The Terrace, Wellington.
20. Mr Gerry Te Kapa Coates (Te Runanga o Ngāi Tahu), Ms Margaret Hicks and Mr Graeme Manley (Southwood Export Limited) appeared at the hearing to speak to their individual submissions. Mr Graeme Manley also represented Southland Plantation Forest Company of New Zealand Limited and Kodansha Treefarm New Zealand Limited.
21. The applicant was represented by Dr Toni Withers, Dr Robert Radics and Dr. Carl Wardhaugh from Scion. Mr Grant Wilcock from Oji Fibre Solutions New Zealand Limited also presented to provide background information on the paper and pulp industry to support the applicant's presentation.

Information available for the consideration

22. The information available for the consideration comprised:

- the application
- the EPA Staff Assessment Report
- submissions
- comments received from DOC
- information obtained during the hearing.

23. The Committee considered that it had sufficient information to assess the application, and waived any further legislative information requirements.

Matters for consideration

24. The Committee considered the application in accordance with section 38 of the Act, taking into account the matters specified in sections 36 and 37, relevant matters in Part 2 of the Act, and the Methodology.

25. Each point is addressed in the following sections of this decision.

26. Specific points raised by submitters (either in their submission or during the hearing) are addressed where appropriate throughout this decision.

Summary of appearances and information discussed at the hearing

Presentations from the applicant party at the hearing

Dr Toni Withers, Scion

27. Dr. Withers expressed that biocontrol is an environmentally sustainable method of pest control with previous biocontrol agents being effective at controlling the second (summertime) generation of *P. charybdis*. She emphasised that one of the key benefits of releasing *E. daenerys* will be that it can have greater impact on *P. charybdis* populations in the first (springtime) generation than existing biocontrol agents. Dr Withers noted that *E. daenerys* appears to be host specific to *Paropsis* and *Paropsisterna* and could prevent $7.2m in losses per annum of damage to New Zealand's eucalypt industry while reducing the reliance on pesticides.

Mr Grant Wilcock, Oji Fibre Solutions NZ Limited

28. Mr Wilcock indicated that Oji Fibre Solutions New Zealand Ltd has been in existence for four and a half years (after buying the previous Carter Holt Harvey operations) and has a number of sites in Australia and New Zealand. The company has three pulp and paper mills located in New Zealand that collect all types of fibre.

29. Mr Wilcock noted that eucalyptus is chipped on site at Kinleith Mill and has a high yield of 70-75% pulp. Eucalyptus pulp complements *Pinus radiata* and recycled pulp when manufacturing high performance papers and is the hardwood species of choice for commercial, technical and operational reasons. In addition, eucalyptus pulp improves compressive strength properties of Kinleith paper which complements the containability achieved with softwood fibre. High yield eucalyptus pulp also contains residual lignin which "sets" during the corrugating process resulting in high strength corrugated board.

30. Mr Wilcock stated that New Zealand is an exporter of a wide range of primary produce from fruit and vegetables to meat and dairy. The supply chains are often long and include significant periods (up to six months) in cool storage with variable humidity. Mr Wilcock emphasised that high performance packaging is critical to the safe and efficient transportation of each product. He noted that virgin pulp-based packaging products are a durable, cost effective and environmentally friendly solution.

31. Mr Wilcock concluded that by using eucalypt-based paper and pulp, New Zealand has a cost effective and durable method of packaging for exporting economically significant primary products. He referred to the apple and kiwifruit industries which rely on eucalypt-based packaging and their current and projected economic values:

    a. Apple: Export revenue of NZ $780m (December 2018) with 21 million cartons that is forecasted to increase in 2019. Planting of apples continues to increase.

    b. Kiwifruit: Export revenue of NZ $2.2bn (March 2019) with $150m worth of single layer eucalypt-based trays. Japan, Europe and China have a 72% share and are primary markets for New Zealand.

Dr Toni Withers, Scion

Benefits of growing Eucalyptus

32. Dr Withers presented on the benefits of eucalypt forestry to New Zealand. She noted that eucalypt trees (of which there are many species) have numerous benefits. Apart from superior quality pulp compared to other trees, eucalypts also produce one of the hardest and most durable woods in the world, and eucalypt poles do not require chemical treatment. Dr Withers mentioned that eucalypts have been imported since the arrival of the first European settlers in New Zealand and are currently used in power poles, cross arms, bridges, wharfs and vineyard posts. She noted other significant environmental benefits such as uses in laminated veneer lumber (LVL) production, firewood, providing a winter flowering food source for bees, and shade and shelter for organisms such as birds. Furthermore, even though the New Zealand eucalypt industry is small compared to pine forestry, it is good to have a diversified plantation forest estate for greater resilience to climatic and environmental challenges. She also noted that nutrient recycling by eucalypt species is superior to that achieved by other plantation tree species, eucalypts can complement native trees in replanting projects, and that eucalypts could play a useful role in plans to plant large numbers of trees throughout New Zealand (such as the New Zealand Government's Billion Trees project).

33. Dr Withers stated that the *Symphomyrtus* sub-genus, which includes most of the fibre and wood producing species and is cool-tolerant, is attacked by the Eucalyptus tortoise beetle. An estimated 15,300 hectares are planted using symphomyrtus species in New Zealand. Species in the *Monocalyptus* sub-genus are slower growing. Both types are being developed by the New Zealand Dryland Forests Initiative which aims to plant 100,000 hectares by 2030.

Risks to industry and environment from insect attack

34. Dr Withers highlighted that aerial applications of insecticide cost between $160-340 per hectare, per spray, have adverse effects on the environment through increasing the overall chemical burden. She noted that the whole industry currently spends $1-2 million per annum for chemical sprays to reduce *P. charybdis* populations. The industry experiences yield losses between $4,800 and $9,700 per hectare per year if chemical spray is not used. Trees that have been repeatedly defoliated by Eucalyptus tortoise beetle attack can stop growing completely. The Net Present Value (NPV) of susceptible eucalyptus plantations in New Zealand is $402-503 m.

35. Dr Withers also noted that Scion estimates eucalyptus species provide additional ecosystem services to New Zealand conservatively estimated at $11m per year.

Dr Robert Radics, Scion

How did we value New Zealand eucalypts?

36. Dr Radics expanded on the methodology used to provide a valuation of New Zealand eucalyptus forests. He noted that Scion used a four-step process:
    a. Ascertaining the size and value of eucalypt plantations.
    b. Completing a cost-benefit risk assessment of chemical treatment.
    c. Completing a cost-benefit risk assessment of existing biocontrol agents.
    d. Comparing the efficacy of chemical treatment and existing biocontrol agents in different hypothetical scenarios.

37. Dr Radics described the use of forest inventory plantation data for eucalypts in 2016, which showed that 23,182 hectares were planted with these species throughout New Zealand. This

data does not include woodlots of less than 40 hectares, so an additional 16% (4,416 ha) was included in Scion's calculations to account for these, giving a total figure of 27,598 ha planted in eucalyptus throughout New Zealand.

38. Dr Radics explained that Scion had used Berill et al (2006)'s yield model to estimate trunk volume. Net Present Value (NPV) was obtained by applying age class data (young plantations currently dominate) with weighted stumpage value applied differentially for solid and pulp wood ($101/m^3 and $50/m^3, respectively). *Symphomyrtus* species (which are susceptible to beetle damage) accounted for 60 to 75% of all eucalyptus plantations, giving a final estimate of NPV of $402-503 million for eucalypts susceptible to *Paropsis charybdis* in New Zealand.

39. Dr Radics showed how estimates of the benefit:cost ratios for using beetle control chemicals varied with increasing application costs for different levels of beetle infestation and for short rotation (15 year) and long rotation (40 year) plantings. These graphs indicated where the economic benefits of chemical application would exceed break even point.

40. Dr Radics concluded that it is estimated that 12,300 hectares of eucalyptus plantations are planted in species resistant to *P. charybdis* but 15,300 ha are susceptible (*Symphomyrtus* species). He noted that economic modelling showed that the cost of spraying chemical pesticides to control *P. charybdis* in small wood lots or when damage is only low can not be justified economically.

Dr Toni Withers, Scion

Economic benefits of Paropsis charybdis control by Eadya daenerys

41. Dr Withers stated that effective biocontrol of *P. charybdis* will reduce damage from heavy to light and reduce the need for pesticide spraying applications. The result would mean a reduction in yield from 20% volume loss to less than 10% (Elek & Baker, 2017). This improvement provides an average NPV of $1,245 per hectare over a long rotation. She stated that for the 15,300 hectares of susceptible eucalypt species in New Zealand, the NPV of using this biocontrol agent instead of chemical control equates to $17.4m to $26.8m saved.

42. Dr Withers highlighted that reduced populations of *P. charybdis* would lead to an improvement in tree health, increased cost savings through reductions in pesticide usage, improvements in acceptability and 'social licence to operate' for those renewable plantations that produce fibre.

43. She concluded that there would be reduced damage to susceptible eucalypt species from the use of *E. daenerys*. This may result in improved growth rates, shorter rotation time, increased wood volumes and yield and, subsequently, increased profitability and increased confidence for small growers to invest in diversified plantings.

P. charybdis biology and biocontrol

44. Dr Withers described the biology of *P. charybdis* and its effects on eucalypt species. She stated that both adult and larval stages of *P. charybdis* damage plants by inhibiting all flush (new growth) from expanding and through the consumption of young leaves. Each adult female lays up to 2,000 eggs. Each year, at least two generations of *P. charybdis* occur with the first generation laying eggs in spring and the next generation in summer. Nearly all eggs that are laid are viable, with first generation eggs having a 95% hatch rate. This results in rapid population expansion and Dr Withers concluded that for any method to be effective in controlling *P. charybdis* and reducing damage to eucalyptus tree growth, the first generation of the beetle needs to be controlled.

45. In relation to existing biocontrol agents, Dr Withers stated that the cooler spring temperatures restrict the ability of current biocontrol agents to reduce first generation populations of *P. charybdis*. She noted that current biocontrol agents (two species of egg parasitoids) are effective in reducing second generation populations of *P. charybdis* with as few as 4% of eggs surviving in this generation. She concluded that the first generation is responsible for all current damage and *E. daenerys* would be the optimal biocontrol agent to target this generation.

46. Furthermore, Dr Withers noted that *P. charybdis* is one of many eucalyptus beetles native to Australia. She stated that Scion had completed field work with Dr Geoff Allen of University of Tasmania to search for parasitoid species which may be suitable for controlling *P. charybdis* in New Zealand. Dr Withers highlighted that Scion's earlier research evaluated all of the parasitoids of *P. charybdis* and concluded that, after five years of field research, *E. daenerys* was the most promising in terms of host specificity. Molecular research confirmed host range and number of species (Sharanowski et al. 2018).

47. Dr Withers stated that in order to be confident that *E. daenerys* has a restricted host range, Scion collaborated with Dr Allen over many years to survey field-collected insects from the parasitoid's home range for parasitism by *E. daenerys*. Thousands of leaf-feeding caterpillars were collected and reared in Australia by Dr Allan and he also hosted international scientists who had reared 2,700 Gonipteran (weevils) larvae for this purpose; there were no observations of parasitism by *E. daenerys* in any of these insects. Dr Withers emphasised that the importance of this observation is that larvae of these weevils are present on the same plantations at exactly the same time as *E. daenerys*. She concluded that Scion is confident that, in conjunction with host testing, these observations consolidate the notion that *E. daenerys* are parasitic specifically to leaf beetles and primarily *P. charybdis*.

The risk of E. daenerys causing direct adverse environmental effects

48. Dr Withers stated that *E. daenerys*, which has a single generation per year (univoltine) in Tasmania, would attack the first generation of *P. charybdis* larvae from November to December. She noted that observations showed female *E. daenerys* lay one egg directly into host larvae of any size, with the juvenile parasitoid larva emerging from (and killing) its host after three weeks. The parasitoid then spins a cocoon in the soil, and overwinters until it emerges as an adult the following November to December.

49. Dr Withers noted that *E. daenerys* has been reared only from four *Paropsis* and *Paropsisterna* beetles in Australia. She emphasised that New Zealand has no native paropsini beetles - only invaded pests. She added that other New Zealand beetle species belonging to the Chrysomelinae subfamily might be at risk if their larvae are medium sized (>5mm), leaf-feeders and active during early summer.

Host testing experiments

50. Dr Withers highlighted that *P. charybdis* is the largest of the invasive paropsine genus in New Zealand. Dr Withers discussed Scion's host testing regime, which featured both choice and no-choice tests. Scion tested the two largest species out of the phylogenetically closest relatives in New Zealand in the subfamily Chrysomelinae. In terms of endemic species in the subfamily Chrysomelinae, Dr Withers identified three potential test genera: *Allocharis*, *Chalcolampra* and *Caccomolpus*. She noted that Scion undertook field surveys to obtain specimens of each of these genera but were successful only in locating one species from the genus *Allocharis*.

51. Dr Withers noted that host testing also included two beneficial weed biocontrol agents in the Chrysomelinae*: Gonioctena olivaceae,* which has been introduced for control of scotch broom

and *Chrysolina abchasica* for the control of tutsan. In addition, Scion also completed host testing on other beneficial weed biocontrol agents in a sister subfamily (Galerucinae)*: Agasicles hygrophila* (introduced for alligator weed control) and *Lochmaea suturalis* (heather control). Furthermore, Scion also completed host testing on two other beneficial weed biocontrol agents in unrelated subfamilies: *Neolema oglobini* (Criocerinae) (for tradescantia control) and *Cassida rubiginosa* (Cassidinae) (for Californian thistle control).

52. Dr Withers described a no-choice physiological assay, designed to present the parasitoid with maximum opportunity to attack and parasitise a potential host. In these tests, one female *E. daenerys* wasp was confined with eight beetle larvae on foliage in Petri dishes and observed over 24 hours. During the testing, behavioural observations (number of stings made by the wasps and time spent on the plants) were made. After 24 hours, the beetle larvae were removed and reared on foliage until pupation or death. Numbers of larvae from which parasitoids emerged were counted and dead larvae from which no parasitoid had emerged were dissected to look for evidence of incomplete parasitism (i.e. the parasitoid had attacked the host successfully but failed to develop fully and emerge).

53. Dr Withers discussed the results obtained by Scion which showed viable (complete) parasitism only in the two paropsine beetles tested. *Paropsis charybdis* had a 30 to 34% parasitism rate (n = 240) and the Australian native Chrysomelinae*, Trachymela sloanei*, had a parasitism rate of 12.5% (n = 40). *Eadya daenerys* larvae emerged from each these five parasitized *T. sloanei* beetles, but only three of these larvae went on to spin cocoons and, of these, only one developed successfully to adulthood, producing a viable, but minute, adult. This suggests that *T. sloanei* would not be an optimal host for *E. daenerys*.

54. Compared to other beetles, unsuccessful internal (incomplete) parasitism by *E. daenerys* was discovered upon dissection of four other non-target Chrysomelinae: *Dicranosterna semipunctata* 1.6% (n = 16), *Allocharis nr tarsalis* 7.5% (n = 10), *Chrysolina abchasica* 1.8% (n = 14) and *Gonioctina olivaceae* 5.2% (n = 12). All other species in Galerucinae*,* Cassidinae and Criocerinae had 0% parasitism (n = 11-16).

55. Dr Withers noted that survival of the beetle test species reared in containment ranged from 40% (*Chrysolina*) to 90% (*Allocharis*). Target pest rearing survival dropped from 95% in the absence of parasitism, to 9% after stinging by *E. daenerys*. She noted that physiological host testing is considered the worst case scenario and over-estimates the likely field host range. Dr Withers made reference to Scion's 24 hour testing which allowed for nocturnal and diurnal activity by *E. daenerys* and was long enough for deprivation effects to become extreme.

56. The physiological host testing confirmed the minimum host size of about 35 mg. Of the beetle species tested, only the three exotic pest species were larger than this. The other test species, which could not support complete parasitism, were all smaller than this, suggesting that any non-target beetles that mature to less than 35 mg pupal weight will be unable to support complete development of *E. daenerys* and therefore, that *E. daenerys* would be unable to form populations in habitats occupied by such beetles.

57. Dr Withers stated that the *E. daenerys* attack rate when given a choice was significantly less than against *P. charybdis* (number of stings per minute). She noted that Scion observed an overlap in the attack rate by *E. daenerys* on *T. sloanei* with *P. charybdis* when given no choice.

58. Dr Withers concluded that no non-target beetle feeds on Myrtaceae and that *E. daenerys* shows little interest in non-target beetles except *T. sloanei* and *P. charybdis*, both of which feed on eucalyptus leaves. All beetles that consume eucalyptus leaves in New Zealand are considered pests. The sub-alpine native beetle, *Allocharis nr tarsalis,* was attacked in no-choice 24 hour physiological assay testing but ignored in two-choice Petri dish tests. Dr

Withers concluded that, while Scion cannot rule out that *E. daenerys* will reach sub-alpine areas, without the presence of eucalyptus species or paropsine hosts, there is minimal risk to non-targets. In addition, there is minimal overlap in the potential occurrence of *A. nr tarsalis* and *E. daenerys*, as CLIMEX composite match index modelling showed.

59. When questioned about the CLIMEX modelling results, which showed that *E. daenerys* might be able to survive in some areas where larger native Chrysomelinae beetles are located, Dr Withers explained that the model used Tasmanian data on *E. daenerys*'s distribution based on a 40 x 40 km grid, so the resultant map's granularity was coarse. Dr Withers had recently received new data based on a 5 x 5 km grid and she suggested that this might show less overlap with the sub-alpine native beetles' locations.

60. When questioned about the possibility of eucalyptus being grown in sub-alpine regions, Dr Withers explained that *Eucalyptus nitens* and *Eucalyptus globulans,* which are grown in the South Island, are cold-tolerant but not snow-tolerant. There are no alpine eucalyptus species in New Zealand.

Dr Carl Wardhaugh, Scion

61. Dr Wardhaugh presented on the relatedness between native Chrysomelinae beetles and *P. charybdis*. Scion has co-authored a publication with two beetle experts – Dr Chris Reid from the Australian Museum and Dr Rich Leschen, Landcare Research.

62. Dr Wardhaugh noted that according to DOC's website, native Chrysomelines are all "naturally uncommon" but a more accurate assessment would refer to these native beetles as poorly sampled in their natural habitat, e.g. alpine areas. He noted that all but one species are flightless, very few host plants have been reported and Chrysomelinae beetles can be found in mosses, ferns, leaf litter and tussocks with larvae mainly feeding well hidden on the plant.

63. Dr Wardhaugh noted that a recent study of molecular phylogeny of the subfamily Chrysomelinae has shown that the New Zealand native species are very dissimilar to the Australian paropsines and the species are likely to have diverged from each other 40 million years ago. He also noted that three genera, *Allocharis*, *Cyrtonogetus* and *Chalcolampra* have now been combined into a single genus, *Chalcolampra*.

64. He stated that Scion found and tested one native Chrysomelinae species: *Allocharis nr tarsalis*. Scion searched sub-alpine habitats of the Kahurangi National Park with the blessing of local iwi, Manawhenua Ki Mohua (umbrella entity for three iwi of Golden Bay), and acquired a DOC permit. Dr Wardhaugh noted that the larvae of *A. nr tarsalis* are external leaf feeding and that observations in containment showed the larvae were poor physiological hosts as *E. daenerys* was not attracted to those larvae.

65. Dr Wardhaugh expressed his personal viewpoint that it was highly unlikely that *E. daenerys* would establish in sub-alpine zones. He noted that natural widespread dispersal is unlikely as *E. daenerys* are not strong fliers and instead one or a few *E. daenerys* individuals may be carried by wind to the sub-alpine zone. He stated that in the sub-alpine zone, there are no eucalyptus species or *P. charybdis* larvae to parasitise, therefore, any potential encounter with non-target larvae would be very rare. Even if *E. daenerys* were to encounter non-target larvae, an attack would be unlikely as there are no Paropsine larvae in close proximity to elicit an oviposition response as shown in containment. Dr Wardhaugh concluded that *E. daenerys* would be unable to develop and sustain a population in such an environment.

Presentation by EPA Staff

66. Aubanie Raynal (Advisor, New Organisms) presented a summary of the EPA Staff Assessment Report focussing on the benefits, risks and costs of *E. daenerys* and assessing the parasitoid wasp against the minimum standards in the HSNO Act. The staff assessment discussed the information provided in the application, information readily available in scientific literature, and information submitted to the EPA via public submissions. The EPA staff assessed the potential benefits and positive effects of introducing the wasp, in particular the benefits to the environment and to the market economy. The report also considered potential risks and costs (adverse effects) associated with its introduction. The potential adverse effects assessed included the risk of the wasp attacking non-target insects and adversely affecting food webs. The EPA also assessed the effects of the wasp on the relationship Māori have with their environment. The staff assessment concluded that the benefits of releasing the wasp to control the Eucalyptus tortoise beetle are likely to outweigh any identified risks and costs. The staff assessment also concluded that *E. daenerys* meets the minimum standards for introduction and release as stated in the Act.

Record and summary of presentations from submitters at the hearing

Gerry Te Kapa Coates, Te Runanga O Ngāi Tahu

67. Gerry Te Kapa Coates presented Ngāi Tahu's submission. Mr Coates outlined the Ngāi Tahu value system, which includes whanaungatanga (family), manaakitanga (looking after their people), kaitiakitanga (stewardship), tikanga (appropriate action), tohungatanga (expertise) and rangatiratanga (leadership). Mr Coates discussed the role the Ngāi Tahu HSNO Komiti plays in monitoring EPA applications and expressed that the EPA and MPI must be ever mindful of its task of 'active protection' under the Treaty of Waitangi.

68. Mr Coates stated that Ngāi Tahu were in opposition to the release of *E. daenerys* on the basis that neither the economic or environmental case had been made for the introduction of such a new exotic biocontrol agent to control an introduced pest that may or may not affect an exotic forestry industry with relatively small economic value. Mr Coates noted that Scion estimates *E. daenerys* could prevent approximately $7.2 million in losses per year from eucalypt forests and the total value of such eucalyptus forests is $402 to 503 million. Mr Coates concluded that this was a relatively small benefit when compared with the total value of exotic standing timber of $14 billion.

69. Mr Coates stated that the only perceived benefit from the release of *E. daenerys* would be a reduction in the use of broad spectrum chemical pesticides on the environment.

70. Mr Coates highlighted that consultation with Māori raised questions about the application to which he considered the applicant gave seemingly inadequate responses.

71. Mr Coates concluded that if *E. daenerys* is to be released, monitoring the establishment and the efficacy of the biocontrol agent should be a condition.

Ms Margaret Hicks (by telephone)

72. Ms Hicks expressed concerns with the application relating to the element of risk that she believed should not be ignored and that the disadvantages of eucalyptus forests should be considered too.

73. Ms Hicks stated that the whole point of the application to release *E. daenerys* is not to control the Eucalyptus tortoise beetle, but, is instead a method for the eucalypt industry to expand the

distribution of their plantations. She highlighted that eucalypt plantations are not a suitable and sustainable species of tree for New Zealand for numerous reasons.

74. Firstly, Ms Hicks emphasised the apparent focus on monoculture which won't save nature. She noted that identical species grown closely together facilitates the spread of pests and diseases which, in this example, could result in the proliferation of pathogenic organisms such as myrtle rust through eucalypt plantations. The establishment and spread of self-sustaining populations of myrtle rust via eucalypt plantations could in turn pose an increased risk to native Myrtaceae species such as manuka and pohutukawa. In the case of manuka, Ms Hicks noted that this would have economic ramifications for New Zealand manuka and honey industry.

75. Secondly, Ms Hicks highlighted the potential risk of expanding eucalypt plantations in New Zealand to a potentially greater incidence of forest fires. She noted that eucalyptus species are some of the most flammable trees and that each tree emits quantities of volatile organic compounds that are the equivalent of a can of petrol. She stated that it is therefore unsurprising that as eucalypts are native to Australia, we often hear of forest and bushfires there.

76. Ms Hicks noted that many European countries have cleared native trees and replanted using eucalypt species and New Zealand seems to be following this trend.

77. She noted that the large expansion of eucalyptus forests in Spain and Portugal which have recently had outbreaks of fire due to the high flammability of exotic eucalypt and pine species.

78. Ms Hicks emphasised the importance of learning from international examples as it would appear countries that have planted eucalyptus have had a greater incidence of forest fires. Ms Hicks alluded to research into the 2018 Californian wildfires which concluded that eucalyptus species were among the species involved. She stated that New Zealand needs to learn from international examples where fires had occurred to better understand the risks involved with expanding New Zealand's eucalypt industry and the rising temperatures attributed to climate change.

79. Ms Hicks highlighted that eucalyptus species are part of the myrtle family of plants (*Myrtaceae*) and with the increase in land being converted to eucalypt forests, these trees may act as a biological vector for myrtle rust (*Austropuccinia psidii*). This may have impacts on the many New Zealand myrtle species such as rata, manuka and pohutukawa which are vulnerable to myrtle rust. Ms Hicks noted that any adverse environmental impacts on manuka would cascade and have serious ramifications for New Zealand's apiculture industry.

80. Ms Hicks concluded that *E. daenerys* has not proven to be species specific and she believed that the testing programme conducted by the applicant was inadequate. Ms Hicks strongly believed that the primary purpose of the application was monetary benefit and the potential risks had not been adequately addressed to warrant any release.

Mr Graeme Manley, Southwood Export Limited

81. Mr Manley stated that Southwood Export Limited (SWEL) manages two client companies – Southland Plantation Forest New Zealand Limited and Kodansha Treefarm New Zealand Limited with a combined forest resource of 12,600 hectares over 42 forests that are predominantly *Eucalyptus nitens*. He stated that *E. nitens* became the optimal species for hardwood chip exports in 1987 with over 860 hectares of *E. nitens* established by 1993. Annual production is 340,000 tonnes of export chip with 28,000 to 30,000 tonnes being shipped out of Bluff port each month. He noted that annual sales value was in excess of $36 million and this subsequently injects significant capital into the South Island regions.

82. Mr Manley remarked that the New Zealand eucalypt industry had encountered pests before in the scale insect, *Erioccocus coriaceus*, which had been somewhat controlled by *Rhyzobius ventralis*, a species of ladybird. Broad spectrum insecticides in the form of alpha-cypermethrin had been previously used to control outbreaks of the *P. charybdis* which had become the primary threat to maintaining healthy forest growth. Mr Manley noted that while alpha-cypermethrin has positive outcomes in reducing Eucalyptus tortoise beetle populations in the short term, after three years, significant re-population occurs.

83. Mr Manley advised that the eucalypt industry faces emerging problems with maintaining Forest Stewardship Council (FSC) certification which is essential for exporting to international markets as the continued use of chemical pesticides reduces the ability to maintain certification and therefore, a loss of market access. Mr Manley stated that new methods are required to control the Eucalyptus tortoise beetle and alternative chemical products have yielded inconclusive results and are more expensive. He noted that spraying is not a long-term solution and may affect commercial apiarists.

84. Mr Manley noted that the real benefit from any introduced biocontrol agent will come from any reduction in populations of early larvae before it does significant damage and growth loss and before the adult has an opportunity to reproduce.

85. SWEL is a member of the Government & Industry funded Specialty Wood Products research group concentrating on both non-durable and durable eucalypt species. Mr Manley stated that there is a plethora of potential uses for eucalypt trees including solid timber, veneer, laminated veneer lumber (LVL) and reconstituted products. *E. nitens* in particular has specialty purpose potential and offers a real chance to add value in the South Island given its ability to grow better than other eucalypts in cooler climatic environments.

86. Mr Manley stated that eucalyptus planting may increase significantly in the future with the government's pledge to plant 1 billion trees by 2028. He believed that farmers may seek to plant more eucalypt species as they are more aesthetically pleasing than *Pinus radiata*.

87. Mr Manley concluded that SWEL and its client companies support this five year programme to introduce a new biological control agent to reduce populations of the Eucalyptus tortoise beetle.

Applicant's response to matters raised

88. Dr Withers responded on behalf of Scion and addressed the apparent inadequate consultation with Māori. Dr Withers stated that Scion did speak with the HSNO Komiti of Ngāi Tahu in person on 26 October 2017. She noted that consultation with local iwi began in 2014 and Scion were told that, "host testing would be considered inadequate if even one native species is not tested" because Māori consider all native species as taonga. Dr Withers noted that Scion perhaps did not address Māori questions in the application as well as they should have due to the similarity and repetition of questions and because they were considered to have been addressed in other ways before the application was lodged. To address concerns of Māori, Dr Withers stated that Scion had invited Māori to their containment facility to examine the environment where *Eadya daenerys* would be held. In addition, Scion created a website and a YouTube video with the primary aim of addressing many of the questions and concerns they had received. Scion also created a mailing list of Māori and iwi and contacted the individuals and parties on this list in 2017 and 2018.

89. In response to concerns about the value of introducing an exotic species to control an exotic pest that is consuming an exotic plant, Dr Withers noted that this is what biological control of

pests in New Zealand is always about and stated that much of what New Zealanders consume and grow, from apples to kiwifruit, are exotic.

End summary of hearing

90. The hearing was adjourned and closed on 22 January 2019.

91. The Committee would like to thank all people who submitted the information that was used in making this decision. Public submissions provide a focus for the Committee on points that need clarification, and the Committee found the submissions and the applicant's responses very helpful in its consideration of the application.

Organism description

92. The organism approved for release is:

Taxonomic Unit	Classification
Class	Insecta
Order	Hymenoptera
Family	Braconidae
Genus	*Euphorinae*
Species	*Eadya daenerys* (Ridenbaugh, 2018)
Common name	N/A

Inseparable organisms

93. No inseparable organisms associated with *E. daenerys* were identified.

Assumptions for risk assessment

94. The Committee noted that there is uncertainty about whether or not *E. daenerys* will successfully establish self-sustaining populations and have an impact on *P. charybdis* populations in the New Zealand environment. The Committee considered that if the wasp fails to establish, there will not be any significant effects from its release. Conversely, if *E. daenerys* successfully establishes, any effects would be at their greatest. Therefore, the Committee assessed the benefits and risks and the minimum standards associated with the release of the wasp based on the establishment of self-sustaining populations in the environment.

Identification and assessment of potentially significant adverse effects

95. The Committee considered the potential risks and costs of the release of *E. daenerys* including any potentially significant adverse effects on the environment, public health, people and communities, the market economy, and Māori culture, traditions, and the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

Potential adverse effects on the environment

96. The Committee considered the potential for *E. daenerys* to cause adverse effects if the actions by the wasp damage and reduce populations of native arthropods and interfere with trophic webs.

Risks to non-target native beetle species

97. The Committee considered the host range experiments that had been undertaken to examine if *E. daenerys* could attack and parasitise non-target native beetle species. The Committee also considered the biophysical characteristics of many of New Zealand's known native Chrysomelid beetles that may be at risk of attack. They are known to live in sub-alpine environments, associate with native plants or complete their vulnerable life stages inside plant hosts. In addition, *Allocharis nr tarsalis* is a diurnal leaf feeder. These factors protect native leaf beetles from potential exposure to and attack by *E. daenerys*. The Committee also noted that most known native members of the subfamily Chrysomelinae are smaller than the minimum size for hosts of *E. daenerys* and that no-choice testing of *Allocharis nr tarsalis* showed that this beetle could not support full development of the parasitoid. In choice tests, *E. daenerys* preferred the target host, *P. charybdis*, over *Allocharis nr tarsalis*.

98. The Committee concluded that native beetle species are not at risk of attack by *E. daenerys* due to poor overlapping of habitats and *E. daenerys* having a strong preference for *P. charybdis* in host testing.

Risks to weed biocontrol agents

99. The Committee considered the potential impact *E. daenerys* would have on existing beneficial weed biocontrol agents belonging to the family Chrysomelidae that have been released in New Zealand.

100. The Committee concluded that existing beneficial biocontrol agents would not be adversely impacted by the release of *E. daenerys* as testing in containment showed that these beetles are not attractive to the parasitoid or are unable to support full development of the paraistoid if attacked. They are not physiological hosts of the parasitoid.

Interference with ecosystem interactions and food webs

101. The Committee considered the potential of *E. daenerys* to elevate pressures on other biocontrol species through a reduction of common prey or hosts.

102. The Committee also considered the potential impact of *E. daenerys* to benefit other pest species, increase competition for nectar and the potential for hybridisation to occur.

103. The Committee noted that while *P. charybdis* has two native predators in the brown soldier bug (*Cermatulus nasalis*) and the predatory shield bug (*Oechalia schellenbergi*), the Eucalyptus tortoise beetle does not constitute sole prey for these two species. Therefore, the Committee concluded that these two species would be unaffected by the reduction in *P. charybdis* larvae.

104. The Committee considered if the reduction of *P. charybdis* populations could lead to an outbreak of sleeper pests on eucalypt trees that are present in New Zealand, such as the bronze bug (*Thaumastocoris peregrinus*).

105. The Committee noted that while potential reductions of *P. charybdis* populations may occur from the release of *E. daenerys*, the occupation of the niche by another eucalyptus pest remains hypothetical. The Committee concluded that if there were to be any occurrence of another eucalyptus pest occupying the niche of *P. charybdis*, proper control measures for the new pest could be investigated prior to the pest becoming significant to the eucalypt industry.

106. The Committee noted that while adult *E. daenerys* individuals feed on nectar, it is highly unlikely that *E. daenerys* would have adverse effects on the availability of nectar for other nectar-feeding species such as birds and other insects.

107. The Committee noted that there are no native or introduced species in the *Eadya* genus and while there are six genera (*Cryptoxilos, Dinocampus, Leiophron, Meteorus, Microctonus* and *Syntretus*) in the same subfamily as *E. daenerys* present in New Zealand, these parasitoid wasps are not considered closely related enough to be able to interbreed naturally with *E. daenerys*.

108. The Committee concluded that the potential for hybridisation to occur between *E. daenerys* and a parasitoid wasp from a related subfamily is unlikely.

109. The Committee concluded that the release of *E. daenerys* is unlikely to have adverse impacts on ecosystem interactions and food webs.

Potential adverse effects on the economy

110. The Committee considered the potential adverse impact on the market economy if *E. daenerys* attacks target larvae of beneficial biocontrol agents previously introduced in New Zealand.

111. The Committee noted that the applicant had nine species host-tested to ascertain the likelihood of *E. daenerys* attack on beneficial biocontrol agents. The Committee noted that host testing showed that it is highly improbable that *E. daenerys* would attack beneficial biocontrol agents and, if an attack were to occur, it would be an isolated case or spill-over effects where weed hosts and susceptible eucalyptus hosts grow in close proximity to each other.

112. The Committee considered that *E. daenerys* could potentially vector viruses that may damage other plants if approved for release. The Committee noted that any potential release of *E. daenerys* specimens in our environment would be dependent on the wasp meeting the strict biosecurity requirements of an import health standard.

113. The Committee concluded that the release of *E. daenerys* is highly improbable to have adverse effects on the New Zealand market economy.

Potential adverse effects on Māori culture, traditions, and Te Tiriti o Waitangi

114. The Committee took into account the possible effects on the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, valued flora and fauna, and other taonga, and the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

115. The Committee noted that the applicant engaged with Māori during the pre-application stage face-to-face at hui and also through email, post and videoconferencing with more than twenty Māori and iwi groups across New Zealand between 2013 and 2018.

116. The Committee noted Māori concerns about the potential release of another exotic organism and its potential to impact people and the environment. The Committee also noted Māori concerns in relation to the continued use of pesticides and the preference to have native tree plantations instead of eucalyptus.

117. The Committee considered the application to be broadly consistent with the principles of the Treaty of Waitangi (Te Tiriti o Waitangi) including the principle of active protection.

118. The Committee noted that no risks to native or taonga species, ecosystems and traditional Māori values, practices, health and well-being were identified in the application.

119. The Committee considered that it is unlikely that the parasitoid would have adverse effects on taonga species and concluded the risk to be negligible.

120. The Committee noted that any potential risks from the release of *E. daenerys* to Māori interests are likely to be acceptable.

121. The Committee made a recommendation that Māori should be included in the implementation and monitoring of biocontrol programmes, such as this programme, against the Eucalyptus tortoise beetle. The Committee encouraged biocontrol practitioners to engage with local iwi and hapū capability where possible so that they could take into consideration concerns relating to monitoring and efficacy of new biocontrol agents.

122. The Committee further noted that an ongoing relationship between the applicant and Māori should be sustained to ensure that Māori are adequately informed if and when *E. daenerys* is released and if any further work such as research and monitoring is conducted on this species and its potential impacts.

123. After assessing all the information, the Committee did not identify any adverse effects on the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, valued flora and fauna, and other taonga.

Potential adverse effects on public health and people and communities

124. The Committee did not identify any significant adverse effects on public health and people and communities from the application to release *E. daenerys*.

Identification and assessment of potentially significant beneficial effects

125. The Committee considered the potential benefits of the release of *E. daenerys*, including any potentially significant beneficial effects on the environment, public health, people and communities, the market economy, and Māori culture, traditions, and the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

Potential benefits to the environment

126. The Committee considered whether *E. daenerys* would reduce the abundance of *P. charybdis* populations, which would reduce the ability of the beetle to spread within existing sites and to new habitats.

127. The Committee also considered whether control of the beetle by the biocontrol agent will lead to significant reductions in pesticide use and incidences of non-target damage.

Limiting the risk of the spread of P. charybdis and invasion into new sites will improve biodiversity values

128. The Committee considered that through the action of *E. daenerys* reducing *P. charybdis* populations, the future expansion of *P. charybdis* into unmanaged and natural habitats may be curtailed. The Committee noted that *P. charybdis* has not yet reached its full range in New Zealand and the use of *E. daenerys* is likely to decrease its entry into and rate of invasion of other eucalyptus forests that provide habitats for native and beneficial exotic species.

129. The Committee noted that in host testing, *E. daenerys* had a strong preference for *P. charybdis* over native beetle species.

130. The Committee noted that while eucalyptus forests are known to support less diverse communities of insects than native forests, a decrease in *P. charybdis* populations from *E. daenerys* biocontrol would allow these forests to produce greater numbers of flowers and vegetation. Subsequently, this would attract nectar feeding organisms such as bees and birds e.g. tui and bellbirds. The growth of eucalyptus trees from reduced defoliation would lead to a proliferation of insects that could fill niches in and around trees which would attract insectivorous birds such as fantails.

131. The Committee concluded that it is likely the release of *E. daenerys* would reduce the vigour and abundance of *P. charybdis* in New Zealand, thus reducing its progressive invasion of existing and new eucalypt habitats and sustaining biodiversity which may be at risk from *P. charybdis* in the future. The Committee concluded that it is likely the release of *E. daenerys* would improve biodiversity values through reduced defoliation of eucalyptus trees which, in turn, would attract organisms to these habitats.

Reductions in pesticide use

132. The Committee noted that *P. charybdis* populations are controlled by repeated spraying of pesticides which have potentially adverse effects on native and beneficial arthropods. The Committee noted that reductions in pesticide usage would in turn translate into environmental benefits such as reducing the collateral damage on non-target and beneficial native arthropods along with reducing the undesirable effects of increasing the chemical burden on the environment.

133. The Committee noted that whilst biocontrol by *E. daenerys* is likely to lead to reductions in pesticide applications, they did not consider that it would eliminate the need for broad-spectrum pesticide application. However, they noted that in the absence of a sustainable control method, such as biocontrol, pesticide use would probably increase as a consequence of the expansion of the range of *P. charybdis*.

134. The Committee concluded that the release of *E. daenerys* would have future beneficial environmental effects by reducing collateral damage from the use of pesticides that can kill native or other beneficial arthropods that support ecosystems. The release of *E. daenerys* may also reduce the chemical burden on the environment where it controls or eradicates *P. charybdis*.

Potential benefits to the market economy

135. The Committee considered the economic benefits of the release of *E. daenerys* through the increased yield of *P. charybdis*-susceptible eucalyptus species, reduced pesticide costs and the continuation of Forest Stewardship Council (FSC) certification.

Increased yield of eucalyptus forests

136. The Committee considered the increase in yield of eucalypt forests following the control of *P. charybdis* by the parasitoid. The Committee noted that following the release of *E. daenerys* pressures on eucalyptus trees would reduce and, as a result, the growth of trees in size and height would improve. The improvement of forest health would provide businesses with greater opportunities to harvest and for faster harvest. The Committee also noted that tree deaths attributed to consecutive *P. charybdis* attacks would also be reduced or avoided.

Reductions in costs attributed to pesticide use

137. The Committee considered the financial cost of controlling or eradicating *P. charybdis* through pesticide usage. The Committee noted the release of the wasp is likely to reduce *P. charybdis* in areas designated for management or eradication of the beetle, reducing financial costs to businesses.

Continuation of FSC certification

138. The Committee considered the ability of eucalyptus growers to maintain FSC certification from the reduction of *P. charybdis* populations following the release of *E. daenerys*. The Committee noted that eucalyptus growers rely heavily on pesticide spray to control and eradicate populations of *P. charybdis* which subsequently increases the risks that they are able to maintain FSC certification. That may adversely affect access to key international markets for New Zealand timber exports. The Committee noted that the reduction of chemical reliance by growers would allow them to maintain FSC certification and therefore have continuation of market access.

139. The Committee considered that there are likely to be benefits to the economy in the long term from the control of *P. charybdis* by *E. daenerys*. The Committee however noted these benefits would vary across different areas, based on *P. charybdis* abundance, susceptible eucalyptus plantations and the controls that are being employed.

Potential benefits to people and communities

140. The Committee considered that the release of *E. daenerys* could indirectly improve the community through the improvement of eucalyptus tree health and the increase of eucalyptus plantations.

141. The Committee noted that benefits on communities would vary across New Zealand. The Committee noted that reduced pesticide usage could decrease the contamination of waterways and potentially benefit communities through freshwater-related recreational activities. Improvements to air and water could also lead to improved tree health in eucalypt plantations which could create more employment opportunities in the forestry industry and in sectors that support wood processing and associated businesses.

142. The Committee concluded that whilst there are likely to be benefits to people and communities from the release of *E. daenerys,* the benefits are predicted to be minimal at a national scale.

Potential beneficial effects on public health and on Māori and their relationship with the environment

143. The Committee did not identify direct benefits to public health or benefits that relate to Māori and their relationship with the environment specifically.

Weighing of beneficial and adverse effects

144. The Committee concluded that the potential risks and costs of releasing *E. daenerys* are **negligible** while the potential benefits are **non-negligible**.

145. Therefore, the Committee found the benefits outweighed the risks of releasing *E. daenerys.*

Minimum Standards

146. Under the provisions of Section 38 of the Act, the Committee considered whether *E. daenerys* meets the minimum standards set out in section 36 of the Act; specifically whether *E. daenerys* would not:

(a) cause any significant displacement of any native species within its natural habitat; or

(b) cause any significant deterioration of natural habitats; or

(c) cause any significant adverse effects on human health and safety; or

(d) cause any significant adverse effects to New Zealand's inherent genetic diversity; or

(e) cause disease, be parasitic, or become a vector for human, animal, or plant disease, unless the purpose is to import or release an organism to cause disease, be a parasite, or a vector for disease.

Potential to cause significant displacement of any native species within its natural habitat

147. The Committee considered the potential for *E. daenerys* to cause significant displacement of any native species within their natural habitats.

148. The Committee noted that host range testing and studies in its range indicate that *E. daenerys* is specific to eucalyptus-feeding paropsine beetles. In addition, native Chrysomelinae are not known to live in eucalyptus forests in New Zealand. The Committee considered it unlikely for *E. daenerys* to cause significant displacement of any native beetles in their natural habitat as *E. daenerys* would be restricted to the vicinity of eucalyptus.

149. The Committee concluded that *E. daenerys* is not likely to cause significant displacement of any native species within its natural habitat.

Potential to cause significant deterioration of natural habitats

150. The Committee considered the potential for *E. daenerys* to cause significant deterioration of natural habitats.

151. The Committee noted that *E. daenerys* could potentially cause adverse indirect effects on ecosystem interactions such as food webs. The Committee found that significant adverse indirect effects in the ecosystem are very unlikely since the agent would not cause excessive pressure on native insect species or natural habitats. This could occur through interactions such as reducing prey availability for native predators that may feed on Eucalyptus tortoise beetle but none are dependent on this food source (such as two species of soldier bug and bird species), or hyperparasitism of *E. daenerys* which, in turn, may cause elevated pressures on native parasitoids. The Committee noted that hyperparasitism of wasps in the family Braconidae is rare and none have been reported from *E. daenerys*.

152. The Committee noted that *E. daenerys* may potentially reduce the quantity of nectar available for nectar-feeding species through competition. However, the Committee considered that the presence of *E. daenerys* would not add significant competition for nectar with other species.

153. The Committee concluded that the effects of *E. daenerys* on Eucalyptus tortoise beetle populations are unlikely to cause significant deterioration of natural habitats and that the indirect effects of *E. daenerys* on the ecosystem and food webs would be minimal.

Potential to cause significant adverse effects on human health and safety

154. The Committee considered the potential for *E. daenerys* to cause significant adverse effects on human health and safety. The Committee noted that there are no known mechanisms of interaction between humans and the agents and the wasp does not sting.

155. The Committee concluded that *E. daenerys* is not likely to cause any significant adverse effects on human health and safety.

Potential to cause significant adverse effects on New Zealand's inherent genetic diversity

156. The Committee considered the potential of *E. daenerys* to cause adverse effects on New Zealand's inherent genetic diversity. The Committee considered that this could occur through cross-breeding with other *Eadya* wasp species in New Zealand.

157. The Committee noted that there are no native parasitoid wasps in the *Eadya* genus in New Zealand that could interbreed with *E. daenerys*.

158. The Committee concluded that *E. daenerys* is not likely to cause any significant adverse effect to New Zealand's inherent genetic diversity.

Potential to cause disease, be parasitic, or become a vector for disease

159. The Committee considered the potential for *E. daenerys* to cause disease, be parasitic, or become a vector for human, animal, or plant disease, resulting in damage to species other than *P. charybdis*.

160. The Committee noted that this biocontrol agent is not known to cause disease or become a vector for animal, plant or human disease in their native range.

161. The Committee noted that prior to any potential release of *E. daenerys*, the wasp would need to meet strict biosecurity standards, be free from any pests or diseases and would not be a cause of disease.

162. The Committee concluded that *E. daenerys* is not likely to cause disease, be parasitic, or become a vector for disease.

Conclusion on the minimum standards

163. The Committee was satisfied that *E. daenerys* meets the minimum standards set out in section 36 of the HSNO Act.

Ability of the organisms to establish undesirable self-sustaining populations

164. In accordance with section 37 of the Act and clauses 10(e) and (f) of the Methodology, the Committee took into consideration the ability of *E. daenerys* to form undesirable self-sustaining populations, and the ease of eradication of such populations.

165. The Committee noted that the intention of the importation and release of *E. daenerys* is to establish and develop self-sustaining populations, in order to control *P. charybdis*. Further, they considered that in order for a self-sustaining population of *E. daenerys* to be undesirable, it would need to cause undesirable adverse effects.

166. The Committee considered that any population of *E. daenerys* will be desirable since that is the foundation of a classical biological control strategy, and that this agent is not likely to cause adverse effects in the New Zealand environment.

167. The Committee noted that the potential risks of releasing *E. daenerys* are negligible and that if any population of *E. daenerys* were found to be undesirable, it would be difficult and expensive to eradicate such a population without the application of non-specific insecticides.

168. The Committee concluded that it is highly improbable that *E. daenerys* would form undesirable self-sustaining populations.

Achieving the purpose of the Act

169. The purpose of the Act is to protect the environment, and the health and safety of people and communities, by preventing or managing the adverse effects of hazardous substances and new organisms (section 4 of the Act).

170. In order to achieve the purpose of the Act, when considering the application the Committee recognised and provided for the following principles (section 5) of the Act:

    a. the safeguarding of the life-supporting capacity of air, water, soil and ecosystems

    b. the maintenance and enhancement of the capacity of people and communities to provide for their own economic, social and cultural well-being and for the reasonably foreseeable needs of future generations.

171. The Committee took into account the following matters when considering the application in order to achieve the purpose of the Act (sections 6, 7 and 8 of the Act):

    a. the sustainability of all native and valued introduced flora and fauna

    b. the intrinsic value of ecosystems

    c. public health

    d. the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, valued flora and fauna, and other taonga

    e. the economic and related benefits and costs of using a particular hazardous substance or new organism

    f. New Zealand's international obligations

    g. the need for caution in managing adverse effects where there is scientific and technical uncertainty about those effects

    h. the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

172. The Committee is satisfied that this decision is consistent with the purpose of the Act and the above principles and matters. Any substantive issues arising from the legislative criteria and issues raised by submitters have been discussed in the preceding sections of this decision.

Decision

173. After reviewing all of the information contained in the application, the Committee was satisfied that the application met the requirements of section 34 of the Act. In any event, in accordance with section 59(3)(a)(ii), the Committee waives any information requirement that has not been met.

174. The Committee considered that the threshold for approval under section 38 of the Act has been met. It is satisfied that the organism meets the minimum standards set out in section 36 of the Act, and that the beneficial effects of the organism outweighs the adverse effects of the organism, taking into account all of the following:

- all the effects of the organism and any inseparable organisms,
- the matters in section 37 of the Act,

- the relevant matters in Part 2 of the Act; and
- the Methodology.

175. The Committee decided to exercise its discretion and **approve** the import for release and/or release from containment of *E. daenerys* under section 38(1)(a) of the Act. The Committee noted that in accordance with section 38(2) of the Act, the approval has been granted **without controls**.

176. The Committee noted that under section 38(3) of the Act, if *E. daenerys* has not been released within five years of the date of this decision, this approval for release will lapse. However, any person may apply before the expiry of the time limit for an extension of that time limit for a further period of up to five years.

177. The Committee has waived the requirement under section 38(4) of the Act, to notify the Authority of the release of *Eadya daenerys*.

25 February 2019

Dr Louise Malone **Chair, Decision Making Committee** **Environmental Protection Authority**	**Date**

Organism	Approval code
Eadya daenerys Ridenbaugh 2018	NOR100169

References

Berill, J-P., Shelbourne, C.J.A. and McKinley, R.B. 2006. Comparison of alternative species volume yields and stem dry matter production in New Zealand. Rotorua: Scion.

Elek, J.A. & Baker, S.C. 2017. Timing and frequency are the critical factors affecting the impact of defoliation on long term growth of plantation eucalypts. Forest Ecology and Management. 391, 1-8.

Sharanowski, B., Ridenbaugh, R.D. and Barbeau, E. 2018. Description of four new species of *Eadya* (Hymenoptera, *Braconidae*), parasitoids of the Eucalyptus tortoise beetle (*Paropsis charybdis*) and other Eucalyptus defoliating leaf beetles. Journal of Hymenoptera Research. 64: 141-175.