Environmental Protection Authority
Te Mana Rauhī Taiao

New Zealand Government

Decision

Date	5 February 2021
Application number	APP203875
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	Tasman District Council
Date of hearing/consideration	17 December 2020
Date Application received	14 September 2020
Considered by	A decision-making committee of the Environmental Protection Authority (the Committee)[1] • Dr Nick Roskruge (Chair) • Dr John Taylor • Mr Peter Cressey
Purpose of the application	To import and release two parasitoids, *Metoecus paradoxus* and *Volucella inanis* as biological control agents for the invasive German and common wasps (*Vespula germanica* and *V. vulgaris*).
New organism approved	*Metoecus paradoxus* Linnaeus 1761 *Volucella inanis* Linnaeus 1758

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

Summary of decision

1. Application APP203875 to import and release two parasitoids, *Metoecus paradoxus* and *Volucella inanis*, as biological control agents (BCAs) for the invasive German and common wasps (*Vespula germanica* and *V. vulgaris*), in New Zealand, was lodged under section 34 of the Hazardous Substances and New Organisms Act 1996 (the Act).

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(1)(a) of the Act.

Application and consideration process

4. The application was formally received on 14 September 2020.

5. The applicant, Tasman District Council, applied to the Environmental Protection Authority (EPA) to import and release two parasitoids, *Metoecus paradoxus* and *Volucella inanis*, as BCAs for the invasive German and common wasps (*Vespula germanica* and *V. vulgaris*), in New Zealand.

Public notification

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

7. Section 59(1)(c) of the Act requires the application to be open for submissions for 30 working days from the date of public notification. The submission period started on 28 September 2020 and closed on 10 November 2020.

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), other government departments and Crown entities in accordance with section 58(1)(c) of the Act and clause 5 of the Methodology. Local authorities, 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.

Submissions from members of the public

9. The EPA received 30 submissions during the public notification period, 25 submissions supported the application, two submissions neither opposed nor supported the application and three submissions were opposed to the application.

Comments from MPI and DOC

10. In accordance with section 58(1)(c) of the Act, MPI and DOC were advised of, and provided with, the opportunity to comment on the application.

11. MPI supported the application. They considered that the biosecurity risks of releasing the parasitoids are likely to be negligible whereas, the benefits to the New Zealand environment, economy and society are likely to be minor to moderate. If the BCAs established in high numbers it would reduce damage to New Zealand ecosystems, control costs and negative impacts on human health and well-being as well as benefiting New Zealand's apiculture industry. However, MPI noted that the application did not provide sufficient information on the BCAs impact on wasp populations. In addition, they noted that the lack of host range testing makes the evidence case less robust compared to previous full release BCA applications (submission 127677).

12. DOC strongly supported the release of the two BCAs due to the adverse impact of *Vespula* wasps on New Zealand biodiversity and the high host specificity of the BCAs demonstrated by the applicant (Submission 127662).

13. The Committee is satisfied that the submissions from MPI and DOC have been considered in making this decision.

Reports providing advice to the Committee

14. 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 3 December 2020.

15. Kaupapa Kura Taiao (KKT) completed a Māori Perspectives Report (MPR) on the potential impact of the release of *Metoecus paradoxus* and *Volucella inanis* on Māori and their relationship with the environment.

Hearing

16. 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. Seven submitters indicated they wished to be heard and four individuals presented their submissions during the hearing.

17. 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 17 December 2020 at the Terrace Conference Centre, Level 3, 114 The Terrace, Wellington with participants joining via video conference.

18. Rod Hitchmough (DOC), Member of the Public 03, Barry Foster (Apiculture NZ) and Andrea Dorn appeared at the hearing to speak to their individual submissions.

19. The Tasman District Council was represented by Paul Sheldon and the application lead, Bob Brown (Manaaki Whenua Landcare Research (MWLR)).

Information available for the consideration

20. The information available for the consideration comprised:

    - the application
    - the EPA Staff Assessment Report
    - submissions
    - information obtained during the hearing.

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

Matters for consideration

22. 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.

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

Paul Sheldon, Tasman District Council

24. Mr Sheldon presented the application on behalf of the Tasman District Council.

25. Mr Sheldon noted that the Vespula Action Group, which the Tasman District Council is part of, is funded by the MPI Sustainable Farming Fund (SFF) which is composed of stakeholders from conservation groups, district councils, government agencies and other environmental parties across New Zealand.

26. Mr Sheldon stated that the Tasman region and the adjoining Marlborough Sounds have a substantial proportion of New Zealand's beech forests. Honeydew from beech trees is a major food source for both common and German wasps and results in plague populations of these invasive

social wasps. He noted that there can be up to 30 wasp nests per hectare and many thousands of wasps per nest.

27. Mr Sheldon discussed the adverse non-human impacts of common and German wasps specifically on horticultural production including grape and fruit crops, honey production including wasps robbing hives and causing extensive bee mortality, reducing available honeydew for native bird species such as kaka and tui and consuming native insects such as caterpillars and spiders.

28. Mr Sheldon acknowledged that common and German wasps also pose adverse risks to humans. He mentioned that the Tasman District Council receives one to two complaints each month related to wasps with these generally related to wasp nests in close proximity to dwellings or recreation areas.

29. Mr Sheldon stated that people allergic to wasp stings need to carry epi-pens and avoid areas of high wasp density during the mid to late summer period when wasp numbers are at their highest. He noted that nationally approximately 1,300 people seek medical advice every year for wasp stings with serious allergic reactions and occasional deaths being reported. He gave one example where a man had died from multiple wasp stings and acknowledged that while such instances are rare, they do occur.

30. Mr Sheldon noted that invasive common and German wasps are not included in the Tasman Regional Pest Management Plan (RPMP) as they do not have a way of controlling them at a landscape scale. However, local biosecurity staff do respond to individual calls for assistance poisoning individual nests and providing advice.

31. Mr Sheldon provided an example of the Nelson Lakes – St Arnaud area which is badly impacted by invasive common and German wasps. He showed a picture of the Nelson Lakes and highlighted that poison bait through products such as Vespex is used on waterline edge tracks. He noted that while Vespex and other products may be effective at suppressing wasp populations near the waterline edge tracks, wasps are effective at reinvading areas especially when they are abundant higher up on the ranges. Furthermore, Mr Sheldon stated that it is not feasible to regularly bait landscape scale areas such as rural areas and the entire beech forest area of the Tasman District.

32. Mr Sheldon concluded that both common and German wasps are in high numbers in the Tasman District, and pose inherent risks to humans and other biological organisms, wasp control via poisoning is only effective in local areas and temporary due to ongoing wasp reinvasion and that wasp control at a landscape scale can only be achieved through biological control.

Bob Brown, Manaaki Whenua Landcare Research (MWLR)

33. Dr Brown presented the application on behalf of the Tasman District Council.

34. Dr Brown began by discussing the biological factors that allow *Vespula* wasps to be invasive in New Zealand such as their long overwintering diapause, cooperative social structure, generalist diet and adaptability.

35. Dr Brown expanded by outlining the environmental factors that enable Vespula wasps to be invasive in New Zealand such as the mild climatic conditions, an abundance of honeydew and the lack of native *Vespula* species which provides both invasive common and German wasps with an open ecological niche.

36. In addition to these factors, Dr Brown shared a diagram of a *Vespula* nest and highlighted the adaptation of an envelope surrounding the wasp nest which enables these invasive social wasps to not only protect themselves from birds and pests but also to regulate the temperature of the nest.

37. Dr Brown noted that there are six species of Vespidae wasp in New Zealand with the other four species: *Ancistrocerus gazella, Polistes chinensis, P. dominula* and *P. humilis* all being exotic invasive species. He emphasised that bumblebees (*Bombus terrestris*) are the nearest beneficial relatives with similar social behaviour, colony and nesting ecology.

38. Dr Brown discussed a displayed phylogenetic tree of Aculeata – the subclade of Hymenoptera that bees and wasps belong to. He stated that while bees and wasps share the same subclade, the last time they shared the same common ancestor was 180 million years ago.

39. For host range tests and surveys, Dr Brown referred to international evidence from the National Bee Unit (NBU) in the United Kingdom which has surveyed bee hives since the 1950s. He emphasised that the NBU has surveyed on average 35,000 hives annually since 2010 with no reported detection of either of the BCAs.

40. Dr Brown discussed the biology of the two BCAs with *V. inanis* being a brood parasite of *Vespula* and having been observed in most *Vespula* nests in the UK (2016-2019 UK surveys). He stated that *V. inanis* has a high fecundity (>600 eggs) and is an excellent flyer. One *V. inanis* larva requires at least two *Vespula* larvae to complete development and its morphological adaptations of being dorsoventrally flattened enables it to enter *Vespula* cell walls. Dr Brown stated that it is hypothesised that the visual mimicry of the adult hoverfly is complemented by chemical mimicry as the hoverfly larvae are undetected by worker wasps in the nest.

41. Dr Brown stated that, similarly to *V. inanis, Metoecus paradoxus* is a brood parasite of *Vespula*. It was also observed in many *Vespula* nests in 2016-2019 UK surveys. He stated that the beetle has high fecundity (up to 700 eggs) with one beetle larva requiring one wasp larva to complete its development. Finally, he stated that the adult beetles have chemical mimicry as they smell like wasp queens and are able to enter and leave *Vespula* nests without being attacked.

42. In relation to BCA efficacy, Dr Brown provided a tabled example of *Vespula* parasitism by the two BCAs from UK *Vespula* nest surveys between 2018 and 2019. Of the 26 common wasp nests surveyed, 23 of them were parasitised by *V. inanis* and 13 by *M. paradoxus*. Of the six German wasp nests surveyed, five were parasitised by *V. inanis* and zero by *M. paradoxus*. Dr Brown stated that the lack of *V. germanica* parasitism by *M. paradoxus* is most likely due to the small number of *Vespula* nests surveyed.

43. In response to some of the concerns raised by submitters, Dr Brown stated that should the DMC approve the release of the two BCAs, MWLR will monitor the BCAs to ascertain if they have successfully established populations although, he acknowledged that both active and passive monitoring would be required such as the use of citizen science. Dr Brown expanded that the persistence and spread of the BCAs could be monitored via websites such as iNaturalist.

44. Additionally, Dr Brown stated that beekeepers would be notified pending any potential release so that non-target adverse effects on honeybees could be identified.

45. Dr Brown stated that ascertaining the efficacy of the BCAs is unfeasible until populations are stable.

46. In terms of ecosystem effects and the potential risk to native species, Dr Brown stated that these BCAs are quite different to native parasitoids as the BCAs impact *Vespula* wasps within nests. Pollen and nectar feeding *V. inanis* adults will only provide minor competition with native species and the BCAs will most likely be preyed upon by generalist predators such as spiders and mantids. He concluded that any indirect ecosystem effects imposed by the BCAs will be miniscule compared to the current adverse impacts by invasive social wasps.

47. Dr Brown ended his presentation by acknowledging that while biocontrol may be an effective tool for New Zealand, it is not a silver bullet. He stated that biocontrol offers a landscape scale solution that is self-perpetuating. For integrated pest management (IPM), biocontrol is considered part of a larger suite of tools. Dr Brown noted that for lower population densities of social wasps, other tools may be more effective such as localised chemical control and tools that disrupt mating.

Questions from Decision Making Committee

48. The Committee noted that the application is somewhat unusual due to a lack of non-target host range testing. The Committee asked if this was a weakness in the risk assessment and if there are any intentions to carry out host range testing with native species or if the phylogenetic analyses is sufficient? Dr Brown replied that MWLR are comfortable with the literature review. He stated that *Volucella inanis* was tested on bumblebees as one Volucella species does parasitise bumblebees. Dr Brown explained that there are higher risks in other parts of the world such as North America due to the presence of native wasps. In comparison, New Zealand is quite unique with its fauna and is considered to be a safer environment to release the BCAs due to a lack of native social

bees and wasps. Furthermore, New Zealand is the world leader for using BCAs on social wasps with the only other example of BCAs used on Hymenoptera in the southern United States.

49. The Committee asked how MWLR would create a BCA population sufficient to release in the wild. Dr Brown replied that the hoverfly is difficult to rear in containment due to the flickering artificial lighting. He stated that MWLR can rear them well in glasshouses by collecting wasp nests, removing workers and then facilitate rapid reproduction prior to releasing the BCAs. For *M. paradoxus*, MWLR would place the eggs on a card and lure the worker wasps to collect the larvae.

50. The Committee asked if New Zealand's mild climatic conditions pose any implications for the successful establishment and spread of the BCAs? Dr Brown replied that the BCAs and *Vespula* wasps will have a broad, overlapping climatic range and they are found in the same natural environments in Europe.

51. The Committee asked if the hoverfly will have any beneficial role as a pollinator? Dr Brown answered that it could in areas where there is an overabundance of invasive social wasps. The hoverfly can also fly extensive distances which may allow pollination of a wide range of flowers in more areas.

52. The Committee asked what is the behaviour of the BCAs in the off-season e.g. winter? Dr Brown replied that both of the BCAs are dormant over winter.

53. The Committee noted that New Zealand's climate is quite variable and asked if there will be a localised priority for the BCAs? Dr Brown answered that MWLR are planning on starting at the top of the South Island due to the largest population of *Vespula* wasps being present there. In terms of average temperature, MWLR does not consider that the BCAs will have any issues acclimatising to a broad range of environments. In relation to altitude and whether the BCAs are capable of establishing at high elevations, Dr Brown stated that he did not know.

54. The Committee asked if MWLR are looking to use the BCAs to assist in the control of *Vespula* wasps in inaccessible areas? Dr Brown replied that even with effective products such as Vespex, interested parties observe rapid repopulations and re-invasions from inaccessible areas. *Vespula* wasp reinvasion from inaccessible areas should slow due to biocontrol.

55. The Committee noted that one of the IPM options is mating disruption. The Committee asked how the development of this option is progressing? Dr Brown stated that MWLR think they have a compound that will disrupt mating behaviour but requires further analysis. He acknowledged that their team of international experts had hoped to gather and collaborate this year but COVID-19 hampered collaboration efforts in New Zealand.

Presentation by EPA staff

56. Aubanie Raynal (Advisor, New Organisms) presented a summary of the EPA Staff Assessment Report.

57. Ms Raynal introduced the target pests and their impacts in New Zealand followed by the characteristics of the BCAs. Then, she focussed on the perceived benefits to the environment, economy, people and communities, public health and Māori followed by the potential risks and costs of *M. paradoxus* and *V. inanis,* including the potential risk of the BCAs attacking non-target native species and adverse effects on food webs.

58. Ms Raynal concluded that the benefits of releasing the two BCAs are likely to outweigh any identified risks and costs. She added that *M. paradoxus* and *V. inanis* met the minimum standards for introduction and release, as stated in the Act.

Questions from Decision Making Committee

59. The Committee asked if it is correct that *M. paradoxus* larvae are non-target specific when attaching to an organism? Ms Raynal stated yes, that is correct. *Metoecus paradoxus* larvae attach to any organism passing by.

60. The Committee noted the lack of host range testing of bumblebees. The Committee asked how concerned Ms Raynal was. Ms Raynal responded that she was initially concerned however, after extensive research she was unable to find evidence of non-target attacks by either of the BCAs.

61. The Committee asked if a lack of host range testing is unique? Ms Raynal stated that it is unique. She noted that the lack of host range testing made it more difficult to prove host-specificity of the BCAs however, the visual and chemical mimicry of the BCAs is a persuasive argument for host specificity.

62. The Committee asked if the introduction of the parasitoids would form part of an IPM strategy? The Committee noted that there is no suggestion that the intention is to eradicate Vespidae using BCAs but instead complement the existing tools used to control invasive Vespids. The Committee asked if the EPA considered to what extent the introduction of these BCAs might impact the species and if any efforts were made to try to determine the quantitative impact on the wasp problem? Ms Raynal stated that there is a lack of information on the impact on wasp populations. She and Dr Brown discussed the potential benefits of the BCAs and they believe multiple BCAs and tools are required to effectively control and/or eradicate Vespidae. The BCAs would simply mitigate the impact of the wasps.

63. The Committee noted that there is an extraordinarily high density of wasps unlike anywhere else in the world. The Committee asked is it likely that the BCAs would also have a population explosion due to the availability of hosts? Ms Raynal responded that it would be a really good result. Dr

Brown stated that it would definitely be a great result however, it will take many years, if not decades, for the BCAs to be effective and have observable results.

64. The Committee asked if there is any data that connects climate change with wasp distribution and population density? Ms Raynal replied that she was unable to find any evidence that observed a correlation between climate change and wasp population density. Generally, high wasp abundance in New Zealand is due to an abundance of food and the lack of predators. Dr Brown expanded by providing an example that *Vespula germanica* is expanding north in Europe to Scandinavia due to warmer temperatures. In New Zealand, it is already widespread.

65. The Committee asked if there is any link between manuka and invasive social wasps? Ms Raynal stated there is no link between the two.

66. Mr Hitchmough noted that *Metoecus paradoxus* lays eggs on rotten wood and *V. germanica* uses dry wood not rotting wood. Mr Hitchmough asked if MWLR have any insight into how this difference will affect the relationship between these two species? Dr Brown responded with evidence from Swiss surveys from the 1980s that *M. paradoxus* did transfer to *V. germanica* nests. The relationship between the two species also depends on the wood available for wasps to collect and use for nest construction. In beech and native forests, Dr Brown stated that he is unsure what wood will be used. He noted that MWLR can see a difference in nest colouration between the two species which relates to the type of wood used. He concluded that currently in beech forests, the breakdown of wasp nests are as follows: 90% *V. vulgaris* and 10% *V. germanica*.

Record and summary of presentations from submitters at the hearing

Rod Hitchmough, Department of Conservation (DOC)

67. Mr Hitchmough presented DOC's submission. He outlined DOC's outcomes from their 2016-2020 Statement of Intent and DOC's high-level biodiversity goals from the 2018 Annual Report. He stated that invasive social wasps are a major biodiversity problem and represent an ongoing risk to New Zealand's current and future conservational outcomes to varying degrees.

68. Mr Hitchmough described the impact invasive social wasps pose through their invasion of native and human-influenced ecosystems, interference with natural processes such as food webs through predation, depletion of nectar and honeydew resources and outcompeting native species.

69. Mr Hitchmough highlighted the adverse impact invasive social wasps have in the honeydew beech forests of the northern South Island and acknowledged invasive social wasps are widespread and also have problematic densities in the North Island. He emphasised that where invasive social wasps occupy beech forests, their population densities are so high that the standing crop of invertebrate prey are completely removed. In such environments, no caterpillars reach maturity at the height of the wasp season. He discussed another example where DOC rangers have

witnessed baby birds being killed along with a healthy lizard being stung to death by social wasps before being stripped to bone within 20 minutes.

70. Mr Hitchmough mentioned that invasive social wasps also pose a serious risk to human health via stings to visitors with allergies and that high wasp densities adversely impact recreational activities and therefore the tourism industry.

71. Mr Hitchmough stated the benefits of parasitoid BCAs through the predation of social wasp larvae and pupae which would reduce social wasp populations and therefore, their overall adverse ecosystem impacts. He elaborated that biocontrol has the opportunity to have a multi-year impact as it could provide New Zealand with a self-replicating and self-spreading tool, unlike highly labour-intensive chemical control. Furthermore, biocontrol may be an effective tool earlier in the wasp season, unlike fipronil-based chemical control which is typically only effective late into the season when invasive social wasp abundance is at its peak and adverse impacts have already occurred.

72. Mr Hitchmough acknowledged that while DOC initially requested intensive host range testing on native species related to the target host, they did not consider it was necessary for this application as no native species are related to the target species, no native species share similar social structure and nesting behavior as social wasps (closest are native ants), no native species produce wood-pulp-based nests and that studies in their native range show both parasitoids are extremely host specific even when other similar wasps and hornets are available.

73. Mr Hitchmough ended his presentation by stating that DOC is strongly supportive of the release of the two BCAs to control invasive social wasps.

Questions from Decision Making Committee

74. The Committee asked for Mr Hitchmough's opinion on whether exotic or native species would fill the ecosystem niche occupied by invasive social wasps if they were eradicated. Mr Hitchmough replied that it is highly likely that native species would fill the ecosystem niche occupied by invasive social wasps

75. The Committee asked how and to what degree invasive social wasps are contributing to native species decline? Mr Hitchmough stated that invasive social wasps contribute extensively to native species decline but their adverse impact is worsened in environments where they overlap with other invasive species such as rats. He provided the example of northern offshore islands where a study found that rodents and wasps are mutually beneficial and form a synergistic relationship. It is difficult to ascertain the impact eradicating one species would have on the other invasive species.

Member of the Public 03

76. Member of the Public 03 stated that they're supportive of the release of the BCAs.

77. Member of the Public 03 believed that it is reasonable to presume from the evidence that the balance of the effects of the release of these organisms would be considerably positive.

78. Member of the Public 03 noted that there would be some minor adverse effects as some of the insects predated by invasive wasps are also pests such as white butterflies and as a result, these species may become more abundant.

79. The submitter stated that a potential risk of eradicating or controlling invasive common and German wasps is that the ecological niche inhabited by these wasps may be subsequently filled by other invasive species such as *Polistes* wasps.

80. Member of the Public 03 acknowledged that the benefits may outweigh the risks and biocontrol may achieve positive biodiversity outcomes unlike current methods such as pesticides.

81. The submitter stated that it is important to note that there should be caution regarding the predicted success of these BCAs. *Volucella inanis* may struggle with a lack of pollen available in beech forests where invasive social wasps are most abundant.

82. Member of the Public 03 also remarked that we have not been provided with conclusive evidence that would indicate *M. paradoxus* could be effective at choosing the correct type of wood to enable it to be transferred to a *Vespula* nest.

83. Member of the Public 03 concluded by stating that should the BCAs be approved for release, ongoing monitoring on their efficacy and wasp populations should occur. Furthermore, in conjunction with biocontrol, ongoing work for alternative solutions needs to be sustained by the Wasp Action Group.

Barry Foster, Apiculture NZ

84. Mr Foster outlined that Apiculture NZ represents the interest of beekeepers and honeybees in New Zealand. He stated that the value of the New Zealand apiculture industry includes over $425m worth of honey exports (year ended August 2020) and the overall industry value is far greater than $5b from honey and other bee products and indirectly through pollination.

85. Mr Foster stated that invasive social wasps are a significant pest for the apiculture industry and have been consistently ranked as the third or fourth greatest cause of honeybee colony loss in six of the New Zealand Colony Loss Surveys. He mentioned that 41 percent of hives are surveyed in New Zealand. In 2019, beekeepers attributed the loss of 7,869 colonies to wasps with the cost of colony loss in 2019 being almost $4m. He stated that invasive social wasps also affect foraging bees resulting in lost honey production and/or pollination efficiency.

86. Mr Foster stated that Apiculture NZ supports the application to introduce the two BCAs as widespread suppression of invasive wasp populations would be beneficial to bee health and

productivity, increasing profitability. He elaborated by noting some key benefits in relation to the decrease of hive loss (potentially by 12%), the increase of hive productivity as bees would need to use less resources to defend hives from wasps, the reduction of hive management currently required in high wasp population areas and the improvement of the general foraging environment of honeybees, particularly in beech forests and river beds.

87. Mr Foster concluded by adding that Apiculture NZ sees limited adverse effects to the health of honeybees following the release of the BCAs, based on the risk assessment provided in the application. Futhermore, Apiculture NZ noted that while one consideration is potential competition for food resources by *V. inanis* where the adults feed on nectar and pollen, this is unlikely to have an effect due to the limited population size of the BCAs.

Questions from Decision Making Committee

88. The Committee asked how Apiculture NZ solicits the views of its members given the diversity of its members? Mr Foster replied that Apiculture NZ is made up of 9,000 members with the vast majority being hobbyists complemented by a strong commercial base. He concluded that he was confident their submission and supporting position is an accurate representation of their members.

89. The Committee asked if there is a geographical focus on Apiculture NZ's member surveys? Mr Foster replied that there is geographical surveying with a regional breakdown of where beekeeping losses are.

Andrea Dorn

90. Ms Dorn stated that she supports the release of the BCAs as she loathes invasive social wasps due to the adverse environmental impacts attributed to them.

91. Ms Dorn stated that one of her passions is monarch butterflies and she is a member of the Moths and Butterflies of NZ Trust. She noted that in the past she has had swan plants with many caterpillars in Kohimarama, Auckland. She stated that she has only seen two monarch butterflies this year.

92. Ms Dorn mentioned that she doesn't have many opportunities to rear butterflies and she has had to remove a wasp nest from her carport at one stage.

Final questions raised by DMC to the applicant:

93. The Committee asked if there are currently populations of these two BCAs in containment? Dr Brown stated that unfortunately there are no populations of the two BCAs as all individuals died in containment due to difficulties encountered while rearing under artificial lighting.

94. The Committee asked what sort of commitment is there from government or council in the husbandry of these insects? Dr Brown stated that the SFF is to reinvest for another year of rearing the BCAs.

95. The Committee asked if MWLR has a time frame for a potential release of these BCAs? Dr Brown stated the end of 2021. He replied that MWLR would need to import new populations of both BCAs into containment and simulate a hibernation period for them. The challenge with importing these BCAs is the lack of synchronicity between northern and southern hemispheres and ensuring they have adapted.

96. The Committee asked how or why will these BCAs be more effective at controlling the common and German wasp than *Sphecophaga vesparum vesparum* and *S. v. burra*? Dr Brown responded that genetic data informs MWLR that invasive common and German wasps in New Zealand originate from southern United Kingdom. Historical *Sphecophaga* releases in New Zealand faced multi-prong problems such as having a genetic bottleneck and the hydrocarbon profile of *Sphecophaga* BCAs did not match worker wasps which ultimately meant they were attacked when entering a wasp nest due to a lack of effective mimicry. He passed the response to his colleague Dr Simon Fowler to elaborate further.

97. Dr Fowler responded by agreeing that for a full release biocontrol application to have minimal host range testing is unusual. He stated that it is important to note that host range testing is simply a tool used in the risk assessment process as there are a lot of unknowns.

98. Dr Fowler stated that in relation to biocontrol applications, there is usually minimal information on the BCAs and the at-risk non-target native species. Therefore, there is not a great deal of literature or evidence available to use and a phylogenetic approach to selecting non-target species for host range testing is the most effective basis to work from.

99. He noted that larger wasps and bees are all well known and documented. Conversely, smaller native parasitoids are not well known. New Zealand has no native social bees or wasps or subfamilies related to *Vespula*.

100. Dr Fowler stated that the most at-risk species following the introduction of *V. inanis* and *M. paradoxus* are non-native bumblebees and honeybees. He noted that the unusual aspect of this application is that these species are extraordinarily well known given the available information – they are also native to Europe where the BCAs naturally occur. He concluded that MWLR already had all the information they needed for the risk assessment without needing to complete host range testing.

101. The Committee noted that while the phylogenetic approach seems to have credence, is there a literature exemplar of this approach? Dr Fowler stated that there is. He noted that the host range

test list used to include a massive range of plant species. This list has been carefully analysed by Bob Pemberton (Research Entomologist, USA) to highlight that apart from the closely related plant species tested, all the rest were arguably a cosmetic waste of time and while it may appear useful on paper, it did not inform researchers adequately of the risks to those species.

102. Dr Fowler stated that the phylogenetic approach seems to be incredibly reliable. In his personal view, he believes you can also transfer this approach to the biocontrol of arthropods although, it is complicated by the fact that some of the BCAs for arthropods that people have historically considered have been inherently non-host specific i.e. generalist predators.

End summary of hearing

103. The hearing was adjourned and closed on 17 December 2020.

104. 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.

Assessment

105. The Committee reviewed the content of the application, the EPA Staff Assessment Report, the KKT Māori Perspectives Report, the information provided in written submissions and received during the hearing. They determined that there was sufficient information available to make a decision.

Organism description

106. The organisms proposed for release are *Metoecus paradoxus* and *Volucella inanis* (tables 1 and 2).

Taxonomic unit	Classification
Class	Insecta
Order	Coleoptera
Family	Ripiphoridae
Subfamily	Ripiphorinae
Genus	*Metoecus*
Species	*paradoxus* (Linnaeus 1761)

Table 1: Taxonomic description of *Metoecus paradoxus*.

Taxonomic unit	Classification
Class	Insecta
Order	Diptera
Family	Syrphidae
Subfamily	Eristalinae
Genus	*Volucella*
Species	*inanis* (Linnaeus 1758)

Table 2: Taxonomic description of *Volucella inanis*.

Inseparable organisms

107. No inseparable organisms associated with *M. paradoxus* and *V. inanis* were identified.

Assumptions for risk assessment

108. The Committee considered that if the parasitoids fail to establish, there will not be any significant effects from their release. Conversely, if *M. paradoxus* and *V. inanis* successfully establish, any effects would be at their greatest. Therefore, the Committee assessed the benefits and risks as well as the minimum standards associated with the release of the parasitoids based on the establishment of self-sustaining populations in the environment.

Identification and assessment of potentially significant adverse effects

109. The Committee considered the potential risks and costs of the release of *M. paradoxus* and *V. inanis* 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

110. The Committee considered the potential for *M. paradoxus* and *V. inanis* to impact native species, interfere with ecosystem food webs, and to interbreed or hybridise with native insect species.

Risks to non-target species

111. The Committee considered that based on the applicant's phylogenetic approach and the available scientific literature, the at-risk non-target species were exotic honeybees and bumblebees. However, given the extensive information known about the biology and ecology of both honeybees and bumblebees, and the results of the no-choice host range experiments conducted by MWLR, the Committee considered that the applicant could quantify the risks to these species. Therefore, the host-range testing for native non-target species was considered unnecessary.

112. The Committee noted that successful parasitism of non-target native bee and wasp species by either *V. inanis* and *M. paradoxus* is likely to be limited by the small size of the native species, the small size of their nest entrances, the lack of a comb surrounding the native larvae and the sealed chamber.

113. The Committee concluded that native bee and wasp species, as well as exotic beneficial bee species are not at risk of attack by the BCAs.

Vespula wasps could be replaced by a worse pest

114. The Committee considered that if the BCAs were to successfully control and/or eradicate the common and German wasp, it could lead to the emergence of other exotic and invasive pests already present in New Zealand such as *Polistes* wasps.

115. The Committee noted that the likelihood of *Polistes* wasps taking advantage of reduced *Vespula* populations is unlikely as paper wasps are generally confined to margins and clearings, avoiding dense bush. *Polistes* wasps are also far less aggressive than *Vespula* wasps, build smaller nests and have a narrower range of prey.

116. The Committee concluded that while other pests could replace *Vespula* wasps, the magnitude of the effects would be minor as the occupation of the *Vespula* niche by another wasp remains hypothetical.

Interference with ecosystem interactions and food webs

117. The Committee considered that the decrease of common and German wasp populations would not adversely affect any native or exotic species considering the adverse ecosystem impacts of these invasive social wasps.

118. The Committee further noted that the introduction of the BCAs could potentially represent a source of food for insectivores and may increase the competition for nectar with native and beneficial exotic species. However, the Committee noted that due to their small size and solitary behaviour, the BCAs are unlikely to represent the main source of food for potential predators or be able to outcompete native species for resources such as nectar.

119. The Committee concluded that the release of the BCAs would have a minor adverse effect on ecosystem interactions and food webs as effects will be localised and contained with no discernible wider ecosystem impact.

Risk of hybridisation

120. The Committee noted that no native or introduced species are found in the same genus as *M. paradoxus* or *V. inanis* in New Zealand.

121. The Committee concluded that native insect species are not sufficiently related to the BCAs to naturally hybridise.

Conclusion

122. The Committee concluded that overall the release of the BCAs would have negligible adverse effects on the environment.

Potential adverse effects on the economy

123. The Committee considered that the reduction of wasp populations could adversely impact the market economy with the decrease of pesticide sales and the activity for pest control companies especially in highly infested regions.

124. The Committee concluded that the overall risks on New Zealand's market economy following the release of the BCAs is low.

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

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

126. The Committee noted that the applicant engaged with Māori via posted and emailed consultation letters, feedback forms and information leaflets sent to Māori individuals and groups mainly in the South Island. The North Island was also included in their consultation with the EPA's Te Herenga Network who represent Māori nationwide.

127. The Committee considered that effects on Māori interests are likely to be acceptable and it is considered highly improbable that the BCAs will attack native species or adversely impact ecosystems and traditional Māori values, practices, health and well-being.

128. The Committee took into consideration KKT's conclusion that the 'application may have a positive effect on the ability and capacity of Māori to maintain their economic, cultural and social well-being', as well as 'a positive impact on the ability of Māori to exercise their responsibilities as kaitiaki'.

129. 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, wāhi tapu, valued flora and fauna, and other taonga.

Potential adverse effects on public health and people and communities

130. The Committee did not identify any adverse effects on public health and people and communities from the release of *M. paradoxus* and *V. inanis*.

Identification and assessment of potentially significant beneficial effects

131. The Committee considered the potential benefits of the release of *M. paradoxus* and *V. inanis* 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

132. The Committee considered the impact of the BCAs through the potential reduction of *Vespula* wasp populations such as improvement of biodiversity and public health, reduction in the reliance

on chemical pesticides, reduction of the economic impacts on primary and tourism industries and enhancement of recreational experiences for people.

133. The Committee noted that the release of the BCAs would provide a highly specific and sustainable tool to control *Vespula* wasp populations.

Improve biodiversity

134. The Committee noted that invasive *Vespula* wasp species profoundly impact the biodiversity of New Zealand by preying heavily on invertebrates and some vertebrates, as well as increasing the competition for nectar with native fauna.

135. The Committee noted that a reduction of *Vespula* wasp populations will improve New Zealand's inherent biodiversity and natural ecosystems.

136. The Committee concluded that the successful control of *Vespula* wasps is highly likely to have a major impact on biodiversity.

Reduce chemical usage

137. The Committee noted that the decrease of *Vespula* wasp populations following the release of the BCAs would reduce the agricultural sector's reliance on fertilisers through the re-emergence of beneficial pollinators.

138. The Committee concluded that the release of the BCAs is likely to lead to an overall reduction in chemical usage.

Conclusion

139. The Committee concluded that the release of the BCAs would have a medium to high beneficial impact on the environment in areas where common and German wasps are abundant.

Potential benefits to the market economy

140. The Committee considered the economic benefits of the release of *M. paradoxus* and *V. inanis* for the primary industries and tourism sector.

141. The Committee noted that invasive common and German wasps are a significant problem for honeybees due to predation, hive robbing and increasing food competition.

142. The Committee noted that the New Zealand apicultural industry, which is worth over $5b, is directly impacted by invasive social wasps through the loss of productivity and revenue, the costs accrued in chemical control and the replacement of destroyed hives.

143. The Committee further noted that the presence of the BCAs would reduce the impact of invasive social wasps in agriculture and horticulture. The Committee noted that invasive wasps consume pollinators which forces farmers to accrue costs associated with fertiliser usage and clover

oversowing. The Committee also noted that invasive wasps disrupt horticultural/forestry activities and damage grapes, apples and pears in autumn.

144. The Committee noted that the presence of the BCAs would reduce the impact of invasive social wasps in New Zealand's primary industries through control and/or eradication of these wasps.

Conclusion

145. Overall, the Committee concluded that the level of economic benefits attributable to the release of the BCAs would be low to medium.

Potential benefits to people, communities and public health

146. The Committee noted that successful control of common and German wasps following the release of *M. paradoxus* and *V. inanis* would reduce the risk of wasps stinging people and disrupting work.

147. The reduction of common and German wasps could also improve the community by providing a more enjoyable environment through recreational activities unhindered by wasps.

148. The Committee concluded that the release of the BCAs would have a low to medium impact on people and the community and public health, with potentially a significant impact for individuals allergic to wasp stings.

Potential beneficial effects on Māori and their relationship with the environment

149. The Committee concluded the overall benefits to Māori associated with this application are likely to outweigh any detrimental impacts to Māori.

150. The Committee noted that the overall impact on the relationship Māori have with their environment and taonga is likely to be beneficial, and is likely to benefit the ability of Māori to exercise kaitiakitanga.

151. The Committee concluded that the overall impact on Māori economic wellbeing (arising from the impact on the environment and taonga) is likely to be beneficial.

152. Furthermore, the Committee concluded that the overall impact on Māori social wellbeing (arising from the impact on the environment and taonga) is likely to be beneficial. This includes impacts on Māori ways of life and taha hauora (human health and well-being).

Weighing of beneficial and adverse effects

153. The Committee concluded that the potential risks and costs of releasing *M. paradoxus* and *V. inanis* are low to negligible whereas the benefits varied from low to high.

154. Therefore, the Committee found the benefits outweighed the risks of releasing *M. paradoxus* and *V. inanis.*

Minimum Standards

155. Under the provisions of Section 38 of the Act, the Committee considered whether *M. paradoxus* and *V. inanis* meet the minimum standards set out in section 36 of the Act.

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

156. The Committee noted that the reduction of invasive *Vespula* wasp populations should not add pressure on predators to seek alternative prey as no specialist predators or insects are known in New Zealand.

157. The Committee noted that phylogenetic information, scientific literature and host range testing indicate that *M. paradoxus* and *V. inanis* are highly specific to Vespidae wasps which are invasive in New Zealand. The Committee noted that New Zealand does not have any native bee or wasp species within the family Vespidae. In addition, the small size of native bee and wasp species, their small nest entrances, lack of combs for the larvae and a sealed chamber should preclude *M. paradoxus* and *V. inanis* successfully parasitising them.

158. The Committee concluded that *M. paradoxus* and *V. inanis* are not likely to cause significant displacement of any native species within its natural habitat.

Potential to cause significant deterioration of natural habitats

159. The Committee noted that based on phylogenetic information and scientific literature, *M. paradoxus* and *V. inanis* are highly host specific to *Vespula* wasp species which are invasive in New Zealand. The Committee noted that any adverse impacts on *Vespula* wasp populations will only cause improvement of natural habitats.

160. The Committee concluded that *M. paradoxus* and *V. inanis* are not likely to cause significant deterioration of native habitats.

Potential to cause significant adverse effects on human health and safety

161. The Committee noted that *M. paradoxus* and *V. inanis* do not sting and are not known to pose any risk to people.

162. The Committee concluded that *M. paradoxus* and *V. inanis* are 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

163. The Committee noted that there are no native or exotic species in the genus *Volucella or Metoecus* in New Zealand that could interbreed or hybridise with *M. paradoxus* and *V. inanis.*

164. The Committee concluded that *M. paradoxus* and *V. inanis* are not likely to cause any significant adverse effect on New Zealand's inherent genetic diversity.

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

165. The Committee considered that *M. paradoxus* and *V. inanis* are not likely to cause disease, be parasitic, or become a vector for disease, except where it is intended to control *Vespula germanica* and *V. vulgaris* through parasitism.

Conclusion on the minimum standards

166. The Committee was satisfied that *M. paradoxus* and *V. inanis* meet the minimum standards set out in section 36 of the HSNO Act.

Additional matters to be considered

167. 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 *M. paradoxus* and *V. inanis* to form undesirable self-sustaining populations, and the ease of eradication of such populations.

168. The Committee noted that the intention of the importation and release of *M. paradoxus* and *V. inanis* is to establish and develop self-sustaining populations to mitigate the adverse effects of common and German wasp populations. Further, the Committee considered that in order for a self-sustaining population of *M. paradoxus* and *V. inanis* to be undesirable, it would need to cause undesirable adverse effects.

169. The Committee considered that any populations of *M. paradoxus* and *V. inanis* will be desirable since that is the foundation of a classical biological control strategy and that these agents are not likely to cause adverse effects in the New Zealand environment.

170. The Committee noted that the potential risks of releasing *M. paradoxus* and *V. inanis* are negligible and that if any populations were found to be undesirable, it would be difficult and expensive to eradicate such a population without the application of non-specific pesticides.

171. The Committee concluded that it is highly improbable that *M. paradoxus* and *V. inanis* would form undesirable self-sustaining populations.

Achieving the purpose of the Act

172. 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).

173. 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.*

174. The Committee took into account the following matters when considering the application in order to achieve the purpose of the Act under sections 6 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, wāhi 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 obligation*

175. The Committee also took into account sections 7 and 8 of the Act regarding the need for caution in managing adverse effects where there is scientific and technical uncertainty about those effects and the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

176. The Committee was 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

177. After reviewing all of the information contained in the application, the Committee was satisfied that the application meets 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.

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

    - all the effects of the organisms and any inseparable organisms,
    - the matters in section 37 of the Act,
    - the relevant matters in Part 2 of the Act; and
    - the Methodology.

179. The Committee decided to exercise its discretion and **approve** the import for release and/or release from containment of *Metoecus paradoxus* and *Volucella inanis* 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 (Table 3).

180. The Committee noted that under section 38(3) of the Act, if *Metoecus paradoxus* and *Volucella inanis* have 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.

181. The Committee also noted that under section 38(4) of the Act, every person who releases *Metoecus paradoxus* or *Volucella inanis* within five years after the date of the approval must notify the Authority within 1 month after the date of release.

Environmental Protection Authority
Te Mana Rauhī Taiao

Date: 5 February 2021

Dr Nick Roskruge
Chair, Decision Making Committee
Environmental Protection Authority

Organism	Approval code
Metoecus paradoxus (Linnaeus, 1761)	NOR100183
Volucella inanis (Linnaeus, 1758)	NOR100182

Table 3. Organisms assessed and approved under section 34 of the Act