Environmental Protection Authority
Te Mana Rauhī Taiao

Form: Call for expression of interest to prescribe certain organisms as 'not new' organisms

for the purposes of the Hazardous Substances and New Organisms (HSNO) Act

Introduction

Fill this form if you or your organisation seeks to make a proposal to prescribe certain new organisms as 'not new' organisms.

Species are classed as new organisms under the Hazardous Substances and New Organisms (HSNO) Act if they were not present in New Zealand before 29 July 1998. As such, you require HSNO Act approval for propagation or distribution of the organism.

To change its 'new' organism status (which means that an organism will no longer be regulated as 'new' under the HSNO Act), an organism must be deregulated under section 140(1)(c) of the HSNO Act, by an Order in Council given by the Governor General prescribing organisms that are not new organisms for the purposes of this Act.

The Environmental Protection Authority will use the information in this form in the decision-making process (which is likely to include a public consultation component). Clearly label and include any confidential information as a separate appendix.

Proposing a candidate new organism does not guarantee the status of the organism will be changed. Organisms will be assessed on a case-by-case basis. We may advise you to apply using another pathway if there's an appropriate one available.

Submission details

Once you have completed this form, you may:

- send by post to: Environmental Protection Authority, Private Bag 63002, Wellington 6140
- or email to: submissions@epa.govt.nz

Submissions open on the 22 March and close on 4 June at 5.00 pm.

Privacy Act

We are collecting your personal information in your submission relating to prescribing an organism as 'not new', and will use the information you provide in this form to contact you in relation to your submission. We may also use your contact details for the purpose of requesting your participation in customer surveys. We will store your personal information securely. Your information may be made public unless you select the box below to request that we keep it confidential. You have the right to access the personal information we hold about you and to ask for it to be corrected if it is wrong. If you would like to access your personal information, or have it corrected, please contact us.

☐ **Please keep my personal information confidential.**

Te Kāwanatanga o Aotearoa
New Zealand Government

Part 1

Name of person or organisation making the proposal: Dr Toni Withers

Postal address: Scion, Private bag 3020, Rotorua 3046

Date: 5/05/2021

Part 2

Details of the new organism(s) proposed to be prescribed as 'not new' organism(s)

Please complete this section for each organism proposed to be prescribed as a not new organism.

1. Name of the organism

Paropsisterna cloelia (Stål, 1960)

Synonyms: *Chrysophtharta variicollis, Paropsisterna variicollis* (a junior synonym; Leschen et al, 2020).

Common name: Eucalyptus variegated beetle (EVB).

2. Why do you want to prescribe this organism as 'not new'?

Including:

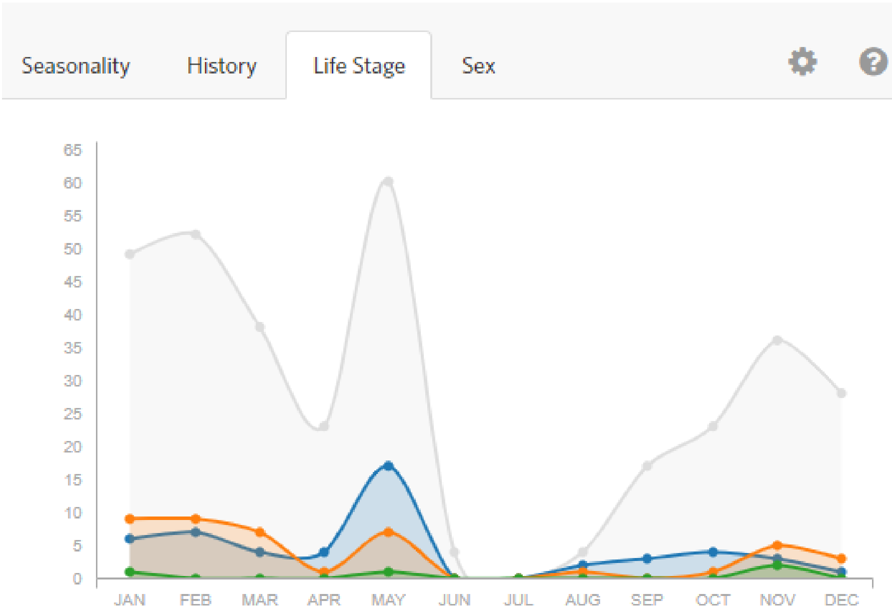
a. Is there any information on the economic or environmental impacts of the organism?
b. What is the benefit of making this organism 'not new'?
c. Can these benefits be quantified?
d. Can these benefits be achieved by alternative means?

a. The main damage to commercial crops caused by parospine pests is the loss of pulp-wood and timber production resulting from heavy and repeated defoliation of the host trees. Paropsine chrysomelid beetles are major pests in all Australian states and in New Zealand where eucalypts are grown commercially. Three durable Eucalyptus species trials in the Hawke's Bay region were visited from 18 to 26 January 2017 to assess the incidence of and defoliation by this pest *Paropsisterna cloelia* (Lin et al., 2017). *Pst. cloelia* accounted for 73% of paropsine adults observed and nearly 100% of the larvae and eggs, and was more abundant than *Paropsis charybdis* at time of sampling. The most severe impacts were found on the tree species *E. bosistoana, E. tricarpa, E. camaldulensis* and *E. quadrangulata* with moderately severe chewing (51–60% defoliation).

This pest *Pst. cloelia* is not being significantly impacted by the biological control agents introduced against *P. charybdis*. Only the egg parasitoid *Enoggera nassaui* is able to reproduce in the much smaller *P. cloelia* eggs. In the laboratory *E. nassaui* did parasitise

45% of *Pst. cloelia* eggs in 24 hours but significantly less than *P. charybdis. Neopolycystus insectifurax* is not effective against *Pst. cloelia* (see p 54; https://nzpps.org/wp-content/uploads/2021/08/NZPPS-2021-Conference-programme-and-abstracts.pdf). The adult beetles are present feeding on foliage between August and May (only in winter months do the beetles disappear). Economic impacts have the potential to be serious and cumulative in addition to the other paropsine beetles. Instances of *Pst. cloelia* are recorded on an iNaturalist project: https://inaturalist.nz/projects/eucalyptus-leaf-beetles-nz

EVB observations across different times of the year in the below graph shows when the larvae (in orange) and adults (in blue) are active.



b. The benefit of making this organism not new will be the increased efficiency with which scientists and postgraduate researchers will be able to undertake pest management research on *P. cloelia* in the field and in the laboratory. Currently, only Scion has EPA permission to collect this beetle and rear (develop) it in containment under NOC100191. University of Canterbury forestry school has two postgraduate students enrolled and currently undertaking research on the NZ Drylands Forests Initiative, one of whom plans to study the impacts of this pest. It becomes a practical barrier to undertaking laboratory-based research on temperature development, natural enemy impacts or any biological aspects of the pest without being able to move to or "develop"/ rear *Pst. cloelia.* The University of Canterbury does not have an invertebrate containment facility. Scion similarly wishes to have the ability to investigate new pesticide products for the management of *Pst. cloelia* and *P. charybdis*, and it cannot apply pesticides or take pesticides into the containment facility where live beneficial insect cultures are co-existing. The development approval is insufficient to enable Scion to apply pesticides to *Pst. cloelia* within our spray facilities. So all research facilities require the ability to move the *Pst. cloelia* in the field and into and out of non-containment laboratories, in order to test pesticides impacts against them in assays. De-newing will enable this research to progress.

There is research being undertaken by the NZDFI on resistance of families or seed lots of the ground durable promising Eucalyptus species to the feeding preferences of defoliating paropsine beetles (Millen et al., 2018). For plant resistance assays to be most effective and produce quantifiable data, it is best practice to ensure even numbers of insects can be present on each tree. This may require moving the insects from tree to tree to ensure similar feeding pressure per tree. This type of experiment is only going to be possible if *P. cloelia* is made not new.

c. These benefits will have quantifiable benefits for both the forestry industry and the local environment.

d. It is not possible to undertake the pest management and tree resistance experimental research described above, within a containment facility. The practicality, affordability and speed of undertaking research experiments on managing this pest will be significantly increased and fast-tracked if it is no longer new.

3. Describe the biology of the organism

Including:

a. What are the biological characteristics of the organism?
b. Where is it found overseas?
c. Does it cause a disease?
d. Does it have potentially beneficial characteristics?
e. What adverse effects could making this organism 'not new' have on people or the environment, if any? Can these be quantified?

a. In the majority of *Paropsisterna* species, eggs are laid late in the spring or early in summer on new or one-year-old foliage. The eggs of *Pst. cloelia* are deposited in messy overlapping rows on the surface of freshly expanding leaves generally on young shoots. There are four larval instars. The final instar is distinctive with a heavy black line running medially down the dorsal surface, from the mesothorax or metathorax to the 7th abdominal segment. The larval stages are gregarious and all four stages can be present in one group of larvae where they feed together, moving from leaf to leaf, removing the entire leaf lamina. Mature larvae are 10 mm long and, when fully fed, drop to the ground and pupate in the leaf litter or topsoil. They over-winter as adults in crevices of bark, under stones or in leaf litter. Under field conditions mature *Paropsisterna* spp. adults emerge from over-wintering in the spring and feed on "flush" foliage. Diapause allows lifecycle synchronization so that individuals resume development together, facilitating mating location and the temporal coincidence of reproductive and development with favourable conditions (Nahrung and Allen 2004). Diapause termination is dependent on day degrees above a threshold temperature of 6.7°C rather than a specific environmental cue. Experimental work by Nahrung and Allen (2004) on a closely related species suggest *Paropsisterna* beetles simply require around 615 Day Degree above 6.7°C to terminate diapause. Eggs hatch in eight to eleven days. In NSW, Australia, *Pst. cloelia* can have up to five generations (Elliott et al., 1998). We do not yet know how many generations it can undertake in New Zealand.

Nahrung (2006) stated that *Paropsisterna cloelia* are pests of *E. grandis, E. camaldulensis, E. globulus, E. nitens, E. dunnii and E. viminalis* (Simmul and deLittle 1999; Loch 2005). Observations also include the following hosts*; E blakelyi, E. urophylla, E. pellita, E. camaldulensis*. Dr Chris Reid from the Australian Museum had collections of *Pst. cloelia* found on *E. ovata, E. aggregate, E. bicostata, E. bridgesiana, E. macarthurii, E. mannifera, E. melliodora, E. pauciflora,* and *E. viminalis.* Lin *et al.* recorded the most severe damage in the Hawkes Bay on E. *bosistoana, E. tricarpa, E. camaldulensis* and *E. quadrangulata*.

Adult and larval feeding behaviour differ somewhat. Adult *Pst. cloelia* feed alone, chewing the edge of the leaf towards the midrib which results in a scalloped effect on leaf margins. Large numbers of beetles result in the host tree appearing ragged and defoliation in successive seasons can result in the tree developing a “broom-topped” appearance. Larvae feed preferentially on new growth, stripping the host tree of young leaves and shoots, both apically and laterally. As larvae develop, their rate of consumption rises steeply. The only natural enemies observed in New Zealand to date are the feeding activities of predatory bugs such as *Oechalia schellenbergii*. Ladybirds such as *Cleobora mellyi* and *Harmonia axyridis* have been observed feeding on the eggs.

b. The beetle is found throughout Australia, New Caledonia, and New Zealand. In New Zealand, it has spread in five years from Blenheim in the south to Gisborne in the north, and Taupo in the west of the north island. The accidental introduction of the eucalypt-feeding beetle *Paropsisterna cloelia* (= *P. variicollis*) occurred in Hawkes Bay, New Zealand, in 2016. MPI closed out the response in 2017 as being too widespread for eradication. Since then Nahrung *et al* (2020) have undertaken a molecular study and confirmed the conspecificity of the *Pst. cloelia* population invasive in NZ with populations widespread in eastern Australia. The same species has also invaded Western Australia since the 1970s, and New Caledonia since the early 2000s (Jolivet & Verma 2008).

c. No

d. No beneficial impacts of EVB have been located.

e. I cannot think of any reasons why making this organism not new would have a greater impact upon the environment or people than its current status as a rapidly-spreading pest.

4. Has the organism formed a self-sustaining population in New Zealand?

Including:

a. Where and when has the population(s) of the organism been found in New Zealand?

b. How does this organism spread?

a. FIRST DETECTION 2016: Location: 900 metres from Trelinnoe Park Café and 300metres from the edge of Trelinnoe gardens, Old Coach Road/ old Taupo Road, Hawkes Bay NZTM 1924848 E 5645366N.

The detection was made by SPS Biosecurity Ltd whilst undertaking Exotic Forest Health Surveillance in the adjoining Esk Forest. Collection date: 07/03/2016. Host: *Eucalyptus globulus* Labill. (Myrtaceae). Identified by Ines Schonberger Landcare Herbarium. Lincoln. 2015/0349 IP1, #3 Diagnostics: Stephanie Sopow SCION Research 9/03/2016, Dr Disna Gunawardana 10/03/2016, PHEL to genus level. Confirmation to species level by Dr Chris Reid 13/11/2016, Australian Museum, Sydney. Images of adults, larvae and male genitalia.

Since the first detection, it has rapidly spread and is now forming self-sustaining populations from Gisborne in the north island and Kaikoura in the south island. The most up-to-date distribution maps may be those as a result of citizen science photographs and identifications on iNaturalist on: https://inaturalist.nz/observations?taxon_id=559118

b. EVB spreads by flight and is undoubtedly also assisted by human-mediated transport (probably via vehicle).

5. Is any person attempting to manage, control or eradicate the organism under any Act or is the organism the subject of an enforcement action or action under a civil penalty regime?

Including:

a. If the organism has been part of an official incursion response or other MPI response or management activity, describe what happened here including why the response was stood down.

After first being identified in Hawke's Bay in 2016, further inspections at the infested site revealed additional adults, larval aggregations on leaves and an egg raft. MPI initiated a response. A subsequent MPI/SPS visit on 11/03/2016 revealed two additional infested sites (one with adults only and the other with adults and young larvae). Completion of further survey work in 2016 resulted in the detection of specimens approximately 30km apart. MPI Case number for the incursion investigation was INV-PGP-14561. MPI Surveillance & Incursion Investigation Team closed the response in 2017 when the second season of monitoring showed *Pst. cloelia* had spread throughout the wider Hawkes Bay. We believe the response was stood down as this vast geographic distribution made any eradication attempt not feasible.

Is there reason to believe that this organism was deliberately imported in contravention of an Act of Parliament? If so, please explain.

No.

6. Is there any other information you wish to include?

Biological control agents that appear to specialise on *Pst. cloelia* have been found during research on paropsine beetle species complexes, including a sexually transmitted mite *Chrysomelobia captivus* Seeman & Nahrung, and an endoparasitoid *Eadya annleckieae* Ridenbaugh (Nahrung et al. 2020). The potential for a biological control project to introduce either agent for consideration as a potential biocontrol agent and to undertake safety and host testing will depend upon industry funding and support. Denewing the host beetle would assist in all aspects of these biological control projects. In particular, it would help during releases to establish the parasitoid in the future. De-newing of the target pest would permit us to legally release the possibly-infested larvae after they have been parasitized. Without denewing EVB the direct releases would not be possible and only the adult parasitoids could be moved about, a less than ideal method.

Part 3

7. Provide references to the information you provided (if applicable)

Elliott HJ, Ohmart CP, Wylie FR 1998. Insect pests of Australian Forests. Ecology and management. Inkata Press, Melbourne. 214 pp.

Lin H, Murray T, Mason E 2017. Incidence of and defoliation by a newly introduced insect pest, *Paropsisterna variicollis* (Coleoptera: Chrysomelidae), on eleven durable *Eucalyptus* species in Hawke's Bay, New Zealand. New Zealand Plant Protection 70: 45-51.

Leschen R, Reid CAM, Nadein KS 2020 **(**https://doi.org/10.11646/zootaxa.4740.1.1)

Nahrung HF, Lewis ASR, Ridenbaugh RD, Allen GR, Reid CAM, McDougal RL, Withers TM 2020. Expansion of the geographic range of the eucalypt pest *Paropsisterna cloelia* (Stål) (Coleoptera: Chrysomelidae) through synonymy and invasion. Austral Entomology 59.

Jolivet P, Verma KK. 2008. On the origin of the chrysomelid fauna of New Caledonia. *Research on Chrysomelidae* **1**: 309-319.

Nahrung HF, Allen GR 2004. Overwintering ecology of *Chrysophtharta agricola*: mechanisms of reproductive diapause induction and termination. Australian Journal of Zoology 52: 505-520.

Nahrung HF 2006. Paropsine beetles (Coleoptera: Chrysomelidae) in south-eastern Queensland hardwood plantations: identifying potential pest species. Australian Forestry 69: 270-274.

Millen P, van Ballekom S, Altaner C, Apiolaza L, Mason E, McConnochie R, Morgenroth J, Murray TJ 2018. Durable eucalypt forests – a multi-regional opportunity for investment in New Zealand drylands. New Zealand Journal of Forestry 63: 11-23.

Simmul TL, De Little DW 1999. Biology of the paropsini (Chrysomelidae: Chrysomelinae). In: Cox M ed. Advances in Chysomelidae Biology. Backhuys Publishers, Leiden, The Netherlands. Pp. 463-477.