

---

# APP203631 Eucalyptus tortoise beetle BCA Submissions

---

15 November 2018

Under section 34 of the Hazardous Substances and New Organisms Act 1996  
Volume 2 of 3

To release from containment a parasitoid wasp, *Eadya daenerys*, for biological control of the pest Eucalyptus tortoise beetle, *Paropsis charybdis*, a pest of Eucalyptus trees in New Zealand.

Submission Number	Submitter	Submitter Organisation
SUBMISSION 127385	Mark Dean	Ernslaw One Limited
SUBMISSION 127386	Mark Forward	Nelson Forests Limited
SUBMISSION 127387	Paul Millen	New Zealand Dryland Forests Initiative (NZDFI)
SUBMISSION 127388	Venise Comfort	New Zealand Forest Owners Assn
SUBMISSION 127389	Jenny Dymock	Northland Regional Council
SUBMISSION 127390	Dean Satchell	Sustainable Forest Solutions
SUBMISSION 127391	John McLean	NZ Farm Forestry Assn - Gisborne-East Coast Branch
SUBMISSION 127392	Peter Berg	NZ Farm Forestry Association - National Office
SUBMISSION 127393	Scott Andrew	Juken New Zealand Limited



# SUBMISSION FORM

For Hazardous Substance and New Organism Applications



**Once you have completed this form**

**Send by post to:** Environmental Protection Authority, Private Bag 63002, Wellington 6140

**OR email to:** [submissions@epa.govt.nz](mailto:submissions@epa.govt.nz)

**Once your submission has been received the submission becomes a public document and may be made publicly available to anyone who requests it. You may request that your contact details be kept confidential, but your name, organisation and your submission itself will become a public document.**

<b>Submission on application number:</b>	APP203631
<b>Name of submitter or contact for joint submission:</b>	Mark Dean
<b>Organisation name (if on behalf of an organisation):</b>	Ernslaw One Limited
<b>Postal address:</b>	PO BOX 36 TAPANUI 9542
<b>Telephone number:</b>	
<b>Email:</b>	

I wish to keep my contact details confidential

The EPA will deal with any personal information you supply in your submission in accordance with the Privacy Act 1993. We will use your contact details for the purposes of processing the application that it relates to (or in exceptional situations for other reasons permitted under the Privacy Act 1993). Where your submission is made publicly available, your contact details will be removed only if you have indicated this as your preference in the tick box above. We may also use your contact details for the purpose of requesting your participation in customer surveys.

The EPA is likely to post your submission on its website at [www.epa.govt.nz](http://www.epa.govt.nz). We also may make your submission available in response to a request under the Official Information Act 1982.

- 
- I support the application
- I oppose the application
- I neither support or oppose the application

---

**The reasons for making my submission are<sup>1</sup>: (further information can be appended to your submission, see footnote).**

With over 120,000 ha of plantation, Ernslaw One is the fourth largest forestry company in New Zealand. We have a project to develop a resource of fast growing hardwood species to create new export markets. As owners of FSC certified forests we are required to minimise the use of highly hazardous chemicals, including most if not all insecticides. Therefore In order to have the confidence to plant species potentially susceptible to paropsis attack an assurance that bio-control agents such as Eadya daenerys can be deployed if necessary is of paramount importance to our investors.

---

**All submissions are taken into account by the decision makers. In addition, please indicate whether or not you also wish to speak at a hearing if one is held.**

- I wish to be heard in support of my submission (this means that you can speak at the hearing)
- I do not wish to be heard in support of my submission (this means that you cannot speak at the hearing)

**If neither box is ticked, it will be assumed you do not wish to appear at a hearing.**

---

---

**I wish for the EPA to make the following decision:**

Grant permission for unrestricted release of Eadya daenerys for control of Paropsis charybdis in New Zealand.

---

---

<sup>1</sup> Further information can be appended to your submission, if you are sending this submission electronically and attaching a file we accept the following formats – Microsoft Word, Text, PDF, ZIP, JPEG and JPG. The file must be not more than 8Mb.



# SUBMISSION FORM

For Hazardous Substance and New Organism Applications



**Once you have completed this form**

**Send by post to:** Environmental Protection Authority, Private Bag 63002, Wellington 6140

**OR email to:** [submissions@epa.govt.nz](mailto:submissions@epa.govt.nz)

**Once your submission has been received the submission becomes a public document and may be made publicly available to anyone who requests it. You may request that your contact details be kept confidential, but your name, organisation and your submission itself will become a public document.**

<b>Submission on application number:</b>	APP203631
<b>Name of submitter or contact for joint submission:</b>	Mark Forward
<b>Organisation name (if on behalf of an organisation):</b>	Nelson Forests Limited
<b>Postal address:</b>	58A Gladstone Rd, Private Bag 5, Richmond
<b>Telephone number:</b>	0274229949
<b>Email:</b>	<a href="mailto:mark.forward@nelsonforests.com">mark.forward@nelsonforests.com</a>

I wish to keep my contact details confidential

The EPA will deal with any personal information you supply in your submission in accordance with the Privacy Act 1993. We will use your contact details for the purposes of processing the application that it relates to (or in exceptional situations for other reasons permitted under the Privacy Act 1993). Where your submission is made publicly available, your contact details will be removed only if you have indicated this as your preference in the tick box above. We may also use your contact details for the purpose of requesting your participation in customer surveys.

The EPA is likely to post your submission on its website at [www.epa.govt.nz](http://www.epa.govt.nz). We also may make your submission available in response to a request under the Official Information Act 1982.

- 
- I support the application
- I oppose the application
- I neither support or oppose the application

---

**The reasons for making my submission are<sup>1</sup>: (further information can be appended to your submission, see footnote).**

As a forest grower with a number of stands of Eucalyptus nitens, we support this application to release the parasitoid wasp, Eadya daenerys, for biological control of the pest Eucalyptus tortoise beetle, Paropsis charybdis. This beetle causes significant damage to this tree species to the point at where it has become uneconomic to grow and the stands of trees are in significant decline.

---

**All submissions are taken into account by the decision makers. In addition, please indicate whether or not you also wish to speak at a hearing if one is held.**

- I wish to be heard in support of my submission (this means that you can speak at the hearing)
- I do not wish to be heard in support of my submission (this means that you cannot speak at the hearing)

**If neither box is ticked, it will be assumed you do not wish to appear at a hearing.**

---

---

**I wish for the EPA to make the following decision:**

To allow the release from containment the parasitoid wasp, Eadya daenerys

---

---

<sup>1</sup> Further information can be appended to your submission, if you are sending this submission electronically and attaching a file we accept the following formats – Microsoft Word, Text, PDF, ZIP, JPEG and JPG. The file must be not more than 8Mb.



# SUBMISSION FORM

For Hazardous Substance and New Organism Applications



**Once you have completed this form**

**Send by post to:** Environmental Protection Authority, Private Bag 63002, Wellington 6140

**OR email to:** [submissions@epa.govt.nz](mailto:submissions@epa.govt.nz)

**Once your submission has been received the submission becomes a public document and may be made publicly available to anyone who requests it. You may request that your contact details be kept confidential, but your name, organisation and your submission itself will become a public document.**

<b>Submission on application number:</b>	APP203631
<b>Name of submitter or contact for joint submission:</b>	Paul Millen
<b>Organisation name (if on behalf of an organisation):</b>	New Zealand Dryland Forests Initiative (NZDFI)
<b>Postal address:</b>	c/o Marlborough Research Centre 85 Budge Street Private Bag 1007 Blenheim
<b>Telephone number:</b>	03 574 1001
<b>Email:</b>	<a href="mailto:p.millen@xtra.co.nz">p.millen@xtra.co.nz</a>

I wish to keep my contact details confidential

The EPA will deal with any personal information you supply in your submission in accordance with the Privacy Act 1993. We will use your contact details for the purposes of processing the application that it relates to (or in exceptional situations for other reasons permitted under the Privacy Act 1993). Where your submission is made publicly available, your contact details will be removed only if you have indicated this as your preference in the tick box above. We may also use your contact details for the purpose of requesting your participation in customer surveys.

The EPA is likely to post your submission on its website at [www.epa.govt.nz](http://www.epa.govt.nz). We also may make your submission available in response to a request under the Official Information Act 1982.

- I support the application
- I oppose the application
- I neither support or oppose the application

**The reasons for making my submission are<sup>1</sup>: (further information can be appended to your submission, see footnote).**

The NZDFI is a public/private tree breeding and research partnership that is developing genetically improved nursery stock, management systems and wood processing options for eucalypt species that produce naturally durable hardwood. These species are well-adapted to New Zealand's dryland eastern regions.

The NZDFI partners established this research and development project to ensure the supply of improved nursery stock sufficient to meet our vision of planting 100,000 hectares of durable eucalypt forests in east coast regions by 2030; the aim being to create a multi-regional sustainable durable hardwood products value chain. This value chain could be worth \$2 billion and employ 1700 people by 2050.

Established in Marlborough in 2008, the NZDFI partners are Proseed Ltd (Ngai Tahu subsidiary), Vineyard Timbers Ltd, Marlborough Research Centre Trust-Te Rito o Hiranga (MRCT) and University of Canterbury's School of Forestry- Te Kura Ngahere (UC SoF). NZDFI's trial-site management and communications are managed by MRCT in Blenheim with an extensive research programme led by UC SoF in Christchurch. Thirty landowners host over 80 hectares of research trials from the Bay of Plenty to North Canterbury.

The durable eucalypt species we are developing offer a viable, sustainable alternative land-use on summer-dry, marginal grazing land in our target east coast regions. This is because the eucalypts we have selected for genetic improvement have the following attributes:

- fast-growing, and tolerant of the summer-dry conditions which are challenging to other species
- produce naturally durable timber – a real alternative to environmentally damaging copper-chrome-arsenic (CCA)-treated radiata pine and to unsustainably harvested tropical hardwoods
- store more carbon, more rapidly, than almost any other forest species grown in New Zealand
- coppice readily (regrow from a cut stump), thereby reducing the potential for erosion after harvest
- can be managed under a continuous cover regime
- produce nectar and pollen at times of year when other species are not flowering, so add bio-diversity by supporting bees and native birds and insects.

This is a strategic opportunity to diversify New Zealand's forest industry, and boost regional development and employment in our target east coast regions. It also presents an opportunity for New Zealand to take the lead in developing internationally valuable IP and sustainable hardwood products – increasingly needed as tropical hardwood supplies diminish.

However, the ability of eucalypts to thrive in the presence of established and future biological threats is fundamental to the success of our program. Eucalyptus tortoise beetle, *Paropsis charybdis*, is an Australian leaf eating insect that was introduced to New Zealand. Due to the absence of predators, this beetle can thrive and produce large populations that result in severe defoliation of some of the eucalypt species that we have under research. Repetitive events impact on forest productivity and currently the only control is by using insecticides.

Recently, Australian researchers concluded that developing plantation stock more resistant or tolerant to leaf beetle attack was the highest pest management priority for Australian eucalypt plantations. This is already part of our eucalypt breeding

<sup>1</sup> Further information can be appended to your submission, if you are sending this submission electronically and attaching a file we accept the following formats – Microsoft Word, Text, PDF, ZIP, JPEG and JPG. The file must be not more than 8Mb.

---

programme as we want to develop genetic resistance along with other socially and environmentally acceptable methods to reduce insect threats and impacts with a minimal chemical footprint.

Hence the reason for our full support of this proposal by Scion to release from containment a parasitoid wasp, *Eadya daenerys*, for biological control of larvae of the pest Eucalyptus tortoise beetle, *Paropsis charybdis* in New Zealand. We consider that Scion are internationally recognised in this field of research and have had several other successful releases in recent times. They have conducted extensive research into any potential harm the wasp could pose and would only be proceeding with this application if they consider these wasps will not be a threat to other NZ biological organisms.

---

**All submissions are taken into account by the decision makers. In addition, please indicate whether or not you also wish to speak at a hearing if one is held.**

I wish to be heard in support of my submission (this means that you can speak at the hearing)

I do not wish to be heard in support of my submission (this means that you cannot speak at the hearing)

**If neither box is ticked, it will be assumed you do not wish to appear at a hearing.**

---

---

**I wish for the EPA to make the following decision:**

To grant consent for Scion to release from containment the parasitoid wasp, *Eadya daenerys* into the NZ environment.

---





# SUBMISSION FORM

For Hazardous Substance and New Organism Applications



**Once you have completed this form**

**Send by post to:** Environmental Protection Authority, Private Bag 63002, Wellington 6140

**OR email to:** [submissions@epa.govt.nz](mailto:submissions@epa.govt.nz)

**Once your submission has been received the submission becomes a public document and may be made publicly available to anyone who requests it. You may request that your contact details be kept confidential, but your name, organisation and your submission itself will become a public document.**

<b>Submission on application number:</b>	APP203631
<b>Name of submitter or contact for joint submission:</b>	Venise Comfort
<b>Organisation name (if on behalf of an organisation):</b>	New Zealand Forest Owners Association (FOA)
<b>Postal address:</b>	NZFOA PO Box 10986 Wellington 6143 New Zealand
<b>Telephone number:</b>	027 530 4443 or (04) 473 3769 (extension 5)
<b>Email:</b>	<a href="mailto:venise.comfort@nzfoa.org.nz">venise.comfort@nzfoa.org.nz</a>

I wish to keep my contact details confidential

The EPA will deal with any personal information you supply in your submission in accordance with the Privacy Act 1993. We will use your contact details for the purposes of processing the application that it relates to (or in exceptional situations for other reasons permitted under the Privacy Act 1993). Where your submission is made publicly available, your contact details will be removed only if you have indicated this as your preference in the tick box above. We may also use your contact details for the purpose of requesting your participation in customer surveys.

The EPA is likely to post your submission on its website at [www.epa.govt.nz](http://www.epa.govt.nz). We also may make your submission available in response to a request under the Official Information Act 1982.

- 
- I support the application
- I oppose the application
- I neither support or oppose the application

---

**The reasons for making my submission are<sup>1</sup>: (further information can be appended to your submission, see footnote).**

The FOA supports this application for the following reasons:

Biological control, using a wasp species to control the tortoise beetle will reduce the amount of chemical being applied to control the insect and will also reduce costs.

Scion has spent five years researching the biocontrol agent and FOA has confidence in Scion's ability in this area.

Biological control is the only feasible means to reduce the impact of damaging insects that arrive from Australia and cause negative impacts on eucalyptus planted in forests for harvest and production purposes. It also has the ability to reduce the negative impact of damaging insects on eucalyptus species located in parks and gardens.

It is likely that the biological control agent will eventually arrive in New Zealand on its own, but this will take years if not decades, would be in an uncontrolled manner, and unlikely to provide a useful control mechanism.

For these reasons we strongly support the application to release from containment a parasitoid wasp *Eadya daenerys*, for biological control of the pest *Eucalyptus* tortoise beetle.

---

**All submissions are taken into account by the decision makers. In addition, please indicate whether or not you also wish to speak at a hearing if one is held.**

- I wish to be heard in support of my submission (this means that you can speak at the hearing)
- I do not wish to be heard in support of my submission (this means that you cannot speak at the hearing)

**If neither box is ticked, it will be assumed you do not wish to appear at a hearing.**

---

---

**I wish for the EPA to make the following decision:**

FOA strongly urges EPA to consider favourably Scion's application for the release of *Eadya daenerys*.

---

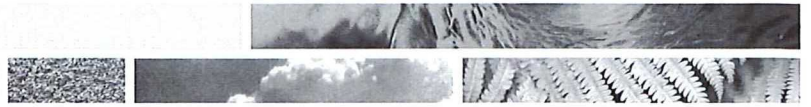
---

<sup>1</sup> Further information can be appended to your submission, if you are sending this submission electronically and attaching a file we accept the following formats – Microsoft Word, Text, PDF, ZIP, JPEG and JPG. The file must be not more than 8Mb.



# SUBMISSION FORM

For Hazardous Substance and New Organism Applications



Once you have completed this form

Send by post to: Environmental Protection Authority, Private Bag 63002, Wellington 6140

OR email to: [submissions@epa.govt.nz](mailto:submissions@epa.govt.nz)

Once your submission has been received the submission becomes a public document and may be made publicly available to anyone who requests it. You may request that your contact details be kept confidential, but your name, organisation and your submission itself will become a public document.

<b>Submission on application number:</b>	APP203631
<b>Name of submitter or contact for joint submission:</b>	Dr J J Dymock
<b>Organisation name (if on behalf of an organisation):</b>	Northland Regional Council
<b>Postal address:</b>	Private Bag 9021 Whangarei Mail Centre Whangarei 0148
<b>Telephone number:</b>	09 4701200
<b>Email:</b>	<a href="mailto:jennydymock@editento.com">jennydymock@editento.com</a>

I wish to keep my contact details confidential

The EPA will deal with any personal information you supply in your submission in accordance with the Privacy Act 1993. We will use your contact details for the purposes of processing the application that it relates to (or in exceptional situations for other reasons permitted under the Privacy Act 1993). Where your submission is made publicly available, your contact details will be removed only if you have indicated this as your preference in the tick box above. We may also use your contact details for the purpose of requesting your participation in customer surveys.

The EPA is likely to post your submission on its website at [www.epa.govt.nz](http://www.epa.govt.nz). We also may make your submission available in response to a request under the Official Information Act 1982.

- 
- I support the application
- I oppose the application
- I neither support or oppose the application

---

**The reasons for making my submission are<sup>1</sup>: (further information can be appended to your submission, see footnote).**

The Northland Regional Council supports the application to release *Eadya daenerys* as a biocontrol agent of the Eucalyptus tortoise beetles. Northland has a climate which is suitable for growing high value eucalyptus species but these species are difficult to grow in Northland due to damage by the Eucalyptus tortoise beetle, *Paropsis charybdis*. *P. charybdis* is widespread in Northland and causes serious damage to Northland's eucalyptus plantations. These plantations currently cover over 450 ha, and rank fifth in NZ in terms of eucalypt production and this is expected to increase.

Eucalyptus are also significant amenity trees in Northland and provide shade, shelter, erosion control and floral nectar sources for pollinators.

The parasitoid, *Eadya daenerys* has a one-year life-cycle, with adults present only in spring. It is expected to parasitize and reduce the damaging spring generation of *P. charybdis*, currently not attacked by existing predators and parasitoids which attack the second *P. charybdis* generation in late summer.

Host specificity tests showed that although non-target Chrysomelid beetles were attacked by the parasitoid, *Eadya daenerys*, none of these parasitoids survived to complete development, except in *Trachymela sloanei*, which is also a pest of eucalypts. The *Eadya* parasitoid wasp did not oviposit in the larvae of Chrysomelid weed biocontrol beetles that are important to Northland. While there is a chance that the *Eadya* wasp may stray into non-eucalyptus habitats and showed attacking behaviours towards some non-target chrysomelid beetles in confined spaces, this is unlikely to occur in the field as the *Eadya* parasitoid wasp lives in eucalyptus habitat, searching for beetle larvae on the surface of eucalypt leaves.

See attached full submission

---

**All submissions are taken into account by the decision makers. In addition, please indicate whether or not you also wish to speak at a hearing if one is held.**

- I wish to be heard in support of my submission (this means that you can speak at the hearing)
- I do not wish to be heard in support of my submission (this means that you cannot speak at the hearing)

**If neither box is ticked, it will be assumed you do not wish to appear at a hearing.**

---

---

<sup>1</sup> Further information can be appended to your submission, if you are sending this submission electronically and attaching a file we accept the following formats – Microsoft Word, Text, PDF, ZIP, JPEG and JPG. The file must be not more than 8Mb.

---

**I wish for the EPA to make the following decision:**

Release the parasitoid wasp, *Eadya daenerys*, for biological control of the Eucalyptus tortoise beetle, *Paropsis charybdis*

---

Submission on the application APP203631 for full release of the parasitoid wasp, *Eadya daenerys*, for biocontrol of the Eucalyptus tortoise beetle, *Paropsis charybdis*.

### **Economic value of Eucalyptus spp. to Northland**

Eucalyptus tortoise beetle (ETB), *Paropsis charybdis*, is widespread in Northland and causes serious damage to Northland's eucalyptus plantations. These plantations currently cover over 450 ha, and rank fifth in NZ in terms of eucalypt production and this is expected to increase.

Northland's climate is suitable for growing eucalyptus, especially the more valuable and durable species such as, the blue gums, *Eucalyptus saligna*, *E. botryoides* and *E. nitens*.

Eucalypts have a number of attributes. The Blue gum group is suitable for tongue and groove flooring, parquet, overlay, joinery, stairs, doors, furniture, panelling, decking, outdoor furniture and sliced veneer. The Stringybark group is suitable for flooring, joinery, decking, cross arms and sliced veneers. The Ash group is suitable for furniture, joinery and sliced veneer.

Eucalyptus are also significant amenity trees in Northland and provide shade, shelter, erosion control and floral nectar sources for pollinators.

### **Damage to Eucalypts by Eucalyptus tortoise beetle, *Paropsis charybdis*.**

#### *Adult beetle feeding damage*

Most species of *Eucalyptus* spp. grown in New Zealand can be defoliated to some extent by Eucalyptus tortoise beetle adult feeding. The most severely attacked species include:

*E. globulus*, *E. viminalis*, *E. johnstonii*, *E. smithii*, *E. grandis*, *E. deanei*, *E. guilfoylei*, *E. macarthurii*, *E. longifolia*, *E. quadrangulata*, *E. dunnii*, *E. resinifera*, *E. scias*, *E. pellita*, *E. guilfoylei*, *E. leucoxydon* and *E. melliodora*.

Other species subject to attack include *E. saligna*, *E. botryoides*, *E. robusta*, *E. bosistoana*, *E. rummeryi*, *E. propinqua*, *E. punctata*, *E. diversicolor*, *E. camaldulensis*, *E. teretecornis*, *E. brookerana*, *E. nitens*, *E. bicostata*, *E. maidenii* and *E. ovata*.

#### *Larval feeding damage*

Oviposition (egg laying), and consequent larval damage, is largely restricted to eucalypts in the sub-genus *Symphyomyrtus*, *Eucalyptus globulus*, *E. viminalis* and *E. nitens*.

*E. nitens* can be subject to severe attack and defoliation when in a plantation situation. It is widely grown in New Zealand for wood fibre in large plantations, replacing short fibre native species such as tawa, in wood pulp and fine paper processing. *E. nitens* is particularly susceptible to *Paropsis charybdis* feeding damage and therefore currently difficult to grow in Northland without insecticidal treatment of plantations.

### **Biocontrol of *Paropsis charybdis***

In the 1970s and 1980s four natural enemies of *P. charybdis* were introduced to New Zealand for biological control (Murray *et al.* 2008). Two of these, the parasitic fly *Froggattimyia tillyardi* and the parasitic wasp *Neopolycystus* sp., did not establish. A predatory ladybird, *Cleobora mellyi*, which feeds on eggs and larvae of *P. charybdis*, established successfully. Although it currently has a limited distribution it is now successfully established in Northland. The final species, *Enoggera nassau*, established well and is now present through much of the country. This parasitoid successfully controlled *P. charybdis* in many regions, however a self-introduced hyperparasitoid *Baeoanusia albifunicle* was found attacking *E. nassau* in 2002. *Neopolycystus insectifurax* is a self-introduced parasitoid of *P. charybdis* first recorded in New Zealand in 2002. *Neopolycystus insectifurax* is not

susceptible to hyperparasitism by *B. albifunicle* and may boost biological control of the second *P. charybdis* generation in late summer (Murray *et al.* 2008).

The parasitoid, *Eadya daenerys* has a one-year life-cycle, with adults present only in spring. It is expected to parasitize and reduce the damaging spring generation of *P. charybdis*, currently not attacked by existing predators and parasitoids which attack the second *P. charybdis* generation in late summer.

### Host range testing

Beetles were selected for host range testing based on how closely related they were to *P. charybdis* which is in the family Chrysomelidae, subfamily Chrysomelinae.

To be at risk of exposure to *E. daenerys*, larvae of non-target beetles need to feed externally during the daytime on the leaves of their host plants for at least a portion of their lifecycle. They would also need to do this in springtime (November-December) when *E. daenerys* adults will be active.

Many species do not feed on leaves or at the right time of the year. For instance, some Galerucinae beetle species feed within the soil on plant roots (Pre-application consultation document). The *Eadya* parasitoid hunts for beetle larvae on the leaves of trees, will never encounter a larva in the soil.

Laboratory host specificity tests, always using *P. charybdis* as the control pest species for comparison, were conducted on beetles from the Chrysomelidae family including two pest species, one endemic beetle and 6 beneficial beetles. All species tested had springtime-active, and external leaf-feeding larvae.

- 1) two pests, the small tortoise beetle, *Trachymela sloanei*, and the blackwood tortoise beetle *Dicranosterna semipunctata*.
- 2) one native beetle, the veronica leaf beetle, *Allocharis nr tarsalis*, from the 40 species or so that exist in subalpine areas.
- 3) two closely related weed biological control agents (beneficial beetles), the tutsan leaf beetle, *Chrysolina abchasica*, and the broom leaf beetle, *Gonioctena olivacea*.
- 4) four more distantly related weed biological control agent beetles, the heather beetle, *Lochmaea suturalis*, the alligator weed leaf beetle, *Agasicles hygrophila*, the green thistle leaf beetle, *Cassida rubiginosa*, and the tradescantia leaf beetle, *Neolema ogloblini*.

### No choice tests

Host specificity tests (Table 1 from Appendix 5, EPA application) showed that when not attacked by *E. daenerys*, *P. charybdis* had a survival success to pupation of 80. When attacked by *E. daenerys* the survival rate of *P. charybdis* dropped to less than 10%.

The parasitoid, *E. daenerys*, completed its development through its life cycle only on *P. charybdis* and in the eucalyptus pest, *T. sloanei*.

Incomplete physiological development, (death of the parasitoid inside the body of the test host) was discovered upon dissecting the bodies of four non-target species of Chrysomelinae: in the native sub-alpine veronica leaf beetle (internal parasitism 8%), in the tutsan leaf beetle (internal parasitism at 2%), in the broom leaf beetle (internal parasitism 5%) and in the blackwood tortoise beetle pest (2%).

Table 1. Percentage survival and Percentage parasitism of Chrysomelid beetles by the parasitoid *Eadya daenerys* in no-choice tests (Withers et al, Appendix 5, EPA Application APP203631

species	subfamily	Common name	% survival without <i>Eadya</i>	% survival with <i>Eadya</i> (no choice)	% parasitism by <i>Eadya</i> (no choice)
<i>Paropsis charybdis</i> (2 tests)	Chrysomelinae	Eucalyptus tortoise beetle	95.3%, 67.3%	9.4%, 7.0%	34.4%, 30.2%
<i>Trachymela sloanei</i>	Chrysomelinae	small tortoise beetle		57.5%	12.5%
<i>Dicranosterna semipunctata</i>	Chrysomelinae	Blackwood tortoise beetle		62.5%	1.6%
<i>Allocharis sp. nr tarsalis</i>	Chrysomelinae	Veronica leaf beetle (endemic)		90.0%	7.5%
<i>Chrysolina abchasica</i>	Chrysomelinae	Tutsan beetle		40.2%	1.8%
<i>Gonioctena olivacea</i>	Chrysomelinae	Broom leaf beetle		85.4%	5.2%
<i>Lochnaecea suturalis</i>	Galerucinae	Heather beetle		75.0%	0
<i>Agasicles hygrophila</i>	Galerucinae	Alligator weed beetle		55.4%	0
<i>Cassida rubignosa</i>	Cassidinae	Green thistle leaf beetle		60.2%	0
<i>Neolema ogloblini</i>	Criocerinae	Tradescantia leaf beetle		85.0%	0



### Behavioural preference tests

The behaviour of the *Eadya* parasitoid was observed under two experimental test conditions: sequential no-choice tests (10mins) and two-choice tests (25mins).

Table 2. Proportion of tested female *E. daenerys* that were observed to attack non-target hosts (from the pre-application consultation report) in no-choice tests over 10 minutes and two choice tests with *P. charybdis* present over 25 minutes (from the pre-application consultation document)

Species	Common name	proportion <i>Eadya</i> females attacking (no choice)	proportion <i>Eadya</i> females attacking (two choice with <i>Paropsis</i> )
<i>Paropsis charybdis</i>	Eucalyptus tortoise beetle		100%
<i>Trachymela sloanei</i>	small tortoise beetle	5/8	NA
<i>Dicranosterna semipunctata</i>	Blackwood tortoise beetle	1/12	6/17
<i>Allocharis sp. nr tarsalis</i>	Veronica leaf beetle (endemic)	3/12	2/8
<i>Chrysolina abchasica</i>	Tutsan beetle	2/15	3/16
<i>Gonioctena olivacea</i>	Broom leaf beetle	0/13	0/15
<i>Lochnaeece suturalis</i>	Heather beetle	1/13	0/12
<i>Agasicles hygrophila</i>	Alligator weed beetle	1/16	2/17
<i>Cassida rubiginosa</i>	Green thistle leaf beetle	0/16	1/15
<i>Neolema ogloblini</i>	Tradescantia leaf beetle	1/15	3/15

#### No-choice behavioural tests

Behavioural assays with female *Eadya daenerys* artificially confined with non-target beetle larvae in no choice tests resulted in occasional attacks against some of the non-targets.

#### Two-choice behavioural tests

The proportion of female *E. daenerys* attacking *P. charybdis* in paired tests was 100%. Significantly fewer attack behaviours by *E. daenerys* were recorded towards non-target hosts compared to *P. charybdis* in each of the paired non-target larvae tests in all except for the paired *Paropsis-Trachymela sloanei* test. Tests were carried out in confined spaces and in the presence of both the non-target beetle host plants and *Eucalyptus* spp.

### Conclusion

The Northland Regional Council supports the application to release *Eadya daenerys* as a biocontrol agent of the Eucalyptus tortoise beetles. Northland has a climate which is suitable for growing high value eucalyptus species but these species are difficult to grow in Northland due to damage by the beetle, *Paropsis charybdis*.

Host specificity testing showed that, although non-target Chrysomelid beetles were attacked by the parasitoid, *Eadya daenerys*, none of these parasitoids survived to complete development, except in *Trachymela sloanei*, which is also a pest of eucalypts. The *Eadya* parasitoid wasp did not oviposit in the larvae of Chrysomelid weed biocontrol beetles that are important to Northland. While there is a

chance that the *Eadya* wasp may stray into non-eucalyptus habitats and showed attacking behaviours towards some non-target chrysomelid beetles in confined spaces, this is unlikely to occur in the field as the *Eadya* parasitoid wasp lives in eucalyptus habitat, searching for beetle larvae on the surface of eucalypt leaves.

## References

Murray, T., Withers, T.M., Mansfield, S. and Bain, J. 2008. Distribution and current status of natural enemies of *Paropsis charybdis* in New Zealand. NZ Plant Protection 61:185-190

Withers, T.M., Todoroki, C.L., Allen, G.A., Pugh, A.R. and Gresham, B.A.

Host specificity testing predicts *Eadya daenerys* (Hym.: Braconidae), a potential biological control agent for the invasive pest *Paropsis charybdis* will be host specific to Paropsini (Col.: Chrysomelidae: Chrysomelinae) unpublished manuscript. EPA Application Appendix 5



# SUBMISSION FORM

For Hazardous Substance and New Organism Applications



**Once you have completed this form**

**Send by post to:** Environmental Protection Authority, Private Bag 63002, Wellington 6140

**OR email to:** [submissions@epa.govt.nz](mailto:submissions@epa.govt.nz)

**Once your submission has been received the submission becomes a public document and may be made publicly available to anyone who requests it. You may request that your contact details be kept confidential, but your name, organisation and your submission itself will become a public document.**

<b>Submission on application number:</b>	APP203631
<b>Name of submitter or contact for joint submission:</b>	Dean Satchell
<b>Organisation name (if on behalf of an organisation):</b>	Sustainable Forest Solutions
<b>Postal address:</b>	33 b Skudders Beach Road RD 1 Kerikeri 0294
<b>Telephone number:</b>	09 4075525
<b>Email:</b>	dsatch@gmail.com

I wish to keep my contact details confidential

The EPA will deal with any personal information you supply in your submission in accordance with the Privacy Act 1993. We will use your contact details for the purposes of processing the application that it relates to (or in exceptional situations for other reasons permitted under the Privacy Act 1993). Where your submission is made publicly available, your contact details will be removed only if you have indicated this as your preference in the tick box above. We may also use your contact details for the purpose of requesting your participation in customer surveys.

The EPA is likely to post your submission on its website at [www.epa.govt.nz](http://www.epa.govt.nz). We also may make your submission available in response to a request under the Official Information Act 1982.

- I support the application
- I oppose the application
- I neither support or oppose the application

**The reasons for making my submission are<sup>1</sup>: (further information can be appended to your submission, see footnote).**

I am strongly in support of allowing *Eadya daenerys* to be released into New Zealand.

I am a forest grower and have invested the last 25 years into researching and deploying high value timber species, primarily in Northland. At the top of that list are *Eucalyptus* species because they produce strong, attractive and durable timbers that are in demand by consumers. *Eucalyptus* timber is used in New Zealand primarily for high quality exterior hardwood decking and interior polished floor products. These are high quality applications and command high market premiums, which equate to good returns for growers and a profitable land use. Indeed the current price is approximately 5 times what a similar *radiata* grade and size produce, yet growth rates are comparable.

The global market for timber is unpredictable because of unique demand and supply issues, especially long time frames. Over the last decade unprecedented demand for good quality hardwood has emerged and continues to grow as supply is not met. As a consequence, prices for hardwood have improved progressively and are likely to continue on that trajectory. This change has occurred in the course of a single *radiata* rotation primarily because retaining old growth natural forests around the world has become a priority for most countries. However, it will take time for the plantation forest industry to react to such market forces and refocus on planting hardwood forests, given that almost all forestry research in New Zealand has historically been dedicated to one softwood species, *radiata* pine, which continues to compete on global markets with other low value and abundant softwoods.

In recognition of the high market premiums available to *Eucalyptus* growers, especially for naturally durable eucalypt timber species, increased interest has been expressed by growers looking for alternatives to *radiata* pine, with few options that are fast growing and yield timber which is in demand and also achieves high market value.

Growers are starting to realise that *Eucalyptus* timber can produce high returns. However, growers also require confidence that their trees will grow to maturity successfully. Biosecurity is the most important issue for the success or otherwise of plantation forests, especially given the rotation lengths involved - adapting to an incursion by changing crops is out of the question.

It would not give growers confidence to invest in plantation forests if well-researched biological control agents for important pests cannot be introduced, especially where an extensive testing programme by our science research provider, Scion, demonstrates their safety. Scion are a world leader in biological control research and research into safety of such agents for release. After considerable research effort Scion have reached the conclusion that *Eadya daenerys* is safe for release and have applied for this.

Indeed, the target pest *Paropsis charybdis*, the *Eucalyptus* tortoise beetle, has been the most destructive and difficult *eucalyptus* pest to control for over 100 years in New Zealand. Now, growers have put in a concerted and dedicated effort into finding a suitable biological control for this pest, one that does not cause unwanted effects on non-target insects. The *Eadya daenerys* wasp is a specialist parasitoid that only attacks certain leaf beetle pests of *Eucalyptus*, in particular *P. charybdis*.

This wasp offers a new world of opportunities to grow high value solid timber hardwoods in New Zealand. In the early 1900's, before the inadvertent introduction of *Paropsis charybdis* into New Zealand, the *eucalypt* species of choice was red mahogany, *Eucalyptus scias*. The reason why this species was selected by the NZ Forest Service was that not only did it grow well in New Zealand, but also its timber properties were superior to other *eucalypts*. These include exceptional strength and hardness properties, along with rich colour and a decorative ribbon pattern in the grain, an elite timber. Because this species was favoured by the tortoise beetle when it arrived, red mahogany was abandoned as a plantation species in favour

<sup>1</sup> Further information can be appended to your submission, if you are sending this submission electronically and attaching a file we accept the following formats – Microsoft Word, Text, PDF, ZIP, JPEG and JPG. The file must be not more than 8Mb.

---

of lesser-quality alternatives less subject to Paropsis attack, eucalypts without these exceptional timber properties. This exceptional species has not been grown in New Zealand for 100 years. This is just one example of a lost opportunity that could be regained simply by introducing an effective biocontrol agent of Paropsis. This serious pest has been the bane of growers for too long.

It is also acknowledged that trees and forestry are an important land use for New Zealand, one that also offers important public benefits, so important that the current government has set in motion a comprehensive programme to scale up planting of forests, not only for producing timber but also erosion control and carbon sequestration. Growing well researched high-value plantation forestry species on relatively short rotations not only meets those public objectives, but also generates economic value and returns to growers. Given that Eucalyptus is one of the most widely planted tree species in New Zealand and possibly the most suitable plantation forest species for erodible hill country, with biological control of Paropsis the opportunities for economic activity using the species are significant. New Zealand as a country should not lose sight of that opportunity.

---

**All submissions are taken into account by the decision makers. In addition, please indicate whether or not you also wish to speak at a hearing if one is held.**

- I wish to be heard in support of my submission (this means that you can speak at the hearing)
- I do not wish to be heard in support of my submission (this means that you cannot speak at the hearing)

**If neither box is ticked, it will be assumed you do not wish to appear at a hearing.**

---

---

**I wish for the EPA to make the following decision:**

To allow release from containment of the parasitoid wasp *Eadya daenerys* for biological control of the pest Eucalyptus tortoise beetle, *Paropsis charybdis*

---



# SUBMISSION FORM

For Hazardous Substance and New Organism Applications



**Once you have completed this form**

**Send by post to:** Environmental Protection Authority, Private Bag 63002, Wellington 6140

**OR email to:** [submissions@epa.govt.nz](mailto:submissions@epa.govt.nz)

**Once your submission has been received the submission becomes a public document and may be made publicly available to anyone who requests it. You may request that your contact details be kept confidential, but your name, organisation and your submission itself will become a public document.**

<b>Submission on application number:</b>	APP203631
<b>Name of submitter or contact for joint submission:</b>	Dr. John A. McLean
<b>Organisation name (if on behalf of an organisation):</b>	Gisborne-East Coast Branch New Zealand Farm Forestry Association
<b>Postal address:</b>	20 Sterling Park, Gisborne 4010
<b>Telephone number:</b>	(06) 868-6440
<b>Email:</b>	<a href="mailto:jands.mclean@gmail.com">jands.mclean@gmail.com</a>

I wish to keep my contact details confidential

The EPA will deal with any personal information you supply in your submission in accordance with the Privacy Act 1993. We will use your contact details for the purposes of processing the application that it relates to (or in exceptional situations for other reasons permitted under the Privacy Act 1993). Where your submission is made publicly available, your contact details will be removed only if you have indicated this as your preference in the tick box above. We may also use your contact details for the purpose of requesting your participation in customer surveys.

The EPA is likely to post your submission on its website at [www.epa.govt.nz](http://www.epa.govt.nz). We also may make your submission available in response to a request under the Official Information Act 1982.

- I support the application
- I oppose the application
- I neither support or oppose the application

**The reasons for making my submission are<sup>1</sup>: (further information can be appended to your submission, see footnote).**

We fully support this application to release the parasitoid wasp, *Eadya daenerys*, for the biological control of the larvae of the pest *Eucalyptus* tortoise beetle, *Paropsis charybdis*, which is a pest in some of the plantations in our area. Our Branch has been a steady supporter of Paul Millen's NZ Dryland Forests Initiative (NZDFI) and we have test plantings of *Eucalyptus* species in several areas. Some of these plantations have trees showing varying degrees of defoliation by the tortoise beetle. As the NZDFI regional strategic plan seeks to establish 100,000 hectares of durable eucalyptus forests in New Zealand's dry east coast regions, the approval for the release of this host specific parasitoid wasp is timely.

**All submissions are taken into account by the decision makers. In addition, please indicate whether or not you also wish to speak at a hearing if one is held.**

- I wish to be heard in support of my submission (this means that you can speak at the hearing)
- I do not wish to be heard in support of my submission (this means that you cannot speak at the hearing)

**If neither box is ticked, it will be assumed you do not wish to appear at a hearing.**

**I wish for the EPA to make the following decision:**

On behalf of the Gisborne-East Coast Branch of the New Zealand Farm Forestry Association we wish the EPA to consider favourably the application for the release of the parasitoid wasp *Eadya daenerys*

John A. McLean Ph.D.  
20 Sterling Park  
Gisborne 4010

<sup>1</sup> Further information can be appended to your submission, if you are sending this submission electronically and attaching a file we accept the following formats – Microsoft Word, Text, PDF, ZIP, JPEG and JPG. The file must be not more than 8Mb.



# SUBMISSION FORM

For Hazardous Substance and New Organism Applications



**Once you have completed this form**

**Send by post to:** Environmental Protection Authority, Private Bag 63002, Wellington 6140

**OR email to:** [submissions@epa.govt.nz](mailto:submissions@epa.govt.nz)

**Once your submission has been received the submission becomes a public document and may be made publicly available to anyone who requests it. You may request that your contact details be kept confidential, but your name, organisation and your submission itself will become a public document.**

<b>Submission on application number:</b>	pAPP203631
<b>Name of submitter or contact for joint submission:</b>	Peter Berg, Biosecurity representative and member of National Executive.
<b>Organisation name (if on behalf of an organisation):</b>	New Zealand Farm Forestry Assn
<b>Postal address:</b>	PO Box 10349, The Terrace, Wellington 6143
<b>Telephone number:</b>	021421291 Peter Berg 04-4720432 National Office
<b>Email:</b>	<a href="mailto:peter@bergforests.co.nz">peter@bergforests.co.nz</a>

I wish to keep my contact details confidential

The EPA will deal with any personal information you supply in your submission in accordance with the Privacy Act 1993. We will use your contact details for the purposes of processing the application that it relates to (or in exceptional situations for other reasons permitted under the Privacy Act 1993). Where your submission is made publicly available, your contact details will be removed only if you have indicated this as your preference in the tick box above. We may also use your contact details for the purpose of requesting your participation in customer surveys.

The EPA is likely to post your submission on its website at [www.epa.govt.nz](http://www.epa.govt.nz). We also may make your submission available in response to a request under the Official Information Act 1982.



- I support the application
- I oppose the application
- I neither support or oppose the application

**The reasons for making my submission are<sup>1</sup>: (further information can be appended to your submission, see footnote).**

Eucalyptus species have been widely planted in New Zealand for more than 50 years and a significant commercial resource is now established around New Zealand (some 20, 000ha). Eucalypts have been planted for a number of reasons including the fact that several species provide timbers suitable for higher quality (and value) enduses and are more durable or stronger than our traditional wood source. Several species also have other advantages including erosion control, carbon sequestration and are more suited to continuous cover forestry fitting other forestry goals the Government is currently strongly supporting and promoting. While this includes a number of species with greater or lesser susceptibility to Paropsis charybdis the pest's impact is very detrimental to host species and to eucalyptus forests overall. Unlike other crops trees must grow exposed to such pests for long periods - 30-40 years, so any control mechanisms developed need to be robust and effective long term. Part of the success of Paropsis as a pest is due to the fact that in this country there are few natural predators and biological control offers both a long lasting and practical way to reduce its severity in forest crops. Forestry has provided some excellent case studies of biological pest control commencing with the Sirex wood wasp outbreak in the 1940-50s which was hugely damaging - two predator wasps were introduced quickly halting the spread and damage caused by the pest and providing long term control, Sirex is largely unknown 60-70 years later. Work undertaken by Scion has demonstrated that Eadya is a very effective and host specific predator of Paropsis and that we can expect similar outcomes to that achieved with Sirex. The NZFFA has almost 2000 members and is the defacto representative of over 14,000 other smaller forest growers many of whom include eucalypt species in their forests as a matter of course and the continued ability to plant and grow this group of species is for many fundamental to a successful forestry enterprise.

**All submissions are taken into account by the decision makers. In addition, please indicate whether or not you also wish to speak at a hearing if one is held.**

- I wish to be heard in support of my submission (this means that you can speak at the hearing)
- I do not wish to be heard in support of my submission (this means that you cannot speak at the hearing)

**If neither box is ticked, it will be assumed you do not wish to appear at a hearing.**

<sup>1</sup> Further information can be appended to your submission, if you are sending this submission electronically and attaching a file we accept the following formats – Microsoft Word, Text, PDF, ZIP, JPEG and JPG. The file must be not more than 8Mb.

---

**I wish for the EPA to make the following decision:**

The NZFFA would like to see the EPA permit the release from containment of the parasitoid wasp *Eadya daenerys* for biological control of the pest Eucalyptus tortoise beetle, *Paropsis charybdis*

---



# SUBMISSION FORM

For Hazardous Substance and New Organism Applications



**Once you have completed this form**

**Send by post to:** Environmental Protection Authority, Private Bag 63002, Wellington 6140

**OR email to:** [submissions@epa.govt.nz](mailto:submissions@epa.govt.nz)

**Once your submission has been received the submission becomes a public document and may be made publicly available to anyone who requests it. You may request that your contact details be kept confidential, but your name, organisation and your submission itself will become a public document.**

<b>Submission on application number:</b>	APP203631
<b>Name of submitter or contact for joint submission:</b>	Scott Andrew
<b>Organisation name (if on behalf of an organisation):</b>	Juken NZ Ltd
<b>Postal address:</b>	Norfolk Road PO Box 535 Masterton 5840
<b>Telephone number:</b>	
<b>Email:</b>	

I wish to keep my contact details confidential

The EPA will deal with any personal information you supply in your submission in accordance with the Privacy Act 1993. We will use your contact details for the purposes of processing the application that it relates to (or in exceptional situations for other reasons permitted under the Privacy Act 1993). Where your submission is made publicly available, your contact details will be removed only if you have indicated this as your preference in the tick box above. We may also use your contact details for the purpose of requesting your participation in customer surveys.

The EPA is likely to post your submission on its website at [www.epa.govt.nz](http://www.epa.govt.nz). We also may make your submission available in response to a request under the Official Information Act 1982.

- 
- I support the application
- I oppose the application
- I neither support or oppose the application

---

**The reasons for making my submission are<sup>1</sup>: (further information can be appended to your submission, see footnote).**

Juken NZ is a vertical integrated forestry company with sawmills in Kaitaia, Gisborne and Masterton and with forest estates on the East Coast and in the Wairarapa. Within the forest estate there is 350ha of Eucalyptus planted in the last 1-7 years to support the company's mills in diversifying its product mix.

The Eucalyptus tortoise beetle, *Paropsis charybdis* has established itself within the Eucalyptus plantations, which has led to moderately to severe defoliation reducing the growth and health of the trees. Spraying insecticide is not an option for the company.

The introduction of the parasitoid wasp *Eadya daenerys* to control the eucalyptus tortoise beetle will vastly improve the vigour and health of the eucalyptus estate leading to the final desired timber product.

---

**All submissions are taken into account by the decision makers. In addition, please indicate whether or not you also wish to speak at a hearing if one is held.**

- I wish to be heard in support of my submission (this means that you can speak at the hearing)
- I do not wish to be heard in support of my submission (this means that you cannot speak at the hearing)

**If neither box is ticked, it will be assumed you do not wish to appear at a hearing.**

---

---

**I wish for the EPA to make the following decision:**

To approve Scions application to introduce the parasitoid wasp, *Eadya daenerys*, for biological control of larvae of the pest Eucalyptus tortoise beetle, *Paropsis charybdis*.

---

---

<sup>1</sup> Further information can be appended to your submission, if you are sending this submission electronically and attaching a file we accept the following formats – Microsoft Word, Text, PDF, ZIP, JPEG and JPG. The file must be not more than 8Mb.