Responses to submissions APP20263 – Tutsan

111604 Department of Conservation

Supports L. strigana **but does not support** ***C. abchasica***

> ***'..do not support its release until further research shows the species has insignificant impact on native hypericums and does not exacerbate the current threat status of native hypericum species.'***
>
> ***'The Department does not support…until the impact …on the growth and seed production of native hypericums is confirmed as insignificant'.***

Before supporting the release of *Chrysolina abchasica*, DOC requires reassurance that the likelihood of decline in the populations of native *Hypericum* species as a result of insect attack is not significant. Landcare Research believes there is sufficient evidence to show that this risk is negligible, and this evidence is presented here.

Laboratory testing is good at determining whether a potential biological control agent can complete development on a particular host plant (fundamental host range) but cannot always adequately predict which of these might be attacked in the field (realised host range). This interpretation has always been a challenge for the practice of biological control. Given the conservative decision-making normally now employed in choosing control agents, the risk of a 'false negative' (accepting an agent that is unsafe) is present, but is low. A more likely risk is a 'false positive' (the risk of rejecting an agent that is safe). Hinz et al. (2014) describe cases where successful and essentially safe biological control agents released before modern testing procedures would probably be rejected if proposed for release now. One of those cases was the introduction of *Chrysolina quadrigemina* which successfully controlled St John's Wort in the USA. They reported research in California where laboratory tests showed that C. *quadrigemina* completed development on several Hypericum species in the laboratory. For two of those species, no attack was observed after release in the field but *C. quadrigemina* was found on the native *H. concinnum*. Attack was not particularly noticeable because it was 29 years after release before this attack was noticed. After all this time, and even with some attack by *C. quadrigemina*, *H. concinnum* remains common in Californian plant communities.

Groenteman et al. (2011) concluded that *C. hyperici*, the successful control agent for St John's wort in New Zealand, may have been rejected under the requirements of the HSNO Act 1998. In this case, surveys indicate that the beetles were found relatively consistently on several native *Hypericum* populations but at levels low enough that the 'impact on natives is considered to be low or absent' (Groenteman et al., 2011). She stated:

> … found *Chrysolina* (can't tell which of the two species) on *H. involutum* in Central Otago. Found eggs, larvae and adults. Eggs and larvae found 3 years in a row…….. feeding signs on *H. rubicundulum* and one hatched egg over repeated surveys of one population. Have found

one adult in soil dug under that population of *H. rubicundulum.* (R. Groenteman, Landcare Research, pers comm.)

These are significant examples because they so closely resemble the *Chrysolina/Hypericum* association under consideration in this application. *C. hyperici* performed much better on native *Hypericum* species in laboratory tests than C. abchasica (see application) and so *C. abchasica* should be less likely to cause damage than *C. hyperici.*

There have been a number of methods developed to improve the prediction of field behaviour from positive laboratory results (Paynter et al., 2015). The identification and validation of a threshold of laboratory attack below which we can confidently predict no establishment in the field is a major breakthrough in this area (Paynter et al. (2015). Using this approach, the native *Hypericum* species are not considered capable of supporting persistent, damaging populations of *C. abchasica.*

There are four indigenous Hypericum species in New Zealand. *Hypericum pusillum* is the most widespread and common of these (http://www.nzflora.info/factsheet/Taxon/Hypericum_pusillum.html). Although native, *H. pusillum* is not endemic, and can also be found in Australia.

Hypericum involutum was tested but was not attacked in any way by *C. abchasica* in laboratory tests and cannot be a host. It is not considered further in this response.

Hypericum rubicundulum and *H. minutiflorum* are closely-related sister species with similar and highly specific habitat requirements. Both are diminutive, prostrate herbs that grow in periodically waterlogged sites such as depressions, and tarn or wetland margins. *Hypericum rubicundulum* occurs in otherwise dry-climate sites in inland South Island, with one record from the Kaweka Lakes in the North Island (http://www.nzflora.info/factsheet/Taxon/Hypericum_rubicundulum.html). *Hypericum minutiflorum* is its North Island analogue. It is a tiny plant with a few stems up to only 5 cm in length and leaves 1.5 to 4.5 mm long. It is restricted to sites in the upland Volcanic Plateau of the North Island (http://www.nzflora.info/factsheet/Taxon/Hypericum_minutiflorum.html).

'not all native hypericums were used in feeding and other research (H. minutiflorum and H. involutum were not included)'

Peter Heenan (Landcare Research, pers. comm.) comments that *H. rubicundulum* and *H. minutiflorum* are genetically almost identical. Landcare Research chose to test *H. rubicundulum* as a surrogate for *H. minutiflorum* because of this close genetic relationship, ecological similarity, the extreme rarity of the species, and because it is notoriously difficult to propagate. They concluded that even though it was not tested, *H. minutiflorum* is unlikely to have a significantly different susceptibility than *H. rubicundulum. ,* i.e. it will be a fundamental host but not a field host for *C. abchasica.* If it is a poorer host than *H. rubicundulum* then it is at less risk. The risk score for *H. rubicundulum* is exceptionally low, and it is highly unlikely that *H. minutiflorum* would be so much better as a host for its risk score to reach the threshold for it to be a field host. Landcare Research believes that further testing *H. minutiflorum* or the other native *Hypericum* species is unlikely to improve the predictions presented in the application about whether these are field hosts.

' The risk is not that C. abchasica will form self-sustaining populations on native hypericums but that Chrysolina will disperse from adjacent tutsan and St John's wort and damage native Hypericum by reducing their competitiveness and ability to produce seed….where hypericums occur together such as in the central North Island and Rangitoto Island.'

'..native hypericums are small herbs and may be susceptible to heavy grazing. Compared with (other biocontrol agents) the potential impact of Chrysolina abchasica on native flora is much higher'……'(Other Chrysolina biocontrol agents have insignificant effects) Thus it is possible that C. abchasica will have low impact on native hypericums'

'There is no information on the effect… on the growth and seed production or health of native hypericums'

'Native hypericums …are already at risk of extinction and we would not wish to increase the risk of extinction through addition pest burden from biocontrol agents such as Chrysolina abchasica) '

C. abchasica could cause significant damage to native *Hypericum* populations if:

1. Self-sustaining populations developed on these hosts that caused damage to plants year after year, <u>or</u>
2. Incidental damage from itinerant *C. abchasica* adults or larvae dispersing from *H. androsaemum* was sufficiently severe to kill a significant proportion of plants and depress seed production below replacement levels (spillover)

DOC appears to accept the evidence from 'risk scores' that although *H. pusillum* and *H. rubicundulum* supported complete development in the laboratory, these plants will not support self-sustaining populations of *C. abchasica* in the field*.* Landcare Research maintains that the results obtained for its surrogate *H. rubicundulum* indicate that *H. minutiflorum* will not support beetle populations either. Any potential damage would therefore come from incidental encounters with dispersing beetles.

There are two scenarios in which incidental or spillover attack could lead to damage of native *Hypericum* species:

Scenario 1 – short distance movement of C. abchasica from source infestations. Larvae dislodged from tutsan plants may attempt to feed on any native *Hypericum* plants growing beneath. Laboratory observations show that *C. abchasica* larvae are not very mobile (Hugh Gourlay, pers. comm.) so this effect would be restricted to plants growing in very close proximity to the source plant.

Mobile adults will, however, become abundant in tutsan infestations. *Hypericum pusillum*, *H. rubicundulum* (and presumably *H. minutiflorum*) were sub-optimal hosts for oviposition in the laboratory. High adult densities could result in oviposition on any of these plants growing near tutsan, with subsequent larval feeding. There is a significant risk of damage to native *Hypericum* plants in the immediate vicinity of source host plants but the density of mobile adults feeding or laying eggs would fall off rapidly with distance, as would the risk of oviposition and damage. This effect would only be possible if the non-target *Hypericum* co-exists with tutsan in the same habitat (see below).

Scenario 2 – damage to non-targets by dispersing adults. C. abchasica adults are expected to disperse significant distances in search of tutsan infestations. Dispersing adults could theoretically feed, or produce feeding larvae on native *Hypericum* plants. This could only significantly depress the population dynamics of the native species if:

1. The host plant and the non-target species co-existed regionally
2. The non-target plant could attract and arrest the dispersal of adult *C. abchasica*
3. Damage to non-target plants affected survival status of the non-target species
4. There was spillover risk from host plants species other than tutsan

Co-existence of tutsan with native *Hypericum* species.

Tutsan is a common weed in higher rainfall areas particularly in the north and west of New Zealand, but is less suited to, or absent from drier and cooler eastern or upland regions (http://www.nzflora.info/factsheet/Taxon/Hypericum_androsaemum.html). Tutsan has a similar climate preference in its native Europe where it is most commonly present in regions with wet, maritime climates, and is less so in more continental climates

(http://hypericum.myspecies.info/taxonomy/term/612/maps). The native (but not endemic) *H. pusillum* is the native species with the closest range overlap with tutsan, but this species tolerates a wider range of habitats (http://www.nzflora.info/factsheet/Taxon/Hypericum_pusillum.html) and is also commonly found where tutsan is absent. Conversely, *H. rubicundulum* occurs in dry areas of the South Island (and one site in Hawkes Bay) where range overlap with *H. androsaemum* will be very rare. There also appears to be no significant overlaps in the ranges of tutsan and *H. minutiflorum.* Nick Singers (NSES Ltd, freelance ecologist, formerly DOC Turangi) is very familiar with *H. minutiflorum* in its native range. He states:

> "While tutsan is abundant on the papa hills around Taumarunui it is rare on pumice soils in the Taupo basin and central volcanic plateau which H. minutiflorum almost exclusively grows on. I think I have only recorded it a couple of times in the CNI (central North Island). At the site level where H. minutiflorum grows I doubt they overlap but their distributions will be close to one another (within 10km)."

David Havell (DOC, pers. comm) reports that the closest known *H. androsaemum* to a *H. minutiflorum* site is 6 km. Peter Heenan (pers. comm.) is also of the view that range overlap of tutsan with *H. minutiflorum* and *H. rubicundulum* is unlikely to be significant.

Apparency of native *Hypericum* species and attractiveness to adult *C. abchasica*

Chrysolina abchasica is adapted to *Hypericum androsaemum* which is a tall semi-woody herb with large leaves. *Hypericum pusillum* is a small prostrate plant, although it is relatively obvious where it occurs (Figure 1). Conversely, *H. rubicundulum* and (especially) *H. minutiflorum* are exceptionally small plants that are low to the ground and barely visible in their environment (note the holotype images on the relevant nzflora pages). Unless extremely attractive to dispersing adults it would be exceptionally rare for *C. abchasica* to randomly encounter either *Hypericum* species except in the immediate vicinity of tutsan plants supporting large beetle populations.

To colonise a plant in the field, dispersing adults would need to arrest movement, feed and lay eggs. The following information was not presented in the application but is relevant to the concerns that have been raised by DOC. Landcare Research (http://www.landcareresearch.co.nz/science/plants-animals-fungi/plants/weeds/biocontrol/approvals/current-applications/tutsan) conducted oviposition tests in which potted plants were placed in a confined arena (ten trials with tutsan present and ten with tutsan absent) and exposed to adult *C. abchasica*. At the end of the exposure period, as well as recording the number of eggs laid and the fate of any hatching larvae, Landcare

Research recorded whether there was evidence that adult beetles had fed on the plants exposed (Table 1).

Species exposed	Percent of tests in which adult feeding was observed	
	Tutsan present	**Tutsan absent**
Hypericum androsaemum	100	-
Hypericum pusillum	40	70
Hypericum rubicundulum	0	0
Hypericum involutum	0	10

It is not known whether adults disperse in autumn to find overwintering sites near hosts to use in spring, or (more likely) on emergence from overwintering in spring to find host plants and lay eggs. In either case, these results suggest that none of the native *Hypericum* species tested would be sought out as food for dispersing adults. While adults fed on *H. pusillum* in 70% of tests in the absence of tutsan. *H. rubicundulum* and *H. involutum* were not suitable food for adults. These results suggest that it is more likely that adults encountering *H. involutum* or *H rubicundulum* in the field would re-disperse rather than settle. *Hypericum minutiflorum* was not tested, but a similar response is probable.

It is also worth noting that when confined in a test arena (and therefore unable to disperse to a preferred host), adults laid fewer total eggs in the absence of tutsan than when the host was present (*H. androsaemum* 221/*235, *H pusillum* 34/23, *H. rubicundulum* 27/21, *H. involutum* 0/0, *separate controls). If the native species were attractive to ovipositing adults then more eggs would have been laid when tutsan was not available as an alternative. *Hypericum minutiflorum* was not tested, but a similar response is probable.

Likely damage to native *Hypericum* plants

Notwithstanding the comments above regarding the likelihood of adults encountering individual non-target plants, could adults and larvae cause damage to those plants? Photographs were taken by Landcare Research of several plants following the completion of development tests in the laboratory (Figures 2-5). While larvae caused heavy damage on *H. androsaemum* (Figure 2), the damage by 11 larvae on *H. rubicundulum* (Figure 3) and 12 larvae on *H. pusillum* (Figure 4) plants was barely discernible. There was high mortality in the two weeks following emergence of adults reared on *H. rubicundulum* (71%) and *H. pusillum* (70%) compared with H. androsaemum (7%). This indicates that while feeding intensity on natives was adequate to allow about approximately half of larvae to complete development it was not adequate to produce the fat body necessary for adult survival. It appears therefore that *C. abchasica* are not voracious feeders on the native species tested. It would also suggest that large numbers of eggs would need to be laid for individual plants to be damaged by larvae. However, in the case of *H. rubicundulum* and *H. minutiflorum* there is a proviso. Concerning *H. minutiflorum*, Nick Singers (pers. comm.) recently stated:

> "When I grew it, it formed a much lusher plant in potting mix, which was anomalous compared to field plants, producing a dense and lush turf over the potting mix."

The *H. rubicundulum* plant in Figure 3 is much more robust and lush than the field collected plants depicted in the holotype image on the eflora page. This suggests that the same culturing response occurred for this species. This may indicate that:

- fewer larvae would be required to damage an individual, poorly-grown plant in the field than was observed on the lush plant in the lab, or on the other hand,
- it is possible that leafy lab-reared plants were more acceptable as a host than the wildtype specimens found in the field would be. Laboratory test results may have overestimated the susceptibility of this species.

Other *Hypericum* species as sources of beetles for spillover onto natives

St John's wort is a fundamental host for *C. abchasica*, but performed sufficiently poorly in the laboratory to predict that it will not be field host in New Zealand. Its Paynter risk score was 0.17 or 0.21, below the threshold required to indicate it would be a field host.

This is borne out by field observations in the native range of *C. abchasica.* Hugh Gourlay (Landcare Research) visited two sites in Georgia with Elena Olsen of CABI and records the following:

> '*As I recall, having assessed these transects and quadrats we found at least four species of Hypericum were present with H. androsaemum occurring at around a level of 10% cover, H. inodorum at 40% cover, H. xylosteifolium at 20% cover and H. perforatum at 5% cover. Each quadrat was surveyed for insects. Ten H. androsaemum plant stems were cut and searched for damage and presence along with flowers and seed pods and a visual check of the other plant species in each quadrat was made to detect Chrysolina abchasica or Lathronympha strigana. Along two transects 3 Lathronympha strigana larvae were found in shoot tips of H. inodorum and 4 on H. perforatum but no C. abchasica were found on any plant species other than H. androsaemum.'*

The questions raised by DOC have caused Landcare Research to reconsider whether tutsan is the only possible field source for beetles that could result in spillover damage to native *Hypericum* species. The Flora of New Zealand lists 15 species of *Hypericum* naturalised in New Zealand (http://www.nzflora.info/factsheet/Taxon/Hypericum.html). Most of these are of highly limited distribution. Apart from tutsan, five have distributions that could result in range overlap *with H. rubicundulum* or *H minutiflorum*.

Biocontrol theory predicts that closely-related plant taxa are more likely to be attacked by a host specific biocontrol agent than taxa that are less closely-related (Wapshere,1974, Pemberton 2000). In a recent phylogeny of *Hypericum* species, Meseguer et al (2013) placed New Zealand *Hypericum* species in a series of clades

Clade B - *H. rubicundulum* and *H. minutiflorum* (in the same clade as *H. japonicum,* Heenan 2008)

Clade C – Tutsan, *H. inodorum*

Clade E – *H perforatum, H humifusum*

Clade D – *H calycinum, H. henryi, H. kouytchense*

Clades D & E are related and share a common ancestor with Clade C. Clade B is less related again. *Hypericum henryi, H. kouytchense* and *H. humifusum* were not tested. Theory would predict that the susceptibility of *H humifusum* to *C. abchasica* would resemble that of *H. perforatum*, and the susceptibility of *Hypericum henryi,* and *H. kouytchense* would resemble that of *H calycinum.*

The dominant *Hypericum* species at the two sites in Georgia was *H. inodorum.* This belongs in the same taxonomic clade (clade C) as tutsan (Meseguer et al., 2013). Theory would predict it is therefore more likely to be a host than St John's wort or the other exotic Hypericum species present in New Zealand and belonging to other clades, yet *Chrysolina abchasica* was not observed on *H. inodorum* in the field (H. Gourlay, pers. comm.).

In laboratory tests, the risk scores for H*. perforatum* and *H. calycinum* indicated that although they could be the victims of spillover attack from *C. abchasica* adults developing on tutsan, but neither would support self-sustaining populations of *C. abchasica* that could then interact with native *Hypericum* species. This then suggests that none of the five exotic *Hypericum* species with ranges overlapping those of *H. rubicundulum* or *H minutiflorum* will be field hosts of *C. abchasica.*

Pathogen risk from importation

DOC also pointed out that the fungus *Colletotrichum gloeosporioides* contributed to successful control of St John's wort in Canada (Morrison et al. 1998), and that this pathogen species is also present in New Zealand. DOC questioned whether there was a risk of *C. abchasica* vectoring this fungus to native *Hypericum* species. This is not a risk because:

1. *Colletotrichum gloesosporioides* is a cosmopolitan species but has host specific forms
2. The C. g *gloesosporioides* responsible for contributing to control of St John's wort in Canada is a *forma specialis* specific to *Hypericum* species
3. *Colletotrichum gloesosporioides* is present in New Zealand but the f.sp. on *Hypericum* has not been recorded here (http://nzfungi2.landcareresearch.co.nz/default.aspx?NavControl=search&selected=CollectionSearch) .
4. The control agents will come from Georgia. Pathogen spores imported on control agents cannot be passed to offspring without going through a cycle of disease on the tutsan plants used for rearing agents in containment. No such disease has been observed in containment so the agents released will be free of imported pathogen spores.
5. *Chrysolina hyperici* has been present in New Zealand since 1943. There is no indication that it has vectored any disease to native *Hypericum* species.

In summary, the applicant believes the impact of *Chrysolina abchasica* on native *Hypericum* species would be insignificant because:

- *Hypericum involutum* is not a host
- *Hypericum rubicundulum* and *H. pusillum* will not support field populations of *C. abchasica*
- The susceptibility of *H. minutiflorum* will mimic that of its close relative *H. rubicundulum*
- Incidental damage to native *Hypericum* species could only be significant near high populations of *C. abchasica* on tutsan plants.
- *Hypericum rubicundulum* and *H. minutiflorum* would be almost exclusively geographically and/or climatically isolated from tutsan.
- Although *Hypericum pusillum* may sometimes co-occur with tutsan, the host-finding behaviour of *C. abchasica* adults will be keyed into the coarse habitats of tall tutsan in associated vegetation, not the fine-grained plant mosaics at ground level where *H. pusillum* (and the other native Hypericum species) grow.
- Purely random encounters between *C. abchasica* adults and native *Hypericum* species will be exceptionally rare.

Figure 1. *Hypericum pusillum* plants (green) growing with *H. minutiflorum* (red brown stems as in top right quadrant) at Rangitaiki, Central North Island (photo: P. Johnson). The *H. pusillum* flower is approximately 5mm in diameter.

Figure 2. Damage caused by *C. abchasica* larvae on *H. androsaemum* in development tests

Figure 3. Damage caused by feeding by 11 *C. abchasica* larvae on *H. rubicundulum*

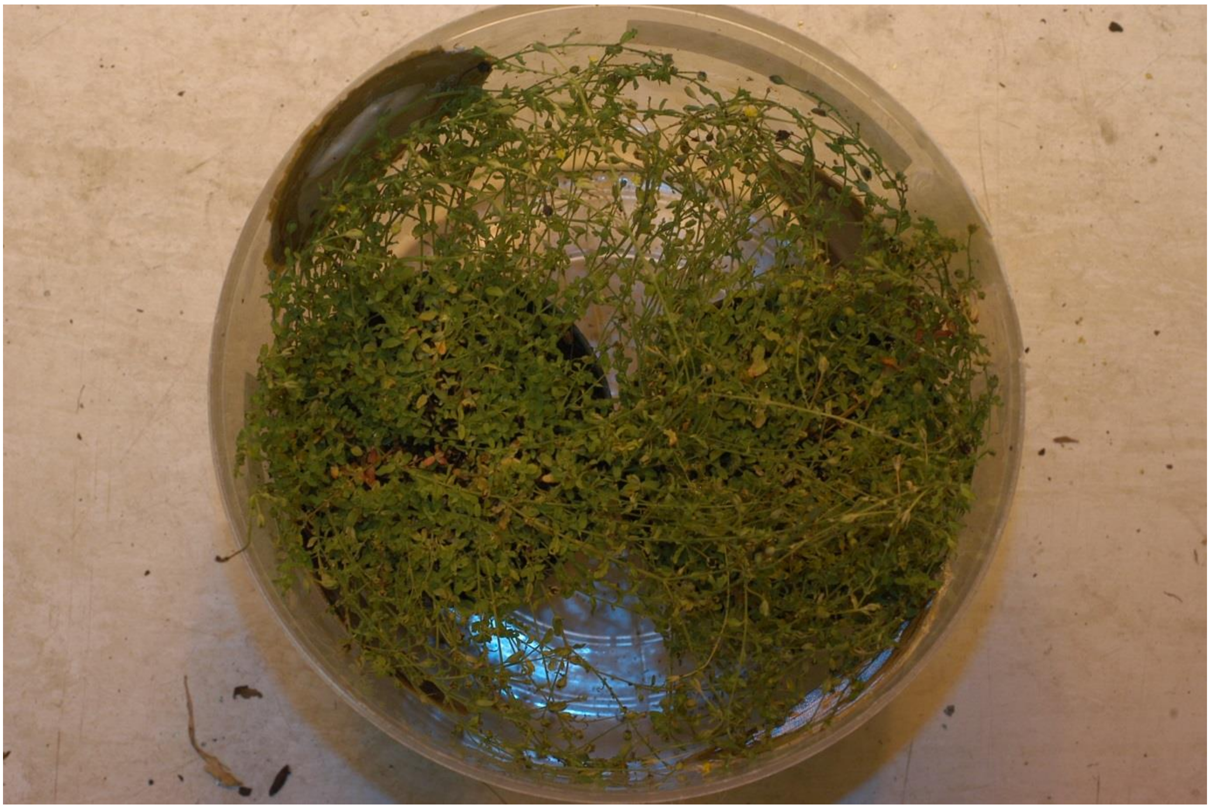

Figure 4. Damage caused by feeding by 12 *C. abchasica* larvae on *H. pusillum*

Figure 5. Damage caused by feeding by five *C. abchasica* larvae on *H. calycinum* (arrow indicates feeding larva)

111601 Northland Regional Council

Supports (Lathronympha) neither supports nor opposes (Chrysolina)

> ***'Populations of SJW are now very low throughout NZ due to herbivory by the two Chrysolina spp … so the fact that populations of Chrysolina species can be sustained on an alternative, low density, non-target host is significant'***

As stated in the response to DOC, no other *Hypericum* species, including St John's wort are expected to be field hosts capable of sustaining permanent populations of *C. abchasica*. As stated in the submission, *Chrysolina hyperici* populations persist at low levels on low density St John's wort populations, only reaching damaging proportions when the host itself outbreaks, restoring biological control. However, St John's wort has not been eradicated, and there is no evidence that the geographical distribution of St John's wort in New Zealand is smaller as a result of biological control. The native Hypericum species are also naturally rare and plants occur at low density. Even if *C. abchasica* populations could persist on these species (which is not predicted by the evidence), like *C. hyperici* on St John's, the rarity of the native plants would not support the development of populations large enough to suppress populations further. The fact that *Hypericum* species other than tutsan are poor hosts for *C. abchasica* reinforces this view.

> ***'…tests of whether H. minutiflorum is a host for the beetle and undertake more detailed host specificity testing on the other native and endemic Hypericum spp to confirm the level of non-target host utilisation by C. abchasica'***
>
> ***'We recommend that a study on population phenology of the endemic H. minutiflorum and H. rubicundulum be undertaken…determine the degree of overlap in time and space'***

Peter Heenan (Landcare Research) described these species recently. He comments that *H. rubicundulum* and *H. minutiflorum* are genetically almost identical. They appear to be South and North Island analogues respectively, occupying similar habitats and climates. Landcare Research has concluded that even though it was not tested, *H. minutiflorum* is unlikely to have a significantly different susceptibility than *H. rubicundulum,* i.e. it will be a fundamental host but not a field host for *C. abchasica.* If it is a poorer host than *H. rubicundulum* then it is at less risk. The risk score for *H. rubicundulum* is exceptionally low, and it is highly unlikely that *H. minutiflorum* would be so much better as a host for its risk score to reach the threshold for it to be a field host. Landcare Research believes that further testing *H. minutiflorum* or the other native *Hypericum* species will not significantly improve the predictions presented in the application. See the response to DOC for more information on this issue, especially with regard to the likelihood of overlapping distributions and the risk of spillover attack.

111600 Te Rūnanga o Ngāi Tahu

Supports

> ***' comment on or model the potentially broader trophic impacts'***

Most introduced biocontrol agents do not accumulate parasitoids following release in New Zealand. Paynter et al. (2010) examined the parasitoid relationships of 28 of the 30 insects released for biocontrol of weeds in New Zealand at 2008. Nineteen parasitoids, mostly natives, were recorded from 10 of those 28 agents, and 15 of those 19 were confined to five agents that have ecological analogues in New Zealand. They concluded that the risk of trophic webs effects were more likely when the introduced agent had related species in New Zealand. There are no *Chrysolina* species in the New Zealand arthropod Collection, and no parasitoids have ever been reared from the St John's wort control agents. Interactions with native trophic webs will therefore be trivial. The parasitoid fauna of tortricids is diverse but not all tortricids are equally susceptible to parasitism (Paynter et al. 2010). Possible interactions of *Lathronympha* with trophic webs may or may not occur, but any effects will be evident only near tutsan.

Assessing the risk of introduced biocontrol agents for weeds on trophic webs remains a difficult and imprecise process. As yet there is no general theory against which to judge the impacts on ecosystem dynamics of introducing new biological control agents for weeds to natural systems. Kaser and Ode (2016) reviewed recent developments in thinking about how natural enemies can interact to mediate prey populations. They provided several illustrations, but conclude that not enough is known about how natural enemies interact with landscape complexity and variable diversity. In particular they point out that

- The signs of interaction between populations can be positive, negative or neutral
- The sign and strength of interactions may vary in time and space

- Whether an affected population can co-exist or is excluded can be affected by several key population parameters, which in turn depend on other resources, and even on climate, weather and other abiotic environmental factors

Until this science becomes better understood, risk assessment will be on a case by case basis, based on available knowledge, and on scientific judgement. One general principle is clear. For host specific control agents for weeds, indirect non-target effects can only be significant where the agent population is high, and this will only be true in the vicinity of the target weed infestations. Given the patchy nature of weeds, the opportunity for adverse interactions at a landscape level are limited.

'(any)…beneficial role a pest weed species may have…'

None of the organisations consulted identified any beneficial role for tutsan in New Zealand. *H. androsaemum* is designated by MPI as an Unwanted Organism.

'Comment on any relevant native habitat restoration plans'

This weed is predominantly a weed of pastoral land and disturbed land rather than native habitats. If biological control is successful, productive forage species will replace tutsan on grazed land. None of the organisations consulted reported any restoration plans for areas of native vegetation infested with tutsan in New Zealand. Restoration activity in native habitats is beyond the remit of the Tutsan Action Group

' …Impacts… against appropriate national and regional Treaty principles and provisions'

The National Biocontrol Collective agrees that better alignment between applications and treaty settlement deeds is desirable. Regional Councils are required to ensure that their operations comply with settlements local to their region. Landcare Research has begun the process of contacting Iwi liaison staff for each region who have good knowledge of the detail of local settlements and how biological control activities may impinge on those settlements. These staff also know how and where best to consult effectively at a local level. The aim is to make consultation at this level a standard part of the application process. However, it will take some time to build these relationships.

Any further advice on how to achieve this aim better would be gratefully received.

'**significant adverse effects on native plants …highly unlikely…some indication of quantum of risk even here would be useful.'**

Historically, ERMA used a 7 level scale to describe the likelihood of effects. Although EPA does not formally refer to this notation any more, it still provides a useful standard scale for likelihood

- Highly improbable - Almost certainly not occurring but cannot be totally ruled out
- Improbable (remote) - Only occurring in very exceptional circumstances.
- Very unlikely - Considered only to occur in very unusual circumstances
- Unlikely (occasional) - Could occur, but is not expected to occur under normal operating conditions.
- Likely - A good chance that it may occur under normal operating conditions.
- Very likely - Expected to occur if all conditions met
- Extremely likely – Almost certain

In this application the author erroneously used the words 'highly unlikely' instead of 'very unlikely', though the intent was the same.

111605 Nursery and Garden Industries NZ -

'Concern…potential localised spillover effects…'

This issue is covered by the response to DOC's submission. The applicant has no further comment.

111593 Walter King

Supports

111594 GWCC

Supports

111595 G&S Fraser

Supports

111596 Beef + Lamb

Supports

111597 RDC

Supports

111598 Lyn Neeson, Ruapehu Fed Farmers

Supports

111599 C Chubb

Supports

111602 BPRC

Supports

111603 Philippa Rawlinson, Federated Farmers

Supports

The applicant has no further comment on submissions 111593 - 111603.

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