Summary and review of consultation responses

A public and stakeholder consultation was held on the proposed release of the non-native biological control agent *Listronotus elongatus* (a weevil) for the control of *Hydrocotyle ranunculoides* (floating pennywort), which is a widespread and invasive non-native aquatic weed.

In summary, there were 10 responses to the consultation. Four contributors were supportive of release, two had some concerns, three did not provide a view either way, and one contributor had already provided comments during the peer review process.

In response to the specific concerns raised:

Q **(Denmark) Re. "*Hydrocotyle ranunculoides* is an obligate freshwater species, but a generalist in its ecological response, within the limits of cool, freshwater bodies. Preferences in terms of water velocity, water depth, bank slope, pH, dissolved oxygen or nutrients are fairly broad with optimal photosynthesis occurring over 20°C, and in high sunlight provided by the summer months**

So, what are "generalist in its ecological response" (actually, what is "ecological response"?) and what is "fairly broad" – these need a bit more precision.

A (CABI) We refer to floating pennywort as being a *generalist* in its ecological response (within the boundaries of freshwater aquatic systems) because by definition, habitat generalists have a wide niche breadth and thrive in a variety of habitats, from mesotrophic pools to eutrophic lakes and being more tolerant of suboptimal conditions, such as low dissolved oxygen, altered water quality, water depth, nutrients, current velocity and so on. Floating pennywort not only grows in a wide variety of ecosystem types (rivers, ditches, marshes, fens, stagnant ponds, river banks) but it also shows plasticity in its growth strategy e.g. increasing root: shoot ratios under decreasing nutrient availability and behaving as a helophyte (buds overwinter under water) in riparian vegetation. *Hydrocotyle* also supports tidal conditions (possibly physiologically linked to the plant's substantial metal absorption capacities) or strong irregular water-level variations and grows on all types of soil, including peat.

Arocena and Mazzeo (1994)[1] found optimal development in waters with the following mean values (extrema between brackets): total suspended solids: 63 mg +/- 52 [21-213] pH=7.1 +/- 0.4 [6.5-7.9], alkalinity: 5.0 meq/l +/- 2.1 [1.3-8.5], phosphorus: 21 µM+/- 10 [7-45], nitrogen: 116 µM +/- 77 [11-241]. In Belgium,

[1] Arocena R, Mazzeo N (1994) Macrófitas acuáticas de un arroyo urbano en Uruguay: su relación con la calidad del agua. *Revista de Biología Tropical* **42**: 723-728

Nijs *et al.* (2009)[2] found *H. ranunculoides* on sites with the following ranges of (O2: 6-11 mg/l pH: 6.7 – 7.5 conductivity: 232-699 µSiemens/cm Total Phosphate (PT): 0.066-0.82 mg/l Soluble reactive phosphorus: 0.005-0.21 mg/l Dissolved inorganic nitrogen: 0.018-4.14 mg/l These data show no particular preference for specific water quality parameters.

Q **(Denmark) Re. "relatively dormant over winter to avoid frost and low temperatures"– well, as the plant cannot move, how can it "avoid" frost? This is rather independent of the plant's wish.**

A (CABI) Noted. "Avoid" was not the appropriate word to use, rather *tolerate* frost is what was intended. *H. ranunculoides* is mainly found in its emerged and/or floating growth form in the UK and Europe. It can survive the winters in different types of waters (even devoid of thermal anomaly), either as rhizomes or with small submerged shoots, which may remain green under ice through the winter. This has been observed in the native range and in its introduced range; even if emergent leaves are killed by frosts and floating leaves die when enclosed in ice, submerged material below ice cover is reported to survive the winter months, with new plants growing quickly in spring from these overwintering parts (Hussner & Lösch, 2007)[3].

Q **(Denmark) I cannot make sense of the words "impressive biomass in heavy stands"**

I think it'd be easier to understand the situation if a (hypothetical?) trophic web were to be presented to show where the suggested biocontrol agent would fit, and what the expected consequences of a successful establishment would be? Describing this only in words somehow impedes full understanding.

A (CABI) In relation to the query relating to the statement "Floating pennywort is capable of reaching impressive biomass in heavy stands", we were endeavouring to convey the density that infestations can reach. Floating pennywort can achieve 100% cover from one side of the riverbank to the other over distances of 25+km. The Environment Agency in the UK reportedly removed 1000 tonnes of material from 3 rivers in a single year. Its high relative growthrates (20cm per day) and regeneration capacity gives floating pennywort the potential for explosive spread, especially in eutrophicated freshwater bodies. Biomass sampling experiments have shown a very high density of material in dense stands, reaching dry weights of up to 530g per m2 and

[2] Nijs I, Verlinden M, Meerts P, Dassonville N, Domken S, Triest L, Stiers I, Mahy G, Saad L, Lebrun L, Jacquemart A-L & Cawoy V (2009) Biodiversity impacts of highly invasive alien plants: mechanisms,enhancing factors and risk assessment – Alien Impact. Final report phase 1, BELSPO contract number SD/BD/01A ,Brussels, 50 pp.

[3] Hussner, Andreas & Lösch, Rainer. (2007). Growth and photosynthesis of *Hydrocotyle ranunculoides* L. fil. in Central Europe. Flora - Morphology Distribution Functional Ecology of Plants. 202. 653-660. 10.1016/j.flora.2007.05.006.

possessing a high leaf area index, with multiple layering attained in a mature raft.

It was hoped that the photos included in the report would also help to capture the extent of the invasions. In terms of trophic webs and interactions, these are difficult to predict as ecological systems are subject to a great deal of variability. Nonetheless, the ultimate aim is for the balance to be redressed and for the biocontrol to reduce the competitive advantage that the monospecific stands of floating pennywort currently have over our native species, promoting enhanced biodiversity and recovery of community assemblages. The weevil would persist in equilibrium with the weed and its new environment (bringing infestations below economic injury levels and more amenable to integrated conventional control).

The biological control programme against water weeds in South Africa has been highly successful, as measured by an increase in the number of sites under biological control, coupled with a significant reduction in the percentage cover of these weeds and a recovery of ecosystem services. The pennywort weevil will not eradicate floating pennywort but once established, its impact is anticipated to improve water quality (e.g. increase in dissolved oxygen concentration, light penetration, and water clarity) and therefore results in aquatic biodiversity recovery. The extent to which this occurs at every site cannot be predicted but CABI recognises the importance of evaluating and sharing the details of pre-release and post-release monitoring for weevil impact and spread, as well as the ecological outcomes and consequences. Whilst successful biological control of invasive aquatic species could be measured on the basis of clearing of the target weed biomass, the return of biological and functionally important aquatic biota is equally important.

In addition, successful control of the pennywort would lead to better protection and aesthetic improvement of culturally important sites, reduced risk of current and future invasion of other suitable native habitats and reduced use of physical /chemical control and associated levels of environmental disturbance.

Q **(HTA) My only concern is that perhaps an even wider range of potential 'food' plants which the agent might possibly consume, could be investigated?**

A (CABI) Assessing the chance that a proposed weed biological control agent will lead to direct non-target impacts has traditionally been carried out using host specificity testing. The process of selecting the test plant list is internationally recognised and follows the *phylogenetic centrifugal approach.* This is built on the premise that species closely related to the target are at greater risk of attack than more distantly related species, such that the number of test species required (the degree of testing) decreases in plant groups increasingly distantly related to the target. The agent is then tested for its capacity to feed, develop and/or reproduce

on non-target species under as natural conditions as possible, either with or without the presence of the target.

For the weevil, the process of selecting which non-target test plants should be included in the testing was reviewed by an expert botanist and approved by a steering committee. Despite the ambiguities of the taxonomic placement of *H. ranunculoides*, the final list evolved over the course of the project to capture key native representatives from the large and important Apiaceae family as well as economic test plants that occur within the current and potential distribution of the target weed. In addition, species with similarity in life history or phenology which might overlap in habitat were added. Special focus was also given to rare and endangered plants even if the overlap in habitat was unlikely. As such, we feel that the list was appropriate and provides a comprehensive definition of the weevil's host range, using test plant species scientifically selected (and including plants of European relevance) to provide sufficient representatives at each of these phylogenetic levels, in fulfilment of internationally recognized standards.

Q **(New Forest Non-Native Plants Project) We are therefore concerned that if the weevil totally eradicated *Hydrocotyle ranunculoides* in a particular area, could it potentially have a greater impact on *Hydrocotyle vulgaris* than indicated by the host-specificity tests?**

A (CABI) The observation in the PRA that in its native range in Argentina the weevil 'caused local patch extinction relatively quickly' must be taken in the context of the native range, where a plethora of natural enemies are feeding on floating pennywort and competition from many other aquatic macrophytes can also impact on patch population dynamics. The weevil is not anticipated to eradicate floating pennywort in the UK since it relies on it to survive but rather to reach an equilibrium whereby their attack on the weed causes a decline in biomass, reproduction and/or population density. This, in turn, leads to a decline in the numbers of weevils until equilibrium is reached between the amount of damage caused by the agents and regeneration by the weed. Since the weevil has a significant preference for floating pennywort and is incapable of sustaining a population on *H. vulgaris* (as shown in the lab), the potential for the weevil to switch hosts is anticipated to be negligible.

Q **(New Forest Non-Native Plants Project) We query whether the concept of 'ecological sieves' would be relevant in a biologically diverse and intricate landscape, such as the New Forest, where *Hydrocotyle vulgaris* could potentially be growing near a waterbody that had become invaded by *Hydrocotyle ranunculoides.* We ask that particular consideration is given to the potential for 'spill-over damage' (whereby the weevil population booms and the natural host is exhausted) in situations where *Hydrocotyle vulgaris* could occur in relatively close proximity to *Hydrocotyle ranunculoides*.**

A As detailed in the PRA, limited development to adult was supported in choice tests on *H. vulgaris* but survival of adults on these non-targets was compromised and this is considered to be a suboptimal host. In addition to the extreme testing undertaken in containment (starvation tests), the field host range of *L. elongatus* in Argentina plays an important role in determining the likely environmental safety post release. The weevil was found to feed and lay a large number of eggs on congeneric *Hydrocotyle modesta* in the specificity tests in Argentina but the weevil has never been found feeding or developing on this species (which overlaps in distribution with the *H. ranunculoides*) nor any of the other 8 sympatric *Hydrocotyle* species. The weevil's fundamental host range is therefore expected to be much broader than the realised host range and it is not anticipated to persist in the absence of the target weed and at worst is expected to be short-lived and unlikely to lead to any negative consequences.

A global review of all known non-target attack (NTA) cases of intentionally released weed biological control agent by Hinz *et al*. (2019)[4] reported less than 1% of all intentional releases worldwide have the potential to lead to negative effects at the population level of nontarget species. Forty-four percent (n = 58) of all NTA cases analysed in the review are classified as spill over, which equates to 3.8% of all intentional releases worldwide and damage has thus far not led to negative consequences at the population level of a non-target species. Hinz *et al*. (2020) have also found pre-release predictions based on lab specificity tests on the risk of potential nontarget attack to be accurate to conservative.

CABI acknowledge that systematic post release monitoring efforts to survey for any non-target plant species based on pre-release testing are an integral part of any weed biocontrol project and will be prioritising this if the weevil is approved for release. Finally, it is important to recognise the risks to *H. vulgaris* populations from *H. ranunculoides* spread are considerable and should also be considered in the final decision.

The full responses of each contributor are below:

<u>Supportive of release</u>

Response 1 (Ramsey Internal Drainage Board)

Having read the invitation to consult and the Risk Assessment, I write on behalf of my Risk Management Authority in response to the above consultation.

Over the years, the elimination of cot and other weeds hampering flood control has been of increasing concern. Now with the advent in recent years of floating pennywort there is more concern. The problem is the selection of a method of weed control which is not harmful to the environment and is permissible by law. The sprays used in the past have had harmful effects leaving the principal method of weed

[4] Hinz, Hariet & Winston, Rachel & Schwarzländer, Mark. (2019). How Safe Is Weed Biological Control? A Global Review of Direct Nontarget Attack. The Quarterly Review of Biology. 94. 1-27. 10.1086/702340.

control as expensive and labour-intensive mechanical removal without the assurance of satisfactory results.

It seems to us that the proposed biological control through the release of the South American weevil *Listronotus elongatus* if effective will be ideal. The harmful effect on the environment generally is minimal being restricted only to a certain plant in a limited location in Oxfordshire.

Accordingly, my Board is most happy to support the licensing of biological control of floating pennywort by the introduction of *Listronotus elongatus* or other natural means.

Response 2 (Inland Waterways Association)

I am responding on behalf of the Inland Waterways Association with regards to the consultation for the Proposed release of the non-native biological control agent *Listronotus elongatus* for the control of *Hydroctyle ranunculoides* (floating pennywort).

The Inland Waterways Association is the membership charity that works to protect and restore the country's 6,500 miles of canals and navigable rivers. IWA is a national organisation with a network of volunteers and branches who deploy their expertise and knowledge to work constructively with navigation authorities, government and other organisations. The Association also provides practical and technical support to restoration projects through its Restoration Hub.

The Association notes that the impact of *H. ranunculoide*s on UK waterways are detrimental to biodiversity and for other users, particularly for navigational purposes. The high invasiveness of *H. ranunculoide*s and the difficulty to control the species, makes it an imperative to reduce and eliminate the species across the country.

The Association in principle supports the proposals for the release of *L. elongatus* to control *H. ranunculoide*s. Our ‘in principle’ support relies on the conditions that other expert bodies share the consensus that the potential risks of releasing *L.elongatus* outweigh the known impacts of *H. ranunculoides.*

Response 3 (BALI)

BALI has no objection to this proposal.

Response 4 (Water Management Alliance of IDBs)

I am responding to the consultation documents from DEFRA, requesting the views of various organisations on whether the non-native biological control agent, *Listronotus elongatus*, should be released in England to reduce the impact of *Hydrocotyle ranunculoides*.

The Water Management Alliance is an umbrella organisation administering the needs of seven Internal Drainage Boards throughout East Anglia and East Sussex.

Floating Pennywort currently impacts four of these boards: the Pevensey and Cuckmere WLMB (P&C WLMB), Norfolk Rivers IDB (NRIDB), Broads IDB (BIDB) and Waveney, Lower Yare and Lothingland IDBs (WLYL IDB).

In the P&CWLMB catchment, the species is rife and is now currently infesting a huge area of the internal drainage district and impacting the Pevensey Levels SSSI, SAC. Its impact effects IDB adopted watercourses, riparian drains (as well as the Environment Agency's main river systems). The P&C WLMB spends an estimated £30,000 per year controlling floating pennywort on IDB drains to mitigate the impact of the plant on flood risk or for the maintenance of IDB infrastructure. The IDB has also spent £45,000 per year over the last two years controlling the invasive within the riparian ditches, which support the designated features of the European site. Control in the riparian ditches has only been possible upon receipt of an external capital funding mechanism (the Water Environment Grant) however further funding of this nature is unlikely to be available for future annual clearances, allowing the plant to continue to dominate the landscape and cause detriment to the European protected species as well as the overall biodiversity interests of this designated site.

In BIDB, NRIDB and WLYLIDB catchments, floating pennywort is currently being controlled as part of a Non-Native Species Initiative project in Norfolk, funded via the Norfolk County Council and various partnership contributions. Although the invasive is currently being controlled in the Broadland IDB catchment areas (NRIDB, BIDB and WLYL IDB), the potential negative socio-economic impact of this species to the Broadland area is insurmountable, in terms of flood risk, biodiversity, tourism, angling, navigation and damage to protected sites. The current practice of control is key to keeping the plant manageable. If for any reason control suddenly became untenable (e.g. through gaps in funding sources) then the presence and exponential growth of this plant is likely to have a huge impact on the local Broadland economy as well as on the nature conservation of sites of International importance.

I have read through the attached documentation and risk assessments on the proposed release of the weevil *L.elongatus,* and I can confirm on behalf of the WMA that the organisation fully supports the release of the weevil, with the view that the current risk of further spread or loss of control of Floating Pennywort in the WMA managed catchments and future detriment to biodiversity interests through its unrelenting presence and growth, far outweighs any slight risk of impacts from the weevil on non-target species.

Some concerns

Response 5 (HTA)

Just to confirm that I have read the information sent about the potential biocontrol strategy for this weed. Although not likely to impact HTA members directly to any significant extent, it would certainly seem that the proposal has been well thought through and has the potential to provide a useful biocontrol strategy. My only concern is that perhaps an even wider range of potential 'food' plants which the agent might possibly consume, could be investigated?

Response 6 (New Forest Non-Native Plants Project)

The New Forest Non-Native Plants Project has been made aware that DEFRA is currently undertaking a consultation on whether the non-native weevil *Listronatus elongatus* should be released as a biological control agent to reduce the impact of floating pennywort *Hydrocotyle ranunculoides.*

The New Forest Non-Native Plants Project was set up in 2009 to stop the spread of invasive non-native plants in the New Forest area, particularly along watercourses and in wetland habitats. It is hosted by Hampshire & Isle of Wight Wildlife Trust and supported by a partnership of organisations including the Environment Agency, Natural England, Forestry England, the New Forest National Park Authority and The Verderers of The New Forest.

The New Forest Non-Native Plants Project has an interest in the control of *Hydrocotyle ranunculoides* having successfully undertaken a rapid response following a report of this species growing in the Cadnam River within the New Forest National Park. The New Forest Non-Native Plants Project is also aware of *Hydrocotyle ranunculoides* recorded at Holbury Manor Ponds within the New Forest National Park and is conscious of its potential to invade species-rich habitats of the New Forest which are recognised as being of national and international importance through a variety of designations including Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar Site. The New Forest Non-Native Plants Project is therefore very interested in the research being undertaken by CABI to identify a potential biological control agent for this highly invasive species.

We welcome the opportunity to respond to the current consultation.

Thank you for sending me the document titled ‘Application to licence the release of a classical non-native invertebrate biological control agent (IBCA) in England’ which contains the pest risk assessment (PRA) prepared by CABI. I note that the information and data provided within the PRA and the summary of reviews should not be reproduced or published and should not be distributed more widely.

On behalf of the New Forest Non-Native Plants Project I have carefully read the PRA, the (undated) letter from your colleague Richard McIntosh (Assistant Chief Plant Health Officer) and the accompanying Annex 1 which includes a) the review by DEFRA’s Risk and Horizon Scanning Team, b) the external consultation responses from the Advisory Committee on Releases to the Environment (ACRE), the anonymous reviewers, DEFRA’s Non-Native Species Policy Team, Natural England, Natural Resources Wales and c) CABI’s responses to the external consultation.

In response to the email that I sent you on 27 March 2021, CABI has answered my queries regarding a couple of points in Annex I to the consultation letter:

- In CABI’s response to the review by Natural Resources Wales, it is stated that ‘Research conducted in the UK on 72 plant species found that *L. elongatus*

sustained significantly more feeding damage in almost all tests; those limited number of plants which did sustain some damage (and oviposition) and were further exposed in choice tests were revealed to have negligible feeding damage ($p<0.01$).'

I queried whether the reference to *L. elongatus* in the above sentence is an error.

CABI have confirmed that this is an error. CABI intended to state 'Research conducted in the UK on 72 plant species found that *H. ranunculoides* sustained significantly more feeding damage in almost all tests; those limited number of plants which did sustain some damage (and oviposition) and were further exposed in choice tests were revealed to have negligible feeding damage ($p<0.01$).'

- In CABI's response to the review by Natural Resources Wales, it is stated that '*Hydrocotyle repens* is highly unlikely to be exposed to the weevil in the risk assessment area given its highly restricted, heavily monitored/managed ecological status and non-aquatic habitat.'

  I queried whether '*Hydrocotyle repens'* had been typed in error as presumably the reference is to *Helosciadium repens* which is the scientific name used by Natural Resources Wales and which is a synonym for *Apium repens* referred to elsewhere in Annex I (in the review by DEFRA's Risk and Horizon Scanning Team).

  CABI have confirmed that although *Helosciadium repens* was referred to correctly in the *original* version of the document, it had subsequently been changed (incorrectly) to '*Hydrocotyle repens'* in the version which has been distributed during DEFRA's consultation exercise.

The New Forest Non-Native Plants Project considers that a cautious approach should be taken by DEFRA when determining the application to release the weevil *Listronotus elongatus* as a biological control for *Hydrocotyle ranunculoides.* In reaching this view the following factors have been considered:

- the need for biological control of *Hydrocotyle ranuncloides;*
- the likely effectiveness of the weevil as a biological control of *Hydrocotyle ranunculoides*;
- the possibility of the weevil having a detrimental effect on native non-target species.

<u>The need for biological control of *Hydrocotyle ranunculoides*</u>

The PRA recognises that *Hydrocotyle ranunculoides* is expanding its range exponentially and has invaded many sites of high nature conservation value. It can significantly affect ecological processes and is known to threaten rare and scarce macrophytes and invertebrates.

The PRA also recognises the economic impacts resulting from infestations of *Hydrocotyle ranunculoides* and the high costs involved in attempts to control it.

The PRA states 'there are at present no satisfactory and sustainable means of effective long-term control of *H. ranunculoides*. The measures presently in use are labour intensive, expensive, non-selective and rarely effective.' The PRA emphasises that 'prospects for long term management using current methods are limited' and that a great deal of investment is required 'to allow for repeated treatment' undertaken by a wide range of organisations, contractors, local communities and volunteer groups in 'a highly coordinated and sustained catchment approach'.

The New Forest Non-Native Plants Project recognises the likely benefits to be achieved by the introduction as the weevil as a biological control agent for *Hydrocotyle ranunculoides*.

Likely effectiveness as a biological control of *Hydrocotyle ranunculoides*

The PRA notes that the weevil does not require an alternative host for its development and is a specialist on *Hydrocotyle ranunculoides*. CABI anticipate that passive dispersal would allow the weevil to colonise new neighbouring patches of *Hydrocotyle ranunculoides* as it does in its native range.

Climatic suitability and establishment potential of the weevil in the UK are considered by the PRA. The PRA concludes that the weevil is a 'highly adaptable and resilient insect and likely to establish in the PRA area, as its host has done.' However, the PRA acknowledges some uncertainty about the weevil's overwintering potential and ability to become established in the UK as climate modelling indicates that the weevil would be capable of achieving one or two generations. The PRA states that the potential for predation or parasitism to affect the establishment of the weevil is 'low but unknown'.

In assessing the likely efficacy of the weevil CABI consider it 'is expected to cause significant harm to the target weed *H. ranunculoides'*.

Possibility of detrimental effect on native non-target species

The New Forest Non-Native Plants Project notes that the weevil has been tested against a carefully selected range of plant species, as listed in Table 3 of the PRA, which are considered to be closely related to *Hydrocotyle ranunculoides.*

We note that the weevil has been tested against a number of native plant species which are associated with the New Forest, for example Marsh Pennywort *Hydrocotyle vulgaris*, Lesser Marshwort *Apium inundatum*, Floating Water Plantain *Luronium natans* and Greater Bladderwort *Utricularia vulgaris*.

The results of the host-specificity testing indicate that '*H. ranunculoides* sustained significantly more feeding damage in all tests, with minimal to negligible damage to

most non-target species' although we note that during the host-specificity testing 'replication has been lower than would have been desirable' due to the availability of large numbers of weevils being hampered by export restrictions.

Table 5 of the PRA lists those non-target species which sustained some damage due to feeding by the weevil; this list of nine species includes two which are associated with the New Forest namely *Hydrocotyle vulgaris* and *Apium inundatum*.

Table 5 reveals that the mean percentage of *Hydrocotyle vulgaris* consumed during the no choice, cut leaf host-specificity tests (after 7 days) was 18.83% (compared to 38.90% for *H. ranunculoides*). The equivalent figure for *Apium inundatum* was 7.66%.

We note that during the host-specificity testing, development to adult weevils had occurred on *Hydrocotyle vulgaris* in both no choice tests and choice tests but this happened only 'on rare occasions' and that the numbers of eggs/larvae were significantly lower than on *Hydrocotyle ranunculoides*. We also note that survival of the limited number of adults emerging from *Hydrocotyle vulgaris* was 'compromised' and consequently 'continuation trials to assess their reproductive potential were not possible' thereby indicating that *Hydrocotyle vulgaris* is not a suitable host for the weevil. Also, we note that developing larvae were consistently found to exit *Hydrocotyle vulgaris* as its relatively narrow petioles were unable to sustain development of the larvae; this would render the larvae susceptible to predation and further suggest that *Hydrocotyle vulgaris* is not a suitable host.

The PRA acknowledges that the geographic distribution of *Hydrocotyle vulgaris* may overlap with *Hydrocotyle ranunculoides* and that *Hydrocotyle vulgaris* could be within the fundamental host range of the weevil. We note that CABI consider 'this is likely to be an artefact of laboratory testing' and that the use of *Hydrocotyle vulgaris* as a host plant in the field would be unlikely as feeding and oviposition on *Hydrocotyle ranunculoides* is 'consistently and significantly higher...and development on the non-targets is poor and unsustainable'.

We note that the PRA states (in section 3.2.3) that *Hydrocotyle vulgaris* 'does not share the same ecological niche as *H. ranunculoides* and studies suggest its small physical size may preclude its use as a host in the field'. However, we are aware that when *Hydrocotyle vulgaris* is growing in more eutrophic conditions it can be physically larger than the size it would be expected to reach in its typical habitats.

The PRA (section 3.3.1) notes that in its native range in Argentina the weevil 'caused local patch extinction relatively quickly' and observations suggest that the weevil 'actively moves to new food sources when the local population begins to become exhausted'. We are therefore concerned that if the weevil totally eradicated *Hydrocotyle ranunculoides* in a particular area, could it potentially have a greater impact on *Hydrocotyle vulgaris* than indicated by the host-specificity tests?

This potential for 'spill-over damage' is addressed in the section of the PRA which focuses on 'uncertainty' (section 3.6). The PRA states 'Whilst the host range testing

offers robust evidence of the significant preference for the host *H. ranunculoides* over closely related nontarget species, the inclusion of *H. vulgaris* in the fundamental host range of the weevil could be seen as a source of concern, even if this is an artefact of the precautionary and artificial testing in quarantine. Potential transient impact on *H. vulgaris* where the two species may co-occur marginally cannot be dismissed if a situation arises whereby the weevil population booms and the natural host is exhausted. This is known as spill-over damage and is normally temporary'.

We note that the PRA concludes (section 3.7.2) that the host specificity testing confirm that the weevil 'can only effectively develop and sustain a population on *H. ranunculoides*' and that 'negative impact on non-target species is considered to be minor and most likely transient'. The PRA concludes that 'whilst the physiological host range of the weevil has encompassed' *H. vulgaris* in the laboratory trials 'it is predicted that behavioural and ecological "sieves" will restrict the agent from utilizing all the hosts that were indicated as acceptable for minor feeding and development in the laboratory'.

We query whether the concept of 'ecological sieves' would be relevant in a biologically diverse and intricate landscape, such as the New Forest, where *Hydrocotyle vulgaris* could potentially be growing near a waterbody that had become invaded by *Hydrocotyle ranunculoides*.

We note that the PRA concludes (section 3.7.6) that 'the use of biocontrol is the only long term and sustainable option for the management' of *Hydrocotyle ranunculoides* which is continuing to expand its range exponentially and is continuing to prove very challenging to control, despite large investment'. We note that CABI have demonstrated that the weevil is a specialist on *Hydrocotyle ranunculoides* and that CABI believe the weevil can contribute to the management of *Hydrocotyle ranunculoides* 'without any sustained negative impacts'. We note that the PRA concludes that 'the potential economic and environmental benefits, should the weevil successfully establish, are very high and should outweigh any perceived risks associated with its introduction'.

We note that DEFRA have considered the likely impact on *Hydrocotyle vulgaris* and have concluded that when the results of the host-specificity study are coupled with the notion that the realised host range of a biological control agent is commonly a subset of its fundamental host range 'the risk of the weevil to non-target species, including from spill-over attack, appears to be minimal'.

Having carefully considered the PRA, the summary of the reviews and CABI's response to those reviews, The New Forest Non-Native Plants Project is of the opinion that a cautious approach should be taken by DEFRA when determining the application to release the weevil *Listronotus elongatus* as a biological control for *Hydrocotyle ranunculoides*.

We ask that particular consideration is given to the potential for 'spill-over damage' (whereby the weevil population booms and the natural host is exhausted) in

situations where *Hydrocotyle vulgaris* could occur in relatively close proximity to *Hydrocotyle ranunculoides*.

We are grateful to CABI for producing such a detailed, yet clearly written, PRA. We are also grateful to the various organisations who have reviewed the PRA and whose comments are included in Annex 1 to DEFRA's consultation letter.

Thank you for the opportunity to comment.

No view

Response 7 (Denmark)

Re. "*Hydrocotyle ranunculoides* is an obligate freshwater species, but a generalist in its ecological response, within the limits of cool, freshwater bodies. Preferences in terms of water velocity, water depth, bank slope, pH, dissolved oxygen or nutrients are fairly broad with optimal photosynthesis occurring over 20°C, and in high sunlight provided by the summer months. "

So, what are "generalist in its ecological response" (actually, what is "ecological response"?) and what is "fairly broad" – these need a bit more precision.

Also: "relatively dormant over winter to avoid frost and low temperatures" – well, as the plant cannot move, how can it "avoid" frost? This is rather independent of the plant's wish.

I cannot make sense of the words "impressive biomass in heavy stands "

I think it'd be easier to understand the situation if a (hypothetical?) trophic web were to be presented to show where the suggested biocontrol agent would fit, and what the expected consequences of a successful establishment would be? Describing this only in words somehow impedes full understanding.

Response 8 (Austria)

As Macrobials have to be authorized as Plant Protection Products in Austria, the authority will deal with a submitted dossier for the authorization, but not before.

Response 9 (Peak District National Park)

Thank you for the consultation on biological control of *H. ranunculoides*, which has been forwarded to me by National Parks England. I am responding on behalf of the Peak District National Park.

Hydrocotyle ranunculoides currently appears to be of very restricted occurrence in the Peak District, and the nature of water bodies suggests that it is perhaps unlikely to become a particularly widespread problem in the area, albeit there may be scope for local problems. We therefore have no experience of control of *H. ranunculoides*,

and other organisations are likely to be much better placed to comment. We therefore have no particular comments from the Peak District.

Previous contribution

Response 10

I was consulted via Licensing. My response was of no objection or questions, in view of the comprehensive evaluation offered by ACRE.