Symposium Discussion Topic:

Should Agents That Attack Native Or Other Non-Target Plants Be Used for Biological Weed Control?

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The issue of whether agents that attack native or other non-target plants should be used for biological weed control was the theme of a workshop, attended by approximately 100 delegates, held on 4 February 1992 as part of the VIII International Symposium on Biological Weed Control, at Lincoln University, Canterbury, New Zealand. This report summarises the discussions and is based mainly on written submissions that were prepared after the workshop by 23 of the participants.

The programme title for the workshop (Should we use agents that attack native and other non-target plants?) was interpreted in two ways. Most participants believed that the topic referred to the introduction or release of oligophagous agents, which could, or would, inadvertently damage plants other than the target weed (non-target species or NTS). This interpretation provided the basis for most of the discussion. A few participants were of the opinion that the title addressed the issue of whether exotic insects should be introduced against native plants that have become weeds. This aspect was also discussed, but in less detail, and appropriate comments are included at the end of this report.

There was agreement that in principle agents should not be automatically excluded from consideration for release on the grounds that they might damage native or other non-target plants. However, agents with the potential to damage NTS should only be considered AS A LAST RESORT, when all other agents and other control methods (mechanical, herbicidal and cultural) have been tried and have failed.

Regarding the term "attack" in the title, consensus was reached that this referred to cases where agents could complete their development (or at least a considerable portion of their life cycle) on the NTS and would cause enough damage to routinely reduce the vigour and/or fecundity of the plants. Agents that might cause sporadic damage through infrequent contacts with the NTS or might 'nibble' on non-reproductive or non-meristematic tissues were not considered to be a problem.

A corollary to drawing these distinctions is that we should be able to predict how the agent will behave once it is released in a new habitat. In fact predictions of the amount of damage that an agent might cause, both on the target weed and NTS, are almost always imprecise and usually cannot be extrapolated from cage tests or observations of the agent in its native habitat.

As a result, in most cases, decisions whether to release or not will be based on eventualities and therefore should err conservatively in favour of the endangered NTS.

A modus operandi for the selection and release of agents that attack NTS cannot be compiled because each case has its own unique set of circumstances and must be considered de novo. This in no way implies that the standard protocols of biological weed control (screening tests, etc.) should not be adhered to as well.

In general, before a formal request is made for release of an agent that might attack NTS, a cost-benefit analysis should attempt to weigh-up the costs (economic, environmental, social etc.) of the weed against the benefits that might accrue from release of the agent. The following parameters need to be considered during each cost/benefit investigation:

- The importance (ecological, aesthetic, economic, cultural, etc.) of the NTS and its associated fauna, both the herbivores and higher trophic levels. All interested parties should be consulted, including those in neighbouring countries into which the agent is likely to disperse.
- The status of the NTS (e.g. rare or common) must be established. A common NTS may be more tolerant of an increased herbivore load than a rare one.
- The amount of damage that the agent might cause on the NTS. Overall levels of damage may not increase significantly above those already exerted by native herbivores.
- The potential threat may be diminished if the distributions (spatial and temporal) of the target weed and NTS are allopatric, especially if the agent is unable to survive continuously, or for extended periods, on the NTS.
- The threat from the weed, or control methods used against it, to the NTS and other native or desirable plant species. The abundance of a NTS that is being displaced by the target weed may increase in spite of additional herbivory from an introduced agent.

- When the NTS is a crop, the potential threat from an introduced agent will be mediated by existing insecticide regimes.

On balance, increased levels of herbivore damage, which may or may not cause a decline in the abundance of the NTS, can be tolerated, and release of the agent justified, if the natural ecosystem as a whole is likely to benefit from the introduction. In instances where the NTS is threatened with extinction through release of the agent, guaranteed protection for the NTS is required and major benefits must accrue, both for the ecosystem and other plant species endangered by the presence of the weed.

Other Issues

The integrity of biological weed control is at risk if agents are released that attack NTS. Researchers need to be thorough and honest in their investigations and presentation of proposals that motivate release of these agents. The credibility of biological control will be maintained if consultation processes are developed to reach consensus with, and satisfy the long-term wishes of, all interested parties, including those in neighbouring countries.

Deciding to Release

As to whom should make the final decision about releasing agents that attack NTS, various proposals were made:

- Politicians as representatives of the community
- All interested parties (environmental, agricultural, forestry, etc.)
- Ministry of Agriculture
- Professionals with experience in the field, as they are able to interpret host-specificity tests, etc.
- Open public enquiry
- Regulatory authorities guided by researchers.

The role of the biological control researchers in making the decision should be confined to the submission of a proposal. They should never be involved in the final decision.
Should Native Plants Be Targeted for Biological Control?

Although most participants felt that exotic insects should be used against native plants that had become weeds, there were also strong objections to this procedure, with the belief that it might threaten the integrity of biological control. The use of mycoherbicides, or seed-feeding agents, for biological control of these weeds was proposed as a compromise.