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Review

Benefits from biological control of weeds in New Zealand range from negligible to massive: A retrospective analysis

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**Benefits from biological control of weeds in New Zealand range from negligible to massive: A retrospective analysis**

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Abstract

Emerging concern highlighting non-target impacts in classical biological control of arthropods and weeds has heightened awareness of these risks but raised the risk of obscuring beneficial effects. This review applied a retrospective assessment of the benefits from weed biological control in New Zealand, using the framework designed for pre-clearance assessment of classical biological control. Of those agents released which can be assessed because of sufficient passage of time (n=33), their impact has been assessed according to the modern criteria for judging beneficial effects used by New Zealand's Environmental Protection Authority (negligible, minimal, minor, moderate, major and massive). Cases with negligible benefit (n=12) included failures to establish self-sustaining populations, while cases with minimal benefit (n=11) included some where predation reduced the realised benefit of established organisms. The remaining cases offered massive (n=2), major (n=1), moderate (n=5) or minor (n=2) benefit. Suppression of ragwort (*Jacobaea vulgaris* Gaertn. (1754), and St Johns wort (*Hypericum perforatum* L.) were considered to be massive in magnitude, offering long term ecosystem benefits of controlling invasive weeds. Improved clarity around risk and benefit could help improve the quality of debate on biological control, and the five step scale used in New Zealand may prove more widely useful elsewhere.

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