

Biological control of mistflower (*Ageratina riparia*) with a fungal agent facilitates native vegetation regeneration

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Summary Biological control represents a sustainable long-term strategy for mitigating impacts of invasive alien plants on native ecosystems. It is often assumed, but rarely demonstrated, that a decline in alien plant abundance and competitive performance as a function of biological control will result in recovery of impacted native flora across invaded vegetation communities. Here, we examine patterns of native vegetation community responses to biological control of the invasive plant mistflower *Ageratina riparia* (Regel) R.M.King & H.Rob. (Asteraceae) with the white-smut fungus *Entyloma ageratinae*. Native vegetation (i.e. species richness, community composition, and percent cover of vascular plants) was surveyed in 24 permanent 1 m × 10 m belt transects at seven sites within wet sclerophyll forest in New South Wales and south-east Queensland. Surveys were conducted in areas of dense mistflower infestation (>70% cover) prior to or soon after the fungus colonised each site

in 2011, and subsequently in 2012 and 2017. Surveys were conducted prior to agent release in 2011, then post release in 2012 and 2017. We found a significant 5-fold reduction in mistflower cover as a function of agent activity through time, which was in turn associated with a 4-fold increase in native plant richness, from an average of five species per transect in invaded areas in 2011 to an average of more than 20 species in 2017. Such positive effects of biological control on native plant richness were similar in New South Wales and Queensland, although vegetation composition varied by region. The reduction of mistflower abundance following biological control, and flow-on increases in native species richness, are likely to lead to benefits for ecosystem structure and function.

Keywords Biological control, ecosystem monitoring, fungal pathogen, invasive species impacts, vegetation community.