

Predicting parasitism of weed biocontrol agents

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We conducted a nationwide survey of parasitism of weed biocontrol agents in New Zealand (NZ) and found that 19, mostly native, parasitoid species attack 10 weed biocontrol agent species. Fifteen of these parasitoid species were confined to five agents that possessed “ecological analogues”, defined as a native NZ insect that belongs to the same superfamily as the agent and occupies a similar niche on the target weed. Parasitoid species richness in NZ was positively correlated to richness in the area of origin. However, only agents with ecological analogues contributed significantly to this pattern. Our results support Lawton’s (1985) hypothesis that, to find enemy-free space, selected agents should “feed in a way that is different” and “be taxonomically distinct” from native herbivores in the introduced range. A review of NZ weed biocontrol programmes indicated that parasitism is significantly associated with the failure of agents to suppress weed populations. Although our conclusions are based on an unavoidably limited data set, we conclude that biocontrol agents that escape attack from parasitoids are more likely to suppress weed populations and should be less likely to have significant indirect non-target effects in food webs. Biocontrol practitioners can reduce the chance of weed biocontrol agents attracting species-rich parasitoid faunas after introduction by i) selecting agents that have species-poor parasitoid faunas in their area of origin, and/or ii) avoiding agents that have ‘ecological analogues’ awaiting them in the introduced range.

