holistic and integrated approach that would result in long-term, sustainable management has become apparent. A combination of biological control, grazing management and herbicides was investigated in an extensive field study in southern New South Wales. During the field trials, we monitored the impact of grazing and herbicide treatments on the weed and biological control agents, as well as on pasture composition. This IWM program was pioneering work in that it is one of the few IWM projects in the world that has a major emphasis on the biological control agents. An important focus of this study was therefore the compatibility and role of biological control in this IWM approach. Results showed that biological control can be successfully established despite limitations by grazing and herbicide treatments. At least at the spatial scale of this study, none of the other control measures impeded the efficacy of the biological-control agents. Management of biological control agents e.g. provision of refugia might be essential. We anticipate that biological control will be an important part of an effective long-term weed management together with herbicide and pasture management strategies.

Developing an integrated management program for kudzu

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Kudzu is a perennial, semi-woody, climbing legume native to China. Since the late 1800s, it has been introduced deliberately to North America as an ornamental, as forage for livestock, for improving soil, and for preventing soil erosion. By 1946, over 121,406 ha of kudzu had been planted throughout the United States. Presently, extension agents report almost a half-million ha of it in 700 of 3,140 administrative districts from Florida to the Pacific Northwest. Commercial forests occupied by kudzu lose more than US$120 per ha annually, and it may be a reservoir of pathogens responsible for disease outbreaks in row crops. A variety of ways for managing small populations of kudzu exist, including herbicides, mechanical removal, and intensive livestock grazing. No existing strategy yields convenient and economical suppression over large areas, herbicides often are restricted in proximity to aquatic habitats and land of certain propriety (like some national parks), and the relief of areas occupied by kudzu is often considerable, making its eradication inconvenient, dangerous or both. For instances in which herbicide use is ill-advised, alternative strategies for managing kudzu are being considered, including biological control. In China, an abundance of natural enemies prevents, in part, kudzu from becoming either an important economic or environmental liability. Survey of populations there has revealed many insects and pathogens associated with kudzu, including a sawfly and a rust. Preliminary host-range testing of potential biological control agents has begun. Systematic resolution concerning kudzu and related taxa is incomplete, however, and must be refined before selection of biological control agents may proceed. In the field, several different plants are mistaken for kudzu, and it may hybridize with related taxa. Molecular tools for distinguishing among specimens are being tested, and are expected to help professionals match more accurately kudzu with its potential biological control agents.

Biocontrol of Orobanche spp. by inundative releases of Phytomyza orobanchia (Diptera, Agromyzidae)

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New approaches are necessary to control parasitic weeds of the genus Orobanche. The fly Phytomyza orobanchia (Diptera, Agromyzidae) is particularly suitable for biological control since it is oligophagous feeding only on Orobanche species. In total, of the 140 Orobanche spp. described, the occurrence of P. orobanchia is reported from 21 species. The use of P. orobanchia in biocontrol of Orobanche is based on