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PERSPECTIVES IN THE APPLICATION OF HEMIPARASITES TO CONTROL INVASIVE PLANTS IN HUNGARY

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The most common methods to control invasive alien plant species include herbicide application and mechanical removal. Biological solutions, mostly the introduction of natural enemies, such as native hemiparasitic plants, are less often used, although there is increasing evidence on their efficacy worldwide. In Europe, species of the Scrophulariaceae family are used to suppress the competitive power of invasive grasses, but they are not applied as a routine method in conservation practice due to limited experience. Here, we show preliminary results of two novel applications of hemiparasitic plants in Hungary, where other solutions are inefficient or unfeasible, rendering hemiparasite-based biological control the last chance. *Sporobolus cryptandrus* is a North-American grass recently invading dry sandy grasslands in Hungary. Chemical control is inefficient due to the abundant seedbank of the species; grazing is not an option due to its unpalatable leaves, and, in addition, it regenerates fast after the removal of above-ground organs. In a mesocosm experiment, however, we found that *Odontites lutea*, a native hemiparasite of dry sandy grasslands not only considers it a host but can reduce its biomass with 40% within one year. Lower biomass may translate into lower competitive power, providing recolonization opportunities for native species that had developed some resistance against *Odontites* during their evolutionary history. In another experiment we tested *Rhinanthus minor* to suppress a native invasive species, *Calamagrostis epigeios* in isolated moist grasslands of karst dolines. Chemical control is not feasible due to karst water resource protection, and the remote and patchy spatial arrangement

of these habitats makes regular grazing and mowing unfeasible. However, we found that *Rhinanthus*, if sown after an initial mowing round, can reduce *Calamagrostis* biomass with nearly 50% in the following year. Neither mowing without sowing *Rhinanthus* nor sowing *Rhinanthus* without mowing had any detectable effect on *Calamagrostis*. Other plant species did not benefit from *Calamagrostis* suppression in the short run (i.e. the following year), thus we also tested the effect of additional hay transfer from adjacent non-invaded karst dolines. Unfortunately, the extra litter hindered *Rhinanthus* germination and the expected suppression of the invader did not occur. Sowing pure seed may be a better option in future trials. Our two pilot studies provide ample evidence for the need to include hemiparasites in the toolbox of conservation practitioners aiming to control challenging plant invasions, but also highlight the large array of knowledge gaps that future research should address.