ADVANCING BIOCONTROL STRATEGIES FOR BROOMRAPE MANAGEMENT

Deniz Inci[1], Emre Eren Muslu[2], Ayşe Kökdemir[3], Sena Er[3], Seçkin Kaya[3], Ahmet Uludağ[2]*

[1] Department of Plant Sciences, University of California, Davis, US
[2] Department of Plant Protection, Çanakkale Onsekiz Mart University, TURKEY
[3] Department of Horticulture, Çanakkale Onsekiz Mart University, TURKEY

**email: emreerenmuslu@outlook.com*

ABSTRACT

Broomrapes are invasive, troublesome, and plant-parasitic weeds considered highly challenging to manage in the Mediterranean, including Türkiye. Their biological capabilities favor broomrapes to establish a parasitic relationship with their hosts and enormous seed bank and distribution. Therefore, conventional weed management strategies are inefficient to prevent, suppress, and control broomrape infestations. Broomrape management strategies should be purposefully designed, such as reducing or even inhibiting the seed bank, the ability to detect host plants, germination rates, and the capability to penetrate the host vascular system. Biological control of broomrapes has focused on insect herbivores, but the majority are not found to be broomrape-specific predators except Phytomyza orobanchia, which is reported to be a broomrape-specific biocontrol agent. However, the efficacy of P. orobanchia in reducing broomrape populations is quite limited by cultural practices. On the other hand, some bacteria, such as Pseudomonas aeruginosa, P. fluorescens, Bacillus atrophaeus, and B. subtilis, are reported to target the growth of broomrape radicles. Moreover, *Fusarium oxysporum f. sp. orthoceras, F. arthrosporioides, F. solani, Macrophomina phaseolina, Alternaria alternata,* and *Rhizoctonia solani* were isolated from the diseased inflorescences of Egyptian broomrape and were found to be pathogenic to the broomrape. Azospirillum brasilense could even inhibit the broomrape radicle growth. Moreover, mycorrhizal fungi populations such as Rhizobium leguminosarum or Azospirillum brasilense may mislead some broomrape seeds to find crop roots. Nevertheless, none of these biocontrol agents might disperse uniformly across the desired agricultural land, nor their broadcast application is easy. The scientific gap among these management strategies essentially requires further research.

Key words: Broomrape, Management strategies, Biological control