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UPDATE ON SUNFLOWER BROOMRAPE SITUATION IN SPAIN

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ABSTRACT

Sunflower broomrape (*Orobanche cumana* Wallr.) is an allochthonous parasitic plant species in Spain, where it only occurs in sunflower crops. It was introduced in the 1950s in central Spain and in the 1970s in southern Spain. Recent studies suggested that they were two separate introductions, probably from different geographic areas. Both gene pools evolved from race E to race F in the 1990s, presumably by point mutations since no increase in genetic diversity was detected. The racial situation of the parasite in both race-F gene pools, named Guadalquivir Valley (FGV) and Cuenca (FCU), was stable until recently, when more virulent populations were detected in both. Our studies suggested that the increased virulence in the GV was caused by the genetic recombination of avirulence alleles of both gene pools FGV and FCU, resulting in a new race named GGV that parasitizes race-F resistant hybrids carrying Or7 allele but not DEB2 line, with Ordeb2 gene that provides resistance to race-G populations from eastern Europe. In central Spain, a recent study has revealed that populations from the GV (FGV and/or GGV) have been introduced in the area at a large scale, with genetic recombination between CU and GV populations that will probably result in an expansion of the GGV race in this area. Additionally, we have detected a new race in CU characterized by parasitization on DEB2 but not on hybrids carrying Or7. This new race, named FCU+, did not result from the introgression of any external avirulence gene since no increased intrapopulation diversity was detected. Accordingly, it is hypothesized that a point mutation caused it. The increasing complexity of the sunflower broomrape situation in Spain urges control measures aimed at curtailing its expansion into new regions, together with the identification of novel sources of resistance to ensure the sustainability of this crop, currently essential for Spanish agriculture.

Keywords: Sunflower broomrape, parasite, wild species, resistance