

**GENETIC DIVERSITY ANALYSIS OF BROOMRAPE (*OROBANCHE CUMANA*) POPULATIONS IN SUNFLOWER GROWING AREAS IN EUROPE**

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**ABSTRACT**

*Orobanche cumana* or broomrape is an obligate root parasite of sunflower (*Helianthus annuus*) that strongly impacts yield in southern and eastern Europe. The host-parasite system of *O. cumana* and sunflower is characterized by a typical gene-for-gene interaction. The extensive use of sunflower varieties carrying monogenic resistance genes enhanced the selection pressure on the parasite, leading to the emergence of new races. The two most recent races of *Orobanche* that were officially described are referred to as race F and G. This work reviews the results of monitoring broomrape populations in 8 different European countries during the past 10 years. Seeds of *O. cumana* collected in sunflower fields were tested for their virulence on a differential set of sunflower varieties carrying different resistance genes. Race F is still the most predominant in most regions, but in east European countries a wider diversity of races and an increased incidence of the more aggressive race G was observed. The genetic diversity of the isolates was studied using a set of 180 SNPs that allowed to classify them according to their geographic origin and showing higher levels of heterozygosity in eastern Europe populations. These results will be corroborated by more recent GbS data that were obtained for a subset of the collection. All in all, this study provides an overview of the pathogenicity profiles and the molecular diversity of *O. cumana* populations across the major sunflower markets in Europe.

**Key words:** Sunflower, *Helianthus annuus*, Broomrape, *Orobanche cumana*, genetic diversity