



**PROCEEDINGS OF
5TH INTERNATIONAL SYMPOSIUM
ON BROOMRAPE IN SUNFLOWER**

1-3 NOVEMBER, 2023

ANTALYA, TURKEY

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**Organized by
Trakya University
International Sunflower Association
International Researchers Association**

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WELCOME NOTES

The parasitic angiosperm broomrape (*Orobanche cumana* Wallr) causes economic damage in sunflower production in a number of countries around the world, but especially in Central and Eastern Europe, Spain, Turkey, Israel, Iran, Kazakhstan, and China. For almost a century, there has been a constant tug-of-war between sunflower breeders and *Orobanche cumana*, with frequent changes in which side has the upper hand. Almost as soon as the breeders find a source of resistance to the latest race of the pathogen, broomrape responds by evolving into another virulent race. The development of resistant cultivars as well as optimized managing strategies is a high priority in controlling this parasite, over the world.

This is the 5th specific symposium on broomrape in sunflower, after those held in Turkey in 2008, Moldova in 2011, Spain in 2014 and Romania, in 2018.

The symposium is organized by Trakya University and International Researchers Association in cooperation with the International Sunflower Association (ISA). The symposium will be held in Megasaray Westbeach Hotel, Antalya, Turkey, on November 1-3, 2023. The symposium covers all aspects related to broomrape parasitisms in sunflower, including parasite biology, physiology, parasite-host interaction, the racial status of broomrape, genetic resistance, molecular breeding, chemical control using herbicide-tolerant, and integrated management.

The symposium gathered sunflower scientists from around the world, and present their recent achievements. The organizers also invited relevant stakeholders to provide a view on the broomrape situation around the world as well as prospects to overcome the limitation for sunflower production, imposed by this parasitic weed.

There are 18 oral presentations and 8 poster presentations. There will be 146 participants from 18 countries from the world.

We would like to thank all of you for joining this conference and we would like to give also special thanks to our sponsors and collaborators for giving us a big support to organize this event.

Prof Dr Yalcin KAYA
Head of the Organizing Committee

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Dr Mehmet DEMİRCİ	IRSA, TURKEY

INVITED SPEAKERS

Dr Leonardo VELASCO	Broomprae resistance from wild species
Dr. Dragana MILADINOVIĆ	Broomprae resistance utilizing genomic tools
Dr Mehmet DEMİRCİ	CLEARFIELD control Broomrape and weeds.

EDITOR OF THE PROCEEDINGS ABSTRACT BOOK

Prof Dr Yalcin KAYA, Assoc Prof Dr Necmi BESER

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**WILD HELIANTHUS SPECIES AS A VALUABLE BREEDING SOURCE FOR
BROOMRAPE RESISTANCE OF CULTIVATED SUNFLOWER
(HELIANTHUS ANNUUS L.)**

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ABSTRACT

Sunflower is an important industrial crop. Together with the expansion of the production areas, the challenges in growing sunflower are becoming tougher. Undoubtedly one of the most important problems in sunflower cultivation is the parasitic plant broomrape (*Orobanche cumana*). The first use of wild *Helianthus* species for introduction of broomrape resistance dates from the first half of 20th century when Russian academician Zhdanov developed resistant sunflower genotypes from interspecific crosses with *H. tuberosus*, *H. mollis* and *H. maximiliani*. Taking into account the ability of broomrape to evolve into more aggressive races and thus overcome the resistance genes, scientists are forced to constantly search for new sources of resistance. As a result, sources with different levels of resistance are found in *H. tuberosus*, *H. mollis*, *H. maximiliani*, *H. nuttallii*, *H. debilis*, *H. neglectus*, *H. niveus*, *H. argophyllus*, *H. divaricatus*, *H. bolanderi*, *H. petiolaris*, *H. praecox*, *H. deserticola* and *H. grosseserratus*. Breeding for genetic resistance is even more challenging due to the existence of not only large broomrape interpopulation divergence, but also intrapopulation divergence. One of the areas that has not received enough attention is the anatomical characterization of the root of wild sunflower species and sunflower in general. It is known that pre-haustorial resistance to broomrape is determined by the development of physical barriers in host root cell walls, which prevents linkage of broomrape to the host. A detailed anatomical characterization of root in wild *Helianthus* species can give valuable information about differences between the species and more knowledge about the nature of resistance of certain *Helianthus* species to broomrape.

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Key words: wild sunflower, broomrape, resistance