

# Plant resistance parasitizes “ *Orobanche Cumana* ” in sunflower: Genotypic selection of resistant plants and phenotype confirmation

## STUDENTS

Hugo Arteaga - Moya<sup>1</sup>, Carmen Aguilar - Martínez<sup>1</sup> Rubén Gavilán - Román<sup>2</sup>, Beatriz Gómez - León<sup>2</sup>.

## RESEARCHERS

Begoña Pérez - Vich<sup>3</sup>, Marcos Mateo - Fernández<sup>1</sup>, Belén Fernández - Melero<sup>3</sup> Leonardo Velasco - Varo<sup>3</sup>, María Reyes - Amil<sup>2</sup>, Lidia del Moral - Navarrete<sup>3</sup>.

## INSTITUTE

1. IES Fidiana, Córdoba. 2. CES Lope de Vega SCA, Córdoba.  
3. Mejora Genética Vegetal por Resistencia a Enfermedades. Instituto de Agricultura Sostenible (IAS).



## INTRODUCTION

The crops of sunflowers dates back according to archaeological studies to 3,000 BC in Arizona and New Mexico. Thanks to the crops of sunflowers, we can obtain the famous sunflower oil. Of this oil, 155 million liters were exceeded in 2021 in Spain, this being the lowest figure in the last 5 years (2.98 liters per person per year being consumed).

Sunflower seeds are characterized by being rich in vitamin E (antioxidant and anti-inflammatory effects) in addition, this vitamin reduces the risk of developing prostate cancer as well as complications in people with diabetes mellitus. In women in the menopause, it has been seen to decrease the severity and frequency of hot flashes. They are rich in minerals that promote bone health. The type of fat it contains is one of the healthiest, as well as being rich in fiber and with a high caloric content (but of good quality). Today there are 6 types of sunflowers that are divided into two large categories, with the Big Smile being the most popular and the most used, either for decoration or for consumption of the seeds they produce.

In this project, it was obtained an unknown quantity of sunflowers with the "jopo" (*Orobancha cumana*). Without adequate knowledge of them being reached. This being the unknown that we must solve in the experiment.

## MATERIALS AND METHODS

### SUNFLOWER

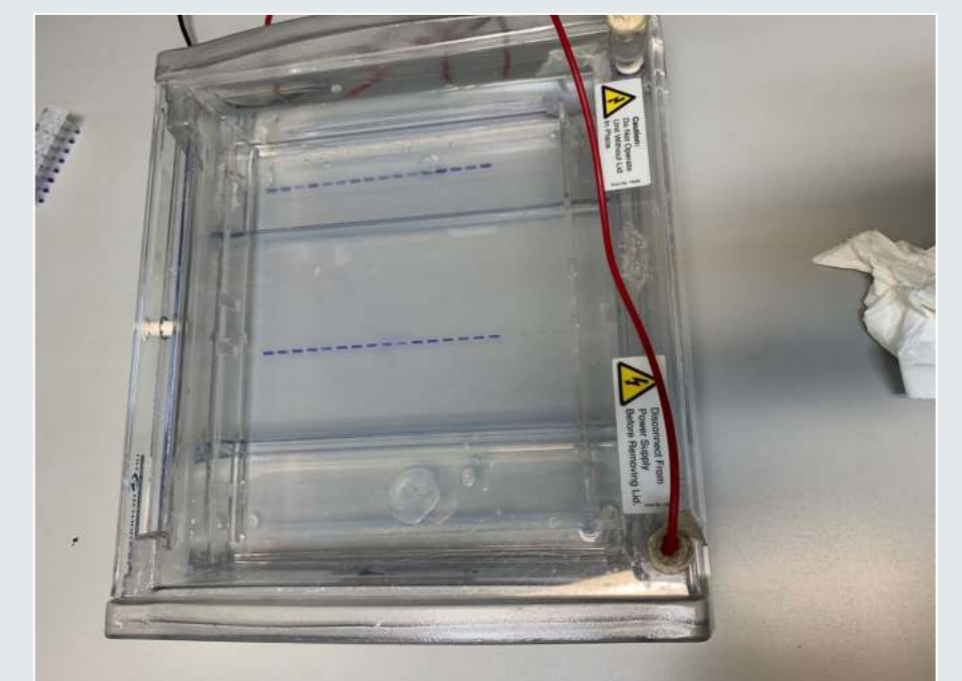
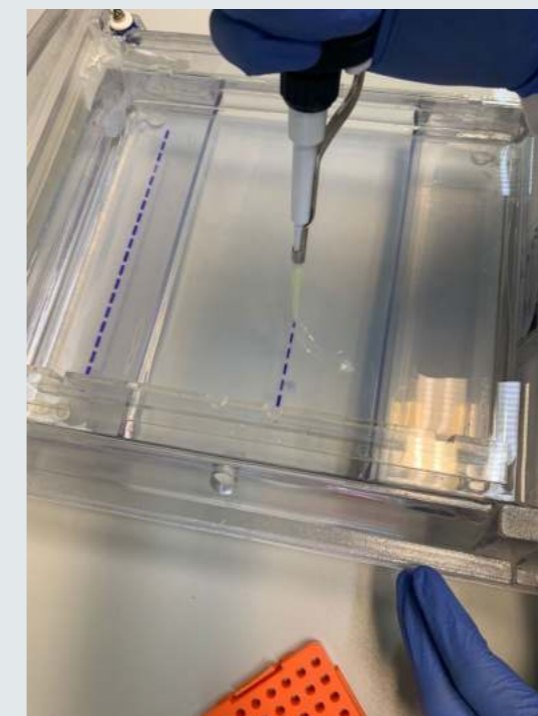


### JOPO SEEDS



### PCR AND ELECTROPHORESIS IN AGAROSE GEL

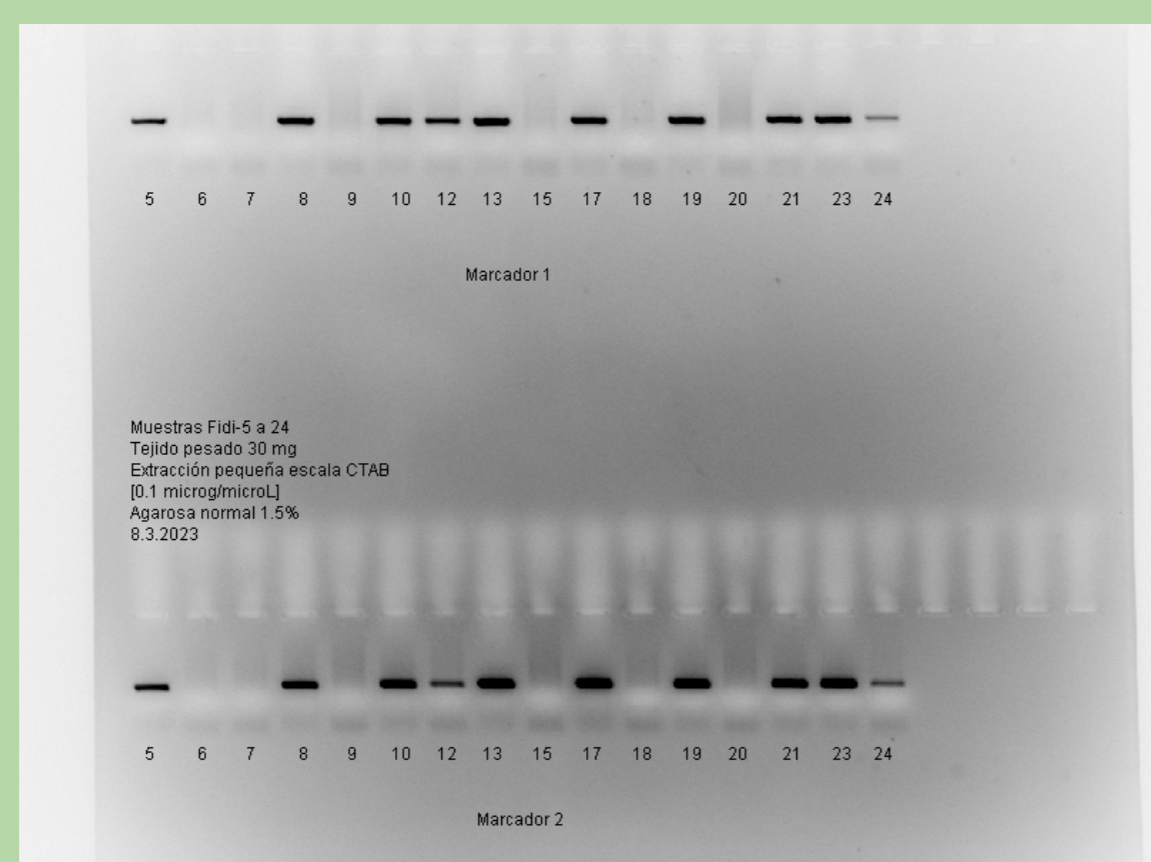
PCR: the DNA of the sunflower was amplified to find the resistance gene against the sunflower blight, in order to find out which samples we have are resistant and which are susceptible.



## RESULTS

### GENOTYPES

According to the results obtained in electrophoresis gel after applying PCR, the samples 5, 8, 10, 12, 13, 17, 19, 21, and 23 amplified the DNA.



### PHENOTYPES

To check the phenotype, we planted several sunflowers with jopo seeds and left them for a couple of weeks. Thanks to this study we have been able to see physiologically which has been affected by jopo and which has not.



## CONCLUSIONS

By looking at the results, you can see which sunflowers are susceptible to jopo and which have recognized jopo as a pathogen. As we have said before, some sunflowers have been susceptible, which are fidi 5, 8, 10, 12, 13, 17, 19, 21 and 23 (this means And the sunflowers that have accepted jopo as a pathogen are the remaining ones, being fidi 6, 7, 9, 15, 18, 20, 24 (this indicates that they lack the gene to be resistant to jopo).

th at they have the gene that determines that the sunflower is resistant). icates that they lack the gene to be resistant to jopo).