A PRELIMINARY STUDY ON THE IDENTIFICATION OF DIFFERENT SUNFLOWER VARIETIES WITH THE LEVEL OF RESISTANCE TO RACE G MINOR SPECIES AN

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ABSTRACT

Orobanche cumana has become a bottleneck factor restricting the healthy development of the sunflower industry in China. Planting sunflower varieties resistant to broomrape is the simplest, feasible, and cost-effective control measure at present. It is important to clarify the mechanism of sunflower resistance for breeding resistant varieties to broomrape. In this study, we used the petri dish filter paper system to edaluate and identify the resistance level of 32 sunflower varieties. We selected two sunflower varieties (JK103 and LD5009) with significant difference in resistance and sensitivity level. After artificial inoculation of the G race, the differences in the number of parasitic nodulation on roots, callose deposition in cell wall, hydrogen peroxide accumulation, ROS scavenging enzyme activity and transcription expression of resistance genes between resistant and susceptible varieties were compared at germination stage, nodulation stage and shoot meristem stage. The results showed as follows: (1) The average number of parasitism tubercle in the roots of JK103 was 3.2, significantly lower than that of LD5009, which was 16.2; The callose mass deposited in the root cell wall of JK103 was significantly higher than that of LD5009; The content of hydrogen peroxide and the activities of different ROS scavenging enzymes in the roots of JK103 and LD5009 showed an initial trend of increase and then later decreased. The magnitude of the changes of the above indicators in the roots of JK103 was significantly higher than that of LD5009 at the same time point; The quantitative transcription level results of the resistance-related genes showed that, except *XTH6*, the relative expression content of all tested resistance-related genes, such as *Ha-PR1*, *LOX*, *CAT*, etc. in resistant variety JK103 was significantly higher than the susceptible variety LD5009. The above results suggested that sunflower against the infection of broomrape via structural and physiological resistance mechanism, meanwhile, the signal molecules,

such as H2O2, JA and SA were also involved in the establishment of sunflower resistance upon the infection of broomrape.

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Key words: *Orobanche cumana*; resistance gene; hydrogen peroxide content; antioxidant enzyme activity