Is Pro106Ser Mutation The Only Mechanism of Glyphosate Resistance in Goosegrass?

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Glyphosate resistance in goosegrass (*Eleusine indica*) biotypes were recently identified in Paraná State and the resistance mechanism was associated with a Pro106Ser mutation in EPSPS gene. However, glyphosate resistance has been often attributed by more than one mechanism in some other weed species. This study aimed to evaluate other possible resistance mechanisms that could be involved in these biotypes, as well as to validate a molecular marker for rapid detection of resistant populations. A resistant biotype was compared with a glyphosate susceptible biotype by different methods including dose response, shikimate accumulation, ^{14}C-glyphosate absorption and translocation, glyphosate metabolism, EPSPS enzyme assay, gene copy number and sequencing. A qPCR-based assay was also tested for genotyping the previous reported Pro106Ser target site mutation in resistant biotypes. The results showed resistance factor of five comparing resistant and susceptible plants, which matches with levels of shikimate accumulation (6-fold) and EPSPS enzyme activity (5-fold). There were no significant differences in absorption and translocation, glyphosate metabolism nor EPSPS copy number between resistant and susceptible biotypes, suggesting that resistance is not caused by these mechanisms. All resistant plants harbored a Pro106Ser mutation in EPSPS gene. The qPCR-based genotyping assay showed high efficiency and accuracy on discriminating resistant and susceptible plants, which means that this method could be used for quick resistance detection when monitoring large number of populations. Therefore, although vacuole sequestration was not evaluated, Pro106Ser target site mutation is the most likely mechanism confering glyphosate resistance in goosegrass from Brazil.

Palavras-chave: 5-enolpyruvylshikimate-3-phosphate synthase, quick test for resistance detection, target site resistance, *Eleusine indica*

Apoio: UEM, CAPES and Monsanto