

Population Genetics of the Agricultural Weed Palmer Amaranth

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It is common to find agriculture weeds causing the significant loss of crop yield, due to most weeds being competitive on gathering resources than most crop plant; thus, chemical herbicide is one of the effective control method that are commonly used. *Amaranthis palmeri* (Palmer Amaranth) is the most agricultural problematic species and has become resistant to chemical herbicide within the six different biological pathways. This makes it difficult to control the weed Palmer amaranth. There has been agricultural research focused on genetic mutation that cause resistance mechanism in this species, but there isn't any genetic investigation of the species expansion in the desert Southwest and in the eastern U.S. and Central California, which invades into agricultural field. There is also no progress of genetic framework for a population that can relate neutral genetic variation to agriculturally-adaptive genetic variation that is herbicide resistance. Recently, Palmer amaranth seeds and leaf samples were collected in the population of southwestern U.S. and will be in the process of genotyping-by-sequencing analysis which will be perform by researchers at the University of Illinois. Calculation of genetic diversity and structure metric for Palmer amaranth across its native range will be study at CSU, Fresno for subsequent bioinformatics analysis. Another experiment that will take place in CSU, Fresno is a comparative ecophysiology with seeds that are collected from the expeditions and will be take place in the greenhouse. These investigation is to understand the processes that influence plant to become aggressive weeds, and propose possible control methods to mitigate this major economic setback in agriculture.