Weed Warfare: Investigating Allelopathy, Year Six

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Amaranthus palmeri is a highly invasive noxious weed that causes significant problems in agriculture because of its resistance to glycine (Round-up). This glycine resistant strain of A.palmeri is estimated to have infested millions of acres of farmland, particularly harming soybean, corn and cotton crops. The purpose of this study was to examine the effects of cold-extracted Dioscorea bulbifera leaf extract on corn and soybean root mass, shoot mass, root length, and shoot height in a field study scenario, to determine the effects of cold- extracted verses a mechanically agitated Dioscorea bulbifera leaf extract on A. palmeri seed germination, and to determine the specific metabolomic signature of a cold extracted leaf-extract treatment versus control. Corn and soybeans were both grown in a field trial setting and enoculated with cold extracted Discorea bulbifera leaf extract. Plants were grown for 3 weeks and then mass of the root, shoot, the length of the root and the height of the shoot were measured, which allows for a growth ratio analysis. A germination study was conducted by treating amaranthus palmeri seeds with both cold extracted and mechanically extracted Dioscorea bulbifera extract. Seed vigor was determined through a speed of germination vigor test. Metabolomics testing was done on plants treated with cold extracted Dioscorea bulbifera extract. Additionally, Amaranthus palmeri's germination rate is impeded by the Dioscorea bulbifera leaf extract. This study could lead to more environmentally friendly and efficient herbicides as well as alternatives to herbicides that are no longer effective due to herbicide resistance.

Awards Won:
Fourth Award of $500