Herbicidal effects of Datura stramonium (L.) leaf extracts on Amaranthus hybridus (L.) and Tagetes minuta (L.)

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Abstract

Evolution of weeds resistant to herbicides demands new solutions to cope with the problem since economic losses generated by weeds can be higher than those caused by insect pests. Bioactive compounds known as allelochemicals have the potential to act as natural herbicides in weed management in agro-ecosystems. Laboratory, pot and greenhouse experiments were carried out to investigate the herbicidal effects of Datura stramonium aqueous leaf extracts on the germination and early growth of Tagetes minuta and Amaranthus hybridus. The laboratory and greenhouse experiments were arranged as completely randomised design, and the open field pot experiment was arranged as a randomised complete block design. Four concentrations of 2, 4, 6 and 8%, respectively of D. stramonium aqueous leaf extracts were used. Distilled water was the control. Data for germination, radicle and plumule length was collected within the first 10 days for the laboratory experiment. Root length, shoot length and biomass yield was collected 30 days after germination for both the greenhouse and field experiments. Results indicated that germination percentage, radicle length, plumule length and dry matter significantly decreased ($P<0.001$) as concentration of D. stramonium leaf extracts increased in all the experiments. This implies that D. stramonium has pre-emergence and early post emergence herbicidal effects on the two weeds. This study revealed that allelopathic sprays of D. stramonium can be used by resource poor small scale farmers or organic farmers for the control of Amaranthus hybridus and T. minuta in Zimbabwe.