

The potential role of sorghum and sunflower water extracts in enhancing the herbicidal potency of atrazine herbicide in controlling weeds in Zea maize

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Abstract: Allelopathy research has advanced remarkably during the two last decades due to the need to a substitute to alleviate application of synthetic herbicides. Response of maize and associated weeds to foliar application of sorghum or sunflower water extracts alone or in combination with reduced doses (0.50 and 0.75 L/fed., fed.=feddan=0.42 ha) of atrazine herbicide were studied in comparison with hand hoeing twice at 30 and 45 days after sowing (DAS) and the recommended field dose (labeled) of atrazine (1 L/fed). The study was carried out at a privet farm, Shalkan Province, Kalubia Governorate, Egypt over two summer seasons in 2013 and 2014. The experimental design was a randomized complete block design with four replications per treatment. Below-labeled doses of atrazine were combined with 100 L/fed. of each of allelopathic sorghum or sunflower water extract. Results showed that all weed control treatments significantly suppressed total dry weight of weeds. Whereas, these treatments increased total dry weight of maize at least 13% than un-weeded control. Allelopathic sorghum water extract sprayed alone or in combination with reduced doses of atrazine herbicide gave, to a large extent, similar results to applying the full dose of atrazine, either in reducing total dry weight of weeds or increasing total maize dry biomass. Maize grain yield was significantly increased by 32.18% and 34.16% with applying sorghum or sunflower extracts plus atrazine at 0.75 (L/fed), respectively versus 39.60% of applying the full dose of atrazine. Hand hoeing twice recorded the maximum weed suppression and subsequently the highest grain yield per fed. It could be concluded that the use of water extract of sorghum or sunflower can improve atrazine performance. They allowed for greatly enhanced weed control and significantly increased yield and yield-related components in maize.

Keywords: Maize – Allelopathy – Allelochemicals - Weed control - Sorghum extracts - Sunflower extracts.