

Efficacy of Herbicide Mixtures with Atrazine on Weed Control and Yield of Maize

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Abstract—Maize (*Zea mays* L.) being one of the oldest and most productive cereal food crop is among the world's three most important cereal crops. The importance of weed competition in maize depends on the crop growth stage, the amount of weed present, the level of water, nutrient stress and the weed species. The first few weeks are critical for weed control in maize. Few herbicides like atrazine, pendimethalin, oxyfluorfen and 2, 4-D are available for weed control in maize but these herbicides control only broad leaf weeds. Control of grasses and sedges remain a problem for the farmers, especially when the too high or too low soil moisture hinders the inter-cultural operation. Topramezone and tembotrione are the selective, post-emergence herbicides that have been recently introduced for use in maize. These herbicides inhibit the enzyme hydroxy-phenyl pyruvate dioxygenase (4-HPPD) and the biosynthesis of plastoquinone, with subsequent carotenoid pigment formation, membrane structure and chlorophyll disruption (Porter et al., 2005). HPPD inhibiting herbicides are most effective in newly developing tissues that emerge bleached, as a consequence of failure to properly assemble photosynthetic units and thus they control weeds. (Schonhammer et al., 2006). Tank mix application of these herbicides with lower dose of atrazine was reported to be more effective providing broad spectrum weed control than lone application of individual chemicals. A field experiment was conducted in sandy loamy soils at College farm, College of Agriculture, Professor Jayashankar Telangana State Agricultural University, Rajendranagar, Hyderabad to evaluate the efficacy of herbicide mixtures with and without adjuvants in maize crop during kharif 2014. Higher maize grain yields were recorded under hand weeding at 20 and 40 DAS (6580 kg ha⁻¹), which was at par with topramezone + atrazine @ 25.2 + 250 g a.i ha⁻¹ + MSO as PoE (6436 kg ha⁻¹) and tembotrione + atrazine @ 105 + 250 g a.i ha⁻¹ + stefes mero as PoE (6282 kg ha⁻¹). Lowest weed dry matter was recorded with hand weeding at 20 and 40 DAS followed by topramezone + atrazine @ 25.2 + 250 g a.i ha⁻¹ + MSO as PoE and tembotrione + atrazine @ 105 + 250 g a.i ha⁻¹ + stefes mero as PoE at 20 DAS. Weed management practices also exerted significance influence on growth, yield attributes, yield and economics in maize.