

1.2.1 Makungu Melvin C. (1996). Weed control in commercial sorghum (*Sorghum bicolor* L.) varieties under Zambian conditions. (Supervisors: Dr. D. M. N. Mbewe and Dr. W. Schmidt).

Commercially grown sorghum is slowly replacing maize in the expanding opaque beer brewing industry in Zambia. The lack of an established weed control package for commercial sorghum production has compelled farmers to use herbicide weed control methods recommended for maize in commercial sorghum fields. Against this background a 5 x 2 factorial experiment with a split plot design comprising five weed control methods and two sorghum hybrid varieties, was set up at UNZA Field Station and Blue Gum Farm in the 1994/95 rainy season. The first objective of this experiment was to test the efficacy of two herbicides (Atrazine and Cyanazine) for weed control in commercial sorghum production under Zambian conditions. The second objective of this experiment was to determine the cost effectiveness of using the two herbicides for weed control in sorghum fields. Atrazine (Gesaprim 50% FW) was applied at rates of 3.5 l/ha and 2.0 l/ha. Cyanazine (Bladex 50% SC) was applied at a rate of 2.0 l/ha. Zero weeding and clean weeding treatments were also included in the study as controls. Weed control methods, thus comprised the five levels that were assigned to the sub plots. Sorghum hybrid varieties, comprised the two levels that were assigned to the main plots and included two commercial sorghum hybrids, MMSH 413 and MMSH 375. Assessments of weed cover (%) and crop cover (%) were carried out at 2, 5, 8 and 11 weeks after sowing. Other parameters that were determined include plant height, panicle length, and grain per panicle, panicles per plant, plants per hectare and 1,000 sorghum grain weights. Economic analysis was conducted by subtracting the explicit sorghum production costs from the value of expected sorghum sales. Results obtained from both locations showed significant differences in the weed control efficacy of the herbicide treatments at 5 weeks after sowing. This is the critical period for weed control in sorghum. The most effective herbicide treatment was Atrazine (Gesaprim 3.5 l/ha) because it reduced the weed cover to 11 % of the total flora. This was followed by Atrazine (Gesaprim 2.0 l/ha) which reduced the weed cover to 22% of the total flora. The least effective herbicide treatment was Cyanazine (Bladex 50% SC 2.0 l/ha) with a weed cover of 33% of the total flora. Economic analyses show

that the most economical weed control method for both sorghum varieties was the usage of Atrazine (Gesaprim 50% FW 3.5 l/ha) which had a net profit of 85.4% associated with its average grain yield of 2.9 tons. This was followed by Atrazine (Gesaprim 50% FW 2.0 l/ha) with an average grain yield of 1.8 tons/ha and a net profit of 14.9%. The least economical herbicide treatment was Cyanazine (Bladex 50% SC 2.0 l/ha) with a net profit -21.5 % associated with its average grain yield of 1.2 tons/ha.