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Effect of sprayer nozzles on efficacy and economy of spraying herbicide in sugarcane

Two experiments (pre emergence & post-emergence spraying) were conducted in year 2000 at Sugarcane Research Institute (SRI) to evaluate different types of sprayer nozzles for efficacy and economy of spraying herbicides in sugarcane. Six different types of nozels eg. Impact-red {swath width (SW)- 2.0 m} Impact-blue (SW- 1.5 m), Impact-green (SW- 1.0 m), solid cone-single (SW- 0.81 m), hollow cone-single (SW- 0.67 m) and solid-cone-double (SW- 1.2 m) were tested in RCBD with three replications. Sugarcane was grown under irrigation. Plot size was 9m long 6 cane rows. In the pre-emergence trial, a mixture of Diuron + Paraquat (2.8 kg.+ 400 g [a.i]./ha) was sprayed at 4 days after planting (DAP). In the post emergence trial, Paraquat (800 g [a.i.]/ha) was sprayed at 28 DAP. Operator walked on the ridges to spray herbicides. When using single cone nozzles, sprayer lance was swan to cover the target. Subsequent weeding was done manually when required.

Post-emergence spraying required more (21%) time than pre emergence. Because of swinging the sprayer lance while walking when using solid & hollow cone nozzles, spraying further delayed by 10% in pre-emergence & 22% in post emergence trials. No differences on crop damages due to different nozzles. Labour requirement for manual weeding at 7 weeks after planting (WAP) was twice (16/ha) in plots sprayed by single (impact & cone) nozzles and thrice (24/ha) in the plots sprayed by double cone nozzle. Spraying Paraquat at 28 DAP reduced germination, tillering, tiller height but millable stalks, cane yield and juice quality were same. In pre-emergence trial, labors for manual weeding at 7 & 16 WAP has no difference (P=0.05) among treatments.

Pre calibration of sprayer nozzles is crucial for accurate application of herbicides. Any nozzle could be used for pre emergence application but more time is required for nozzles with narrow swath width. Double cone nozzle is not suitable to apply post-emergence herbicide. Initial set back of cane growth due to post-emergence application of Paraquat was recovered in later stages under irrigation. Cost of total weed control is same in both pre-emergence and post-emergence spraying. However, more labors required for subsequent manual weeding in post emergence sprayed trial than pre emergence sprayed trial. This is risky, because laborers may not be available at appropriate time for manual weeding. Therefore, it is suggested to apply pre-emergence herbicides and follow up other operations accordingly.