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Effect of Nutrient Levels and Herbicides on Weeds and Sugarcane

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Sub-optimal and imbalanced nutrient availability and severe weed infestation during the early stages of weed growth are the reasons for the low productivity of sugarcane crop. Since the sugarcane is a long duration crop and to sustain the soil nutrient status the thrust is more on integrated nutrient management practices (INM). Moreover, these INM practices are also having a greater bearing on the weed flora. The extent of damage caused by weeds largely depends on the composition of weed flora, their population and growth habit (Johari and Singh, 1991). Therefore, the experiment was planned to study the efficacy of pendimethalin at 1.5 kg ha^{-1} and atrazine at 2 kg ha^{-1} under various fertilization levels on weeds and sugarcane.

The field experiment with five nutrient management treatments as main plot treatments and four weed management treatments as sub-plot treatments was laid out in split plot design having three replications during December 2002 to December 2003 at Annamalai University Experimental Farm, Annamalainagar, Tamil Nadu, India (Table 1). The soil was clayey loam, low in available nitrogen, medium in available phosphorus and high in available potassium with a pH of 7.5. The 30 days old polybag raised seedlings of sugarcane variety CoC 98061 were transplanted in the small pits made in the center of the furrows with an intra-row spacing of 30 cm. One seedling was planted in each pit and irrigation was given immediately after transplanting. Dhaincha (*Sesbania aculeata*) was used as green manure intercrop and the seeds were sown on both the sides of ridges with an intra-row spacing of 10 cm on the day of polybag seedling transplanting and was incorporated *in situ* on the 45th day after sowing and earthing up was given to incorporate the green biomass completely into the soil. Penshibao, a multi functional nutritive foliage fertilizer, was sprayed twice at 45 and 75 DAT. Herbicides were sprayed by mixing them with 500 litres of water ha^{-1} on three days after transplanting.

The predominant weed flora were *Cyperus rotundus, Cynodon dactylon, Dactyloctenium aegypticum, Echinochloa colona, Panicum repens, Acalypha repens, Acalypha indica, Commelina benghalensis, Cleome viscose, Corchorus olitorius* and *Trianthema portulacastrum*. Sedges, grasses and broad-leaved weeds contributed 66.62, 28.18 and 5.2% of the total weed population. The green manure intercropped treatments recorded significantly lower weed population and weed biomass (Table 1). The reason for low weed population under the green manure intercropped treatments might be due to the weed smothering effect of green manure (*Sesbania aculeata*). The hand hoe weeded treatment registered the minimum weed population and biomass; this was comparable with the pendimethalin treatment. The atrazine treatment was next in order.

In sugarcane cultivation, the cane yield is the ultimate product that decides the benefit accrued out of it. The nutrient management treatments had significantly influenced the cane yield. Among the nutrient management treatments, the treatment green manure intercropping+recommended NPK+$ZnSO_4$+ *Acetobacter*+Penshibao proved superior by recording 34.72% higher cane yield when compared to the farmers' practice of recommended NPK alone. The increase in yield under this treatment might be due to the better availability of nutrients and lesser interference of weeds. Among the weed management treatments, the hand hoe weeded treatment and pendimethalin treatment proved superior by registering an increased cane yield. The increased yield may be attributed to the reduced weed population, lesser weed biomass production and

Table 1. Effect of treatments on weeds and cane yield

Treatment	Weed density (No. m^{-2}) 60 DAT			Total weed biomass (kg ha^{-1}) 60 DAT	Cane yield (t ha^{-1})
	Sedges	Grasses	Broad-leaved weeds		
Nutrient management					
Recommended dose of NPK	13.77* (225)	9.19* (105)	4.07* (17)	534.70	90.99
Pressmud 10 t ha^{-1}+Recommended NPK+$ZnSO_4$ 37.5 kg ha^{-1}+ *Acetobacter* 2 kg ha^{-1}+Penshibao 100 ppm	13.86* (223)	8.97* (108)	3.94* (17)	525.58	108.41
Green manure+Recommended NPK+$ZnSO_4$ @ 37.5 kg ha^{-1}+*Acetobacter* 2 kg ha^{-1}+Penshibao 100 ppm	7.20* (58)	5.12* (26)	2.92* (8)	108.42	122.33
Pressmud 10 t ha^{-1}+75% of :recommended N and full dose of P, K+$ZnSO_4$ 37.5 kg ha^{-1}+*Acetobacter* 2 kg ha^{-1}+Penshibao 100 ppm	13.69* (234)	8.58* (96)	4.04* (4)	522.82	91.33
Green manure+75% of recommended N and full dose of P, K+$ZnSO_4$ 37.5 kg ha^{-1}+*Acetobacter*2 kg ha^{-1}+Penshibao @ 100 ppm	7.29* (60)	4.84* (23)	2.90* (8)	108.83	114.38
LSD (P=0.05)	2.64	2.05	0.34	4.47	1.87
Weed management					
Hand hoe weeding at 30 DAT	7.02* (51)	5.68* (32)	3.09* (9)	121.70	115.65
Pendimethalin 15 kg a. i. ha^{-1}	9.23* (94)	5.63* (32)	3.27* (10)	181.66	114.19
Atrazine 2 kg a. i. ha^{-1}	11.67* (136)	5.48* (30)	3.28* (10)	264.55	106.35
Weedy	16.94* (359)	12.57* (193)	4.65* (23)	866.36	85.96
LSD (P=0.05)	1.67	1.92	0.20	4.28	1.55

*Data are root transformation values of x+0.5. Data in parentheses are original values.

lower nutrients removal by weeds. Even though, the hand hoe weeded treatment had more number of weed population till 30 DAT, it did not retard the crop growth to a greater extent. This might be due to the reason that the weeds when hand hoed at apt time, before they could firmly establish by causing greater interference.

REFERENCE

Johari, D. and R. G. Singh, 1991. Weeds of sugarcane, losses due to them and their control. *Bharatiya Sug.* **16** : 33-39.