

Cane yield in relation to shoot-population density of sugarcane (*Saccharum* species)

R. L. YADAV

Indian Institute of Sugarcane Research, Lucknow, Uttar Pradesh 226 002

Received: April 1992

The final number of millable canes in sugarcane (*Saccharum* sp.) compresses the population of mother-shoots (the first emerged shoots) and tillers form during different months of crop growth. Singh and Yadav (1986) reported that mother-shoot population is more important than tillers in influencing yield of sugarcane. This communication reports the relationship of mother-shoots and tillers with the yield of cane.

The field experiment was conducted during 1987-88 and 1988-89 with 2 planting densities (40,000 and 80,000 each with 3 bud setts/ha) and 3 row geometries (single rows 90 cm apart, double rows at 25 : 65 cm and triple rows at 45 : 45 : 90 cm configuration) at Lucknow, in a randomized block design with 5 replications. The crop (*Saccharum* spp. hybrid cv. 'Co 1148') was planted on 15 February 1987 and 22 February 1988. A uniform dose of 150 kg N/ha as urea (46.4% N) was applied, half at the time of planting and the remainder as top-dressing in last week of May. The crop was harvested on 5 February 1988 and 3 February 1989. The size of the plot was 43.2 m².

The initial shoot density recorded after the completion of germination on day 45 after planting was considered as mother-shoot population. Thereafter, shoot count was done at monthly interval to record the

stage of maximum shoot number. The total shoot population at this stage minus the population of mother shoots (initial count) were considered tillers. Likewise from the final population of millable canes, initial shoots were subtracted and the remainder canes considered as those formed by tillers.

Simple correlation coefficients between yield and number of mother-shoots, yield and tillers yield and number of millable canes, and yield and tiller's cane in total number of millable canes were worked out. Regression equation for the same characters was also computed.

The pooled results of both the years indicated that higher planting density gave larger yield with greater number of mother-shoot canes and total millable canes at each row geometry (Table 1).

The double-row geometry produced higher number of mother shoots, tillers and millable canes than the other row geometries.

The planting density of 40,000 with 3-bud setts/ha in double-row geometry gave equal yields to those of 80,000 with 3-bud setts/ha in single row planting.

The yield of sugarcane had positive significant correlations with the number of mother shoots (0.709) and millable canes (0.488). The number of tiller canes, however, showed negative correlations (-0.688).

Table 1. Cane yield (tonnes/ha) and population ('000/ha) of different types of shoots as influenced by planting density and row geometry (pooled data of 1987-88 and 1988-89)

Treatment	Yield	Mother shoot	Tillers	Millable canes	Millable cane of tiller
<i>Single row, 90 cm</i>					
40,000 3-bud setts/ha	67	49	154	93	46
80,000 3-bud setts/ha	75	73	187	108	75
Mean	71	61	171	102	41
<i>Double rows, 25 cm : 65 cm</i>					
40,000 3-bud setts/ha	75	78	173	108	30
80,000 3-bud setts/ha	98	130	228	140	10
Mean	87	104	201	124	20
<i>Triple rows, 45 cm : 45 cm : 90 cm</i>					
40,000 3-bud setts/ha	67	73	182	95	22
80,000 3-bud setts/ha	79	110	170	113	5
Mean	73	94	176	104	14
<i>Mean of planting density</i>					
40,000 3-bud setts/ha	70	67	170	99	33
80,000 3-bud setts/ha	84	104	195	120	17
<i>CD (P = 0.05) for yield</i>					
Geometry	5.7				
Density	3.9				
Interaction	9.4				

The coefficient of determination indicated that the number of mother-shoots have greater potential (0.5037) to influence cane yield than the tillers (0.2203). The canes formed by tillers had significant negative influence (-0.4746) on yield, indicating that tillering should be suppressed to get higher cane yield.

Following regression equations were developed for relationship of cane yield (Y) with mother-shoot canes, tiller canes and total number of millable canes.

With mother-shoot canes

$$Y = 49.525 + 0.3187 X$$

With tillers

$$Y = 39.854 + 0.2026 X$$

With total number of millable canes

$$Y = 39.418 + 0.3407 X$$

With tillered-canes in total number of millable canes

$$Y = 89.998 - 0.5389 X$$

Therefore, greater population of mother-shoots (with higher planting of more setts) with minimum number of tillers is essential to enhance sugarcane productivity per unit area in 'Co 1148'.

REFERENCE

- Singh, K. and Yadav, R. L. 1986. A new approach of sugarcane cultivation : No tiller Agronomy. (In) *Proceedings of 49th Convention of Sugarcane Technologists Association India*, pp. A 17-A 22.