is not practicable. Therefore, the possible choice is the inter- subspecific hybridization between the spanish and virginia types followed by intermating among F_2 progenies to exploit both the additive and non-additive genetic components.

ACKNOWLEDGEMENT

The authors are thankful to the Tamil Nadu Agricultural University for providing the necessary facilities for the study.

REFERENCE

GRIFFING,B.(1956). A generalised treatment of the use of diallel cross in quantitative inheritance, **Heredity 10**: 31-50.

SUBRAHMANYAM.,P and Mc DONALD,D. (1987). **Groundnut Rust Disease Epidemiology and Control.** Proceedings of a discussion group meeting 24-28 Sep 1984., ICRISAT Centre, Patacheru, A.P., pp.27-39.

(Received: April 1995 Revised: August 1995)

Madras Agric. J., 83(11): 691-693 November 1996
https://doi.org/10.29321/MAJ.10.A01085

AZOSPIRILLUM INOCULATION ON SUGARCANE

R. DURAI and V.K. RAVICHANDRAN

Department of Agronomy
Agricultural College and Research Institute
Tamil Nadu Agricultural University
Coimbatore 641 003

ABSTRACT

Field experiments were conducted at the Sugarcane Research Station, Cuddalore with the objective of finding out the use of *Azospirillum* sp. as a supplemental source of N in sugarcane crop cv Co. 6304. Application of 7 kg of *Azospirillum* sp. along with 225 kg of N ha^{-1} recorded same cane yield to that of 300 kg N ha^{-1}, resulting in a saving of 75 kg N ha^{-1}. The influence of *Azospirillum* was more evident at optimum N levels rather than at higher levels.

KEY WORDS : Sugarcane, *Azospirillum*, Inoculation, Yield

Sugarcane crop requires higher dose of nitrogen upto 300 kg ha^{-1}, as compared to many other crops. Consequent on the release of high yielding varieties of sugarcane, the demand for N may go up further. In the late 1960s and early 1970s, synthetic N fertilizer was being used increasingly to meet the extra N required for high crop yields. With the present energy crisis and the concomitant escalating cost of synthetic N fertilizer, the scientists are exploring the alternative sources of N for crop production. In this context, an attempt was made to study the use of *Azospirillum* sp in sugarcane as a supplemental source of N According to Subba Rao (1986), *Azospirillum brasilense* has been established as the best Indian isolate for sugarcane and soil + powdered FYM in the ratio of 1:1 acts as an ideal carrier. Experiments conducted by Michael Raj *et al.* (1984) in four types of soils over two seasons indicated that *Azospirillum* was observed to be more effective in enhancing the cane yield. In a field experiment conducted by Rajaram and Srinivasan (1986) under loamy soil condition proved that *Azospirillum* application to sugarcane either as sett treatment or soil application along with 200 kg N ha^{-1} as urea showed the same available N status as that of 280 kg N ha^{-1} as urea alone. Based on the results available and also to explore further the utilisation of *Azospirillum* sp. in sugarcane in east coast zone of Tamil Nadu as supplemental source of N, the present research study was undertaken at the Sugarcane Research Station, Cuddalore, Tamil Nadu.

MATERIALS AND METHODS

Field experiments were carried out consecutively for two years (1989-90 and 1990-91) under sandyloam soil condition at the Sugarcane Research Station, Cuddalore with the variety Co. 6304, in plant crop. The design was randomised block with three replications. The experiment comprised of ten treatments (Table 1). Of *Azospirillum* (35 pockets, each 200 g) was applied with 5 pockets as sett treatment, 20 pockets as basal dressing, and the remaining as top dressing on 30th

Table 1. Yield and quality characters of sugarcane as influenced by N and *Azospirillum*

Treatments	Population / ha '000			Cane yield (t/ha)			CCS (%)			Sugar yield (t/ha)		
	I year	II year	Mean	I year	II year	Mean	I year	II year	Mean	I year	II year	Mean
Control	64.3	66.9	65.6	64.7	68.6	66.6	11.0	10.9	10.9	7.1	7.4	7.2
Azospirillum alone	77.5	79.4	78.4	70.3	75.4	72.8	11.4	10.5	10.9	8.0	7.9	7.9
75 kg N/ha	84.2	85.3	84.8	99.5	102.0	100.7	11.0	10.4	10.7	10.9	10.6	10.7
75 kg N/ha + Azo	87.1	93.3	90.2	106.0	108.5	107.2	11.1	10.1	10.6	11.7	10.9	11.3
150 kg N/ha	92.2	100.7	96.5	110.3	116.7	113.5	11.3	10.3	10.8	12.4	12.0	12.2
150 kg N/ha + Azo	98.3	103.3	100.8	120.4	123.0	121.7	11.0	10.4	10.7	13.2	12.7	12.9
225 kg N/ha	105.1	110.1	107.6	126.5	132.3	129.5	11.1	10.5	10.8	14.0	13.8	13.9
225 kg N/ha + Azo	106.1	115.7	110.9	133.6	139.4	136.5	12.1	10.6	11.3	16.1	14.7	15.4
300 kg N/ha	101.5	121.1	111.3	138.4	140.8	139.6	11.8	10.5	11.1	16.3	16.6	16.4
300 kg N/ha + Azo	103.1	125.7	114.4	141.3	143.5	142.4	11.9	10.4	11.1	16.8	14.9	15.8
SE	2.14	2.71		1.7	1.67		1.24	0.93		1.45	1.51	
CD at 5%	6.05	7.56		4.8	4.72		NS	NS		4.10	4.27	

mixed with enough compost or FYM before application. While total P_2O_5 was given as basal along the furrows at the time of planting, N and K_2O were applied in three equal splits on 30, 60 and 90 DAP.

RESULTS AND DISCUSSION

The influence of *Azospirillum* was more evident at optimum levels and it resulted in saving of 75 kg N ha^{-1}. The millable cane population in the plant crop (Table 1) was markedly increased with application of nitrogen and *Azospirillum* sp. The significantly highest population of 1,14,400 canes ha^{-1} was recorded in the treatment, 300 kg N ha^{-1} + *Azospirillum* 7 kg ha^{-1}. Regarding cane yield, significant difference could be noticed due to biofertilizer inoculation, upto 6.2 t ha^{-1} (Table 2). In both the years of study, similar results were obtained. Application of 300 kg N/ha alone recorded a mean yield of 139.6 t/ha. This showed that there was a saving of 75 kg N/ha due to the addition of Azospirillum. Though the commercial cane sugar remained unchanged, significant difference could be observed in sugar yield. It varied in the same way as the cane yield. At higher dose of 300 kg N/ha, the influence of Azospirillum in cane yield was 2.8 t/ha while it was 7.1 t/ha at

Table 2. Cane yield (t ha^{-1})

Bio-fertilizer	With Azospirillum			Without Azospirillum			Difference
	I Year	II Year	Mean	I Year	II Year	Mean	
Control	70.3	75.4	72.8	64.7	68.6	66.6	6.2
5 kg/ha	106.0	108.5	107.2	99.5	102.0	100.7	6.5
150 kg/ha	120.4	123.0	121.7	110.3	116.7	113.5	8.2
225 kg/ha	133.6	139.4	136.5	126.5	132.3	129.4	7.1
300 kg/ha	141.3	143.5	142.4	138.4	140.8	139.6	2.8
Mean	114.3	117.9	116.1	107.8	112.0	109.9	6.2

225 kg N/ha level. It indicated that the effect of Azospirillum inoculation could be more indicative at optimum dose of N rather than at higher doses.

It may be concluded that the supplemental application of 7 kg of *Azospirillum* (35 pockets) along with 225 kg N/ha, produced cane yield equal to that of 300 kg N/ha. Influence of *Azospirillum* was more evident at optimum N levels.

REFERENCES

SUBBA RAO, N.S., (1986). **Bio-fertilizers in Agriculture** Oxford and IBH Publishing Co., New Delhi.

MICHAEL RAJ, S., SRINIVASAN, T.R., and MOHAN NAIDU, K. (1984). Sugarcane nutrition through bio-ferilizers. **Indian J. Pl. Nutr. 3:** 183-189.

RAJARAM, V. and SRINIVASAN, T.R. (1986). Methods of application of bio-fertilizers in relation to sugarcane varieties. **Indian J. Agron., 31:** 410-413.

(Received : May 1995 Revised : June 1995)

Madras Agric. J., 83(11): 693-696 November 1996

PATH ANALYSIS IN COLOURED LINTED COTTON VARIETIES

K.AMUTHA, T.S.RAVEENDRAN AND D.KRISHNADOSS

School of Genetics
Tamil Nadu Agricultural Universtiy
Coimbatore 641 003

ABSTRACT

Estimation of correlation coefficients in 15 parental genotypes revealed positive influence of boll weight, plant height, number of bolls per plant and days to maturity on seed cotton yield. In hybrids, number of bolls per plant and lint index were the most important characters which influenced the yield directly or indirectly. All the characters except days to first boll bursting and seed index had significant and positive correlation with seed cotton yield at the genotypic and phenotypic levels in parents. In hybrids, plant height, number of sympodia per plant, number of bolls per plant and boll weight had positive association with seed cotton yield at both the levels. In parents, colour of the lint had a positive correlation with fibre fineness and ginning outturn at the genotypic level while it was negatively correlated with bundle strength both at genotypic and phenotypic level. The colour of lint had negative relationship with 2.5 per cent span length and bundle strength in the hybrids, the respective genotypic and phenotypic correlation coefficients being negative. The association analysis showed the necessity for employing special techniques to break the linkage between lint colour and fibre quality in the breeding programme to evolve colour cotton varieties.

A knowledge on genetic correlation between different characters is very essential for a plant breeder to plan the crop improvement programmes. It assumes importance in the context of constructing a selection index as it gives the strength of relationship between the characters studied. Path coefficient analysis (Wright, 1921) provides an effective means of finding direct and indirect causes of association. The main yield components as revealed from earlier investigations are boll number, boll weight and number of sympodial branches (Singh *et al.*, 1979). Earlier reports also indicated that colour was negatively associated with lint length, and lint colour had pronounced effects on lint length, fibre maturity and fibre fineness (Silow, 1944). Since yield components of coloured linted cotton varieties have not been investigated earlier, a study was undertaken and the results are reported.

MATERIALS AND METHODS

The material consisted of 10 coloured linted varieties (Arkansas Green, Texas Green, Brymer Brown, Higgin Botham, Nankeen Brown, Russian Brown, Lousiana Brown, Algerian Brown, Hirsutum Tashkent and Parbhani American (Female lines) and 5 white-linted standard varieties, (MCU-5, MCU-7, MCU-9, KC-1 and LRA-5166 (testers) and the resulting 50 F_1's were raised in an experiment. The parents were also raised in an experiment adjacent to the hybrid plot. Each group was grown in a randomised block design with three replications at the Department of Cotton, Tamil Nadu Agricultural University, Coimbatore during summer season in 1993. Each hybrid/parent was raised in single row plot of 6m length with a spacing of 75 cm between rows and 30 cm between plants in a row. Observations were recorded on five competitive plants selected at