

## EFFECT OF INOCULATION OF *Acetobacter diazotrophicus* (ACN) WITH DIFFERENT LEVELS OF NITROGEN ON THE YIELD OF SUGARCANE VARIETY CoC - 92061.

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### ABSTRACT

A field experiment was conducted in sugarcane variety CoC 92061 with 5 different levels of nitrogen with and without *Acetobacter diazotrophicus* (ACN) inoculation. All other package of practices were followed. Besides a saving of 5 percent recommended inorganic nitrogen, the yield was found to enhance due to the inoculation of *Acetobacter diazotrophicus* (ACN).

**KEYWORDS:** *Acetobacter diazotrophicus*, Biological Nitrogen Fixation, Sugarcane brix percentage, Variety CoC 92061.

Sugarcane is a commercial crop and much importance is given particularly in the cultivation aspects. The modern sugarcane cultivation technologies are formulated including the fertiliser management through organic, inorganic and biological sources. Biological Nitrogen Fixation is the potential biological process that maintains the soil nitrogen status under normal conditions.

The utilization of atmospheric dinitrogen involves the integration of the nitrogen fixation and nitrogen assimilatory pathways of the microsymbiont and the plant host (Mellor and Werner, 1990). A new diazotrophic bacterium *Acetobacter diazotrophicus* found living inside sugarcane roots, stems and leaves was reported by Cavalcante and Dobereiner (1988). Microbial activities in the rhizosphere and endorhizosphere, particularly biological nitrogen fixation, are important in increasing the crop productivity. Researchers found that nitrogen fixing *Acetobacter* is to colonise in the roots, stems and leaves of sugarcane to contribute the enough nitrogen requirement of sugarcane. An investigation was made to know the effect of *Acetobacter diazotrophicus* on growth and yield of sugarcane variety CoC - 92061.

### MATERIALS AND METHODS

Sugarcane variety CoC - 92061 was selected for its importance in national economy and its demand. *Acetobacter diazotrophicus* was isolated from field grown sugarcane and was confirmed at

Main Biocontrol Research Laboratory, Chengalpattu managed by Tamilnadu Co-Operative Sugar Federation (TNCSEF). Sugarcane was grown in one cent plots in three replications with two sets of graded levels of nitrogenous fertiliser given as 25, 50, 75 and 100 percent recommended N dose. One set had *Acetobacter diazotrophicus* inoculation. The first treatment had neither *Acetobacter diazotrophicus* inoculation nor inorganic source nitrogen to serve as control and the sixth treatment had only *Acetobacter diazotrophicus* inoculation.

All other package of practices was carried out and sugarcane was harvested on maturity. The yield and sugar per centage in terms of brix were recorded for each treatment.

### RESULTS AND DISCUSSION

The results from the field experiment supported the evidence of *Acetobacter diazotrophicus* as the potential nitrogen fixing organism in sugarcane. The inoculation of *Acetobacter diazotrophicus* @ 5 kg/ha with 50 percent recommended N had increased yield (128.10 t/ha) than uninoculated plots (99.63 t/ha). It was on par with the yield (128.93 t/ha) obtained from the treatment given with 100 per cent recommended N alone. Also the treatments which had 75 percent, 100 percent recommended N with *Acetobacter diazotrophicus* at 2 kg / ha were not significantly increased the yield. Thus the inoculation of *Acetobacter diazotrophicus* as

Table 1. Effect of inoculation of *A. diazotrophicus* with different levels of nitrogen on the yield and brix percentage of sugarcane variety CoC-92061

Treat-ments	Yield (t/ha)	Percentage increase over control	Brix per-centage	Percentage increase over control
T <sub>1</sub>	63.33	-	13.6	-
T <sub>2</sub>	86.97	37.32	13.9	2.20
T <sub>3</sub>	99.63	57.31	14.4	5.82
T <sub>4</sub>	116.27	83.59	15.1	11.03
T <sub>5</sub>	128.93	103.58	15.8	16.17
T <sub>6</sub>	74.23	17.21	14.3	5.14
T <sub>7</sub>	104.20	64.53	15.1	11.02
T <sub>8</sub>	128.10	102.27	15.8	16.17
T <sub>9</sub>	129.10	103.85	15.8	16.17
T <sub>10</sub>	129.50	104.48	16.0	17.64

C.D. 1.510  
(P=0.05) 0.324

T <sub>1</sub> - No N+	NO <i>A. diazotrophicus</i>
T <sub>2</sub> - 25 % N +	- do -
T <sub>3</sub> - 50 % N +	- do -
T <sub>4</sub> - 75 % N +	- do -
T <sub>5</sub> - 100 % N +	- do -
T <sub>6</sub> - No N +	<i>A. diazotrophicus</i> @ 2kg/ha
T <sub>7</sub> - 25 % N +	- do -
T <sub>8</sub> - 50 % N +	- do -
T <sub>9</sub> - 75 % N +	- do -
T <sub>10</sub> - 100 % N +	- do -

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## POPULATION DYNAMICS OF TEAK DEFOLIATOR, *Hyblaea pura* IN COMMERCIAL TEAK PLANTATION\*

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### ABSTRACT

The population dynamics of teak defoliator, *Hyblaea pura* was studied on three commercial teak plantations in South India. Defoliator, *H. pura* occurred in two distinct epidemic infestations in all the sites, one during April-June and the second during September-December. The correlation between larval population and weather parameters showed that rainfall had highly significant positive influence and wind velocity had negative influence on larval population. Other factors like relative humidity, minimum and maximum temperatures were of no significance.

**KEY WORDS:** Commercial teak plantation, Defoliator, Population dynamics.

Nowadays teak, *Tectona grandis* cultivation has become an attractive commercial venture in the plains of Tamil Nadu. Many private firms have

nitrogen fixing organism reduced 50 percent of the recommended fertilizer nitrogen requirement.

It was noted that the cane brix percentage considerably increased when *Acetobacter diazotrophicus* was inoculated. Boddey *et al.*, (1991) reported that some sugarcane varieties could obtain large contributions of plant associated biological nitrogen fixation ranging from 60 percent to 80 percent of total plant nitrogen equivalent to over 200 kg/ha/yr. So it can be concluded that the inoculation of *Acetobacter diazotrophicus* would increase yield of sugarcane besides reducing the application of inorganic nitrogen.

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started investing more money on teak. The major problem these entrepreneurs often encounter is the pests, especially the defoliator *Hyblaea pura*

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