

21 CJA AGRESCO Proceeding No. 21.3.3.4

FORM-C: NEW TECHNICAL PROGRAMME

01.	Experiment No. and Title	: Standardization of number of pheromone traps for sugarcane internode borer
02.	Budget Head	: B.H. 12939 Scheme on Forecasting Weather, Pest and Disease at Navsari
03.	Collaborative department, if any	: Main Sugarcane Research Station, Navsari Agricultural University, Navsari
04.	Background information:	<p>Sugarcane is an important cash crop for earning foreign exchange. It is the second most important industrial crop of India and Gujarat and more specifically in the South Gujarat region. It is estimated that insect pests cause about 20 to 40% yield losses. In South Gujarat, borers are one of the most significant insect pests that attack sugarcane, thus reducing crop production and productivity. Among all the borers, sugarcane internode borer, <i>Chilo sacchariphagus indicus</i> (Kapur) (Lepidoptera: Crambidae) damage noticed regularly and reported yield loss about 10-35% (Yalawar <i>et al.</i>, 2010 & Srikanth <i>et al.</i>, 2022). Sugarcane internode borer (INB) attacks both commercial varieties (David, 1986) and germplasm (Mahesh <i>et al.</i>, 2018) in the grand growth phase reducing length and thickness of affected internodes. Although the borer generally attacks formative internodes, it also destroys the apical meristem in young and weak shoots leading to dead heart production. Further, larvae enter from the top and feed on the spindle above the meristem or reach and injure the meristem resulting in dead heart production. Internode borer and other major borers management options through chemical insecticides are available but with costlier insecticides to the farmers. Further, many farmers face the issue during maturity and ripening phase for spraying operation due to crop height and dense nature of the crop. In context to non-chemical and low-cost management strategies for sugarcane internode borer, sex pheromone-based strategy could play a vital role in internode borer management.</p> <p>In the light of the response of number of traps and borer incidence, in fact the number of traps for the internode borer were established for very old varieties and long time ago, there perhaps is a urgent need to determine/standardize the number of traps as per current situation and assess the number of traps to be installed in present weather conditions. In view of the above observations, it becomes imperative to have a relook at the precise number of sex pheromone traps to be installed against INB.</p> <p>To fill up the lacuna and give the immediate remedy to the farmer regarding number of traps to be installed for the mass trapping of sugarcane internode borer, the present investigation is proposed with following objective under south Gujarat condition.</p>
05.	Objectives	: To quantify the number of pheromone traps for management of sugarcane internode borer
	Null Hypothesis & Alternate Hypothesis	: H ₀ : The effect of number of traps/ha on incidence of internode borer are same. H ₁ : The effect of number of traps/ha on incidence of internode borer are different.

06. Principal investigator and associates	:	1. Dr. C. U. Shinde, Assistant Professor [PI] 2. Dr. K. M. Patel, Assistant Professor [Co-PI] 3. Dr. R.C. Patel, MSRS, NAU, Navsari [Co-PI] 4. Dr. J. J. Pastagia, Professor and Head (Project Incharge) [Associate]	
07. Location and Agro-climatic sub-region	:	Main Sugarcane Research Station, Navsari Agricultural University, Navsari & Farmers field South Gujarat Heavy Rainfall Zone-I AES-II	
08. Year and Season	:	2025-26	
09. Crop and Variety	:	Sugarcane and CoN 15071	
10. Experimental details	:	As hereunder	
	(a) Treatments	Tr. No.	Treatments
		T ₁	30 sex pheromone trap/ha (Distance between two trap @ 18 m)
		T ₂	40 sex pheromone trap/ha (Distance between two trap @ 16 m)
		T ₃	50 sex pheromone trap/ha (Distance between two trap @ 14 m)
		T ₄	Control (No sex pheromone trap) [Treatment for comparison of insect damage]
	(b) Experimental Design	Large Plot Technique	
	(c) Repetitions	05 (Five)	
	(d) Plot size (if applicable)	0.5 acre per each treatment	
	(e) Spacing	1.2 meter between two rows	
	(f) Seed rate (kg/ha)	--	
	(g) Manures and fertilizer	--	
	(h) Any other detail, if required	--	
11. Observations to be recorded	:	<ul style="list-style-type: none"> • Incidence (%) • Intensity (%) • Infestation index • Moth catches per trap per week • Cane yield (kg/plot) 	
12. Methodology:	:	<ul style="list-style-type: none"> • To evaluate the effect of sex pheromones on incidence of sugarcane internode borer, a field experiment will be conducted as per the standard procedure 	

suggested in the “Research methodology for recording observations of sugarcane pests” published under “AICRP on Sugarcane” by Radadia and Shinde (2013).

- For mass trapping purpose, number of pheromone traps/ha as per the treatments will be installed at crop canopy level in different locations at the initiation of grand growth stage and maintained till the harvesting of the crop in the sugarcane field.
- Observations on numbers of male moth catches in trap will be recorded from ten randomly selected traps at weekly intervals throughout the period of the pest. Trapped moths will be removed from the trap after recording their number. Thus, the mean number of moth capture will be worked out.
- The distance of 20 m will be maintained between two pheromone traps to avoid trap interference and the position of traps will also be randomly changed at fortnight intervals to nullify the effect of the position of the trap and moth catches.
- Pheromone septa will be replaced by fresh one after 45 days. Isolation distance of 500 m will be maintained between each location. Each treatment will be imposed on separate location.
- The half of the acre sugarcane field will be kept without traps (control) for comparison of insect infestation level.
- After the installation of traps, following observations will be recorded from each treated plot and control plot.
- Observations will be recorded from at least 3-meter row length per treatment per repetitions for INB incidence (%) at harvest. Count the total number of canes and total number of infested canes due to internode borer at harvest.
- Observations will be recorded from 25 canes per treatment per repetitions for intensity (%) of sugarcane internode borer at harvest.
- The cane damaged due other borer infestation will be omitted from the observations. Cane damaged due to sugarcane borer complex will be considered in to the count, if INB damage symptoms seen on the same cane. Thus, sugarcane internode borer damage cane will be sorted during the multiple borer infestation.
- Cane yield and economics will be calculated as per standard methodology.
- Incidence (%), intensity (%) and infestation index of INB will be worked out with the following formula.

INB Incidence (%)

$$= \frac{\text{Total number of infested cane due to INB observed from 3 mt row length}}{\text{Total cane observed from 3 mt row length}} \times 100$$

INB Intensity (%)

$$= \frac{\text{Total number of infested internodes due to INB}}{\text{Total number of internodes observed from 3 mt row length}} \times 100$$

$$\text{INB Infestation index} = \frac{\% \text{ incidence} \times \% \text{ intensity}}{100}$$
