

21 CJA AGRESCO Proceeding No. 21.3.3.5

FORM-C: NEW TECHNICAL PROGRAMME

01.	Experiment No. and Title	: Management of sugarcane whitefly, <i>Aleurolobus barodensis</i> (Mask.) under south Gujarat
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: Sugarcane is an important cash crop in agriculture sector of India. Sugarcane is a main source of sugar in the world. About 60 per cent sugar of the world production is obtained only from sugarcane. Production and productivity have been affected by several insect pest and diseases which are major constraints and responsible for low productivity and production of sugarcane in India. These biotic stresses are also reduced the sugar recovery in sugarcane. Sugarcane is known to be attacked by about 228 insects and non-insect pests in India (David and Nandagopal, 1986). Sucking pest like whitefly are the major constrain in the cane production. There are three species of whiteflies viz., <i>Aleurolobus barodensis</i> Maskell, <i>Neomaskellia bergii</i> Sign and <i>Neomaskellia andropogonis</i> Corbett attacking the sugarcane. Among them, <i>A. barodensis</i> is the important one. The leaves turn yellow and/or pinkish in case of severe infestation. It's attack in the early stages of crop growth results in a serious setback to the crop and at the later stages causes deterioration in the quality of juice. In addition, sooty mould develops on the honey-dew exuded by this insect, interfere with the photosynthetic activities of the leaves, render the tops of canes unfit as cattle feed (Nikpay and Goebel, 2016). The losses by this pest to the tune of 15-20 per cent in cane yield and 1-2 units in sugar recovery and 41.9 per cent in sucrose content of juice have been reported by Gupta and Nagar, 1951 and (Singh <i>et al.</i> , 1956). In the recent past, sugarcane whitefly causes enormous losses to the sugarcane under south Gujarat condition particularly Navsari, Valsad, Surat, Tapi and Bharuch district cane growing areas and the same issue has been raised by all the Sugar factories of the zone and farmers to the University to urgent solution at least ad-hoc recommendation. Therefore, it is felt necessary to give the urgent remedy to the farmers against sugarcane whitefly. Hence, an experiment on management of sugarcane whitefly, <i>A. barodensis</i> through insecticides in combination with cultural methods against under South Gujarat conditions is proposed with following objectives.	
05.	Objectives	: To study the bioefficacy of different newer treatment against <i>A. barodensis</i>
	Null Hypothesis & Alternate Hypothesis	: H ₀ : The bioefficacy of different treatments on incidence of sugarcane whitefly and its impact on sugarcane yield are same. H ₁ : The bioefficacy of different treatments on incidence of sugarcane whitefly and its impact on sugarcane yield are different.

06. Principal investigator and associates	:	1. Dr. K. M. Patel, Assistant Professor [PI] 2. Dr. C. U. Shinde, Assistant Professor [Co-PI] 3. Dr. R. C. Patel, MSRS, NAU, Navsari [Co-PI] 4. Dr. A. T. Patel, Farm Manager [Co-PI]																																						
07. Location and Agro-climatic sub-region	:	Main Sugarcane Research Station, NAU, Navsari South Gujarat Heavy Rainfall Zone I- AES II																																						
08. Year and Season	:	2025-26																																						
09. Crop and Variety	:	Sugarcane and Co 86032																																						
10. Experimental details	:	As hereunder																																						
(a) Treatments	:	<table border="1"> <thead> <tr> <th>Tr. No.</th> <th>Treatment</th> <th>Conc. (%)</th> <th>Quantity required per 10 litre of water</th> </tr> </thead> <tbody> <tr> <td>T₁</td> <td>Destruction of puparia by removing infested leaves + Pyriproxyfen 10 EC + 2% Urea</td> <td>0.01 + 2%</td> <td>10 ml + 200 g</td> </tr> <tr> <td>T₂</td> <td>Destruction of puparia by removing infested leaves + Dimpropridaz 120 g/l SL + 2% Urea</td> <td>0.024 + 2%</td> <td>20 ml + 200 g</td> </tr> <tr> <td>T₃</td> <td>Destruction of puparia by removing infested leaves + Diafenthiuron 30+Pyriproxyfen 8 SC (Ready mix formulation) + 2% Urea</td> <td>0.076 + 2%</td> <td>20 ml + 200 g</td> </tr> <tr> <td>T₄</td> <td>Pyriproxyfen 10 EC</td> <td>0.01</td> <td>10 ml</td> </tr> <tr> <td>T₅</td> <td>Dimpropridaz 120 g/l SL</td> <td>0.024</td> <td>20 ml</td> </tr> <tr> <td>T₆</td> <td>Diafenthiuron 30+Pyriproxyfen 8 SC (Ready mix formulation)</td> <td>0.076</td> <td>20 ml</td> </tr> <tr> <td>T₇</td> <td>Destruction of puparia by removing infested leaves</td> <td>-</td> <td>-</td> </tr> <tr> <td>T₈</td> <td>Control (water spray)</td> <td>-</td> <td>-</td> </tr> </tbody> </table> <p>All the concentration will be worked out by using 1000 litres of water/ha for spraying (spray fluid). None of chemical is registered by CIB & RC against sugarcane whitefly (As on 30/11/2024). All the above listed insecticides are selected based on their mode of action & label claim in other crops against different species of whitefly.</p>			Tr. No.	Treatment	Conc. (%)	Quantity required per 10 litre of water	T ₁	Destruction of puparia by removing infested leaves + Pyriproxyfen 10 EC + 2% Urea	0.01 + 2%	10 ml + 200 g	T ₂	Destruction of puparia by removing infested leaves + Dimpropridaz 120 g/l SL + 2% Urea	0.024 + 2%	20 ml + 200 g	T ₃	Destruction of puparia by removing infested leaves + Diafenthiuron 30+Pyriproxyfen 8 SC (Ready mix formulation) + 2% Urea	0.076 + 2%	20 ml + 200 g	T ₄	Pyriproxyfen 10 EC	0.01	10 ml	T ₅	Dimpropridaz 120 g/l SL	0.024	20 ml	T ₆	Diafenthiuron 30+Pyriproxyfen 8 SC (Ready mix formulation)	0.076	20 ml	T ₇	Destruction of puparia by removing infested leaves	-	-	T ₈	Control (water spray)	-	-
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	(b) Experimental Design	:	Randomized Block Design (RBD)	
	(c) Replications	:	3	
	(d) Plot size (if applicable)	:	Gross	: 6 × 6 m = 36 sq. m.
		:	Net	: 6 × 3.6 m = 21.6 sq. m.
	(e) Spacing	:	1.2 meter between two rows	
	(f) Seed rate (kg/ha)	:	1,00,000 eye buds/ha	
	(g) Manures and fertilizer	:	N: P: K 250: 125: 125 kg/ha	
	(h) Any other detail, if required	:	NA	
11.	Observations to be recorded	:	<ul style="list-style-type: none"> • Number of whitefly (nymphs and puparia)/ 2.5 sq. cm leaf area • Cane yield (kg/plot) 	
12.	<p>Methodology:</p> <p>Time and method of application:</p> <ul style="list-style-type: none"> • All the recommended agronomical practices will be followed to raise sugarcane crop. Need base spray will be made during the present investigation. The first spray will be applied at initiation of the whitefly population and the subsequent spray will be applied at 28 days after each spray. • The observations will be recorded one day before spray as well as 7, 14, 21 and 28 days after each spray. All the insecticides will be applied as a foliar need-based spray by using a knapsack sprayer fitted with hollow cone nozzle. • The control plot will be sprayed with water before insecticide application to determine the quantity of water required for insecticidal spray for each plot. • Destruction of whitefly puparia by removing infested leaves from respective treatments will be made at one week interval. During the subsequent application of treatments, the destruction of whitefly puparia will be made first before the second and onwards application. <p>Method of recording observation:</p> <ul style="list-style-type: none"> • To evaluate the different management strategies against sugarcane whitefly, 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) with slight modification as per the work of Wali Muhammad <i>et al.</i> (2021). • To record the observations of whitefly, ten canes will be randomly selected and tested from each net plot. Two leaves per cane will be randomly selected for recording the observation on whitefly. Number of whitefly (nymphs and puparia) will be counted from three spots of selected leaf i.e. proximal, middle and distal area. From each selected spot, 1 cm × 2.5 cm = 2.5 sq. cm. area will be critically 			

observed for recording the observation on whitefly. Thus, average population per 2.5 sq. cm leaf area will be worked out. The data obtained will be statistically analyzed by adopting standard statistical techniques (Steel and Torrie, 1980) after suitable transformation, if required.

Cane yield and Economics:

Cane yield and yield parameters

- Number of millable canes: The counts for number of millable canes will be made at the harvest from the net plot and the average will be worked out.
- Thus, number of millable canes per meter row length will be converted to hectare. The yield of sugarcane crop will be recorded at harvest from each net plot area (kg/plot) and converted in to hectare basis (t/ha).
- The cane yield per hectare will be calculated for each treatment and statistically analyzed for interpretation by following standard statistical technique (Steel and Torrie, 1980). The increase in yield over control will be worked out by following formula given by Khosla (1977).

Increase in yield over control (%)

$$= \frac{\text{Yield in treatment} - \text{Yield in control}}{\text{Yield in control}} \times 100$$

- Residue analysis of effective treatment/s will be done at the time of harvest.

Economics:

- To find out the economics of different treatments evaluated against sugarcane whitefly, Incremental Cost Benefit Ratio (ICBR) will be worked out. For this purpose, total cost of insecticidal treatment per hectare will be calculated for each treatment based on the prevailing market price and the harvesting cost incurred from treatment over control.
- The net gain (yield) over control will be calculated by subtracting the cane yield obtained in control treatment from the sugarcane yield obtained in each insecticidal treatment. Then, the realization will be worked out for each treatment based on increased yield (q/ha) over control. The net profit (Rs./ha) for each treatment will be computed by deducting the cost of insecticidal treatment from the value of realization over control.
- The gross ICBR i.e. net gain in rupees per rupee cost of insecticidal treatment will be calculated by dividing net profit with the cost of treatment.
