UNIVERSITY OF AGRICULTURAL SCIENCES, BANGALORE

Zonal Agricultural Research Station ,V.C.Farm, Mandya-571 405

No. ZARS/AICRP(SC)/ /2012-13 Date:24 / 06 / 2013

To,

Dr G.G,Radadia

P.I (ENT). AICRP (Sugarcane)

Professor of Entomology

N.M. College of Agriculture

Navasari Agricultural University

Navasari -396450

GUJARAT STATE

Sir,

Sub: Submission of Annual report 2012-13 of Entomology AICRP (Sugarcane) reg...

With reference to the above subject I am here with submitting annual report of entomology AICRP (Sugarcane) Mandya, for your kind information and further needful.

Thanking you,

Yours faithfully,

(V.N.Patel)

Professor of Entomology

Z.A.R.S, V.C.Farm,

Mandya 571405

KARNATAKA STATE

UNIVERSITY OF AGRICULTURAL SCIENCES, BANGALORE

ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE

ANNUAL REPORT

OF

SUGARCANE ENTOMOLOGY

2012-2013

Submitted to

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ZONAL AGRICULTURAL RESEARCH STATION

V.C. FARM, MANDYA-571 405

KARNATAKA

SUGARCANE ENTOMOLOGY (AICRP 2012-13)

The research trials of Entomology section in All India Coordinated Research Project on sugarcane mainly focuses on the varietal clones exhibiting resistance to various pests and diseases, resurgence and co-evolution of pests on sugarcane. Therefore, attempts have been also made to study the genotypes with enhanced resistance in relation to yield and yield attributing characters for further inclusion in varietal trials.

1. Reporting period	**:**	April 2012- March 2013
2. Location	**:**	Zonal Agricultural Research Station, V.C. Farm, Mandya-571 405
3. Project Title	**:**	All India Coordinated Research Project on Sugarcane

Objectives:

AICRP (Entomology)

a) Screening zonal varieties for their reaction to major insect pests

b) Monitoring and identifying the key insect pests and natural enemies in the zone

c) Management of sugarcane borers by non chemical meance

Project E.4.1: Evaluation of Zonal Entries / Genotypes, for their reaction against Major Insect pests.

2. Objectives: To grade the entries in the Zonal varietal trials for their behavior towards damage by key pests in the area.

3. Experimental details:

a. Location: ZARS, Mandya b. Situation: Irrigated

c. No. of Entries: 08 +03 d. Fertilizer (kg/ha)250:100:125 NPK

e. Replication: Three f. Plot size: 6M x 6R x 0.9M =32.4 m^2

4. Date of planting: 13/01/2012

5. Results:

Table 1: Reaction of Sugarcane Genotypes under IVT Early 1st plant trial against Early Shoot Borer, Top Shoot Borer, Internode borer and Sugarcane mealybug.

Sl.No	Genotype	Incidence of Borers (%)							Incidence of Mealybug (%)	
		ESB	I.G*	TSB	I.G	INB	I.G	I. I**	M.bug	I. G
1	Co 09002	14.89(22.65)#	**LS**	9.50(17.81)	LS	25.92 (29.80)	MS	5.24	5.25(13.20)	MS
2	Co 09003	8.00(16.40)	LS	7.25(15.59)	LS	27.59 (31.06)	MS	11.42	11.41(19.73)	MS
3	Co 09004	11.00(19.33)	LS	13.25(21.29)	MS	3.33 (6.14)	LS	0.45	0.42(3.66)	LS
4	Co 09005	15.41(23.07)	MS	16.75(24.15)	MS	33.33 (33.93)	MS	8.48	8.50(16.89)	MS
5	Co 09006	18.83(25.71)	MS	20.75(27.06)	MS	28.57 (31.18)	MS	5.67	5.67(13.76)	MS
6	Co 09007	10.66(19.04)	LS	3.50(10.76)	LS	25.0 (25.0)	MS	4.04	4.08(11.61)	LS
7	CoN 09071	18.25(25.26)	MS	9.00(17.44)	LS	8.33(13.80)	LS	1.03	1.00(5.61)	LS
8	CoN 09072	15.33(22.99)	MS	6.00(14.17)	LS	40.74(39.37)	HS	19.19	19.17(25.95)	MS
9	Co 85004	12.83(20.95)	LS	10.00(18.39)	LS	35.71(29.37)	MS	11.79	11.83(20.10)	MS
10	Co 94008	18.33(25.29)	MS	14.00(21.95)	MS	10.00(11.07)	LS	2.82	2.83(9.59)	LS
11	CoC 671	10.83(19.18)	LS	10.50(18.84)	LS	25.93(25.69)	MS	5.17	5.17(13.09)	MS
	SEm	1.06		1.00		NS			0.69	
	CD	3.14		2.95					2.05	

 # = Arc sign transformed values *I.G = Infestation Grade ** I.I = Infestation Index

1. Experimental details:

a. Location: ZARS, Mandya b. Situation: Irrigated

c. No. of Entries: 10+02 d. Fertilizer (kg/ha) 250:100:125 NPK

e. Replication: Three f. Plot size: 6M x 6R x 0.9M =32.4 m^2

2. Date of planting: 17/12/2011

Table2: Reaction of Sugarcane Genotypes under IVT Mid-late 1st plant trials against Early Shoot Borer, Top Shoot Borer, Internode borer and Sugarcane mealy bug.

Sl.No	Genotype	Incidence of Borers (%)							Incidence of Mealybug (%)	
		ESB	I.G	TSB	I.G*	INB	I.G	I. I**	M.bug	I. G
1	Co 09009	5.16(13.05)#	LS	16.00(23.37)	MS	33.33(35.22)	MS	3.30	2.75(9.50)	LS
2	Co 09010	7.83(16.25)	LS	12.25(20.47)	MS	43.33(41.70)	HS	4.74	3.50(10.74)	LS
3	Co 09012	2.92(9.71)	LS	8.50(16.94)	LS	31.43(33.76)	MS	2.92	1.50(6.88)	LS
4	Co 09013	5.00(12.88)	LS	13.50(21.55)	MS	45.45(42.36)	HS	2.43	1.75(7.56)	LS
5	Co 09014	2.67(9.35)	LS	9.25(17.68)	LS	30.55(33.62)	MS	4.19	2.50(9.07)	LS
6	Co 02040	6.67(14.96)	LS	27.33(31.41)	HS	25.00(29.79)	MS	9.97	7.75(16.07)	MS
7	CoN 09073	8.25(16.68)	LS	14.75(22.49)	MS	41.67(39.62)	HS	5.76	4.50(12.23)	LS
8	CoN 09074	5.50(13.56)	LS	12.25(20.47)	MS	22.22(27.60)	MS	7.75	6.75(15.05)	MS
9	CoSnk 05102	4.00(11.44)	LS	23.50(28.99)	HS	18.18(24.76)	LS	3.95	2.25(8.62)	LS
10	CoVSI 09121	4.25(11.82)	LS	23.50(28.98)	HS	25.64(30.07)	MS	7.75	5.00(12.75)	MS
11	Co 86032	19.25(26.01)	MS	28.33(32.15)	HS	30.00(33.36)	MS	1.27	3.00(9.97)	LS
12	Co 99004	9.25(17.70)	LS	20.00(26.53)	HS	13.33(21.16)	LS	3.15	4.50(12.24)	LS
	SEm	0.709		1.030		NS			0.646	
	CD	2.08		3.82					1.89	

 # = Arc sign transformed values *I.G = Infestation Grade ** I.I = Infestation Index

1. Experimental details:

a. Location: ZARS, Mandya b. Situation: Irrigated

c. No. of Entries: 02+03 d. Fertilizer (kg/ha)250:100:125 NPK

e. Replication: Three f. Plot size: 6M x 8R x 0.9M =43.2 m^2

2. Date of planting: 20/12/2011

Table3: Reaction of Sugarcane Genotypes under AVT Early 1st plant trial against Early Shoot Borer, Top Shoot Borer, Internode borer and Sugarcane mealy bug.

Sl.No	Genotype	Incidence of Borers (%)							Incidence of Mealybug (%)	
		ESB	I.G*	TSB	I.G	INB	I.G	I. I**	M.bug	I. G
1	Co 08001	17.67(21.30)#	MS	15.50(19.84)	MS	38.75(35.07)	MS	12.82	12.75(18.20)	MS
2	CoVSI 08121	14.66(19.35)	LS	10.50(16.27)	LS	20.83(20.07)	MS	4.44	4.50(10.57)	LS
3	Co 85004	10.67(16.26)	LS	5.50(11.71)	LS	37.50(33.75)	MS	10.08	10.00(15.78)	MS
4	Co 94008	14.00(18.90)	LS	12.75(17.96)	MS	28.47(27.84)	MS	10.88	10.00(15.87)	MS
5	CoC 671	22.00(23.79)	MS	7.75(13.92)	LS	7.68(15.73)	LS	3.45	4.75(10.86)	LS
	SEm	1.202		0.86		NS			0.77	
	CD	3.26		2.66					3.26	

 # = Arc sign transformed values *I.G = Infestation Grade ** I.I = Infestation Index

1. Experimental details:

a. Location: ZARS, Mandya b. Situation: Irrigated

c. No. of Entries: 05+02 d. Fertilizer (kg/ha)250:100:125 NPK

e. Replication: Three f. Plot size: 6M x 8R x 0.9M =43.2 m^2

2. Date of planting: 27/01/2012

Table 4: Reaction of Sugarcane Genotypes under AVT Mid-late 1st plant trial against Early Shoot Borer, Top Shoot Borer, Internode borer and Sugarcane mealy bug.

Sl.No	Genotype	Incidence of Borers (%)							Incidence of Mealybug (%)	
		ESB	I.G	TSB	I.G	INB	I.G	I. I	M.bug	I. G
1	Co 08008	29.00(35.57) #	MS	9.00(17.44)	LS	22.00(21.93)	MS	1.45	3.67(11.03)	LS
2	Co 08009	17.25(24.53)	MS	8.25(16.69)	LS	40.00(38.86)	MS	3.4	2.25(8.60)	LS
3	Co 08016	30.00(33.20)	HS	4.25(11.82)	LS	26.67(25.78)	MS	2.17	4.00(11.44)	LS
4	Co 08020	27.00(31.30)	MS	9.25(17.65)	LS	33.33(35.01)	MS	2.38	6.00(14.12)	MS
5	CoSnk 08101	34.75(36.32)	HS	20.50(26.90)	HS	46.67(43.08)	HS	5.07	6.75(15.05)	MS
6	Co 86032	32.00(34.41)	HS	6.50(14.76)	LS	26.67(30.79)	MS	1.39	3.25(10.28)	LS
7	Co 99004	18.25(25.26)	MS	7.25(15.59)	LS	40.00(38.86)	MS	6.37	6.75(14.99)	MS
	SEm	1.058		0.677		NS			0.853	
	CD	3.26		2.08					2.63	

 # = Arc sign transformed values *I.G = Infestation Grade ** I.I = Infestation Index

1. Experimental details:

a. Location: ZARS, Mandya b. Situation: Irrigated

c. No. of Entries: 05+02 d. Replication: Three

e. Fertilizer (kg/ha) 250:100:125 NPK

f. Plot size: 6M x 8R x 0.9M =43.2 m^2 2. Date of planting: 20/12/2011

Table 5: Reaction of Sugarcane Genotypes under AVT Early II plant trial against Early Shoot Borer, Top Shoot Borer Internode borer and Sugarcane mealy bug.

Sl.No	Genotype	Incidence of Borers (%)							Incidence of Mealybug (%)	
		ESB	I.G*	TSB	I.G	INB	I.G	I. I**	M.bug	I. G
1	Co 07012	8.16(16.58) #	LS	5.66(13.53)	LS	26.67(26.15)	MS	1.22	74.50(59.89)	HS
2	Co 07015	9.66(18.11)	LS	8.75(17.20)	LS	26.67(26.15)	MS	2.04	27.25(31.36)	MS
3	CoN 07071	15.33(23.05)	MS	7.67(15.96)	LS	6.67(8.86)	LS	0.39	44.75(41.98)	HS
4	PI 07131	8.00(16.27)	LS	7.00(15.32)	HS	6.67(8.86)	LS	0.39	48.50(44.14)	HS
5	CoC 671	9.75(18.19)	LS	6.66(14.95)	LS	6.67(8.86)	LS	0.36	35.25(36.33)	HS
6	Co 94008	12.00(20.23)	LS	10.50(18.87)	MS	13.33(13.08)	LS	1.54	12.00(20.20)	MS
7	Co 85004	6.33(14.53)	LS	6.50(14.61)	LS	6.67(8.86)	LS	0.70	26.25(30.80)	MS
	SEm	0.81		NS		NS			2.26	
	CD	2.51							6.97	

 # = Arc sign transformed values *I.G = Infestation Grade ** I.I = Infestation Index

1. Experimental details:

a. Location: ZARS, Mandya b. Situation: Irrigated

c. Fertilizer (kg/ha)250:100:125 NPK

d. No. of Entries: 06+02 e. Replication: Three

f. Plot size: 6M x 8R x 0.9M =43.2 m^2

2. Date of planting: 16/12/2011

Table 6: Reaction of Sugarcane Genotypes under AVT Mid-late II plant trial against Early Shoot Borer, Top Shoot Borer, Internode borer and Sugarcane mealy bug.

Sl.No	Genotype	Incidence of Borers (%)							Incidence of Mealybug (%)	
		ESB	I.G*	TSB	I.G	INB	I.G	I. I**	M.bug	I. G
1	Co 07006	5.00(12.78#)	LS	8.25(16.68)	LS	44.44(41.75)	MS	10.26	20.50(26.5)	MS
2	Co 07007	13.75(21.53)	LS	19.25(26.02)	MS	50.00(45.00)	MS	12.75	33.00(35.05)	HS
3	Co 07008	19.50(26.20)	MS	8.25(16.67)	LS	27.20(31.03)	LS	8.77	14.50(22.34)	MS
4	Co 07009	28.50(32.20)	MS	21.00(27.24)	HS	50.00(45.00)	LS	6.78	11.25(19.55)	MS
5	Co 07010	31.50(34.13)	HS	26.25(30.80)	HS	20.00(23.89)	LS	3.57	5.25(13.23)	MS
6	CoSnk 07103	13.25(21.31)	LS	9.00(17.33)	LS	45.83(42.59)	MS	7.69	29.00(32.53)	MS
7	Co 86032	18.00(25.08)	MS	8.25(16.64)	LS	47.62(43.51)	LS	8.51	16.50(23.91)	MS
8	Co 99004	12.25(20.45)	LS	9.00(17.43)	LS	38.89(38.51)	LS	7.09	7.00(15.26)	MS
	SEm	1.49		0.84		4.33			1.25	
	CD	4.53		2.56		13.14			3.79	

 # = Arc sign transformed values I.G = Infestation Grade I.I = Infestation Index

Inference:

Genotypes were screened under different categories for their reaction against important pests. Among the genotypes screened the following genotypes have shown less susceptible reaction against different sugarcane pests and fared better than other genotypes and controls.

Trial	Genotypes	
	Less susceptible reaction to three pests	**Less susceptible reaction to two pests**
IVT Early	Co 09071*●#◊, Co 9007*●◊, Co 09004*#◊	Co 09002*●, Co 09003*●
IVT Midlate	Co 9012*●◊, Co 9014*●◊,Co SnK 05102*#◊	Co 9009*◊, Co 9010*◊
AVT Early (Ist PC)	Co VSI 08121*●◊	
AVT Midlate (Ist PC)	-	Co 08009●◊, Co 08016●◊, Co 08008●◊, Co 08020●
AVT Early (IInd PC)	-	Co07015*● Co 07012*●
AVT Midlate (IInd PC)	-	Co 07006*●, Co SnK 07103*● Co 07007*, Co 07008●#

*** ESB ● TSB # INB ◊ Mealy Bug**

Project E. 28: Survey and Surveillance of Sugarcane insect pests

2. Objectives: To identify the key insect-pests in the area

3. Experimental details:

a. Location: Mandya district b. Situation: Irrigated

c. Methodology: Survey was conducted once in a month in different sugar factory areas of Mandya district. Data collected on the incidence of different sugarcane pests in the factory areas is pooled and presented briefly in the table given below

4. Results:

Survey and Surveillance of Sugarcane insect pests in Mandya district

Sl. No.	PEST	LEVEL OF INCIDENCE (%)
1	Early Shoot Borer	13.5 – 61.11
2	Top Shoot Borer	8.25 – 34.50
3	Internode Borer	11.00 – 35.50
4	Sugarcane Pyrilla	<0.25 adult or nymph/clump
5	SugarcaneWoolly aphid	Few clumps to one gunta area
6	Sugarcane mite	10% of the area was affected by the mite in Madarahally village
7	Root Grub	Four Instances (<1 gunta area affected) at Tandarasanahally

Project E. 30: Monitoring of insect-pests and Bioagents in sugarcane agro eco-system

2. Objectives: To find out the activity of sugarcane pests and their bio-agents

3. Experimental details:

a. Location: ZARS, Mandya b. Situation: Irrigated

c. Plot Size: 1.0 ac d. Fertilizer (kg/ha) 250:100:125 NPK

e. Variety: Co 62175

4. Date of planting: 2/12/2011

5. Methodology: Sugarcane was raised in 1.0 acre area. All the recommended practices were followed except, application of insecticides. Incidence of borers and their natural enemies was recorded by examining 100 shoots/canes at 5 places (Four corners and in the middle), Sucking pests and their natural enemies were evaluated by examining 20 canes at five places.

6. Results:

Monitoring of insect-pests and Bioagents in sugarcane agro eco system

Pest	Level of Incidence (%)	Incidence of Natural enemies (%)
Early Shoot Borer	21.25	*Trichogramma acheae* 37.5% eggs
Top Shoor Borer	18.75	*Tetrastichus schoenobii* 44.45%eggs
Internode Borer	28.00	-
Sugarcane Pyrilla	0.25 nymphs or adults/clump	-
Sugarcane Woolly aphid	8 clumps(25% of leaf area covered by the aphids)	*Encarsia flavoscutellum* 2adults/leaf *Micromus* sp 3 larva/leaf *Dipha aphidivora* 0.5pupa /leaf
Sugarcane Pink mealy bug	12% millable canes	-
Aphid *Rophalosiphum maids*	One colony/ 5 clumps	-
White fly *Neomaskellia bergii*	Onlyon 6 clumps of border row	*Encarsia tristis* 85% nymphs

4. Project E.36: Management of Borer Complex of Sugarcane through Pheromone lures

2. Objectives: To study the population dynamics of sugarcane borers (Early Shoot Borer, Top Shoot Borer and Inter node Borer)

3. Experimental details:

a. Location: ZARS, Mandya b. Situation: Irrigated

c. Plot Size: 1.0 ac d. Fertilizer (kg/ha) 250:100:125 NPK

e. Variety: Co 62175

4. Date of planting: 2/12/2011

5. Methodology: Three pheromone traps each for early shoot borer, top shoot borer and internode borer were installed in the second fortnight of February till the harvest of the crop in one acre area. The pheromone lures were changed once in two months. Observations on the moth catches in each trap were made daily and the data was pooled for the standard meteorological week. Observations on the incidence of ESB was made on 30, 60,90and 120 days after planting. Top shoot borer incidence was recorded on 150 and 210 days after planting. Internode borer incidence was recorded at the time of harvest. Similar observations were also made in the control plot which was located hundred meters away from the earlier said plot. Observations made were pooled and presented below.

Results:

Pest	**Level of Incidence (%)**	
	Plot - A **With Pheramone Trap**	**Plot – B** **Without Pheramone Trap**
Early shoot borer	17.75	19.25
Top shoot borer	20.50	21.75
Internode borer	29.25	30.00
Yield tonnes /ac	36.50	35.70

Moths of all the three borers ESB TSB and INB were active through out the year. Characteristic peak of ESB was recorded on 19th standard week (May 2nd week). Early shoot borer activity continued till the end of 38th week. Top shoot borer activity was high from 10th to 28th week and 34th to 52nd week. Inter-node borer activity was low through out the year except on 38th week. The incidence of different borer pests and yield level of cane did not differ much between control plot and pheromone trap installed plot.