

**RESEARCH ARTICLE :**

# Biological and mechanical method of pest management in sugarcane and its adoption

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**SUMMARY :** The farmers are not using the specific pest problem based pesticides. Also they are not using bio control agents for some of the pest. Farmers are not usually removing the trash. Also due to labour shortage farmers are not able to remove the trash. It will leads to pest and disease incidence. An experiments result shows that there was increased yield due to detrashing. Keeping this in view the demonstration was conducted with the aim to introduce the detrashing tool and control the internode borer with bio control agents. The result of demonstration revealed that the detrashed sugarcane crop recorded higher cane yield (139.32 tonnes/ha), gross income (Rs.1, 42,660/ha), net return (Rs. 97,648 / ha) and benefit cost ratio (3.17) compared to the farmers practices (2.84). The result of bio control agents demonstration revealed that the integrated pest management practices recorded higher cane yield (156.20 tonnes/ha), gross income (Rs.1, 59,948/ha), net return (Rs.1, 14,798 /ha) and benefit cost ratio (2.54) compared to the farmers practices (2.30).

**KEY WORDS :**Sugarcane,  
Biocontrol agents,  
Detrashing tools,  
Borers, Adoption

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## **BACKGROUND AND OBJECTIVES**

In sugarcane crop borers are the very important pest. Early shoot borer affects the young seedlings leads to dead heart symptoms. When the dead heart symptom is more than 15 per cent, it causes yield reduction. The internode borer affects the grownup crop. The farmers are not using the specific pest problem based pesticides. Also they are not using bio control agents for some of the pest. Farmers are not usually removing the trash. Also due to labour shortage farmers are not able to remove the trash. It will leads to pest and disease incidence.

Detrashing of sugarcane will create free aeration and healthy cane. Women labours are not willing to remove the trash due to its thornness. An experiments result shows that there was increased yield due to detrashing. Tamil Nadu Agricultural University has released the sugarcane detrashing tool to reduce the drudgery. A single person can remove the trash in half acre in a day. Keeping this in view the study was conducted with the following objectives.

– To demonstrate the sugarcane detrashing tool technology in farmers field with hands on training

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– To demonstrate the effect of biological control method for sugarcane internode borer

– To assess the adoption of sugarcane detraghing tool and biological control method among the non demonstrated farmers.

## RESOURCES AND METHODS

The demonstration was conducted with the aim to introduce the detraghing tool and control the internode borer with bio control agents. Vriddhachalam taluk is one of the major sugarcane growing area in Cuddalore

**Table 1 : FLD on introduction sugarcane detraghing tool**

Sr. No.	Sugarcane yield (tonnes/ha)		Total cost (Rs./ha)		Gross income (Rs./ha)		Net return (Rs./ha)		Benefit cost ratio	
	*FP	**RP	FP	RP	FP	RP	FP	RP	FP	RP
1.	123.42	136.50	41250	44800	126382	139776	85132	94976	3.06	3.12
2.	112.50	139.50	42800	45200	115200	142848	72400	97648	2.69	3.16
3.	128.40	142.50	43500	44650	131482	145920	87982	101270	3.02	3.27
4.	129.75	143.25	41800	43800	132864	146688	91064	102888	3.18	3.35
5.	129.50	142.75	43500	44650	132608	146176	89108	101526	3.05	3.27
6.	115.00	128.50	42500	44000	117760	131584	75260	87584	2.77	2.99
7.	128.50	138.50	43500	45250	131584	141824	88084	96574	3.02	3.13
8.	128.50	140.50	42275	45750	131584	143872	89309	98122	3.11	3.14
9.	121.50	143.60	42600	45000	124416	147046	81816	102046	2.92	3.27
10.	112.50	145.00	43750	44900	115200	148480	71450	103580	2.63	3.31
11.	119.50	149.50	41500	45000	122368	153088	80868	108088	2.95	3.40
12.	112.50	138.60	43500	44750	115200	141926	71700	97176	2.65	3.17
13.	121.50	139.50	44600	45250	124416	142848	79816	97598	2.79	3.16
14.	132.80	132.50	45200	44850	135987	135680	90787	90830	3.01	3.03
15.	130.25	125.50	41800	44750	133376	128512	91576	83762	3.19	2.87
16.	98.50	110.25	44250	46800	100864	112896	56614	66096	2.28	2.41
17.	105.60	125.00	41300	46150	108134	128000	66834	81850	2.62	2.77
18.	110.20	147.25	40250	45750	112845	150784	72595	105034	2.80	3.30
19.	98.50	138.25	40500	46000	100864	141568	60364	95568	2.49	3.08
20.	103.50	147.50	41500	43750	105984	151040	64484	107290	2.55	3.45
21.	108.50	136.50	40750	44250	111104	139776	70354	95526	2.73	3.16
22.	125.80	149.50	41000	45100	128819	153088	87819	107988	3.14	3.39
23.	123.75	146.50	42350	45650	126720	150016	84370	104366	2.99	3.29
24.	131.25	148.50	41500	44350	134400	152064	92900	107714	3.24	3.43
25.	123.75	146.25	42000	44250	126720	149760	84720	105510	3.02	3.38
26.	119.50	135.50	42800	44500	122368	138752	79568	94252	2.86	3.12
27.	98.50	128.50	43600	44850	100864	131584	57264	86734	2.31	2.93
28.	136.50	146.80	43500	45250	139776	150323	96276	105073	3.21	3.32
29.	128.60	136.50	43500	44600	131686	139776	88186	95176	3.03	3.13
30.	103.5	128.50	41750	45600	105984	131584	64234	85984	2.54	2.89
31.	116.20	132.40	42800	44750	119040	135577	76240	90827	2.78	3.03
32.	102.50	145.50	41500	46450	104960	148992	63460	102542	2.53	3.21
33.	107.50	138.25	42500	44100	110080	141568	67580	97468	2.59	3.21
34.	110.50	144.50	41250	45850	113152	147968	71902	102118	2.74	3.23
35.	125.00	146.00	43500	45350	128000	149504	84500	104154	2.94	3.30
36.	118.25	151.25	42500	44500	121088	154880	78588	110380	2.85	3.48
Mean	117.84	139.32	42463	45013	120663	142660	78200	97648	2.84	3.17

\*- Farmers practice \*\*- Recommended practice

Biological & mechanical method of pest management in sugarcane & its adoption

**Table 2 : FLD on sugarcane biological control method**

Sr. No.	Sugarcane yield (tonnes/ha)		Total cost (Rs./ha)		Gross income (Rs./ha)		Net return (Rs./ha)		Benefit cost ratio	
	*FP	**RP	FP	RP	FP	RP	FP	RP	FP	RP
1.	122.25	143.50	42500	43680	125184	146944	82684	103264	1.94	2.36
2.	110.50	139.80	43000	44900	113152	143155	70152	98255	1.63	2.18
3.	130.50	148.20	42700	45600	133632	151756	90932	106156	2.12	2.32
4.	128.50	136.50	44000	44750	131584	139776	87584	95026	1.99	2.12
5.	132.25	138.20	44750	45250	135424	141516	90674	96266	2.02	2.12
6.	112.00	139.60	43000	44850	114688	142950	71688	98100	1.66	2.18
7.	123.00	140.00	43650	45300	125952	143360	82302	98060	1.88	2.16
8.	118.75	147.50	42385	46000	121600	151040	79215	105040	1.86	2.28
9.	113.75	142.00	41065	45250	116480	145408	75415	100158	1.83	2.21
10.	121.25	146.30	42080	46150	124108	149811	82028	103661	1.94	2.24
11.	109.50	145.75	43500	43500	112128	149248	68628	105748	1.57	2.43
12.	116.25	135.40	43450	44750	119040	138649	75590	93899	1.73	2.09
13.	111.50	129.60	42630	45900	118272	132710	75642	86810	1.77	1.89
14.	123.00	130.25	44650	46000	125952	133376	81302	87376	1.82	1.89
15.	132.75	146.50	41090	45850	135936	150016	94846	104166	2.30	2.27
16.	104.60	149.60	41325	44475	107110	153190	65785	108715	1.59	2.44
17.	108.50	150.25	42300	43950	111104	153856	68804	109906	1.62	2.50
18.	99.75	146.30	41250	44650	102144	149811	60894	105161	1.47	2.35
19.	102.80	156.20	43250	45150	105267	159948	62017	114798	1.43	2.54
20.	128.50	146.20	44200	43950	131584	149708	87384	105758	1.97	2.40
21.	127.80	138.50	42500	44575	130867	141824	88367	97249	2.07	2.18
22.	109.50	147.50	41250	45100	112128	151040	70878	105940	1.71	2.34
23.	112.50	136.50	42000	44900	115200	139776	73200	94876	1.74	2.11
24.	126.00	139.00	43000	44760	129024	142336	86024	97576	2.00	2.17
25.	130.00	126.40	44000	43975	133120	129433	89120	85458	1.62	1.94
26.	127.60	137.60	44500	43950	130662	140902	86162	96952	1.93	2.20
27.	124.50	138.50	41100	44850	127488	141824	86388	96974	2.10	2.16
28.	131.50	140.50	43750	45125	134656	143872	90906	98747	2.07	2.18
29.	125.30	135.60	42900	43500	128307	138854	85407	95354	1.99	2.19
30.	126.50	146.50	42250	44625	129536	150016	87286	105391	2.06	2.36
31.	128.00	131.25	43350	43750	131072	134400	87722	90650	2.02	2.07
32.	100.75	145.30	41450	44875	103168	148787	61718	103912	1.48	2.31
33.	101.80	138.75	42650	44000	104243	142080	61593	98080	1.44	2.22
34.	109.60	150.50	41550	45875	112230	154112	70680	108237	1.70	2.35
35.	124.30	155.25	43550	45650	127283	158976	83733	113326	1.92	2.48
36.	107.50	149.75	41600	44850	110080	153344	68480	108494	1.64	2.41
Mean	118.41	142.08	42727	44840	121372	145494	78645	100653	1.82	2.24

\*- Farmers practice \*\*- Recommended practice

district. The demonstration was conducted in Arasakuli, Kollapakkam, Vijayamanagarm, Yuiyakondaravi Villages in Vriddhachalam taluk in collaboration with Sri Ambika Sugars Ltd, Pennadam. The demonstration was conducted in 36 farmers fields with one acre each with control. Hands on training was provided to demonstration farmers in Krishi Vigyan Kerndra about the sugarcane detrashing tool. The detrashing was done during 3<sup>rd</sup> and 5<sup>th</sup> month of the crop in all the FLD farmers by detrashing tool utilizing the family labour.

Also the demonstration for control of internode borer pest in sugarcane was conducted by release of *Trichogramma chilonis* 15 CC per ha in 6 times from 4<sup>th</sup> month onwards at fortnight interval. The bio control agent demonstration was also conducted in 36 farmer's field in one acre each in Arasakuli, Kollapakkam, Vijayamanagarm, Yuiyakondaravi Villages in collaboration with Sri Ambika Sugars Ltd., Pennadam. The adoption of detrashing tool and biological method was measured in the same village with 30 non-demonstrated farmers both for detrashing tool and biological control method.

## OBSERVATIONS AND ANALYSIS

The result of sugarcane detrashing tool demonstration and biological control demonstration is as follows.

The result Table 1 of demonstration revealed that the detrashed sugarcane crop recorded higher cane yield (139.32 tonnes/ha), gross income (Rs.1, 42,660/ha), net return (Rs. 97,648 /ha) and benefit cost ratio (3.17) compared to the farmers practices (2.84).

### FLD on sugarcane internode borer management:

The result (Table 2) of demonstration revealed that the biological control practices recorded higher cane yield (156.20 tonnes/ha), gross income (Rs.1, 59,948/ha), net return (Rs.1, 14,798 /ha) and benefit cost ratio (2.54) compared to the farmers practices (2.30).

### Adoption of sugarcane detrashing tool and biological control method:

The survey was conducted in the FLD implemented villages after 2 years to measure the spread and adoption of introduced technologies. The survey was conducted with 30 sugarcane farmers each (Non- FLD farmers) in Arasakuli, Kollapakkam, Vijayamanagarm, Yuiyakondaravi villages. The results are presented in the Table 3.

It could be observed from the Table 3 that majority (85.83%) of the sugarcane growers adopted the sugarcane detrashing tool technology by seeing the FLD farmers in that village. Low initial investment for the purchase of sugarcane detrashing tool and easy operation might be the reasons for higher percentage of adoption of technology.

Also it could be observed from the Table 3 that only a meagre percentage (23.33%) of sugarcane growers adopted the biological control of borers in sugarcane in all the villages. Non-availability of bio control agents and inadequate knowledge about the technology might the reasons for higher percentage of non-adoption of biological control of sugarcane bores. Similar work related to the present investigation was also carried out by Prasifka and Gray (2012); Sandler (2008); Saroj (2000) and Thirumurugan and Koodalingam (2005)

### Conclusion:

It could be concluded that the sugarcane detrashing tool technology not only increased the yield but also reduced the drudgery of farm women. Also increased rate of adoption was observed in the subsequent years. The farmers were not continued the biological control method due to inadequate knowledge about the biological control method of sugarcane borers and non-availability of bio control agents. The registered sugar factory growers were adopting the bio control technology continuously. The extension officials may conduct more

**Table 3 : Adoption of sugarcane detrashing tool and biological control method**

Sr. No.	Villages	Detrashing tool				Biological control method			
		Adoption		Non-adoption		Adoption		Non-adoption	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
1.	Arasakuli,	25	83.33	5	16.67	6	20.00	24	80.00
2.	Kollapakkam	28	93.33	2	6.67	10	33.33	20	66.67
3.	Vijayamanagarm	26	86.67	4	13.33	4	13.33	26	86.67
4.	Yuiyakondaravi	24	80.00	6	20.00	8	26.67	22	73.00
	Over all	103	85.83	17	14.17	28	23.33	92	76.67

number of demonstrations and trainings and timely supply of bio control agents to sugarcane farmers.

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14<sup>th</sup>  
Year  
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