



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(8): 338-340
© 2022 TPI
www.thepharmajournal.com
Received: 07-05-2022
Accepted: 10-06-2022

AS Bhagade

Final Year B.Sc. (Ag) Student,
COA, DBSKKV, Dapoli,
Maharashtra, India

Dr. SV Pathak

Professor (CAS), Department of
FMPE, CAET, DBSKKV,
Dapoli, Maharashtra, India

Dr. VA Rajemahadik

Assistance Professor,
Department of Agronomy, COA,
DBSKKV, Dapoli, Maharashtra,
India

Er. CS Bagde

M. Tech Student, Department of
FMPE, CAET, DBSKKV,
Dapoli, Maharashtra, India

Corresponding Author

AS Bhagade

Final Year B.Sc. (Ag) Student,
COA, DBSKKV, Dapoli,
Maharashtra, India

Performance evaluation of hand operated sugarcane detrasher

AS Bhagade, Dr. SV Pathak, Dr. VA Rajemahadik and Er. CS Bagde

Abstract

Removal of unwanted bottom dried and yellowish green leaves in sugarcane is detrashing. Getting manpower for the purpose is very hard due to drudgery. Hand operated sugarcane De- trasher is developed from the locally available material. This tool was evaluated in sugarcane fields of two different varieties viz, CO-8005, CO-69032. From the evaluation it is found that, In CO-8005 field average stripping efficiency was 83.92% and 1101.4 sugarcanes were handled in 1 hr. In CO-96032 field average stripping efficiency was 82.25% and 1204.28 sugarcane were handled in 1 hr. Field capacity of the tool is found to be 0.22 acre per day.

Keywords: Detrashing, sugarcane, stripping efficiency

Introduction

Detrashing in sugarcane cultivation is a recommended practice, which involves removal of unwanted bottom dried and yellowish green leaves on fifth and seventh month after planting. Sugarcane stalk bears large number of leaves (30-35) equal to the number of inter-nodes under good management systems. However, all these leaves are not productive, only top eight to ten leaves are required for optimum photosynthesis. The bottom most green leaves are parasitic on the upper productive leaves and drain out the food reserves (photosynthates) which otherwise could be used for stalk growth. Therefore, in sugarcane it is important to remove the lower dry and green leaves. Detrashing helps in maintaining clean field which minimizes rodents, rats, squirrels in the field which cause damage to the crop, enhances air movement and enriches CO₂ with in the crop canopy providing an ideal micro-climate for unrestricted growth of cane, availability of more food material for stalk growth, reduces the problem of infestation of several insect-pests like scales, mealy bug, white flies etc, reduces bud sprouting due to accumulation of water inside the sheath and detrashed leaves can be used as a mulch for moisture conservation or composting.

Physical labour for doing this operation is hard to obtain because of the drudgery. Though the agriculture workers wear a full sleeve shirt during manual detrashing, spines (thorny hair like structures found on leaf and leaf sheaths) cause pricking of the hands causing "Irritant Contact Dermatitis (ICD)", "Allergic dermatitis (AD)" and "Keratinization" (The deposition of keratin in cells occurring in the epidermis of the skin and structures in nails and hair. The cells become flattened and loses their nuclei). Contact dermatitis results in large burning and itchy rashes, and these can take anywhere from several days to weeks to heal. The symptoms of both include red rash, blister or welts and itchy and burning skin. The leaf blades present in the cane irritate and scratch the hands forming "abrasion and fissures". When the de-trashing operation is done manually without any tool, the labourers hands are often injured and they were subjected to the above-mentioned injuries. In view of avoiding the direct contact with hands and sugarcane leaves and also to reduce the drudgery involved in detrashing, an ergonomically improved sugarcane detrashing tool was designed and developed with a substantially reduced weight

Benefits of Detrashing

1. It minimizes the bulky trash to be managed at harvest time (about 12-20 t/ha). With detrashing, clinging, vines are also removed and fewer trashes remain after harvest. It is easier to pile the trashes in-between rows.
2. It activates the microbes leading to rapid decomposition of the remaining trash at harvest time if moisture is available. This reduced the need to apply chemical fertilizer;

- It improves CO₂ circulation leading to sweeter canes at harvest. Cleaner (less trashy and muddy) canes improve sugar recovery and mill efficiency. Detrashed canes had 21.7% higher recoverable sugar per ton than trashy no-detrashed canes (Dosayla 1994). Thus, overall sugar recovery improves and sugar yield per ha increased.
- Dethrashing recycles some nutrients absorbed, improves soil tilth, water infiltration and water retention and ultimately increases sugar yield (Mendoza et al 2003).
- Moreover, the conventional practice of burning the trash then stubble shaving in the conventional ratoon cane establishment has a hidden cost. Burned tillers that emerge 2 or 3 days after cutting the stalks are the vigorous tillers. To flush tillers out, additional 2 to 3 bags of urea are necessary.

Material and Method

A) Sugarcane Detrashing Tool

This ergonomically improved sugarcane detrashing tool is made up of light weight plastic pipe of 25 mm diameter and 60 cm length. Tool is completely homogeneous without any joint hence less chance of breakage.

Main parts of tool

- "U" shaped Blades
- Metal ring
- Handle

1. "U" shaped Blades

"U" shaped plastic blade made by cutting pipe in middle along the length, then it is heated to mould in flat "U" shape. It has 12 cm length and 6 cm width (width can be varied). Both edges of both blades were chamfered by which blades are stiff enough to detach the leaves

2. Metal Ring

Metal ring is provided which can be moved to and fro to adjust the gap between two blades depending upon the diameter of sugarcane stalk. For adjusting the width of opening, and to provide the tension to blades by increasing

cutting length of pipe upto 22 cm and slightly mould outward.

3. Handle

In 60 cm pipe 12 cm is blade, 4 cm mould, 22 cm portion used for giving tension to blades and remaining 22 cm portion used as handle. Rubber grip is fitted on handle for easy and safe handling of tool. Length of handle is more so it reduces chances of drudgery involved in detrashing and easy to operate on more height.



Plate 1: Developed Sugarcane Detrashing Tool

B) How to use Detrashing tool

The blades are inserted between the internodes at the top and pulled vertically down for removing the dry and unwanted leaves. Detrashing angle of 5 degree and varying approaching/ cutting width ranging from 25 to 50 mm were provided in the tool to ease the detrashing process. This detrasher tool is a small hand tool for stripping green and dry leaves in standing sugarcane. It strips, separates and pushes the leaf sheath away from stalk. The person who is intended to do detrashing needs to hold the tool and placed it at lower leaf position where the unproductive and dried leaves are present. Detrashing can be done by pushing the tool down manually and due to this action and lower leaves will be detached from the standing cane stalk. This ergonomically improved detrashing tool can be comfortably used for detrashing the sugarcane leaves during fifth and seventh month. Field capacity of the tool is found to be 0.22 acre per day.



Plate 2: Detrashing of sugarcane using developed detrashing tool

Important features of tools

- Detrashing tool is completely homogeneous.
- Light weight due to plastic material.
- Long handle with rubber grip, can operate on more height.
- Provide tension for adjusting opening width of blades according to cane diameter.
- Less cost of production, can utilise waste pipe from farmers field
- Simple design, easy to manufacture.
- can be manufactured at local workshop.

Result

Table 1: When sugarcane stripper is evaluated in the field following results were obtained.

Variety	Cane diameter	No. Of leaves (initially)	No. of leaves after 1 pass	Duration to remove 1 leave(sec)	No. of sugarcane handle in 1 hr	Stripping efficiency (%)
8005	1.5	8	2	0.6	750	75
	1.8	7	1	0.5	1028.5	85.71
	2.0	7	2	0.5	1028.5	71.42
	2.4	6	0	0.4	1500	100
	2.1	8	1	0.5	1200	87.5
	Avg.				1101.4	83.92
96032	2.5	7	1	0.4	1285.7	85.71
	2.0	7	2	0.4	1285.7	71.42
	1.8	8	1	0.6	750	87.5
	2.4	6	0	0.4	1500	100
	2.0	6	2	0.5	1200	66.66
	Avg.				1204.28	82.25

Conclusion

The following conclusions are drawn from the test result of the performance of sugarcane detrashing tool

1. In sugarcane variety "CO 8005" average stripping efficiency was 83.92% and 1101.4
2. sugarcane handled in 1 hr
3. In sugarcane variety "CO 96032" average stripping efficiency was 82.25% and 1204.28 sugarcane handled in 1 hr
4. This ergonomically improved detrashing tool can be comfortably used for detrashing the sugarcane leaves during fifth and seventh month and the field capacity of the tool is 0.22 acre per day.

Jianlin. Experiment on the factors affecting the detrashing quality of the straight and bending sugarcane, Trans. Chinese Society of Agricultural Engineering, 2009, 123-129.

References

1. FAO Stats. Report of United nation food and agriculture organization, 2016.
2. Status paper on sugarcane farmer, 2013.
3. Caillouet KG. Apparatus and method for harvesting cane, United State Patent, 2001.
4. Clayton JE, Roberts DL. Methods of dry cleaning sugarcane in the handling process, Proc American Soc Sugarcane Technology, 1971, 164-169.
5. Clayton JE, Whittemore HD. Research in mechanical harvesting and cleaning of sugarcane in Florida. Proceedings, American Society of Sugar Cane Technologists, 1970, 162-175.
6. Duttamujumdar SK, Sharma AK, Brahm Prakash. Vision document, Indian Instt. of sugarcane research, 2011.
7. Li SP, Meng YM, Ma EL, Tan HH, Chen WX. Research on the working mechanism and virtual design for a brush shape cleaning element of a sugarcane harvester. Journal of Materials Processing Technology, 2002, 418-422.
8. Meng YM, Li SP, Liu Z. Research on the mechanism of nonlinear arrangement of sugarcane cleaning element in brush shape. Trans Chin Soc Agric Mach, 2003, 50-53.
9. Ramp RM. Progress in the development of a successful Louisiana sugar cane detrasher, Proc ISSCT Puerto Rico, 1965, 327-346.
10. Srivastava AC. Development of the sugarcane defoliator, Agric Mech Asia Afr Latin Am, 1990, 49-52.
11. Wang Guang-ju, Yang Jian, Liang Zhao-xin, Mo Jian-lin, Qiao Yan-hui. Experimental Study of the Factors Influencing Sugarcane Detrashing Quality of Sugarcane Detrashing Machine, J Agricultural Mechanization Research, 2006, 142-145.
12. Yang Jian, Huang Lili, Yang Wang, Liang Zhaoxin, Mo