



## **NAIL WEEDER- A NEWLY INVENTED TOOL TO CONTROL WEEDS IN JUTE**

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### **Introduction**

Jute is one of most important fibre crop of India. Jute produces natural eco-friendly biodegradable fibre. Jute nourishes about 5.5 million farm families across the world and raw jute farming provides 10 million man-days of employment (Mahapatra *et al.* 2012). When the world is worried about plastic hazards, the alternate use of jute fibre is a solution. So the productivity of jute should be increased to meet the need of large number of people. There are many reasons between the gap of actual and potential productivity of jute in India. The most important limiting factor is weed problem. Weed is the most harmful pest in Jute which may deplete up to 70-75% of yield. To minimize this problem weed management should be effectively practiced. Various herbicides are available in the market to kill the weeds in jute field but they also cause environmental pollution. On the other hand, manual hand weeding gives the highest weed control efficiency but the wages of labour is also high. That's why CRIJAF invented a new tool for weed control in jute named Nail weeder which can eradicate all the inter row weeds of jute plant at the initial stage (5-7 days after sowing).

### **Major weed flora in jute**

Jute crop may be affected by both monocot and dicot weeds as reported by Mukherjee *et al.*, (2011).

A) Monocot Weeds: (i) *Digiteria sanguinalis*, (ii) *Echinochloa colona*, (iii) *Elusine indica*, (iv) *Cyperus rotundus* etc.

B) Dicot weeds: i) *Digera arvense*, (ii) *Cleome viscosa* and (iii) *Physalis minima* etc.

### **Effect of different weed management practices on jute**

Generally hand weeding gives best result among the weed management practices in terms of fibre yield of jute but it is not economical feasible because higher labour wage increases the cost of cultivation that constitutes up to 45% of the total cost of cultivation in jute. As the jute is crop affected by grassy weeds, sedges and also by broad leaved weed, so not a single herbicide, rather than non-selective herbicide, can control all the weed flora (Vision 2050 ICAR- CRIJAF).

### **New approach of weed control in jute**

An integrated weed management practice is advisable to control the weed as well as keeping economic feasibility. Use of newly developed tools like- Nail weeder developed by ICAR-CRIJAF and Jute brush is very suitable to control weeds efficiently and economically profitable too.

### Brief description of Nail Weeder

The nail weeder is a new weeding tool invented by CRIJAF which contains 2-15 nails fixed at 3 cm apart in a series each nails are 0.9-0.8 cm in thick, one scrapper and one tyne. CRIJAF nail weeder removes weed from jute field at very early stage (5-7 days after sowing). The critical crop weed competition period of jute is its young stage where a manual weeding is necessary to remove weeds. At this stage use of nail weeder removes all the inter row weeds from the jute field.

### Advantage of using nail weeder

- 1) At young stage of jute if manual weeding is done it needs approx 45 man days/ha where as nail weeder removes 80-85% of weed flora (inter row weeds) and requires only 6-7 man days/ ha . The intra row weeds can be removed by manual hand weeding. So it increases economic feasibility.
- 2) The inter row weeds removed by nail weeder acts a soil mulch of the field and helps in soil moisture conservation in the dry months.
- 3) Nail weeder also pulverises the soil during its operation.
- 4) Nail weeder also helps in line arrangement and thinning of broadcast jute.
- 5) It is a mechanical approach of weed control so there is no toxic effect of herbicide on environment.

### Effect of nail weeder use on soil micro-organism population

Soil micro-organism population is the key factor of soil productivity. The use of chemical herbicide drastically reduces the growth of micro-organism due to their chemical hazards. The nail weeder use can cut the amount of chemical herbicide usage as well as at initial stage of the crop, nail weeder pulverises the soil. So aeration of the soil increases, it makes a soil mulch which maintains soil temperature and conserves soil moisture which supports the multiplication of the micro-organism specially bacteria. (Moreno *et al.* 2008)

### Economical benefit of nail weeder

Different studies on weed management practice of jute reveals that the every weed index was highest in favour of twice hand weeding practices. Naturally total fibre and stick yield is also highest in hand weeded plot. But use of nail weeder along with a herbicide 30 DAS enjoyed very close result with twice hand weeded plot in case of every weed index as well as yield. But the cost of cultivation drastically reduced if one use nail weeder along with a herbicide instead of twice hand weeding as nail weeder saves almost 75% of weeding cost in comparison with hand weeding which helps in increasing the value of net return as well as B:C. (Chakraborty *et al.* 2020).

### Economical evaluation of the technology for 1 ha area during 2018-19

Particular	Hand weeded plot	Nail weeder used plot
Input Cost (Rs./ha)	31800	34200
Human labour cost (Rs./ha)	27500	8200
Total cost of cultivation (Rs./ha)	59300	42400
Average fibre yield (q/ha)	37.94	36.32
Fibre price (Rs./q)	3700	3700
Average stick yield (q/ha)	113.27	109.05
Stick price (Rs./q)	200	200
Gross return (Rs./ha)	163032.00	156194.00

Net return (Rs./ha)	103732.00	113794.00
B:C	1.75	2.68
Net profit over hand weeding (Rs./ha)		10062.00

### Conclusion

Several research findings and trial established that use of new invented technology- Nail weeder for weed control in jute is economically profitable over hand weeding and environmentally as well as economically feasible over solo herbicide application. Though it's wide use is still absent, spreading of information about it's advantage among the farmers is necessary to increase it's acceptance among the farming community.

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