



Cost Effective Technologies of Jute Production

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Jute is a crop of warm and humid climate which is grown in rainfed situation during summer to early rainy season (mid March to end of July). Cultivation of jute starts from land preparation, and ends with retting and extraction of jute. Important practices include ploughing and levelling of field, seed treatment, line sowing, fertilization, weeding, retting and extraction of fibre. The critical operations in jute cultivation like harvesting, retting, fibre extraction, drying, bundling etc. coincide with rice transplantation making labour availability further scanty. Under such a situation, cultivation of jute has become uneconomic. Considering the above facts, cost effective techniques of jute production are discussed below to make it more profitable.

Introduction

Jute is an important eco-friendly bast fibre crop grown in Eastern and Northern states of India. It is cultivated in 8 lakh ha area by around 40 lakh small and marginal farmers of West Bengal, Bihar, Odisha, Assam, Uttar Pradesh and Tripura. West Bengal is the leading state of the country in acreage and production of jute. It is an annually renewable resource with a high biomass production per unit land area. There are two species of jute available for commercial cultivation *i.e.* *tossa* (*Corchorus olitorius*) and white (*Corchorus capsularis*). *Tossa* jute gives higher fibre yield in comparison to white jute. It is preferably grown in upland condition. White jute is hardy in nature and can be grown in both on high and low land condition. It is one of the most versatile natural fibres that have been used as raw materials in packaging, textiles, non-textile, construction and agricultural sectors.

Jute thrives best under warm and humid climate. It is a crop of around four months grown in rainfed situation during summer to early rainy season (mid March to end of July). Weeding and retting (microbial decomposition in high volume of water) are two major field operations in jute cultivation. It is an under-mechanized crop. Therefore, it is more oriented towards intensive use of labour. Around 70% of total cost of cultivation (approx. Rs. 60,000/ha) is shared by these two operations. Nowadays, profit margin of jute growers is gradually declining due to continuous rise in the cost of agro inputs and tough competition from cheaper and durable synthetic materials. Usually the jute growers are poor with small and fragmented land. They have small capital with low risk bearing capacity. Their family members are major source of labour required for the production. In special case, skilled labourers are employed on payment basis for retting and fibre extraction of jute. The critical operations in jute cultivation

like harvesting, retting, fibre extraction, drying, bundling etc. coincide with rice transplantation making labour availability further scanty. Under such a situation, jute has become an uneconomic crop. Considering the above facts, cost effective techniques are discussed below to make it profitable:

Cultivation of jute starts from land preparation, which includes ploughing and levelling of field. Land preparation with the help of power tiller (6-14 H.P.) is cheaper and faster in comparison to bullock drawn country plough. Operational costs for power tiller come around Rs. 6,000/ha against the country plough (Rs. 8,000/ha.) and in both the cases two numbers of operations are required. Power tiller is able to perform other farm operation such as harrowing, puddling, transport etc.

Seed treatment with fungicide Carbendazim @ 2.0 g/kg or Captan @ 5.0 g/kg should be done as a precautionary measure to avoid seed borne diseases. Broadcast method requires more seed (6-7 kg/ha) in comparison to line sown crop. Line sown crop through multi row seed drill (MRS) requires 3-4 kg seed per hectare. It favours better intercultural operations and produces 10-15% higher fibre yield (Fig. 1). A person can sow 0.5-0.6 ha land (line to line distance 25 cm.) in one day with MRS.



Fig. 1: Line sowing of jute through MRS



Fig. 2: Balanced fertilized jute field

It is beneficial to apply chemical fertilizer (N: P: K: 60:30:30) based on the analysis of the soil for available nutrient status (Fig. 2). Phosphatic and potassic fertilizer should be applied at the time of sowing. Nitrogenous fertilizer should be applied in three equal split (first at the time of sowing, second at 20-25 days after sowing and third at 40-50 days after sowing).

During the first month, after sowing weed management is the most critical field operation. In this stage jute crop is not able to compete with weeds. It has been reported that if it is not managed properly, losses can go up to 40-70% of jute fibre. There is requirement of 90-170 labour/ha to carry out 2-3 hand weeding. It is costly and time taking. Application of herbicides alone or in combination with one hand weeding (35 days after sowing) is very economical to control the weeds in jute field. Investment on herbicide application (Rs.1, 500-2,500/ha) saves 60-130 manual labour/ha.

Weed management through selective herbicides as pre- or post-emergence herbicides or direct spray of post emergence herbicides have been found effective and economical in jute. Herbicides like butachlor 50% EC or butachlor 5G @ 1.0 to 1.5 kg a.i./ha applied from 7 days before sowing to 72 hour after sowing of jute can control annual grass and some broad leaved weeds for three weeks. It also effectively reduces the *Cyperus difformis* in jute field.

The granular formulation of butachlor should be mixed thoroughly with soil under proper moist condition. In dry sown jute field, effective weed killing ability of butachlor @ 1.0 kg/ha has also been observed, when applied 48 to 72 hours after rain without any sign of damage of the crop. Pretilachlor 50% EC @ 0.83 to 0.9 kg ai/ha (within 45 to 48 hours of sowing following sufficient rain or irrigation) is found to be effective against grasses as well as *Trainthema sp.* Glyphosate 41% SL @ 0.82 kg SL/ha with 2% urea at 25 days after sowing in between jute lines using direct spray (mike nozzle guarded by plastic bottles, 10 x 10cm) can effectively control composite weed flora in jute field (Fig. 3).

As an alternative, to eliminate the dependency on herbicides, application of CRIJAF nail weeder 3-15 days after emergence of seedling (at the interval of five days) kill 80-85% weed flora (Fig.4). It requires 7 man days/ha only against 90-170 manual labour (2-3 weeding). Rest 15-20% weeds are removed manually.



Fig. 3: Application of Glyphosate 41% SL @ 0.82 kg a.i./ha with 2% urea for control of composite weed flora in jute field



Fig. 4: Application CRIJAF Nail weeder in one fortnight old jute field

Yellow mite, Bihar hairy caterpillar, semilooper and jute stem weevil are the major insect pests of jute crop which infect the crop at various growth stages. Spraying neem oil based formulations @ 2ml/L (15000 ppm) as deterrent gives good control of all the major insect pests of jute. Foliar spray of fenazaquin 10%EC @ 2ml/L gives satisfactory control of yellow mite. Spraying of lambda-cyhalothrin 5%EC @ 1ml/L is very effective for control of Bihar hairy caterpillar. Spraying of cypermethrin 10%EC @ 2ml/L is effective for the control of semilooper and jute stem weevil.

Incidence of stem and root rot of jute (disease intensity 2 plant/m²) is effectively controlled by seed treatment with carbendazim 50% WP @ 2g/kg or foliar spray @ 2g/L and copper oxychloride 50% WP @ 4g/L immediately after the appearance of disease incidence. This operation is repeated at the interval of 15-20 days depending upon the incidence of disease. The spray of above recommended fungicide/chemical also gives effective control of minor diseases *viz.* Hoogly wilt and anthracnose, soft rot and black band of jute.

After weeding, retting and extraction is the second most important activity in jute cultivation. On an average, it involves around 45% of total cost of cultivation. Retting consists of bundling of 110-120 days old green stems (18-20 cms diameter) together and immersing them in slow running clear water for 18-21 days. In this process, fibres in the bark get loosened

and extracted from retted stalks gently, washed in water, dried in sun and tied in bundles (called bale, one bale=180 kg).

For in situ jute retting in low volume water, Low Density Poly Ethylene (LDPE) lined micropond is beneficial in case of water scarcity (under deficit rainfall or non-availability of water). Bundles of jute can be retted fast (8-10 days) than conventional method. A circular micro pond of 6.5 m floor diameter and 7.5 m top diameter is dug in area of 80-100 m² (Fig.5). The depth of pond is kept around 1.35 m. A silpaulin sheet of 32 X 32 feet (around 200 GSM) is spread over this micro-pond. The cost of this micro-pond comes around Rs. 6,000/-. Ground water is filled to the brim from near by tubewell (1 hour). Early sown jute (20th March) of one acre land (three bigha *i.e.* 3999 m²) can be retted in three phased manner at 15-20 days interval (one bigha each time). After extraction of fibre, the black dirty water from the micropond can be diverted to rice field for irrigation (Fig.6). This method gives golden coloured and lustrous jute fibres which is 2 grade superior than conventional retting. It saves carriage cost of harvested jute plants for retting (Rs.7,000/ha). Rain water can also be stored in this micro-pond. It can be applied as life saving irrigation in high value crops.



Fig. 5: Retting of jute in micro-pond



Fig. 6: Extraction of fibre in micro-pond

Besides, use of talc based microbial formulation developed by Central Research Institute for Jute & Allied Fibres (CRIJAF) Barrackpore, Kolkata is beneficial for retting of jute. Thirty kg talc based formulation (@ Rs.25/kg) is sufficient to ret jute crops harvested from one hectare of land. It is user friendly and does not have any adverse effect on human and soil biopta health. It reduces the duration of retting by 5-7 days. Fibre quality is improved by two to three grades and income is increased by Rs. 5,000-6,000/ha compared to conventional retting.

Conclusion

By adoption of above mentioned techniques the jute growers can earn more by reducing the cost of cultivation of jute.

References

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