

## Mesta

- Mesta is one of the most important commercial fibre crop after Cotton and Jute. In trade and industry both the Jute and Mesta fibre together is known as **raw jute**
- The fibre is obtained from the bark of the plants of jute/mesta and known as bast fibre or stem fibre. After the harvest of the crop the fibre is obtained by retting of the plants and as such it requires huge volume of water for retting.
- Bast fibres are silky lusture, high tensile strength, low extensibility, considerable heat and fire resistance and long stable length ,that make it suitable for industrial use. Raw jute/ mesta fibre is mainly used in the industry in the manufacture of packaging materials
- Mesta, a herbaceous annual plant (ligno-cellulosic bast fibre crop like jute) believed to be originated from Afro- Asian countries, ranks next to jute in importance (sharing 15% of raw jute-cum-mesta fibre production). Mesta is more adaptive and drought tolerant than jute under diverse conditions of climate and soil.
- In India (2010-11), area under mesta is around 85 thousand hectares with a fibre production of 6.2 lakh bales ( One bale is equal to 180 kg)
- Andhra Pradesh (A.P) is a leading state in the country with respect to both area and production which accounts for 30 per cent of the area and 42 per cent of the production. In A.P., mesta is concentrated in Srikakulam and Vizianagaram districts accounting for 98.7% area of total area in the State.
- Mesta comprises of two major distinct cultivated species — *Hibiscus cannabinus* L. (Kenaf, 2n = 36) and *Hibiscus. sabdariffa* L. (Roselle, 2n = 72). There are two main types of *H. sabdariffa* var. *altissima* and var. *sabdariffa*. The more economically important is var. *altissima* is cultivated for its jute-like fibre in India, whereas var. *sabdariffa* is widely expoted for its calyces and fibre.

### Varieties:

Sl. No.	Variety	Duration (Days)	Fibre yield (q/acre)	Special characteristics
I	<i>Hibiscus sabdariffa</i> L.			
1	AMV-3(Surya)	140-150	7.5	Suitable for all the mesta growing areas of Vizianagaram and Srikakulam Dist. Moderately tolerant to drought, and foot & stem rot.
2.	AMV-4(Kalinga)	140-150	8.0	Withstands to drought and suitable for all the mesta growing regions of Vizianagaram and Srikakulam Dt.
3.	AMV-5(Durga)	135-140	10-12	Suitable for all the mesta growing tracts of Andhra Pradesh
4.	AMV-7(Janardhan)	130-140	12-15	Suitable for all the mesta growing tracts of Andhra Pradesh.Moderately tolerant to leaf rot.
II <i>Hibiscus cannabinus</i> L.				
5.	AMC-108(Bhimli)	120-130	5	Superior fibre quality and useful for the cottage industries.



### **Climate :**

\*A warm humid climate is considered most suitable for growing both the species of mesta. Both grow well in dry rainfed areas.

\*None of these can stand water logging conditions.

### **Soils:**

Alluvial, red sandy, red loamy with clay base and lateritic soils with rich loamy content are suitable. The acidic soils are not suitable without proper amendments. The sabdariffa types develop chlorosis in high pH of the soils. These types can be grown in soils having a pH of 4.5-7.8.

### **Land Preparation :**

The land is ploughed and followed by working gorru and guntaka which helps in pulverizing the soil properly. The well ploughed and pulverized soil helps in the proper operation of seed drills etc. for better germination of seeds.

**Sowing time:** May- June

**Seed rate:** Seed quantity and seed rate varies in between two species of mesta. A seed rate of 5 kg /acre for sabdariffa and 6 kg/acre for cannabinus is required. Mesta is normally sown by broadcasting method, line sowing has been found to be advantageous over broadcasting. A spacing of 30x10 cms. can be adopted for

maintaining the optimum population for realizing higher yields.

### **Advantages of line sowing :**

1. Plant growth is uniform, since uniform space is maintained in the field.
2. Intercultural operations like weeding hoeing etc. are easier to attempt
3. Application of fertilizers and pesticides etc. also become easier
4. Lesser quantity of seed is required in line sowing than broadcasting
5. Higher yields can be realized

**Manures & Fertilizers:** Balanced application of both organic & inorganic fertilizers at proper time is very important for a crop. It is therefore, advised application of 4-5 tons of FYM / Compost per acre at least as basal at the time of land preparation for better crop growth. A fertilizer dose of N,P & K @ 24:16:16 kg/acre is recommended for higher fibre yields. The N & K can be applied as top dressing in two split doses one at the time of 1<sup>st</sup> weeding and another 6 weeks after sowing. If the soils are poor in available NPK, an application of 24-16-16 NPK kg/acre is advisable for realizing higher fibre yields. In adverse conditions ie., excess moisture or prolonged drought condition the foliar application of 2%N & 1%K is advisable to save the crop from stress conditions.

### **Intercultural operations:**

Weeding, thinning and hoeing are three major intercultural operations attempted in mesta crop. Weeding takes nearly 25-30% of the total cost of production. If the weeding is not done at proper time whole crop is adversely affected. Weeding and thinning is generally done

simultaneously. The first weeding is done at the age of 3 weeks of the crop and second weeding is done after 5<sup>th</sup> week age of the crop. Application of Fluchloralin @ 800ml/acre as pre-sowing herbicide(3 days before sowing) is recommended or application of Butachlore @ 1.5 kg a.i /ha (or) Pendimethalin @ 1-1.25 lt/acre as pre-emergence weedicides immediately after sowing is effective in controlling the weeds.

**Irrigation:** No irrigation generally applied to this crop since growing in rainfed condition the water requirement of mesta crop is about 50 cms. It is therefore, advisable to irrigate the mesta field for better yield during important stages of crop growth.

## **Pests & Diseases of Mesta**

### **A) Insect Pests:**

For all sucking pests, seed treatment with thiomethoxam @6g/kg or thiochlorid(8g/kg) or chlorpyrifos @6ml/kg is highly recommended.

#### **1) Jassid:**

Both nymphs and adults injure the plants by sucking the cell sap and injecting toxic saliva into the leaf tissue. The edges of affected leaves first turn pale green, later become yellowish green and finally red. In case of severe infestations the leaves curl downwards and become crinkled. Due to this, the plants become stunted in growth leading to reduction in fibre length and weight.

**Control measures:** Spray Methyl demeton 2ml or Dimethoate 2ml or monocrotophos 1.6 ml or Oxymethyl demeton 2ml or Imidacloprid 0.25 ml or Thiomethoxam 0.2 gms or Acetamipride 0.2 gms /lt of water.

#### **2) Mealy bug:**

Both nymphs and adult females cause injury to the host plant by thrusting their long filamentous stylets and injects a toxic saliva as it feeds. The attacked regions can be identified by the swelling and shortening of internodes and development of deep green colour, as well as stunted leaves and terminal growth, which is commonly called “**bunchy top**”.

One or more of the following symptoms may be observed:

- Crinkled or twisted leaves and shoots
- Shortening of internodes and formation of bunchy tops
- Bunched and unopened leaves
- Distorted or bushy shoots
- White fluffy mass on terminal shoot.
- Presence of honeydew, black sooty mold, and ants

**Control measures:** Mealy bug can be effectively controlled by spraying Neem oil 5ml or Pongamia oil 5 ml or Propenophos 2ml or Triazophos 2ml or Methyl parathion 2ml per lt. of water. Add adhesive like Sandovit –triton AE or Teepol @ 1ml/lt. of spray fluid for effective penetration on the skin of the insect. Known alternative host plants around the mesta crop should be destroyed. The affected mesta plants should be removed and destroyed

#### **3) Green semilooper:**

Green semilooper is confined to the top apical leaves and extend downwards. Often a number of perforations of various sizes will appear on leaf lamina due to damage by young caterpillars. The grown up larvae feeds gregariously from the leaf margins and finally the

whole leaf will be eaten by leaving only midribs. In case of severe incidence, semiloopers cut the young leaves and the tender growing points of the plant.

**Control measures:** Spray Thiodicarb (1.0g/L) or Indoxacarb (1ml/l) or Novuluron(1.0ml/L) or Phosphomidon 80 SL (1 ml/litre) @ 500 litres of spray fluid/ha.

#### 4) Aphids:

Greenish yellow aphids are seen in colonies on the under side of tender leaves, stem and the pods. Some times it is serious problem especially during prolonged dry spells. Due to desapping the plant loses its vitality. In severe cases curling of leaves, stunted growth and drying and death of the plants.

**Control measures:** Spray Dimethoate 2ml or Monochlorophos 1.6 ml or Oxy- methyl demeton 2ml or Imidacloprid 0.25ml or Thiomethaxam 0.2gm or Acetamiprid 0.2gm/lit. of water.

### B) Diseases

#### 1. Foot & Stem rot :

Intensity of the disease is more under shade, low lying and ill drained soils. Lesions develop at the foot & stem of the plant. They are light brown and cover the stem partially or totally. A black basal rot spreading over the stem upto 90 cms above the ground level is the diagnostic symptom of this disease. Severely affected plants look ash gray with inside in stem which contributes to heavy loss in fibre yield. Partial rotting of basal stem is also noticed in some of the plants. The diseased plant showing stem infection may break at any point due to gales/high wind velocities, as a result the quality of the fibre and its yield will be reduced by 20%.

#### Control measures

- i. Deep summer ploughing.
- ii. Facility for drainage of excess water to prevent water logging
- iii. Treat the seed with Mancozeb 3 gm or Metalaxyl 3 gm or Metalaxyl mz 2 gm or with cyamoxanil + soil application of *Pseudomonas fluorescens* @20g/kg seed / kg of seed. Spraying with ridomyl 2 gm/lit. when disease symptoms are noticed.

#### 2. Leaf Blight :

The earliest symptom can be observed on the leaf apex in one week old seedlings as a small spot which gradually spread towards the petiole along the midrib. In some cases the infection initiates from the base of the lamina and moves along the sides of the midrib towards the apex and it is often confined to one or two lobes.

**Control measures:** Spray Mancozeb 3 gm or Copper oxychloride 3 gms /lit. of water twice with an interval of 7 days.

#### 3. Yellow Vein Mosaic Virus :

Mild scattered yellow spots appear on young leaves which gradually turn to bright yellow alternating with green areas. Affected leaves become leathery, smooth and reduced in size. Diseased plants mature late and bear very few flowers and capsules. The fibre and grain yield will be reduced **Control measures:** Sowing of mesta in 1st fortnight of June and spraying with Thiamethaxam (0.1g/lit) or Imidacloprid (0.25ml/lit) at 50 days after sowing to check the white fly which is vector for the disease.

## Harvesting:

A proper stage of harvesting gives higher fibre yield as well as better quality. If the plants are harvested pre-maturely in early stages, the quality fibre is good but the fibre yield is poor. If the plants are harvested late the fibre yield is better but quality of fibre goes down. The best time to harvest mesta for fibre is when the plants are in 50% flowering.

Harvesting is done normally by cutting the plants close to the ground. In some areas the plants of mesta are also uprooted. Such plants take more time to ret and quality of fibre is adversely affected. After the harvesting the plants are sorted out based on the thickness of the stems followed by bundling of plants in convenient sizes of 25-30 cms in diameter. These bundles kept standing in the field for 2-3 days for shredding of leaves. The shredding of leaves simultaneously helps in shrinking and rupturing of the bark which helps in the entrance of retting microorganisms.

## Retting:

Steep method of retting is very popular in all mesta growing areas. The steep retting consists of bundling of mesta plants after harvesting . The bundles are kept in standing position in 50-60 cms deep water for nearly 3-4

days. This helps in retting of the hard lower portion of the bark. After 3-4 days the standing bundles are laid down in the retting water and slightly drowned (nearly 10 cms) in water with the help of weights made of cement blocks or stones. Care should be taken not to put any weighed material which releases tannin and iron. For hastening the retting process spraying of 1.25 % Urea solution(12.5gm/lt. of water) on mesta sticks is desirable before retting of the bundles.

Soon after completion of retting the fibre can be extracted from the sticks by single plant extraction method. The fibre is extracted from a single plant individually, each plant from the bundle is taken out and with the help of fingers the fibre is extracted, washed and kept. The bundles of ret fibre after washing are open and dried on bamboo frames under the sun. After 3 or 4 days the dried fibre is properly assorted and bundled in different grades for marketing of the fibre.

## Advanced retting methods:

Two improved techniques of microbial retting are developed by **Central Research Institute for Jute and Allied Fibres, Baratpur, Kolkata** by utilization Microbial retting consortium for efficient



retting during water scarcity situation utilizing minimum amount of ground water.

They are a) Mechano-microbial/ ribbon retting

b) *Micro-pond microbial* retting.

### a) **Mechano-Microbial/Ribbon Retting**

- The power operated bast fibre extractor can extract 25 kg dry fibre ribbons per hour with broken sticks while manually operated Mesta fibre extractor can extract 15 kg dry fibre per hour with unbroken sticks.
- These ribbons are then treated with the microbial consortium @ 100 ml/10 kg of green ribbons and kept for 1 hour covering with polythene sheet. For small scale, in polythene lined retting tank of 1 M<sup>3</sup> size (1m x 1m x 1m) containing 1000 litres of water
- After Five to seven days, the retting process will be completed

### b) **Micro-pond microbial retting**

- A circular micro pond of 6.5 m floor diameter and 7.5 m top diameter and 1 m deep having 1 m wide earthen embankment lined with polyethylene sheet (800 to 1000 gauge, 30



ft x 27 ft) is sufficient to mesta harvested from 1333.3 M<sup>2</sup> (0.13 Hectors) land.

- The sharp bases of the mesta plants have to be blunted by ramming the bundles on hard surface to avoid damage to the polyethylene sheet.

- A single layer of straw bundles arranged radially at the bottom of the pond over polyethylene/tarpulin sheet to avoid damage to the polyethylene sheet
- Harvested Mesta bundles are arranged radially upto three layers keeping base of the plants towards periphery of the pond. Microbial consortium @ 1 kg/layer diluted in 10 liters of water will be applied to the mesta bundles in the pond.
- The retting process will be completed with 12-15 days.
- The fibre will be with golden yellow colour

### **Advantages of these methods:**

- Retting is completed within 12 to 15 days compared to 18 to 21 days under conventional retting.
- Transport cost of harvested mesta bundles to the retting spot under conventional method (35 to 40 man days/ha, amounting Rs. 3500 to 4000) will be eliminated in this method.
- The pond can be used for fish cum paddy culture after retting.
- The quality of fibre will be improved at least by 2 to 3 grades.
- The farmer will be benefitted by Rs. 2000 to 3000/acre over conventional method as the fibre yield is around 20 qtl/acre.
- The pond embankment can be utilized for plantation of high value vegetable crops (early cauliflower, cabbage, brinjal, tomato and capsicum etc.), which will compensate the cost of polythene.