

Suggested Cultural Practices for Jute Mallow

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Introduction

Jute mallow is famous for its sturdy natural fiber. The strong, weatherproof fiber is used in the manufacture of everything from burlap sacks to fashions and furnishings. But many people don't realize that special types of jute mallow are widely cultivated as a leafy vegetable (Fig.1). This vegetable is known by several names in different countries, including Jew's mallow, bush okra, and Egyptian spinach. Jute mallow is an important food for many families in the Middle East, Africa, and Asia. The leaves are a rich source of iron, protein, calcium, thiamin, riboflavin, niacin, folate, and dietary fiber.

The following suggested cultural practices were developed at AVRDC in the Taiwan lowlands. Growers may need to modify the practices to suit local soil, weather, pest, and disease conditions.

Climate and soil requirements

Native to Africa, jute mallow is cultivated over a wide range of environments today. The adaptable plant grows in humid to semi-arid areas throughout the tropics and subtropics. Jute mallow responds especially well to warm, humid weather and is often grown near riverbanks. Cold weather and extended periods of drought can kill the crop.

A loam or silty-loam soil is ideal, but jute mallow grows well in many soil types. It tolerates soil pH of 4.5 to 8.0, but more extreme pH conditions



Fig. 1. Jute mallow is famous for its natural fiber and some varieties are grown as a nutritious leafy vegetable

will reduce the availability of iron in the soil and cause yellowing between leaf veins.

Choosing a variety

There are more than 15 species of *Corchorus*. The species differ in leaf and fruit shape, leaf and stem color, pubescence, branching habit, and height (Fig. 2). The most widely cultivated species is *C. oleritorius* (Fig. 3). *C. capsularis* is closely related but differs in fruit shape (Fig. 4). The choice of species and variety for vegetable production is dictated mainly by what is available. Regardless of species, choose a variety that performs well in the field and is preferred by targeted markets.

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Fig. 2. Jute mallow species vary in plant size



Figs. 3, 4. Popular species *Corchorus olitorius* (top photo) and *C. capsularis* (bottom photo) are closely related, differing mainly in pod shape

Preparing the field

Jute mallow is a small-seeded plant, therefore, thorough land preparation is required to promote good growth. Plow, harrow and rototill the field. Then use a plow or mechanical bed shaper to form beds (Fig. 5). At AVRDC we form beds that are 20-



Fig. 5. Raised beds are formed for planting

cm-high during the dry season and 30-cm-high during the wet season. The distance between furrows is 150 cm and bed tops are about 90 cm wide.

Planting

Jute mallow is planted either by direct seeding or transplanting. Direct seeding is used when seed is plenty, labor is limited and during the dry season when flooding is not a problem. Direct seeding is also appropriate for once-over harvesting. Transplanting is preferable when there is limited supply of seed, plenty of labor, and during the wet season when there is high risk of washing out of seeds due to heavy rains. Transplanting is often used for crops that are harvested multiple times.

Option 1. Direct seeding

The seed has a dormancy period and may take several months to germinate. Break dormancy by putting seeds in a cloth bag and steeping them in just-boiled water for 10 seconds. Let seeds dry overnight. Treated seeds should be sown quickly since they cannot be stored.

Seeds are either broadcast or sown in rows. Seeding rates range from 0.5–2.5 g/m² or 5–10 kg/ha, depending on viability and size of seed. Each gram of seed contains about 500 seeds.

If broadcasted, spread seeds uniformly over a well-prepared bed and cover lightly with a layer of compost or rice hull. If grown in rows, space furrows 10 cm apart on the bed. Plant two or three seeds per hill in hills spaced 5–10 cm apart. Place seeds 0.5 cm deep and cover as stated before. Seedlings may be thinned to one plant per hill when they have two to three true leaves.

Option 2. Transplanting

Transplanting reduces the amount of time the crop is in the field and secures a more uniform stand. There are two steps to transplanting: seedling production in a nursery and setting plants into the field.

Seedling production. Seedlings can be grown in a raised seedbed or in cell trays. If started in a seedbed, the soil should be partially sterilized by burning a 3-5 cm thick layer of rice straw or other dry organic matter on the bed. This also adds minor amounts of P and K to the soil. Broadcast the

seeds and cover with 0.5 cm of compost or rice hulls. Use 0.5-1.0 g seed/m².

If seedlings are started in trays, individual cells should be 3–4 cm wide and deep (size 100–128 cell trays are recommended) (Fig.6). Fill trays with a potting mix that has good water-holding capacity and good drainage such as peat moss, commercial potting soil, or a potting mix prepared from soil, compost, rice hull, and vermiculite or sand. At AVRDC, we use a mixture of 67% peat moss and 33% coarse vermiculite. If you use non-sterile components, sterilize the mixture by autoclaving or baking at 150°C for 2 hours. Sow two or three seeds per cell, 0.5 cm deep, and thin to one seedling when they have two true leaves.



Fig. 6. Seedlings in 100-cell tray

Whether using seedbeds or cell trays, seedlings should be protected with a fine-mesh nylon net or grown inside a greenhouse or screenhouse. This provides shade and protects seedlings from rain and pests. Water seedlings thoroughly every morning or as needed (moist, but not wet), using a mist sprinkler to avoid soil splash and plant damage.

If seedlings have been grown in shade, harden them by gradually exposing them to direct sunlight during the 4–5 days prior to transplanting. On the first day, expose them to 3–4 hours of direct sunlight. Increase the duration until they receive full sun throughout the fourth day. Seedlings are ready for transplanting three weeks after sowing or when transplants have five or six true leaves.

Seedlings produced in a seedbed should be gently removed with a trowel and planted bare-root. Seedlings produced in trays are lifted with their root balls intact when transplanted.

Setting plants into the field. Optimum spacing varies depending on variety and harvest method.

Wider spacings are used for tall varieties with broad leaves, multiple branches, and harvested several times. Narrower spacings are used for short and bushy varieties and once-over harvesting.

Rows are spaced 10 cm apart with 5–10 cm between plants within row. Transplant in the late afternoon or on a cloudy day to minimize transplant shock. Dig holes 10 cm deep, place the transplant in the hole, cover the roots with soil and lightly firm (Fig.7). Irrigate immediately after transplanting to establish good root-to-soil contact.



Fig. 7. Newly transplanted bed

Fertilizing

Jute mallow responds well to added fertilizer, especially nitrogen. A combination of both inorganic and organic fertilizers improves yield and maintains soil fertility. The rate of fertilizer application depends on soil fertility, soil type, fertilizer recovery rate, and soil organic matter. A soil test is highly recommended to determine the available N, P, and K. The amount of applied fertilizer can then be calculated based on your target yield and adjusted for residual nutrients. Suggested fertilizer recommendations are shown in Table 1. Fertilizer recommendations depend heavily on local conditions, so consult your fertility management specialist for appropriate fertilizer rate.

Table 1. Recommended fertilizer rates (kg/ha) for jute mallow production at AVRDC

| Nutrient | Pre-plant | Days after sowing/transplanting | | |
|-------------------------------|-----------|---------------------------------|----|----|
| | | 10 | 20 | 30 |
| Compost | 10,000 | | | |
| N | 48 | 30 | 8 | 8 |
| P ₂ O ₅ | 64 | 8 | 8 | 0 |
| K ₂ O | 48 | 15 | 8 | 0 |

Irrigating

Jute mallow is sensitive to drought. Irrigating is critical after sowing or transplanting to ensure a good stand. At AVRDC, fields are furrow-irrigated every 10 days during the cool-dry season, and weekly during the hot-dry season. As a rule, plants should be irrigated if wilting occurs in midday. Irrigate thoroughly to develop a deep, healthy root system.

Good drainage is essential for plant survival and growth. Raised beds, clean furrows, and large drainage canals facilitate quick drainage of excess water after heavy rains. Avoid over-irrigation since this leads to disease development and leaching of soil nutrients. Drip irrigation or micro-sprinkler irrigation is recommended in areas with limited water supply. If sprinkler irrigation must be used, avoid late evening irrigation to prevent foliar diseases.

Controlling weeds

Thorough land preparation is essential. Jute mallow, especially when direct-seeded, is slow to establish and vulnerable to competition from weeds.

Mulching is recommended for controlling weeds, reducing soil erosion, and conserving soil moisture. Be sure organic mulching materials are free of weed seeds. Organic mulching is easier to apply if the crop is transplanted, but can also be used for direct-seeded crops after the seedlings reach a height of 10–15 cm. Herbicides are also available. Before using a herbicide, check that it is recommended for jute mallow and follow instructions on the label. Hand or hoe weeding can be performed as needed.

Controlling pests and diseases

The foliage and shoot tips of jute mallow are susceptible to damage by insects and spider mites (Figs. 8, 9). Nematodes (*Meloidogyne* spp.) cause stunting of plants. Pest damage is usually less severe in plantings that are well fertilized and rotated with other crops. Insect pests may be managed by covering beds with fine-mesh nylon netting.

Pesticides are useful for controlling pests when they cause significant damage. Choose a pesticide that targets the pest and avoid pesticides that kill beneficial organisms. Choose pesticides that last only for a short period. To avoid exposing consumers to pesticide residues, follow instructions for time intervals between spraying and harvesting.



Figs. 8, 9. Insect damage

Only a few diseases affect jute mallow. Damping-off caused by *Rhizoctonia*, *Pythium* or *Phytophthora* spp. occurs in seedbeds. These pathogens are managed through the use of raised beds, well-drained soils, and proper watering. Stem rot (*Sclerotium rolfsii*) is a common disease during the dry season, causing plants to wilt. Stem rot is managed by deep plowing, using raised beds, rotating crops, and allowing ample time for breakdown of green manure before planting.

Harvesting

Jute mallow is harvested 30–60 days after planting, depending on variety. Some varieties are sensitive to short daylengths, causing them to bloom prematurely. These varieties should be harvested 20–40 days after planting, just before pods develop.

Plants may be harvested once or several times. Once-over harvest is adapted for quick-growing varieties. Whole plants (20–30 cm tall) are pulled from soil with roots, washed and tied in bundles. With multiple harvests, young leaves and shoots are picked every two to three weeks. New side shoots will develop and harvesting can be repeated three or four times. Frequent harvesting delays flowering and prolongs the harvest period.

Jute mallow wilts rapidly after harvest. Harvest during the cooler time of day, such as early morning or late afternoon, and keep the produce cool and shaded (Fig. 10). ☞



Fig. 10. Jute mallow bundled and ready for shipping