

jet of water to knock off mites and destroy their webs. Be sure to spray the underneath of the leaves. However, this should be done early in the day to allow the foliage to dry. Wetness of the foliage for an extended period is conducive to development of fungal diseases.

## Diseases

### Early blight

Leaf spots of early blight are circular, up to 1 cm in diameter, brown, and often show a circular pattern which distinguishes this disease from other leaf spots. Early blight thrives best under warm wet conditions. Leaf spots



Early blight (Credits, Nature garden)

first appear on the oldest leaves and progress upward on the plant. Entire plant could be defoliated and killed.

## Controlling

Once early blight has established is very difficult to control. The most important way of controlling early blight is attempting to prevent its establishment and further spread.

### What to do:

- Rotating with other crops like amaranth is essential. Do not rotate with tomato, potato or peppers as these belong to the same family and susceptible to the same diseases.
- In areas with a high humidity, wider plant spacing should be used.
- Practice good field hygiene. Remove infected leaves during the growing season discard all badly infected plant debris at the end of each season.
- Use certified disease-free seeds

## Harvesting

- The crop is ready for harvest 4 weeks from transplanting.
- The stems are cut approximately 15 cm above the ground. This allows new side shoots to develop. Picking is done at weekly intervals.
- If complete harvesting is practiced, spacing can be as close as 10 x 10 cm and plants are uprooted.

This method is mainly used when there is less than 2 months before the main staple food crop will be planted.

## Post-harvest Handling

Value Addition Techniques: Sorting, Cleaning & Grading

### Sorting

- Black Nightshade should be sorted to remove insects and yellow or damaged leaves before packing
- Airing of the harvested leaves is done to remove field heat

### Cleaning

- Leaves should be thoroughly washed with portable water

### Grading

- Grade the leaves by size, bunching those of the same size and tying in small bundles before packing in well ventilated container for transportation to markets

## Storage

Fresh leaves should be stored in the refrigerator or stored in a cool place.

## Record keeping

The following records should be kept: land preparation, seed variety, date of planting and harvesting, fertilizer, pest and disease control such as pesticides and herbicides, weeding, harvesting, and labor, both manual and mechanized.

This manual designed to provide simplified easily accessible information on ecological requirements and production/crop management practices for improved African nightshade production. It is meant to be a guide to the smallholder farmers and a reference to agriculture extension personnel. It is intended to raise awareness and provide decision support information about African nightshade production as an opportunity at farm and how to do basic farming for subsistence and market and ultimately enhance farmers' income and improve their livelihood.

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# Laikipia, Isiolo, Samburu Transforming the Environment Through Nexus.

Listen Crop Manuals: Indigenous Vegetables

## AFRICAN NIGHTSHADE (*Solanum spp.*)

**Local name:** *Managu, Osuga, Mnayu, Kitulu, Lekuru, Sohot*



## Introduction



Amanagu (*Solanum villosu*) (Credits: Farmwork)

Narrow-leaved African nightshades, also called *mnavu* in Swahili. The plant is an erect, many-branched herb growing 0.5 to 1.0 m high. The plant bears thin, oval, slightly purplish leaves up to 15 cm in length, has numerous white flowers and usually purple to black, round berries about 0.75 cm in diameter containing many small, flattened, yellow seeds.

There are several species with black berries, but the most popular are those with orange berries belonging to *Solanum villosum*.

The leaves are eaten as a cooked vegetable, often mixed with other vegetables and the fresh fruit is also consumed. Some *Solanum* varieties are preferred for their bitter taste while others are considered 'sweet', particularly after being boiled and the water discarded. The raw leaves contain 4% protein, 6% carbohydrates and are moderately high in vitamin C.

## The main varieties

Variety	Characteristics
<i>Solanum villosum</i> (Managu)	<ul style="list-style-type: none"><li>Grows well in low altitude areas; produces orange colored fruits which are edible; more popular variety in Kenya</li></ul>
<i>Solanum scabrum</i> (Giant Managu)	<ul style="list-style-type: none"><li>Bigger in size; produces bigger leaves and fruits which are black in color; grows well in medium altitude areas which receive a lot of rainfall; not very popular in Kenya.</li></ul>

## Land Preparation

Minimum tillage

<sup>1</sup>References: IPGRI, (1997). Traditional African Vegetables. Promoting the conservation and use of under-utilized and neglected crops. The proceedings of a conference held by the International Plant Genetic Resources Institute (IPGRI), August 1995, ICRAF, Nairobi, Kenya. 171 pp. www.bioversityinternational.org

## Propagation and planting

Seeds are either planted directly in the field or through a nursery. There are certified seeds in Kenya.

- Seed Rate 50g per acre

### Nursery propagation

- The soil in the nursery should be loosened and enriched with decomposed manure.
- Seeds should be mixed with sand and/or ash at a ratio of 1:3 for uniform sowing.
- Sow the mixture thinly, either by broadcasting or in rows, 15 - 20 cm apart and cover with a fine layer of soil.
- After sowing, the bed should be mulched with tall grass or a similar material to retain moisture. This mulch can be removed once the plants are 3 cm.
- Transplant when seedlings have 6 true leaves and are 10 - 15 cm tall. The spacing should be 20 cm in the row by 40 cm between the rows.

### Direct sowing:

- Allows plant to establish faster and produce bigger leaves
- Seed germination takes place between 4 - 7 days
- Lines should be drawn on the farm and seed drilled on the line
- The seedlings should be thinned to attain a spacing of 15 cm between the plants after 30 days

## Husbandry

- Nightshades require large amounts of nutrients, and therefore do well in soils that are rich in organic matter
- Apply cattle, chicken or compost manure at a rate of 2-5 kg/m<sup>2</sup> depending on availability
- Irrigation is needed for good yields
- Harvesting
- The crop is ready for harvest 4 weeks from transplanting.
- The stems are cut approximately 15 cm above the ground. This allows new side shoots to develop. Picking is done at weekly intervals.
- If complete harvesting is practiced, spacing can be as close as 10 x 10 cm and plants are uprooted. This method is mainly used when there is less than 2 months before the main staple food crop will be planted.
- Roots of these crops can be kept in water to keep the plants fresh.

## Pests and diseases

Pests are similar to those of *Solanaceae* family (i.e. tomatoes). The most common pests include: Aphids; spider mites and the most common disease is early blight

### Aphids (*Aphis spp.*)

Aphids are a major pest, causing leaves to curl and become unattractive to customers.

Aphids feed by sucking plant sap. Small aphid populations may be relatively harmless, but heavily infested plants usually have wrinkled leaves, stunted growth and deformed pods. Plants, in particular young plants, may dry out and die under heavy aphid attack. Heavy attack on older plants may cause crop loss by decreasing flower and seed production. Damage may also reduce seed viability.

#### What to do

- Conserve natural enemies. They are important in natural control of aphids.
- Monitor regularly the crop.
- Whenever necessary spray only affected plants (spot spraying).
- Use biopesticides that are not harmful to natural enemies (for instance neem, ashes, soapy water).

### Spider mites (*Tetranychus spp.*)



Spider mites (*Tetranychus spp.*) (Credits Warwick HRI, University of Warwick)

The plant's leaves and growth tips are susceptible to mites (very small, sucking arthropods) that result in twisted growth and low productivity.

The picture shows two spotted spider mites (*Tetranychus urticae*). The adult female is 0.6 mm long. The male is smaller.

Generally, spider mites feeding may cause reduction in plant growth, flowering, number and length of berries, and number of seeds per berry. Damage is most severe when mites attack young plants. Mite damage may be particularly severe during the dry season.

#### What to do

- Avoid planting next to infested fields.
- Avoid use of broad-spectrum pesticides, in particular pyrethroids; this may lead to spider mite outbreaks.
- Use overhead irrigation or wash plants with a strong