

## **Amaranth (*Amaranthus spp.*) - Mchicha**

### **Introduction**

Seed production is a highly specialized. Seed production of certain crops may be easier than others depending on maturity period, mode of reproduction, susceptibility to seed borne diseases and seed multiplication factor.

Important species of amaranth are *A. cruentus*, *A. caudatus*, *A. hypochondriacus*, *A. tricolor* and *A. dubius*

### **Land selection**

Amaranth is a predominantly self-pollinated crop. The Isolation required to separate one variety from the other is 100 m.

The land selected should not have had any amaranth seed crop in the previous season so that contamination from previous crop can be prevented and build up of soil borne diseases reduced.

### **Land preparation**

Amaranth seeds are very small and therefore the soil should be very well prepared without clods or crusts.

## **Agronomic requirements**

### **Planting**

Spacing is 25 cm within row and 50 cm between rows. Seed rate is 1.5-2 kg kg/ha  
You conduct germination test to determine the actual seed rate

Amaranth can be established by transplanting seedlings or sowing directly by drilling in rows and thinning after about 3 weeks.

### **Weed control**

The seed plots should be kept free from weeds for high quality seed  
Amaranth has wild types (*A. viridis* and *A. spinosus*) and seeds of the variety under production should not be allowed to mix with the wild type.

### **Fertilizer Application**

Incorporating 20-30 t/ha of manure into the soil during ploughing is recommended. Chemical fertilizers Compound (10-20-20) may also be applied at planting and 40% N as topdressing.

### **Crop protection**

To manage diseases start with disease free seeds and fields. Diseases can be transmitted by wind, insects or plant debris. Disease will be controlled by roguing and timely use of pesticides

### **Amaranth seed transmitted diseases**

<b>Disease</b>	<b>Control</b>
Stem rot	Use healthy seeds
Leaf rot	Use healthy seeds

### **Pests**

Leaf eating caterpillars  
Beetles  
Nematodes

### **Roguing**

Roguing ensures that the seed lot produced is of the highest genetic, sanitary and physiological quality possible  
Roguing is done by regularly inspecting the seed field and removing any off-types or diseased plants.  
The entire plant should be removed by pulling or cutting before it flowers.

Characters to be considered when roguing are: -  
General appearance

Leaf colour and shape  
Colour of flowers in spike  
Physical characteristics of spike  
Plant height  
Diseases prevalence  
Maturity period

### Harvesting

Different varieties mature at different times. When seed is mature panicles of individual plants should be cut down, laid on tarpaulins, polythene sheets or woven large mats (*mkeka*) and dried. The seed is then threshed winnowed and collected in containers for storage. When we wait too long to harvest, seeds might shatter on the ground reducing the yield

### Expected seed yield

This will depend on variety of Amaranth. This can be from 200-300 kg/ha for species like tricolor and 1-1.5M T/ha for *A.cruentus*

Storage can be improved by: -

- Harvesting under dry conditions
- Drying immediately after harvesting
- Storing at low RH
- Airtight packaging after drying seeds well



For Further information contact

KALRO-KAKAMEGA

P. O. Box 169-50100,

KAKAMEGA

Tel: 056-30031,

Email address: [kalro.kakamega@kalro.org](mailto:kalro.kakamega@kalro.org)

Compiled by: -

C. Ndinya-Omboko, S. Weller, M. Odendo,

E. Onyango, J. Simon,

# Amaranth



## Seed Production



Logos of other  
collaborators to be placed here

## **Spiderplant (*Cleome gynandra*)- Mwangani**

### **Introduction**

Seed production is a highly specialized. Seed production of certain crops may be easier than others depending on maturity period, mode of reproduction, susceptibility to seed borne diseases and seed multiplication factor.

### **Land selection**

Spider plant is a cross-pollinated crop. The Isolation required to separate one variety from the other is a minimum of 200 m for certified seed and 400 m for high status seed (Breeders'-basic). Crop rotation is necessary to avoid pest build up and minimize infestation

### **Land preparation**

Amaranth seeds are very small and therefore the soil should be very well prepared without clods or crusts.

### **Agronomic requirements**

#### **Planting**

Spacing is 25-30 cm within row and 50 cm between rows. Seed rate is 6 kg/ha

Spiderplant is often directly sown by drilling. For even distribution while sowing, Mix seed with sand in the ratio of one to ten. Plant seeds in soils with sufficient moisture to ensure good emergence.

### **Weed control**

The initial growth of spider plant is slow and therefore early weeding is necessary. This encourages vigorous growth.

### **Thinning**

Thinning should be done 3-4 weeks after sowing

### **Fertilizer Application**

Well decomposed manure of humid state is recommended at 3 kg per sq. m. Compound fertilizer 10-10-20 is applied at a rate of 2 tablespoonfuls in one metre Basal application is important.

### **Crop protection**

To manage diseases start with disease free seeds and fields. Diseases can be transmitted by wind, insects or plant debris. Disease will be controlled by roguing and timely use of pesticides

### **Pests**

Flee beetles, aphids, nematodes, and harlequin (**hurricane**) bugs (*Bagrada hilaris*), stem borer, pod borer and cutworms are common pests in spider plant. These are controlled by using recommended pesticides, practicing crop rotation and application of ash in the African villages

### **Roguing**

Roguing ensures that the seed lot produced is of the highest genetic, sanitary and physiological quality possible

Roguing is done by regularly inspecting the seed field and removing any off-types or diseased plants.

The entire plant should be removed by pulling or cutting before it flowers.

Plants of Spiderplant varieties show much variation and the varieties tend to be unstable because of ease of crossing during breeding.

Characters to be considered when roguing are: -

General appearance

Stem colour  
Leaf colour and shape  
Colour of flowers in spike  
Flower characteristics  
Plant height  
Pest and diseases prevalence  
Maturity period

### Harvesting

Harvesting is done when seeds are mature by cutting panicles or the entire stem. This should be timed well to avoid losses due to shattering. The pods should be laid on tarpaulins, polythene sheets or woven large mats (*mkeka*) to dry. The seed is then threshed winnowed and then collected in containers for storage. Spiderplant seed undergo a period of dormancy after harvesting

### Expected seed yield

Estimated seed yield is 500-1000 kg/ha

### Postharvest handling

Factors that result in reduced seed viability are: -

- Delay of seed drying
- Poor seed drying
- Poor storage conditions

Storage can be improved by: -

- Harvesting under dry conditions
- Drying immediately after harvesting
- Storing at low RH
- Airtight packaging after drying seeds well



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# Spiderplant



## Seed Production



Logos of other  
collaborators to be placed here

**African nightshade (*Solanum spp.*)-  
*Mnavu***

**Introduction**

Seed production is a highly specialized. Seed production of certain crops may be easier than others depending on maturity period, mode of reproduction, susceptibility to seed borne diseases and seed multiplication factor.

Types of African nightshade commonly grown in western Kenya include *S. vilosum*, *S.amERICANUM*, *S.eldoretii* and *S. scabrum*

**Land selection**

African nightshade is a self-pollinated crop. The Isolation required to separate one variety from the other is a minimum of 25 m for certified seed and 50 m for high status seed (Breeders'-basic). Crop rotation is necessary to avoid pest build up and minimize infestation

**Land preparation**

African nightshade seeds are very small and therefore the soil should be very well prepared without clods or crusts.

**Agronomic requirements**

**Planting**

Nightshades may be sown directly or started in the nursery. Spacing is 30-40 cm within row and 50 cm between rows. Seed rate is 6 kg/ha

Transplant when leaves are 10-15 cm tall Thinning should be done 4 weeks after sowing in the case of direct planting.

**Fertilizer Application**

Combine farmyard manure and inorganic fertilizer for best results. Well decomposed cattle manure is applied at a rate of 2-6 kg per sq. m depending on soil type and quality of manure. Calcium ammonium nitrate can be applied at a rate of three tea spoonfuls in one metre of row.

**Crop protection**

To manage diseases start with disease free seeds and fields. Diseases can be transmitted by wind, insects or plant debris. Disease will be controlled by rogueing and timely use of pesticides.

Birds are common pests in African nightshade at seedling and fruiting stages.

Other major pests are flea beetles, aphids, and nematodes.

**Spider plant seed transmitted diseases**

Disease	Control
Early blight	-Harvest seeds only if plants do not show symptoms.
Anthrachnose	
Wilt	
Canker	-Rogue plants that show symptoms
Mosaic virus	

**Rogueing**

Rogueing ensures that the seed lot produced is of the highest genetic, sanitary and physiological quality possible

Rogueing is done by regularly inspecting the seed field and removing any off-types or diseased plants.

The entire plant should be removed by pulling or cutting before it flowers.

Characters to be considered when rogueing are: -

- General appearance
- Leaf shape
- Stem colour
- Colour of flowers
- Plant height
- Maturity period

### Harvesting and Processing

*S. Villosum* can be picked when berries turn yellow and *S.eldoretii* fruits fall down easily when fruits become ripe. Fruits of *S. scrabrum* remain on the plant when ready.

There are two methods of processing seed

1. Collected fruits are squeezed in water, washed thoroughly and dried preferably in shade till properly dry.

2. Fruits are put in a polythene bag and kept there for three days to allow them to ripen and ferment. Next they are removed dried properly and rubbed to separate seed from chaff. Seeds are then stored in clean, sealed containers.

### Expected seed yield

Estimated seed yield is kg/ha

### Postharvest handling

Factors that result in reduced seed viability are: -

- Delay of seed drying
- Poor seed drying
- Poor storage conditions

Storage can be improved by: -

- Harvesting under dry conditions

- Drying immediately after harvesting
- Storing at low RH
- Airtight packaging after drying seeds well



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## African nightshade



## Seed Production



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