



Sweet Potato Production Guide



Researching Soils, Crops and
Water in Zambia



Table of Contents

Foreword	ii
Acknowledgements	iii
1. Introduction	1
2. Climatic and Soil Requirements	1
3. Recommended Varieties	1
4. Recommended Management Practices	2
5. Crop Protection	4
6. Harvesting	5
7. Postharvest Handling and Processing	5

Foreword



Zambia has the potential to produce sufficient food for its citizens and for export.

In order to ensure that good agricultural practices are employed by farmers, crop specific production information should be made available to them.

Due to technological advances and the changing environmental and socio-economic conditions it became necessary to revise the first edition of the Sweet potato Production Guide, which was published in 2002. This revised edition is meant to provide farmers and other stakeholder's crop specific information in order to promote good agricultural practices and enhance productivity and production.

The information contained in this booklet has been generated over a number of years of research and is appropriate for all categories of farmers. The information is meant for extension officers, agricultural training institutions and other development partners.

It is my sincere hope that this information will go along way in stimulating Sweet potato production in Zambia.

The Zambia Agriculture Research Institute (ZARI) is committed to alleviating poverty and enhancing food security by contributing to increased and sustainable food production.

A handwritten signature in blue ink, appearing to be 'M. Mwale', written in a cursive style.

M. Mwale Director,
Zambia Agriculture Research Institute,
Ministry of Agriculture,

2018

Acknowledgments

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1.0 Introduction

Sweet potato (*Ipomoea batatas* L.) is a dicotyledonous plant of the family Convolvulaceae. Though a perennial, it is normally grown as an annual mostly propagated vegetatively from vine cuttings. Generally, both roots and leaves are used as food and are good sources of vitamin A, vitamin B, vitamin C, calcium, iron, potassium and sodium. It is a good food security crop because it can be produced on fairly infertile soil with hardly any inputs and can withstand periods of irregular rainfall and drought. Since the crop is tolerant to a wide range of growing conditions, it can grow well in any part of Zambia provided the temperature is not limiting.

2.0 Climatic and Soil Requirements

2.1 Climate

Sweet potato grows best under warm conditions above 24°C, but when temperatures fall below 10°C, it is severely retarded. The crop is easily damaged by frost. It does well with well-distributed annual rainfall of 750-1200 mm with approximately 500 mm falling during the vegetative growth period.

2.2 Soil types

Sweet potato prefers sandy-loam soils of a high organic matter content and with permeable subsoil, but does poorly on clay soils. A soil pH of 5.6 to 6.6 is ideal.

3.0 Recommended Varieties

There are a lot of local varieties, which are grown for different preferences though normally low yielding. However, improved varieties that meet both the consumer preferences and better agronomic attributes have been developed. Recently released varieties with a characteristic deep orange flesh, which is associated with high carotene content and therefore rich in vitamin A include Olympia, Kokota, Chiwoko and Chumfwa.

These are given in the table below. These are given in the table below.

Variety Name	Maturity Period (Months)	Potential Yield (t/ha)	Other major characteristics
Chingovwa	3 - 4	18	Cream flesh. 34% DM, widely grown
Zambezi	4	16	Deep orange flesh associated with high carotene content, 28% DM
Lukulu	4 - 5	34	White, 27% DM
Lunga	4	30	White, 29% DM
Lukusashi	3 - 4	37	Light orange, 27% DM
Kalungwishi	4	27	Light orange, 32% DM
Mulungushi	4 - 5	29	Yellow flesh, 33% DM
Twatasha	5	20	31% DM, Orange flesh
Chiwoko	5	20	Orange flesh, 34% DM
Kokota	5 - 6	19	Orange flesh, 29 % DM, tolerant to insect pests
Olympia	5	25	31% DM, orange flesh; tolerant to diseases and insect pests
Kanga	5 - 6	21	White flesh, 28% DM' tolerant to diseases and insect pests
Chumfwa	5	20	Pink root colour; intermediate orange fresh colour; 31% DM

4. Recommended Management Practices

Sweet potato can be grown as a sole crop but can also be mixed with legumes and cereals. To avoid build up of pests and diseases, the crop should not be planted on the same land more than once every three years. Because of its efficiency in nutrient utilisation, continuous cultivation of the crop on the same piece of land might lead to nutrient depletion.

4.1 Land Preparation

Ridges and mounds are preferred because they promote root development, easy root tuber penetration, easy harvesting and also minimize erosion and flooding problems. Ridges should be spaced at 1 meter apart. Mounds use more land than ridges. It is advisable to have the land prepared early and have the crop planted on time when the vines are available. Well prepared land promotes good crop establishment.

4.2 Planting

Planting materials can either be vine cuttings or sprouts from roots. Tip vine cuttings are better than basal ones because they give the best sprouting percentage and highest yield. These cuttings should contain at least 5 nodes and should be 25-30cm long obtained from health mother plants. Vines should be cut into suitable pieces and leaves removed from the lower 2/3 of each cutting.

The roots from the previous year's crop normally provide sprouts for planting. The sprouts when ready for planting should be 15-20cm long with evidence of active leaves.

Sweet potato should be planted when the rains are steady except if grown in the dambo (swamp) or under irrigation.

The spacing along the ridges should be 25-30cm planted with two thirds of the vine inserted in the soil at an angle of about 45 degrees with at least two nodes exposed.

A wider spacing should be adopted for mixed cropping. One vine cutting of 25-30cm length should be used per station. The use of bundles is a waste of planting materials.

4.3 Weed Control

Sweet potatoes should be kept weed free until the crop covers the ground. First weeding may be done 3-4 weeks after planting followed by a second weeding 6-7 weeks after planting. Earthing up or re-ridging is recommended after the first weeding to protect tubers from weevil attack.

4.4 Fertiliser Use

The crop responds well to organic manure. Most of the farmers bury the growing vegetation under either the mounds or ridges when preparing the land which is used by the plant when decomposed. Results from inorganic fertilizer trials indicate that too much nitrogen may encourage vine growth at the expense of roots. Sweet potato makes good use of residual fertilizer in rotation with crops that require a lot of fertilizer during their growing period.

4.5 Crop Rotation Practices

Sweet potato fits well in many rotational systems. Rotation helps to control weevils and nematodes. Sweet potato would also benefit from nutrients left by other crops including green manure cover crops within a rotation cycle.

5.0 Crop Protection

Sweet potato is affected by a number of pests and diseases which result in poor crop performance and loss in yield. It is therefore important that measures are taken to control these pests and diseases in order to reduce damage.

The major pests and diseases of sweet potato in Zambia and their control measures are discussed in the following.

5.1 Major Diseases and Control Measures

5.1.1 Sweet Potato Virus Disease (SPVD)

Sweet potato virus disease is caused by Sweet potato Feathery Mottle Virus (SPFMV) and Sweet potato Chlorotic Stunt Virus (SPCSV) that are spread by aphids and white flies. The disease is also spread by planting infected vines. Use of knives that have been used to cut infected plants can transmit the virus to healthy ones.

Typical symptoms of SPVD include vein clearing, chlorosis, puckering, leaf strapping, leaf curling, severe plant stunting, leaf distortion and mosaic.

Control Measures

The disease can be controlled by use of resistant varieties and clean planting materials. Removal of all infected plants from the field and destroying them reduces incidence of the disease.

5.2 Major Insect Pests and Control Measures

5.2.1 Sweet potato Weevil (*Cylu ssp.*)

Sweet potato weevil (*Cylu ssp.*) is the major pest of sweet potato in Zambia. The adults and larvae attack leaves, vines and roots. The most severe damage is done to roots.

This renders the crop unmarketable and unfit for human consumption.

Control Measures

Cultural practices such as earthing up to seal the soil cracks, timely harvesting and use of weevil free planting materials can help in controlling the pest.

6.0 Harvesting

Exudation from mature roots and cracking of ridges are used as indicator of maturity though this could be due to moisture stress or soil related issues.

In some varieties, harvesting can be done within 3-4 months while with late maturing ones it may take as long as 6 months. Normally harvesting starts around May, June, and July depending on variety.

Piece meal harvesting is a common practice. During harvest avoid bruising the roots as this would lower their market value. Delayed harvesting encourages weevil infestation, pest build up and mole attacks.

7.0 Post-harvest Handling and Processing

7.1 Storage

If storage is desired after harvesting, the roots should be sorted out into clean and unbruised ones. Such roots should be left in the sun to cure naturally for 2-4 hours before storage. The roots should then be dusted with wood ash and any of the following procedures followed:

Pit Storage: Dig a pit of 0.5 x 0.5 m. Line the bottom of the pit with clean dry grass or dry sticks. Pack cured and ash treated roots in the pit up to 15 cm from the upper ground level. Cover lightly with dry grass and topsoil. Finally, cover with a mat or any metal sheet to keep away rainy water; in case of rains.

Saw dust heap: At the corner of a storage house, place a heap of saw dust of about 10 cm thick. Place cured and ash treated roots on the saw dust and cover with about 5 cm of saw dust.

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