



Finger Millet Production Guide



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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 Finger Millet Production Guide, which was published in 2002. This revised edition is meant to provide farmers and other stakeholders 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 a long way in stimulating cowpea 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, consisting of stylized initials 'M. Mwale'.

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

2018

Acknowledgements

The Editorial Committee wishes to express its gratitude to the Finger Millet Research Team of Zambia Agriculture Research Institute for providing the technical information and invaluable advice.

The Zambia Agriculture Research Institute wishes to recognize the support provided by World Bank through the Agricultural Productivity Programme for Southern Africa- Zambia Project (APPSA-Zambia), for financing the publication of this production guide.

1.0 Introduction

Finger Millet (*Eleusine indica* L.) is an important cereal crop which is grown throughout the high rainfall areas (Region III) of Zambia. It is grown under a number of traditional systems namely chitemene, fundikila and mibanda. Increasingly it is being grown on permanent fields in most areas of region III. Finger millet is an important food and cash crop in the high rainfall areas of Zambia. It is also a very dependable major food security crop whose grain can store for more than three seasons without chemicals. The available improved varieties perform well in permanent fields and can even grow during the off season under irrigation.

Despite its small size, the nutritive value of Finger millet is higher than that of maize as it contains minerals and high protein value content. Its main protein fraction has high biological value with good amounts of tryptophan, cystine, methionine and total aromatic amino acids. All of these components are crucial to human health and growth, but are deficient in most cereals and hence finger millet is an important cereal for prevention against malnutrition. It provides health benefits. For instance, it has mitigating effects on diabetic patients because of its slow digestion which lowers the blood sugar level.

2. Climatic and Soil Requirements

2.1 Climate

Finger millet grows well under average temperatures of 25°C with annual rainfall above 1000mm which is evenly distributed during growth period. Partial or minor droughts especially during flowering can cause loss of yield.

2.2. Soil Types

Finger millet grows on all types of soils. It is relatively tolerant to low pH compared to other cereal crops. Moderately light and well drained soils are most suitable. Heavy soils should be avoided as these make it hard for the seed to germinate.

3.0. Recommended Varieties

Varieties which are recommended for cultivation in Zambia and their agronomic attributes are given in the table below.

Variety	Maturity	Potential Yield kg /ha	Characteristics
Nyika	65 days	3000	Medium height, Long Fingers ,big grain and ,light brown grain
Senga	65 days	3000	Medium height, short fingers, brown grain.
Chibuli	70 days	4000	Medium height, medium fingers, brown grain.
Sumina	70 days	8000	Short thick curved fingers at tip, large grain, many productive tillers and light brown grain
Namwenya	70 days	8000	Long thick fingers, large grain many pro-

4.0. Recommended Management Practices

4.1. Land preparation

Land preparation for good yields should be done in October to allow the soil settle and all residues to rot. The land should have a fine tilth, with no clods, good drainage and flat so that no water settles on the field.

4.2 Planting

The best time for planting Finger millet is at the onset of rains which is usually during the first three weeks of December. Planting after 25th December should be avoided since there is a build up disease which can affect the yield. A recommended seed rate of 8kg per ha and 2kg per lima and a spacing of 30 cm between rows and 2cm depth will give a good yield. The recommended planting methods are; drilling using a rope and line marker. When using the drilling method, make furrow 30cm apart. While with the line marker, the rake-like wooden plank with spikes of 30cm apart makes it easier to make furrows. In both cases, seed is easily drilled evenly in furrows of 30cm apart so that once the seed germinates the seedlings are thinned to leave a space of 5cm between plants.

4.3 Weed control

Weeding three times is recommended in order to keep the field clean. The first weeding should be done during top dressing, second when the next flush of weeds appear and the third, just before flowering. This is very important in finger millet since it is a small seeded crop which competes poorly with weeds.

To minimise weed infestation, fields previously planted to finger millet for three consecutive seasons, should be avoided.

4.4 Fertilizer use

The recommended fertilizer application rates in Finger millet for basal dressing is 100kg/Ha “D” Compound while for top dressing, it is 75kg/Ha Urea. Basal fertilizer is applied during planting in furrows by drilling. Lightly cover the fertilizer before drilling the seed. Four weeks from the date of planting, Urea is applied by banding and lightly covering with soil to avoid it being washed away.

4.5 Crop Rotation practices

Finger millet should not be cultivated in the same field continuously or follow another cereal. It should be rotated with a legume and other crops such as roots and tubers and oilseeds. This will lead to reduction of pests and diseases build-up while inclusion of a legume will help to replenish the nitrogen status of the soil through biological nitrogen fixation.

5. 0.Crop Protection

Finger Millet 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.

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

5.1 Major Diseases and Control Measures

5.1.1 Blast (*Pyricularia grisea*)

Finger millet blast is characterized by the appearance of lesions on the leaves, nodes and heads. On the leaves, lesions are typically

spindle-shaped, wide in the center and pointed toward either end. Large lesions usually develop a grayish center, with a brown margin on older lesions. When conditions for disease development exist, lesions on the leaves of susceptible lines expand rapidly and tend to coalesce, leading to complete drying of infected leaves. When the area between the leaf blade and leaf sheath (leaf collar) is infected, the collar turns brown and dies. This is called collar rot, which leads to death of the whole leaf above it. Besides attacking the leaves, the fungus may also attack the neck causing neck rot. When a neck is infected, all parts above the infected node may die. When this occurs, yield losses may be large because grain formation is inhibited and/or formed grains may be shriveled. In such cases yield losses may be as high as 90%.

Control Measures

To minimise the incidence of Blast, early planting is advised. Other measures include cultural practices such as crop rotation and use of resistant varieties.

5.2 Major Pests and Control Measures

A number of pests attack finger millet but Army worms and Aphids are important.

Armyworm attacks come as occasional outbreaks and may cause massive destruction within a short period of time.

Aphid infestation and damage is severe in the young crop during the dry periods. Damage by aphids is through sucking of plant sap thereby stunting the plant.

Control Measures

If infestation is severe, use of recommended insecticides is advised.

6.0. Harvesting

Harvesting begins when the crop is mature. The crop is considered mature when fingers turn reddish brown depending on the variety. Harvesting is done by nipping the head with a knife leaving the straw standing. The harvested crop should be kept in clean sacks.

7.0 Post Harvest Handling and Processing

The harvested crop is sun dried on a clean slab or on tent. Threshing is done on a slab floor or tent and the threshed grain is winnowed to ensure that the grain is completely clean.

The cleaned grain is kept in clean sacks and stored in a cool well ventilated room on raised racks to ensure that the sacks do not touch the ground.

The finger millet grain can be kept for 3-5 years without deterioration due to insects attacks.

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