

## Improved Cultivation Practices of Finger Millet

Vijay Kumar Kushwaha<sup>1</sup>, Kamaluddin<sup>1\*</sup>, Isha Ojha<sup>1</sup>, Rahul Kumar Rai<sup>2</sup>, Vijay Sharma<sup>1</sup>, Nidhi Verma<sup>3</sup> and Himanshu Panday<sup>4</sup>

### Introduction

Finger millet is botanically known as *Eleusine coracana* L., belonging to the family poaceae. It is a staple food and wonder grain crop after wheat, maize and rice in India. Finger millet is oldest food grain crop, which is originally native to the Ethiopian highlands and was introduced into India approximately 4000 years ago. Generally, it is grown in dry weather and it can withstand severe drought conditions and adaptable to the high elevations. This crop is cultivated as dry land crop in both tropical and sub-tropical region and in India and is mainly grown in Andhra Pradesh, Karnataka, Uttar Pradesh, Tamil Nadu & Kerala. It is third largest crop after pearl millet and sorghum. Finger millet is commonly known as Ragi and its native names are Mandua, Kelvargu/Ariyam in Tamil Nadu, Koovarugu in Malayalam, Ragulu in Telugu, Finger millet in Kannada, Maruba Dhan in Assam, Marwa in Bengali, Ngli, Bavato in Gujarati, Nachani in Marathi, Madia in Oriya,

Mandal in Punjabi, and Finger millet in Rajasthani. India is the leading producer of finger millet in the world. Its grains are highly resistant to storage insect pests but with adequate attention the crop can stay in good condition upto 50 years. and die. These symptoms can vary in appearance and severity depending on the stage of the disease and environmental conditions. One of the hallmark symptoms of Turcicum leaf blight is the development of spindle-shaped or elongated lesions on the leaves.



Finger millet contains about 1.5g fat, 2.6g Ash, 3.6g crude fiber and 73g carbohydrates.

***Vijay Kumar Kushwaha<sup>1</sup>, Kamaluddin<sup>1\*</sup>, Isha Ojha<sup>1</sup>, Rahul Kumar Rai<sup>2</sup>, Vijay Sharma<sup>1</sup>, Nidhi Verma<sup>3</sup> and Himanshu Panday<sup>4</sup>***

*<sup>1</sup>Department of Genetics and Plant Breeding, CoA, BUAT, Banda*

*<sup>2</sup>Department of Agricultural Economics, CoA, BUAT, Banda*

*<sup>3</sup>Department of Agronomy, CoA, BUAT, Banda*

*<sup>4</sup>Indian Institute of Sugarcane Research, Lucknow*

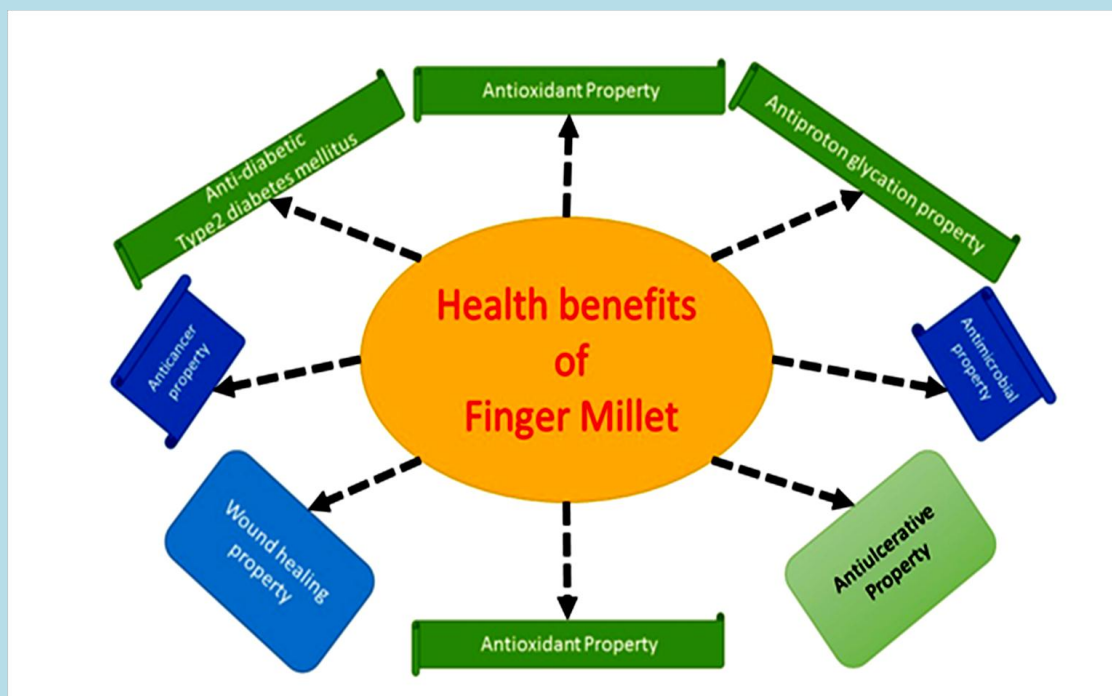
It is also rich in calcium as compared to other cereals crops having 160-490mg calcium. It's also a good source of micronutrients and vitamins containing iron (4-12mg), phosphorus (200-320mg), magnesium(140mg), zinc (1.5-2.4mg), copper (0.5mg), manganese (1.9-5.5mg), molybdenum (2µg), potassium (214mg), sodium (49mg), iodine (10µg), thiamine (0.24mg) and riboflavin (0.11mg). It has 7% protein ranging between 4.88 to 15.58%.

Minimum annual rainfall should be 100cm for its better growth and yield.

### Soil

Finger millet crop can be grown on a wide range of soil from rich loam to poor shallow upland soil with good organic matter. It prefers porous and well drained loam to light red loam and sandy loam soils of good fertility and water holding capacity. Black soils with good drainage can also be considered for cultivation of this crop as it tolerates water

### Health Benefits of Finger Millet



### Suitable Climate for Finger Millet Cultivation

Finger millet is a short day plant which is grown in a wide range of environment. It requires 30<sup>0</sup>C to 34<sup>0</sup>C day temp and 22<sup>0</sup>C to 25<sup>0</sup>C night temperature for the good growth and development of the crop.

stagnation to some extent. Best performance of growth and yield is at soil pH of 4.5 to 8.0. Heavy clay soils with poor water drainage should be avoided.

### Field Preparation in Finger Millet

For rainfed crop (crop with 80cm of rainfall), main field should be ploughed 2 to 3

times deeply to conserve the moisture content in the soil. In case of irrigated crop, it is required to plough the field till the fine tilth upon monsoon arrival.

### Tillage Practices

Deep ploughing is advantageous for moisture conservation. In the month of April or May, one deep ploughing with mould board plough, followed by ploughing with wooden plough twice is necessary. Before sowing secondary tillage with cultivator and multiple tooth hoe should be done to prepare smooth seed bed which is necessary. Minor land smoothing before sowing helps in better in-situ moisture conservation.

### Sowing Methods in Finger Millet Cultivation

The following sowing methods are used in finger millet.

**1. Broadcasting:** It is most common method practiced and the seeds are directly dispersed in the field over the surface in this method.



**2. Line Sowing:** In this method, finger millet seeds are sown in lines and this method is better than broadcasting. In this method, spacing of 22cm to 30cm between lines

and 8 to 10cm within lines should be maintained. The seeds should be sown about 3 cm deep in the soil. It is beneficial in inter cropping and helps in control of weeds effectively.



**3. Drilling in Rows:** In this method, seeds are sown using drill. Sowing seeds by seed cum fertilizer drill is very beneficial in line sowing.



**4. Transplanting the Seedlings:** Transplanting is a process of raising the seedling in nursery beds and transplanting it further into the main field. Leveling and watering of beds is required during transplanting.



Ideally 4 weeks old seedlings should be transplanted in the fields. For early Rabi and Kharif season, seedling should be transplanted at a distance of 25 X 10cm and for late Kharif season, the distance should be 30 X 10 cm. Planting should be done at 3 cm depth in the soil. Before transplanting, following steps should be taken to prevent disease occurrence.

- Use 0.1% carbendazim solution and dip the leaf portion of finger millet seedling to prevent Blast disease from nursery to main field.
- Dip the root portion of the finger millet seedling in the solution of Azospirillum inoculants in 40 to 45-liter water for about 30 minutes.
- Start watering the seedling after 3<sup>rd</sup> day of transplanting.

**Nursery Management:** An area of 150 m<sup>3</sup> is sufficient to raise seedling to transplant 1 ha of land.

| Improved Varieties of Finger Millet |         |                   |
|-------------------------------------|---------|-------------------|
| Sr. No.                             | Variety | Maturity Duration |
| 1.                                  | PES 400 | 98-102 Days       |
| 2.                                  | PES176  | 12-105 Days       |
| 3.                                  | KM-65   | 98-102 Days       |
| 4.                                  | VL 315  | 105-115 Days      |
| 5.                                  | VL 146  | 95-100 Days       |
| 6.                                  | VL 149  | 98-102 Days       |
| 7.                                  | VL 124  | 95-100 Days       |

**Seed rate:** Seed rate of Finger millet is 8-10 kg ha<sup>-1</sup> for direct sowing and 5 kg ha<sup>-1</sup> for transplanting. 20-25 days old seedling are ideal for transplanting.

### Manures and Fertilizers

Apply compost or farmyard manure @ 10-13 tonnes/ha about a month before sowing. Application of the fertilizer like NPK depends on the region and soil. Different states have different requirement for both irrigated and rainfed conditions. Finger millet cultivation in Tamil Nadu requires NPK of 30:30:30 kg /ha at the time of seed sowing, whereas in Karnataka NPK of 50:50:50 kg/ha at the time of seed sowing. For other region, NPK should be applied according to fertility of soil. Entire P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should be applied at sowing whereas nitrogen is applied in two or three split doses depending upon moisture availability for getting better yield. In those areas where good rainfall and moisture availability occurs, 50% of recommended nitrogen should be applied at sowing and remaining 50% in two equal split at 25-30 and 40-50 days after sowing. In areas of uncertain rainfall, 50% nitrogen should be applied at the time of sowing and the remaining 50% nitrogen at around 35 days after sowing is recommended.

### Weed Control

Weed problem in ragi crop can be effectively managed by cultural and



mechanical measures. One hand weeding for line sowing and 2 effective hand weeding is sufficient for effective management of weeds in broadcast crop. Isoproturaon @ 0.5 a.i./ha in case of rainfed crop while Oxyflurofen @ 0.1kg a.i./ha in case of irrigated condition can be used as a pre-emergence measure to control the weed. 2,4-D sodium salt @ 0.75 kg a.i./ha is effective as a post emergence which should be sprayed around 20-25 days after sowing for effective control of weeds.

### Disease Control

Finger millet is affected by various diseases in which blast caused by *Pryicularia grisea* is the major disease. This disease is quite severe in *kharif* crop at all growth stages. The losses caused will be more if the disease appears in the nursery and on the ears affecting the neck and fingers.

### Management

- By growing resistant varieties like GPU 28, GPU 26 and GPU 48.
- Treating seeds with fungicides like carbendazim @ 2g/kg a day before sowing.
- If necessary spraying the nursery with carbendazim (0.05%) or kitazin (0.1%) or Ediphefos (0.1%) or Saaf (0.2%).
- Spray any of the above fungicides at 50 per cent flowering and repeat 10 days

later if Kitazin or Ediphenfos were used to control neck and finger blast.

### Pest

The insect pest of finger millet and their control measures are as follows:

| Sr. No. | Pests                    | Control  |
|---------|--------------------------|--|
| 1.      | Army worms and cut worms | When the symptoms are noticed, dusting of Malathion 5% @ 24 kg/ha or Endosulfan 4% @ 12 kg/ha or Phasolone 5% @ 24 kg/ha or Quinolfos 1.5% @ 24 kg/ha. |
| 2.      | Leaf aphid               | Spray Dimethioate (0.05%) or Quinofos (0.05%)  |
| 3.      | Stem borers              | Spray the crop with Dimethioate (0.05%) or Phosphamidon (0.05%) or Monocrotophos (0.04%)   |
| 4.      | Ear caterpillars         | Dusting of Malathion 5% @ 24 kg/ha or Quinolfos 1.5% @ 24 kg/ha or Endosulfan 4% @ 24 kg/ha or Phosalone 4% @ 24 kg/ha                                 |

### Harvesting

Harvesting is done when the ear-heads are physiologically mature. Short duration varieties mature in 95-105 days while medium to late varieties mature in 110-125 days.

### Yield

Average yield of Finger millet is about 25-30 q/ha grain and 60-70 quintals of straw per hectare.

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