Finger Millet
Genetic Male-sterile Line INFM 95001

- **Source of *ms*$_1$ male-sterile gene**
- **Easy to distinguish from male-fertile plants at anthesis**
- **Medium maturity (ca 94 days to 75% panicle exsertion)**
- **White medium-sized seeds (average 1000-seed mass 3.5 g)**
- **Recommended for use in composite breeding and heterosis studies**

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Plant Material Description no. 71

International Crops Research Institute for the Semi-Arid Tropics
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Purpose of description

Finger millet is a highly self-pollinated crop. Crossing is therefore difficult and limited to parents with contrasting morphological markers. The presence of the *ms₁* allele will make crossing easier in finger millet. The *ms₁* allele can also help to measure heterosis and to develop random-mating populations for recurrent selection.

Origin

To induce mutations, M_0 seeds of the finger millet line IE 3318 = SDFM 63 from Zimbabwe) were treated with 1.5% aqueous solution of ethyl methane sulfonate for 6 h at 25°C in 1990. Treated seeds were sown and a single male-sterile plant was observed in a population of 2500 M_2 progeny during the 1991/92 rainy season. Open-pollinated seeds from this plant were harvested and sown in Jan 1993. Five single-crosses (bagged, male-sterile x male-fertile heads) were made in the M_3 generation. The M_4 full-sib progenies were sown in Sep 1993. Two families segregated for male-sterility, while all the plants from the other three full-sib families were fertile. Four plant x plant crosses were made within one of the segregating M_4 families. Seed did not set on nonpollinated male-sterile panicles that had been bagged to prevent natural cross-pollination. A total of 383 plants of M_5 full-sib progeny from the four crosses were sown in isolation in Jun 1995 at a plant density of 125 000 plants ha^{-1}. Progenies were morphologically similar and the ratio of male-fertile to male-sterile plants fitted a χ^2 test of 1:1 in each cross. The harvest from open-pollinated male-sterile plants was bulked to produce INFM 95001.

Male-sterile character

Description. Plants homozygous for the simply inherited recessive *ms₁* allele are male-sterile. Such plants have remained fully male-sterile in several environments. Male-sterile plants have always produced fully fertile F_1 progeny when pollinated by any parent homozygous (Ms_1Ms_1) for male-fertility.

Maintenance. The male-sterile line can be maintained in isolation with open pollination by harvesting seed from the half of the population that is homozygous male-sterile (ms_1ms_1). As the pollinator plants are heterozygous (Ms_1ms_1), half of the plants in the following generation should again be homozygous (ms_1ms_1) and male-sterile, and the other half heterozygous (Ms_1ms_1) and produce viable pollen.

Plant characters

Grain yield and threshing percentage (grain mass as a fraction of panicle mass) were recorded on 196 male-fertile and 187 male-sterile equally spaced plants. The mean grain yield was 34.1 g $plant^{-1}$ for male-fertile and 1.4 g for male-sterile plants. The threshing percentage was 74.4 for male-fertile and 13.9 for male-sterile plants.

Male-sterile plants tend to have narrower fingers (9.2 vs 12.6 mm) and more nodal tillers (22 vs 3 $plant^{-1}$) than male-fertile plants. At anthesis, male-sterile plants have fewer exserted anthers than male-fertile plants. Their anthers are about one-fifth the normal size

and are light cream instead of creamy yellow. At grain maturity, open-pollinated male-sterile panicles have incomplete seed set.

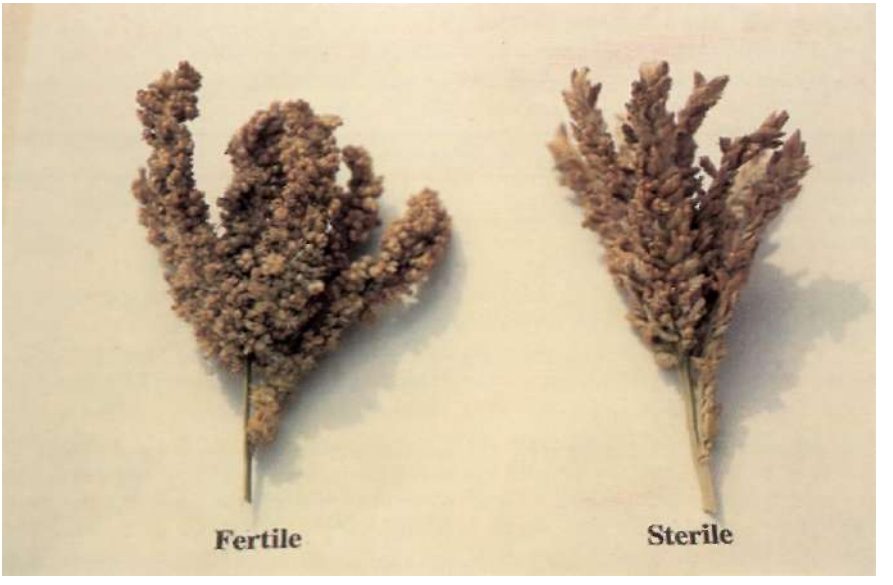
I N F M 95001 has an erect growth habit with a mean plant height of 1.29 m (Table 1). It is a medium-duration line (94 days to 75% panicle exsertion).

Table 1. Morphological characters of I N F M 95001.

Character	Description	Character	Description
Basal tillers plant^{-1}	4.9	Mean leaf sheath length (mm)	101
Productive tillers plant^{-1}	6.4	Mean leaves on the main tiller (number)	15.4
Node color	Green	Mean panicle exsertion (cm)	12.9
Stem pigmentation	Light purple	Inflorescence shape	Open without finger branching
Mean culm thickness (mm)	9	Fingers panicle^{-1}	7.0
Mean flag leaf dimension (mm)	10.6 x 465	Finger length (mm)	75.2

Seed characters

Seeds are round and white at physiological maturity. Individual grain mass is heavier in male-sterile (3.5 mg) than in male-fertile plants (3.0 mg). Seed dormancy is present for 3 to 4 weeks after harvest.



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Plant Material Descriptions
from the
International Crops Research Institute for the Semi-Arid Tropics

Brief descriptions of crop genotypes identified or developed by ICRISAT, including:

- germplasm accessions with important agronomic or resistance attributes
- breeding materials, both segregating and stabilized, with unique character combinations
- cultivars that have been released for cultivation.

These descriptions announce the availability of plant material, primarily for the benefit of the Institute's cooperators. Their purpose is to facilitate the identification of cultivars and breeding lines and to promote their wide utilization. Requests for seed should be addressed to the Director General, ICRISAT, or to appropriate seed suppliers. Materials for research arc sent by ICRISAT to cooperators and other users free of charge.

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