

---

# Pearl Millet Male-sterile Line ICMA 841 and its Maintainer ICMB 841

---



- Highly resistant to downy mildew
- High seed yield (0.7-1.1 t ha<sup>-1</sup>)
- Medium height (0.7-1.7 m)
- Medium maturity (43-60 days to flowering)
- Compact and cylindrical panicles of average length (14-19 cm)



ICRISAT

Plant Material Description no. 58

International Crops Research Institute for the Semi-Arid Tropics  
Patancheru 502 324, Andhra Pradesh, India

## Purpose of description

Male-sterile line ICMA 841 and its maintainer ICMB 841 were recommended by the All India Coordinated Pearl Millet Improvement Project (AICPMIP) in 1988 for large-scale distribution and utilization for producing experimental hybrids. These lines are the seed parents of three hybrids, Pusa 23, ICMH 423, and Pusa 322, which have been released for cultivation throughout India.

## Origin and development

ICMA 841 and ICMB 841 were developed from 5141A and 5141B, which were bred and released by the Indian Agricultural Research Institute (IARI), New Delhi. Although 5141A and 5141B were resistant to downy mildew in India initially, the resistance was later overcome by the populations of the pathogen in some parts of the country. The original 5141A (stock no. 8035) and 5141B (stock no. 8038) showed genetic variability for several traits, including resistance to downy mildew, when sown in the downy mildew nursery at ICRISAT Asia Center (IAC). Vigorous downy-mildew-free 5141B plants were selfed and crossed with downy-mildew-free plants of 5141A. This process of selection, selfing, and backcrossing was repeated twice a year for four generations using pedigree selection in the downy mildew nursery. ICMA 841 and ICMB 841 were chosen from the resulting A/B pairs on the basis of phenotypic similarity, high vigor, good tillering, good seed set, and freedom from downy mildew.

## Performance

**Parental lines.** In India, the expression of male sterility in ICMA 841 is stable in cool post-rainy season sowings; less than 2% of the plants shed some pollen. ICMB 841 produces pollen profusely. In rainy season sowings, the proportion of ICMA 841 plants that shed pollen can be a little higher than 2%, depending on the growing conditions. (Availability of adequate moisture, highly fertile soil, and high light intensity at flowering favor pollen shedding.) In the downy mildew nursery at IAC during the 1983 and 1984 rainy seasons, incidence of downy mildew was less than 3% in ICMA 841, compared to 85% in the susceptible control NHB 3. The mean downy mildew incidence in ICMA 841 in disease nurseries across 7-8 locations in India during the 1983 and 1984 rainy seasons was about 1%.

**Hybrids.** In a preliminary yield trial, hybrids in which ICMA 841 or 5141A was one of the parents had comparable grain yields at three locations in India (Table 1). In general, hybrids produced on ICMA 841 were slightly taller, matured later, produced fewer tillers, and had thicker stem and longer heads, than those produced on 5141A. Hybrids produced on ICMA 841 tend to lodge less than those produced on 5141A.

ICMA 841 has higher seed yield potential than other currently available male-sterile lines of pearl millet in India. Also, stigma receptivity in ICMA 841 is longer than that in ICMA 1 (81A). Therefore, hybrid seed can be produced less expensively on ICMA 841 than on other male-sterile lines. ICMA 841 and the hybrids derived from it stay green even after seed maturity. This trait is highly valuable because the stover can then be used as green fodder at harvest.

**Table 1. Grain yield<sup>1</sup> (t ha<sup>-1</sup>) of pearl millet hybrids produced on ICMA 841 and 5141A, at three locations in India, rainy season 1984.**

Seed parent	Grain yield (t ha <sup>-1</sup> )			
	Hisar	ICRISAT	Asia Center	Bhavanisagar
ICMA 841	1.06		2.09	1.78
5141A	1.09		2.08	1.54

1. Mean of three replications at each location.

## Plant characters

ICMA 841 and ICMB 841 have an erect growth habit. The stem is thick and sturdy. In the rainy season at IAC, the A line flowers in approximately 53 days, 2-3 days earlier than the B line. The plants are of medium height (100-130 cm) and produce a moderate number of tillers (2-5 basal tillers for each plant). Panicles are of medium length (14-19 cm), compact, and generally cylindrical to conical (Table 2). However, these traits vary significantly, depending upon soil fertility, growing season, and location. Most of the panicles have very short bristles. Leaves and nodes are hairy. Leaf blade hairiness is recessively inherited. This trait is usually detectable by the 6-leaf stage, and can be used to eliminate off-types. A tuft of bristles is present at the apex of the panicle in many of the plants of ICMA 841 and its maintainer and, being inherited as a dominant trait, it can be used to identify hybrids based on this male-sterile line.

**Table 2. Morphological characters of pearl millet male-sterile line ICMA 841, ICRISAT Asia Center, rainy season 1984.**

Character	ICMA 841	5141A
Time to 50% bloom (d)	53.0	51.3
Plant height (cm)	106	96
Panicle length (cm)	15.0	11.5
Effective tillers in each plant	3.1	3.3
Grain yield (t ha <sup>-1</sup> )	1.05	9.7
Thousand-grain mass (g)	6.8	-

## Seed characters

Seeds are hexagonal to pyramidal, light gray, with intermediate endosperm texture. Average mass of 1000 seeds is 6-8 g.



**ICRISAT**

**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 are sent by ICRISAT to cooperators and other users free of charge.