

1000-seed mass). The seed is light gray and hexagonal in shape. Both populations have mixed anthers of purple and cream color.

Seed of NCD₂A₄ and NCD₂B₄ will be maintained and distributed upon request in germplasm quantities by ICRISAT, Patancheru under the terms and conditions of the ICRISAT Breeding Materials Transfer Agreement.

References

Hanna WW. 1989. Characteristics and stability of a new cytoplasmic-nuclear male-sterile source in pearl millet. *Crop Science* 29:1457-1459.

Rai KN, Andrews DJ and Rao AS. 2000. Feasibility of breeding male-sterile populations for use in developing inter-population hybrids of pearl millet. *Plant Breeding* 119:335-339.

ICMR 98001: A Restorer Stock of A₅ Cytoplasmic-nuclear Male Sterility in Pearl Millet

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ICMR 98001 pearl millet (*Pennisetum glaucum*) restorer stock is a highly male-fertile inbred line in the A₁ cytoplasmic background. This line was developed at ICRISAT, Patancheru, India from one of the several pollen-fertile plants identified in a topcross hybrid produced by crossing Large-seeded Genepool-1 (LSGP-1) developed at ICRISAT, Patancheru (Rai et al. 1999) with male-sterile line 81A₅ that possesses the A₅ cytoplasm. LSGP-1 was developed by random mating 959 large-seeded (>10 g 1000-seed mass) germplasm accessions from 23 countries (Rai et al. 1999). The line 81 A₅ was developed by seven generations of backcrossing of a *d*₂ dwarf maintainer line 81B (Anand Kumar et al. 1984) into the A₅ male-sterility-inducing cytoplasm identified from one of the 67 pollen-sterile plants of LSGP-1 (Rai and Rao 1998).

During the 1995 postrainy hot summer (hereafter referred to as 'dry') season, 81 A₅ was crossed using the bulk pollen from 140 plants of LSGP-1. Of the 645 plants of the resulting topcross hybrid grown at Patancheru during the 1995 rainy season, six were pollen-fertile. Two generations of head-to-row evaluation, using seeds from open-pollinated panicles of the pollen-fertile plants in the A₅ cytoplasmic background, concomitant with selection

for high levels of pollen fertility, was followed by one generation of selfing of pollen-fertile plants to produce six S₁ progenies, one S₁ from each of the six rows. Six fertile plants in each S₁ were selfed to produce S₂ progenies and also testcrossed onto 81A₅. During the 1997 dry season, it was observed that all plants in one S₂ progeny were pollen-fertile and they had 65-95% selfed seedset. Similarly, all the plants in the corresponding testcross were pollen fertile and they had 75-95% selfed seedset. Further selfing in this S₂ produced S₃ progenies. An additional selfing in this S₃ produced S₄ progenies and testcrossing of those selfed plants onto 81 A₅ produced testcross hybrids.

Evaluation during the 1998 dry season at Patancheru showed that all plants in one S₄ progeny and its corresponding testcross were pollen-fertile and they had 90-100% selfed seedset. A S₅ progeny (ICMA₅R-1) produced from this S₄ progeny was designated as ICMR 98001. It was evaluated in a yield trial along with three other restorer stocks during the rainy season in 1998 and 1999 at Patancheru. ICMR 98001 gave a mean grain yield of 201 g m⁻² compared to 264 g m⁻² for an A₁-system restorer line (ICMR 356) of a commercial hybrid ICMH 356. In this trial, ICMR 98001 grew 1.6 m tall, produced 1.4 panicles plant⁻¹, and took 54 days to 50% flowering (6 days later than ICMR 356). ICMR 98001 has short (21 cm), cylindrical and compact panicles with tufted tip. It has hairy leaf blade and leaf sheath, and yellow anthers. It is a prolific pollen producer with plants having 85-100% selfed seedset. The seed is small (7.2 g 1000-seed mass), gray in color, hexagonal in shape and has spiny outer surface.

Seed of ICMR 98001 will be maintained and distributed in germplasm quantities on request by ICRISAT, Patancheru, under the terms and conditions of ICRISAT Breeding Materials Transfer Agreement.

References

Anand Kumar, Andrews DJ, Jain RP and Singh SD. 1984. ICMA-1 and ICMB-1 pearl millet parental lines with A₁ cytoplasmic-genic male sterility system. *Crop Science* 24:832.

Rai KN, Andrews DJ, Rao AS, Rajewski JF and Du RH. 1999. Restorer sources of A₅cytoplasmic-nuclear male sterility in *Pennisetum* germplasm and its implications in pearl millet hybrid breeding. *International Plant Genetic Resources Newsletter* 120:20-24.

Rai KN and Rao AS. 1998. Registration of pearl millet cytoplasmic-nuclear male-sterile line ICMA-5. *Crop Science* 38:556.