An ICRISAT-NARS Success Story

Large-seeded Pearl Millet in Drought-prone Environments

The problem
A large-seeded, high yielding and early-maturity hybrid (MBH 110), bred by a private seed company became the most-preferred pearl millet cultivar in the Indian state of Maharashtra during 1980s. The problem, however, lay in the history of downy mildew (DM) disease epidemics on hybrids.

The solution
ICRISAT’s pearl millet breeders developed an open-pollinated variety (ICTP 8203) with high grain yield (2.1 t/ha), early maturity (78-80 d), large seed size (>12 g/1000 seeds), dark-grey seed color, terminal drought tolerance and high level of DM resistance. This variety provided a potential replacement for MBH 110 in case it became susceptible to downy mildew disease.

Impact in Maharashtra
• Hybrid MBH 110 started showing increased DM susceptibility in late 1980s and it succumbed to an epidemic in 1989. ICTP 8203, released in 1988, was rapidly adopted by the farmers and gained cultivation on 100,000 ha in 1989 – all within a year of its release. The area under ICTP 8203 increased to 0.8 million ha at the peak of its popularity in 1995.

• ICTP 8203 was estimated to be grown on 0.3 million ha even in 2001, maintaining its high level of DM resistance and largely grown in drought-prone areas with shallow soils and poor fertility where other pearl millet cultivars cannot compete with it.

• Now cultivated for 15 years, ICTP 8203 stands out among the very few long-living improved pearl millet cultivars in India.

Spillover impact
• An NGO introduced ICTP 8203 and conducted its farmer-participatory evaluation along with other pearl millet varieties in Namibia. This variety was selected by most of the farmers and was adopted by them as Okashana 1.

• ICTP 8203 along with its other sister varieties and related breeding lines became a major component of a large-seeded early-maturing composite from which three additional varieties were developed.

• ICMV 88908, released as new Okashana 1, was adopted on 100,000 ha in Namibia.
♦ ICMV 221, released and adopted on >50,000 ha in India, was also released in Kenya and Eritrea, and adopted on >40,000 ha.
♦ AIMP 92901 was released in India.

Breeding implications

• Success of ICTP 8203 and related varieties (and their several other positive features) demonstrated the iniari group of landraces from Africa as the most valuable germplasm of pearl millet to date.

• Further exploitation of iniari germplasm led to the development of a large-seeded, downy millet-resistant and extra-early maturing composite (EEBC) which matures in 65-67 days – thus making it the earliest maturing pearl millet population produced anywhere in the world.

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An Eritrean farmer looks at his crop – the early maturing and drought-tolerant variety ICMV 221 is popular in Eritrea and Kenya.

Partners
• Maharashtra State Seed Corporation
• All India Coordinated Pearl Millet Improvement Project

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