

CI 112: Pearl Millet Biofortification Research-for-Development

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Pearl millet (*Pennisetum glaucum* (L) R. Br.) is an important staple food crop in the arid and semi-arid tropics of India and Africa. Considering the widespread micronutrient malnutrition arising from the deficiencies of iron (Fe) and zinc (Zn), ICRISAT, supported by HarvestPlus Challenge Program of the CGIAR, and in partnerships with the public and private sector in India, has undertaken to help develop pearl millet cultivars with high levels of these micronutrients. Large variability for Fe and Zn content has been observed in commercial cultivars, improved breeding lines, improved populations and hybrid parents. Cost-effective and rapid screening techniques have been standardized to enhance the breeding efficiency. Both Fe and Zn contents have been found to be largely under additive genetic control with no significant heterosis over better-parent, which would require breeding both parents for high Fe and Zn contents. Fe and Zn contents are highly significantly and positively correlated (often $r > 0.70$), indicating that simultaneous genetic improvement of both micronutrients will be highly effective. The association of these two micronutrients with grain size has been found either non-significant or positive, indicating that Fe and Zn content can be improved without compromising on grain size. Association of Fe and Zn content with grain yield has generally been found negative, but mostly low and not always significant, indicating that high grain yield can be combined with high levels of Fe and Zn content through selection in large segregating populations. A biofortified high-Fe variety ICTP 8203 Fe 10-2 developed from selection within a popular variety ICTP 8203 (also released as PCB 138 in Punjab in 1990) has been released in Maharashtra. A high-Fe experimental hybrid ICMH 1201 has also been developed and is under production by a seed company for commercialization. Breeding lines and hybrid parents with higher levels of Fe and Zn contents are being developed to diversify cultivar base with high-yielding hybrids having high levels of these micronutrients.