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Full Length Research Paper

Evaluation of pearl millet for yield and downy mildew resistance across seven countries in sub-Saharan Africa

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Abstract

Forty pearl millet germplasms consisting of traditional and improved open pollinated varieties, hybrids, and inbreds were selected to represent diversity for grain yield or

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quality, fertility restoration for specific cytoplasms, resistance to diseases or pests, variation in height and maturity, and origin. Evaluations were conducted in field trials in Ghana, Mali, Nigeria, and Senegal in 2003 and 2004 and in Burkina Faso, Niger, and Zambia in 2004. Data were collected on yield, downy mildew incidence, maturity, plant height, and panicle length. Variation occurred for all traits across locations and genotypes. Across locations and years, Sosat-C88, ICMV IS 89305, Gwagwa, NKK, Sosank, and CIVT were the highest yielding entries. Yields of Sosat-C88, Sosank, and CIVT were more stable across environments, and yields of ICMV IS 89305, Gwagwa, and NKK increased in response to more favorable environments. Sosank, CIVT, ICMV IS 89305, Sosat-C88, and Gwagwa were also among the most downy mildew resistant entries. Across locations and years, grain yield was negatively correlated with downy mildew incidence, and positively correlated with days to flowering, plant height, and panicle length. These correlations differed among some of the individual trials, with days to flowering having the least consistent correlations with grain yield. Further selection for improved yield and broad adaptation in pearl millet is likely to be possible, however, site-specific selection is necessary to identify other important traits in addition to yield. The high-yielding and downy mildew resistant pearl millets identified in this study will be useful to introgress new traits into preferred local varieties, or to serve as parental material for breeding and hybrid development.

Key words: *Pennisetum glaucum*, *Sclerospora graminicola,* multi-environment trials, yield potential, yield stability.
