to powdery mildew, virus yellows, curly top, and bolting. It has a low level of tolerance to rhizomania but was not entered into the rhizomania resistance breeding program. C93 may be useful as a source population with a somewhat different genetic base and higher sucrose concentration potential than other releases from Salinas.

C94 was released in 1989. After recognition of the importance of rhizomania in California, a large number of germplasm lines from many sources were screened for resistance under field conditions at Salinas (9). Most highly bred sugarbeet germplasm was found to be highly susceptible, except for the sources of C93R and C47R. An exception was a low frequency of plants within germplasm lines originating from the Great Western and USDA breeding programs in Colorado (9). Plants from within lines FC 703, FC 705, FC 709 (3), GW 674, GW 359, GW 777, and GW 602 that appeared partially resistant were selected and crossed in pairs. The full-sib families were evaluated for reaction to rhizomania, and individual plants from within 14 of the most resistant families were selected and recombined into a single population, which was assigned the breeding line number R20. Three additional cycles of recurrent phenotypic selection were made within R20 for resistance to rhizomania among 4-mo-old plants grown under severely infested field conditions. This fifth-cycle synthetic of R20 was released as C94. The resistance to rhizomania in C94 appears to be quantitatively inherited and conditions a lower level of resistance than C93R. C94 has very low sucrose concentration and high root yield characteristics. It appears to have disease reactions and bolting susceptibility as expected for its germplasm base. It is moderately to fully susceptible to most prevalent diseases in California. In tests in Colorado, C94 showed moderate resistance to root rot caused by Rhizoctonia solani Kühn (anastomosis group AG-2-2). C94 is a source of moderate resistance to rhizomania in a largely different germplasm base than C93R and C47R.

Breeder seed is maintained by the USDA-ARS and will be provided to sugarbeet breeders in quantities adequate for reproduction.

Written requests should be made to the author.

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References and Notes


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Registration of NPM-1 and NPM-2 Grain Pearl Millet Germplasms

NPM-1 (Reg. no. GP-31, PI 574382) and NPM-2 (Reg. no. GP-32, PI 574383) grain pearl millet [Pennisetum glaucum (L.) R. Br.] germplasms were released by the Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln, in April 1992. These germplasms were selected for early maturation and high seed set under dryland, high-plains conditions of western Nebraska. Both germplasms contain restorer genes for the A1 (Tift 23') cytoplasmic male sterility system (1).

Both germplasms were derived from the Nebraska Dwarf Pearl Millet Population (NDMP) by selection for divergent phenotypes and subsequent intermating within the two distinct populations. NDMP originated from a dwarf population of pearl millet obtained in 1977 from Dr. A.J. Casady, Kansas State University, Manhattan, KS. The original population was composed of breeding material from the pearl millet breeding programs at Serere, Uganda, and Bambey, Senegal. The principal dwarfing gene was d2 (2). NDMP was developed using six generations of random-mating and mass selection in Nebraska at either the Department of Agronomy Farm at the University of Nebraska's Agricultural Research and Development Center (ARDC), Mead, NE, or at the High Plains Agricultural Laboratory, Sidney, NE. In 1985, three replications of 100 half-sib families and 40 S1 families of NDMP were evaluated at the ARDC, and = 10 plants were selfed in each plot. Fourteen productive, selfed plants of average maturity (55-65 d to flowering) and height (<80 cm) with large heads on the main stem and complete self fertility under selling bags were selected. Equal amounts of selfed seed from these plants were bulked to form NPM-1, which was initially evaluated under the designation MLS (Mid-Late Synthetic). Seven productive plants conforming to an early (<55 d to bloom) dwarf plant type (<60 cm) with four or more erect tillers of similar size and with complete self fertility were selected and seed were bulked to form NPM-2. NPM-2 was initially evaluated as EDS (Early Dwarf Synthetic). Progeny of the two populations of selected plants were intermated in separate isolations with mild selection for two generations to form the Syn 2 synthetic populations. Tall, late, or weak plants were removed before anthesis, and plants with incomplete seed set were removed at harvest. Two hundred nonreplicated S1 families from NPM-1 were grown in 1988, and the population was reconstituted using remnant seed of 96 selected families. Families were selected on the basis of productivity, relative uniformity, absence of any partial seed set, and conformation to the NPM-1 phenotype. One hundred fifty-two S1 families of NPM-2 were also grown in 1988, and the population was reconstituted using remnant seed of 57 selected families. Families were selected on productivity, uniformity, good seed set, earliness, and conformation to the NPM-2 phenotype. Both populations were