REGISTRATIONS OF CULTIVARS

Registration of ‘Ein El Gazal’ Cowpea

‘Ein El Gazal’ cowpea [Vigna unguiculata (L.) Walp.] (Reg. no. CV-199, PI 619432) was developed by the Agricultural Research Corporation (ARC) of the Sudan in collaboration with the University of California, Riverside (UCR), and was released by the National Release Committee of the Sudan in 2000. Ein El Gazal is adapted for grain production under rainfed conditions in the Sahelian Zone of the Sudan in northern Kordofan where annual rainfall in the last 33 yr (1968–2000) at El Obeid (13° 10’ N 30° 14’ E elevation 577 m) has averaged only 303 mm per growing season.

Ein El Gazal, tested as UCR 1-12-3, was derived from a cross in 1977 between a California cultivar, CB5 (Mackie, 1946), as the female parent and a breeding line from Senegal, ‘BamBay 23’ (Sène and N’Diaye, 1974), as the male parent. Crossing and initial selections were conducted at UCR. The main objective was to obtain an extra-early cowpea cultivar by crossing two early flowering lines with different genetic backgrounds to achieve transgressive segregation for earlier flowering. Emphasis was given to developing an extra-early cowpea cultivar due to the following circumstances. The long-term average rainfall in the Sahel from 1918 to 1968 (e.g., 388 mm at El Obeid, Sudan, and 447 mm at Louga, Senegal) had been sufficient to result in useful grain production in most years by available cowpea landraces that had cycle lengths of 90 to 100 d from sowing to harvest. However, from 1968 to 1998, there has been a near continuous drought in the Sahel (average rainfall of only 301 mm at El Obeid and only 276 mm at Louga) during which time only extra-early cowpea cultivars with cycle lengths of about 60 d have consistently produced useful quantities of grain. Both parents used in the cross are erect, which is associated with extreme earliness of flowering. Both parents have large cream seeds (individual seed weight of both CB5 and BamBay 23 is 210 mg under Sahelian conditions in Senegal) with black eyes and rough seed coats. These seed qualities are attractive to many Sahelian consumers.

An F2-derived F4 population of 585 families and parental lines were grown in a well-irrigated field at UCR in 1978. Twenty-three lines were selected that began flowering a few days earlier and had the same type of large high quality seed as the parents and were erect with synchronous flowering. Further selections were made on the basis of grain yield in tests conducted under well-irrigated field conditions at UCR in 1979 and well-irrigated and dry field conditions at UCR in 1980 and 1981. Selected lines were then tested under rainfed conditions with variable levels of drought in the Sahel at BamBay, Senegal, in 1981 and 1982 (Hall and Patel, 1985). Ein El Gazal was extra early in that 50% of the plants produced their first flowers 37 d after sowing and plants reached physiological maturity in about 60 d under watered conditions and a few days sooner with terminal drought. In 1982 at Louga with only 181 mm of rainfall, Ein El Gazal produced 1091 kg ha–1 of grain in 55 d, whereas local landraces in an adjacent experiment had only just begun flowering at this time and produced virtually no grain because of a terminal drought. Ein El Gazal has substantial yield potential in that in 1982 at BamBay with 452 mm of rain, it produced 2406 kg ha–1 of grain. A subset of the UCR lines that gave high average grain yields in Senegal, including Ein El Gazal, was sent to the Sudan.

In the first yield trial at El Obeid, Experiment Station, Sudan, in 1982, which was a dry year with only 230 mm of rain, Ein El Gazal produced 500 kg ha–1 of grain while two local landraces, ‘Garn ElKabish’ and ‘Gambaru’, only produced 135 and 169 kg ha–1, respectively (Hall and Patel, 1985). From 1985 through 1993, Ein El Gazal was evaluated in seven annual trials on the experiment station at El Obeid with an annual rainfall of 285 mm and no pesticide applications, other than a seed dressing of Fernasan D (tetramethylthiuram disulﬁde). Ein El Gazal produced an average grain yield of 596 kg ha–1 and had greater yield stability than a local landrace that produced an average grain yield of only 215 kg ha–1. Ein El Gazal also was evaluated in 60 on-farm trials over 5 yr at three locations in northern Kordofan, Sudan, with no pesticide applications (Agricultural Research Corporation, 1992–1997). Ein El Gazal produced an average grain yield of 363 kg ha–1 compared with the average yield of a local landrace, ‘Baladi’, of only 85 kg ha–1. In 6 yr of trials at El Obeid Research Station, 50% of plants of Ein El Gazal produced their first flower 41 to 48 d after sowing and plants reached physiological maturity in 60 to 71 d. In contrast, 50% of plants of the local landrace used in the trials produced their first flowers 58 to 88 d after sowing and plants reached physiological maturity in 87 to 117 d, which accounts for their smaller grain yields than Ein El Gazal when the rainy season was short. Ein El Gazal is erect with synchronous flowering and has cream seeds with a black eye, a rough seed coat, and an average individual seed weight when grown in northern Kordofan of 186 mg. By 2001, about 500 000 farmers in northern Sudan had been supplied with seed of Ein El Gazal, including farmers in the states of North Kordofan, South Kordofan, and South Darfur.

Breeders seed can be obtained from either the Agricultural Research Corporation at El Obeid Research Station, P.O. Box 429, El Obeid, Sudan, or the Botany & Plant Sciences Department, University of California, Riverside. U.S. Plant Variety Protection will not be applied for.

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References


