

Progress in breeding for drought tolerant groundnut varieties at ICRISAT centre

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Drought is one of the major constraints that limits groundnut production in the semi-arid regions of the world. Development of drought tolerant groundnut varieties receives high priority at ICRISAT Centre (IC). Using a line-source sprinkler technique, about 3020 germplasm and advanced breeding lines were screened for three types of drought stress, i.e., mid-season, end-of-season, and long-term stress during the postrainy seasons from 1981-1992. Several germplasm and breeding lines with tolerance to mid-season and end-of-season stresses have been identified on the basis of total dry matter and pod yield productivity under water deficit conditions. Studies on the relationship between yield potential and crop sensitivity to drought indicated that it is possible to breed high yielding varieties with tolerance to mid-season stress.

To enhance the levels of drought tolerance 125 crosses involving known drought tolerant varieties and widely adapted varieties as parents have been made. The segregating

material was grown under rainfed conditions at ICRISAT and Anantapur and under simulated mid-season drought stress conditions during the postrainy season at IC. Pedigree, mass pedigree and single pod descent methods were employed for advancing the material. The advanced breeding lines were yield tested in both rainy (under rainfed conditions) and post-rainy (simulated mid-season stress conditions) seasons in replicated yield trials. The promising drought tolerant varieties are tested in the National Drought Nursery organised by AICORPO and in an international trial. So far 28 varieties have been evaluated in the National Drought Nursery. In these nurseries, ICGVs 86744, 86610, 86187, and 87354 for early-season drought, and ICGVs 87118, 87354, 86169, and 86187 for mid-season drought have shown promise. Three varieties, ICGVs 87354 (9 locations for 3 years), ICGVs 86187, and 86647 (4 locations for 2 years) have given consistently higher pod yield than controls and are now recommended for testing in larger plots in chronic drought-

prone areas in India. In the International Drought Trial conducted during the dry season the pod yield advantage of the drought tolerant varieties over the best local controls ranged from 13.7 to 16.4% in the Philippines, 2.9 to 35.7% in Thailand, and 42.9 to 54.3% in Indonesia. In all the three countries, ICGV 86644 was superior to the local controls. In Vietnam four varieties, ICGVs 86708, 86707, 86644, and 86742 outyielded TMV 2 with a pod yield advantage ranging from 19 to

60%. Under a dry spell of 32 days at pod filling stage, ICGV 86708 produced a pod yield of 5.4 t ha⁻¹ compared to 3.7 t ha⁻¹ of TMV 2. Through empirical field screening and testing, moderate success in breeding for drought tolerance has been achieved. In future, physiological traits such as water use efficiency (as measured by specific leaf area) will be utilized for hastening the breeding process.