

Registration of *Aspergillus flavus* Seed Infection Resistant Peanut Germplasm ICGV 91278, ICGV 91283, and ICGV 91284

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Improved Spanish peanut (*Arachis hypogaea* L. subsp. *fastigiata* var. *vulgaris*) germplasm ICGV 91278 (Reg. no. GP-98, PI 614083), ICGV 91283 (Reg. no. GP-99, PI 614084), and ICGV 91284 (Reg. no. GP-100, PI 614085) were developed at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) Center, Patancheru, Andhra Pradesh, India. These lines were released by the Plant Materials Identification Committee of ICRISAT in 1999 for resistance to natural seed infection and invitro seed colonization by the aflatoxin-producing fungus *Aspergillus flavus* (Link:Fr).

ICGV 91278, ICGV 91283, and ICGV 91284 originated from the following three crosses, respectively, 'JL 24'/UF 71513-1, U 4-7-5/JL 24, and 'J 11'/ICGV 86184. The first two crosses were made in the 1986-87 postrainy season and the third in the 1985 rainy season at ICRISAT. JL 24 is an early-maturing popular cultivar in India (Patil et al, 1980). It is susceptible to seed infection and seed colonization by *A. flavus* UF 71513-1 is a selection from UF 71513, a valencia (subsp. *fastigiata* var. *fastigiata*) line from the USA. It is resistant to seed infection and seed colonization by *A. flavus* (Mehan, 1989). U 4-7-5 is susceptible to seed colonization by *A. flavus* (Mehan, 1989), but supports only

low levels of aflatoxin production (Mehan et al, 1986). J 11 is a widely grown cultivar in western and central India and is resistant to seed infection and seed colonization by *A. flavus* (Mehan et al, 1981). J 11 is also resistant to seed infection by *A. flavus* in Senegal (Zambettakis et al, 1981) and Thailand (Thailand Coordinated Groundnut Improvement Program, 1985) and is being used in breeding programs of these countries (Rao et al, 1989). ICGV 86184 is a breeding line developed at ICRISAT from Faizpur 1-5/UF 71513-1 cross. It is interesting to note that both of ICGV 91283 parents, U 4-7-5 and JL 24, are susceptible to seed colonization by *A. flavus*. In selection of these lines (ICGVs 91278, 91283, and 91284), the phenotypically similar high-yielding F2 plants in each cross were mass selected and bulked together at harvest. In all three crosses, the process of bulking phenotypically similar plants (mass selection) was repeated until F8 generation when the bulks became phenotypically homogeneous. The pedigrees of these germplasm lines are as follows: ICGV 91278, JL 24/UF 71513-1 F2-B1-B2-B1-B1-B1-B1; ICGV 91283, U 4-7-5/JL 24 F2-B1-B1-B1-B1-B1-B1; ICGV 91284, J 11/ICGV 86184 F2-B1-B1-B1-B1-B1-B1 (where B refers to bulk selection).

ICGV 91278, ICGV 91283, and ICGV 91284 were evaluated in the field for *A. flavus* seed infection (Mehan et al, 1981) in three rainy seasons under rain-fed conditions and two postrainy seasons under imposed late-season drought conditions, and for seed colonization in all of these five seasons (Mehan et al, 1981; Mixon and Rogers, 1973). The average natural seed infection was 0.8% in ICGV 91278, 1.3% in ICGV 91283, and 0.7% in ICGV 91284 compared with 0.9% in the resistant control J 11 and 11.2% in the susceptible control JL 24. The seed colonization by *A. flavus* under artificial inoculation conditions in the laboratory averaged 18.4% in ICGV 91278, 15.4% in ICGV 91283, and 16.7% in ICGV 91284 compared with 13.6% in J 11 and 46.6% in JL 24.

These three lines were evaluated for pod yield in two rainy and three postrainy seasons, in replicated trials at ICRISAT and other locations. ICGV 91278, ICGV 91283, and ICGV 91284 produced an average pod yield of 2.16, 2.39, and 2.17 t ha⁻¹, respectively. These yields represent 12.5, 24.5, and 13.0% increase over J 11. Each line takes about 100 to 105 d after planting (DAP) to mature in the rainy season at ICRISAT, which is 10 to 15 d earlier than J 11.

The number of primary branches ranges between six and seven in these lines. The number of secondary branches ranges between one and two in ICGV 91278, and three and four in ICGV 91284. In ICGV 91283 it is only one. All lines have an erect growth habit and elliptical medium sized leaves (BPGR and ICRISAT, 1992). The leaf color is green in ICGV 91278 and ICGV 91284 and light-green in ICGV 91283. The height of main stem is 30 cm in ICGV 91278 and ICGV 91284, and 18 cm in ICGV 91283 at 90 DAP during the postrainy season. Canopy width is 43 cm in ICGV 91278, 44 cm in ICGV 91283, and 57 cm in ICGV 91284.

All three lines have small sized (24–26 mm average length and 11–13 mm average breadth) two-seeded pods with an occasional three-seeded pod in ICGV 91278. Pods of ICGV 91278 and ICGV 91284 have a slight beak, moderate constriction, and slight reticulation. Pod beak, constriction, and reticulation are moderate in ICGV 91283. The

average meat content is 70% in ICGV 91278 and ICGV 91283 and 71% in ICGV 91284. Their seeds have tan testa color, which weigh 40 to 41 g 100-seed⁻¹ in ICGV 91278 and ICGV 91283 and 33 g 100-seed⁻¹ in ICGV 91284. The average oil content is 46.5, 48.7, and 47.0% and average protein content 27.2, 23.8, and 22.3%, respectively for ICGV 91278, ICGV 91283, and ICGV 91284.

ICGV 91278, ICGV 91283, and ICGV 91284 are high-yielding germplasm lines and can be grown in areas where peanut is exposed to end-of-season drought, conducive to aflatoxin contamination through preharvest seed infection by *A. flavus*. These germplasms can also be used as improved sources of resistance in a genetic enhancement program.

Breeder seed of ICGV 91278, ICGV 91283, and ICGV 91284 will be maintained by the Genetic Resources Unit, Genetic Resources and Enhancement Program, ICRISAT Center, Patancheru P.O., Andhra Pradesh 502 324, India. Limited quantities of seed of these lines are available upon request for research. Seed of each line are also deposited with the U.S. National Seed Storage Laboratory, 1111 S. Mason St., Fort Collins, CO 80521-4500.