Registration of Seven Improved Chickpea Breeding Lines Resistant to Leaf Miner

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Several chickpea (*Cicer arietinum* L.) breeding lines, FLIP 2005-1C (Reg. No. GP-264, PI 645455), FLIP 2005-2C (Reg. No. GP-265, PI 645456), FLIP 2005-3C (Reg. No. GP-266, PI 645457), FLIP 2005-4C (Reg. No. GP-267, PI 645458), FLIP 2005-5C (Reg. No. GP-268, PI 645449), FLIP 2005-6C (Reg. No. GP-269, PI 645460), and FLIP 2005-7C (Reg. No. GP-270, PI 645461) resistant to chickpea leaf miner were developed and released by the International Center for Agricultural Research in the Dry Areas (ICARDA), Syria, in August 2006 for distribution to chickpea researchers for use in breeding programs.

Chickpea leaf miner (*Liriomyza cicerina* Rondani) is an important pest and is widely distributed in west Asia and north Africa, which often causes economic damage to chickpea (Weigand and Tahhan, 1990; Khoja, 2006). Although effective insecticides for the control of leaf miner are available, they are uneconomical and unfriendly, thus rarely used. The use of host plant resistance is the best control option for leaf miner. Evaluation of a large number of chickpea germplasm accessions at ICARDA resulted in the identification of a few chickpea cultivars resistant to this pest (Singh and Weigand, 1996). These cultivars were either small seeded or have poor agronomic performance. Because of the high fluctuation of the leaf miner populations from year to year, it was difficult to establish a breeding program for leaf miner resistance. However, by delaying planting for 3 to 4 wk in the spring, we observed that the leaf miner infestation was high enough to discriminate regularly between susceptible and resistant plants. Thus, we initiated a breeding program for leaf miner resistance using the modified screening methodology that included sowing the crop in the late spring (second half of March), irrigating as necessary for proper germination, sowing the material in rows spaced at 0.45 m between rows, sowing a spreader-cum-indicator row at an interval of scoring the test entries for leaf miner infestation on a 9 scale, where the susceptible check is taken, and growing the selected lines with rating the information of their resistance reaction for one year.

This technique has resulted in the identification of a number of genetically enhanced leaf miner resistant lines. Seven of these lines with good agronomic size, and plant type were selected for distribution by chickpea researchers. These lines were five crosses, ILC 3805/ILC 3379, ILC 3805/ILC 5901/ILC 3397, ILC 5901/ILC 5309, and ILC 3805/ILC 5901/ILC 5309. The crosses were made at Tel Hadya (the main station of ICARDA, in Aleppo, Syria (36.01° N, 36.56° E, 284 m above sea level) in 1999, and the crossed seeds were grown at Terbol in the Bequa’a Valley in Lebanon (33.49° N, 35.59° E, 890 m above sea level) in the off-season in the spring season in 2000 at Tel Hadya following pedigree method. From F3 to F5 generations, all evaluation was done at Tel Hadya following pedigree methods.

In F5, 303 leaf miner resistant progenies appeared to be agronomically uniform and bulked. These lines were then planted in 2004, and 141 lines with good agronomic traits in late spring under leaf miner stress of the PYT we selected seven of the best lines (lines 75, 109, 136, 142, 181, and 199) that were

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