

### Registration of LAMD 609 Tobacco Germplasm

LAMD 609 (Reg. no. GP-52, PI 599689) is a germplasm line of Maryland tobacco (*Nicotiana tabacum* L.) developed by the Maryland Agricultural Experiment Station and released in 1994 (1). LAMD 609 is a genetically stable breeding line with an extremely low alkaloid content. This line will offer new germplasm for developing improved breeding material in Maryland tobacco with varying levels of total alkaloids for the mid-Atlantic region.

LAMD 609 originated from a 1970 cross between 'MD 609' (4) and LA Burley 21 (3). The backcross breeding method was used to incorporate the two nonlinked, low-alkaloid genes (2) from LA Burley 21 into the standard MD 609 cultivar. After six backcross cycles with MD 609 as the recurrent parent and five generations of self-pollination, LAMD 609 was released as a stable line in the BC<sub>6</sub>F<sub>5</sub> generation.

In a 2-yr (1991 and 1992) field study with four replications at the Upper Marlboro Facility of the Central Maryland Research and Education Center, LAMD 609, MD 609, and LA Burley 21 were evaluated for agronomic performance and chemical content. Averaged over the 2 yr, LAMD 609 had a total alkaloid content of 0.06%, compared with 1.93% for MD 609. Total N content was similar, with LAMD 609 and MD 609 producing levels of 3.80 and 4.01%, respectively. Additional chemical analyses of cured leaf samples obtained from a separate field planting in 1991 indicated that the primary alkaloid in LAMD 609 and MD 609 was nicotine, with a small trace of secondary alkaloids. In the 2-yr study, LAMD 609 had a lower yield per hectare (1542 kg) than MD 609 (1978

kg). The quality index of 25 for LAMD 609 was lower than the 51.6 value observed for MD 609. The lower quality leaf was due, in part, to a higher percentage of undesirable green color in the cured leaf. LAMD 609 and MD 609 had similar maturity, with both lines flowering approximately 70 d after transplanting. Additional information on the development and performance of LAMD 609 has been published (1).

Breeder seed of LAMD 609 will be maintained by the Maryland Agricultural Experiment Station. Small quantities of seed for breeding purposes may be obtained from the corresponding author.

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## REGISTRATION OF PARENTAL LINES

### Registration of ICMP 85410: Dwarf, Downy Mildew Resistant, Restorer Parental Line of Pearl Millet

ICMP 85410 pearl millet [*Pennisetum glaucum* (L.) R. Br.] (Reg. no. PL-36, PI 597490) is the restorer line of the single-cross grain hybrid ICMH 85410 (ICMA 2/ICMP 85410). It was developed by the Genetic Enhancement Division, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) Asia Center (IAC), Patancheru, India, and released on 21 December 1994.

ICMP 85410 is a *d<sub>2</sub>d<sub>2</sub>* dwarf inbred pollinator derived from one cycle of recurrent selection for combining ability within an F<sub>2</sub> population obtained from the cross ICP 165/ICP 220. Two male-sterile lines, ICMA 1 (1) and ICMA 2 (2), were used as testers for combining ability. Selected progenies were screened for downy mildew [caused by *Sclerospora graminicola* (Sacc.) J. Schröt.] resistance. The S<sub>1</sub> selection, (ICP 165/ICP 220)-64, produced a high-yielding, early-maturing hybrid in combination with ICMA 2. This progeny was also resistant to pearl millet downy mildew.

ICP 165 [SC 14(M)-1] was developed in Uganda. ICP 220, [SD2/EB-2(D1088)]-1, derived from parents from Nigeria and the USA, was developed by Institut de Recherches Agronomiques Tropicales et des Cultures Vivrières (IRAT). Single-plant selections were made in both these populations at IAC to obtain entries for the ICRISAT Pollinator Collection. Both ICP 165 and ICP 220 were good specific combiners, providing hybrids with high and stable grain yield. ICP 165 was resistant to downy mildew in the IAC disease nursery, and ICP 220 was relatively susceptible.

The S<sub>1</sub> selection, (ICP 165/ICP 220)-64, was advanced up to the S<sub>6</sub> generation by the bulk pedigree method with selection for dwarf plants. Hybrid ICMH 85410 was multiplied in isolation using ICMA 2 as the male-sterile line. The pollinator was entered into the ICRISAT Pollinator Collection (IPC) and assigned IPC number 0736.

ICMP 85410 is an inbred restorer line with grain yield ranging from 1141 to 1692 kg ha<sup>-1</sup>. Mean grain yield is 12% higher than J 104 (restorer of early-maturing commercial hybrid BJ 104), but 16% lower than ICMP 423 (5). It has dwarf plant height (95 to 107 cm) and flowers 56 to 64 d after sowing at IAC. ICMP 85410 tillers moderately (3 to 5 plant<sup>-1</sup>) and has a cylindrical panicles. It has dominantly inherited, nonhairy foliage and recessively inherited brown spots of varying shapes on upper leaves that serve as markers. Grains are relatively small (1000-grain wt. is 6.3 g), globular in shape, and yellowish gray in color.

ICMP 85410 was tested for resistance to downy mildew in 11 disease nurseries in India and western Africa. Downy mildew incidence ranged from 0 to 21%, compared with 0 to 22% for the resistant inbred control P 7-4 in India. In western Africa, ICMP 85410 had 0 to 85% downy mildew incidence, compared with 2 to 86% for P 7-4. The susceptible inbred control 7042 had high levels of incidence in India (6 to 92%) and western Africa (43 to 100%). ICMP 85410 had a downy mildew resistance reaction similar to ICMP 423 except at Samaru, Nigeria, where it was more susceptible.

A subselection of ICMP 85410 has been used as a parent of the first pearl millet molecular mapping population (4), and the mapped progenies have been screened against downy mildew iso-

lates from India, Niger, Nigeria, and Senegal to identify quantitative trait loci contributing to the relatively stable downy mildew resistance of ICMP 85410 (3). Results from these studies indicate that significant contributions to resistance, effective against one or more of these isolates, are found on five of seven linkage groups in ICMP 85410.

Across three environments, hybrids of ICMP 85410 had 26 to 94% seed set when this pollinator was crossed onto male-sterile lines with A<sub>1</sub>, A<sub>2</sub>, A<sub>3</sub>, and A<sub>4</sub> cytoplasm, compared with 0 to 69% seed set in hybrids of J 104 (6). Hybrids of ICMP 85410 have 44 to 64% seed set when 81A<sub>1</sub> is the female parent and 76 to 93% with 81A<sub>4</sub>, compared with 4 to 12% with 81A<sub>1</sub> and 0 to <1% with 81A<sub>4</sub> for J 104. ICMP 85410 is a good fertility restorer of both the A<sub>1</sub> and A<sub>4</sub> systems of cytoplasmic male sterility.

Small quantities of seed of ICMP 85410 can be obtained from the Genetic Enhancement Division, ICRISAT Asia Center, Patancheru 502 324, Andhra Pradesh, India. A sample of original seed is preserved in the genebank at ICRISAT Asia Center; seed are also deposited with the U.S. National Seed Storage Laboratory, 1111 S. Mason St., Fort Collins, CO 80521-4500.

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### Registration of C76-89-5 Parental Line of Sugarbeet

Sugarbeet (*Beta vulgaris* L.) parental line C76-89-5 (Reg. no. PL-37, PI 593698) was developed by the USDA-ARS in cooperation with the Beet Sugar Development Foundation and the California Beet Growers Association. This line was released in 1996. C79-89-5 combines well with monogerm testers and for combined resistance to bolting and diseases that are prevalent in the western USA. It is adapted throughout California.

C76-89-5 is a multigerm, self-sterile line descended from a single full-sib (FS) family. The FS from which C76-89-5 was derived was one of six that were selected from a larger set and recombined to produce C76-89 (PI 578087) released in 1993. These original FS families were obtained from pair crosses between individual plants of C31-89 (2) crossed to individual plants from a line similar to C82 (1). Following the initial FS progeny tests, selected FS families were increased and simultaneously crossed to a monogerm tester. These experimental hybrids were evaluated in trials at Salinas and Brawley, CA. Based on these trials, the increase of the FS that became C76-89-5 was selected. Following increase, this line underwent one cycle of individual plant selection for combined nonbolting tendency and multiple disease resistance. Twelve-month-old plants from an overwintered planting in soil highly infested with beet necrotic yellow vein virus (BNYVV), which causes rhizomania, were selected for nonbolting, root size and shape, and relative absence of foliar and root disease symptoms. At 6 mo of age, these plants had been inoculated with *Erwinia carotovora* (Jones) Bergey et al. subsp. *betavascularum* Thomson et al. Natural infection with powdery mildew (caused by *Erysiphe polygoni* DC.) was not controlled. After the initial field selection for nonbolting and disease resistance, the beets were reselected based on individual root sucrose concentration. During development and testing, C76-89-5 was identified as R76-89-5.

C76-89-5 appears to have merit as a candidate pollinator of commercial hybrids, in that it imparts to its hybrids both high sugar concentration and high sugar yield. These trials, however, were run under conditions in which moderate disease pressure could enhance the apparent performance relative to the more susceptible commercial checks. C76-89-5 has the highest level of resistance known to virus yellows. For the beet yellows virus (BYV) component of virus yellows, resistance is moderate. For beet western yellows virus (BWV) and other similar luteoviruses, C76-89-5 has high resistance. C76-89-5 has a high frequency of the *Rz* allele that conditions resistance to BNYVV. It is highly resistant to sugarbeet erwinia root rot and moderately resistant to powdery mildew. It is a nonbolting type under California conditions. C76-89-5 is moderately susceptible to beet curly top virus (BCTV). It has a small, compact, dark-green canopy and smooth roots with moderately low soil tare. It is a narrowly based line with the genetic variability that can be ascribed to a full-sib family and could be improved for some traits by continued selection.

Breeder seed is maintained by the USDA-ARS and will be provided to sugarbeet researchers in quantities adequate for reproduction, upon request to the author.

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