REGISTRATION OF BELTSVILLE-6, A SEMI-DORMANT ALFALFA GERMPLASM

(REG. No. GP 108)


A population of alfalfa (Medicago sativa L.), Beltsville-6 (GP 108), was developed by AR, SEA, USDA and released to alfalfa breeders in April 1979.

Beltsville-6 was developed from an intercross of 362 vigorous plants selected from broadcast stands of the nondormant cultivars 'Bonanza', 'Florida 66', 'Agate', 'Narragansett' and 'Moapa'. The selected plants had survived at least four winters (1970-75) in experimental field plots in Maryland. Selections from Florida 66 were made at Wye Mills, Md., and selections from Bonanza and Moapa were made at both Beltsville, and Wye Mills, Md. In the initial intercrossing, 154, 128, and 80 clones were derived from Bonanza, Moapa, and Florida 66, respectively. The resultant population was increased for one generation at Reno, Nev. to allow additional genetic recombination. Approximately 8,000 seedlings of the Reno intercross were screened in the laboratory at Beltsville for resistance to anthracnose caused by Colletotrichum trifolii Bain commonly occurring before the 1978 growing season (5, 6). From this screening, 199 plants free from phenotypic symptoms of the disease were selected and intercrossed to produce Beltsville-6. The parental background of this germplasm can be traced principally to Indian and African sources (1).

Beltsville-6 provides a source of highly vigorous, semi-dormant, disease- and insect-resistant alfalfa. The germplasm was selected under field conditions which were conducive to improvement of tolerance to winter stress. Beltsville-6 has resistance to commonly occurring strains of anthracnose, to Fusarium wilt, caused by Fusarium oxysporum Schlecht., and to the pea aphid (Acrystosiphon pisum Harris). The germplasm will be useful to breeders interested in extending the northern adaptation of nondormant alfalfa. Beltsville-6 has an upright growth habit, earlier bloom, and less winter dormancy than alfalfa types normally used in the mid to upper U.S. latitudes.

The mean frequencies of plants resistant to the commonly occurring strains of anthracnose, as determined by moisture chamber inoculation (2) at Beltsville were as follows: Beltsville-6 = 74.4%, 'Arc' = 77.2%, 'Saranac' AR = 35.3%, 'Bonanza' = 0.0%, Florida 66 = 0.0%, 'Moapa' = 0.0%, and 'Narragansett' = 0.0%. In a test for Fusarium wilt resistance at St. Paul, Minn., the mean percentages of resistant plants were: Beltsville-6 = 74.5%, 'Arc' = 53.9%, 'Moapa 69' = 81.8%, 'Agate' = 47.2%, 'Narragansett' = 26.2%, and 'Ranger' = 25.7%. In a seedling survival test for pea aphid at Beltsville the mean percentages of surviving plants were: Beltsville-6 = 48.4%, 'Kanza' = 57.0%, 'Williamsburg' = 6.0%, and 'Ranger' = 6.5%.

In other tests Beltsville-6 exhibited low frequencies of resistant plants to: bacterial wilt, caused by Corynebacterium insidiosum (McCull.) H. L. Jens., 'Harlan' = 9.7%, and spotted alfalfa aphid (Theioaphis maculata Buckton) = 16.0%.

Seed stocks of Beltsville-6 are maintained by the Field Crops Laboratory, AR, SEA, USDA, Agricultural Research Center (West), Beltsville, MD 20705.

REFERENCES


2. GP. No. 52, R. K. Thompson and J. C. Craddock*. Two barley (Hordeum vulgare L.) populations, Composite Cross XXXIII-A (GP No. 51) and Composite Cross XXXIII-B (GP No. 32), have been released by the Arizona Agricultural Experiment Station and AR, SEA, USDA to provide a diverse gene pool with sources of resistance to barley yellow dwarf virus (BYDV).

These populations of spring barley are the culmination of a breeding program established at Mesa, Ariz. in 1962. The sources of BYDV resistance were 'Abate' (CI 9280-1), 'Benton' (CI F237), CI 1227, and CI 2376. These sources of resistance had previously been incorporated in 28 three- and four-way cross combinations of coat-type barley cultivars using genetic male-sterile (mag!) 'California Mariout' as the adapted female parent to facilitate hybridization.

The initial backcross breeding procedure using 'Ariva' and 'Harlan' as recurrent parents and utilizing male sterility for hybridization was changed in 1964 to the male-sterile-facilitated recurrent selection system. Seed from all F2 and selected F2 and F3 plants were composited into one population. Annually, for 12 years, several hundred male-sterile and male-sterile plants were selected and intercrossed in the F3 generation. The F1 generation was increased at the same time without selection. The plants were grown under irrigation and selections were made for BYDV resistance and general adaptability. Crosses were made between plants with opposite or different characteristics to maintain heterozygosity.

Four populations in addition to the 1964 population were constituted as a result of subsequent introduction of germplasm into the base population or as a result of improving the method of screening for BYDV. Once established, 200 to 250 lines have been maintained in the laboratory for use in various research and extension activities.
