nursery with clones primarily of high combining ability for forage yield.
N.S. 46 resulted from natural interpollination in 1966 among plants that persisted in an alfalfa-brome grass pasture test (seeded in 1954 at the Nebraska Agricultural Experiment Station) that was initially cut for hay, then rotationally grazed, and later continuously grazed. The parental plants came from A169, A224, polycross progeny of seven broad-crowned rhizomatous or creeping-rooted clones, and 'Vernal'.

N.S. 47 resulted from natural interpollination in 1966 among 50 creeping-rooted plants in an alfalfa-brome grass nursery established in 1960 at the Nebraska Agricultural Experiment Station. The alfalfa-brome grass was cut 3 or 5 times annually. The origin of the plants was similar to that described for N.S. 31 and 33.

The persistence of A169 and A224 under continuous grazing was superior to that of many cultivars, while forage yields were about equal to those of 'Buffalo', 'Ranger', and 'Vernal' (1).

N.S. 31, 33, 46, and 47, A603, A604, and six cultivars were seeded in three alfalfa-brome grass pastures and in pure stands in nonirrigated tests at Mead, NE, Field Laboratory in 1969. Stand and hay yields of the experiments were in the same range as those of Ranger and Vernal from 1970 to 1977 in all tests (unpublished data).

Percentages of plants resistant to bacterial wilt [caused by *Corynebacterium insidiosum* (McCull.) H. L. Jens.] were 51, 16, and 5% for A224, Ranger, and Grimm, respectively. In another test, percentages of plants resistant to bacterial wilt were 27, 45, 48, 39, 19, 36, 4, 37, and 58% for N.S. 31, 33, 46, and 47, A603, A604, 'Du Puits', Ranger, and 'Vernal', respectively.

Ten grams of seed of each germplasm are available except for N.S. 47 (8 g) to each applicant upon written request to the Dep. of Agronomy, Univ. of Nebraska, Lincoln, NE 68583.

W. R. KEHR (2)

References and Notes

2. Research agronomist (retired) USDA-ARS and professor of agronomy, Dep. of Agronomy, Univ. of Nebraska, Lincoln, NE 68583. Published with the approval of the director of the Nebraska Agric. Exp. Stn. as Journal Article no. 7245. Registration by the Crop Sci. Soc. of Am. Accepted 24 Apr. 1984.

REGISTRATION OF N.S. 72 P2, N.S. 75 P2, N.S. 78 P2, AND N.S. 81 P2PA1SAA1 ALFALFA GERMPLASMS WITH MULTIPLE PEST RESISTANCE

N.S. 72 P2 (Reg. no. GP 168), N.S. 75 P2 (GP 169), N.S. 78 P2 (GP 170), and N.S. 81 P2PA1SAA1 (GP 171) winter-hardy alfalfa germplasms (*Medicago sativa* L.) were released by the Nebraska and Minnesota Agricultural Experiment Stations and USDA-ARS 6 Mar. 1984. They provide resistance to Phytophthora root rot (caused by *Phytophthora megasperma* Drechs. f. sp. medicaginis Kuan and Erwin), bacterial wilt [caused by *Corynebacterium insidiosum* (Mc Cull.) H. L. Jens.], pea aphid (*Acyrthosiphon pisum* (Harris)), and spotted alfalfa aphid (*Theroiphis maculata* (Buckton)).

N.S. 72 was developed by hand-crossing in a diallel manner five clones selected after three or four cycles of phenotypic selection for pest resistance and vigor in winter-hardy germplasm. N.S. 75 was developed by interpollination among 60 plants (20 each selected from three broad-based synthetics developed from three or four cycles of phenotypic selection for pest resistance in winter-hardy germplasm). N.S. 78 is a broadbased germplasm pool developed by interpollination by bees in a natural isolation that had 4200 plants (100 plants transplanted at random from each of 42 sources that had high forage yield and pest resistance). N.S. 81 was developed by interpollination among 99 Phytophthora root rot resistant plants (33 each selected from three broadbased synthetics developed from three or four cycles of phenotypic selection for pest resistance and vigor in winter-hardy germplasm). Two cycles of phenotypic recurrent selection for resistance to Phytophthora root rot were conducted in N.S. 72, N.S. 75, N.S. 78, and N.S. 81 in cooperation with the Minnesota Agricultural Experiment Station. One cycle of phenotypic selection for resistance to pea aphids and spotted alfalfa aphids was conducted at the Nebraska Agricultural Experiment Station. N.S. 81 P2PA1SAA1.

Percentages of plants resistant to Phytophthora root rot in Minnesota tests for N.S. 72 P2 and 'Agate' were 28 and 34%, respectively; in N.S. 75 P2, N.S. 81 P2PA1SAA1, 'Agate,' and 'Saranac' were 60, 52, 45, and 5%, respectively; and in N.S. 78 P2, Agate, and Saranac were 50, 42, and 2%, respectively. Percentages of plants resistant to bacterial wilt in N.S. 72 P2, N.S. 75 P2, N.S. 78 P2, N.S. 81 P2PA1SAA1, 'Narragansett,' 'Ranger,' and 'Vernal' were 60, 63, 50, 47, 36, and 62%, respectively, in a Nebraska test. In Nebraska seedling tests, percentages of plants resistant to pea aphids in N.S. 75 P2, N.S. 81 P2PA1SAA1, 'Dawson,' and Vernal were 75, 69, 64, and 2%, respectively; and percentages of plants resistant to spotted alfalfa aphid biotypes collected in Nebraska were 52, 21, 46, and 0%, respectively. In another Nebraska test, percentages of plants resistant to pea aphids in N.S. 78 P2, Dawson, and Vernal were 43, 55, and 0%, respectively; and percentages of plants resistant to spotted alfalfa aphid biotypes collected in Nebraska were 12, 41, and 0%, respectively.

Two-year average forage yields of N.S. 72 P2, N.S. 75 P2, N.S. 78 P2, and N.S. 81 P2PA1SAA1 were 110, 100, 109, and 101%, respectively, of the average yields of four check cultivars per test in yield tests at Mead, Nebr. Four of six cultivars, 'Baker,' Dawson, 'Kanza,' 'Riley,' Saranac, and Vernal were used per test. Two-year average seed yields of N.S. 72 P2 were equal to those of Vernal but 25% less than those of Ranger at Fresno, CA. Two-year average seed yields of N.S. 75 P2 were equal to those of Dawson and Saranac and 8% higher than those of Vernal at Fresno. At Caldwell, 2-year average seed yields of N.S. 78 P2 were equal to those of Dawson but 25% less than those of Dawson and Saranac. Two-year average seed yields of N.S. 78 P2 were equal to those of Dawson and 16% higher than those of Saranac and Vernal at Fresno. At Caldwell, 2-year average seed yields of N.S. 78 P2 were equal to those of Dawson, 7% higher than those of Vernal, and 11% less than those of Saranac. Two-year average seed yields of N.S. 81 P2PA1SAA1 were equal to those of Vernal and 6% less than those of Dawson and Saranac at Fresno. At Caldwell, N.S. 81 P2PA1SAA1 2-year average seed yields were 9% higher than those of Vernal, 8 and 17% less than those of Dawson and Saranac, respectively.

Ten grams of seed of N.S. 72 P2, N.S. 75 P2, N.S. 78 P2, and N.S. 81 P2PA1SAA1 are available to each applicant upon written request and agreement to appropriately recognize its source as a matter of open record when this