

MAY 15 1991

## REGISTRATION OF ARS-2678 KURA CLOVER GERMPLASM

ARS-2678 (Reg. no. GP-91, PI 542965) Kura clover (*Trifolium ambiguum* Bieb.) germplasm was developed by the USDA-ARS, USDA-SCS, and the Utah Agricultural Experiment Station. This germplasm was released in March 1988.

The 81 parent clones of ARS-2678 were selected because they were winterhardy in the Intermountain Region of the USA, were relatively tolerant of drought and high temperatures, spread extensively by means of rhizomes, and exhibited superior forage and seed yields in nonirrigated environments. They also were selected for increased nodulation and N<sub>2</sub> fixation activity when inoculated with *Rhizobium leguminosarum* biovar *trifolii*.

The original spaced-plant source nursery established in 1978 consisted of 255 plants of Kura clover representing 5 plants of each of 51 seed accessions collected by D.R. Dewey and A.P. Plummer in the USSR. Most of the accessions were obtained from the Stavropol Botanical Garden and originated in the Caucasus Mountain area. On the basis of above-ground biomass, lateral rhizome extension, and seed yield measured in 1980 and 1981, 27 individual plants from 20 accessions were selected and moved to an isolated seed increase block. Five to 35 open-pollination progeny plants of each of 23 of these selected maternal plants were started in a greenhouse from seed harvested in the original source nursery. These were established by transplanting in a spaced-plant nursery in Cache Valley, Utah, during 30 April through 4 May 1982. Plants of a previous Kura clover germplasm release, C-2 (1), were used as checks.

Forage and seed yields were measured on each plant in June 1982. A part of the siblings in each progeny were destructively sampled in August 1982 to measure shoot and root weights and to determine acetylene reduction activities. On 9-10 June 1983, all remaining progeny plants were evaluated for aboveground biomass and lateral rhizome extension and density. One hundred sixty-seven visually superior plants then were excavated and nodule weight data obtained. Plants chosen on the basis of superior shoot and root weights were transplanted to the parental isolated seed increase block. Following measurement of nitrogen fixation activity ( $\mu\text{mol}$  acetylene reduced/h<sup>-1</sup> plant<sup>-1</sup>), previously selected

plants determined to be inferior were removed from the seed increase block; 81 (27 parents and 54 progeny) were retained. Selected plants were significantly ( $P < 0.01$ ) superior to those not selected in N<sub>2</sub> fixation attributes. Successive elimination coupled with combined within- and among-family selection were used to maintain a broad germplasm base in the synthetic while enhancing agronomic attributes. No plants of the C-2 germplasm source were included in the seed increase block. Plant Introduction (PI) accessions contributing to ARS-2678 and the corresponding percentages of the total germplasm base derived from them were PI 440671 (2%), PI 440672 (4%), PI 440673 (7%), PI 440677 (4%), PI 440679 (10%), PI 440681 (6%), PI 440682 (4%), PI 440684 (6%), PI 440685 (4%), PI 440688 (4%), PI 440691 (2%), PI 440695 (15%), PI 440696 (14%), PI 440711 (2%), PI 440712 (1%), PI 440715 (1%), and PI 440716 (6%). An additional 5% of the parentage of ARS-2678 was derived from an accession created by bulking seeds of the original collections from the USSR. ARS-2678 is a hexaploid with 48 chromosomes (R.R. Smith, 1990, personal communication).

Syn-1 seed was produced from 1984 to 1987 and was pooled, released, and distributed as ARS-2678. Additional Syn-1 seed was produced in 1988 and 1989, bulked, and also will be distributed as ARS-2678. Five grams of ARS-2678 seed are available to each applicant upon written request and agreement to make appropriate recognition of its source as a matter of open record when this germplasm contributes to the development of a new cultivar or hybrid. Seed stocks are maintained by the USDA-ARS, Forage and Range Research Laboratory, Utah State University, Logan, UT 84322-6300.

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### Notes and References

1. Townsend, C.E. 1975. Registration of C-2 Kura clover germplasm. *Crop Sci.* 15:738.
2. M.D. Rumbaugh and D.A. Johnson, USDA-ARS, Forage and Range Res. Lab., Utah State Univ., Logan, UT 84322-6300; and J.R. Carlson, USDA-SCS, West Technical Service Ctr., Portland, OR 97209. Approved as Paper no. 3987. Registration by CSSA. Accepted 31 July 1990. \*Corresponding author.