Registration of ‘Performer’ Switchgrass

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‘Performer’ switchgrass [Panicum virgatum L.] (Reg. No. CV-247, PI 644818) was cooperatively developed as a cultivar by the USDA-Agricultural Research Service and the North Carolina Agricultural Research Service, North Carolina State University, Raleigh, NC and released on 1 November 2006. Incorporation and preservation of the unique switchgrass germplasm adapted to the Southeastern U.S. is important in the development of a new cultivar with improved nutritive value and, hence, forage quality (i.e., intake and digestion). Generally, forage quality and dry matter yield are negatively associated. The development of this new cultivar retained acceptable dry matter yield, but with improved nutritive value over existing cultivars, and over other adapted warm-season grasses, which is valuable to the ruminant industry.

Performer was developed from three cycles of selection occurring under natural environmental conditions. The original source population (Cycle 0) consisted of a selected group of 161 lowland form switchgrass plants, representing 11 different germplasm sources. The 11 germplasm sources, with cultivar or location of origin in parentheses, were 63–85 (Pangburn), 63–90 (Kanlow), 63–78 (SC 56–23), 63–69 (Pinehurst, NC), 63–79 (Wilmington, NC), 63–75 (Bn-11361), 63–73 (F-687, Am-181, Stuart), 63–76 (Bn-11362), 63–72 (F-286, Am-180, Wahass, O.), 63–70 (Pinehurst, NC), and 63–71 (Am-175, Jasper County, SC). The 161 plants were evaluated for dry matter yield and in vitro dry matter digestion (IVDMD). A total of 31 plants were selected for dry matter yield and IVDMD. These plants, in addition to two other plants that were selected to maintain their germplasm (accession 63–87 (Pangburn)), were allowed to cross-pollinate at random, with the resulting progeny bulked in equal amounts across clones to represent Cycle 1.

Cycle 1 was represented by the 660 half-sib progeny from the 33 selected Cycle 0 plants. The progeny were classified for dry matter yield, IVDMD and N concentration (Godshalk et al., 1983; Godshalk et al., 1986). A total of 33 progeny were formed using three different indices. Each index was designed to establish it as a covariate, thus preventing IVDMD concentration as a result of selection. One 16-clone synthetic was produced. A second index (Index II), with weights of one for initial growth yield, zero for IVDMD, and zero for N concentration, produced 16-, 8-, and 4-clones. A given plant (among the 33 plants selected) was frequently present in more than one synthetic. Six synthetics were described above. A second index (Index II), with weights of one for initial growth yield, 62 on IVDMD, and zero for N concentration, produced 16-, 8-, and 4-clones. An additional synthetic and a 4-clone synthetic were produced from Index III, which consisted of weights of zero on initial growth yield, one for IVDMD, and zero for N concentration. A given plant (among the 33 plants selected) was frequently present in more than one synthetic. All six synthetics were bulked in equal amounts across clones to constitute Cycle 2.

Cycle 2 consisted of open-pollinated progeny synthetics described above. As a result of variation in the six synthetics of the 33 plants selected for Cycle 1, the half-sib family size of the progeny ranged from 20 to 50 per family. The 33 Cycle 2 families (progeny) were planted in a randomized complete block design with four replicates at the Central Crops Research Station at Clayton, NC during 1985 and 1986 (Godshalk et al., 1988a, 1988b). Eighteen plants and data were collected over two years. Data recorded included plant height, plant shape, and various combinations of these traits. Six synthetics were described above. A second index (Index II), with weights of one for initial growth yield, 62 on IVDMD, and zero for N concentration, produced 16-, 8-, and 4-clones. A given plant (among the 33 plants selected) was frequently present in more than one synthetic. All six synthetics were bulked in equal amounts across clones to constitute Cycle 3.

Cycle 3 consisted of open-pollinated progeny synthetics described above. As a result of variation in the six synthetics of the 33 plants selected for Cycle 2, the half-sib family size of the progeny ranged from 20 to 50 per family. The 33 Cycle 3 families (progeny) were planted in a randomized complete block design with four replicates at the Central Crops Research Station at Clayton, NC during 1985 and 1986 (Godshalk et al., 1988a, 1988b). Eighteen plants and data were collected over two years. Data recorded included plant height, plant shape, and various combinations of these traits. Six synthetics were described above. A second index (Index II), with weights of one for initial growth yield, 62 on IVDMD, and zero for N concentration, produced 16-, 8-, and 4-clones. A given plant (among the 33 plants selected) was frequently present in more than one synthetic. All six synthetics were bulked in equal amounts across clones to constitute Cycle 4.

Incorporation and preservation of the unique switchgrass germplasm adapted to the Southeastern U.S. is important in the development of a new cultivar with improved nutritive value and, hence, forage quality (i.e., intake and digestion). Generally, forage quality and dry matter yield are negatively associated. The development of this new cultivar retained acceptable dry matter yield, but with improved nutritive value over existing cultivars, and over other adapted warm-season grasses, which is valuable to the ruminant industry.