

Registration of Q4188 and Q4205, Sexual Tetraploid Germplasm Lines of Bahiagrass

Q4188 (Reg. no. GP-1, PI 619631) and Q4205 (Reg. no. GP-2, PI 619632) sexual tetraploid germplasm lines of bahiagrass (*Paspalum notatum* Flugge) were developed by the Universidad Nacional del Nordeste, Corrientes, Argentina, and released by the Universidad Nacional del Nordeste and the University of Florida Agricultural Experiment Station in 2002.

Tetraploid bahiagrass plants are generally obligate apomicts, and improvement has been hampered by the lack of stable, sexual tetraploid types. Research at the Facultad de Ciencias Agrarias, Universidad Nacional del Nordeste (FCA-UNNE), Corrientes, Argentina, in cooperation with USDA-ARS, Coastal Plain Experiment Station has led to the development of two tetraploid lines, Q4188 and Q4205, which exhibit sexual behavior.

Q4188 was derived from the cross Q3664/Q3853. Parent Q3664 originated from a cross between a sexual tetraploid plant (PT-2), induced by colchicine treatment of the sexual diploid Pensacola bahiagrass biotype (*P. notatum* var. *sauroae*), and a white-stigma bahiagrass strain (WSB). The original cross was made by Burton and Forbes (1961). In 1979, the Q3664 plant was given to FCA-UNNE, Argentina, where they showed by embryological analyses that Q3664 is facultatively apomictic with a high level (>70%) of sexual reproduction (Quarin et al., 1984). Parent Q3853 was introduced to FCA-UNNE by pieces of rhizomes from Brazil collected by J.F. Valls and coworkers (accession no. 4751, found near Osorio and Capivari, state of Rio Grande do Sul). Embryological analyses showed that this plant is obligately apomictic.

Plant Q4188 reproduces sexually. A total of 472 ovaries, fixed at monthly intervals throughout a complete flowering season, showed over 76% of the mature ovules bearing one meiotic embryo sac. The remaining ovules had immature or aborted embryo sacs, but aposporous sacs were not observed. Genetic fingerprinting done by means of restriction fragment length polymorphisms (RFLPs) and random amplified polymorphic DNAs (RAPDs) indicated that self-pollinated progenies of plant Q4188 (experimental number F131) originated exclusively by sexual means (Ortiz et al., 1997). The plant has short, stout, ascending rhizomes; erect growth habit; red-purple basal leaf sheaths; and purple anthers and stigmas.

Plant Q4205 is a selected, selfed progeny of plant Q3664.

A total of 76 plants from self-pollination of Q3664 were established in a space-planted field nursery. At flowering, 20 to 70 ovaries from each plant were cleared (Herr, 1971) and observed with a differential contrast microscope. Forty-nine plants (64.4%) formed some aposporous embryo sacs in addition to the normal meiotic sac, and the remaining 27 plants were free of apospory. Plant Q4205 was selected from among these 27 sexual plants. It appeared visually to be the most vigorous plant. A total of 265 ovaries were observed and all were free of aposporous embryo sac formation. The selected clone has short rhizomes, upright growth habit, red-purple leaf sheaths, white stigmas, and is 100% sexual. It has a visually recessive marker for white stigmas.

Confirmation of ploidy and sexual reproduction was done by examination of 40 root tips and ovules from each germplasm line at the USDA-ARS Coastal Plain Experiment Station, Tifton, GA, and at the University of Florida in 2001. While limited in scope by the number of root tip cells and flowers surveyed, the plants appeared to be tetraploid and to reproduce sexually. Chromosome number ($2n = 4x = 40$) was determined by microscopic observation of root tips that had been pretreated for 2 h in a saturated aqueous solution of α -bromonaphthalene, transferred to 5 M HCl for 2 min, then stained in basic fuchsin (1%, v/v) for several hours and squashed in acetic orcein (1%, v/v). Using clarified ovaries fixed in FAA at anthesis (Herr, 1971), we observed the method of reproduction of the florets of both lines for evidence of meiotic embryo sacs and any indication of aposporous development. Cleared ovaries were observed with differential interference contrast and phase contrast microscopy. Phenotypic variability of Q4188 and Q4205 was observed for plant height and flowering habit among greenhouse-grown plants at Gainesville, FL.

Because cultivated bahiagrass tetraploid grasses are considered to be obligate, or highly obligate apomicts, these 100% sexual tetraploid lines should have practical value when used as female parents in plant improvement programs. They should produce fertile tetraploid progenies when crossed with pollen from apomictic strains. Line Q4205 has an additional advantage for hybridization because of its visual recessive marker for white stigmas.

Vegetative stocks of lines Q4188 and Q4205 will be maintained at the Facultad de Ciencias Agrarias, Universidad Nacional del Nordeste, c.c. 209, 3400 Corrientes, Argentina, and at the North Florida Research and Education Center, Marianna, FL. Limited quantities of open-pollinated seed of Q4188 and Q4205 will be made available for research on request to the Florida Agric. Exp. Stn. Recipients of vegetative stocks or seed are asked to make appropriate recognition of the source of these germplasm if used in the development of a new cultivar, germplasm, parental line, or genetic stock.

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