Registration of ‘Jumbo’ Annual Ryegrass

‘Jumbo’ tetraploid annual ryegrass (Lolium multiflorum Lam.) (Reg. no. CV-220, PI 614099) resulted from doubling the chromosomes of an advanced breeders population of ‘Surrey’ (Prine et al., 1989; Prine, 1996) diploid annual ryegrass, a cultivar resistant to crown rust [caused by Puccinia coronata (Pers.) Cda.]. Surrey was selected from the crown-rust-susceptible ‘Marshall’ (Arnold et al., 1981) annual ryegrass. Jumbo was released as a cultivar by the University of Florida, Institute of Food and Agricultural Sciences on 20 Sept. 1999. Jumbo was tested under the experimental designation, FL X1997 (G) L.R.

In 1989–1991, three ramets from each of >300 crown rust resistant plants were selected each season in early April utilizing a 4-by-10 grid selection pattern over a 9000 spaced-plant crossing nursery at Gainesville, FL. More than 900 ramets from selected plants were sent to Reed Barker, USDA National Forage Seed Production Center, Corvallis, OR, in early May of 1989, 1990, and 1991. The ramets were established in a greenhouse and subsequently transplanted to a field to evaluate seed production and resistance to stem rust (caused by P. graminis Pers.:Pers.). Seed of selected plants was returned to Gainesville each fall to establish the 1990–1991 and 1991–1992 plantings. After selection of the 300 plants for shipment to Oregon, the Gainesville planting was further rogued for crown rust resistance, and the selected plants were allowed to produce seed at Gainesville. In 1990–1991 and 1991–1992, a row nursery was planted at Gainesville with seed produced in both Oregon and Florida. Every third row was derived from Florida seed with the rest of the nursery established with Oregon seed. Selected plants sent to Oregon were from the rows planted with Oregon seed. In the spring of 1993, 350 plants were selected in a 4-by-10 grid pattern over all rows from a 9000-plant Florida nursery. Equal quantities of seed were harvested from each selected plant, composited, and identified as FL X1993 LR select. A small sample of FL X1993 LR select seed was sent to Germany where the chromosomes were doubled by means of colchicine. Seed from 344 individual plants verified by flow cytometer as tetraploids were returned to Florida in the fall of 1995. In December 1995, equal quantities of seed from each tetraploid plant were composited and planted in a 6000-spaced-plant nursery at Gainesville and rogued for disease susceptibility and off-types. Seed was harvested from >400 selected plants in a 4-by-10 grid pattern in this nursery in the spring of 1996. Equal quantities of seed from each plant were composited and used to establish a selection nursery in the fall of 1996. This planting was similar to the 1995–1996 nursery, with equal quantities of seed from the selected plants composited and designated FL X1997 (G) L.R. In the fall of 1997, this seed was planted in a prebreeder seed field near Halsey, OR, and rogued in the spring of 1998 for stem rust susceptibility, poor seed production, and off-types. This prebreeder seed was used for testing in the southeastern USA and to plant a Breeder seed field near Halsey, OR, in 1998–1999. After roguing for stem rust susceptibility, Breeder seed was harvested in the summer of 1999 and used for testing and for Foundation seed production.

During the three seasons, 1997–1998, 1998–1999, and 1999–2000. Jumbo was tested in ryegrass trials in Florida and other southeastern states as FL X1997(G) L.R. Jumbo was higher or not different from the highest forage-yielding entries in most trials. Jumbo was later maturing and had higher resistance to crown rust and gray leaf spot (caused by Pyricularia grisea (Cooke) Sac.) than Surrey. The crown rust index for Jumbo at Gainesville for 2000 was 1.55 (1–3 highly resistant, 3–5 resistant, 5–7 susceptible, and 7–10 highly susceptible), the highest crown rust resistance of all ryegrass genotypes evaluated (Prine, 2000). Seed producers in Oregon found Jumbo had high seed yields and resistance to race(s) of stem rust typically found in ryegrass seed production areas of the Willamette Valley. Jumbo had moderate resistance to Helminthosporium leaf spot disease (caused by Drechslera spp.), and was considerably more resistant than Surrey.

Jumbo exhibited little cold damage during the winter of 2000–2001 in nurseries at Gainesville, FL, and Marianna, FL. Jumbo has larger stems, leaves, seed heads, and seed than the diploid, Surrey, from which it was derived. The protein content and in vitro organic matter digestibility (IVOMD) compares favorably with Surrey and other ryegrass cultivars. Because of its large plant size, Jumbo is expected to be primarily used for forage purposes. It is later maturing than Surrey. Jumbo is adapted to southeast ryegrass belt and Oregon ryegrass seed production area.

Florida Foundation Seed Producers, Inc., Greenwood, FL, has granted Barenbrug USA of Tangent, OR, exclusive rights for production and marketing of Jumbo seed. Seed classes of Jumbo will be one generation each of Breeder, Foundation and Registered and two generations of Certified. Application No. 200000196 has been made for United States Plant Variety Protection for Jumbo.


Acknowledgments

Appreciation is expressed to Reed Barker, USDA-ARS National Forage Seed Production Center, Corvallis, OR for his selection in the diploid population and to Ulf Feuerstein of Deutsche Saatveredelung (DSV), Germany for doubling the diploid population that became Jumbo. Appreciation is also expressed to ryegrass researchers in GA, AL, MS, LA, TX, OK, AK, TN, and NC who tested Jumbo.

References


G.M. Prine, Univ. of Florida, IFAS, Agronomy Dep., P.O. Box 110500, Gainesville, FL 32611-0500; A.R. Blount, North Florida REC-Marianna, 3925 Hwy 71, Marianna, FL 32446; L.S. Dunavin, West Florida REC-Jay, 4253 Experiment Road, Hwy 182, Jay, FL 32565; P. Mislevy, Range Cattle REC-Opa, 3401 Experiment Station, Opa, FL 33865; R.L. Stanley, Jr. (retired), 311 Old Daniels Church Road, Eastman, GA 31028. Contribution of Florida Agric. Exp. Sta. Journal Series No. R-08296. Registration by CSSA. Accepted 28 Feb. 2002. *Corresponding author (agr@gnv.ifas.ufl.edu).

Published in Crop Sci. 42:1749 (2002).

Registration of ‘Horizon 314’ Oat

Horizon 314 winter oat (Avena sativa L.) (Reg. no. CV-368, PI 628345) was jointly developed and released in 2000.