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Joseph and Nezpurs Idaho Fescue

Forage Grasses for the Intermountain-Northwest

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Idaho fescue, *Festuca idahoensis* ELMER, is an important, indigenous, forage grass species in the western United States including central to northern Idaho, eastern Oregon, Washington, western Montana and southward to Colorado. The species is also widely distributed in the high elevations of northern California and in the southern British Columbia and Saskatchewan provinces of Canada (Tisdale 1959 and Pavlick 1983).

Idaho fescue possesses drought tolerance and grows predominately from 305 to 2,743 meters (m) (1,000 to 9,000 feet) in elevation with annual precipitation from 50 to 76 centimeters (cm) (20 to 30 inches) (Daubenmire 1966). It is a valuable forage species in areas of central Idaho and a very palatable sheep forage on many of the higher altitude, sagebrush-grassland, range sites in eastern Idaho (R. B. Murray personal communication 1983). Paulsen (1969) reported it to be an excellent forage in the grassland-alpine and open ponderosa-

pine summer cattle ranges of western Colorado. Because it produces an extensive, deep root system, it is an excellent erosion control grass for cut-over forest areas (Hafenrichter et al. 1968).

Description

'Joseph' and 'Nezpurs' are perennial, densely tufted, bunch fescues with olive to dark green, fine, stiff leaves. The culms are hollow, spreading, light tan, 50 to 100 cm (20 to 40 inches) tall with an open, scabrous sheath. Panicles are open, 10 to 20 cm (4 to 8 inches) long, spreading at anthesis (bloom); spikelets have mostly 5 to 7 florets, with yellowish or purple anthers. The lemmas — lower of two bracts enclosing the flower — are 5 to 9 millimeters (mm) long, scabrous with 2 to 7 mm, stiff awns with a glabrous palea and caryopsis that frequently dehisce.

Mature seeds weigh approximately 1 milligram (mg) per seed (425,000 to 460,000 seeds per pound).



Fig. 1. Idaho fescue - sagebrush vegetation complex at the U.S. Sheep Experiment Station, Dubois. This site has an elevation of 5,500 feet and annual precipitation of 11 inches.

Plants flower in early June and seed matures in early July at Moscow, Idaho. Seed germination requires 8 to 10 days. Seedlings are fine with a 3 to 6 mm coleoptile and first leaf 28 to 30 mm in length (Hitchcock 1950 and Ensign 1980).

Breeding-Development Program

Idaho fescue characteristically has poor seed production and weak seedling vigor (Hafenrichter et al. 1968). Consequently, a breeding program was initiated in 1950 to produce cultivars with improved floret fertility (seed set), larger seed size (seedling vigor) and better germination. Seed of 89 selected ecotypes from Idaho, Oregon, Washington, Montana, Wyoming, California and the British Columbia and Saskatchewan provinces of Canada were the basis for a clonal source nursery in which genetic diversity of the species was evaluated. Early investigations noted considerable variation among and within ecotypes (Slinkard 1968).

A phenotypic recurrent selection program was initiated to select progeny with increased floret fertility, seed size and seed germination. The initial breeding nursery consisted of 182 progeny rows of 20 spaced plants each selected from the source nursery. About 200 plants with high indice ratings for the above three criteria were retained in the breeding nursery for interpollination the following year. Seeds were harvested from these plants for the next cycle of recurrent selection. Three cycles of recurrent selection were used.

Selection of Joseph and Nezpurs Cultivars

One hundred different progeny were identified after the third cycle of selection. Twenty clones from this group were selected for intercrossing based upon high indices and agronomic type.



Fig. 2. Typical 'Joseph' space plant in June showing plant type, seed formation and olive-green plant color.

They were a relatively tall height of 72 to 80 cm (28 to 31 inches), upright, with good basal leaf growth (Table 1). The panicles were large with 65 percent average floret fertility, the seed size was .33 g/200, and the germination was 91.4 percent. This group of clones, designated as Idaho Syn 'A,' was planted in three replications, in isolation, and allowed to intercross. The synthetic seed was released as Idaho fescue, 'Joseph' cultivar. These indices for the original clones, selected to start the breeding program, averaged 55 percent floret fertility, .24 g/200 seeds and 80 percent germination.

From the 100 clones described above, 90 were selected, based upon high indices for floret fertility, seed size and germination. These clones were phenotypically variable for plant size of 50 to 70 cm (20 to 28 inches), basal growth, culm and panicle color and seed productivity per plant. Floret fertility, seed size and percent germination of these 90 clones were 71.7 percent, .31 g/200 seeds and 89

Table 1. Comparative data for 'Joseph' and 'Nezpurs' Idaho fescue with selected other fine leaf fescue.

Cultivar - common name	Plant height (cm)	Growth habit (type)	Maturity (date)	Basal growth (score)	Forage (g)	Panicle shape	Panicle habit	Leaf color
Joseph, Idaho fescue	72 to 80	Erect ¹	5/11 ²	7.0 ³	718 ⁴	Oblong ⁵	Open ⁵	O-G ⁶
Nezpurs, Idaho fescue	55 to 70	Erect	5/10	6.3	194	Oblong	Open	O-G
Covar, sheep fescue	60 to 62	Very erect	5/12	6.0	68	Tapering	Compact	B-G
Durar, hard fescue	62 to 75	Very erect	5/11	6.8	334	Oblong	Int.	L-G
Cascade, chewing red fescue	80 to 85	Semi-erect	5/16	9.0	426	Oblong	Open	D-GR
Dawson, creeping red fescue	55 to 68	Semi-erect	5/18	8.9	299	Oblong	Int.	D-GR

¹At maturity.

²At 50 percent heading, date.

³1 = little; 9 = abundant.

⁴Representative space plants 1980-1981.

⁵At medium dough stage.

⁶At maturity O-G olive-green, B-G bluegreen, L-G light green, D-GR dark green.



Fig. 3. Typical 'Nezpurs' plant during anthesis showing upright plant type, excellent panicle development and basal leaf growth.

percent, respectively. This group of clones, designated as Idaho Syn. 'C,' was planted in three replications to interpollinate, and synthetic seed was produced and released as Nezpurs. Nezpurs, a variant spelling of Nez Perce, honors the tribe that roamed over much of the area where Idaho fescue grows best, and Joseph honors their most famous chief (Howard and McGrath 1941 and Beal 1963).

The two synthetic cultivars were released officially in June 1983 and accepted for certification in Idaho on a limited generation system of breeders, foundation and certified seed classes. Applications for plant variety protection were filed for each variety in October 1983. Seed production contracts were developed with seed companies in northern Idaho.

Seed Production

Idaho fescue seed should be planted in the early fall in firm, weed free, fertile soil at a depth of 0.6 cm ($\frac{1}{4}$ inch). Row spacing of 76 to 92 cm (30 to 36 inches) is recommended to facilitate weed control and field rouging. Rates of 4.5 kilograms per hectare (kg/ha) (4 pounds of pure-live-seed per acre) are recommended for these row plantings. For chemical weed control, the grower must apply recommended chemicals at rates listed on the label.

The Idaho fescue plants turn a golden brown soon after pollination. Seeds are subject to shattering at harvest time in late June; thus, early swathing just before seed shattering is recommended.

Adaptation and Use

Joseph and Nezpurs fescues are adapted to variable climatic and soil conditions in the Intermountain area and the Pacific Northwest states where the precipitation ranges from 35 to 76 cm (14 to 30 inches). They are cold and drought hardy, and once established, they will persist on shallow, gravelly to well drained loam soils. They are moderately shade tolerant and grow well within Ponderosa-sagebrush meadows.

Idaho fescues are very palatable and are choice grasses for cattle, sheep and some wildlife ruminants. They are quite palatable in the fall to early winter periods in comparison to other forage grasses. Careful, light grazing is required during the first 2 to 3 years of establishment. Vigorous, well managed plants will reseed and help maintain the species.

These grasses are expected to grow well alone or in mixtures of 'Secar' bluebunch wheatgrass, *Agropyron spicatum* (Pursh) Scribn. and Smith, and another native species found growing with Idaho fescue. Idaho fescue plants produce extensive, fine fibrous roots and, when well established, will provide ground cover and erosion control for steep banks, roadsides, skid trails and recreational areas. These bunch grasses may also be used in cutover forest areas, and when seeded judiciously, should not cause undue competition with tree seedling establishment.

Sowing 7 to 9 kg/ha (6 to 8 pounds per acre of pure-live-seed) should be adequate to provide a dense cover for erosion and forage purposes. Recommended planting with Secar bluebunch wheatgrass is at 9 kg/ha (8 lb/acre) and Idaho fescue at 4.4 kg/ha (4 lb/acre). The seedbed should be firm, moist and free of competitive weeds. Early fall plantings are most successful, depending on the soil condition. Seed early in the spring if fall seeding cannot be made.

Soil analysis should be taken before seeding to ascertain need for plant nutrients. If soil tests show less than 6 ppm of phosphorus, then 67 kg/ha (60 lb/acre) of P_2O_5 is recommended. These grasses do not require or respond to heavy nitrogen fertilizer applications. Weed control is often needed for the first 2 years after seeding. Use of approved herbicides at label rates is suggested. The fescues are susceptible to excessive rates of many grass herbicides including 2,4-D.

Limited seed of these cultivars should be available in 1987.

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