

PLANT GUIDE MANAGEMENT AND USE OF

INTERMEDIATE AND PUBESCENT WHEATGRASS

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DESCRIPTION

Intermediate wheatgrass *Elytrigia intermedia* (Host) Nevski, (formerly *Agropyron intermedium*) is an introduced (1932) perennial grass native to Europe and Asia. Included in this group are the species known as pubescent wheatgrass (formerly *Agropyron trichophorum*) which is an introduced (1934) perennial grass native to Europe and Asia and considered slightly more drought tolerant and winter hardy than intermediate wheatgrass. As the common name implies, the spikes, spikelets, glumes, lemmas and leaves of pubescent wheatgrass are densely covered with hairs whereas intermediate wheatgrass vegetative structures are for the most part smooth, but may have ciliate hairs on the leaf margins.

Intermediate and pubescent wheatgrass grows to 3 to 4 feet tall. They are long-lived cool season grasses with short rhizomes and a deep feeding root system. The seed spikes may be up to 4 to 8 inches long. Leaves are 4-8 mm wide and green to blue-green in color and sometimes drooping. The lemmas, paleas and glumes are smooth to pubescent as discussed above. The glumes are acute to blunt, generally five nerved, awnless to awn tipped. The florets usually fewer than seven. Intermediate and pubescent wheatgrass readily cross and commercial seed often contains both types.

IMPROVED CULTIVARS

'Amur' (*Elytrigia intermedia*) intermediate wheatgrass was developed from seed originally obtained from China by the Pullman PMC and transferred to the Los Lunas PMC, New Mexico and released by the PMC, New Mexico AES and University Park in 1952. Selected for leafiness, vigorous growth, strong seedling vigor, and good seed production. It is a slow sod former. It was originally released for revegetation of disturbed lands and for pasture seedings at higher elevations. Introgression has occurred resulting in a high percentage of pubescent types over the years. Certified seed stock is no longer available. It has been replaced by species, which are more widely adapted and/or better producers. It is not readily utilized in the northern U.S.

'Chief' (*Elytrigia intermedia*) intermediate wheatgrass was developed from seed originating in Russia by the Agriculture Canada Research Station in Saskatoon, Saskatchewan and was released in 1961. It was selected for high seed yield and forage quality. Its intended uses are as a grass component in grass-alfalfa hay mixtures and for short-term pasture that remains productive for about five years under heavy grazing pressure. Certified seed is available and Agriculture Canada maintains breeder seed.

'Clarke' (*Elytrigia intermedia*) intermediate wheatgrass was developed from seed originating in Russia by the Agriculture Canada Research Station and was released in 1980. Selected for drought tolerance, winter hardy and high seed yielding. Its intended uses are for hay and pasture either dryland or irrigated in the northern Great Plains of Canada and the U.S. Certified seed is available and breeder seed is maintained by Agriculture Canada.

'Greenar' (*Elytrigia intermedia*) intermediate wheatgrass was developed from seed originating in Russia by Pullman PMC and was released by Idaho-Oregon-Washington AES and the PMC as P-2327 in 1945. Aberdeen and Pullman Plant Materials Centers named it in 1956. Selected for vigor, moderate sod formation, leafy, broad-leafed, late maturing, and high production. Its intended use is for hay and pasture. Certified seed is available and breeder seed is maintained by Pullman PMC.

'Greenleaf' (*Elytrigia intermedia*) pubescent wheatgrass was developed from seed originating from unknown European or Asian sources. Commercial seed sources in Washington and North Dakota were utilized by the Agriculture Canada Research Station to develop this cultivar and it was released in 1966. It has higher forage yields than 'Topar' and improved seedling vigor over 'Mandan 759'. Intended for use as a winter hardy plant for pasture and hay production.

Stands will not maintain high productivity under continuous heavy grazing. Certified seed is available and Agriculture Canada maintains breeder seed.

'Luna' (*Elytrigia intermedia*) pubescent wheatgrass was developed from seed originating in Russia and Turkey by the Los Lunas PMC and was released by the New Mexico AES and PMC in 1963. Selected for excellent seedling vigor, fast establishment and good forage production. Luna is one of the most broadly adapted pubescent wheatgrasses available and performs well from the central to northern Great Plains to the northern Rockies and Sierra Nevada regions. Certified seed is available and breeder seed is maintained by the Meeker PMC.

'Mandan 759' (*Elytrigia intermedia*) pubescent wheatgrass was developed from seed originating in Russia by the ARS Northern Great Plains Research Laboratory in Mandan, North Dakota and was never officially released. It has excellent seedling vigor and good forage production in the northern Great Plains. It is a rapid spreader under favorable conditions. It is an integrate type with about 75 percent of the plants pubescent and 25 percent glabrous. It performs well as the grass component in alfalfa mixes for hay and for pasture. Certified seed is available, but 'Manska' is intended to replace 'Mandan 759' over time. The Great Plains Research Laboratory maintains breeder seed.

The Great Plains Research Laboratory developed 'Manska' (*Elytrigia intermedia*) pubescent wheatgrass from seed originating in Russia. It traces to 11 separate commercial lots of 'Mandan 759'. Selected for improved vigor, resistance to leaf spot, high forage and seed production, and nutritional quality. High nutritional value is the primary advantage of 'Manska' over other pubescent wheatgrass cultivars. ARS, Bismarck PMC, University of Nebraska and North Dakota AES, released it in 1992. It is intended for use in grass alfalfa hay mixes and for pasture. Certified seed is available and the Great Plains Research Laboratory maintains breeder seed.

'Oahe' (*Elytrigia intermedia*) intermediate wheatgrass was developed from seed originating in Russia by South Dakota AES, Brookings, South Dakota and was released in 1961. Named after the Oahe Dam on the Missouri River, it is an abbreviation for the Sioux word meaning "Big House". Selected for its uniformly bluish-green color, drought tolerance, vigor, rhizomatous traits and high seed yields. 'Oahe' is adapted for hay, pasture and conservation purposes. Certified seed is available and South Dakota State University maintains breeder seed.

'Reliant' (*Elytrigia intermedia*) intermediate wheatgrass was developed from sources adapted to the Northern Great Plains region. It was developed by the Northern Great Plains Research Laboratory and released by ARS, North Dakota AES and Bismarck PMC in 1991. Selected for resistance to leaf spot, vigor, forage and seed production, forage quality and winter survival. It is of medium height, late maturing and adapted for hay, pasture and conservation purposes. Persistence and sustained productivity under hayland management in mixes with alfalfa are the primary advantages of 'Reliant' over other intermediate wheatgrass cultivars. Certified seed is available and the Great Plains Research Laboratory maintains breeder seed.

'Rush' (*Elytrigia intermedia*) intermediate wheatgrass was developed from seed originating from sources in Germany. It was developed by the Aberdeen PMC and released by the Idaho AES and Aberdeen PMC in 1994. Selected for superior seedling emergence and vigor compared to other intermediate wheatgrasses, good spring recovery, good rate of spread by rhizomes, uniform seedheads, wide leaves, high forage production, and high seed production. It has the largest seed of intermediate wheatgrasses, averaging 66,000 seeds per pound. It is adapted for soil erosion control, roadside stabilization, mine spoil stabilization, hayland, pastureland both dry and irrigated, and forage for livestock and wildlife. Certified seed is available and breeder seed is maintained by Aberdeen PMC.

'Slate' (*Elytrigia intermedia*) intermediate wheatgrass was developed from seed originating from a derivative of 'Amur' and another accession. It was developed by the Nebraska AES and ARS and was released in 1969. Selected for strong rhizomatous spread, erect form, broad flat leaves, and slate green color. It is adapted for use in the central Great Plains region. Certified seed is available and breeders seed is maintained by Nebraska AES and ARS.

'Tegmar' (*Elytrigia intermedia*) intermediate wheatgrass was developed from seed originating in Turkey. It was developed by Pullman PMC and was released by Idaho-Washington AES and Aberdeen and Pullman PMCs in 1968. Selected for long life, late maturing, vigorous seedlings, rapidly developing rhizomes, drought tolerance and dwarf growth form. It is generally about half the height of other intermediate wheatgrasses. Intended for use in erosion control, roadside and ditch stabilization, dam stabilization and grassed waterways. Certified seed is available and breeder seed is maintained by Aberdeen PMC.

'Topar' (*Elytrigia intermedia*) pubescent wheatgrass was developed from seed originating in Turkey. It was developed by Pullman PMC and was released by the California-Idaho-Oregon-Washington AES and Aberdeen-Lockford-Pullman PMCs in 1953. Selected for seedling vigor, vigorous growth, late maturing, sod formation, and drought resistance. It forms sod faster, is more adapted to poor fertility, higher elevations and saline conditions than most pubescent wheatgrasses. Intended use is soil erosion and site stabilization. Certified seed is available and breeder seed is maintained by Aberdeen PMC.

USES

Grazing/pastureland/hayland - Used for hay and pasture in the northern Great Plains, west to eastern Washington, and south into Colorado and Kansas. Produces good hay yields both individually and with alfalfa where stiff stems tend to keep alfalfa from lodging. Intermediate wheatgrass has fairly slow regrowth following clipping and is best adapted to single crop haying situations. Intermediate and pubescent wheatgrass responds very well to irrigation with production nearing the level of 'Regar' meadow brome and orchardgrass and exceeding smooth brome under full irrigation. 'Regar' and orchardgrass will normally out produce intermediate wheatgrass hay production in multiple cutting situations. Intermediate wheatgrass responds well to limited irrigation. It is able to tolerate droughty conditions when irrigation ceases as long as about 12 inches of total moisture is provided. It provides excellent spring, early summer and fall pasture, but must be carefully managed to ensure maintenance of the stand and high production.

Intermediate and pubescent wheatgrass is palatable to all classes of livestock and wildlife. It is a preferred feed for cattle, sheep, horses, deer, antelope and elk in spring, early summer and fall. It is considered a desirable feed for cattle, sheep, horses and elk in summer and winter.

Erosion control/reclamation - Intermediate and pubescent wheatgrass is well adapted to stabilization of disturbed soils. This grass can be used in critical and urban areas where irrigation water is limited and to stabilize ditchbanks, dikes and roadsides. This grass can also be used to build soils because of its heavy root production. Levels as high as 7000 pounds (dry weight) per acre of root production in the upper 8 inches of soil have been measured in five-year-old stands.

Wildlife - Strips of this grass ungrazed provide good nesting cover for game birds and migratory waterfowl.

ADAPTATION

Intermediate wheatgrass is adapted to areas with 12 to 13 inches of annual rainfall or greater. The pubescent type can tolerate slightly more droughty conditions of about 11 to 12 inches of rainfall or greater. It performs best above 3500 and up to 9000 feet elevation. It can be seeded at lower elevations, but its moisture requirement is greater. It is not as drought tolerant as 'Hycrest', 'Nordan', 'Ephraim', 'Douglas', 'Fairway' crested wheatgrasses; 'P27', 'Vavilov' Siberian wheatgrasses; or 'Bozoisky-Select', 'Mankota' Russian wildrye.

Intermediate wheatgrass prefers well drained loamy to clayey textured soils. Pubescent wheatgrass performs best on loamy to sandy to shallow soils. They will tolerate slightly acidic to mildly saline conditions, are cold tolerant, can withstand moderate periodic flooding in the spring, and are very tolerant of fire. Pubescent wheatgrass can tolerate lower fertility, more alkaline soils, higher elevations and drier conditions than intermediate wheatgrass. Both perform poorly on wet, poorly drained, moderately saline to alkaline and soils with prolonged inundation.

ESTABLISHMENT

Both species should be seeded with a drill at a depth of 1/2 inch or less on medium to fine textured soils and no more than 1 inch deep on coarse textured soils. Single species seeding rates recommended for both grasses are 10 to 12 pounds Pure Live Seed (PLS) per acre or 21 to 25 PLS seeds per square foot. A firm weed free seedbed enhances stand establishment. They are compatible with other species particularly alfalfa. Stand longevity and seeding with alfalfa can enhance productivity. If used as a component of a mix, adjust to percent of mix desired. The best dryland results are obtained from seeding in very early spring on heavy to medium textured soils and in late fall (dormant) on medium to light textured soils. Irrigated lands should be seeded in spring through summer. Late summer (August - mid September) seedings are not recommended unless irrigation is available.

For mined lands, roadsides and other harsh critical areas, the seeding rate should be increased to 15 to 18 pounds PLS per acre or 31 to 38 PLS seeds per square foot.

Intermediate and pubescent wheatgrass establishes fairly quickly, more quickly than 'Regar' meadow brome or smooth brome varieties. Seedling vigor is good to excellent. Under favorable conditions intermediate and pubescent wheatgrass provide good weed suppression. They make good spring growth, fair summer growth and good fall growth if moisture is available. Light frequent irrigations are beneficial for stand establishment.

Protect new seedings until they are fully established and are able to withstand pulling by grazing animals without being uprooted. It is desirable to cut at least one hay crop prior to grazing.

Stands may require weed control measures during establishment. Application of 2,4-D should not be made until plants have reached the four to six leaf stage. Mow weeds at or prior to their bloom stage. Grasshoppers and other insects may also damage new stands and pesticides may be needed.

MANAGEMENT

Intermediate and pubescent wheatgrass have good palatability to livestock and wildlife (see USES). Livestock and wildlife will graze both wheatgrasses throughout the growing season, but they are a more preferred forage in spring, early summer and fall. They will not withstand heavy continuous grazing and maintain a healthy productive stand. Stands are not as susceptible to spring and fall freezing as smooth brome, meadow brome or orchardgrass.

Ten to twelve inches of new growth should be attained in spring before grazing is allowed on established stands. A six-inch stubble height should be maintained following each mowing and going into winter. In pasture tests, stands consistently out-yield other grass-legume mixtures. For this reason, stocking rates can be set higher than other grasses. Care should be taken to allow proper rest of 21 to 28 days between grazing periods in irrigated and high moisture situations.

When planted with a legume, harvest hay at optimum stage for the legume. This will allow the grass to be harvested prior to flowering and result in very high quality hay. Harvest pure stands for hay when plants start to flower.

Apply nitrogen as needed to maintain vigorous growth. Irrigated seedings and those in higher rainfall zones (18 inches +) will respond well to annual applications of 40 or more pounds of available nitrogen per acre during the establishment year and 70 to 90 pounds per acre each fall. A balance of nitrogen and phosphate fertilizer needs to be considered in order to maintain a legume component. A soil test is recommended.

Forage production can be restored and stands may benefit from ripping if sodbound conditions occur. Care should be taken to avoid excessive tillage because stands may be damaged.

Environmental Concerns

Intermediate and pubescent wheatgrass is long-lived (50+ years), spreads slowly vegetatively and very little via seed distribution. They are not considered "weedy" or invasive species, but can spread into adjoining vegetative communities under ideal climatic and environmental conditions. Research indicates that most seedings do not spread from original plantings. It is known to coexist with native taxa and adds additional biodiversity in those situations. On favorable sites where it is best adapted, it can maintain dominance and exist as a monoculture. There is no documentation that they cross with native species, but as noted previously, intermediate and pubescent wheatgrasses do cross with each other.

SEED PRODUCTION

Seed production of intermediate and pubescent wheatgrass is generally not difficult. If fields are maintained in rows and adequate fertility levels are maintained, seed can be produced for 7 to 10 years or more. Row spacing of 36 inches dryland and 24 to 36 inches irrigated are recommended (although rhizomatous, intermediate and pubescent wheatgrass should be maintained in rows). Cultivation is required to maintain rows.

Average production of 250 to 350 pounds per acre can be expected under dryland conditions. Average production of 450 to 550 pounds per acre can be expected under irrigated conditions. Seed yields drop significantly after about four years of production. Harvesting is best completed by swathing, followed by combining of the cured rows. The seed heads will shatter when mature and if direct combining is desired the stand should be harvested with 15 to 20 percent moisture. This will require drying to 12 percent moisture before storing in bins and to 15 percent before storing in sacks. Seed is generally harvested in mid to late August.

Foundation and Registered seed of many cultivars mentioned above are available through the appropriate state Crop Improvement Association or commercial sources.

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