

**PMC Display Nursery Field 20 (planted June, 2002)
12 inch or less precipitation**

one drill width border mix	
Sand Hollow squirreltail	<i>Elymus multisetus</i>
High Plains sandberg bluegrass	<i>Poa secunda (Poa sandbergii)</i>
Canbar canby bluegrass	<i>Poa secunda (Poa canbyi)</i>
Sodar streambank wheatgrass	<i>Elymus lanceolatus ssp. lanceolatus</i>
Schwendimar thickspike wheatgrass	<i>Elymus lanceolatus ssp. lanceolatus</i>
Bannock thickspike wheatgrass	<i>Elymus lanceolatus ssp. lanceolatus</i>
Critana thickspike wheatgrass	<i>Elymus lanceolatus ssp. lanceolatus</i>
Vavilov Siberian wheatgrass	<i>Agropyron fragile</i>
P-27 Siberian wheatgrass	<i>Agropyron fragile</i>
Nordan crested wheatgrass	<i>Agropyron desertorum</i>
Hycrest crested wheatgrass	<i>Agropyron cristatum X desertorum</i>
CD-II crested wheatgrass	<i>Agropyron cristatum X desertorum</i>
Roadcrest crested wheatgrass	<i>Agropyron cristatum</i>
Douglas crested wheatgrass	<i>Agropyron cristatum</i>
Fairway crested wheatgrass	<i>Agropyron cristatum</i>
Ephraim crested wheatgrass	<i>Agropyron cristatum</i>
Whitmar beardless wheatgrass	<i>Pseudorogneria spicata</i>
Anatone bluebunch wheatgrass	<i>Pseudorogneria spicata</i>
P-238 bluebunch wheatgrass	<i>Pseudorogneria spicata</i>
P-7 bluebunch wheatgrass	<i>Pseudorogneria spicata</i>
Goldar bluebunch wheatgrass	<i>Pseudorogneria spicata</i>
Secar Snake River wheatgrass	<i>Elymus wawawaiensis</i>
Tetracan Russian wildrye	<i>Psathyrostachys juncea</i>
Mankota Russian wildrye	<i>Psathyrostachys juncea</i>
Bozoisky-Select Russian wildrye	<i>Psathyrostachys juncea</i>
one drill width border mix	

12 - 16 inch precipitation

Rosana western wheatgrass	<i>Pascopyrum smithii</i>
Arriba western wheatgrass	<i>Pascopyrum smithii</i>
Sherman big bluegrass	<i>Poa secunda (Poa ampla)</i>
San Luis slender wheatgrass	<i>Elymus trachycaulus</i>
Pryor slender wheatgrass	<i>Elymus trachycaulus</i>
Covar sheep fescue	<i>Festuca ovina</i>
Bighorn sheep fescue	<i>Festuca ovina</i>
Durar hard fescue	<i>Festuca trachyphylla</i>
Newhy hybrid wheatgrass	<i>Elytrigia X Pseudoroegneria</i>
Paiute orchardgrass	<i>Dactylis glomerata</i>
Rush intermediate wheatgrass	<i>Thinopyrum intermedium</i>
Oahe intermediate wheatgrass	<i>Thinopyrum intermedium</i>
Luna pubescent wheatgrass	<i>Thinopyrum intermedium</i>
Reliant intermediate wheatgrass	<i>Thinopyrum intermedium</i>
Manska pubescent wheatgrass	<i>Thinopyrum intermedium</i>
Magnar basin wildrye	<i>Leymus cinereus</i>
Trailhead basin wildrye	<i>Leymus cinereus</i>
Shoshone beardless wildrye	<i>Leymus triticoides</i>
Prairieland altai wildrye	<i>Leymus angustus</i>
Alkar tall wheatgrass	<i>Thinopyrum ponticum</i>
Jose tall wheatgrass	<i>Thinopyrum ponticum</i>
Largo tall wheatgrass	<i>Thinopyrum ponticum</i>
Garnet mountain brome	<i>Bromus marginatus</i>
Bromar mountain brome	<i>Bromus marginatus</i>
one drill width border mix	

16 inch or greater precipitation

BG-23 Perennial rye	<i>Lolium perenne</i>
Garrison creeping foxtail	<i>Alopecurus arundinaceus</i>
Hi-Mag tall fescue	<i>Lolium arundinaceum</i>
Johnstone tall fescue	<i>Lolium X Festuca</i>
Potomac orchardgrass	<i>Dactylis glomerata</i>
Latar orchardgrass	<i>Dactylis glomerata</i>
Manchar smooth brome	<i>Bromus inermis</i>
Regar meadow brome	<i>Bromus biebersteinii</i>
Fleet meadow brome	<i>Bromus biebersteinii</i>
Paddock meadow brome	<i>Bromus biebersteinii</i>
one drill width border mix	

The Aberdeen Plant Materials Center in cooperation with the South Bingham Soil Conservation District established this display nursery in June, 2002. The purpose of the display nursery is to allow the public to observe grasses used to conserve soil, provide forage for livestock and wildlife, habitat for wildlife and to improve water quality. This guide is intended to provide you basic information on each of the varieties included in the display. The display nursery includes 59 varieties of 29 different grass species arranged so similar varieties are located next to each other for visual comparison. Irrigated grasses are grouped together on the south side and grasses used in more arid desert areas are found on the north side. Each plot has a sign for identification and a map is also included for your convenience. The following descriptions begin with the non-irrigated grasses on the north side of the display nursery.

Squirreltail, Bottlebrush *Elymus elymoides* ssp. *elymoides* or *californicus* and *Elymus multisetus*

Bottlebrush squirreltail is a short-lived, drought tolerant, cool season, native bunchgrass. It is short to medium sized (6 to 22 inches tall), tufted and has fair forage value in winter and spring and poor forage value in summer when seedheads are present. The bristly awns are objectionable to grazing animals and cause difficulties in seed handling, planting and harvesting. This species is often an increaser on poor condition to improving rangelands. It is adapted to a wide variety of soils including saline soils in the 8-18 inch precipitation zones. It is hoped it will have attributes that will enable it to establish a foothold in annual rangelands dominated by cheatgrass or medusahead rye. ARS and NRCS have released three squirreltail accessions, Sand Hollow Selected Germplasm (*E. multisetus*) in 1996; Toe Jam Selected Germplasm (*E. elymoides* ssp. *californicus*) in 2003; and Fish Creek Selected Germplasm (*E. elymoides* ssp. *elymoides*) in 2003. These have not been fully tested and their full range of adaptation is not known at this time. Sand Hollow is best adapted to sandy foothill rangelands receiving 12 inches or more annual precipitation in the lower Snake River Plains. Toe Jam is best adapted to loam to sandy loam soils in the Great Basin and lower to middle Snake River Plains receiving 8-14 inches of precipitation. Fish Creek is best adapted to sandy loam to silt loam to clay loam soils receiving 10 inches or more annual precipitation in the middle to upper Snake River Plains. Additional bottlebrush squirreltail accessions are currently under evaluation by ARS in Logan, NRCS at Bridger and Meeker PMCs and the Forest Service in Provo, Utah. Average seeds per ft² at 1 lb. rate 4. Seeding rate 7 lb./ac.

Bluegrass, Sandberg *Poa secunda* (*Poa sandbergii*)

Sandberg bluegrass is a small, low producing, very drought tolerant, native, perennial bunchgrass that grows in small tufts usually no larger than 6-8 inches in diameter. It is widely distributed throughout western range plant communities where it is considered an important grass for soil stabilization and forage for wildlife. It is best adapted to medium to heavy textured soils. It is found from 1,000 feet in Washington to 12,000 feet in northern New Mexico. It is adapted to 8-20 inches of moisture annually. It is tolerant of heavy trampling. Forage yields are very low, seed viability is generally poor, and forage quality declines rapidly in mid to late spring as it matures. It is one of the first grasses to green-up in the spring. Due to its low stature, Sandberg bluegrass can withstand heavy grazing pressure. On large areas of western semi-desert rangelands, overgrazing has depleted most of the desirable bunchgrasses except Sandberg bluegrass. It provides little to no forage in summer and fall unless fall rains occur. High Plains Selected Class Germplasm is a recent release from Bridger PMC. The Forest Service is nearing release of another accession. Plant at 1/4 inch or less depth. Average seeds/ft² at one pound rate 21. Recommended pure stand seeding rate 2 lb./ac. It is best utilized in low rainfall area native mixes.

Wheatgrass, Streambank *Elymus lanceolatus* ssp. *lanceolatus*

A long-lived, very drought tolerant, creeping sod-former adapted to fine-medium textured well-drained soils. Streambank wheatgrass has excellent seeding vigor and is particularly well adapted for erosion control where effective precipitation is 8 or more inches. It has little value as forage and is primarily used for stabilization of roadsides, airport runways, ditchbanks, and lakeshores. It has also been used as a drought tolerant turfgrass, but care must be taken to not over irrigate this grass or stand will be lost. Planting depth 1/4 to 1/2 inch. The only variety is 'Sodar' released by Aberdeen PMC. Average seeds per ft² at 1 lb. rate 3. Recommend pure stand rate 6 lb./ac. (double to triple seeding rate for turf and critical area applications)

Wheatgrass, Thickspike *Elymus lanceolatus* spp. *lanceolatus*

A long-lived, native sod-forming grass widely distributed in the northern part of the Intermountain Region. Drought tolerance, early spring growth, fair palatability, but low forage production characterizes this species. More drought tolerant than western wheatgrass, it is well suited for wind erosion control on medium to coarse-textured soils. It is best utilized as forage until early fall. Can tolerate moderate grazing and considerable trampling. Adapted to disturbed range sites and dry areas subject to erosion, roadsides, and waterways in the 8-18 inch precipitation zones. Use as a native component in rangeland mixes. Planting depth 1/4 to 1/2 inch. Improved varieties include 'Bannock' (Aberdeen release), 'Schwendimar', 'Critana' and 'Elbee'. Bannock is noted for its rapid establishment, moderate sod formation and greater forage production. Critana is more drought tolerant, exhibits good seedling vigor and readily establishes on critical areas. Schwendimar is noted for quick stabilization of coarse textured soils along the Columbia River. Average seeds per ft² at 1 lb. rate 3. Recommend pure stand rate 6 lb./ac.

Wheatgrass, Siberian *Agropyron fragile*

Similar to crested wheatgrass, Siberian wheatgrass has finer leaves, and retains its greenness and palatability later into the summer than crested wheatgrass. It yields less than most crested wheatgrass cultivars. It occupies sites where standard crested wheatgrass will grow but is more drought tolerant (7-16 inches of precipitation) and is especially useful on juniper sites. Once established, it is reported to be well adapted to light-sandy, droughty soils and can withstand extended periods of drought better than crested wheatgrasses. Planting depth 1/4 to 1/2 inch. Adapted varieties include 'P-27' (Aberdeen release) and 'Vavilov' (recently released with improved seedling vigor). Average seeds per ft² at 1 lb. rate 4. Recommend pure stand rate 6 lb./ac.

Wheatgrass, Crested (Standard type-AGDE2) *Agropyron desertorum*

A very long-lived, drought tolerant bunchgrass adapted to a wide range of sites and precipitation zones as low as 9-10 inches. Growth begins early in the spring and again with fall moisture. Palatability is excellent in the spring and late fall, less during summer dormancy and after seed formation. It has very vigorous seedlings. Adapted to foothills with 9-16 inches precipitation, sagebrush, ponderosa pine, mountain brush, and juniper-pinyon ranges. Expect low vigor and poor stands above 6500 feet elevation. This species is more drought tolerant than Fairway type crested wheatgrasses. A recent release by ARS, 'Douglas' crested wheatgrass is the first hexaploid on the market. Douglas is characterized as having larger seed, broader leaves and stays green longer into the early summer than other types mentioned above, but requires 14 inches of precipitation or more for long-term survival. It also establishes easily, but produces less forage. Because it stays green longer than other types, it is a preferred forage selection. Douglas is not as drought resistant as Nordan, Summit, Hycrest or CD-II. Planting depth 1/4 to 1/2 inch. Adapted varieties are 'Douglas', 'Nordan' and 'Summit'. Average seeds per ft² at 1 lb. rate 4. Recommend pure stand rate 5 lb./ac.

Wheatgrass, Crested (CD-II and Hycrest-hybrids) *Agropyron cristatum x A. desertorum*

A hybrid cross between Standard type and induced tetraploid Fairway type crested wheatgrass. Seedlings are extremely vigorous during germination and early establishment. Survives under greater competition than other crested wheatgrasses. Yields more forage (15-20%) in younger stands; is an outstanding seed producer, but more stemmy. Occupies same sites as standard and Fairway crested wheatgrass. Especially useful in drier sagebrush - cheatgrass sites. Survives in areas with 9-16 inches precipitation. Does not persist as well as Standard type crested wheatgrass or Siberian wheatgrass in very droughty sites. Planting depth 1/4 to 1/2 inch. Cultivars include 'CD-II' and 'Hycrest'. Average seeds per ft² at 1 lb. rate 4. Recommend pure stand rate 5 lb./ac.

Wheatgrass, Crested (Fairway type-AGCR) *Agropyron cristatum*

A very long-lived, drought-tolerant, vigorous introduced bunchgrass. Similar to standard crested wheatgrass but shorter, earlier maturing, with finer stems and leaves. Establishes on similar sites (10-18 inches precipitation) as standard and grows more effectively than standard at higher elevations. This species does not survive as well as standard crested wheatgrass under severe drought conditions. Planting depth 1/4 to 1/2 inch. Adapted varieties are 'Fairway' and 'Ephraim' (Aberdeen release). 'Ephraim', is a tetraploid variety of *A. cristatum* that is weakly rhizomatous in higher rainfall areas. 'Roadcrest' is a turf-type with short rhizomes and is recommended for low maintenance lawns. Other cultivars available but less adapted include 'Parkway', 'Kirk' and 'Ruff'. Average seeds per ft² at 1 lb. rate 4. Recommend pure stand rate 5.0 lb./ac.

Wheatgrass, Beardless *Pseudoroegneria spicata inermis*

A long-lived, drought tolerant, erect native bunchgrass. It differs from bluebunch wheatgrass in the absence of awns. It begins growth in early spring and readily greens up in fall following fall rains. It is very palatable, quality persists longer into growing season and yields are equal to crested wheatgrass. Recommended sites include the 12-18 inch precipitation areas in mountain foothills after timber harvest or wildfire. It is best adapted to winter-wet and summer dry climates. It has poor seedling vigor. Planting depth 1/4 to 1/2 inch. Adapted variety is 'Whitmar'. Average seeds/ft² at 1 lb. rate 3. Recommended pure stand rate 7.0 lb./ac.

Wheatgrass, Bluebunch *Pseudoroegneria spicata*

A long-lived, drought-tolerant, widespread native bunchgrass. It begins growth early in spring and again with the onset of fall rains. It is highly palatable and recovers rapidly after grazing but has low resistance to repeated or heavy grazing. It is not recommended as a hay crop. Several years are required for stand to obtain full productivity due to poor seedling vigor. Allow seedlings to reach maturity (seedhead development) before grazing. Recommended sites include foothills and valleys with 10-20 inches precipitation, sagebrush, ponderosa pine, mountain brush and juniper-pinyon ranges. Low plant vigor results in poor stands on sites above 6500-ft. elevation. Planting depth 1/4 to 1/2 inch. Adapted varieties are 'Anatone' (Aberdeen release) for use above 10" precipitation and 'Goldar' (Aberdeen release) and 'P7' for use above 12" precipitation. Average seeds per ft² at 1 lb. rate 3. Recommend pure stand rate 7.0 lb./ac.

Wheatgrass, Snake River *Elymus wawawaiensis*

Snake River wheatgrass is a native of the lower canyons of the Snake River and its tributaries in Washington, eastern Oregon, and western to northern Idaho. 'Secar' Snake River Wheatgrass, previously considered to be bluebunch wheatgrass but found to be a subspecies of thickspike wheatgrass, is more drought tolerant than bluebunch wheatgrass. It is similar in appearance to bluebunch wheatgrass, but differs morphologically in having narrower, acuminate (pointed) to aciculate (needle-like) glumes, a more imbricate (overlapping) spike, and glabrate (without hairs) basal leaf sheaths. It is adaptable to most bluebunch wheatgrass areas but is best suited for the lower precipitation areas (8 to 12 inches). (See bluebunch wheatgrass). The only variety is 'Secar'. It is an early maturing bunchgrass with good seedling vigor and establishes well in native seed mixes. Secar is considered more drought tolerant than previously released bluebunch wheatgrasses. Average seeds per ft² at 1 lb. rate 3. Recommend pure stand rate 7 lb./ac.

Wildrye, Russian *Psathyrostachys juncea*

A long-lived introduced very drought tolerant bunchgrass. Grows rapidly in the spring and produces abundant basal leaves that remain green and palatable through summer and fall as long as soil moisture is available. It endures close grazing better than most grasses. It cures well on the stump (better than most cool season grasses) and makes excellent late fall and winter feed. Russian wildrye is not suited for hay production due to the predominance of basal leaves, which makes it difficult to harvest. Once established, it competes effectively against undesirable plants and it withstands drought as effectively and is more palatable than crested wheatgrass. However, most varieties have been erratic in establishment, demonstrate poor seedling vigor, and provide poor soil protection. Seed in areas receiving at least 8 inches of precipitation. Adapted to sagebrush, mountain brush, juniper-pinyon, and moderately saline sites. Useful on soils too alkaline for crested wheatgrass and too dry for tall wheatgrass. Planting depth 1/4 to 1/2 inch; and is very sensitive to deeper placement. Highest production occurs in wide row spacing of >18 inches. On steep slopes it should be planted on the contour. 'Vinall', an earlier variety, has poor seedling vigor and is not recommended. Canadian releases include 'Swift', which was selected for seedling vigor, and 'Cabree', selected both for seedling vigor and reduced seed shattering. U.S. releases include 'Bozoisky-Select', selected for increased seedling vigor and forage production and 'Mankota', selected for establishment from deeper seeding depths. In plantings in the Intermountain West, Bozoisky-Select and Mankota should be the varieties of choice. Average seeds per ft² at 1 lb. rate 4. Recommend pure stand seeding rate 6 lb./ac.

Wheatgrass, Western *Pascopyrum smithii*

A long-lived, late maturing, widely distributed, winter hardy, strongly rhizomatous, native grass with coarse blue-green leaves. Western wheatgrass begins spring growth later than most wheatgrasses and is typified by poor germination and low seedling vigor. When used as pasture it is considered to be an excellent source of spring and early summer forage with protein content of 16 to 18 percent. However, forage quality rapidly declines as plants mature. Provides winter grazing if protein supplements are provided. Protein content of western wheatgrass is usually a little higher (4-5 percent) than other wheatgrasses once cured. Plantings usually result in scattered stands that spread in 3 to 4 years to site dominance. Western wheatgrass is the most aggressive native sod grass available. Once established, it becomes very persistent and provides excellent soil binding erosion control characteristics. It is productive native hay in above normal precipitation years, under water spreading, and other supplemental water irrigation systems. It is particularly productive in clayey swales and silty waterways, and has moderate to high salt tolerance. Adapted to lowlands prone to early season flooding with precipitation at or above 12 inches (use 14 inch + for areas that receive 50 percent or greater winter precipitation) and most mountain brush areas. Planting depth 1/4 to 1/2 inch. Adapted varieties include 'Rosana' (northern variety), 'Rodan' (northern variety), and 'Arriba' (southern variety). Other releases include 'Barton', 'Flintlock', and 'Walsh'. Average seeds per ft² at 1 lb. PLS rate is 3. Recommended pure stand seeding rate 6 PLS lb./ac. Not recommended in pure stands. Recommended 50% mixed stand seeding rate 3.0 lb./ac.

Bluegrass, Big *Poa secunda* (*Poa ampla*)

A medium-lived native bunchgrass, which re-establishes from seed for long-lived, stands. Adapted for early spring grazing, sometimes as much as four weeks ahead of crested wheatgrass, but becomes unpalatable earlier in summer than most grasses. It has poor seedling vigor and requires as much as 4 to 8 years to reach full productivity. Because young plants are easily pulled up, grazing should be deferred until roots are well anchored. Recommended sites include sagebrush - grass sites at 2,000 to 6,000 feet elevation, sunny places on mountain brush and ponderosa pine ranges. It provides excellent nesting cover for upland birds. Adapted to 9 to 20 inch precipitation. It will not tolerate early spring flooding, high water tables, or poor drainage. It tolerates weakly acidic to weakly saline conditions. It can also be used for ground cover and erosion control on cut or burned-over timberland. Use only in native seed mixtures due to its slow establishment. Planting depth 0-1/4 inch. Adapted variety, 'Sherman'. Average seeds/ft² at 1 lb. rate 21. Recommend pure stand rate 2 lb./ac.

Wheatgrass, Slender *Elymus trachycaulus trachycaulus*

Slender wheatgrass is a short-lived (3-5 years) native bunchgrass with good seedling vigor and moderate palatability. It is valuable in erosion-control seed mixes because of its rapid development, moderate salt tolerance, and compatibility with other species. It is well adapted as a cover crop to improve soil tilth and to increase organic matter in saline sites. It tolerates a wide range of conditions and adapts well to high altitude ranges and more favorable sites on mountain brush areas receiving 10 inches or more annual precipitation. It is excellent in aspen and tall mountain brush areas and is shade tolerant. Planting depth 1/2 to 3/4 inch. 'Revenue' is a Canadian variety, selected for salinity tolerance, seed set, and forage yield. 'San Luis' is a southern variety adapted to high elevations. 'Pryor' is a northern variety, selected for superior salt tolerance, drought tolerance, and seedling vigor. Average seeds per ft² at 1 lb. rate 3.0. Recommend pure stand rate 6 lb./ac. Limit slender wheatgrass to 1 pound PLS per acre in native mixes. Higher rates effect the establishment of slower developing native species.

Fescue, Sheep *Festuca ovina*

A long-lived short stature introduced bunchgrass with short leaf blades. It is more drought tolerant than other fescues. Production is low, but groundcover and root production is excellent. It is used for turf, highway plantings, airport landing strips, burned over timberland and reclamation areas where a long-lived, persistent, competitive ground cover is needed. Not recommended for pasture or hay. Sheep fescue is best adapted to 10+ inch precipitation zones. A very good erosion control and understory species that competes well with weeds. Early spring seedings are recommended. Only pure stands or mixtures with hard fescue are recommended. Planting depth 0-1/4 inch. Adapted varieties are 'Covar' and 'Bighorn'. Average seed per ft² is 16 at a 1 lb. rate. Recommended pure stand rate is 4 lb./ac.

Fescue, Hard *Festuca trachyphylla*

A very fine leafed, low growing introduced bunch grass with poor palatability to livestock. It is widely used for turf, highway plantings, airport landing strips, burned over timberland and reclamation areas where a long-lived, persistent, competitive ground cover is needed. It is adapted to areas having an excess of 14 inches precipitation. Seedlings are slow to establish but persist through the development of abundant fibrous roots. The dense root system may encourage increased rodent populations. Early spring seedings are recommended. Only pure stands or mixtures with sheep fescue are recommended. Planting depth 0-1/4 inch. 'Durar' is the adapted variety. Average seeds per ft² at 1 lb. rate 13. Recommended pure stand rate 4 lb./ac.

Wheatgrass, NewHy -RS *Pseudoroegneria spicata x Elytrigia repens*

NewHy -RS is a hybrid cross between quackgrass and bluebunch wheatgrass. NewHy is a mildly rhizomatous grass suited for use under a wide range of soil conditions and specifically saline conditions. It begins growth early in the spring, retaining succulence and palatability for livestock later in the summer than many grasses. Some problems exist with seedling vigor and germination which may reduce initial stands; however, once established it becomes a very vigorous, high producing, high forage quality species capable of withstanding repeated grazing with good recovery. In saline areas, NewHy is not as productive as tall wheatgrass or tall fescue, but forage quality is significantly better. The hybrid is noted for tolerance to very strongly saline soils and responds to irrigation, sub-irrigation or moderately wet conditions, and dryland areas where effective precipitation is 14 inches or more. Adapted to foothills, intermediate sagebrush and juniper sites, and higher mountain areas up to 8000 feet elevation, and on saline dry or wet bottomland and pastures. Planting depth 1/4 to 1/2 inch. The only cultivar is 'NewHy'. Average seeds per ft² at 1 lb. rate 3. Recommend pure stand seeding rate 8 lb./ac.

Orchardgrass *Dactylis glomerata*

A long-lived, high producing, introduced bunchgrass, adapted to well drained soils. It produces long folded leaves arising mostly from the plant base. A shade tolerant plant that is highly palatable to livestock and wildlife, especially in the early part of the growing season. It is a widely preferred species for hay, pasture, or silage. For highest forage quality and regrowth, harvest while still in the boot stage. It is less winter hardy than meadow or smooth brome or timothy and is more vulnerable to diseases than many pasture grasses. Orchardgrass is compatible in alfalfa, sainfoin and clover mixes. It can be grown under irrigation or on dryland where the effective precipitation is 18 inches or more. It requires a good fertility program for high production. It is also used in erosion-control mixes primarily for its forage value. This species does best on soils with few limitations and good drainage. Avoid shallow and sandy soils. Varieties are early-, mid-, and late-season at maturity. Late-season varieties are preferred in mixture with alfalfa. Early - 'Hallmark', 'Potomac'; Mid - 'Akaroa', 'Ambassador'; Late - 'Latar' (recommended with alfalfa). 'Paiute' orchardgrass (Aberdeen release) is more drought tolerant (adapted to 16 inches + of precipitation) than the other varieties. Planting depth is 1/4 to 1/2 inch. Average seeds per ft² at 1 lb. rate 12. Recommend pure stand rate 4 lb./ac.

Wheatgrass, Intermediate *Thinopyrum intermedium*

A mildly rhizomatous sod-forming, late maturing, long-lived, introduced grass, suited for use as hay and pasture, alone or with alfalfa or other legumes on medium to fine textured soils. It begins growth early in the spring and

remains green and palatable into the summer, producing large amounts of quality forage. It does not mature seed at high elevations, but spreads vegetatively. Recommended for the sagebrush to high mountain zones (up to 9000 feet) and deep, upland soils with 13-18 inches of rainfall. This species is excellent for situations where only one to two irrigations are possible, because it readily responds to irrigation with increased forage production, but can also withstand extended drought periods when irrigation water is not available. Useful on disturbed sites for soil stabilization and erosion control. It is not shade tolerant, but is moderately tolerant of saline soil conditions. Planting depth 1/4 to 1/2 inch. Adapted varieties are 'Rush' (Aberdeen release), selected for excellent seedling vigor, drought tolerance, and forage yield; 'Reliant,' selected for disease resistance and production; 'Oahe' with improved seed production, forage yield, and rust resistance; 'Amur' selected for slightly more drought tolerance performs well at higher elevations, and 'Tegmar' (Aberdeen release), a low growing cultivar noted for erosion control, sod-formation and seedling vigor. Average seeds per ft² at 1 lb. rate 2. Recommend pure stand rate 8 lb./ac.

Wheatgrass, Pubescent *Thinopyrum intermedium*

A long-lived, late maturing, introduced, sod-forming grass adapted to low-fertility sites and coarse to medium textured soils. Very similar to intermediate wheatgrass (pubescence on leaves and seed heads) but slightly more drought-resistant, alkali tolerant, and somewhat less palatable. It is better adapted for pasture than for hay. Its ability to remain green during the summer, when soil moisture is limited, is a significant characteristic. Adapted to foothills with 11-18 inches precipitation, this species is excellent for situations where only one to two irrigations are possible, because it readily responds to irrigation with increased forage production, but can also withstand extended drought periods when irrigation water is not available. Useful on disturbed sites for soil stabilization and erosion control. It is not shade tolerant, but is moderately tolerant of saline soil conditions. It is very useful for erosion control on a wide range of sites. Suggested varieties are 'Luna' (most commonly used) as well as 'Manska' and 'Greenleaf'. Average seeds per ft² at 1 lb. rate 2. Recommend pure stand rate 8 lb./ac.

Wildrye, Basin *Leymus cinereus*

A slightly spreading, robust, large native bunchgrass. Basin wildrye is tall, coarse, long-lived, and highly palatable early in spring and becoming low in palatability as it matures. It is useful for calving pasture and wildlife forage and cover. Poor seedling vigor usually results in sparse stands, but one of the highest producing species once established. Do not graze new seedlings until seedheads are evident or at the end of the second growing season. Mature plants are unpalatable and need to be managed for use at earlier periods with grazing management scheduled to maintain a 10 to 12 inch stubble height to avoid removing the growing point of this species. Great care must be taken to avoid close grazing or clipping which may result in plant loss in a single season. Winter grazing with protein supplements utilize old coarse growth. Best adapted to moderately saline or alkaline lowlands, flood plains, flow in areas with high water holding capacity. Especially suited to deep, fine textured clayey to loamy soils that receive 8-12 inches precipitation. Plantings have been established in rainfall areas as low as 5 inches, however basin wildrye plantings are not recommended in areas with less than 8 inches annual precipitation. Particularly well suited for many juniper areas; performs well throughout the mountain brush zone and in aspen openings. Planting depth 1/2 to 3/4 inch. Adapted cultivars are 'Magnar' (blue-green upright leaves)(Aberdeen release) and 'Trailhead' (green overhanging leaves) selected for excellent drought tolerance. Average seeds per ft² at 1 lb. rate 3. Recommend pure stand seeding rate 7 lb./ac. Basin wildrye is highly recommended for native species mixtures.

Wildrye, Beardless *Leymus triticoides*

A long-lived, sod-forming native grass. It is adapted to poorly drained, wet or wet-saline-alkaline soils or dryland areas that receive at least 14 inches of precipitation. Selected primarily for stabilization and cover on wet to wet-saline soils, this plant is one of the most salt tolerant species available. It is of secondary importance as a forage species due to its coarseness in later growth stages, but is considered productive when fertilized and used for hay or winter grazing. Due to poor seedling vigor and high seed dormancy, establishment is difficult and dormant fall planting is recommended. Planting depth 0-1/4 inch in a firm weed free seedbed. Adapted variety 'Shoshone'. Another variety that may have potential, but has not been extensively tested in the Intermountain west is 'Rio'. Average seeds per ft² at 1 lb. rate 4. Recommended pure stand rate 6 lb./ac.

Wildrye, Altai *Leymus angustus*

A winter hardy, drought resistant, long-lived, cool season introduced bunchgrass, sometimes with short rhizomes. It is known to root and use moisture to depths of 15 feet. Basal leaves are somewhat coarse, but very palatable during the late summer and early fall (protein levels of 8 percent are common in standing winter-feed). In northern regions it is commonly swathed into windrows and utilized as forage for winter feeding operations. Adapted to moderately deep to deep loams to clay loams with 14 inch or greater rainfall. It can withstand saline conditions almost as well as tall wheatgrass and is also almost as productive as tall wheatgrass on saline sites. Seedlings develop slowly and good seedbed preparation and weed control is essential. 'Eejay', 'Pearl' and 'Prairieland' are released varieties. Average seeds per ft² at 1 lb. rate 2. Recommended pure stand rate 10 lb./ac.

Wheatgrass, Tall *Thinopyrum ponticum*

A long-lived, tall-statured, coarse, vigorous, very late maturing, winter hardy introduced bunchgrass. Once established, (seedlings are slow to establish) tall wheatgrass is one of the most tolerant grasses of salt, alkali and high water table conditions. It starts growth early in the spring, reaching maturity in late summer. Reported to be the latest maturing of the wheatgrasses. Palatability is fair early in the growing season, but mature plants become very unpalatable and must be managed for use at earlier stages of growth. It does not stand continuous close grazing. Old coarse growth often makes current growth unavailable. Late standing material becomes good winter forage for livestock when used with supplemental protein sources. This grass has a very wide range of soil and climate adaptation (recommended for 14 inch or higher rainfall zones or sites with high watertables) and is useful for erosion control on critical areas. Provides nesting and food for upland game birds and is also used for wind barriers to control soil erosion and drifting snow. It is adapted to salty areas such as greasewood and saltgrass sites where the water table is from a few inches to several feet below ground surface. Also intermediate and favorable sagebrush, mountain brush, and juniper sites where its drought tolerance is evidenced. Planting depth 1/4 to 3/4 inch. Adapted varieties are 'Alkar' (northern areas), 'Jose' (southern areas), 'Largo' (southern areas), and 'Platte' (Great Plains - not tested in west). Average seeds per ft² at 1 lb. rate 2. Recommend pure stand rate 10 lb./ac on good soils. Increase rate to 14 lb./ac. on saline soils.

Brome, Mountain *Bromus marginatus*

A short-lived vigorous native bunchgrass which reaches full productivity in 1 to 3 years. It establishes quickly on clean or disturbed sites, volunteers well on disturbed sites, is moderately palatable, and valuable for quick cover. Because it is short-lived, it is replaced by long-lived species over time. It is shade tolerant and must be allowed to go to seed every 3-4 years to reseed site. It is susceptible to seed head smut. Recommended sites include mountain brush, aspen, conifer forest and subalpine areas in mountain valleys at medium to high altitudes and timber harvest or burns with 16 inches or more annual precipitation. Planting depth 1/4 to 1/2 inch. Adapted varieties are 'Bromar', susceptible to seed head smut and Garnet Tested Class Germplasm, that is more smut resistant. Average seeds per ft² at 1 lb. rate 2. Recommended pure stand rate 10 lb./ac. Limit mountain brome to 2 lb. PLS per acre in native mixes. Higher rates effect establishment of slower developing native species.

Ryegrass, Perennial *Lolium perenne*

A relatively short-lived, rapid developing, vigorous, high forage producing with high quality forage, introduced perennial bunchgrass adapted to a wide variety of soil conditions. Perennial ryegrass can be grown under irrigation or on dryland where the effective precipitation is 15 inches or more. To produce high yields, perennial ryegrass requires as much as 30-50 inches of irrigation and high fertility inputs (split applications recommended). It can be grazed within two months of planting, if vegetation is 10-12 inches high and well established so livestock can not pull plants out by the roots. Well established stands are productive for 3-5 years, if annual over-seeding (5 pounds per acre) of fields occurs each year in late fall or early spring. It does best where winters are mild. It may retard the growth of other perennials if seeded too heavily in a mixture. Generally not recommended in a mixture with other grasses because of strong grazing animal preference towards perennial ryegrass over other grasses. It has good recovery after grazing in the spring but tends to go dormant when summer temperatures exceed 80° F. Suited for most acidic to mildly basic (5-8 pH) areas as a turf, hay or pasture. Perennial ryegrass can be differentiated from annual ryegrass by lack of awns, whereas annual ryegrass has awns. Perennial ryegrass usually contains a fungal endophyte which is linked to the occurrence of ryegrass staggers (there have been reports of ryegrass staggers in Oregon and California). Planting depth 1/4 to 1/2 inch. Adapted varieties are 'Linn', and 'Manawa (H1)'. Tetraploids are also available and have shown promising results in tests at several locations. Most tetraploids are developed for short rotation pastures or green chop. These varieties include 'Bastian', 'Grimalda', and 'Reville'. Many other varieties are available and it is recommended that you consult a seed dealer in your area for locally adapted varieties and be sure to request an endophyte-free forage type. Average seeds per ft² at 1 lb. rate 6. Recommend pure stand rate 5 lb./ac. Higher seeding rates in pure stands may be considered.

Foxtail, Creeping *Alopecurus arundinaceus*

A long-lived, cool-season, dense sod forming introduced grass that is adapted to wet-slightly saline-acidic-poorly drained pasture sites. It has low seedling vigor, but once established spreads readily by rhizomes. Growth begins early in the spring, and leaves remain green until after hard frosts in the late fall. It is very cold tolerant and can persist in areas where the frost-free period averages less than 30 days. It is only moderately salt-alkaline tolerant but produces abundant good quality forage on wet fertile sites (with proper fertility) where it is usually superior to other wet area pasture grasses such as reed canarygrass and timothy (it is similar in appearance to timothy, but seedheads are generally black and hairy). It can be invasive in wet areas. Compatible with cicer milkvetch in a mixture. 'Garrison' and 'Retain' are well-adapted cultivars. Canadian varieties 'Dan' and 'Mountain' have not been tested, and may have potential in Intermountain areas. NOTE: Seed is very light and difficult to seed without the use of cracked corn, 2 bushels of rice hulls/acre, or other carrier. Planting depth 1/8 to 1/4 inch. Average seeds per ft² at 1 lb. rate 17. Recommend pure stand rate 3 lb./ac.

Fescue, Tall *Lolium arundinaceum*

A long-lived, deep rooted, high producing introduced cool-season bunchgrass suited for use under a wide range of soil and climatic conditions. It has lower palatability than most other pasture grasses and other species will be grazed out of a mixed stand. Suited to irrigation, subirrigation, or moderately wet conditions, as well as dryland areas where the effective precipitation is over 18 inches. Best suited for acidic to moist, saline to alkali areas in lowlands with pH from 4.7 to 9.5. It is not well adapted to sandy soils having prolonged droughty periods. It is a high forage producer under well-fertilized conditions. Planting depth 1/4 to 1/2 inch. Adaptable varieties include 'Alta', 'Fawn', and 'Forager'. Turf types are becoming more prevalent on the market and many of these contain endophytes. 'Johnstone' is a hybrid of tall fescue and perennial ryegrass. It is more palatable than regular strains of tall fescue, but retains its wide adaptation and resiliency. NOTE: Fungal endophyte problems can develop in livestock foraging on tall fescue. This problem can be greatly reduced, if not eliminated, by seeding with endophyte-free seed (production may be lower with endophyte free plants). Average seeds per ft² at 1 lb. rate 5. Recommend pure stand rate 5 lb./ac.

Orchardgrass *Dactylis glomerata*

A long-lived, high producing, introduced bunchgrass, adapted to well drained soils. It produces long folded leaves arising mostly from the plant base. A shade tolerant plant that is highly palatable to livestock and wildlife, especially in the early part of the growing season. It is a widely preferred species for hay, pasture, or silage. For highest forage quality and regrowth, harvest while still in the boot stage. It is less winter hardy than meadow or smooth brome or timothy and is more vulnerable to diseases than many pasture grasses. Orchardgrass is compatible in alfalfa, sainfoin and clover mixes. It can be grown under irrigation or on dryland where the effective precipitation is 18 inches or more. It requires a good fertility program for high production. It is also used in erosion-control mixes primarily for its forage value. This species does best on soils with few limitations and good drainage. Avoid shallow and sandy soils. Varieties are early-, mid-, and late-season in maturity. Late-season varieties are preferred in mixture with alfalfa. Early - 'Hallmark', 'Potomac'; Mid - 'Akaroa', 'Ambassador'; Late - 'Latar' (recommended with alfalfa). 'Paiute' orchardgrass (Aberdeen release) is more drought tolerant (adapted to 16 inches of precipitation) than the other varieties. Planting depth is 1/4 to 1/2 inch. Average seeds per ft² at 1 lb. rate 12. Recommend pure stand rate 4 lb./ac.

Brome, Smooth *Bromus inermis*

A long-lived, introduced aggressive sod-forming grass. Very palatable, productive, and shade tolerant. Seedlings are often weak, but once established, plants spread vegetatively to provide full stands. It has notable ability to suppress invasion of undesirable vegetation. Recovery is slow when cut for hay, becomes dormant during hot dry summer periods, and its tendency for sod binding requires occasional root ripping and high fertility. A very useful plant for erosion control seedings. Pasture or hay mixtures with smooth brome become sod bound and must be re-established periodically to maintain the legume component. It should not be planted directly adjacent to areas being restored to native plant communities. It is best adapted to moist well-drained soils in 14 inch or higher rainfall zones. Cultivars have traditionally been divided into three adaptation types: northern, southern and intermediate. Only southern and intermediate types are recommended for the Intermountain West. It is tolerant of slightly saline and alkaline conditions. The southern type (Lincoln) is best for sites that had supported mountain brush and favorable sites in the southern sagebrush and pinyon-juniper zone. An intermediate type, (Manchar) performs best on foothill to mountain rangelands. Planting depth 1/4 to 1/2 inch. 'Manchar' is recommended for forage plantings on northern or higher elevation meadows, hayland or pasture. 'Lincoln' is recommended for erosion control and waterways, and produces less forage but is more aggressive in vegetative spread than 'Manchar'. Average seeds per ft² at 1 lb. rate 3. Recommend pure stand rate 6 lb./ac.

Brome, Meadow *Bromus biebersteinii*

Previously known as *Bromus erectus* and *B. riparius*, this perennial long-lived, introduced, weakly rhizomatous grass reaches full productivity in 2 to 3 years. Seedling vigor is strong and palatability to livestock and wildlife is excellent. Use in pasture and hayland seedings under irrigation or non-irrigated areas where precipitation is above 14 inches annually. Applications of nitrogen during the growing season will significantly increase forage production and regrowth following clipping or grazing. Do not graze until forage has reached 8-12 inch height for best stand management. It is moderately shade tolerant, winter hardy, recovers quickly after grazing, and is well adapted to sites that had supported mountain brush, aspen, conifer forest and subalpine sites in mountain valleys and plains. It is more productive and does not go dormant following harvest or under high summer temperatures as does smooth brome. It is an excellent choice in areas that are prone to early to late spring frost. Productive and compatible in mixtures with legume species such as alfalfa, sainfoin, cicer milkvetch, and birdsfoot trefoil. Varieties include 'Fleet', 'Montana PVP', 'MacBeth PVP', 'Paddock' and 'Regar' (Aberdeen release). Planting depth 1/4 to 1/2 inch. Average seeds per ft² at 1 lb. rate 2. Recommended pure stand rate 10 lb./ac.