UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
FOREST SERVICE INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION

and

STATE OF UTAH DIVISION OF WILDLIFE RESOURCES

and

UNIVERSITY OF IDAHO
IDAHO AGRICULTURAL EXPERIMENT STATION

NOTICE OF RELEASE OF 'APPAR' LEWIS FLAX

The Soil Conservation Service, Forest Service, and the Idaho Agricultural Experiment Station announce the naming and release of 'Appar' Lewis Flax (Linum lewisii Pursh) for use in range seedings; revegetating minespoils, highway rights-of-way, and other disturbed areas; wildlife cover and food; and for beautification. It has been tested by the Forest Service and the Soil Conservation Plant Materials Center, at Aberdeen, Idaho since about 1965 as U7-71. It carries PI-445972.

Appar was named in honor of Mr. A. Perry Plummer who selected the original plant material in the badlands of the Black Hills region of South Dakota. Mr. Plummer was a Range Scientist, now retired, with the Forest Service and headquartered at the Intermountain Forest and Range Experiment Station, Ephraim, Utah. Appar was selected because of outstanding vigor, beauty, and competitiveness with understory grasses prevalent on sites where it was collected.

Lewis flax is a native perennial herb which produces deep blue flowers. It is closely related to domestic cultivated flax, Linum usitatissimum L., which is an annual and to the introduced blueflax from Eurasia, Linum perenne L., which is also perennial. Lewis flax has a wide area of adaptation ranging from Alaska to Manitoba south to New Mexico and California. Appar has proven to be especially well adapted in the Intermountain Region. It is non-toxic and readily utilized by deer and livestock in the spring. Birds consume the seed and capsules in fall and winter. To date, an improved, released cultivar has not been available commercially. Appar will help meet needs for revegetation, especially where adapted native wild flowers are desired either in mixtures with other plants or seeded alone.

Breeders and Foundation seed are being produced at the Aberdeen Plant Materials Center. Foundation seed is currently available from the University of Idaho, Aberdeen Research and Extension Center and through Soil Conservation Disticts in Idaho, Nevada, and Utah.

'APPAR' LEWIS FLAX RELEASE NOTICE

Approval by:

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Thomas N. Shiflet DATE Sept 2, 1980

Thomas N. Shiflet, Director
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'APPAR' LEWIS FLAX (LINUM LEWISII, PURSH) DESCRIPTION, ADAPTATION, USE, CULTURE, MANAGEMENT, AND SEED PRODUCTION

Chas. G. Howard and Kent R. Jorgensen

DESCRIPTION

'Appar' lewis flax is a hardy, relatively short-lived (five to seven years), native perennial forb or herb. Many stems arise from a woody crown which has a tap root. The plant is not rhizomatous. The leaves are alternate, linear, one-nerved, 1-3 mm long, and have acute to rounded tips. Stems and leaves are glabrous and somewhat glaucous. Total height varies from less than 12 inches (30 cm) on harsh droughty sites to approximately 36 inches (91 cm) on irrigated sites.

Flowers are complete and are borne in large open panicles which branch off the main stem. Petals are deep blue with a light yellow inner tip where joined with the pistil which is also yellow. Petals range from about 10 to more than 20 mm long. There are normally five each sepals, petals, stamens, and carpels. Flowers develop profusely for approximately six weeks beginning in mid-May. Flowers open early in the morning and close at mid-day. Petals are shed profusely throughout the flowering period, creating a blue cover under the plants. The fruit is a capsule containing ten cells. Many small dark-colored seeds develop within each cell.

ADAPTATION

Lewis flax is widely adapted to many areas of Western North America ranging from Alaska to Manitoba, southward to Texas, New Mexico, and California. Native stands are often found on slopes, canyons and open flats on well-drained sites from sagebrush zones upward to spruce-fir sites. Appar is especially well adapted to the Intermountain Region served by the Aberdeen PMC in areas where the average annual precipitation ranges from 10 inches (25.4 cm) to 23 inches (58.4 cm).

Appar lewis flax is well adapted to well-drained soils in all life zones of Utah big game ranges, including shadscale-saltbush and big sagebrush sites. It is not well adapted for use as an understory species and does not tolerate much shade. It is well suited for use with other species which do not overtop it. Appar is well adapted for use in mixtures tailored for seeding minespoils and highway rights-of-way on variable sites in Southeast Idaho.

Authors are Manager, USDA, Soil Conservation Service, Plant Materials Center, Aberdeen, Idaho; and Game Biologist, State of Utah Wildlife Resources, Cooperating at USDA Forest Service Intermountain Forest and Range Experiment Station Great Basin Experimental Area, Ephraim, Utah.

TOXICITY

Some native wild flax species are reported to be toxic to livestock. These are believed to be species with a yellow flower and normally found in the Southwest, such as yellow pine flax, Linum neomexicanum Greene.

However, both seed and vegetation of Appar lewis flax have been tested at the USDA, SEA, Poisonous Plant Laboratory at Utah State University. Dr. M. Coburn Williams, Plant Physiologist, reports their tests indicate Appar is not toxic and can be safely used for purposes intended.

USES

Appar lewis flax is sought out by big game animals, especially in the spring. It provides early green feed for deer when they are changing diets from shrubs to more succulent species. Birds consume the seed and capsules in fall and winter. Livestock utilize it throughout the grazing season, especially in the spring. Appar has been successfully used as a component in seed mixtures planted for range restoration, and it adds color and beauty to the natural panorama wherever it is established.

Appar has especially good potential for use as an ornamental in home gardens, parks, highway rest stops, etc. because of the deep blue color of the flowers as compared to light blue to white of other native sources and because of the long flowering period. It would be especially well suited for rock gardens where taller plants might be desired.

CULTURE

Range, minespoil, and other disturbed area seedings should be made in the late fall on weed-free, firm, well prepared seedbeds or the best seedbed which can be prepared under prevailing conditions. Irrigated plantings can be seeded either in the fall or spring. Seeding can be accomplished by broadcasting, seed dribblers, with rangeland drills, or aerially.

MANAGEMENT

Appar lewis flax establishes slowly, and it should not be grazed until the second growing season after planting. It will survive heavy grazing after it is well established. Lewis flax has a life span of five to seven years. During that time, the plants must develop at least one mature seed crop which will shatter and be dispersed on the ground in order to perpetuate the species. Appar will reproduce itself naturally in this manner if the management program permits it.

SEEDS AND SEED PRODUCTION

With one irrigation at Snow Field Station in Utah, clean seed yields have ranged from 31 lbs to 350 lbs per acre (34.8 to 392.4 kg/ha) with a 28-inch

(71 cm) row spacing. The smaller yield was with a one-year-old stand and the larger was achieved in the fourth growing season. Germination varied from 73 to 92 per cent and averaged 84 per cent. The average number of seeds per pound was 278,280. Only one field-scale seed crop, foundation quality, has been harvested to date at the Aberdeen PMC. The one-acre field was seeded in November 1977 in 36-inch rows (91.4 cm). The field was surface-irrigated by furrows. The first full seed crop was harvested in 1979. The clean seed yield was 729 lbs/acre or 817.2 kg/ha. Other attributes of this seed lot were:

1. Purity - 99.24%
2. Other Crop - none
3. Inert Material - 0.75%
4. Weeds - 0.01%
5. Germination - 77%
6. Noxious Weeds - none
7. Weight Per Bu. - 48 lbs.
8. Seeds Per Lb. - 295,100

Seed production fields should be seeded in rows spaced 24 to 36 inches (61 to 91.4 cm) to permit access for machine tillage, hand roguing as needed, and weed control. Seed matures and is ready to harvest from early July to mid-August depending on elevation, degree of irrigation, and weather conditions.

Recommended pure live seed (PLS) seeding rates for row seedings are:

Row Spacing Inches	PLS Lbs. Per Ac.	No. Seeds/Lineal Ft. Drill Row
24	2.5	33
30	2.0	33
36	1.5	30

Seeding rates for use in mixtures for range and disturbed area plantings should be tailored for specific mixtures designed to meet specific needs on specific sites. In most situations, not more than one pound per acre of Appar would probably be used in mixtures. With an average seed count of 286,690 seeds per pound, one pound (PLS) per acre would provide about seven seeds per square foot.

The flowering and seed development of lewis flax, including Appar, is indeterminate. Within each panicle flowers form, capsules develop, and seed maturation occurs progressively from the bottom branches to the tip. As the lower capsules mature they open and will spill seed if disturbed by strong wind. Therefore, the seed grower needs to carefully observe the seed field and select the time when the most seed can be obtained and least amount lost from shatter. At Aberdeen, it was necessary to swath and allow the swaths to dry for at least one week before combining with a pick-up attachment. In attempts to direct combine on two occasions the stems tended to wrap around the reel and the capsules would not thresh well because of excess green vegetation. Forest Service personnel suggest no irrigation after flowering begins. Additional study of the interaction of irrigation frequency with seed production-maturation is needed at Aberdeen. Too much water during the flowering period causes excess vegetative growth and defers seed maturation.

LITERATURE CITED

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