NEW ,MEXICO STATE UNIVERSITY
COLORADO STATE UNIVERSITY
UTAH STATE DIVISION OF WILDLIFE RESOURCES
AND
UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE, INTERMOUNTAIN FOREST AND RANGE: EXP. STA.
SOIL CONSERVATION SERVICE

recommend the naming and release of 'Hatch' winterfat for commercial production and marketing of seed and seedlings.

INTRODUCTION

Scientific Name: Ceratoides lanata (Pursh) J. T. Howell

Common Names: Winterfat, white sage, wintersage, feather sage, Lambstail, American eurotia, sweet sage

Varietal Name: 'Hatch'

Other Identification Used: U-10, B1, Lot 24, NM 5672, T7844.

Origin: Seed was originally collected by A. Perry Plummer in 1953 from a native stand, located 1/4 mile northwest of the Mammoth Creek fish hatchery, southwest of Hatch, Utah, The collection site occurs at a elevation of 7270 ft. (2216m) within a mixed pinyon-juniper and mountain big sagebrush community. Site receives 11-12 inches (28-37cm) 'of annual precipitation.

Species Description: Winterfat is a low-growing half shrub that occurs widely in the western states. Central stems woody, persistent for four to ten years, secondary stems annual, 2-4 feet (.6-1.2m) or taller, woolly hairy, branched with woody stems arising from a woody crown. Leaves are simple, alternate, mostly linear, and revolute-margined. Flowers, principally dioecious, or plygamous in axillary clusters or terminal spikelike infloresences; staminate in inconspicuous four-parted perianth, pistillate with only two united bracts, with long white hairs enclosing hairy utricle fruit. Has extensive fibrous root system as well as a deep penetrating tap root, (Harrington, H D. 1964 and Stevens, Richard 1984). The embryo of a winterfat seed encircles a small globule of perisperm in tear-drop fashion so that the apex of the radicle and the tip of the colyledous form the acute end. The seed coat is a naked transparent

testa enclosed in a stellate pubescent utricle which is obovate inside two paperlike bracts covergd on the exterior by fine, silky, white, pilose hair 3-6 mm long.

Hatch is a high seed producer with good germination. Excellent seedling vigor contribute to its ease of establishment. Seedlings develop rapidly. Plants reach maturity quickly and under favorable conditions will produce seed the first year. Compared to other winterfat., Hatch is more competitive with broadleaf perennials and annual. Site preparation for planting is minimal and seed should be broadcast or drilled on or near the soil surface. Seedlings tolerate light grazing from rodents, livestock or wildlife. Hatch is usually erect, ieafy, with moderately fine stems and produces an abundance of forage and seed. Leaves persist through winter and plants tend to be evergreen with a basal array of overwintering leaves. From all sources of winterfat tested, Hatch was equal or greater in amount of forage and seed produced. Winterfat is considered by many to be an "ice cream" plant and is highly utilized by wildlife and livestock.

Method of Development: Seed was collected from the original site and seeded and compared with 40 other accessions of winterfat. The plant was originally selected for use on sagebrush, pinyon-juniper and mountain brush communities as a winter forage plant for game and livestock. Original plantings were in the intermountain region. Subsequent plantings extended to the short and tall grass regions of the midwest and the ponderosa pine habitat type of the intermountain region and the salt desert shrublands of the southwest. In addition, plantings have been made on mine disturbed soils in combination with other accessions. Hatch has been tested in Utah, New Mexico, Nevada, Wyoming, Idaho, Colorado, Arizona, Montana and Oregon. In most or all cases Hlatch has proved equal to, or superior to, other accessions tested.

Plants reared from seed that was acquired from the original collection site produced uniform offspring. Important forage and seed production traits were determined to be inheritable characteristics. Consequently, breeding or further selection has not been required.

Plantings of Hatch persisted well at all study sites except the arid salt desert shrub communities. Sources of winterfat collected from the salt desert sites have survived better than Hatch when planted in extremely arid circumstances. Hatch is more universally adapted to upland sites than any other source tested.

Uses: Hatch has been selected for its ability to establish, persist, and provide forage diversity and winter forage in the sagebrush and pinyon-juniper communities. Big game have demonstrated a preference to Hatch over other accessions tested. Hatch is an erect, half-shrub that furnishes an abundance of available winter forage, particularly in years; of heavy snow accumulation. Hatch has been successfully used to revegetate mine disturbances. It can be seeded with understory herbs on sites where few

other shrubs occur. It is an important pioneer species to establish on extremely disturbed sites. It normally produces a good seed crop and spreads by natural seeding.

Areas of Adaptation: Hatch originated on a medium textured soil but has proven to be well adapted from heavy soils to fine sandy loam soils. It is adapted to neutral and slightly alkaline sites and is particularly adapted to poorly developed mine spoils. It is not well suited to soils or sites with less than pH 6.5. Its rapid growth rate has made the plant useful for stabilizing wind blown soils and extensive barren sites caused by wild fires. Hatch may not persist on poorly drained soils and sites having a short impervious horizon. Hatch is best adapted to areas of 12 to 16 inches (30-40cm) annual precipitation but once established will persist with only 8 inches. Hatch has excellent winter hardiness and drought tolerance.

Hatch has established and persisted better than any accession when planted in Wyoming and basin big sagebrush types and the pinyon-juniper community. It is unique in its ability to establish and persist on a wider range of sites than other accessions tested. It is best adapted to open, sunny exposures and is only moderate shade tolerant. Hatch will not persist on occasionally flooded areas or sites with a high water table.

Disease or Insect Problems: Seedlings are susceptible to damping-off and can be difficult to grow in a greenhouse. It is suspected tlhat Fusarium or Rhizactonia may be found in weakened plants. Field plantings usually are not affected by the fungi. No other disease or insect problems are known or have been observed that would affect either seed production or forage yields. Plants are not damaged by grasshoppers that often destroy other shrubs or associated herbs.

Seed Harvesting, Handling and Planting: Seed may be hairvested by hand stripping, use of a beater or machine combined. Work by the Los Lunas PMC has shown combine harvesting of winterfat is feasible and economical. Cleaning may be done with a barley debearder with minimum pressure and then screened with a 3/8 inch hardware cloth. Threshed seed can be more easily stored and planted. A hammer mill is often used at 600 RPM to thresh the seed. Some seed damage may result to seeds that are hammer milled. Seed normally ripens in the latter part of September to early October but should not be harvested until after the first killing frost. Because of after ripening, seed should be allowed to dry and then stored for two to three months before germination is determined.

Research has indicated a reasonable germination of 80 percent for Match. Seed samples (utricles) may be cleaned to a purity of about 65 percent. Seeds retain viability for about three years but rapid deterioration occurs in the fourth and fifth years if seeds are stored in open warehouses. There are approximately 112,000 filled utricles (seeds) per pound.

Seeding should be on a pure live seed basis. Seeds of Hatch, like other winterfat collections, are difficult to process and plant. Seeds are normally planted as hairy utricles. The. utricles are lightweight and tend to stick together, consequently they are difficult to meter through conventional drills. Seeds or utricles should be placed at a shallow depth not to exceed one quarter inch (.63cm). Hatch can be successfully seeded by broadcasting or using a thimble type seeder. Agitators are used in seed boxes on various drills and broadcast planters to aid in seed distribution. If broadcast, the surface of the soil should be harrowed or chained to lightly cover the seed. It is recommended that 1 to 3 pounds of seed is planted per acre (PLS) in mixtures on range and mine sites.

Seed increase plantings should be spaced at 30-42 inch (76-106cm) rows. Seeding rate should be about three pounds per acre PLS. Production may be greater than 300 pounds per acre clean seed on nonirrigated sites. Even after establishment overwatering should be avoided. Susceptibility to Simazine has been observed.

Increase and Dristribution: Breeder, foundation and certified seed classes are recommended. Breeder plants will be maintained at the Los Lunas Plant Materials Center and the USDA Forest Service Intermountain Forest and Range Experiment Station site at Bliss, Idaho. Foundation seed will be produced by the Los Lunas and Aberdeen Plant Materials Centers. Foundation seed may be obtained from Crop Improvement Associations, Agricultural Experiment Stations and Soil Conservation Districts beginning in the spring of 1985.

Supporting data have been presented to the Varietal Release Committees in New Mexico, Idaho and Colorado; and 'Hatch' winterfat has been accepted for release to commercial growers and users.

Approval signatures:

Ray T. Margo, Jr., State Conservationist — Date
United States Department of Agriculture
Soil Conservation Service

Thomas N. Shiflet, Director — Date
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Lawrence E. Lassen, Station Director — Date
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