HISTORICAL OVERVIEW OF THE SAGEBRUSH SEED INDUSTRY

Richard Stevens – UDWR Retired

Allan R. Stevens – Snow College


LETTERS
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THE SACRED GROVE


24 28
4 8 12 16 20 24 28
4

Artemisia tridentata tridentata – Basin Big Sagebrush

Artemisia tridentata wyominensis – Wyoming Big Sagebrush

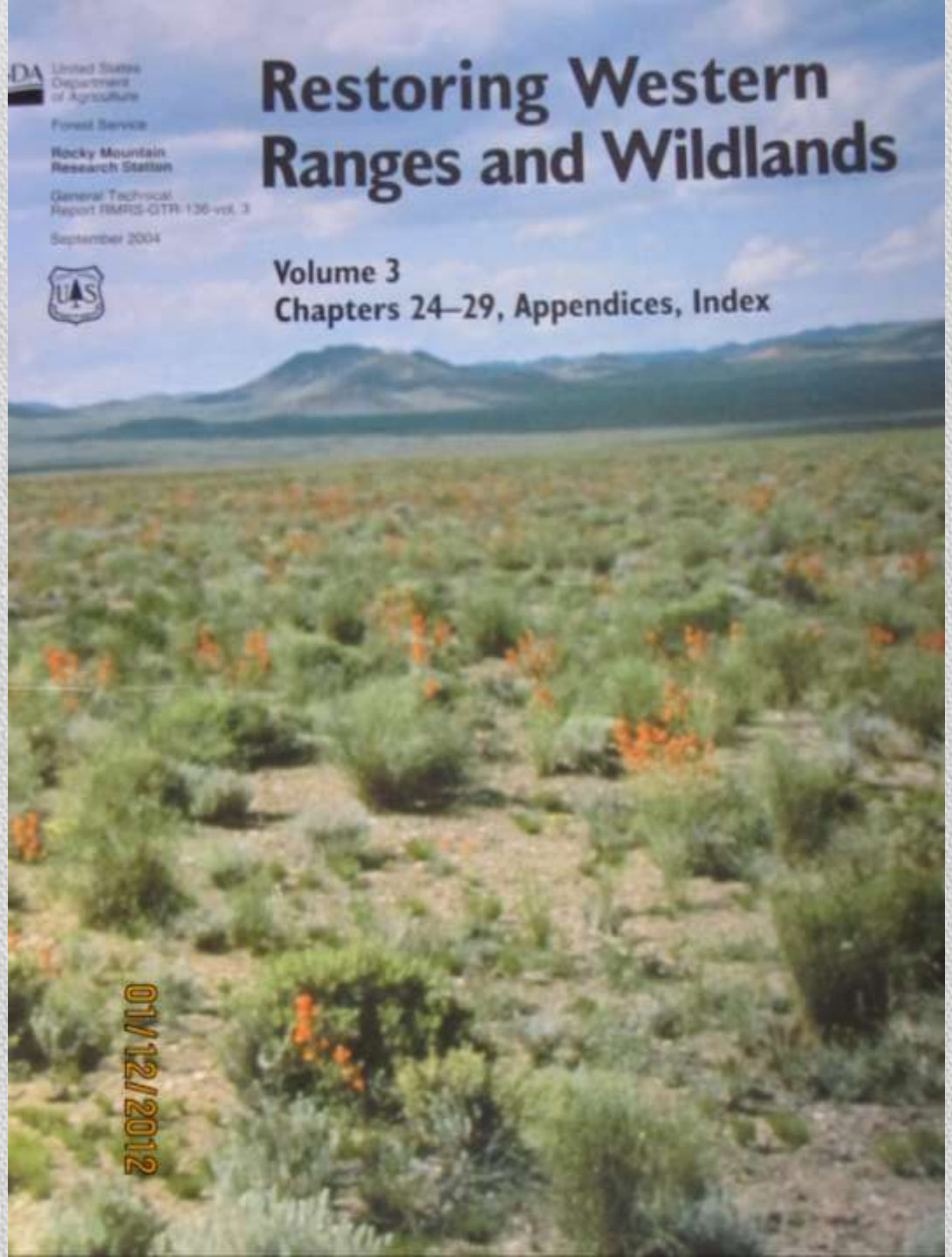
Artemisia tridentata vaseayna – Mountain Big Sagebrush


Wyoming Big Sage Brush
1800
Lot# 07112
01/03/2012


10/31/2011

Restoring Big Game Range in Utah

01/12/2012


United States Department of Agriculture
Forest Service
Rocky Mountain Research Station
General Technical Report RMRS-GTR-136-vol. 3
September 2004
Restoring Western Ranges and Wildlands
Volume 3
Chapters 24–29, Appendices, Index
01/12/2012


01/03/2012

Major Factors that have Influenced the Acceptance of Sagebrush and the Development of the Sagebrush Seed Industry

A. Overcoming Negative, Anti-sagebrush Attitudes
B. Species Identification
C. Seed Collection, Cleaning and Storage
D. Seed Quality
E. Identifying Source of Seed Collection and Collection Permits
F. Seeding Sagebrush
G. Seed Companies
H. Seed Purchase

A. Overcoming Negative, Anti-sagebrush Attitudes

B. Species Identification

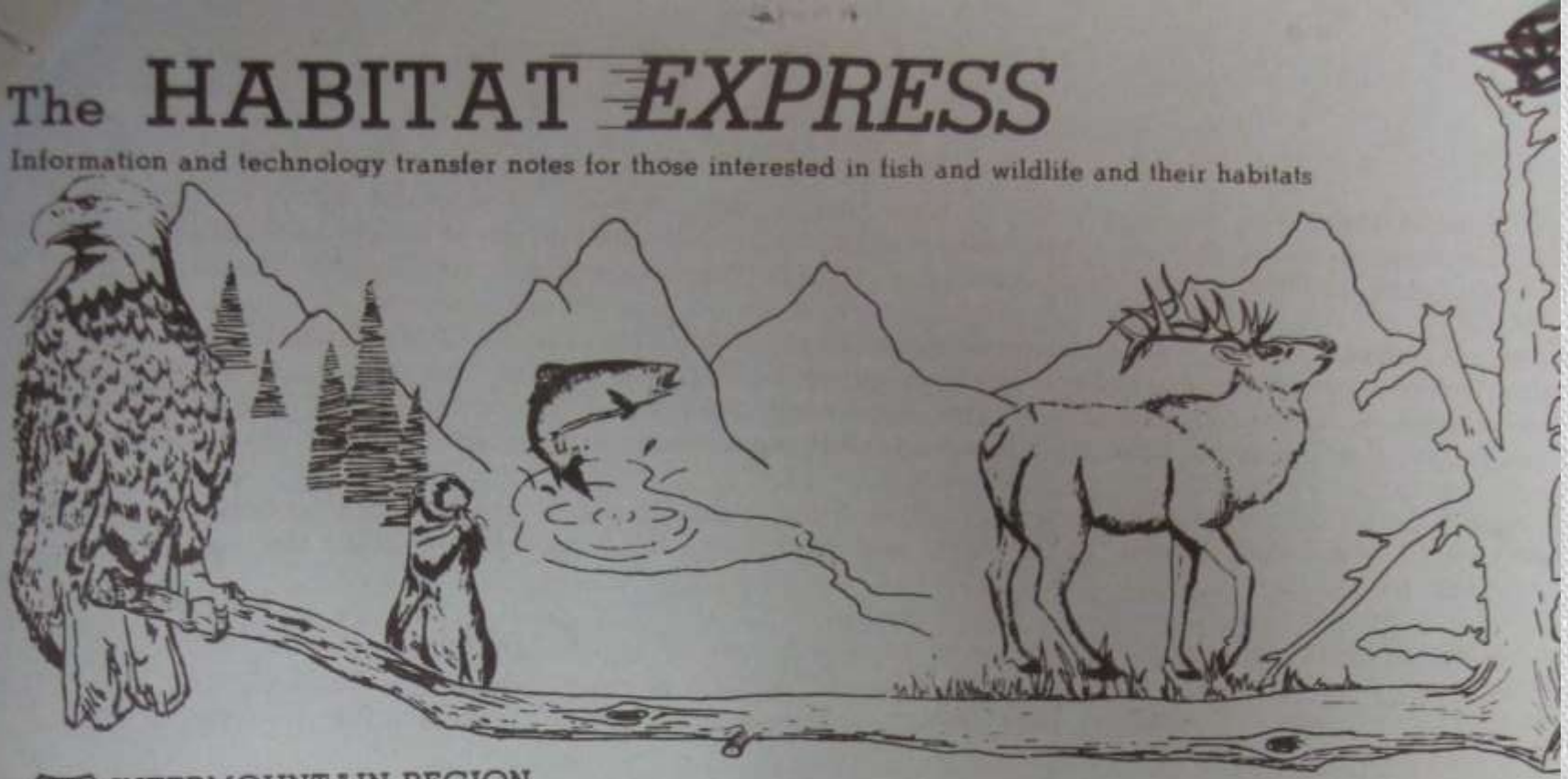
Table 2. Field Identification Characteristics of Eight Sagebrush Taxa.

Sagebrush	Basin Big (Artemisia tridentata ssp. tridentata)	Mountain Big (Artemisia tridentata ssp. vaseyana)	Wyoming Big (Artemisia tridentata ssp. wyomingensis)	Black (Artemisia nova)
Plant Shape	Uneven top, usually single main stem. 2 1/2 to 6 ft.(15 ft) tall.	Flat top. Multiple main stems 1 1/2 to 3 1/2 ft. (5 ft) tall.	Round top, multiple main stems. 1 to 3 ft.(5 ft.) tall.	Flat to round top 6 in to 3 ft. tall. Usually single main stem.
Flowering Stalks	Arise throughout crown, Many remain within crown.	Arise from and extend extend above crown.	Arise throughout crown, most extend above crown.	Arise above crown, red-brown, persists through winter.
Leaves	3 lobed, up to 3 times longer than wide, margins straight. Terminal leaves not whorled. Leaves arise in clusters along stem.	3 lobed. Higher elevation type fan shaped. Lower elevation type fan shaped to straight margins. In both types terminal leaves are whorled and ari e uniformally along stem.	3 lobed, cupped fan shape, wider than long, middle lobe bent forward, margins roll under. Terminal leaves whorled.	3 lobed, fan shaped wider than long. viscid, when crushed will stick to fingers. Terminal leaves whorled.
Color of foliage	Gray-green	Green-gray	Gray-green	Dark green. There are lighter colored populations, these however have red-brown seed stalks, distinctive crushed leaf odor and leaves viscid.
Flowering Date (pollenshed)	Mid Sept. to Mid Oct.	Late July to Early Sept.	Mid Aug. to Mid Sept.	August
Crushed leaf odor	Bitter pungent typical sage smell (methacrolein)	Mild, pleasing, minty (camphor)	Intermediate between pungent and minty.	Viscid, unique, unlike any other.
Layering	No	No	No	Mostly not
Soil	Deep, well drained.	Deep, well drained. Soil moisture available most of the growing season	Moderately deep to shallow, well drained, gravely.	Well drained, rocky to gravely.
Location	Valleys, foothills	Higher elevation type: Mountain brush, Aspen Spruce-fir, subalpine. Lower elevation type: lower mountain brush, pinyon-juniper, upper foothills.	Xeric valleys, foothills, gravely out crops, high plains and alluvial fans.	Lower foothills, valley edges and bottoms. Alluvial fans.

01/12/2012

The HABITAT EXPRESS

Information and technology transfer notes for those interested in fish and wildlife and their habitats



INTERMOUNTAIN REGION
Ogden, Utah

2600

NO. 89-1
JANUARY 1989

IDENTIFICATION CHARACTERISTICS OF MAJOR SAGEBRUSH TAXA AND SPECIES ADAPTED TO AREAS INHABITED BY EACH

On western range and wildlands sagebrush species occur on millions of acres. These area used extensively by big game, small game, non-game, wildlife species, and by livestock. areas also provide important recreational, watershed, and riparian values. Major distu by and detrimental effects of construction, mining, grazing, range enhancement projects activities, climatic conditions, insects and disease have and will continue to reduce o destroy sagebrush areas.

Table 3—Characteristics of subspecies of *Artemisia tridentata* (adapted from McArthur 1983b).

Characteristics	Subspecies				References
	tridentata	*vaseyana*	*wyomingensis*	*spiciformis*	
Habitat and range	Foothills and valley floors. 4,000 to 7,000 ft (1,220 to 2,135 m). British Columbia and Montana to Baja California and New Mexico.	Foothills and mountains. 3,000 to 19,000 ft (915 to 5,790 m). British Columbia and Alberta to California and New Mexico.	Foothills and valley floors. 2,500 to 7,000 ft (760 to 2,135 m). Montana, Washington to Arizona.	High mountain areas. 7,000 to 12,000 ft (2,135 to 3,660 m). Oregon and Montana to Nevada and Colorado.	Beetle and Young 1965; Morris and others 1976; Winward and Tisdale 1977; McArthur and Plummer 1978; McArthur and others 1979a; Dealy and others 1981; Winward 1980; Blaisdell 1981.
Smell	Biter pungent	Pleasant	Bitter pungent	Pungent, not bitter	McArthur and others 1974.
Essential oil	x = 1.4 percent	x = 2.2 percent	x = 1.1 percent	x = ?	Welch and Monsen 1981.
Leaf shape	narrowly cuneate	Cuneate to spatulate	Cuneate	Cuneate to narrowly cuneate	Marchand and others 1966; McArthur and others 1974; McDonough and others 1975; Winward and Tisdale 1977.
Common height ranges	3 to 13 ft (0.9 to 4 m)	2 to 5 ft (0.6 to 1.5 m)	1.5 to 3 ft (0.5 to 0.9 m)	2 to 5 ft (0.6 to 1.5 m)	McArthur and others 1979a; Winward 1980.
Sesquiterpenes compounds	4 to 7	3 to 6	2	5	Kelsey and others 1973.
Ultraviolet visible coumarins	Trace	Abundant	Trace, but often more than *tridentata*.	Abundant	Shafizdeh and Melinknoff 1970; Stevens and McArthur 1974; Brown and others 1975; McArthur and others 1981.
Tendency to layer	None	Mild	None	Very strong	Beetle and Young 1965; Winward 1980; Goodrich and others 1985.

01/12/2012

A Simple Field Technique for Identification of Some Sagebrush Taxa

RICHARD STEVENS AND E. DURANT McARTHUR

Highlight: *A technique has been developed that provides an on-the-spot field test to aid in identification of some sagebrush taxa. Seeds, dried or green crushed leaf material, or stem cambium of various sagebrush taxa will produce distinctive shades of blue when wet and placed under longwave ultraviolet light. The technique is particularly helpful in separation of* Artemisia tridentata *subsp.* tridentata *from* A. tridentata *subsp.* vaseyana. *Subspecies* vaseyana *extracts are blue, whereas those of subsp.* tridentata *are not. All taxa producing blue water extracts are preferred by mule deer.*

Recent observations have demonstrated that palatability on winter ranges of some sagebrush taxa relates closely to chromatographic patterns (Hanks et al., 1971, 1973; Hanks and Jorgensen, 1973). Taylor et al. (1964) noted the differential fluorescence in moist seeds of *Artemisia tridentata* subsp. *tridentata* and subsp. *vaseyana* under ultraviolet light. Subspecies *vaseyana* seeds fluoresce and subsp. *tridentata* seeds do not. We have observed that different shades of blue are apparent in various sagebrush taxa immediately after application of water under longwave ultraviolet light (e.g., black light lamps M-16 for use in the field or UV-21 for laboratory use from Ultraviolet Products Inc., San Grabriel, Calif.). This test is effective on fresh or dried material (crushed leaves, seeds, or broken stems) any time of the year.

Because of the technique's simplicity and ease of use, it should prove useful for identifying sagebrush taxa. Taxa cannot be distinguished solely by color differences of water extract, but the color differences conveniently dovetail, so that taxa most likely to be confused on the basis of morphological criteria are in different color groups (Table 1); e.g., the subspecies of big sagebrush (*A. tridentata*). Subspecies *tridentata* extracts show little color, whereas those of subsp. *vaseyana* are an intense blue. The third subspecies, *wyomingensis*, is recognized by a light-blue water extract. Extracts of a larger statured ecotype of subsp. *wyomingensis* from north-central Nevada (Brunner, 1972) show more blue than those of subsp. *wyomingensis* collections from western Wyoming. *Artemisia tridentata* subsp. *tridentata* and *A. tridentata* subsp. *wyomingensis* cannot always be separated by the color test, but the short stature and spatulate leaves of the latter subspecies contrast with the taller stature and narrow leaves of subsp. *tridentata*.

Color extracts are helpful in identifying some palatable species and ecotypes; e.g., two forms of *A. nova* have been identified (Tables 1 and 2) and designated as forms (a) and (b). *Artemisia nova* (a) tends to be more palatable and produces a bluer extract than *A. nova* (b). Beetle (1960) and Winward and Tisdale (1969) also noted two forms of *A. nova*.

High preference is shown by mule deer for all taxa producing blue extracts. The intensity of the blue can be taken as a palatability indicator with two notable exceptions: *A. tridentata* subsp. *wyomingensis*, which exhibits little color, is highly palatable and *A. bigelovii*, which lacks color, is also palatable.

The authors are game biologist, Utah Division of Wildlife Resources, Ephraim, Utah, and research geneticist, U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station, Ogden, Utah, stationed in Ephraim.

Federal aid in wildlife restoration funds was provided through Project W-82-R.

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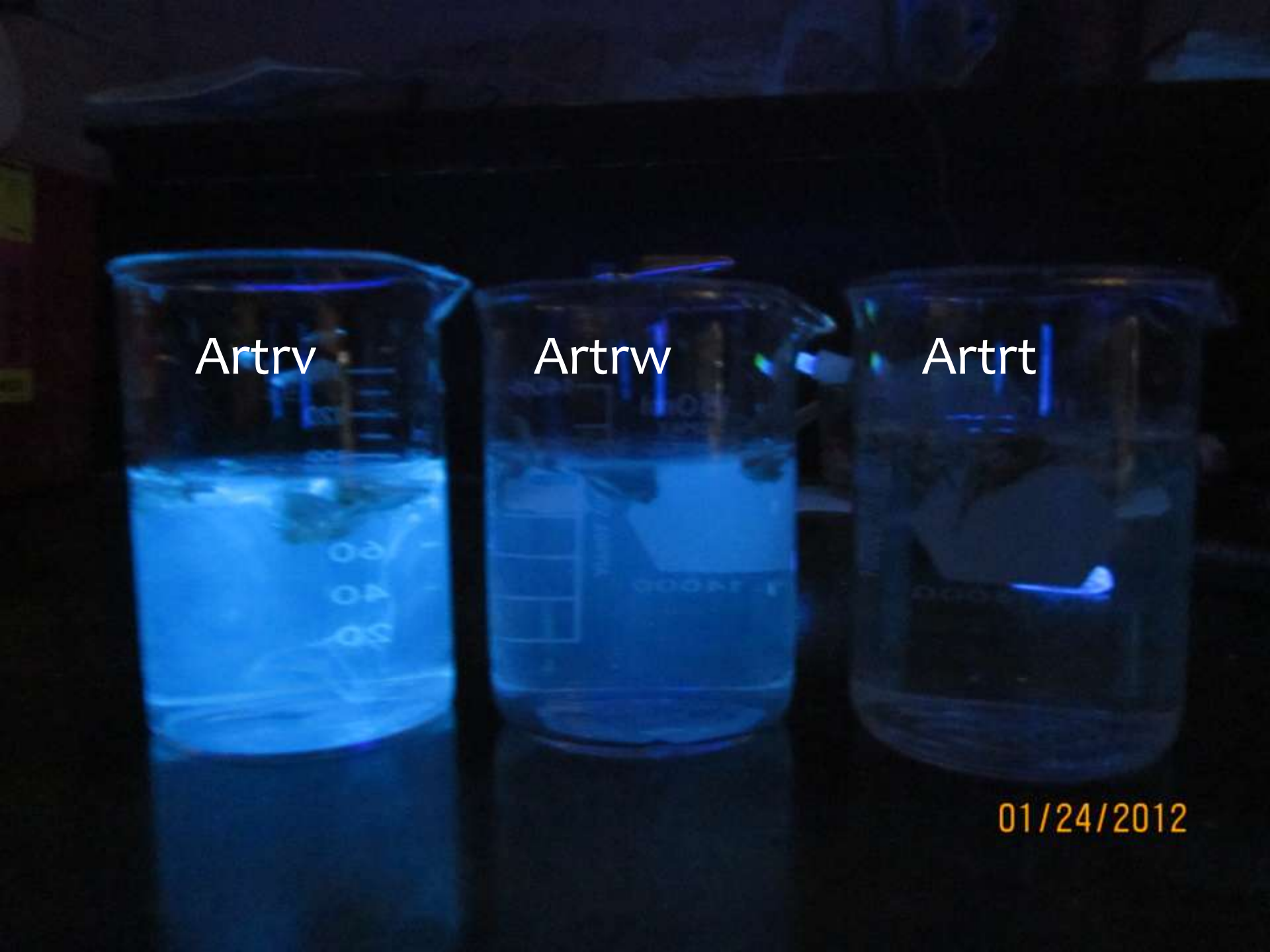
The authors thank the members of Botany and Range Science Department of Brigham Young University, Provo, Utah, and the Chemistry Department of Snow College, Ephraim, Utah, for use of their equipment and materials.

Manuscript received February 19, 1974.

Table 1. Qualitative water soluble extract color groups of some *Tridentatae* taxa.

Intense blue	Light blue	Pale blue to colorless
A. arbuscula	*A. cana*	*A. bigelovii*
A. longiloba	*A. rigida*	*A. nova* (b)
A. nova (a)	*A. tridentata wyomingensis*	*A. tridentata tridentata*
A. rothrockii	*A. tripartita*	
A. tridentata vaseyana		

01/12/2012


Artrv
Artrw
Artrt
01/24/2012

Deseret News, Dec 10, 74

Black light used to find deer feed

EPHRAIM, Sanpete County — The black light used by rockhounds has become the newest tool in scientific game management, thanks to a Utah Division of Wildlife Resources biologist and a U.S. Forest Service geneticist.

Richard Stevens of Wildlife Resources and Dr. E. Durant McArthur of the Forest Service have worked out a method of discovering which of about "flavors" of sagebrush is palatable to deer.

Deer like only about half of the varieties, "with a distinct preference for the Vasey big sagebrush," said a Forest Service official. Up until now, game managers have had to take samples of brush back to the laboratory and do a series of tests to find out whether a deer herd is likely to graze in a particular area.

But Stevens and McArthur, both stationed here, discovered a lightweight, $20 mineral light used by rockhounds can provide on-the-spot analysis. The lamp, available in most lapidary supply stores, emits "black light," an ultraviolet wavelength, to show which minerals fluoresce.

The game manager crushes some sagebrush leaves in a small dish or his palm and adds a little water. Then he finds a dark place and turns the light on the leaves. If the color is an intense blue, he has found one of the deers' favorites.

The smell of sagebrush is also a "pretty good indicator," Forest Service officials add. What smells good to a man smells good to a deer. But this method of identification is considerably less accurate than the mineral light technique.

The new technique, published recently in the Journal of Range Management, is expected to be of tremendous help in game management planning.

The potential use of an area can be checked quickly. The game manager can decide if some sagebrush should be destroyed and the area seeded with more tasty species. He can also check seed to determine palatability in advance.

A proper sagebrush diet is critical to mule deer in winter, when it is their chief source of food.

RICHARD STEVENS, game biologist for the Utah Division of Wildlife Resources, demonstrates use of a "black light" to identify sagebrush edible by deer. Mr. Stevens and Dr. E. Durrant McArthur, research geneticist for the Intermountain Forest and Range Experiment Station, Ogden, developed the technique.

Utahns Develop Way to Tell Value of Sagebrush to Deer

Sagebrush is just sagebrush to most Intermountain area residents, but to mule deer and game managers, it comes in 20 or more flavors.

Deer eat only about half of two dozen types in the Intermountain area — with a distinct preference

Utah Division of Wildlife Resources and Forest Service researchers that provides a simple, on-the-spot field test for use by the game manager.

An inexpensive mineral light, lightweight and easy to carry, is the only piece of equipment

geneticist for the Intermountain Forest and Range Experiment Station at Ogden. Both men are stationed at Ephraim, Utah.

C. Seed Collection, Cleaning and Storage


01/02/2012


01/04/2012


01/03/2012


01/02/2012


01/02/2012

RANGELAND SPECIES GERMINATION THROUGH 25 AND UP TO 40 YEARS OF WAREHOUSE STORAGE

Richard Stevens
Kent R. Jorgensen

ABSTRACT

Germination results are presented from seed stored in an open warehouse in Sanpete County, UT, for 19 shrub, 16 forb, and three grass species for 25 years, and 12 shrub, 20 forb, and 29 grass species for 0 to 40 years. Germination, longevity, and afterripening are discussed for each species and group of species through various periods of storage. Each species exhibited its own unique germination characteristics that varied with source and age of seed. Some species' viability increased with increasing age while others decreased with age.

INTRODUCTION

In 1981 Stevens and others published seed germination data for 32 shrub and forb species stored in an open warehouse through 15 years. These data along with 20 and 25 years germination data for seed of the same species and sources and six additional species are included in this report. In addition, germination results are given for 61 shrub, forb, and grass species with 0 to 40 years of storage.

A limiting factor to range rehabilitation can be the availability of quality seed of desired species at affordable prices. With most wildland species good seed crops are not produced every season: seed needs to be obtained in good years and stored until needed. It is not uncommon to store commercially produced seed. Seed may have to be stored for a few months to many years. Utah State law requires that marketed grass seed be tested every 18 months, and forb and shrub seed every 9 months. These requirements can differ by State. Rules and procedures for testing seed have been established for many wildland species (Stevens and Meyer 1990). Stored seed is generally not tested on a regular basis or prior to seeding when used by the person or agency storing it. Some species possess considerable afterripening, with maximum germinability not reached for a number of years following collection. Some species do not retain viability well, while others experience little change over long periods of storage. To obtain maximum seeding results and maximum return of dollars spent, it becomes imperative to know germinability over years and how long a species can or should be stored. Germinability of each species will affect the seeding rate.

Germination data of some range grasses stored a number of years have been reported (Hafenrichter and others 1965; Little 1937; Tiedemann and Pond 1967). However, longevity germination studies of wildland shrubs and forbs have been somewhat limited. Springfield (1968, 1970, 1973, 1974) worked with germination and longevity of stored winterfat (*Ceratoides lanata*) and fourwing saltbush (*Atriplex canescens*) seed. Longevity reports on germination of stored winterfat (Stevens and others 1977) and antelope bitterbrush (*Purshia tridentata*) seed (Giunta and others 1978) have been made.

Plummer and others (1968) listed the duration of good viability for 44 shrubs, 24 forbs, and five grasses. Plummer and others (1970) also reported germination results after relatively short periods of storage on seed of a number of native shrubs and forbs. Two works from the U.S. Department of Agriculture, Forest Service (1948, 1974) included information on germination and longevity studies for native trees and shrubs. Van Haverbeke (1989) reported on viability of 20-year-old ponderosa pine (*Pinus ponderosa*) seed. Kay and others (1984) reported on germination of seed of 22 Mojave desert shrub species following 9 years of storage. Kay and others (1988) ran germination tests on seed of 115 desert grasses, forbs, and shrubs that had been stored for up to 14 years.

Seed of rangeland species in the Intermountain West are commonly stored in open, unheated, and uncooled warehouses and granaries, sometimes for extended periods. Little information is available as to the length of life of many warehouse-stored rangeland seeds.

METHODS

Study 1: Germination Through 25 Years of the Same Seed Sources—During the fall of 1963, current seed of 19 shrub, 16 forb, and three grass species (table 1) were hand-collected from native stands or purchased from commercial sources. Seed was commercially or hand-cleaned to 85 percent purity or higher, placed in cotton bags, and deposited in metal file cabinets in an open warehouse in Ephraim, Sanpete County, UT, for the duration of the study. Over 25 years (1963-88), temperature in the warehouse ranged from a low of –29.9 to a high of 38.3 °C. Mean daily temperatures during winter, spring, summer, and fall periods were –3.3, 6.7, 20, and 7.2 °C, respectively.

Germination tests on the stored seed were conducted in February of 1965, 1966, 1967, 1968, 1970, 1973, 1978, 1983, and 1988. These dates marked the beginning of the

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Paper presented at the Symposium on Ecology, Management, and Restoration of Intermountain Annual Rangelands, Boise, ID, May 18-22, 1992.
Richard Stevens is Project Leader and Research Biologist, Utah Division of Wildlife Resources, Ephraim, UT 84627. Kent R. Jorgensen is Assistant Project Leader and Research Biologist, Utah Division of Wildlife Resources, Ephraim, UT 84627.


01/23/2012


Wyoming Big Sage Brush
1800
Lot# 07112
01/03/2012

D. Seed Quality

Seed Quality Testing for Range and Wildland Species

Richard Stevens and Susan E. Meyer

The seed bag label provides assurance as to the identity and quality of the seed. Each lot of seed offered for sale is required by law to be properly and truthfully labeled. Label information comes from two sources. The seed producer or dealer provides the common and scientific name, variety, and class (such as foundation, breeder, certified, registered) designations where appropriate, lot number, seed origin, date of harvest, and name and address of the seller. The laboratory performing the seed quality test provides the seed quality information.

People who buy seed for range, wildland, and disturbed land restoration often use nontraditional species that present problems in seed quality evaluation. The seed may be sold at low purity or may not be readily germinable under commonly used test conditions. Seed of nontraditional species is often expensive, making an accurate evaluation of quality even more important.

Government, commercial and private seed-testing laboratories in the United States and Canada are required to use standard procedures as outlined in Rules for Testing Seeds, published by the Association of Official Seed Analysts (AOSA 1988). State seed laboratories perform standard seed tests on request and can answer questions (Table 1).

Quality evaluation for agricultural crop seed is usually a straightforward process. Rules for testing crop species have been standardized and in place for many years. This is not the case for many species used in range and wildland rehabilitation. Accurate and repeatable seed quality evaluation procedures have only recently become available for many of these species.

When a laboratory receives a seed sample of a species not in the AOSA Rules, the analyst uses procedures developed from experience and best judgement. Under these circumstances, results can vary substantially from one laboratory to another, resulting in confusion as to the actual meaning of the label information. This problem is worsened by the fact that standard purity and germination procedures often do not work well on wild-collected native seed, and labeling conventions do not permit adequate explanation. The seed buyer must be educated to understand the implications of label information.

A survey of Intermountain range and wildland species in Rules for Testing Seeds showed that some of the grasses and most of the forbs and shrubs commonly used in rehabilitation were without official procedures for seed quality evaluation. In 1985, the Utah Department of Agriculture, the Utah Division of Wildlife Resources, and the Forest Service, Intermountain Research Station, U.S. Department of Agriculture initiated a project to develop seed quality evaluation procedures for significant species. The project researchers have cooperated with the AOSA in securing adoption of the procedures as official Rules. Official testing procedures for 21 species have been developed to date (Table 2). The project has also generated insight into some communication problems in the wildland seed marketplace that are better addressed through education than through regulation.

Seed-testing is generally a two-step process. The first step, the purity test, determines what fraction of the sample, by weight, consists of pure seed (species being sold), other crop seed, weed seed, and inert material. The second step, the viability test, determines what percentage, by number, of the pure seed is viable.

Purity Testing

The AOSA Rules define the weight of approximately 2,500 seed units as the minimum sample for purity analysis. A major problem in purity testing is obtaining a representative subsample for analysis. Mechanical seed sample dividers are used to assure that the bulk sample is adequately mixed for subsampling. This works well only for free-flowing seed. In general, the lower the sample purity, the more difficult it is to obtain a representative subsample.

Seeds and seed units are not always synonymous. For example, if intact one-seeded fruits (whether or not they contain a seed) are defined as the seed unit, all unfilled fruits must be included as pure seed. This results in an increase in purity values but an accompanying decrease in viability percentage. If only visibly filled fruits are included as pure seed, purity values decrease but viability percentages increase. These changes in purity and viability are not necessarily proportional. Unfilled fruits are lighter than filled fruits, so then tend to "count" more in the viability test (based on numbers) than in the purity analysis (based on weight).

From the point of view of the seed analyst, high purity is always desirable because it improves the accuracy and ease of testing. Most agricultural crop seed is sold at high purity. This is not the case for many wildland seed crops (Table 2). The cost of cleaning seed of many wildland species to high purity is not justified, because the seed

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Richard Stevens
Kent R. Jorgensen

Chapter 27

01/12/2012

Seed Testing Requirements and Regulatory Laws

Federal and State seed laws require that seed used on range and wildland sites be officially tested and appropriately labeled or tagged. It is the responsibility of the seed distributor (who may be the producer, collector, or broker) toward the end user to properly tag each container of seed to comply with these laws. An analysis tag is always required. If seed has been Certified, a seed certification tag will also be attached.

Seed-testing laws and truth-in-labeling laws require that all commercial seed be tagged with the appropriate analysis tag, and that each tag has minimum statements about seed quality and origin. Improperly tagged seed may be subject to legal actions that stop sale movement and use. Violation of State and Federal laws can result in considerable fines.

Information on the analysis tag comes from two sources: 1. The seed producer or dealer provides the common and scientific name, variety (if applicable), lot number, State of origin, year of harvest, and name and address of seller. 2. The laboratory performing the seed test reports percent purity, inert matter, other

USDA Forest Service Gen. Tech. Rep. RMRS-GTR-136. 2004

AOSA
RULES FOR TESTING SEEDS

Volume 1. Principles and Procedures

Published by the
Association of Official Seed Analysts

Effective October 1, 2010

Wyoming Seed Analysis Laboratory

749 Road 9

Powell, WY 82435

Laboratory Report of Analysis

Account No.	Date Received	Date Completed	Lab Number
224	12/09/11	12/13/11	11-1579

Bureau of Land Management
3900 East Idaho Street
Elko NV 89801

Sender's Information*

Product	VNS
Kind	Sagebrush, Wyoming big
Genus/Species	Artemisia tridentata wyomingensis
Lot Number	ARTRW-K-SP
Class	Source Identified

*The information provided here is that of the sender and not of the laboratory.

Purity Analysis

Pure Seed Components In .8382 grams.		Purity
Sagebrush, Wyoming big	*Artemisia tridentata wyomingensis*	24.82%

Purity Grams Required	.75	Weed Seed	0.00%
Noxious Grams Required	7.5	Crop Seed	0.00%
Grams Submitted	338.44	Inert Matter	75.18%

Viability Analysis

Germ Date	Germination %	Dormant %	Hard %	Total Viable	PLS%
-N-	-N-	-N-	-N-	-N-	-N-

Other Crop Seeds None Found

Noxious Weed Seeds: None Found
States: WESTERN
In 7.5 Grams.
(P)Prohibited Noxious (R)Restricted Noxious

Weed Seeds: None Found

Other Determinations
Sagebrush, Wyoming big TZ test 83 %

Status: None

Additional Sender's Information*
Sampled by Wayne Anderson of the Utah Crop Improvement Assoc.
Vendor: The Maple Leaf Company

Remarks
No AOSA seed testing rules for: Sagebrush, Wyoming big.
Inert Matter: Chaff and floral parts.

Tests Requested Purity, Noxious exam, TZ test. No other tests requested.
Services Requested Rush.

WARRANTY: We warrant that the purity and germination test results reported on this form have been carried out in accordance with AOSA rules unless otherwise specified. Test results reflect the condition of the submitted sample and may not reflect the condition of the seed lot from which the sample was taken.
DISCLAIMER OF WARRANTIES: WE MAKE NO OTHER WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Signature: [signature]

Registered Seed Technologist Seal #45

Wyoming Big Sagebrush, VNS

Pure: 24.82 %	Germ: 83.00 %
Crop: 0.00 %	Hard: 0.00 %
Inert: 75.18 %	Weed: 0.00 %
	Origin: UT

No Noxious Found
Test Date: 12.13.2011

ARTRW-K-SP
Net Weight 40 Lbs.

THE MAPLE LEAF CO.
SEED DIVISION

450 South 50 East
Ephraim, UT 84627
435.283.4400

E. Identifying Source of Seed Collection and Collection Permits

SOURCE IDENTIFIED SEED

Species Name:	Artemisia tridentata/wyomingensis
Common Name:	Wyoming Big Sagebrush
Germplasm ID,Gen.:	____, G0
G0 County,State,Elev.:	Sanpete,UT,4800-6000 ft.
G0 Indigenous? No	Cert. #: WC-4611
G0 Natural Track? No	Lot #: ARTRW-K-SP

The seed in this container, with label properly affixed thereto, was produced in compliance with the Seed Certification Requirements and Standards established by the Utah Crop Improvement Association for the SOURCE IDENTIFIED CATEGORY of certified seed. No warranty is expressed or implied as to the fitness for particular purpose or performance of the seed. This tag must be accompanied by a seed analysis label to comply with state and federal seed laws.

•UTAH CROP IMPROVEMENT ASSOCIATION•

•Utah State University, 4855 Old Main Hill, Logan, Utah 84322-4855 (435)797-2082 • www.utahcrop.org

MEMBER OF ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES

Number

85469677

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VEGETATIVE OR MINERAL MATERIAL NEGOTIATED CASH SALE CONTRACT

($2,499 or less for vegetative material)
($2,000 or less for mineral material)

State: Utah

Field Office/District: Richfield

Date of Sale: 11-30-11

Name of Purchaser (*First, Middle, Last*): Maple Leaf Seed Company

Address (*include zip code*):
450 S. 50 E
Ephraim Ut 84627
283-4400

KIND OF PRODUCT	UNITS	EST. QTY.	RATE/UNIT ($)	PRICE ($)
wy Sage	lbs	3000	.09	270.00
ROAD MAINT. FEE or MAT. SITE REC. FEE				
		TOTAL PURCHASE PRICE		270.00

Purchaser is liable for total purchase price shown above. There will be no refunds. Additional payment, if any, will be made in accordance with Sec. 1 (c). This contract is made under terms of Sec. 1 ( ) and the stipulations indicated.

Contract Expires (date): 12-4-11

ALL MATERIAL MUST BE REMOVED FROM THE CONTRACT AREA BY MIDNIGHT OF THIS DATE.

Location of Sale (Contract Area): BLM ONLY
T 14S R 2E Sec. 20-21
T 13S R 2E Sec 33

RECEIVED AS PAYMENT IN FULL

ACCOUNT	COUNTY	PRICE
P.D. (5881)	Sanpete	
O & C (5882)		
CBWR (5897)		
FEHRF (5900)		
Road Maintenance Fee (9110) or (9120)		
Material Site Reclamation (5310) or (5320)		

Purchaser certifies that he/she is twenty-one years of age or older and if purchasing timber is a citizen of the United States. Purchaser acknowledges that he/she has read and understands the terms and conditions of this contract and any attached provisions.

Signature of Purchaser: Lloyd Stevens - Maple Leaf

Signature of Authorized Officer: Sandy K Mecham

Form 5450-5 (January 2002)

SEC. 1 CONTRACT TERMS
(check appropriate block)

X ☐ (a) All materials in contract area in excess of estimated quantity are reserved by the United States.
☐ Severance and/or ☐ Removal in excess of that quantity will subject the Purchaser to trespass action.

☐ (b) The quantity of material is a predetermined amount and may be more or less than the actual amount.

X ☐ (c) Payment shall be made prior to
☐ Severance and/or ☐ Removal of additional units which exceed estimated quantity.

SEC. 2 GENERAL STIPULATIONS
(check appropriate block)

Removal of all materials **must** be in strict accordance with instructions of the Authorized Officer and the following conditions and requirements:

No material may be ☐ severed ☐ removed unless marked or otherwise designated by the Authorized Officer. Title to material sold under this contract shall remain in United States and shall not pass to Purchaser until such material has been removed from the contract area. If this contract involves severance of vegetative material, risk of loss shall be borne by the Purchaser after the material is cut. Nothing herein shall be construed to relieve the Purchaser from liability for any breach of contract or any wrongful or negligent act or for any violation of any applicable regulation of the Department of the Interior.

The Purchaser shall take such measures for prevention and suppression of fire on the contract area and other United States lands as are required by applicable laws and regulations. The Purchaser shall dispose of refuse in accordance with instructions of the Authorized Officer.

If the Purchaser violates any of the provisions of this contract, the Authorized Officer may, by written notice, suspend any further operations of the Purchaser, *except* such operations as may be necessary to remedy any violations. If the Purchaser fails to remedy all violations within thirty (30) days after receipt of the suspension notice, the Authorized Officer may, by written notice, cancel this contract, take appropriate action to recover all damages suffered by Government by reason of such violation, and inform the Purchaser that they will not be issued any further contracts for up to three years.

Forest Product Removal Receipt No(s): _____

SEC. 3 SPECIAL STIPULATIONS
(check appropriate block)

The X ☐ Special Provisions and/or ☐ Map(s) attached are made a part of this contract and are to be complied with.

T 14S R 2E Sec. 3-4-5
T 13S R 2E Sec. 8-17-20-19

(See instructions on reverse)

PURCHASER

90617

THE MAPLE LEAF CO.
SEED DIVISION
450 SOUTH 50 EAST
EPHRAIM, UTAH, 84627
P) 800.671.5323 maplelf@cut.net

SEED SOURCE LOG & COLLECTION INFORMATION

Date: 12 / 16 / 11

Laws & Regulations

Before we purchase your, seed state law requires we obtain the following:

A valid seed permit:
It is illegal to harvest, transport or sell seed in Utah without a permit or proof of ownership. Seed collected from private land requires a permit from the landowner stating you have permission to collect the seed. The permit must state the date of issue and the name, address and phone number of the landowner. If seed is collected from Federal, State or any other government agency land, a valid permit from the governing agency must accompany the seed.

The amount of seed you transport and/or sell must be less than or equal to the amount of seed issued on the permit. If you violate this law your seed is subject to search and seizure by law enforcement.

Sales receipt and transfer of ownership/collection log:
We require that you sign a transfer of ownership stating you have legal rights to sell the seed. Along with your signature, we require a photo copy of your identification and a right thumb print.

Leyes y Reglas

Antes de comprar su semilla, es necesario lo siguente:

Un permiso valido:
Es ilegal juntar, transportar o vender semilla sin permiso o la prueba de propeidad. La semilla reunió de la tierra privada requiere un permiso del hacendado o dueno que indica usted tiene permiso para juntar la semilla. El permiso debe indicar la fecha de emisión y el nombre, la dirección y el número de teléfono del hacendado.Si semilla es reunida de Federal, el Estado o cualquier otra tierra de agencia de gobierno, un permiso válido de la agencia directiva debe acompañar la semilla.

La cantidad de semilla usted transporta y/o vende debe ser menor o igual que a la cantidad de semilla publicada en el permiso. Si usted viola esta ley que su semilla es susceptible buscar y la toma por aplicación de la ley.

El recibo de ventas y transferencia de tronco de propiedad/colección:
Requerimos que usted firma una transferencia de indicar de propiedadllo tiene los derechos legales para vender la semilla. Junto con su firma, nosotros requerimos una copia de foto de su identificación y un pulgar derecho imprime.

Collector Information:

Name/Nombre: Shannon Sterner
Address/Direction: 3259 S 675 W
City/Ciudad: Bount. ful **State/Estado:** Ut
ZIP/Codigo Postal: 84010
Phone#: (801) 295-2529 **Plate #:**
310-2296

Seed and Collection Site Information:

Species: Rose hips R. eglanteria
Description of Collection Site: Davis County
State: UT **County:** Davis **Elevation:** 4300
Ownership: **Permit Info:**
X _____ ___/___/___
Signed/Firma **Date/Fecha**

I certify that this information is accurate and true. By signing the line above, the collector testifies that he/she has legal rights to sell the seed on this collection log.

Yo testifico que este information es correcta y verdad. Firmando la línea arriba, el colector atestigua que él tiene derecho legal a vender la semilla en este registro de la colección.

WEIGH LOG / REGISTRO DE PESAR

Species/Collector 1: RoWo

Weight:	Deducts:	Total:
140	-0	140
166	-0	166
152	-0	152
147	-0	147
163	-0	163
147	-0	147
92	-0	92
		1,007

Species/Collector 1: _____

Weight:	Deducts:	Total:

Right-Hand Thumb Print:

Impression derecha del pulgar:

SOURCE IDENTIFIED SEED

Species Name:	*Artemisia tridentata/wyomingensis*
Common Name:	Wyoming Big Sagebrush
Germplasm ID,Gen.:	____, G0
G0 County,State,Elev.:	Sevier,UT,5900-6800 ft.
G0 Indigenous? No	Cert. #: WC-1047
G0 Natural Track? No	Lot #: 07112

The seed in this container, with label properly affixed thereto, was produced in compliance with the Seed Certification Requirements and Standards established by the Utah Crop Improvement Association for the SOURCE IDENTIFIED CLASS of certified seed. No warranty is expressed or implied as to the fitness for particular purpose or performance of the seed. This tag must be accompanied by a seed analysis label to comply with state and federal seed laws.

•UTAH CROP IMPROVEMENT ASSOCIATION•

•Utah State University, 4855 Old Main Hill, Logan, Utah 84322-4855 (435)797-2082 • www.utahcrop.org

MEMBER OF ASSOCIATION OF OFFICIAL SEED CERTIFYING AGENCIES

Weed% 0.00 PLS Weight(lbs):

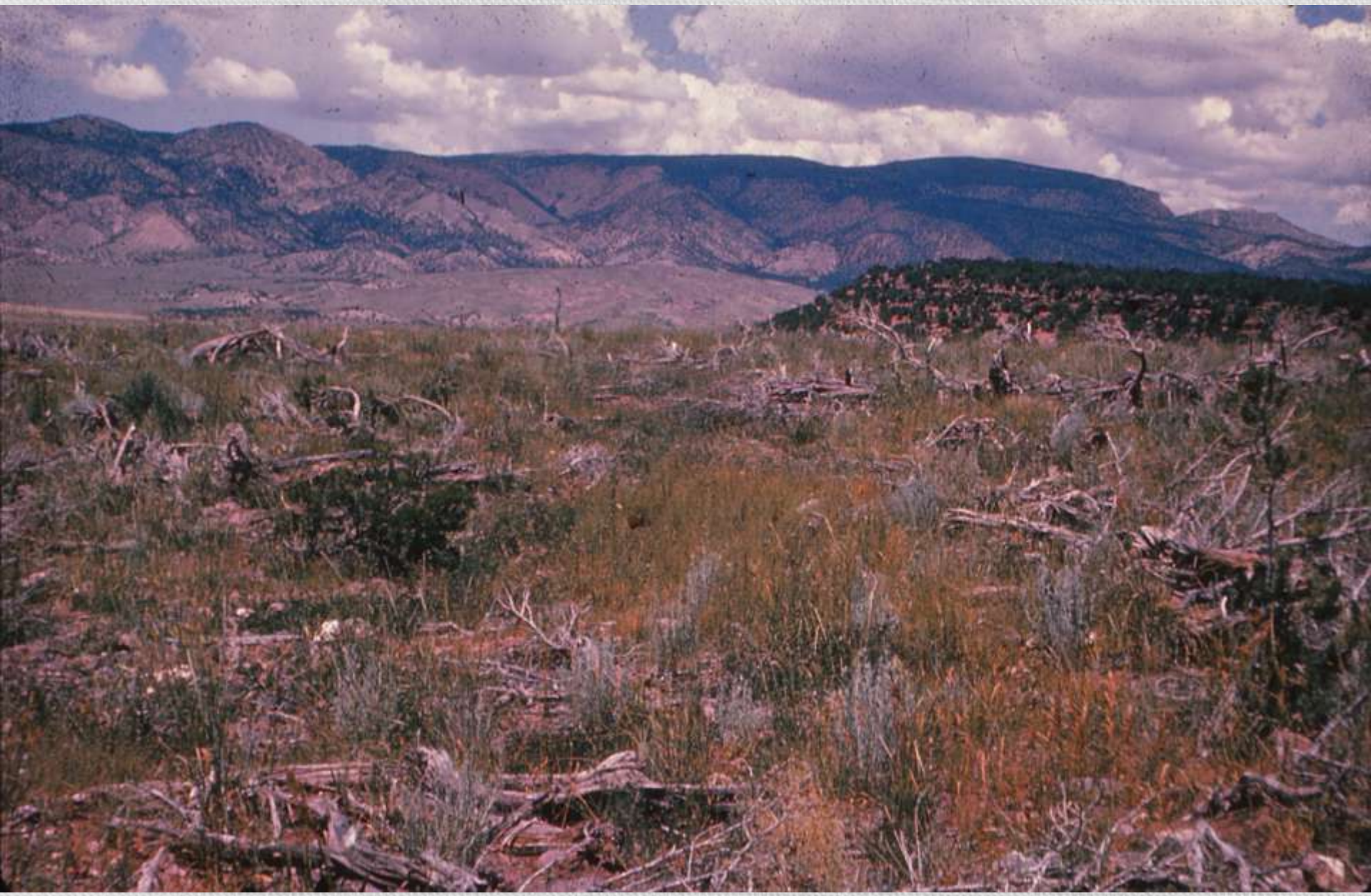
Customer Order Number: 56005000000017

NOTICE TO THE BUYER: Stevenson Intermountain Seed, Inc. guarantees its seed to be of promised quality and true to name as specified, within recognized tolerances. No other warranty is made, expressed or implied. Our liability to the buyer or others is limited to the amount of the purchase price of the seed. Seed not accepted on the above terms and conditions must be returned within 10 days in the original unopened containers.

01/03/2012

F. Seeding Sagebrush


01/02/2012




01/23/2012


01/23/2012


01/23/2012

G. Seed Companies

CERTIFIED SEED DIRECTORY

Membership and Officers
Acres Applied for Certification
Summary of Certification Regulation

UTAH CROP IMPROVEMENT ASSOCIATION

01/24/2012

UTAH Certified Seed

H. Seed Purchase


10/31/2011

Conclusions


10/31/2011

Contributors

Stevenson Intermountain Seed

Plummer Seed

Maple Leaf Company

Utah Division of Wildlife Resources

USDA Forest Service Shrub Science Laboratory

USDI Bureau of Land Management