

A. NOTICE OF NAMING AND RELEASE
OF
'TIMP' UTAH SWEETVETCH (HEDYSARUM BOREALE Nutt.)
FOR

SOIL IMPROVEMENT AND EARLY SPRING FORAGE FOR BOTH WILDLIFE
AND LIVESTOCK

BY THE:
UPPER COLORADO ENVIRONMENTAL PLANT CENTER; Meeker, Colorado
and the
UTAH DIVISION OF WILDLIFE RESOURCES; Ephraim, Utah
and the
COLORADO AGRICULTURAL EXPERIMENT STATION-COLORADO STATE
UNIVERSITY; Fort Collins, Colorado
and the
UTAH AGRICULTURAL EXPERIMENT STATION-UTAH STATE UNIVERSITY;
Logan, Utah
and the
UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE-INTERMOUNTAIN RESEARCH STATION; Ogden, Utah
AGRICULTURAL RESEARCH SERVICE-FORAGE AND RANGE RESEARCH
LABORATORY; Logan, Utah
and the
SOIL CONSERVATION SERVICE-ECOLOGICAL SCIENCES DIVISION;
Washington, DC

The groups listed above announce the naming and release of
'TIMP' Utah sweetvetch (Hedysarum boreale) for commercial
production and marketing of seed and plants based on results
of coordinated and independent study of native Utah
sweetvetch collections by the sponsors.

'TIMP' Utah sweetvetch is a seed-propagated cultivar
recommended for use on rangelands, upland wildlife habitat
improvements, and critical areas within its historically
recognized natural range. This area is generally described
as the Intermountain Region of Utah, Colorado, Wyoming and
Idaho (Major Land Resource Areas 47-Wasatch/Uinta Mountains,
34-Central desertic basin, mountains, and plateaus. 48A-
Southern Rocky Mountains).

Utah sweetvetch grows in areas with 12 to 18 inches of
annual precipitation preferring well-drained, basic sites.
It is found on soils ranging from sands to heavy clay with
wide pH variations.

'TIMP' Utah sweetvetch is a cool-season perennial,
herbaceous legume. This variety is upright (1-2 ft.),
multiple branched, leafy, with abundant attractive pink
flowers producing long lomented seedpods (chainpod) forming
in clusters on multiple seed stalks. Once established it is
persistent, relatively long lived, more tolerant to other

species than competitive i.e. established acceptable stands under dense Russian thistle.

The foliage of Utah sweetvetch is palatable to big game and livestock. 'Timp' produces limited basal green foliage during winter. 'Timp' provides best forage in early spring to mid summer.

'Timp' has a long tap root. Through breeding and selection it has enhanced nitrogen fixing capability. A specific commercial inoculum is available to improve chances for nodulation and nitrogen fixation. 'Timp' when properly treated with commercial Rhizobium and established will improve soil nutrients, complementing diversity and biomass production of companion species. It is not a strongly competitive species at any stage of its life cycle.

'Timp' is highly susceptible to browsing/grazing damage during establishment because of its desirability.

ORIGIN

The genetic material originated from a site at the base of the Wasatch Mountains and east of Orem, Utah Co., Utah and 0.5 mile north of the mouth of Provo Canyon. The collection site ranges from 4800 to 5200 feet in elevation and has an annual precipitation of 14 to 16 inches. Soils at the site are well-drained, stony loam. Associated native vegetation consists of scattered Gambels oak and cliff rose, mountain big sagebrush, bluebunch wheatgrass, needle and thread and arrowleaf balsamroot.

Fifty per cent of the seed in 'Timp' came directly from this site (9040975).

The other 50 per cent came from plants grown from seed originating from the Orem site. However, these plants were grown and individuals selected based on two important traits, seed production and dinitrogen fixation. This select group of plants was considered improved and unified as 9024375 (Cuany Documentation attached). 9024375 was increased in a separate block. Seed produced was blended at the 50 per cent level with 9040975.

The breeders block for 'Timp' was established using 50 per cent 9040975 and 50 per cent 9024375. The progeny called 'Timp' is numbered T9024808. (A Plant Introductory Number will be assigned).

There are no released varieties of Utah sweetvetch for comparison.

DESCRIPTION

Multiple stems, 1 to 2 feet tall, emerging from a woody crown. Leaves alternate, odd-pinnate, 11 to 31 elliptic leaflets, glanddotted and highly variable in size, shape, and hairiness. Inflorescence an elongated, loosely arranged raceme with few to several showy pink flowers. Blooms late June, continuing through the summer season. Fruit matures into a flattened, constricted, chainlike pod.

ADAPTATION

'Timp' Utah sweetvetch is best adapted to well-drained rocky, gravelly, sand clay loam soils. It has proven acceptable performance where the annual precipitation ranges from 12 to 18 inches.

PERFORMANCE

Extensive initial evaluation trials, seed production trials, seed processing/conditioning trials, germination trials, laboratory trials, and field trials across the Upper Colorado Region have been conducted over the last 20 years on this species by the releasing agencies. Over 100 sources of 'sweetvetch (Hedysarum), representing both native and introduced species, have been compared in this evaluation/selection process.

'Timp' was selected based on its seedling vigor, site adaptability, persistence, seed production, dinitrogen fixation; and establishability.

CLASSES OF MATERIALS AVAILABLE

Breeder, Foundation, Registered, and Certified Classes of seed will be recognized. Criteria for all classes of seed will be included in the Utah and Colorado Seed Certification Standards.

MATERIAL DISTRIBUTION

The Upper Colorado Environmental Plant Center, Meeker, Colorado, 81641, will maintain 1) 9024375 a component of the Breeders block, 2) the Breeders block (a 50:50 combination of 9024375 and 9040975), and 3) 'TIMP' (9024808) Foundation seed supplies. Distribution of Foundation seed from requests by commercial growers will be received by Cooperating Agencies and coordinated by the State Crop Improvement Association.

The Colorado Varietal Release Committee reviewed 'Timp' Utah sweetvetch January 19, 1994 and recommend it for release to commercial growers and users.

Approval Signatures:

COO W L L
 Dr. Charles Laughlin, Director
 Colorado Agricultural Experiment Station
 Fort Collins, Colorado

Date: 4/20/94

H Paul Rasmussen
 Dr. H. Paul Rasmussen, Director
 Utah Agricultural Experiment Station
 Logan, Utah

Date: 5-10-94

Duane L Johnson
 Duane L. Johnson, State Conservationist
 USDA Soil Conservation Service
 Lakewood, Colorado

Date: 3/1/94

John E Beckwith for
 Norman W. Priest, Acting State Conservationist
 USDA soil Conservation service
 Salt Lake City, Utah

Date: 7/7/94

B Timmerh
 Administrator,
 for Agricultural Research Service
 U. S. Department of Agriculture

Date: JUN 09 1994

Kevin E Evans
 for Denver P. Burns, Acting, Station Director
 USDA Forest Service, Intermountain Research Station
 Ogden, Utah

Date: 7/11/94

E. Durant McArthur
 Dr. E. Durant McArthur, Project Leader
 USDA Forest Service, Shrub Sciences Laboratory
 Provo, Utah

Date: 8 July 1994

R G Valentine
 Robert G. Valentine, Director
 Utah State Division of Wildlife Resources
 Salt Lake City, Utah

Date: 7 JUN 94

Scott Robertson
 Scott Robertson, President/Administrative Board
 Upper Colorado Environmental Plant Center
 Meeker, Colorado

Date: 7/21/94

Peter Smith
 Peter Smith, Director
 USDA Soil Conseration Service, Ecological Sciences Div.
 Washington, DC

Date: _____

B. ORIGIN AND BREEDING HISTORY OF THE VARIETY

The genetic material originated from a site at the base of the Wasatch Mountains east of Orem, Utah Co., Utah and 0.5 mile north of the mouth of Provo Canyon. The collection site ranges from 4800 to 5200 feet in elevation and has an annual precipitation of 14 to 16 inches. Soils at the site are well-drained stony loam.

Fifty per cent of the Breeders seed for 'Timp' comes directly from the Orem site and is numbered 9040975. The other 50 per cent came from plants selected through a single-plant selection process conducted by Dr. Robin Cuany and numbered 9024375.

History of Utah Sweetvetch Strain 9024375

[Updated January 1994 by R.L. Cuany, N. Oleski and G. Thor.]

The origin of the strain 9024375 of Utah sweetvetch (Hedysarum boreale Nutt.) is by two stages of single-plant selection from a commercial seed lot obtained in 1976 from Stewart and Sons, Ephraim, UT. The selection was first for capacity to produce seed, measured in the years 1978-81 on plants spaced 30" apart in the nursery. Per-plant yields of cleaned seed ranged from 0 to 33 g among about 102 individuals, but there was a considerable fluctuation from year to year, some plants showing a distinct biennial tendency to bear a lot of seed followed by a little, or vice-versa. Average seed yield of plants in the nursery was 8.6, 5.1, and 7.8 g in 1979, 1980, and 1981 (there was flowering but no seed set in 1978, even though the nursery was established in 1977). Average yield of 14 selected plants (Table 1) was 23.0 g (range 10.2 - 33.1) and their 100-seed weight ranged from 0.68 to 1.33 g. In addition to high average yield per plant over three years some attention was paid to greater consistency of production.

Thirteen of these open-pollinated progenies (except R-5-7), plus three best-yielding other progenies of the same source material in another nursery, were subjected to seedling growth test and nitrogen fixation test in the greenhouse, as described hereafter (Oleski, Cuany, and Thor, 1982).

Seeds were scarified, germinated in the laboratory and transplanted after 3 days to clay pots containing Fort Collins clay loam soil mixed 1:1 with sand, in four replications. Seedlings were inoculated at transplanting by dusting with peat-based inoculum (Hedysarum Spec 2, from Nitragin Co.). Greenhouse temperatures were maintained at 24/15°C day/night and two 500 watt lights were on from 6:00 a.m. to 8:00 p.m. After three weeks of growth, seedlings were thinned to five per pot and allowed to grow to eight

weeks, at which time the acetylene reduction assay was employed on the seedlings from each pot after shaking off loose soil. After the incubation in 10% acetylene atmosphere, gas samples were extracted for gas chromatography. Seedlings were separated into nodules, roots, and shoots for obtaining dry weights.

No significant differences were observed between progenies for acetylene reduction to ethylene, expressed as $\mu\text{mols g}^{-1} \text{ nodule h}^{-1}$, called specific nodule activity (SNA) which is a measure of the capacity to fix dinitrogen. Since rates apparently varied from 14 to 78 μmols , it was thought worthwhile to exert mild selection toward higher SNA rates. On the basis of ethylene produced per seedling rather than per gram of nodule in one hour, we selected 12 families as shown in Table 2, paying some attention also to shoot and root dry weights, which were almost significantly different among families ($p < .08$ and $.15$, respectfully). Shoot weight was strongly correlated with nodule weight ($r=0.85$), root weight (0.84) and acetylene reduction per plant (0.67). Nodule weight was also correlated with root weight ($r=0.80$) and acetylene reduction per plant (0.68), which in turn was correlated, though less strongly ($r=0.59$), to SNA per gram.

From results of this test, we chose 12 parents to represent the best of the group and used 12 progeny plants from each parent to make up recombination blocks of similar sets (half-sib progenies) in Meeker, Fruita, and Fort Collins. The set of 144 plants in Meeker is the breeders' seed block of strain 9024375 being multiplied at the Upper Colorado Environmental Plant Center. Although we have data on subsequent seed production and forage vigor of the 12 families at Fort Collins and at Meeker, no further reduction in the broadness of the synthetic was made. [However, a further cycle of selection within 9024375 was made by Boukheloua (1990) and Cuany (unpublished) for seedling vigor in a zero-mineral-N greenhouse experiment whose best plants (300 out of 3000) were then selected in the field for vigor and seed production. The second cycle has not been further multiplied or tested since the polycrossing of the final 50 plants.]

In view of the amount of selection involved, we regard the strain 9024375 as a selection out of, and not the same as the original Stewart's commercial seed. The selection was done by Colorado State University agronomists Cuany, Zemetra, Oleski, and Thor, and the multiplication by the UCEPC/SCS. Testing is also under UCEPC/SCS auspices, and has shown the value of blending 9024375 into the Orem-Bench based proposed cultivar 'Timp'.

The progeny from the blend is called 'Timp' and numbered 9024808. This product has been submitted for a Plant Introductory Number.

Table 1. Plants showing above-average seed yield; Hedysarum at Fort Collins

Plant	Seed yield (g) per plant			
	79 ¹	80 ²	81 ³	82
3-1-10	6.3	13.3	+ 14.7	
3-1-11		4.0	++33.1	
R-1-17	+		++23.9	
R-2-2	+	8.7	++23.7	
R-2-4	8.0	5.7	++23.1	
R-3-2	5.0	3.1	+ 12.6	
R-3-3		11.3	+ 10.2	
R-3-16	+		++22.7	
R-4-7		20.0	++25.7	
R-4-11	9.5	33.0	+ 13.6	
R-5-7	6.4	14.8	++32.7	
R-5-10	+	10.6	+ It.,	
R-5-12	12.4	5.0	++32.9	
R-6-1	15.6	4.7	++23.2	
5-3-11	-	-	7.9 ⁴	20
S-5-1	-	-	E.2	15
5-7-1	-	-	6.6	16

³ In 81, mean of 77 plants harvested was 7.8g; over 10g marked. All plants in this table had good yields at least 2 years out of 3.

⁴ Only 46 out of 192 plants had enough seed to be worth harvest at Stroh Farm in 81, and their mean yield, was 1.43g, so only the 3 highest yielders, as shown, were in the N test.

Table 2. Seedling assay 1982 of Sweetvetch for acetylene reduction and selection of twelve open-pollinated families on which T-9024375 is based.

Family Code	Progeny	SNA $\mu\text{moles C}_2\text{H}_4$ g^{-1} nodule hr^{-1}	Nodule D.Wt/ Plant	Root D.Wt/ Plant	Shoot D.Wt/ Plant	mg Nodule g^{-1} root	100- Seed Wt	Seed Yield rating 1988
			mg	mg	mg		g	
-	R-1-10	47.5	3.2	42	61	76	0.68	-
1	R-1-11	34.6	4.6	75	81	60	0.83	2.04
2	R-1-17	42.2	3.9	58	83	63	0.85	1.25
3	R-2-2	73.4	1.8	33	48	53	0.88	1.80
-	R-2-4	42.1	2.7	49	61	57	0.95	-
4	R-3-2	49.0	3.8	41	52	95	1.06	2.02
5	R-3-3	41.1	2.7	68	63	52	1.13	1.98
-	R-3-16	14.4	4.3	33	57	130	1.09	-
6	R-4-7	38.6	4.0	44	70	98	0.92	1.80
-	R-4-11	65.4	2.3	34	67	70	0.85	-
7	R-5-7*	-	-	-	-	-	1.04	2.09†
-	R-5-10	46.5	3.2	31	57	118	0.91	-
8	R-5-12	71.0	3.6	44	72	64	1.02	1.95
9	R-6-1	53.8	4.4	50	98	90	1.33	2.08
10	S-3-11	59.9	7.2	100	134	71	1.24	1.50
11	s-5-1	60.3	3.2	49	89	68	1.25	1.38
12	s-7-1	51.4	4.7	76	85	64	1.03	1.85
-	ISS	78.3	2.0	30	37	67	0.74	-
	Mean	51.1	3.6	50	71	77	0.99	1.81
	S.E.	13.6	1.3	16	17	-	0.09	-

* Added 1 family not tested in SNA/nodule assay, because good seed yield.

† Rated on a 0-5 scale from 215 live plants out of 24: planted. Family mean.

C. BOTANICAL DESCRIPTION OF VARIETY

cool season, herbaceous, perennial, leguminous forb.

Stems single to several from a woody crown, 1 to 2 feet tall.

Leaves alternate: odd-pinnate, with 11 to 31 elliptic leaflets, gland-dotted and highly variable in size, shape, and hairiness; broader below and narrower above, with narrow, pointed stipules.

Inflorescence an elongated, loosely arranged raceme with few to several showy pink, or purple flowers; having a hairy 5 parted calyx and typical pealike banner, wing, and keel petals; maturing into a flattened, constricted, and reticulate several sectioned loment-type pod, each section containing one brown to ebony, kidney shaped seed (Harrington) .

The seed unit is 2 to 3mm. long, 2 to 3mm. wide and 0.75mm thick. There are about 60,000 seeds per pound of 'Timp' from crops produced in cultivated fields. Seed counts representing both wild and cultivated populations are documented to range from 37,000 to 100,000 seeds per pound. Seed weights increased 17 per cent under test production environments compared to wild conditions. This supports the value of getting seed counts on each lot in order to reduce costs for overseeding, or poor stands because of too few seeds.

Full bloom occurs by mid June with seed maturity and harvest occurring from mid to late July.

Seed quality production at the Meeker UCEPC has ranged from 87 to 94 per cent germination with a 99 per cent purity.

D.

EVIDENCE - BIBLIOGRAPHY

'Timp' is the first released variety of Utah sweetvetch. Colorado and Utah scientists recognized this as an important native legume to the Intermountain West.

Evidence of performance deals entirely with the two individual components of the blend, Orem Bench source and selection T24375 and their relative performance compared to many regional sources. The decision to blend these two materials for the released product was made at a coordination meeting April 28, 1989 with U.S. Forest Service, Utah Division of Wildlife Resources, Agricultural Research Service, Soil Conservation Service, and Upper Colorado Environmental Plant Center (UCEPC).

Utah Division of Wildlife Resources (1991 correspondence) conducted field trials of 24 accessions over three decades, from which supportive data for successful use of the product has been developed.

Forest Service Shrub Sciences Laboratory has been involved in the historic work on the Orem Bench source of Utah sweetvetch primarily in Utah and Idaho.

Collections and trials have been conducted over a 29 year period in Utah, Colorado, Wyoming and Idaho. The genetic material in this released product has been a component of most trials conducted within the Great Basin and the Upper Colorado Region.

The Agricultural Research Service, Logan, Utah has learned and documented through extensive laboratory and field trials the value of Utah sweetvetch. Much of these data relate to the Orem Bench source of Utah sweetvetch.

Dr. Robin Cuany, Dept. of Agronomy upgraded the Orem Bench source by two stages of single-plant selection, first for seed production, secondly for seedling growth and third for nitrogen fixation. Twelve parents were selected to represent the best of the group and 12 progeny plants of each parent were used to make up the (breeders) recombination block of T24375. He views this strain a selection out of, and not the same as the original Orem Bench source.

The UCEPC began Utah sweetvetch collections of the region and worldwide sweetvetch introductions in 1975. The UCEPC has conducted multiple trials from initial screenings, field trials, to seed production/conditioning for the last 18 years. Over fifty collections were evaluated in projects between 1976 and 1990.

Much of the UCEPC documentation supports knowledge learned about the technology required to utilize and commercially produce and condition this unique product.

Three concerns relative to commercial seed production have been identified. The first and most significant is the impact of a seedborn insect that can damage 50 per cent of the seed crop. The insect is difficult to control. The second is the difficulty of removing damaged seed. Insect filled seed is the same size as healthy seed. Cooperative studies with Dr. Bob Hammon CSU Entomologist have identified the pupae (a seed weevil) and tested control techniques. A third problem is the laments breaking apart and shattering to the ground at or even before full maturity.

In 1989 the State of Utah Department of Agriculture initiated a project titled "Development and Demonstration of Commercial Seed Production Practices**utilizing T24808.

Salt tolerances of T24375 were documented finding germination at 12 days was not significantly reduced by concentrations up to 4 g/l of NaCl, a solution having EC of 7.3 mmhos/cm and -3.2 bars of osmotic potential. (Boukheloua, 1990).

PROJECTS, TRIALS AND REPORTS

Data in its complete report form is maintained by the individual agencies and is on file at the Upper Colorado Environmental Plant Center.

The following UCEPC Projects have either annual reports for the duration of the project and if terminated have a summary report. Individuals involved with the following projects: Glen Carnahan, Jarrell Massey, Sam Stranathan, Weidong Guo, Danny Goodson, Gary Noller, Randy Mandel.

Project 081001 Native forbs at the UCEPC. Native collections expressed 60 to 75 per cent survival.

Project 081058 Initial Evaluation of 46 Accessions of Sweetvetch. Wild harvest seed is extremely variable in quality between sites. Direct seeding was sporadically successful, perhaps reflecting seed quality variability and techniques. Significant variations were expressed throughout the collection. A standard performance profile was established allowing comparison of other plantings. Performance of introduced Hedysarum accessions were initially more aggressive but short lived compared to the Utah sweetvetch accessions. Seed born insects were observed.

Project 081072 Initial Evaluation of 42 Accessions of Utah sweetvetch.

Project 08S093 Seed increase/production trials of Utah sweetvetch.

Project 08S133 Seed increase of 9024375 Utah sweetvetch.

Project 088189 Seed increase of 9024808 'Timp' Utah sweetvetch.

Project 08S190 Seed increase in spaced planting block of Utah sweetvetch 9038330.

Project 08A111 Advanced evaluation of interagency Utah sweetvetch accessions.

Project 08A112 Kaiser/Sunnyside, Utah Mine Site Utah sweetvetch component.

Project 08A126, 08A127 Piceance Basin, Horsedraw evaluation of establishment and wildlife use of Utah sweetvetch.

Project 08A121 Direct seeded forbs and shrubs at Colowyo Coal.

Project 08137 Direct seeded forbs and shrubs at Soda Lake wildlife area near Pinedale, Wyoming.

Project 08A149 Utah sweetvetch selection.

Project 08A172 Direct seeded forbs, shrubs and grasses at Coyote Draw, Duchesne, Utah.

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United States
Department of
Agriculture

Soil
Conservation
Service

National Plant Materials Center
B-509, BARC-East
Beltsville, MD 20705
TEL 301-504-8175
FAX: 301-504-8741

To: Sam Stranathan, Colorado PMS

Date: 11 March 1992

Subject: Cultivar name clearance

File Code: 190-18-15

The attached communication regarding naming of the new Sweetvetch release proposed the names 'Orem' and 'Timp'. I took the liberty of checking these names through the Livestock and Seed Division, Seed Regulatory and Testing Branch, Agricultural Marketing Service, and found that these names apparently pose no conflicts. Note that since there is no formal variety registration system, you cannot be assured that this name is absolutely free of conflicts. I have enclosed the communication from the Livestock and Seed Division. If you require additional information, please do not hesitate to call.

Best regards,

Dr. Brian K. Maynard
Conservation Agronomist

enclosures



Appendix 2

USDA-SOIL CONSERVATION SERVICE
LAKEWOOD, COLORADO

Planting Guide

SPECIES: 'TIMP' UTAH SWEETVETCH,
(Hedysarum boreale Nutt.) 9024808

USES: Utah sweetvetch is a legume indigenous to the Intermountain West that has many beneficial characteristics. It's proven to be manageable and productive under cultivated conditions. In association with its compatible Rhizobium, Utah sweetvetch can fix atmospheric nitrogen and improve the nitrogen status of poor soils and harsh sites.

'Timp' is recommended for use on rangeland, mined land, critical areas and to improve upland wildlife habitats. It can be used for beautification and diversity in areas of low maintenance and low precipitation common to xeriscapes and roadsides.

'Timp' is not recommended for irrigated pasture or hayland where introduced legumes can be effectively used. It has limited application as a legume for cropland rotations.

It is most successfully seeded in the fall throughout its range. Treated seed has proven successful in spring plantings. It is not highly competitive with grasses, but has been successfully seeded where weedy broadleaved plants provided competition. Since it does not establish as aggressively as introduced legumes, patience is required for establishment.

DESCRIPTION: 'Timp' is the first release of this species. It is a cool-season perennial, herbaceous legume. This variety is upright (1-2ft.), multiple branched, leafy, with abundant attractive pink flowers. Abundant long lomented seed pods are formed in clusters on multiple seed stalks. In some areas it is called "chainpod" because of its unusual constricted pods.

ADAPTATION: 'Timp' should perform well throughout its natural range described as the Intermountain Region of Utah, Colorado, Wyoming, and Idaho (Major Land Resource Areas 1). 47-Wasatch/Uinta Mountains 2). 34-Central desertic basin, mountains, and plateaus 3). 48A-Southern Rocky Mountains).

While 'Timp' was primarily selected for use in western Colorado, central and eastern Utah, and southwestern Wyoming, tests are underway to determine its geographic adaptation to other neighboring areas.

Page 2 Continuation 'Timp' Plant Guide

ESTABLISHMENT: 'Timp' is best established where competition is controlled, and the seed is placed 1/4 to 1/2 inch deep in a firm seedbed and rolled firmly by a press wheel in the fall.

Cultivated field-produced seed are large (2-3 mm in length), with approximately 60,000 seeds per pound. One pure live seed pound per acre provides 1 to 2 seed per square foot. In pure stand seedings for seed production it's recommended to plant 4 to 5 pounds of pure live seed (PLS) per acre. 'Timp' can yield 150 PLS pounds of seed per acre.

In mixed seedings it's best seeded in a separate row from grasses. Seeding rate can be controlled best when seeded by itself and where the "in row" competition is less.

Commercial inoculum is available and recommended, (Rhizobium Hedysarum Spec. 2 inoculum, Liphatech *1, Milwaukee, Wisconsin).

The seed is firm but not hard like many legumes (approximately 30 percent dormant seed). If spring seeding is anticipated, light scarification or acidification is recommended. These processes permit quicker germination allowing the seedling to take advantage of usually limited spring moisture after germination.

MANAGEMENT: Soils low in phosphorus should be treated prior to planting with the phosphorus incorporated into the soil.

A dedicated grazing management system must be applied during establishment and continued if 'Timp' is to be a contributing component for any significant period of time.

*1 Mention of a trademark, proprietary product, or vendor does not constitute guarantee or warranty of the product by the U.S. Department of Agriculture, and does not imply approval to the exclusion of other products or vendors that may also be suitable.

United States
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UNITED STATES SOIL RCOW E200C
DEPARTMENT OF CONSERVATION 655 PARFET STREET
AGRICULTURE SERVICE LAKEWOOD, CO 80215-5517
FILE CODE: 190
DATE: Jan. 14, 1994

SUBJECT: 'Timp' Utah Sweetvetch response.

TO: Dr. E. Durant McArthur
Project Leader
Shrub Sciences Lab.
735 North 500 East
Provo, Utah 04606

Reply to: 4000

Date: November 9, 1993

Mr. Duane L. Johnson
State Conservationist
USDA-SCS
655 Parfet Street, Room E200C
Lakewood, CO 80215-5517

Dear Mr. Johnson:

Re: Your letter 10/14/93

We are writing in response to your letter to Dr. John Shanahan regarding the release of 'Timp' Utah sweetvetch. Comments that follow come from my own agency (U. S. Department of Agriculture, Forest Service, Intermountain Research Station, Shrub Sciences Laboratory) and the Utah Division of Wildlife Resources. We are pleased that this action is happening. Our thanks go to Sam Stranathan and others who have moved the release documentation to this point. We relieve that 'Timp' is a useful plant material that should be more widely available.

We make the following comments:

1. Our observations are that Utah sweet vetch is not shade tolerant (top of p. 2) to the dense shade produced by oak brush (*Quercus gambelii*) and other overstory shrubs. This doesn't negate the comment about its competitive ability with Russian thistle (*Salsola rpp.*), only a note of caution.

2. It was our understanding that 'Timp' was to be composed not only of the native material from the bench above Orem, Utah (9040973) and the selected material also originally from the Orem site that Dr. Robin Cuaney had developed but also some selected material drawing heavily from the Orem site from the USDA-ARS program in Logan, Utah (Ford et al. 1989, Johnson et al. 1989). The USDA-ARS material had two Orem lines (called in their reports Orem (our U1) and Hobbble Creek (our U9). The Hobbble Creek material was planted there in experimental plantings from a Orem Water Tank collection of ours. We just raise the question to make sure the origin portion is accurate. If it is incorrect as is, fine.

3. The Evidence section on p. 6 should include Idaho as a location of est.

4. In viewing the Notice and Naming and Release, shouldn't you summarize some of the conclusions of the cited reports (p. 7,8) rather than just listing them.

We hope these comments will be useful. And, again thanks for the good work.



E. DURANT McARTHUR
Project Leader

cc: Sam Stranathan, USDA-SCS, 655 Parfet Str., Room E200C, Lakewood CO 80215
Steve Monson, INT, Provo
Richard Stevens, UDWR, 15 South blain Street, Ephraim, UT 84627

We greatly appreciated your response to the release information developed for 'Timp' Utah sweetvetch. The release documentation was modified to address most of your concerns.

You inquired about the components of 'Timp', specifically the inclusion of the "Hobbble Creek" material. You are correct, the initial attempt was to blend the three components, 1. Original Orem 2. CSU upgrade selection and 3. Hobbble creek. This concept, (supported by the UCEPC and CSU) was presented to Mel Rumbaugh and Jack Carlson at one of the Utah interagency meetings and was vetoed. The comment was rather than include Hobbble Creek source for its potential drought tolerance, to exclude it and attempt to develop a drought tolerant ecotype. Dr. Rumbaugh did not want to include the CSU material.

Consequently an increase field of the "Hobbble Creek" source of Utah sweetvetch is in production and being rogued for rhizomatous Characteristics at the UCEPC. Exactly what will come of it is to be determined.

According to our information 'Timp' is composed of Orem source and Cuaney's Orem improved originating from the same gene pool.

We have attempted to include more conclusions within the release documentation. It should be noted that the same group that eliminated the "Hobbble Creek" component agreed on the mix that would be the breeder seed for 'Timp'. The release would be based on the trials comparing and including all Orem sources of Utah sweetvetch. Extensive testing of the blended product would not change the expected performance of 'Timp' and it was important to move a tested Utah sweetvetch into the commercial market.

We appreciate your participation and contributions to the development and naming of 'Timp'. We hope you feel your support has been adequately credited.

Presentation of 'Timp' to the Colorado Varietal Release Committee will take place January 19, 1994. Copies of all documentation will be forwarded to you along with signature sheets.

Respectfully,



Lee E. Hill
State Resource Conservationist

cc: Doug Johnson, USDA-ARS, Logan, Ut.
Richard Stevens, UDWR, Ephraim, Ut.
Stanford Young, Utah crop Improvement, Logan, Ut.
Robin Cuaney, CSU, Dept. of Agronomy, Ft. Collins, CO.
Randy Mandel, UCEPC, Meeker, CO.



United States
Department of
Agriculture

Agricultural
Research
Service

Northern Plains Area
Forage and Range Research
Utah State University
Logan, UT 84322-6300
Telephone: (801)750-3066
FAY: (801)750-3075

November 23, 1993

Sam Stranathan
USDA-SCS
655 Parfet Street, Rm. E200C
Lakewood, CO 80215-5517

Dear Sam:

Enclosed are collated comments from staff at the USDA-ARS Forage and Range Research Laboratory concerning the documentation for the release of 'Timp' Utah sweetvetch. Comments are written directly on the release statement and should be self-explanatory.

A release of Utah sweetvetch certainly fills a definite need for a leguminous forb indigenous to the Intermountain West. This release surely will be of interest to a wide diversity of clientele. As a result, we think that a release of Utah sweetvetch is clearly warranted and needed.

However, we do have some concerns about the release statement in its present form. Our most serious concern is that little performance data are presented for 'Timp' in the release document. Most of the information pertaining to the Evidence for Release section relates to the original Orem Bench material (#9040975) and not specifically to 'Timp' (blended #9040975 and 9024375). Is information available that specifically documents the performance of the blended population in comparison with the Orem Bench material or other check entries? Such information certainly would be required by the State Varietal Review Committee. Hopefully this information is available and could be added to the release statement.

In addition, the exact procedures and detailed information for how the 'improved' portion of the blend (#9024375) was selected for dinitrogen fixation and seed production should be added. Also, what percentage increases in dinitrogen fixation and seed production were achieved in the progeny of the selected population? Even though the release statement indicates that this group of plants was considered improved, no specific data are presented that states how much improvement or how this improved population compares to the original Orem Bench material. Are data available that could be added to the release statement?

Please do not hesitate in contacting us if you have any questions concerning our comments.

With best regards,

Sincerely,

DOUGLAS A. JOKNSOS
Plant Physiologist

Enclosure

cc:
Stanford Young

UNITED STATES DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE ROOM E200C 655 PARFET STREET LAKEWOOD, CO 80215-5517 FILE CODE:190 DPTE: Jan. 14, 1994

SUBJECT: 'Timp' Utah Sweetvetch response.

TO: Dr. Douglas A. Johnson
Plant Physiologist
USDA-ARS Forage and Range Research
Utah State University
Logan, UT. 84322-6300

We greatly appreciated your response to the release information developed for 'Timp' Utah sweetvetch. The release documentation was modified to address most of your concerns.

One of your major concerns was the performance data for 'Timp'. I realize that many of the joint meetings between Utah agencies and SCS were not very well documented but decisions about the product were made primarily by Dr. Mark Rumbaugh and Jack Carlson.

To address your concern as direct as I can, the premise accepted for the first Utah sweetvetch variety was that Orem Bench source material had been tested and compared adequately to justify its use and that the material upgraded by Dr. Cuany, which originated from the Orem Bench source, had not been negatively altered. So the group agreed to blend approximately 50 per cent of each material and call the blended product the new release. The group felt the components contributed to the end product and that testing was adequate to support the release of this first variety.

Detailed information about Dr. Cuany's efforts to develop the component 9024375 will be included in the release documentation.

We appreciate your participation and contributions to the development and naming of 'Timp'. We hope you feel your support has been adequately credited.

Presentation of 'Timp' to the Colorado Varietal Release Committee will take place January 19, 1994. Copies of all documentation will be forwarded to you along with signature sheets.

Respectfully,

Lee E. Hill
State Resource Conservationist

cc: E. Durant McArthur, USDA-FS, Shrub Lab., Provo, UT.
Richard Stevens, UDWR, Ephraim, UT.
Stanford Young, Utah Crop Improvement, Logan, UT.
Robin Cuany, CSU, Dept. of Agronomy, Ft. Collins, CO.
Randy Mandel, UCEPC, Meeker, CO.

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- A. Notice of Naming and Release
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- C. Botanical Description of Variety
- D. Evidence - Bibliography

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Appendix 2 SCS Planting Guide

Appendix 3 Agency Comments

COLORADO DEPARTMENT OF AGRICULTURE

Application to the State Varietal Review Committee, Colorado Agricultural Experiment Station, Colorado State University for approval of a Variety under the Colorado Seed Certification Program.

Name of Applicant:

Upper Colorado Environmental Plant Center
Address: 5538 County Road 4
Box 448
Meeker, Colorado 81641

Name of Breeder:

Component identified as 9040975 is unmodified material available from the original collection site.

The component identified as 9024375 was developed through selection process conducted by Dr. Robin Cuany, Dept. of Agronomy, Colorado State University. The seed production/supply of 9024375 is maintained at the Upper Colorado Environmental Plant Center. Component 9040975 will be coordinated with participating agencies familiar with the original collection site but will be the responsibility of the UCEPC.

A. VARIETY NAME OR TEMPORARY DESIGNATION
'TIMP'

Division or Phylum: Spermatophyta
Subclass: Dicotyledoneae
Family: Leguminosae
Genus: Hedysarum
Species: boreale

Author: (Nutt.) Thomas Nuttall 1786-1859