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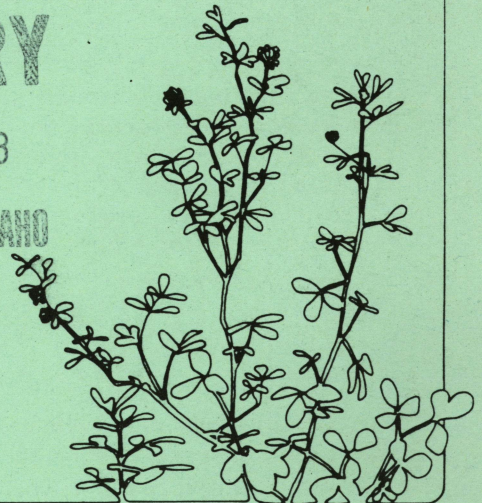
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# Alfalfa Variety Performance and Use in Idaho

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An important cultivated crop, alfalfa produces more high quality hay, pasture, green chop and silage than any other forage crop in Idaho. The extensive range grasses and forbs in the state may, though, exceed alfalfa in total forage produced.

Nationally, Idaho ranks seventh of all states in total alfalfa hay production. Those states having large dairy and beef cattle numbers generally exceed Idaho in hay production (9).

Idaho was second to California among the western states in alfalfa hay production with 1,068,000 acres in 1979 (10). This acreage produced 3,631,000 tons for an average yield of 3.4 tons per acre. Approximately 50 percent of the Idaho acreage is on nonirrigated land. Forage yields under irrigated conditions are generally superior to yields obtained on nonirrigated fields.

Idaho ranked second in alfalfa seed production with 16,170,000 pounds of seed on 42,000 acres in 1979. In 1980, 85 alfalfa varieties and advanced selections were grown in Idaho to produce high quality, certified seed (1). Most of this seed was distributed and sold to large forage-producing areas in the U.S. and Canada. Idaho farmers have a large number of improved and adapted alfalfa varieties from which to choose, and several major alfalfa seed companies produce and sell seed in the state.

Alfalfa is also an excellent soil-improving crop. It is a deep-rooted perennial, capable of manufacturing its own nitrogen through a symbiotic relationship with nodulating bacteria. An annual production of

200 to 300 pounds of nitrogen may be produced by the bacteria and the alfalfa plant. This nitrogen is used to produce forage and also feed nitrogen to nonleguminous plants and grasses frequently grown in association with alfalfa (4). Alfalfa improves soil structure organic matter, water holding capacity and soil nutrient balance. Alfalfa is, therefore, a valuable crop grown in rotation with other crops on both irrigated and nonirrigated lands.

Alfalfa hay, pasture and silage provide the major forage for dairy and beef cattle in Idaho. When properly harvested, the forage is high in protein, minerals and vitamins. High quality forage is palatable, highly digestible and will provide adequate energy for 800 to 900 pound dairy cows (8). Thus, high quality alfalfa is a choice forage for dairymen and beef cattle operators (5). It is often fed with corn silage and/or grain to high producing animals. Although well-matured corn silage surpasses all Idaho forages in total digestible nutrients (TDN) per acre, this feed has less protein minerals and vitamins than high quality alfalfa forage.

Selection of adapted varieties of alfalfa is an important consideration for Idaho producers (3,4). Varieties should produce high forage yields, have fast postharvest recovery and regrowth, be tolerant to some drought under nonirrigated conditions, possess adequate winter hardiness, be adapted to a relatively short growing season and persist for 5 or more years. New varieties must also have resistance to the diseases and insects present in Idaho. Although many alfalfa varieties possess these

characteristics, forage production testing is necessary to identify those varieties adapted to the diverse growing conditions in the state (3).

For the past several years, alfalfa forage trials have been conducted throughout Idaho to test the adaptability of varieties to our variable climatic and soil conditions. Trials were conducted cooperatively with scientists in neighboring states and with alfalfa seed companies. This publication reports the performance of several alfalfa varieties grown at five Idaho locations.

All varieties reported here are not necessarily 1982 recommended varieties for Idaho. Since tests began, several new varieties have been introduced. Some have become obsolete and are no longer under seed production. See section, **Important Points for Alfalfa Growers.**

### Uniform Regional Trials

Idaho joined Washington and Oregon in an extensive evaluation of 11 varieties differing in hardiness and disease and insect susceptibility. Trials in Idaho were located at Aberdeen, Caldwell, Kimberly and Moscow (Table 1). Plantings were made in 1973-74, and forage yields were taken for 2 or more consecutive years.

DuPuits and Moapa 69 were highest for 2 years at Aberdeen. Moapa 69 and Apalachee were highest yielding for 3 years at Caldwell. Lahontan and Narragansett were highest for 2 years at Kimberly. Highest yielding varieties at Moscow for 7 years were Saranac, Team and Narragansett.

Several other varieties also gave excellent yields. Moapa 69, an Arizona nonhardy variety, produced outstanding forage yields at all locations the first 2 years. However, yields gradually declined in later years as stands became depleted. Lahontan, Washoe and DuPuits are only moderately hardy, and yields were reduced after the fifth year at Moscow.

Alfalfa weevils were recorded at Aberdeen. Although the adults were not a problem in 1974, high numbers of alfalfa weevil larvae were noted in Beltsville 72, Washoe and Moapa 69. Pea aphids were not reported to be a problem.

Common leafspot was evident in all locations although Idaho's semiarid climate is generally not conducive to leaf disease buildup. Bacterial wilt is important in Idaho, but the disease did not affect these tests because of relatively short crop rotations and variety resistance. Alfalfa varieties that are resistant to bacterial wilt are recommended for longtime rotations of 5 years or more. Spring black stem has been reported in southwestern Idaho alfalfa fields. In these trials, only Ramsey and Titan

had resistance to spring black stem, but the disease was not a problem. Early summer forage harvest at the onset of the disease is recommended. Agate possesses excellent resistance to *Phytophthora* root rot. This is a common disease on wet soils in some states and is also found in Idaho.

### Regrowth, Flowering and Persistence

Regrowth after each cutting is an important characteristic of alfalfa (9). Rapid regrowth is characteristic of alfalfa varieties having Flemish germplasm. Varieties such as Apalachee, Apex, DuPuits, Glacier, Saranac, Thor and others have such germplasm (2). Rapid regrowth after each cutting provides early, high quality forage desirable in green chop, pasture, silage and hay. Table 2 gives regrowth characteristics of 20 alfalfa varieties.

Regrowth and date of flowering vary among alfalfa varieties. Where large acreages of hay are grown, growers should consider planting two or three varieties with different flowering dates to give a wide spread in maturity and forage harvest dates. Cutting the hay at the sign of first flower is recommended because forage quality is highly correlated with early flowering stage of the plant (8,9). Table 2 gives the variation among flowering dates.

Persistence of stand from year to year is necessary to maintain constant alfalfa forage yields. The percent stand after 7 years of testing at Moscow showed a decided reduction for Moapa 69 and Lahontan (Table 2). For long-term rotations, these nonhardy types are not recommended for Idaho. The more winter hardy varieties — including Agate, Apex, AT-530, Ranger, Saranac, Vernal and others — maintained relatively high plant populations into the test's 7th year. Diseases, insects, excessive repeated defoliation and other factors also help to deplete alfalfa stands. Such conditions were not, though, observed in this test.

Favorably warm summer temperatures and adequate moisture are desirable to promote alfalfa growth in Idaho. Thus, alfalfa in southwest Idaho produces higher forage yields than in the cooler areas such as Aberdeen and Sandpoint. Lack of summer precipitation in northern Idaho will reduce forage yields unless irrigation is available (Table 3).

### Important Points For Alfalfa Growers

**Varieties** — Variety selection should be based upon potential forage yield; disease, weed and insect problems; potential length of stand; and kind of forage utilization. Use available varieties which are resistant to bacterial wilt, stem nematode, spotted alfalfa aphid, pea aphid and *Phytophthora* root rot.

**Table 1. Average annual forage yields and reported disease and insects of alfalfa varieties at four Idaho locations.**

Varieties	Moscow 1974-80 <sup>1</sup>	Caldwell 1974-76 <sup>2</sup>	Kimberly 1974-75 <sup>3</sup>	Aberdeen 1975-76 <sup>4</sup>	Resistant	Susceptible
	(tons/acre dry matter)					
Agate	4.4 a-f <sup>5</sup>	5.9 b-e	3.4 b	6.0 ab	LLS, BW, PRR, CLS	
Apalachee	4.3 a-f	6.1 b-c	3.8 ab	5.9 ab	SN, CLS, AN	AW
Beltsville 72	4.6 a-f	6.2 b-d	3.6 ab	6.1 ab	AN, BW, SN	
DuPuits	4.1 g	5.9 b-e	3.9 ab	6.3 a	SN	BW
Lahontan	3.3 g	5.9 b-e	4.3 a	6.1 ab	SAA, BW, SN	PA
Moapa 69	2.9 h	6.8 a	3.7 ab	6.3 a	SAA	
Narragansett	4.5 a-d	5.8 c-e	4.0 ab	5.7 ab	RN	BW
Saranac	4.6 a-c	5.9 b-e	3.6 ab	5.7 b	DM, BW, CLS	AN
Team	4.5 a-d	5.3 e	3.8 ab	5.3 b	AW, AN, CLS, PA, SN	
Vernal	4.4 a-e	5.5 de	3.6 ab	5.5 ab	BW, PLH	PRR
Washoe	4.2 c-f	5.9 b-e	3.7 ab	6.1 ab	SAA, PA, SN, BW, PRR	DM, CLS
Average	4.16	5.93	3.76	5.91		

<sup>1</sup>2 cuttings each year.

<sup>2</sup>2 cuttings 1974; 3 cuttings 1976.

<sup>3</sup>2 cuttings 1974-75.

<sup>4</sup>2 cuttings 1975; 3 cuttings 1976.

<sup>5</sup>Means with different letters are significantly different at 0.01 level of probability. Designation a-f means a through f.

**Table 2. Seven years (1974-80) of alfalfa variety performance at Moscow, ID.**

Varieties	Average annual yield	Regrowth 1980 <sup>2</sup>	First flower	Stand 1980	Resistance to diseases and insects
	(tons/acre dry matter)	(inches)	(date)	(%)	
Agate	4.4 a-f <sup>1</sup>	6.8	6/26	86	BW, CLS, LLS, PRR, SAA
Apalachee	4.3 a-f	13.0	6/23	86	SN, CLS, AN
Apex	4.3 c-f	12.3	6/19	89	BW, PA, CLS
AT-530	4.6 a-c	11.8	6/26	89	BW, SAA, PA, DM, LLS
Beltsville 72	4.6 a	9.7	6/23	89	AN, BW, SN
Dawson	4.3 a-f	7.8	6/29	76	BW, CLS, PA, PLH, SAA, PA
DuPuits	4.1 e-f	12.9	6/21	90	SN
Glacier	4.2 c-f	11.7	6/18	76	CLS
Iroquois	4.5 a-c	9.1	6/21	76	BW
Ladak #65	4.2 c-f	5.7	6/28	73	BW
Lahontan	3.3 g	13.3	6/28	66	BW, SN, SAA
Moapa 69	2.9 h	11.5	6/28	29	SAA
Narragansett	4.5 a-d	9.2	6/23	79	RN, DM
Rambler	4.1 d-f	10.9	6/28	70	BW
Ramsey	4.0 f	7.5	6/26	85	BW, DM, CLS, LLS, SPBS
Ranger	4.0 f	8.6	6/30	86	BW
Saranac	4.6 a-c	12.0	6/23	85	CLS, BW, DM
Team	4.5 a-d	8.3	6/21	81	AN, AW, CLS, PA, SLS, SN
Thor	4.5 a-d	11.5	6/26	86	BW, DM
Titan	4.6 ab	7.1	6/26	81	BW, SPBS
Vernal	4.4 a-e	7.7	6/29	85	BW, PLH
Washoe	4.2 c-f	11.7	6/30	80	BW, PA, SAA, SN, PRR
Weevlchek	4.3 a-f	7.7	6/26	84	BW, PLH, AW, PA
WL 210	4.3 a-f	7.8	6/28	83	SAA, PA, BW
WL 307	4.4 a-e	11.4	6/28	78	BW, SAA

<sup>1</sup>Means with different letters are significantly different at the 0.01 level of probability. a-c means a through c, etc.

<sup>2</sup>21 days after first cutting June 26, 1980.

Based upon variety release statement and/or report from National Review Board.

AN	Anthraxnose	LLS	Lepto leafspot	SAA	Spotted alfalfa aphid
AW	Alfalfa weevil	PA	Pea aphid	SLS	Stemphyllium leafspot
BW	Bacterial wilt	PLH	Potato leafhopper	SN	Stem nematode
CLS	Common leafspot	PRR	Phytophthora root rot	SPBS	Spring blackstem
DM	Downy mildew	RN	Root-knot nematode		

Table 3. Additional alfalfa forage yields from three different areas in Idaho.

Varieties	Aberdeen 1973-79 <sup>1</sup>	Caldwell 1977-78 <sup>2</sup>	Sandpoint 1976; 70-72 <sup>3</sup>	Resistance to disease and insects
			(tons/acre dry matter)	
Alfa <sup>4</sup>	—	—	4.5 ab	—
Anchor	5.0 c <sup>5</sup>	—	—	BW, DM, PA
Cardinal <sup>4</sup>	—	—	4.4 ab	—
DuPuits	4.7 cd	—	4.5 ab	SN
Glacier <sup>4</sup>	—	—	4.7 a	—
Gladiator	6.0 ab	—	—	AN, BW, AW, SN
Grimm	—	—	4.8 a	—
Haymor <sup>4</sup>	—	—	4.7 a	BW
Ladak 65	4.6 cd	—	4.6 a	BW
Lahontan	4.1 f	5.9 d	—	SN, BW, SAA
Lancer <sup>4</sup>	5.6 b	—	—	—
Narragansett	—	—	4.0 b	RN
Pacer	—	6.5 ac	—	BW, PA, SN, DM
Promor <sup>4</sup>	6.1 a	—	—	—
Ranger	4.7 cd	6.7 ab	—	BW
Resistador	4.5 cg	—	4.6 a	BW, SAA, SN
Saranac	—	6.4 ad	—	CLS, BW
Team	4.9 cd	—	—	AN, AW, CLS, PA, SLS, SN
Thor	4.8 cd	—	—	BW
Titan	4.8 cd	—	—	BW, SPBS
Valor	—	6.1 cd	—	BW, PA, PLH
Vernal	—	6.2 bc	4.6 a	BW, PLH
Washoe	4.7 cd	6.8 a	—	BW, PA, SAA, SN, PRR
Weevlchek	4.1 ef	—	—	AW, PLH, PA
WL 306	4.5 de	—	—	BW, PA, SAA

<sup>1</sup>2 cuttings each year.

<sup>2</sup>2 cuttings each year.

<sup>3</sup>2 cuttings 1976; 1 cutting 1970 and 1972; 3 cuttings 1971.

<sup>4</sup>Seed of varieties not now available.

<sup>5</sup>Means with different letters are not significantly different at the 0.01 level of probability.

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A new disease, verticillium wilt, is present in south-western Idaho for which resistant varieties will soon be available.

Buy high quality certified seed of adapted varieties. Such seed is weed-free, is field and laboratory checked for purity and germination and has records of origin and adaptability.

Some varieties reported in these trials may not be available for Idaho growers. Seed may be produced in other Western states and by seed companies for principal consumers in other major hay-producing states. Also, some varieties produced by major seed companies may not be certified. Other means for identification and designation of seed quality may be used.

Contact your University of Idaho Extension county agent, seed dealers or the Idaho Crop Improvement Association, Boise, Idaho, for sources of certified seed.

**Inoculation** — Make certain the seed you buy has been inoculated with fresh alfalfa inoculum within a few days before planting. Properly inoculated alfalfa seed gives the best yield, even on soils with a history of alfalfa production.

**Soil Tests** — Alfalfa is a deep rooted plant and does best in deep, well-drained soils. Soils should always be tested before field planting for nitrogen, phosphorus and potassium (6,7). Alfalfa is a heavy consumer of phosphorus. Applications of phosphate fertilizers at seeding time and in the fall during subsequent years is usually required. Also, potassium, boron and sulfur may be deficient in certain Idaho soils (6,7).

**Legume and Grass** — Well-adapted grasses such as brome, orchard and intermediate wheatgrasses are frequently planted with alfalfa. The protein content of the hay may not be as high as alfalfa alone, but hay quality and palatability may be superior (8). Total forage production of alfalfa vs. alfalfa-grass is about equal over a 5-year rotation (4). Grasses may also fill in the older alfalfa-grass mix and prevent serious yield reduction if alfalfa thins.

**Time of Harvest** — Plant maturity is important in determining forage quality (9). Harvest when the first flowers appear in the field. At this stage, you will get the highest protein and vitamins with less fiber. The plant will have the highest feeding value (TDN) per unit of forage consumed. At this high quality stage, the intake is greatest, the digestibility and consumption are highest and the energy supplied is nearly adequate for high-producing animals (5,8).

**Fall Regrowth** — The production and longevity of alfalfa varieties are related to frequency of cutting

and fall management. During the fall, the plant needs to store food reserves in its extensive root system to produce vigorous growth the next spring. Thus, growers should allow adequate regrowth (6 to 8 inches) in the fall. Last harvest should not be later than 2 to 3 weeks **before** the usual first killing frost. The exact date of last fall harvest will vary with location in Idaho. Grazing of aftermath in the late fall or early winter is not harmful provided the plant crowns are not damaged by excessive livestock trampling.

**Plant Pests** — Plant resistant varieties where serious diseases or insects may be problems. Such problems may be more common in soils where alfalfa has been grown in the past and where the grower wishes to maintain a longtime stand. Usually 5 to 6 alfalfa hay crop-years are about the maximum for most farm operations. Insecticides and herbicides may be needed for some situations. See your local Extension county agent for the latest recommendations of approved chemicals. Also, ask for the latest bulletin on plant pest controls.

**Harvest Storing Methods** — Modern haying methods allow harvesting high quality hay. Bale and stack the forage to avoid leaf loss and spoilage. Ensiling alfalfa will insure maximum nutrition retention in the forage, provided that the crop is properly cut, wilted to 65 percent moisture and stored to avoid excessive fermentation losses.

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