

APPLICATION FOR REVIEW OF ALFALFA VARIETIES FOR CERTIFICATION ^{1/}

National Certified Alfalfa Variety Review Board

(The criteria for evaluation of applications were developed by the Joint Alfalfa Work Conference and the Association of Official Seed Certifying Agencies)

Applicant's name:

Date: October 25, 1976

University of California

Address:

1004 E. Holton Road, El Centro, California 92243

Sponsoring institution (if other than applicant):

Breeder's name (if other than applicant):

W. F. Lehman, M. W. Nielson, V. L. Marble, and E. H. Stanford

Variety name:

CUF 101

Experimental designation:

CUF 101

The breeder or the sponsoring institution or organization must describe and DOCUMENT in this application those characteristics of the variety which give it distinctiveness and merit by supplying the information requested below. Action will be deferred unless application is sufficiently documented.

I. Summarize here the main advantage (s) over other varieties, or other reasons this variety merits certification.

See Paragraph 1.

II. A statement of the origin and the breeding procedures used in developing this variety.

See Paragraph 2.

III. Area of probable adaptation and primary purpose (hay, grazing, etc.) for which this variety will be used. Report States and areas within States where the variety has been tested, and proposed areas of recommendation and merchandising.

The area of adaptation of CUF 101 is the low desert valley areas of Southern California where damage from the blue alfalfa aphid has been severe and where winter production is desired. The primary use will be for hay, pasture, green chop, and dehydration.

V Submit nine copies of this application to Ed Granstaff, Oklahoma Crop Improvement Association, Agron. Dept., 369 Ag. Hall, Okla. State Univ., Stillwater, Oklahoma 74074. If printed or mimeographed material is enclosed with this application, please send nine copies of such matter.

IV. Information of value to field inspectors (such as uniformity, leaf, flower characteristics, etc.), physiological characteristics, obvious disease and insect reactions, and other identifying characteristics. Report only on items you can do so accurately:

A. Flower color (s):

Purple

B. Pubescence:

Moderate

C. Uniformity:

Not uniform because it has a broad genetic base.

D. Fall and winter dormancy (relative to recognized check variety):

Highly nondormant.

E. Growth habit:

Upright.

F. Special markers:

None.

G. Other (including obvious disease and/or insect characteristics, and pod color and shape): CUF has resistance to the blue alfalfa aphid^{1/}, pea aphid^{2/}, spotted alfalfa aphid^{3/}, and Phytophthora root rot^{4/}.

V. Evidence of performance, including data on yield (in pounds per acre), insect or disease resistance (state causal organism, if known) and other factors. Data may be from tests conducted by private firms or Agricultural Experiment Stations, and shall include recognized check varieties which are used extensively in area of intended usage. A statement and/or data must be included on the following five organisms: Phytophthora root rot, anthracnose, spotted alfalfa aphid, pea aphid, stem nematode and bacterial wilt.

A. FORAGE PRODUCTION

1. Yield at specified locations (attach tabular data):

See Paragraph 3.

2. Persistence (winter and drought tolerance, summer survival, etc.): No information on persistence is available. However, UC Cargo to which 80% of the parentage can be traced, has good persistence. Additionally, CUF 101 was selected from an over-irrigated field 2½ years old. As shown in part in the development of UC Cargo and UC Salton, survivors from a field in Imperial Valley which is treated in this manner can be expected to have a good or improved stand life.

--

4. Disease resistance (state extent of resistance if not immune): Resistance to Phytophthora root rot is better than other nondormant varieties with which it has been tested such as UC Cargo, UC Salton, Mesa Sirsa, and Moapa 69, Tables 10 and 11. Reaction of CUF 101 to downy mildew is about 42% better than Saranac, Uinta, and Caliverde. No tests have been conducted for anthracnose, bacterial wilt, and stem nematode.

1/ Acyrtosiphon kondoi Shinji; 2/ Acyrtosiphon pisum Harris; 3/ Therioaphis maculata Buckton; 4/ Phytophthora megasperma, Drechs.

5. Insect resistance or tolerance (give extent of same):

See Paragraph 4.

6. Lodging:

7. Other:

B. SEED PRODUCTION

1. Comparative yield at specified locations (attach tabular data): No comparative data are available, but seed production in the foundation seed field was good. We planted 3/4 pound seed on four acres and obtained about 3,700 pounds in return.

2. Other:

VI. Procedure for maintaining stock seed, seed classes to be used, a statement as to the limitation of generations that may be certified, and any other requirements or limitations necessary to maintain varietal characteristics.*

Breeder seed is bulked seed from 91 parent plants grown in a cage near El Centro, California, during the summer of 1975. Under certification the classes of seed will be breeder, foundation, and certified. Breeder seed will be used to establish fields of foundation seed. Foundation seed will be used for the production of certified seed. Breeder seed will be maintained by the University of California, Department of Agronomy and Range Science, Davis. If the supply of breeder seed should become depleted, a lot of foundation seed shall be set aside and used to produce subsequent foundation seed. Areas of seed production and maximum eligibility of a stand of CUF 101 to produce a given class of seed will be determined by the certifying agency in the state where it is certified; otherwise, certification requirements are the same as for other cultivars.

VII. If this variety is accepted by official certifying agencies, when will certified seed first be offered for sale:

Fall of 1977.

VIII. Will application be made for Protection under certification provision of the Plant Variety Protection Act?

No.

William F. Lehman

Signature of Applicant

* At the time a variety is accepted for certification, a sample seed lot of the generation or generations requested by the certifying agency shall be submitted to the certifying agency by the sponsor. This lot (s) is to be retained as a control sample against which all future seed stocks released for certified seed production may be compared to establish continued trueness to variety.

Please submit a description of your variety, in the space provided below, as you wish it published by AOSCA.

Include the following:

1. A statement of the origin and the breeding procedures used in developing the variety.
2. Area of probable adaptation and primary purpose (hay, grazing, etc.) for which this variety will be used. Report States and areas within States where the variety has been tested, and proposed areas of recommendation and merchandising.
3. Information of value to field inspectors (such as uniformity, leaf, flower characteristics, etc.) physiological characteristics, obvious disease and insect reactions, and other identifying characteristics.
4. Procedure for maintaining stock seed, seed classes to be used, a statement as to the limitations of generations that may be certified and other requirements or limitations necessary to maintain varietal characteristics.
5. If this variety is accepted by official certifying agencies, when will certified seed first be offered for sale?
6. Will application be made for protection under certifications of the Plant Variety Protection Act?

1. CUF 101 was selected from cultivars growing in a 20-acre, over-irrigated hay production field which was 2½ years old and had been severely infested with the blue alfalfa aphid for about six weeks. Parent plants were selected from the following cultivars: UC Cargo (50), UC Salton (1), UC 76 (20), 1972 breeding mixture (18), and Niagara N71 (2). All parent lines in CUF 101 except Niagara N71 are related to UC Cargo. Approximately 80% of the germplasm in CUF 101 can be traced to UC Cargo.
2. The area of adaptation is the low desert valley areas of Southern California where damage from the blue alfalfa aphid is severe and winter production is desired. The primary use will be for hay, pasture, green chop, and dehydration.
3. Flower color is purple, growth habit is upright, and it is highly nondormant. CUF 101 is resistant to the blue alfalfa aphid, pea aphid, spotted alfalfa aphid, and Phytophthora root rot.
4. Breeder seed is bulked seed from 91 parent plants grown in a cage near El Centro, California, during the summer of 1975. Under certification, the classes of seed will be breeder, foundation, and certified. Areas of seed production and maximum eligibility of a stand to produce a given class of seed shall be determined by the certifying agency in the state where it is certified.
5. Certified seed will first be offered for sale during the fall of 1977.
6. No variety protection is contemplated.

Paragraph 1

CUF 101 is the only variety with resistance to the blue alfalfa aphid. It has resistance to the pea aphid and spotted alfalfa aphid which is equal to or better than the other varieties with which it has been tested such as UC Cargo, Dawson, and Washoe. It has more resistance to Phytophthora root rot than UC Cargo, Moapa 69, Mesa Sirsa, and the other nondormant varieties with which it has been tested. Because CUF 101 has resistance to three important alfalfa aphid pests, the variety will reduce the use of pesticides with a subsequent increase in yield at lower costs which will provide direct benefits to the grower, seedsman, and dairyman.

Paragraph 2

CUF 101 was selected from cultivars growing in a 20-acre, over-irrigated hay production field which was 2½ years old and had been severely infested with the blue alfalfa aphid for over six weeks prior to the time the plants were selected. Parent plants were selected from the following cultivars: UC Cargo (50), UC Salton (1), UC 76 (20), 1972 breeding mixture (18), and Niagara N71 (2). All parent lines in CUF 101 except Niagara N71 are related to UC Cargo. Approximately 80% of the germplasm in CUF 101 can be traced to UC Cargo which was passed by the Variety Review Board in 1975.

Paragraph 3

Production of CUF 101 at El Centro, California, was better than all cultivars such as UC Cargo, UC Salton, and Mesa Sirsa when subjected to an attack of the blue alfalfa aphid (first cutting, Tables 1, 2, and 3). Under relatively normal conditions (all except the first cutting in Table 1), production of CUF 101 was equal to or slightly better than other cultivars, UC Cargo, UC Salton, Moapa 69, and Mesa Sirsa. When all seven cuttings in Table 1 were averaged, the production of CUF 101 was superior to all cultivars in the test.

CUF 101 had better production than all cultivars such as UC Cargo, Mesa Sirsa, and Moapa 69 when the cultivars were grown in single rows at El Centro, California, and severely over-irrigated (all except the first cutting in Tables 2 and 3).

In yield tests at Davis, California (Table 4), CUF 101 was similar to the best cultivars in the test.

Production of CUF 101 at Five Points, California (Table 5), was similar to or better than the other named cultivars in the trial.

CUF 101 has been tested for yield for about one year. Performance in all the tests has been good. Although precise yield predictions are impossible, CUF 101 might be expected to be at least equal to UC Cargo when grown in areas where UC Cargo is adapted because: (1) A large number of parent plants (91) were used in the development of CUF 101 and 80% of the parentage of these plants can be traced to the new cultivar, UC Cargo. (2) CUF 101 was selected from an old field which had been over-irrigated, and (3) CUF 101 is resistant to all aphids attacking alfalfa as well as *Phytophthora* root rot, a major stand-weakening disease in the low desert valley areas where UC Cargo is adapted.

Paragraph 4

CUF 101 is the only variety with resistance to three alfalfa aphids. CUF 101 has better resistance to the blue alfalfa aphid than all other cultivars, Tables 6, 7, and 8. Resistance of CUF 101 to the pea aphid is similar to Kanza, Dawson, WL 512, and, possibly, Converde 95B, AS 13 R, and El Dorado R, Tables 7 and 9. Resistance to the spotted alfalfa aphid is similar to Lew but superior to Kanza, Dawson, and Washoe, Table 7.

Table 1. Yield of alfalfa cultivars planted at the University of California Imperial Valley Field Station, El Centro, and grown under relatively normal irrigation conditions.*

Cultivar	Average green weight per plot 1976							Ave.
	2-20	3-31	5-11	6-11	7-13	8-13	9-21	2-20 to 9-21
CUF 101	13.2	22.4	23.7	20.6	21.6	14.7	11.0	18.2
UC Salton	10.6	19.9	21.2	17.6	18.9	13.3	9.4	15.8
UC Cargo	9.0	19.3	21.8	19.5	20.8	14.4	11.2	16.5
Moapa 69	7.6	17.0	15.3	12.0	14.9	11.6	9.1	12.5
Mesa Sirsa	10.3	20.5	18.4	14.3	15.7	11.6	9.3	14.3
El Camino WL 508	9.3	21.2	19.4	14.7	15.9	12.0	9.1	14.4
UC 76d	10.0	20.2	23.1	19.9	20.4	14.7	11.2	17.0
UC 103	9.4	20.9	21.6	18.8	19.9	13.8	11.0	16.5
UC 207	9.5	20.0	23.2	20.4	21.1	14.5	10.7	17.1
LSD .05	1.36	2.43	1.50	1.64	1.74	1.31	1.03	1.19

* Blue alfalfa aphid damage was severe prior to the 2-20 cutting. There was no blue alfalfa aphid damage after that time. The plots were seeded in 4-row plots with the rows 8 inches apart and 20 feet long. The plots were replicated six times. Planting date was October 3, 1975. Test 21-22E.

Table 2. Yield of alfalfa cultivars subjected to an attack of blue alfalfa aphid from about January 1976 to March 4, 1976, and then to excessive irrigation from April 23, 1976, to the end of the trial. The excessive irrigation led to a severe epidemic of *Phytophthora* root rot.*

Cultivar	Green weight per plot in pounds		Total
	3-11-76	5-5-76	
CUF 101	1.14	1.58	2.72
UC Salton	.51	.72	1.23
UC Cargo	.61	1.03	1.63
UC 76d	.61	.93	1.55
Moapa 69	.34	.42	.76
Mesa Sirsa	.38	.44	.81
UC 103	.59	1.08	1.67
UC 106	.65	1.26	1.91
LSD .05	.14	.30	.39

*The plots were grown near El Centro, California, in single rows, four feet long which were replicated six times. Planting date was November 12, 1975. Test 3, 1W. The root rot data in tables 10 and 11 were obtained from these plots.

Table 3. Yield of alfalfa cultivars subjected first to a severe attack of blue alfalfa aphid (1st cutting) and then to excessive irrigation from April 23, 1976 to the end of the trial. The excessive irrigation resulted in a severe epidemic of *Phytophthora* root rot.*

Cultivar	Green weight per plot in 1976				Ave.
	3-11	5-26	6-25	7-28	
CUF 101	.88	1.80	1.64	1.22	1.39
UC Salton	.65	1.35	1.34	1.02	1.09
UC Cargo	.68	1.54	1.44	1.08	1.19
Moapa 69	.45	1.03	1.02	.85	.84
Mesa Sirsa	.48	.95	.90	.72	.77
UC 76d	.57	1.43	1.48	1.20	1.17
UC 103	.63	1.39	1.45	1.20	1.17
UC 106	.57	1.59	1.55	1.27	1.24
LSD .05	0.12	0.39	0.33	0.22	0.23

* One premature cut was not recorded between the 3-11 and 5-26 cuttings. The plots were planted near El Centro, California, in single rows four feet long which were replicated six times. Test 3,3W.

Table 4. Yield of alfalfa cultivars grown at Davis, California.*

Cultivar	Tons per acre in 1976*				Total
	Cut 2	Cut 3	Cut 4	Cut 5	
CUF 101	1.28	2.07	1.59	1.37	6.32
Moapa 69	1.33	2.01	1.46	1.07	5.98
Lahontan	1.11	1.85	1.47	1.04	5.46
WL 508	1.46	2.19	1.48	1.12	6.35
UC 76	1.27	2.08	1.59	1.32	6.27
DeKalb 185-R	1.02	1.91	1.49	1.18	5.63
El Dorado R	1.28	2.05	1.56	1.01	5.92
AS 13 R	1.32	2.07	1.51	1.18	6.08
Converde 95B	1.23	2.07	1.58	1.19	6.07
WL 512	1.35	2.10	1.52	1.22	6.18
LSD .05	0.22	0.17	NS	0.14	0.44

* The first cutting was weedy and no yield data were taken from it.

Table 5. Yield of alfalfa cultivars planted at the University of California West Side Field Station at Five Points and grown under relatively normal conditions.*

Cultivar	Tons per acre in 1976					Total
	Cut 1	Cut 2	Cut 3	Cut 4	Cut 5	
CUF 101	1.32	1.85	1.74	1.04	0.66	6.60
UC 76	1.20	1.58	1.59	0.87	0.69	5.92
UC Cargo	1.22	1.61	1.69	0.87	0.80	6.20
Moapa 69	1.14	1.65	1.74	0.86	0.69	6.08
Converde 95	1.54	1.99	1.84	1.03	0.66	7.06
DeKalb 167	1.25	1.91	1.67	0.81	0.58	6.22
WL 512	1.14	1.63	1.52	0.88	0.75	5.93
LSD .05	0.22	0.23	0.16	0.14	0.15	0.59

* The plots were seeded at 38 pounds per acre March 12, 1976, in plots 3 feet wide and 18 feet long.

Table 6. Evaluation of resistance in 10 alfalfa cultivars and 4 experimental alfalfas to the blue alfalfa aphid (*A. kondoi*) in greenhouse tests at Tucson, Arizona.

Entry	% resistant plants		
	Expt. 1	Expt. 2	Expt. 3*
CUF 101	-	-	52.7
UC 102	15.0	28.2	45.1
ARS-PA**	-	1.3	0.0
UC Cargo**	-	1.3	0.9
El Camino**	-	1.2	0.0
Niagara N71 Brand**	-	0.0	1.0
UC Salton**	-	0.6	-
El Unico	-	0.0	-
Hayden	-	0.0	-
Washoe**	-	-	0.0
UC 76	-	0.0	-
Mesa Sirsa	0.0	0.0	-
Lew	-	-	0.0
Caliverde	-	0.0	0.0

* Based on 2 replications. Many seedlings in the third replicate died from *Pythium* sp. infection.

** Entries with pea aphid resistance.

Table 7. Comparative resistance of 9 alfalfas to 3 species of aphids in greenhouse evaluation tests. Tucson, Arizona, 1976.

Entry	Mean % seedling survival*		
	<u>A. kondoi</u>	<u>A. pisum</u>	<u>T. maculata</u>
CUF 101	70.29a	70.94b	87.32ab
UC 102	65.00a	58.09c	72.63cd
ARS-PA	25.78b	85.61a	72.75cd
Kansa	23.37b	70.94b	68.55d
Dawson	23.37b	69.51b	72.00cd
Washoe	19.86bc	56.43c	67.15d
Lew	19.24c	46.25d	80.24bc
MSTT	11.93c	23.98e	93.32a
Caliverde (ck)	0.0	0.0	8.0

*Means followed by the same letter(s) are not significantly different at the .05 level of probability.

Table 8. Reaction of alfalfa cultivars to a severe infestation of the blue alfalfa aphid found in an alfalfa yield trial at the University of California Imperial Valley Field Station.

Cultivar	Blue alfalfa aphid damage score
CUF 101	3.0
UC Safton	5.5
UC Cargo	6.3
Moapa 69	6.5
Mesa Sirsa	6.0
El Camino WL 508	6.0
UC 76d	6.3
UC 103	6.0
UC 207	6.2
LSD .05	0.97

A score of 1 = good, 9 = poor.

Table 9. Reaction of alfalfa cultivars to the pea aphid in a field trial planted at Davis, California.

Cultivar	Mean score*	Duncan's multiple range test** 5%
WL 512	1.6	a
CUF 101	2.0	ab
Converde 95B	2.6	abc
AS 13 R	2.8	abc
El Dorado R	2.8	abc
DeKalb 185-1	3.0	bcd
Moapa 69	3.4	cd
Lahontan	4.2	d
LSD .05	1.1	

* Plots were swept with a sweep net and ratings from 1 to 10 were made based on the number of pea aphids in the net. A score of one had very few aphids--eight to ten per sweep or less, and 10 had 250-300 aphids per sweep. These data were obtained from Carl Schoner, Art Swenerton, and V. L. Marble.

**Means with similar letters are not significantly different.

Table 10. Number of alfalfa plants surviving in four foot rows which were first subjected to a severe attack by the blue alfalfa aphid and then by a severe attack by *Phytophthora* root rot.

Cultivar	Number of surviving plants
CUF 101	134
UC Salton	82
UC Cargo	90
UC 76d	134
Moapa 69	70
Mesa Sirsa	62
UC 103	105
UC 106	107
LSD .05	11.5

The plots were grown near El Centro, California, in single rows, four feet long which were sown with one gram of seed and replicated six times. Planting date was November 12, 1975. Test 3, 1W. Data from this test are also shown in Tables 2 and 11.

Table 11. Reaction of alfalfa cultivars to Phytophthora root rot in a field test grown near El Centro, California.*

Cultivar	Resistant 1 + 2	Intermediate 3	Susceptible 4 + 5
CUF 101	21.5	29.6	49.2
UC Salton	9.2	24.4	66.4
UC Cargo	14.0	31.7	54.4
UC 76d	21.1	35.3	43.6
Moapa 69	5.5	9.1	85.3
Mesa Sirsa	8.1	8.6	83.3
UC 103	22.5	32.7	44.8
UC 106	24.1	37.9	38.0
LSD .10	6.6	7.9	4.7
LSD .05	8.0	9.5	11.7

The plots were single rows, four feet long and replicated six times. Planting date was November 12, 1975. Test 3, 1W. Data from this test are also shown in Tables 2 and 10.

Table 12. Reaction of CUF 101 and Saranac alfalfa to downy mildew (*Peronospora trifoliorum*) in greenhouse tests at Manhattan, Kansas.*

Cultivar	Number of plants	% resistant	% of Saranac**
CUF 101	5954	21.8%	142
Saranac	372	15.3%	100

* Data obtained from Dr. D. L. Stuteville, Department of Plant Pathology, Kansas State University.

** Percent of mildew-resistant plants in Saranac, Uinta, and Caliverde have not differed significantly when evaluated under the same testing methods and with the same isolates used in this test.

THE UNIVERSITY OF CALIFORNIA AGRICULTURAL EXPERIMENT STATION

AND

THE UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
WASHINGTON, D.C.

NOTICE OF NAMING AND RELEASE OF CUF 101 ALFALFA

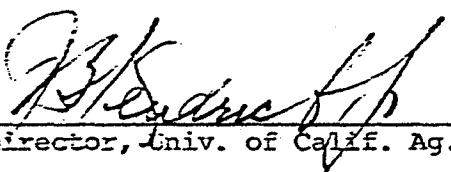
The University of California Agricultural Experiment Station and the Agricultural Research Service, United States Department of Agriculture announce the development and release of a new alfalfa cultivar, CUF 101. The CUF designation refers to the three groups cooperating in the cultivar's development: (C) University of California, (U) U.S. Department of Agriculture and (F) farmers.

CUF 101 is the first cultivar with resistance to the blue alfalfa aphid. It is highly nondormant and has resistance to the pea aphid and spotted alfalfa aphid equal to or better than UC Cargo, Washoe, and Dawson. Resistance to Phytophthora root rot is moderate and greater than UC Cargo, Moapa 69, and Mesa Sirsa.

CUF 101 was selected from cultivars and brands growing in a 20-acre, over-irrigated hay production field which was 2-1/2 years old and had been severely infested with the blue alfalfa aphid for over six weeks prior to the time the parent plants were selected. About 80% of the parentage can be traced to UC Cargo. The remainder is from nondormant plant introductions, germplasm in the breeding program, and Niagara N71 brand.

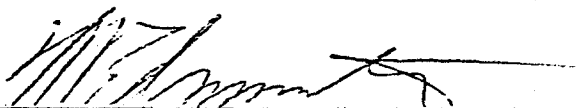
The intended area of adaptation is the low desert valley areas of Southern California and Southern Arizona where damage from the blue aphid may be severe and winter production is desired. Forage production of CUF 101 at El Centro, California, was better than UC Cargo, UC Salton, and Mesa Sirsa when subjected to an attack of the blue alfalfa aphid. In the absence of this aphid it was equal to or better than these cultivars. At Davis and Five Points, California, CUF 101 was equal to or better than the other cultivars in the trial. All production tests were for one year.

Under certification the classes of seed will be breeder, foundation, and certified. Breeder seed is bulked seed from 91 parent plants grown in a cage near El Centro during the summer of 1975. If the supply of breeder seed should become depleted, a lot of foundation seed shall be set aside and used to produce subsequent foundation seed. Breeder seed will be maintained by the University of California, Department of Agronomy and Range Science, Davis. Areas of seed production and maximum eligibility of a stand of CUF 101 to produce a given class of seed will be determined by the certifying agency in the state where it is certified; otherwise, certification requirements are the same as for other cultivars.



Director, Univ. of Calif. Ag. Expt. Sta.

May 28, 1977
Date



Administrator, Agricultural Research
Service, U.S. Department of Agriculture

6/7/77
Date

CUF 101

Description/summary of variety for publication by AOSCA:

1. CUF 101 was selected from cultivars growing in a 20-acre, over-irrigated hay production field which was 2.5 years old and had been severely infested with the blue alfalfa aphid for about six weeks. Parent plants were selected from the following cultivars: UC Cargo (50), UC Salton (1), UC 76 (20) 1972 breeding mixture (18), and Niagara N71 (2). All parent lines in CUF 101 except Niagara N71 are related to UC Cargo. Approximately 80% of the Germplasm in CUF 101 can be traced to UC Cargo. This germplasm is composed of: 0%, *M. falcata*: 1%, Ladak; 2%, *M. varia*; 11%, Turkistan; 1%, Flemish; 7%, Chilean; 0%, Peruvian; 23%, Indian; 49%, African; 4%, Arabian; and 2%, unknown sources of germplasm.
2. The area of adaptation is the low desert valley areas of Southern California where damage from the blue alfalfa aphid may be severe and winter production is desired. The primary use will be for hay, pasture, green chop, and dehydration.
3. Flower color is purple, growth habit is upright, and it is highly nondormant (group 9).
4. CUF 101 is highly resistant Fusarium wilt (*Fusarium oxysporum*), pea aphid (*Acyrtosiphon pisum*), spotted alfalfa aphid (*Therioaphis maculata*), and blue alfalfa aphid (*Acyrtosiphon kondoi*), and it is moderately resistant to Phytophthora root rot (*Phytophthora megasperma*), and northern root knot nematode (*Meloidogyne hapla*). It is susceptible to bacterial wilt (*Clavibacter insidiosum*). Resistance of this cultivar to Verticillium wilt (*Verticillium albo-atrum*), and Aphanomyces root rot (Race 1) (*Aphanomyces euteiches*), and southern anthracnose (*Colletotrichum trifolii*) (Race 1) is unknown.
5. Breeder seed is bulked from 91 parent plants grown in a cage near El Centro, California, during the summer of 1975. Under certification, the classes of seed will be breeder, foundation, and certified. Breeder seed will be maintained by the University of California, Davis. Areas of seed production and maximum eligibility of a stand to produce a given class of seed shall be determined by the certifying agency in the state where it is certified.
6. Certified seed will first be offered for sale during the fall of 1977.
7. Application for Plant Variety Protection is not contemplated.
8. As a means of added varietal protection, are you willing to have the information in this application turned over to the PVP office? YES
9. Variety name: CUF 101 (Amended)
Experimental Designations: CUF 101, UC 101
Date NAVRB first Accepted this variety: 1976
Dates previous amendments were accepted: _____
Date this amendment was submitted: November 27, 1995

CUF 101 ALFALFA

A NEW VARIETY OF ALFALFA WITH RESISTANCE TO THE BLUE ALFALFA APHID

CUF 101 is the first variety of alfalfa with resistance to the blue alfalfa aphid (*Acyrtosiphon kondoi*), a new pest of alfalfa identified in California in the spring of 1975. CUF 101 has good resistance to the spotted alfalfa aphid (*Therioaphis maculata*) and pea aphid (*Acyrtosiphon pisum*), and moderate resistance to Phytophthora root rot (*Phytophthora megasperma*).

It is highly nondormant, purple-flowered, and upright-growing, recovers rapidly after cutting, and is expected to be adapted to areas of California, Arizona, and Nevada where winter forage is desired and the variety UC Cargo is grown.

CUF 101 was released cooperatively by the University of California and the U.S. Department of Agriculture, Agriculture Research Service. It was named after the University of California (C), U.S. Department of Agriculture (U), and farmers (F), the three groups

contributing toward successful development of the variety.

PARENTAGE

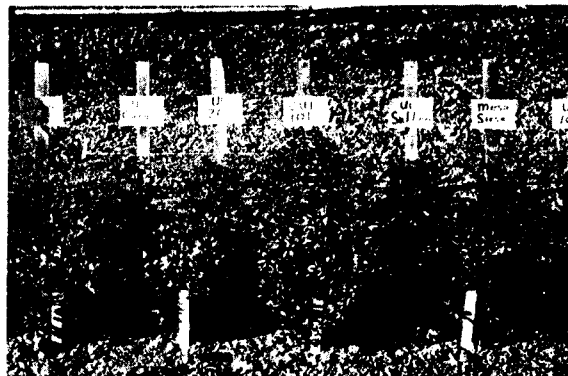
CUF 101 was synthesized from 91 plants selected from varieties and brands growing in a 20-acre overirrigated hay-production field which was 2½ years old and had been severely infested with the blue alfalfa aphid for more than six weeks before the parent plants were selected. About 80 percent of the parentage of CUF 101 is UC Cargo. The rest is from nondormant plant introductions, germplasm in the breeding program, and 1 percent from Niagara N-71 Brand.

FORAGE YIELD

CUF 101, when attacked by the blue alfalfa aphid at El Centro, had better forage production than other varieties tested with it, such as



Resistant (right) and susceptible alfalfa plants growing in the field from which the parents of CUF 101 were selected.



Field test showing the superior growth of CUF 101 alfalfa after a prolonged natural infestation of the blue alfalfa aphid.

Division of Agricultural Sciences
UNIVERSITY OF CALIFORNIA

PRINTED JANUARY 1978

LEAFLET
21009

UC Cargo, UC Salton, Mesa Sirsa, and Moapa 69 (first cutting, Table 1). In the absence of the blue alfalfa aphid, CUF 101 produced equally to or slightly better than those varieties in individual cuttings. When all cuttings in 1976 were averaged, CUF 101 was superior in production to all other varieties in the test. The blue alfalfa aphid was present to some extent until the April cutting in 1977. During this period, CUF 101 was superior in production to the other varieties. More entries were included in this and the other yield trials, but experimental and unadapted varieties were excluded because the information seemed irrelevant.

At Five Points, California (Table 2), CUF 101 produced similarly to or better than other commonly grown varieties in the trial, such as UC Cargo, Moapa 69, WL 512, and AS 13R during the year of the test. At Davis, CUF 101 was similar in forage yield to the varieties grown in the area (Lahontan, Eldorado R, WL 508, and WL 512) during the first and only year that data were available (Table 3). Since UC Cargo is unadapted to the Davis area, subsequent years may reveal a lower production of CUF 101.

Yield information is available for only one year. More information is needed to identify the area of adaptation. Since, however, CUF 101 is closely related to UC Cargo, it may be best adapted to areas where UC Cargo is grown.

REACTION TO BLUE ALFALFA, SPOTTED ALFALFA, AND PEA APHIDS

CUF 101 resists the three major aphids that attack alfalfa: the blue alfalfa, spotted alfalfa, and pea aphids (Table 4). Its resistance to the blue alfalfa aphid is superior to that of all other varieties available at this time. While some blue alfalfa aphids may be found on CUF 101, the numbers will be lower and the damage will be negligible under most conditions. Its very high resistance to the spotted alfalfa and pea aphids is equal to or better than that of the other varieties. Only ARS-PA, an unreleased variety, was superior to CUF 101 in resistance to the pea aphid.

DISEASE RESISTANCE

Resistance of CUF 101 to *Phytophthora* root rot is moderate, though better than that of UC Cargo, Mesa Sirsa, and Moapa 69 (Table 5).

CUF 101 is susceptible to bacterial wilt. No tests have been conducted for resistance to southern anthracnose and stem nematode.

STAND PERSISTENCE

No long-term test information is available to show whether CUF 101 will persist. Persistence is expected to be equal to or better than that of UC Cargo, however, since 80 percent of the parentage of CUF 101 came from UC Cargo, it was selected from an old field, and it has resistance to *Phytophthora* root rot.

ADAPTATION

For hay production, CUF 101 is expected to be adapted best to the lower desert valley areas of California and Arizona where UC Cargo is grown. It is adapted also to areas of central California from about Fresno County and south where UC Cargo can be grown successfully. It is not expected to be adapted as far north as Moapa.

SEED PRODUCTION

CUF 101 has not yet been compared with other varieties in seed production, but the seed-increase field has produced well.

CERTIFIED SEED CLASSES

Under certification the classes of seed will be breeder, foundation, and certified. Breeder seed is bulked from seed from 91 parent plants grown in a cage near El Centro in the summer of 1975. If the supply of breeder seed should become depleted, a lot of foundation seed will be set aside and used to produce subsequent foundation seed. Breeder seed will be maintained by the University of California,

Department of Agronomy and Range Science, Davis. Areas of seed production and maximum eligibility of a stand of CUF 101 to produce a given class of seed will be determined by the certifying agency in the state where it is certified; otherwise, certification requirements are the same as for other cultivars.

AVAILABILITY

Foundation seed for seed production of CUF 101 can be obtained from the secretaries of the California and Arizona Crop Improvement Associations. A supply of certified seed will be available to growers for hay production in the fall of 1977.

Table 1. Yield of Alfalfa Varieties Planted at the University of California Imperial Valley Field Station, El Centro.*

Cultivar	Pounds green weight per plot in 1976									
	2-20	3-31	5-11	6-11	7-13	8-13	9-21	10-27	12-2	Average
CUF 101	13.2	22.4	23.7	20.6	21.6	14.7	11.0	15.1	11.0	17.0
UC Salton	10.6	19.9	21.2	17.6	18.9	13.3	9.4	13.4	9.9	14.9
UC Cargo	9.0	19.3	21.8	19.5	20.8	14.4	11.2	14.9	10.7	15.7
Moapa 69	7.6	17.0	15.3	12.0	14.9	11.6	9.1	11.7	8.4	12.0
Mesa Sirsa	10.3	20.5	18.4	14.3	15.7	11.6	9.3	12.8	9.2	13.6
WL 508	9.3	21.2	19.4	14.7	15.9	12.0	9.1	11.9	8.7	13.6
LSD .05	1.36	2.43	1.50	1.64	1.74	1.31	1.03	1.08	0.94	1.09

* Blue alfalfa aphid damage was severe prior to the 2-20 cutting. There was no blue alfalfa aphid damage after that time in 1976. Planting date was October 3, 1975.

Table 2. Yield of Alfalfa Varieties Planted at the University of California West Side Field Station at Five Points.*

Cultivar	Tons per acre in 1976					
	Cut 1	Cut 2	Cut 3	Cut 4	Cut 5	Total
CUF 101	1.32	1.85	1.74	1.04	0.66	6.60
UC Cargo	1.22	1.61	1.69	0.87	0.80	6.20
Moapa 69	1.14	1.65	1.74	0.86	0.69	6.08
Converde						
95 Brand	1.54	1.99	1.84	1.03	0.66	7.06
WL 512	1.14	1.63	1.52	0.88	0.75	5.93
AS 13R	1.20	1.64	1.63	0.83	0.71	6.01
LSD .05	0.22	0.23	0.16	0.14	0.15	0.59

* Plots were seeded March 12, 1976.

Table 3. Yield of Alfalfa Varieties Grown at Davis, California.

Cultivar	Tons per acre in 1976*				
	Cut 2	Cut 3	Cut 4	Cut 5	Total
CUF 101	1.28	2.07	1.59	1.37	6.32
Moapa 69	1.33	2.01	1.46	1.07	5.98
WL 508	1.46	2.19	1.48	1.12	6.35
Eldorado R	1.28	2.05	1.56	1.01	5.92
AS 13R	1.32	2.07	1.51	1.18	6.08
Converde					
95 Brand	1.23	2.07	1.58	1.19	6.07
WL 512	1.35	2.10	1.52	1.22	6.18
LSD .05	0.22	0.17	NS	0.14	0.44

* The first cutting was weedy, and no yield data were taken from it.

Table 4. Comparative Resistance of 9 Alfalfas to 3 Species of Aphids in Greenhouse Evaluation Tests, Tucson, Arizona, 1976.

Entry	Mean % seedling survival*		
	<i>A. kondoi</i>	<i>A. pisum</i>	<i>T. maculata</i>
CUF 101	70.29a	70.94b	87.32ab
ARS-PA ¹	25.78b	85.61a	72.75cd
Kanza	23.37b	70.94b	68.55d
Dawson	23.37b	69.51b	72.00cd
Washoe	19.86bc	56.43c	67.15d
Lew	19.24c	46.25d	80.24bc
MSTT ²	11.93c	23.98e	93.32a
Caliverde (ck)	0.0	0.0	8.0

* Means followed by the same letter(s) are not significantly different at the 0.05 level of probability.

¹Unreleased variety with very high resistance to pea aphid (*A. pisum*).

²Unreleased variety with very high resistance to spotted alfalfa aphid (*T. maculata*).

Table 5. Reaction of Alfalfa Varieties to Phytophthora Root Rot in a Field Test Near El Centro, California, 1976.

Cultivar	Resistant	Intermediate	Susceptible
	1 + 2	3	4 + 5
CUF 101	21.5	29.6	49.2
UC Salton	9.2	24.4	66.4
UC Cargo	14.0	31.7	54.4
Moapa 69	5.5	9.1	85.3
Mesa Sirsa	8.1	8.6	83.3
LSD .10	6.6	7.9	4.7
LSD .05	8.0	9.5	11.7