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SUMMARY

Breeder, foundation, and certified seed lots of Dawson alfalfa, *Medicago sativa* L., were tested to determine stability in performance during three generations of seed increase under certification.

Dawson is a recent eight-clone synthetic alfalfa variety resistant to pea aphids, *Acyrthosiphon pisum* (Harris), and spotted alfalfa aphids, *Therioaphis maculata* (Buckton); intermediate in resistance to potato leafhoppers, *Empoasca fabae* (Harris); and similar to Ranger in resistance to bacterial wilt, *Corynebacterium insidiosum* McCull H. L. Jens. Breeder, foundation, and certifed seed classes are the Syn-1, -2, and -3 generations, respectively.

Two field experiments were conducted, a seeded forage yield test and a space-planted test. Greenhouse experiments included separate tests for resistance to pea aphids, spotted alfalfa aphids, and bacterial wilt.

Slight variations among seed lots were found for growth habit, winterhardiness, rate of recovery after cutting, and insect and disease resistance. These variations occurred within a generation and among successive generations produced inside and outside the Dawson (northern) area of adaptation.

Seed lots did not differ significantly in forage yield and persistence in the seeded forage yield test. Continuity in performance of seed increases under certification procedures was observed.

A given seed lot was aberrant for one trait but was within the same range as other lots for other traits. Thus, tests for more than one economically important trait are needed to evaluate performance of a given seed lot regardless of seed class.

Age of seed field was not important in the performance of seed lots within breeder, foundation, or certified seed classes.

Results obtained on certified Dawson alfalfa seed classes in field and greenhouse experiments were in agreement with the original variety description.

Performance of Certified Seed Lots of Dawson Alfalfa

W. R. Kehr and G. R. Manglitz[1]

INTRODUCTION

Population changes during seed increases in different environments were reported in alfalfa, *Medicago sativa* L., varieties (2, 3, 4, 8, 18, 19, 22), and seed composites (17). These changes were of potential or actual importance to forage production. Alfalfa varieties are generally highly heterozygous due to the genetic diversity of parental materials and polyploidy. The differential response of plants within varieties to daylength, temperature, and unknown factors may account for population changes (5, 16, 20, 21, 22). The genetic variability within Ranger is a factor in potential changes (10, 14). Clone x location interactions for seed yields could also contribute to changes in varieties of clonal origin (6, 15).

Minor variations in bacterial wilt, *Corynebacterium insidiosum* McCull H. L. Jens., resistance were observed among certified seed lots of Ranger (3, 9). Significant differences in the performance of certified Ranger were not apparent among seed lots produced from different ages of stands in the same state (18). The level of bacterial wilt resistance was similar in seed harvested from nine crop years of foundation Vernal (12). Foundation Vernal is produced where bacterial wilt is not important in stand decline. However, a significant increase in the bacterial wilt resistance of Atlantic resulted from natural selection in an aging stand (1). Seed from plants that survived seven to nine years after seeding had a higher level of wilt resistance than did seed harvested the first five years from the same field. The incidence of virus-infected seedlings generally increased with increase in age of stand in a study that involved 10 alfalfa varieties and stands from 8 months to 8 years old (7). In other work, changes in three varieties were progressive with age of stand and number of generations removed from the original stock (22).

Slight variations were observed for growth habit, winter hardiness,

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and disease resistance among certified seed lots within a generation and successive seed generations, produced inside and outside areas of adaptation (4, 5, 8, 9, 13, 18, 21). However, the use of certification procedures for alfalfa seed production in the United States has led to stability in the forage yield and persistence of varieties.

Dawson is an eight-clone synthetic alfalfa variety resistant to pea aphids, *Acyrthosiphon pisum* (Harris), and spotted alfalfa aphids, *Therioaphis maculata* (Buckton); intermediate in resistance to potato leafhoppers, *Empoasca fabae* (Harris); and similar to Ranger in resistance to bacterial wilt (11). Dawson was tested in the Syn-1 and Syn-2 generations before release and increase. Variations were observed among parental clones and their progenies, and within initial Syn-1 and Syn-2 populations. Thus, it was essential to obtain seed lots from all generations of increase under certification to study stability in performance.

The purpose of this study was to obtain and test seed lots of Dawson alfalfa to determine stability in performance during three generations of seed increase under certification.

MATERIALS AND METHODS

Breeder, foundation, and certified seed lots of Dawson alfalfa were accumulated annually during early years of producing the variety and placed in cold storage at Lincoln. The seed classes breeder, foundation, and certified are the Syn-1, -2, and -3 generations, respectively (11).

The following seed lots were obtained: 6 breeder lots from fields that ranged in age from 1 (the year of seeding) to 4 years; 7 foundation lots from 1- to 4-year-old fields; 52 certified lots from 1- to 5-year-old fields in California (outside of the northern area of adaptation) and 1- to 4-year-old fields in the northern area of adaptation. California certified seed was obtained from three seedsmen but involved eight growers. Certified seed from Idaho, Utah, and Washington came from one seedsman and one to three growers per state. Nine certified lots produced in 1971 were also used to produce a composite, designated Dawson DCC72, for use as a check in forage yield and other tests. This composite was produced from equal quantities of seed from each of six states. Equal quantities of three seed lots from Idaho and two seed lots from Nebraska were used.

Other checks included composites of equal quantities of certified seed as follows: Dawson DCC67, 1967 seed from 2 states; Kanza KCC72, 1971 seed from 3 states; Saranac SCC72, 1971 seed from 4 states; Vernal VCC72, 1971 seed from 9 states.

Saranac and Vernal were the susceptible checks for spotted alfalfa aphid resistance and Vernal was also the susceptible check for pea aphid resistance. Du Puits 6, Ranger AR132, and Vernal F. C. 33696

were obtained from F. I. Frosheiser of the Minnesota Agricultural Experiment Station and used as checks for the bacterial wilt test.

Field Experiments

The field test site at the Mead, Nebraska, Field Laboratory was on Sharpsburg silty clay loam (Typic Argiudoll) on which lime and phosphate had been applied according to soil test recommendations for a four-year stand. A preplant herbicide was incorporated into the soil in seedbed preparation.

Forage Yield Trial

Alfalfa was seeded April 17, 1972, in a randomized block design with four replications. Alfalfa was seeded at 12 pounds of viable seed per acre with a V-belt drill in 5-row plots 15 feet long with 6 inches between rows and 12 inches between adjacent plots. The entire field was cultipacked. Essentially perfect and weedfree stands were obtained. No yields were determined in the year of seeding, but plots were clipped and forage removed in three cuttings.

Entire plots were cut at about 1/10 bloom four times annually before September 10 in 1973 and 1974 with a flail-type custom-built harvester and weighed immediately. Composite forage samples were obtained about every 30 minutes, dried in a forced air oven, and used to calculate dry matter yields.

Stand establishment and persistence were measured by counting the number of six-inch gaps in rows within plots and converting to percent stand.

Spaced Plants

Seed of each entry was scarified, treated with a fungicide, and planted in a soil-sand mixture in paper bands in greenhouse flats in the spring of 1972. Seedlings were transplanted May 4–5, 1972 in a randomized block design with five replications, A replication of each entry consisted of a single row plot of 20 plants spaced one foot apart within rows three feet apart. The experiment was kept weedfree and no insecticides were applied. Plots were clipped and forage removed in three cuttings before September 15 in 1972 and in four cuttings in other years.

Stand counts were obtained each year. Essentially perfect stands were obtained. Stands in 1974 were expressed in percent of initial stands to indicate persistence.

A natural infestation of potato leafhoppers developed about mid-June, 1972. Each plant was visually scored for leafhopper yellowing, reddening, or purpling on a scale of 1 to 9. A score of 1 indicated that up to 10% of the leaves were injured, a score of 5 had 50% injured leaves, etc. In general, resistance was indicated by scores of 1 to 3,

susceptibility 7 to 9, and intermediate resistance 4 to 6. Plot means were analyzed statistically.

Rate of recovery after cutting and fall growth habit were visually scored in both field experiments. Rate of recovery was scored on a scale of 1 = fastest and 9 = slowest. Fall growth habit was scored on a scale of 1 = erect and 9 = prostrate. The yield trial was scored on a plot basis. Spaced plants were individually scored and plot means were analyzed statistically.

Rainfall was about normal during the experiments so supplemental sprinkler irrigation was minimal.

Greenhouse Experiments

Aphid Tests

Separate pea aphid and spotted alfalfa aphid tests were conducted in February and March 1973 to determine percentages of plants resistant to these insects. Separate aphid species cultures were initiated from field collections in Nebraska and increased on alfalfa grown in flats.

For each test, seed of each entry was scarified, treated with a fungicide, and planted in flats filled with a soil-sand mixture. Each test consisted of 5 replications of 50 seeds each planted in a randomized block design. The flats were about 15 inches x 21 inches. A replication of each entry consisted of 2 rows 14 inches long with 25 seeds per row.

A row of the susceptible variety Buffalo was seeded across the long side of each flat. Seedlings in the cotyledon stage were manually infested by shaking large numbers of pea aphids on them. Seedlings in the unifoliate stage were manually infested with spotted alfalfa aphids in the same manner. Additional aphids were added as needed to maintain high populations. Tests were ended when most plants in the susceptible check variety or varieties were dead. Resistance was expressed as seedling survival percentage. About 25 to 30 plants per replication were classified as either resistant or susceptible.

Flats with pea aphid resistant seedlings were sprayed with an aerosol pyrethrin to kill pea aphids. After a week, the plants were reinfested with spotted alfafa aphids to determine the percentages of seedlings with combined resistance to both aphid species. Four replications of 12 to 15 plants each were classified. Susceptibility to spotted alfalfa aphids was expressed as vein clearing of leaves, leaf yellowing with honeydew formation, or seedling survival.

Temperature was maintained at about 70°F for the pea aphid and at about 74°F for the spotted alfalfa aphid tests. Natural light was supplemented with fluorescent lights 16 hours per day.

Bacterial Wilt Test

Seed of each entry was scarified, treated with fungicide, and planted in a soil-sand mixture in 4-inch-diameter clay pots on October 25, 1972. Seedlings were thinned to about 20 to 25 plants per pot 3 weeks later. Seedling top growth was cut off in early December 1972 and January 8, 1973.

Frozen root inoculum was obtained from F. I. Frosheiser of the Minnesota Agricultural Experiment Station. Inoculum was prepared January 9, 1973 by grinding 0.1 pound of roots in a pint of tap water, adding a pint of water, soaking for 30 minutes, and adding 3 more pints of water. Pots were gently tapped so that the entire root mass was removed. The root mass was cut in half with a sharp knife. The bottom half was replaced in the pot and firmed by hand. The 0.07 pint (40 cc) of inoculum was poured into the pot and the top half of the root mass replaced. Entries were arranged in a randomized block design with three replications and watered lightly with a sprinkling can full of the inoculum. Plants were watered regularly with tap water to maintain sustained growth and top growth was cut off at about 30-day intervals. Temperature was maintained at about 72°F. Natural light was supplemented with fluorescent lights 24 hours per day. On May 23, 1973, top growth was cut off, plants removed from pots, roots washed with water, and cross-sectioned with a razor blade to observe wilt symptoms. Plants were classified into 1 of 5 groups: healthy (no symptoms); slight, moderate, or severe symptoms; or dead. Percentages of plants were calculated for each class but only healthy plants were considered resistant.

Statistical analyses were calculated in cooperation with the Statistical Laboratory. Data expressed in percentages were converted to arc sin° for statistical analyses, then reconverted to percentages for tables.

RESULTS

Field Experiments

Forage Yield Trial

Differences in persistence were not significant among entries as measured by percent stand in 1973 and 1974 (Table 1). Rate of recovery after cutting in 1973 was similar for all Dawson seed lots and Vernal. Dawson breeder, foundation, and certified seed class rate of recovery averages were all 5.0. Kanza and Saranac recovered more rapidly than Dawson and Vernal. Fall growth habit differences were found within foundation and certified seed classes. However, the differences were small, within one point on the visual scale, and not related to state of origin or age of seed field. Breeder, foundation, and certified seed class fall growth averages were 4.1, 4.3, and 4.1, respectively. Kanza and Saranac were more erect in fall growth habit

than Dawson and Vernal. Differences in forage yield were not significant among entries in 1973, 1974, or for the 2-year average.

Spaced Plants

Plants resistant, intermediate in resistance, or susceptible to potato leafhopper were found in all entries (Table 2). The percentages of plants in these three categories were similar for most Dawson seed lots. Foundation seed entry 8, and certified seed entries 17, 21, 24, 29, 31, 40, 42, 44, 45, 62, and 63 had lower percentages of resistant plants than other entries. However, damage averages of these 12 entries were in the same range as most entries (Table 6). Breeder, foundation, and certified seed class potato leafhopper averages were 4.7, 4.8, and 5.2, respectively. The most damage was observed on Saranac. However, the damage on most entries was in the same range as Saranac. Differences were found only within the certified seed class. Entry 22 was damaged less than entry 21 from the same seed field, and entry 45 from Idaho, by a visual score difference of only 1.0. Averages for entries 22 and 45 were in the same range as most breeder and foundation lots.

Percentages of plants in the intermediate fall growth habit classes (scores of 4 to 6) in 1972 were similar for all Dawson seed lots (Table 3). Erect or prostrate plants were not found among entries. Kanza and Saranac had many more semi-erect plants (scores 2 and 3) than Dawson lots or Vernal. Differences in entry averages were found only within the certified class (Table 6). However, the variation in averages was a visual score difference of only 0.6. Averages of most Dawson entries were in the same range regardless of seed class. Breeder, foundation, and certified seed class fall growth averages were 5.3, 5.2, and 5.1, respectively. Kanza and Saranac differed from all other entries.

The percentages of plants that were fastest (score 1) and slowest (scores 7 to 9) to recover after cutting were low and similar for all entries (Table 4). Dawson certified entries 23, 38, 39, 40, 46, 47, 56, 58, and 64 resembled Kanza and Saranac in percentage of plants with a score of 2. Neither state of origin nor age of stand were involved in recovery class differences. Entry averages were not different (Table 6). Breeder, foundation, and certified seed class recovery averages were 3.6, 3.5, and 3.4, respectively.

Erect or prostrate plants were not found among entries in the fall of 1973 (Table 5). The percentages of plants in the intermediate fall growth habit classes (scores 4 to 6) were similar for all Dawson seed lots. Kanza and Saranac had many more semi-erect plants (scores 2 and 3) than Dawson lots or Vernal. All Dawson lot averages were in the same range (Table 6). Breeder, foundation, and certified seed class fall growth averages were 4.8, 4.5, and 4.4, respectively. Kanza and Saranac were more erect than Dawson or Vernal. Fall growth

habit scores in these space-planted plots were slightly higher than in forage yield trial plots seeded at 12 pounds per acre (Table 1).

Entry averages were different for persistence, expressed as 1974 stand in percent of the original in 1972 (Table 6). Differences were found within breeder and certified classes. Entry 67, Dawson DCC72, was less persistent than three of its component lots. One replication with a poor stand contributed to the comparatively low persistence of entries 4, 34, and 67. All other Dawson lots had similar persistence. Breeder, foundation, and certified seed class averages for persistence were 87, 89, and 90%, respectively. The persistence of Kanza and Saranac was lower than that of the Dawson lots in this space-planted test but all of the entries were similar in persistence in seeded plots (Table 1).

Greenhouse Experiments

Aphid Tests

Differences in levels of pea aphid resistance were not found among entries within Dawson seed classes (Table 7). Foundation entries 9 and 13, and certified entries 18 and 48, with the lowest level of resistance, were in the same range for resistance level as 5 of 6 breeder lots. Certified lots with the lowest level of resistance originated from foundation lots with high levels of resistance. Breeder, foundation, and certified seed class averages were 48, 42, and 44% resistant plants, respectively. Kanza and Dawson were similar in level of resistance except for two foundation and seven certified Dawson entries. No pea aphid resistant plants were found in Vernal.

Levels of resistance to spotted alfalfa aphid differed among entries within breeder and certified classes (Table 7). Within seed classes, 5 of 6 breeder lots, all foundation lots, and 48 of 52 certified lots were in the same range for resistance level. Similarly, 48 certified lots were in the same range as all foundation lots, and 6 foundation lots were in the same range as 5 breeder lots. Breeder, foundation, and certified seed class averages were 56, 49, and 45% resistant plants, respectively. While a downward trend in resistance with advance in generation was indicated by the averages, a variation of 45 to 56% resistant plants came within the same multiple range for entries. Dawson and Kanza were similar in resistance. No spotted alfalfa aphid resistant plants were found in Saranac or Vernal.

The percentages of plants with combined resistance to pea aphids and spotted alfalfa aphids differed among entries within breeder and certified classes (Table 7). Within seed classes, 5 of 6 breeder lots, all foundation lots, and 50 of 52 certified lots were in the same range for resistance level. Similarly, 50 certified lots were in the same range as 5 foundation and 5 breeder lots. Breeder, foundation, and certified seed class averages were 32, 26, and 28% resistant, respectively, to

both aphid species. Dawson and Kanza were similar in level of combined resistance to the two aphid species.

Bacterial Wilt Test

Differences in levels of bacterial wilt resistance were found among entries within Dawson breeder and certified classes (Table 7). Within seed classes, 5 of 6 breeder lots, all foundation lots, and 51 of 52 certified lots were in the same range. Similarly, 51 certified lots and all foundation and breeder lots were in the same range. Level of resistance was not related to seed field age. Breeder, foundation, and certified seed class averages were 44, 38, and 34% resistant plants, respectively. While a downward trend in resistance with advance in generation was indicated by the averages, a variation of 34 to 44% resistant plants came within the same multiple range for entries.

DISCUSSION

Results obtained on certified Dawson alfalfa seed classes in field and greenhouse experiments were in agreement with the original variety description (11). Slight variations, mostly nonsignificant statistically and biologically, were found for growth habit, winterhardiness, rate of recovery after cutting, and insect and disease resistance among seed lots within a generation and successive generations produced inside and outside of the Dawson (northern) area of adaptation. Similar variations within other varieties were reviewed. Continuity in performance of three generations of seed increase under certification procedures was apparent.

Slight variations and significant differences among seed lots in a space-planted field experiment and in greenhouse tests were not of practical significance to forage yield and persistence in a seeded field yield trial during three years. Persistence was relatively low for three entries in the space-planted test but all entries were similar in persistence in seeded plots. Space-planting, in particular space-transplanting as in this study, increases the likelihood of winter injury compared with seeded plots. Interplant protection against climatic variation occurs in seeded plots. Growth habit and rate of recovery responses were closely related in space-planted and seeded plots. However, slightly different average visual scores may be obtained in the two types of plots due to level of interplant competition. Spaced plants have much more opportunity for stems to spread than plants in seeded plots. Fall growth habit scores for spaced plants were in good agreement in the year of seeding, 1972, and 1973.

A given seed lot was aberrant for one trait but was within the same range as other entries for other traits. Thus, tests for more than one economically important trait are needed to evaluate performance of a given seed lot regardless of seed class.

The certified seed class of Dawson was produced both in the presence (in California) and absence of spotted alfalfa aphid in the year of seeding and subsequent years. Some California fields were sprayed with an insecticide one or more times to control high levels of spotted alfalfa aphid in isolated areas. The level of resistance to spotted alfalfa aphid was high enough that no insecticide was needed for added control in other California fields. The use of insecticide vs no insecticide in seed fields did not influence seed lot performance for aphid resistance or other traits.

Age of seed field was not important in the performance of seed lots within Dawson breeder, foundation, or certified seed classes. However, new seed fields must be established from stock seed as stands are naturally thinned if the original varietal characteristics are to be retained (1). Mechanical thinning of stands after the year of seeding did not affect Dawson seed lot performance. Stock seed should come from the state (or country) of origin (22).

Greenhouse pea aphid, spotted alfalfa aphid, and bacterial wilt tests have given a good indication of field performance for these pests. The precision of the bacterial wilt test in this study was less than that of other tests. The high susceptibility of Du Puits was demonstrated, with a few possible escapes. The percentages of bacterial wilt resistant plants in most Dawson lots were higher than previously reported (11). However, the level of Dawson resistance relative to Ranger and Vernal was in good agreement with previous tests.

Table 1. Field performance of certified seed lots of Dawson alfalfa in a forage yield trial at Mead, Nebraska.

Entry no.	Seed year	Year established	Designation	% stand 6/11/73	% stand 6/3/74	Rate of recovery 6/13/73	Fall growth habit 10/9/73	Forage yield tons/acre dry matter 1973 4 cuts	1974 4 cuts	1973-74 average
Breeder seed										
1	1961	1961	Nebr.	92	82	4.8 b	4.2 bc	7.22	6.76	6.99
2	1967	1967	Nebr.	91	85	5.0 b	4.0 b	7.88	6.85	7.36
3	1968	1968	Nebr.	93	90	5.0 b	4.2 bc	7.09	7.22	7.15
4	1969	1968	Nebr.	88	82	5.0 b	4.0 b	7.57	6.61	7.09
5	1970	1968	Nebr.	95	92	5.0 b	4.0 b	7.54	6.89	7.22
6	1971	1968	Nebr.	93	88	5.0 b	4.0 b	7.72	6.93	7.32
Foundation seed										
7	1966	1966	Wash.	96	89	4.8 b	4.5 dc	7.46	6.94	7.20
8	1967	1966	Wash.	91	87	5.0 b	4.0 b	7.22	6.65	6.93
9	1968	1966	Wash.	96	90	4.8 b	4.5 dc	7.76	6.90	7.33
10	1968	1966-68	Wash.	89	81	5.0 b	4.2 bc	7.36	6.85	7.10
11	1969	1966	Wash.	92	85	5.0 b	4.8 d	7.32	6.86	7.09
12	1969	1968	Wash.	95	92	5.0 b	4.0 b	7.60	7.14	7.37
13	1971	1970	Wash.	90	86	4.8 b	4.0 b	7.32	6.86	7.09
Certified seed										
14	1967	1967	Cal. 1	88	87	5.0 b	4.2 bc	7.24	6.98	7.11
15	1967	1967	Cal. 2	92	90	5.0 b	4.0 b	7.20	6.80	7.00
16	1968	1967	Cal. 2	92	86	5.0 b	4.2 bc	7.66	6.89	7.27
17	1969	1967	Cal. 2	95	90	5.0 b	4.0 b	7.26	6.87	7.07
18	1970	1967	Cal. 2	90	87	5.0 b	4.2 bc	7.57	7.04	7.31
19	1967	1967	Cal. 3	93	86	5.0 b	4.0 b	7.75	7.02	7.38
20	1968	1967	Cal. 3	87	92	4.8 b	4.0 b	7.54	6.98	7.26
21	1969	1967	Cal. 3	92	88	5.0 b	4.0 b	7.14	6.99	7.07
22	1970	1967	Cal. 3	92	87	5.0 b	4.0 b	7.50	7.23	7.37
23	1967	1967	Cal. 4	95	93	5.0 b	4.0 b	7.60	7.21	7.41
24	1968	1967	Cal. 4	91	86	4.8 b	4.0 b	7.65	7.18	7.41
25	1969	1967	Cal. 4	94	89	4.8 b	4.0 b	7.86	7.04	7.45
26	1970	1967	Cal. 4	93	87	5.0 b	4.0 b	6.98	7.11	7.04
27	1971	1967	Cal. 4	92	88	5.0 b	4.0 b	7.47	6.90	7.18
28	1968	1968	Cal. 5	91	89	5.0 b	4.0 b	7.00	7.28	7.14
29	1969	1968	Cal. 5	96	92	5.0 b	4.0 b	7.75	7.12	7.43
30	1970	1968	Cal. 5	92	90	5.0 b	4.0 b	7.30	7.06	7.18
31	1971	1968	Cal. 5	90	90	5.0 b	4.0 b	7.50	7.03	7.27
32	1970	1970	Cal. 6	94	90	5.0 b	4.2 bc	7.66	7.18	7.42
33	1971	1970	Cal. 6	93	86	5.0 b	4.5 dc	7.24	6.76	7.00
34	1970	1970	Cal. 7	94	90	5.0 b	4.0 b	7.30	7.22	7.26
35	1971	1970	Cal. 7	94	87	5.0 b	4.0 b	7.28	7.20	7.24
36	1970	1968	Cal. 8	94	90	5.0 b	4.0 b	7.52	7.30	7.41
37	1970	1970	Cal. 8	85	79	5.0 b	4.0 b	7.29	6.96	7.12
38	1970	1970	Cal. 8	95	92	5.0 b	4.0 b	7.66	7.02	7.34
39	1967	1967	Idaho	94	89	5.0 b	4.2 bc	7.46	7.30	7.38
40	1968	1967-68	Idaho	96	90	5.0 b	4.0 b	7.59	6.82	7.20
41	1969	1967	Idaho	98	90	5.0 b	4.2 bc	7.52	6.90	7.22
42	1969	1967-68	Idaho	95	92	5.0 b	4.0 b	7.22	6.98	7.10
43	1970	1967	Idaho	90	89	5.0 b	4.0 b	7.48	6.74	7.11
44	1970	1967-68	Idaho	95	90	4.8 b	4.2 bc	7.54	7.20	7.37
45	1971	1967	Idaho	88	85	5.0 b	4.0 b	7.49	6.88	7.19
46	1969	1968	Idaho	90	88	4.8 b	4.0 b	7.31	7.22	7.26
47	1970	1968	Idaho	97	92	4.8 b	4.0 b	7.70	7.20	7.45
48	1969	1968	Idaho	95	90	5.0 b	4.2 bc	7.50	6.73	7.11
49	1971	1968	Idaho	95	90	5.0 b	4.0 b	7.62	7.29	7.46
50	1969	1968	Utah	92	91	5.0 b	4.0 b	7.66	7.19	7.42
51	1970	1968	Utah	98	92	5.0 b	4.0 b	7.48	7.33	7.40
52	1971	1968	Utah	90	94	5.0 b	4.0 b	7.33	7.29	7.31
53	1968	1968	Wash.	95	92	5.0 b	4.0 b	7.66	6.70	7.18
54	1971	1968	Wash.	94	90	5.0 b	4.0 b	7.71	6.84	7.27
55	1969	1969	Wash.	94	88	5.0 b	4.0 b	7.51	6.85	7.18
56	1971	1969	Wash.	94	92	5.0 b	4.0 b	7.61	7.37	7.49
57	1970	1968-69	Wash.	96	91	4.8 b	4.0 b	7.90	6.91	7.41
58	1970	1970	Wash.	92	89	4.8 b	4.5 dc	7.71	7.24	7.47
59	1971	1970	Wash.	94	90	5.0 b	4.5 dc	7.50	6.99	7.25
Miscellaneous certified lots, composited to produce DCC72										
27	1971	1967	Cal. 4	92	88	5.0 b	4.0 b	7.47	6.90	7.18
52	1971	1968	Utah	90	94	5.0 b	4.0 b	7.33	7.29	7.31
59	1971	1970	Wash.	94	90	5.0 b	4.5 dc	7.50	6.99	7.25
60	1971	----+	Idaho C17	94	89	5.0 b	4.0 b	7.52	6.94	7.23
61	1971	----	Idaho C18	96	89	5.0 b	4.0 b	7.53	7.23	7.38
62	1971	----	Idaho C19	98	92	5.0 b	4.2 bc	7.68	7.22	7.45
63	1971	----	Nebr. H.	92	88	5.0 b	4.0 b	7.78	7.00	7.39
64	1971	----	Nebr. G.	91	88	4.8 b	4.0 b	7.47	6.95	7.21
65	1971	----	S. Dak.	91	88	5.0 b	4.2 bc	7.42	6.91	7.17
Checks										
66	1967		Dawson DCC67	95	92	5.0 b	4.0 b	7.09	7.34	7.22
67	1967		Dawson DCC72	93	93	5.0 b	4.2 bc	7.58	7.05	7.31
68	1971		Kanza KCC72	88	88	3.0 a	3.0 a	7.60	7.36	7.48
69	1971		Saranac SCC72	95	86	3.0 a	3.0 a	7.74	7.10	7.42
70	1971		Vernal VCC72	92	87	5.0 b	4.0 b	7.80	7.23	7.51

*Means followed by the same letter within a column do not differ at the 5% level of probability according to Duncan's multiple range test.

+No information.

Table 2. Frequency distributions of certified seed lots of Dawson alfalfa for potato leafhopper resistance in space-planted field plots at Mead, Nebraska.

Entry no.	Seed year	Year established	Designation	Percentage of plants in leafhopper classes 7/19/72								
				1	2	3	4	5	6	7	8	9
Breeder seed												
1	1961	1961	Nebr.	0	10	21	14	18	10	17	9	1
2	1967	1967	Nebr.	1	10	17	17	17	18	9	11	0
3	1968	1968	Nebr.	2	20	21	15	21	12	4	4	1
4	1969	1968	Nebr.	1	8	15	12	30	19	7	5	2
5	1970	1968	Nebr.	0	11	17	17	28	14	13	6	0
6	1971	1968	Nebr.	1	9	9	19	25	18	15	1	2
Foundation seed												
7	1966	1966	Wash.	1	13	15	15	17	20	11	4	4
8	1967	1966	Wash.	1	5	8	25	23	21	7	4	5
9	1968	1966	Wash.	0	9	13	12	24	22	13	5	1
10	1968	1966	Wash.	1	11	13	16	19	14	12	9	3
11	1969	1966-68	Wash.	1	13	18	21	20	11	9	5	1
12	1969	1966	Wash.	0	9	19	13	27	1	9	8	2
13	1971	1970	Wash.	1	6	12	17	28	20	11	4	2
Certified seed												
14	1967	1967	Cal. 1	0	9	7	14	23	22	12	6	5
15	1967	1967	Cal. 2	0	11	9	16	21	23	18	2	0
16	1968	1967	Cal. 2	0	8	17	14	14	26	17	4	0
17	1969	1967	Cal. 2	0	4	5	15	29	21	17	9	1
18	1970	1967	Cal. 2	0	6	17	12	26	19	12	7	0
19	1967	1967	Cal. 3	0	3	12	11	30	25	11	6	2
20	1968	1967	Cal. 3	2	5	14	19	27	17	9	6	3
21	1969	1967	Cal. 3	0	3	6	13	18	24	21	13	1
22	1970	1967	Cal. 3	0	11	14	13	29	17	10	2	2
23	1967	1967	Cal. 4	0	9	17	19	16	20	14	4	1
24	1968	1967	Cal. 4	0	5	5	15	19	29	19	6	1
25	1969	1967	Cal. 4	1	9	12	12	22	17	13	13	1
26	1970	1967	Cal. 4	0	10	8	22	21	21	9	8	1
27	1971	1967	Cal. 4	2	9	13	14	22	23	12	6	0
28	1968	1968	Cal. 5	0	9	8	15	22	22	15	8	2
29	1969	1968	Cal. 5	1	4	5	19	21	24	14	10	2
30	1970	1968	Cal. 5	1	7	13	17	29	14	9	8	2
31	1971	1968	Cal. 5	0	3	4	23	26	26	14	3	1
32	1970	1970	Cal. 6	3	6	5	14	31	11	15	10	4
33	1971	1970	Cal. 6	0	8	11	15	32	14	15	3	1
34	1970	1970	Cal. 7	1	9	11	14	26	19	14	3	1
35	1971	1970	Cal. 7	0	12	12	14	32	12	7	4	4
36	1970	1968	Cal. 8	1	9	6	17	19	23	15	5	4
37	1970	1970	Cal. 8	1	7	7	18	22	19	19	4	3
38	1970	1970	Cal. 8	1	5	10	4	24	22	24	6	3
39	1967	1967	Idaho	1	7	9	13	30	16	19	6	0
40	1968	1967-68	Idaho	0	6	3	16	27	29	8	8	3
41	1969	1967	Idaho	0	6	13	15	22	22	12	7	3
42	1969	1967-68	Idaho	0	2	7	11	18	33	18	8	2
43	1970	1967	Idaho	0	3	12	20	25	12	14	10	5
44	1970	1967-68	Idaho	0	4	5	18	25	21	15	9	2
45	1971	1967	Idaho	0	3	2	14	23	30	19	4	5
46	1969	1968	Idaho	1	11	10	11	19	17	15	13	1
47	1970	1968	Idaho	0	2	13	14	21	25	17	5	4
48	1969	1968	Idaho	0	5	11	10	25	23	16	7	3
49	1971	1968	Idaho	1	9	12	14	24	15	11	9	6
50	1969	1968	Utah	0	7	9	14	25	22	17	4	1
51	1970	1968	Utah	0	5	9	12	20	23	13	6	2
52	1971	1968	Utah	0	9	4	19	31	20	11	4	2
53	1968	1968	Wash.	1	4	14	11	24	26	12	7	0
54	1971	1968	Wash.	0	7	10	20	26	21	13	3	0
55	1969	1969	Wash.	2	15	14	15	29	12	16	7	1
56	1971	1969	Wash.	0	6	11	21	28	17	12	4	0
57	1970	1968-69	Wash.	0	16	12	19	25	16	7	3	1
58	1970	1970	Wash.	0	11	16	16	28	18	6	4	0
59	1971	1970	Wash.	1	3	11	13	25	20	20	4	2
Miscellaneous certified lots, composited to produce DCC72												
27	1971	1967	Cal. 4	2	9	13	14	22	23	12	6	0
52	1971	1968	Utah	0	9	4	19	31	20	11	4	2
59	1971	1970	Wash.	1	3	11	13	25	20	20	4	2
60	1971	----	Idaho C17	1	7	8	9	20	24	21	4	6
61	1971	----	Idaho C18	0	7	12	17	21	15	13	9	4
62	1971	----	Idaho C19	0	4	4	13	25	27	15	9	8
63	1971	----	Nebr. H.	0	3	5	19	19	23	15	7	2
64	1971	----	Nebr. G.	0	9	15	14	25	14	15	9	0
65	1971	----	S. Dak.	1	12	13	15	23	17	12	3	2
Checks												
66	1967		Dawson DCC67	0	4	9	12	36	18	8	4	0
67	1971		Dawson DCC72	0	8	9	17	27	19	9	10	0
68	1971		Kanza KCC72	0	4	8	14	37	16	13	5	1
69	1971		Saranac SCC72	0	3	7	10	17	25	21	13	3
70	1971		Vernal VCC72	0	4	13	16	18	23	18	4	5

Table 3. Frequency distributions of certified seed lots of Dawson alfalfa for fall growth habit in 1972 in space-planted field plots at Mead, Nebraska.

Entry no.	Seed year	Year established	Designation	Percentage of plants in fall growth habit classes 10/11/72				
				2	3	4	5	6
Breeder seed								
1	1961	1961	Nebr.	0	2	14	33	51
2	1967	1967	Nebr.	0	4	18	36	42
3	1968	1968	Nebr.	0	0	14	41	45
4	1969	1968	Nebr.	0	1	15	35	49
5	1970	1968	Nebr.	0	2	12	34	52
6	1971	1968	Nebr.	0	1	14	33	52
Foundation seed								
7	1966	1966	Wash.	0	2	17	40	40
8	1967	1966	Wash.	0	1	23	43	33
9	1968	1966	Wash.	0	2	15	39	43
10	1968	1966	Wash.	0	5	18	37	40
11	1969	1966-68	Wash.	0	1	24	44	32
12	1969	1966	Wash.	0	1	19	39	40
13	1971	1970	Wash.	0	3	19	44	34
Certified seed								
14	1967	1967	Cal. 1	0	0	17	48	34
15	1967	1967	Cal. 2	0	2	24	40	34
16	1968	1967	Cal. 2	0	0	19	40	41
17	1969	1967	Cal. 2	0	4	29	41	25
18	1970	1967	Cal. 2	0	3	23	51	22
19	1967	1967	Cal. 3	0	5	31	37	27
20	1968	1967	Cal. 3	0	1	25	41	32
21	1969	1967	Cal. 3	0	4	24	50	22
22	1970	1967	Cal. 3	0	3	25	37	35
23	1967	1967	Cal. 4	0	3	16	46	35
24	1968	1967	Cal. 4	0	5	29	34	32
25	1969	1967	Cal. 4	0	3	12	44	40
26	1970	1967	Cal. 4	0	3	19	45	32
27	1971	1967	Cal. 4	0	4	31	42	23
28	1968	1968	Cal. 5	0	0	13	52	35
29	1969	1968	Cal. 5	0	1	29	34	36
30	1970	1968	Cal. 5	0	3	12	45	40
31	1971	1968	Cal. 5	0	6	20	42	32
32	1970	1970	Cal. 6	0	3	16	41	39
33	1971	1970	Cal. 6	0	2	8	54	36
34	1970	1970	Cal. 7	0	5	23	40	31
35	1971	1970	Cal. 7	0	1	21	46	32
36	1970	1968	Cal. 8	0	5	27	36	32
37	1970	1970	Cal. 8	0	4	15	47	34
38	1970	1970	Cal. 8	0	2	21	35	42
39	1967	1967	Idaho	0	3	13	54	30
40	1968	1967-68	Idaho	0	3	21	37	39
41	1969	1967	Idaho	0	3	26	35	35
42	1969	1967-68	Idaho	0	1	22	45	32
43	1970	1967	Idaho	0	1	21	45	32
44	1970	1967-68	Idaho	0	2	22	53	23
45	1971	1967	Idaho	0	1	22	41	36
46	1969	1968	Idaho	0	1	20	49	30
47	1970	1968	Idaho	0	1	17	41	41
48	1969	1968	Idaho	0	0	17	44	28
49	1971	1968	Idaho	0	3	24	44	28
50	1969	1968	Utah	0	1	17	52	29
51	1970	1968	Utah	0	1	23	45	31
52	1971	1968	Utah	0	6	17	49	27
53	1968	1968	Wash.	0	4	26	31	38
54	1971	1968	Wash.	0	3	22	40	35
55	1969	1969	Wash.	0	2	19	54	25
56	1971	1969	Wash.	0	4	26	41	29
57	1970	1968-69	Wash.	0	5	24	36	35
58	1970	1970	Wash.	0	3	27	34	35
59	1971	1970	Wash.	0	1	26	39	33
Miscellaneous certified lots, composited to produce DCC72								
27	1971	1967	Cal. 4	0	4	31	42	23
52	1971	1968	Utah	0	6	17	49	27
59	1971	1970	Wash.	0	1	26	39	33
60	1971	----	Idaho C17	0	1	27	38	34
61	1971	----	Idaho C18	0	1	23	52	23
62	1971	----	Idaho C19	0	4	25	35	35
63	1971	----	Nebr. H.	0	1	23	39	38
64	1971	----	Nebr. G.	0	0	19	46	33
65	1971	----	S. Dak.	0	3	15	47	35
Checks								
66	1967		Dawson DCC67	0	1	27	38	33
67	1971		Dawson DCC72	0	2	17	4	38
68	1971		Kanza KCC72	3	24	33	32	8
69	1971		Saranac SCC72	2	21	32	33	12
70	1971		Vernal VCC72	0	2	13	29	56

Table 4. Frequency distributions of certified seed lots of Dawson alfalfa for rate of recovery after cutting in space-planted field plots at Mead, Nebraska.

Entry no.	Seed year	Year established	Designation	Percentage of plants in recovery classes 7/26/73								
				1	2	3	4	5	6	7	8	9
Breeder seed												
1	1961	1961	Nebr.	1	9	34	33	13	3	6	0	0
2	1967	1967	Nebr.	1	17	30	28	18	2	1	1	1
3	1968	1968	Nebr.	0	13	42	32	11	1	0	0	1
4	1969	1968	Nebr.	0	14	34	36	12	4	0	0	0
5	1970	1968	Nebr.	0	8	36	42	10	2	1	0	0
6	1971	1968	Nebr.	0	14	27	36	16	4	2	0	0
Foundation seed												
7	1966	1966	Wash.	0	18	35	32	12	3	0	0	0
8	1967	1966	Wash.	1	14	37	28	17	1	1	0	0
9	1968	1966	Wash.	0	17	44	28	7	1	0	1	1
10	1968	1966	Wash.	0	14	34	28	18	2	1	0	1
11	1969	1966-68	Wash.	0	11	41	30	11	3	1	0	1
12	1969	1966	Wash.	0	10	35	47	7	0	0	0	1
13	1971	1970	Wash.	0	17	38	34	10	0	0	1	0
Certified seed												
14	1967	1967	Cal. 1	3	18	41	23	8	5	0	0	0
15	1967	1967	Cal. 2	0	14	50	28	6	2	0	0	0
16	1968	1967	Cal. 2	0	19	35	32	10	3	0	0	0
17	1969	1967	Cal. 2	0	16	48	22	8	4	1	0	0
18	1970	1967	Cal. 2	0	9	42	31	9	7	1	0	0
19	1967	1967	Cal. 3	1	18	40	31	9	0	0	0	0
20	1968	1967	Cal. 3	2	13	39	34	8	2	2	0	0
21	1969	1967	Cal. 3	1	15	38	35	10	1	1	0	0
22	1970	1967	Cal. 3	1	18	35	32	12	1	1	0	0
23	1967	1967	Cal. 4	2	21	36	30	10	1	0	0	0
24	1968	1967	Cal. 4	1	12	46	28	9	2	2	0	0
25	1969	1967	Cal. 4	0	15	35	35	13	2	0	1	0
26	1970	1967	Cal. 4	1	13	46	28	10	0	1	0	1
27	1971	1967	Cal. 4	2	14	39	32	9	1	2	0	0
28	1968	1968	Cal. 5	0	10	44	30	13	1	0	0	1
29	1969	1968	Cal. 5	0	5	42	40	0	4	0	0	0
30	1970	1968	Cal. 5	0	9	49	29	7	5	0	0	0
31	1971	1968	Cal. 5	0	12	40	31	10	5	2	0	0
32	1970	1970	Cal. 6	0	13	38	33	13	2	0	0	1
33	1971	1970	Cal. 6	1	16	48	22	12	1	0	0	0
34	1970	1970	Cal. 7	0	12	36	31	10	6	4	0	0
35	1971	1970	Cal. 7	0	13	41	33	13	0	0	0	0
36	1970	1968	Cal. 8	0	8	44	35	9	3	1	0	0
37	1970	1970	Cal. 8	0	16	34	36	9	3	1	0	0
38	1970	1970	Cal. 8	2	20	38	21	11	5	2	1	0
39	1967	1967	Idaho	0	21	32	30	14	2	0	1	0
40	1968	1967-68	Idaho	0	23	37	25	13	2	0	0	0
41	1969	1967	Idaho	0	17	40	27	11	4	1	0	0
42	1969	1967-68	Idaho	0	15	35	35	14	2	0	0	0
43	1970	1967	Idaho	0	9	42	32	12	1	0	0	2
44	1970	1967-68	Idaho	0	8	37	36	17	1	0	1	1
45	1971	1967	Idaho	1	11	41	28	11	6	1	1	0
46	1969	1968	Idaho	1	21	40	26	9	2	1	0	0
47	1970	1968	Idaho	1	21	30	34	9	2	1	2	0
48	1969	1968	Idaho	2	17	30	33	11	4	1	1	0
49	1971	1968	Idaho	0	17	41	29	9	1	3	0	0
50	1969	1968	Utah	1	14	42	26	11	5	0	0	0
51	1970	1968	Utah	0	18	34	33	12	2	1	0	0
52	1971	1968	Utah	0	18	39	26	11	2	1	1	0
53	1968	1968	Wash.	0	12	36	38	11	3	0	0	0
54	1971	1968	Wash.	2	19	40	27	7	2	1	0	1
55	1969	1969	Wash.	1	13	38	25	12	7	2	0	0
56	1971	1969	Wash.	4	22	41	22	9	2	0	0	0
57	1970	1968-69	Wash.	2	14	34	32	12	3	1	0	0
58	1970	1970	Wash.	0	22	40	25	13	0	0	0	0
59	1971	1970	Wash.	0	8	43	37	9	0	2	1	0
Miscellaneous certified lots, composited to produce DCC72												
27	1971	1967	Cal. 4	2	14	39	32	9	1	2	0	0
52	1971	1968	Utah	0	18	39	26	11	2	1	1	0
59	1971	1970	Wash.	0	8	43	37	9	0	2	1	0
60	1971	----	Idaho C17	0	12	41	34	11	2	0	0	0
61	1971	----	Idaho C18	1	11	48	28	11	1	0	0	0
62	1971	----	Idaho C19	0	12	32	30	20	3	2	0	0
63	1971	----	Nebr. H.	0	18	39	28	14	1	0	0	0
64	1971	----	Nebr. G.	0	23	44	24	6	2	1	0	0
65	1971	----	S. Dak.	0	11	53	24	10	1	0	0	1
Checks												
66	1967		Dawson DCC67	1	10	39	30	15	4	0	1	0
67	1971		Dawson DCC72	0	12	41	36	8	0	2	2	0
68	1971		Kanza KCC72	2	27	29	30	11	2	0	0	0
69	1971		Saranac SCC72	1	27	40	24	8	0	0	0	0
70	1971		Vernal VCC72	0	14	47	26	11	0	1	1	0

Table 5. Frequency distributions of certified seed lots of Dawson alfalfa for fall growth habit in 1973 in space-planted field plots at Mead, Nebraska.

Entry no.	Seed year	Year established	Designation	Percentage of plants in fall growth habit classes 10/10/73					
				2	3	4	5	6	7
Breeder seed									
1	1961	1961	Nebr.	0	1	32	37	29	0
2	1967	1967	Nebr.	0	9	30	32	28	0
3	1968	1968	Nebr.	0	0	50	26	23	0
4	1969	1968	Nebr.	0	4	30	34	31	1
5	1970	1968	Nebr.	0	4	30	40	26	1
6	1971	1968	Nebr.	0	3	34	34	29	0
Foundation seed									
7	1966	1966	Wash.	0	5	42	39	15	0
8	1967	1966	Wash.	0	4	52	29	14	0
9	1968	1966	Wash.	0	3	48	32	17	0
10	1968	1966	Wash.	0	8	37	38	16	0
11	1969	1966-68	Wash.	0	0	47	33	20	0
12	1969	1966	Wash.	0	2	41	36	21	0
13	1971	1970	Wash.	0	2	41	28	29	0
Certified seed									
14	1967	1967	Cal. 1	0	3	42	40	14	0
15	1967	1967	Cal. 2	0	5	54	25	15	0
16	1968	1967	Cal. 2	0	5	54	29	13	0
17	1969	1967	Cal. 2	0	6	43	36	14	0
18	1970	1967	Cal. 2	1	5	45	29	20	0
19	1967	1967	Cal. 3	0	3	41	36	19	0
20	1968	1967	Cal. 3	0	3	33	50	14	0
21	1969	1967	Cal. 3	0	4	53	32	11	0
22	1970	1967	Cal. 3	0	5	49	32	14	0
23	1967	1967	Cal. 4	0	5	45	25	25	0
24	1968	1967	Cal. 4	0	8	41	35	16	0
25	1969	1967	Cal. 4	1	4	39	38	17	0
26	1970	1967	Cal. 4	0	7	50	24	19	0
27	1971	1967	Cal. 4	0	10	47	25	18	0
28	1968	1968	Cal. 5	0	3	44	40	13	0
29	1969	1968	Cal. 5	0	4	46	32	18	0
30	1970	1968	Cal. 5	0	2	44	37	11	0
31	1971	1968	Cal. 5	0	6	45	34	16	0
32	1970	1970	Cal. 6	0	5	43	37	15	0
33	1971	1970	Cal. 6	0	5	42	31	22	0
34	1970	1970	Cal. 7	0	7	48	26	19	0
35	1971	1970	Cal. 7	0	1	54	34	10	0
36	1970	1968	Cal. 8	0	8	49	30	13	0
37	1970	1970	Cal. 8	0	3	49	33	15	0
38	1970	1970	Cal. 8	0	5	48	32	15	0
39	1967	1967	Idaho	0	2	55	26	17	0
40	1968	1967-68	Idaho	0	6	39	32	23	0
41	1969	1967	Idaho	0	6	48	29	16	0
42	1969	1967-68	Idaho	0	4	39	36	20	0
43	1970	1967	Idaho	0	9	36	37	18	0
44	1970	1967-68	Idaho	0	3	54	28	15	0
45	1971	1967	Idaho	0	1	50	34	15	0
46	1969	1968	Idaho	0	0	42	38	20	0
47	1970	1968	Idaho	0	2	46	34	18	0
48	1969	1968	Idaho	0	4	42	32	22	0
49	1971	1968	Idaho	0	2	55	28	15	0
50	1969	1968	Utah	0	0	39	34	17	0
51	1970	1968	Utah	0	4	48	35	13	0
52	1971	1968	Utah	0	7	46	36	11	0
53	1968	1968	Wash.	0	4	44	28	23	0
54	1971	1968	Wash.	0	4	42	35	19	0
55	1969	1969	Wash.	0	3	45	36	15	0
56	1971	1969	Wash.	0	6	56	25	13	0
57	1970	1968-69	Wash.	0	4	44	36	15	0
58	1970	1970	Wash.	0	2	36	36	25	0
59	1971	1970	Wash.	0	2	47	35	15	0
Miscellaneous certified lots, composited to produce DCC72									
27	1971	1967	Cal. 4	0	10	47	25	18	0
52	1971	1968	Utah	0	7	46	36	11	0
59	1971	1970	Wash.	0	2	47	35	15	0
60	1971	----	Idaho C17	0	4	45	25	26	0
61	1971	----	Idaho C18	0	3	53	25	18	0
62	1971	----	Idaho C19	0	1	48	30	21	0
63	1971	----	Nebr. H.	0	5	48	37	9	0
64	1971	----	Nebr. G.	0	4	44	46	6	0
65	1971	----	S. Dak.	0	9	50	29	12	0
Checks									
66	1967		Dawson DCC67	0	4	54	27	14	0
67	1971		Dawson DCC72	0	10	44	35	11	0
68	1971		Kanza KCC72	12	57	28	3	0	0
69	1971		Saranac SCC72	13	51	28	8	0	0
70	1971		Vernal VCC72	0	13	36	43	18	0

Table 6. Performance of certified seed lots of Dawson alfalfa in space-planted field plots at Mead, Nebraska.

Entry no.	Seed year	Year established	Designation	Potato leafhopper 7/19/72	Fall growth habit 10/11/72	Recovery rate 7/26/73	Fall growth habit 10/10/73	1974 stand in % of 1972
Breeder seed								
1	1961	1961	Nebr.	4.9 ag*	5.4 a	3.8	4.8 e	91 ae
2	1967	1967	Nebr.	4.9 ag	5.1 ae	3.7	4.7 e	87 ae
3	1968	1968	Nebr.	4.2 g	5.4 a	3.5	4.7 e	85 ae
4	1969	1968	Nebr.	4.9 ag	5.3 ac	3.5	4.8 e	80 bg
5	1970	1968	Nebr.	4.8 bg	5.3 ac	3.6	4.9 e	90 ae
6	1971	1968	Nebr.	4.7 dg	5.4 a	3.8	4.9 e	88 ae
Foundation seed								
7	1966	1966	Wash.	4.7 dg	5.3 ac	3.5	4.3 ce	88 ae
8	1967	1966	Wash.	5.1 ag	5.1 ae	3.6	4.4 ce	95 ab
9	1968	1966	Wash.	5.0 ag	5.2 ad	3.4	4.3 ce	83 af
10	1968	1966-68	Wash.	5.0 ag	5.1 ae	3.5	4.6 de	91 ae
11	1969	1966	Wash.	4.4 fg	5.0 ae	3.6	4.6 de	86 ae
12	1969	1968	Wash.	4.8 ag	5.3 ac	3.6	4.7 e	95 ab
13	1971	1970	Wash.	5.0 ag	5.1 ae	3.4	4.8 e	88 ae
Certified seed								
14	1967	1967	Cal. 1	5.3 af	5.3 ac	3.3	4.4 de	91 ae
15	1967	1967	Cal. 2	4.9 ag	5.2 ae	3.3	4.5 de	92 ad
16	1968	1967	Cal. 2	4.9 ag	5.3 ac	3.4	4.3 ce	87 ae
17	1969	1967	Cal. 2	5.5 ae	5.0 be	3.4	4.4 ce	94 ab
18	1970	1967	Cal. 2	5.0 ag	4.9 ce	3.6	4.4 de	87 ae
19	1967	1967	Cal. 3	5.3 af	4.9 de	3.2	4.6 e	92 ad
20	1968	1967	Cal. 3	4.9 ag	5.0 ae	3.4	4.4 ce	90 ae
21	1969	1967	Cal. 3	5.7 ab	5.0 be	3.6	4.2 ce	96 a
22	1970	1967	Cal. 3	4.7 cg	5.1 ae	3.4	4.5 de	96 a
23	1967	1967	Cal. 4	4.8 ag	5.2 ae	3.3	4.6 de	86 ae
24	1968	1967	Cal. 4	5.4 ae	4.9 ce	3.4	4.5 de	90 ae
25	1969	1967	Cal. 4	5.2 af	5.3 ac	3.6	4.5 de	91 ae
26	1970	1967	Cal. 4	5.0 ag	5.1 ae	3.4	4.4 de	88 ae
27	1971	1967	Cal. 4	4.9 ag	4.8 e	3.4	4.4 ce	86 ae
28	1968	1968	Cal. 5	5.3 af	5.2 ae	3.6	4.5 de	89 ae
29	1969	1968	Cal. 5	5.5 ad	5.1 ae	3.7	4.4 ce	84 ae
30	1970	1968	Cal. 5	4.9 ag	5.2 ad	3.5	4.5 de	90 ae
31	1971	1968	Cal. 5	5.3 af	5.0 be	3.5	4.4 de	91 ae
32	1970	1970	Cal. 6	5.3 af	5.2 ae	3.6	4.3 ce	86 ae
33	1971	1970	Cal. 6	4.9 ag	5.2 ae	3.3	4.3 cd	87 ae
34	1970	1970	Cal. 7	4.9 ag	5.0 be	3.7	4.6 de	77 dg
35	1971	1970	Cal. 7	4.8 bg	5.1 ae	3.4	4.4 de	84 ae
36	1970	1968	Cal. 8	5.1 ag	4.9 ce	3.6	4.3 ce	88 ae
37	1970	1970	Cal. 8	5.2 af	5.1 ae	3.4	4.4 de	88 ae
38	1970	1970	Cal. 8	5.5 ad	5.2 ae	3.4	4.5 de	85 ae
39	1967	1967	Idaho	5.2 af	5.3 ac	3.5	4.5 de	87 ae
40	1968	1967-68	Idaho	5.3 af	5.2 ae	3.3	4.4 de	88 ae
41	1969	1967	Idaho	5.2 af	5.0 ae	3.4	4.5 de	91 ae
42	1969	1967-68	Idaho	5.7 ac	5.1 ae	3.5	4.6 de	88 ae
43	1970	1967	Idaho	5.3 af	5.1 ae	3.6	4.4 ce	87 ae
44	1970	1967-68	Idaho	5.4 ae	5.0 be	3.8	4.3 ce	92 ad
45	1971	1967	Idaho	5.7 ab	5.1 ae	3.6	4.6 de	91 ae
46	1969	1968	Idaho	5.2 af	5.1 ae	3.3	4.7 e	89 ae
47	1970	1968	Idaho	5.4 af	5.4 a	3.5	4.5 de	85 ae
48	1969	1968	Idaho	5.4 ae	5.2 ad	3.7	4.5 de	92 ad
49	1971	1968	Idaho	5.2 af	5.0 be	3.4	4.3 ce	92 ad
50	1969	1968	Utah	5.2 af	5.2 ae	3.5	4.3 ce	88 ae
51	1970	1968	Utah	5.3 af	5.1 ae	3.5	4.5 de	93 ac
52	1971	1968	Utah	5.1 ag	5.0 ae	3.4	4.2 ce	94 ab
53	1968	1968	Wash.	5.1 ag	5.0 ae	3.8	4.6 de	92 ad
54	1971	1968	Wash.	4.9 ag	5.1 ae	3.4	4.6 de	95 ab
55	1969	1969	Wash.	4.7 cg	5.0 be	3.6	4.6 de	94 ab
56	1971	1969	Wash.	5.0 ag	4.9 ce	3.1	4.3 ce	91 ae
57	1970	1968-69	Wash.	4.5 eg	5.0 ae	3.1	4.4 ce	91 ae
58	1970	1970	Wash.	4.6 dg	5.0 ae	3.3	4.7 e	92 ad
59	1971	1970	Wash.	5.3 af	5.1 ae	3.6	4.5 de	93 ac
Miscellaneous certified lots, composited to produce DCC72								
27	1971	1967	Cal. 4	4.9 ag	4.8 e	3.4	4.4 ce	86 ae
52	1971	1968	Utah	5.1 ag	5.0 ae	3.4	4.2 ce	94 ab
59	1971	1970	Wash.	5.3 af	5.1 ae	3.6	4.5 de	93 ac
60	1971	----	Idaho C17	5.5 ad	5.1 ae	3.5	4.4 ce	91 ae
61	1971	----	Idaho C18	5.2 af	5.0 be	3.3	4.5 de	93 ac
62	1971	----	Idaho C19	5.6 ad	5.1 ae	3.7	4.4 de	86 ae
63	1971	----	Nebr. H.	5.5 ad	5.2 ae	3.5	4.4 de	95 ab
64	1971	----	Nebr. G.	5.0 ag	5.1 ae	3.2	4.4 de	86 ae
65	1971	----	S. Dak.	4.8 bg	5.1 ae	3.4	4.4 ce	96 a
Checks								
66	1967		Dawson DCC67	5.0 ag	5.0 ae	3.7	4.4 ce	92 ad
67	1971		Dawson DCC72	5.0 ag	5.2 ae	3.6	4.3 ce	79 cg
68	1971		Kanza KCC72	5.1 ag	4.1 f	3.1	3.1 a	70 fg
69	1971		Saranac SCC72	5.8 a	4.2 f	3.0	3.3 ab	76 eg
70	1971		Vernal VCC72	5.3 af	5.2 ae	3.5	4.7 e	90 ae

*Means followed by the same letter within a column do not differ at the 5% level of probability according to Duncan's multiple range test.

Table 7. The resistance in certified seed lots of Dawson alfalfa to pea aphids, spotted alfalfa aphids, and bacterial wilt in the greenhouse at Lincoln, Nebraska.

Entry no.	Seed year	Year established	Designation	Percentages of plants resistant			
				Pea aphid	Spotted alfalfa aphid	Combined pea and spotted alfalfa aphid	Bacterial wilt
Breeder seed							
1	1961	1961	Nebr.	45 ac*	51 af	28 be	29 dj
2	1967	1967	Nebr.	43 ac	55 ad	25 be	45 ai
3	1968	1968	Nebr.	46 ac	64 a	26 be	48 ag
4	1969	1968	Nebr.	49 ac	54 ae	31 ae	46 ah
5	1970	1968	Nebr.	53 ab	60 ab	49 a	35 bi
6	1971	1968	Nebr.	51 ac	49 bf	35 ad	58 ab
Foundation seed							
7	1966	1966	Wash.	40 ac	50 af	28 be	44 ai
8	1967	1966	Wash.	45 ac	49 bf	26 be	34 bi
9	1968	1966	Wash.	35 c	42 df	19 de	37 bi
10	1968	1966-68	Wash.	51 ac	52 af	35 ad	49 ag
11	1969	1966	Wash.	41 ac	48 bf	25 be	37 bi
12	1969	1968	Wash.	45 ac	49 bf	25 be	36 bi
13	1971	1970	Wash.	34 c	50 af	21 ce	28 dj
Certified seed							
14	1967	1967	Cal. 1	50 ac	45 cf	30 be	31 bi
15	1967	1967	Cal. 2	37 bc	44 df	26 be	33 bi
16	1968	1967	Cal. 2	46 ac	44 cf	32 ae	26 ej
17	1969	1967	Cal. 2	45 ac	47 bf	27 be	38 ai
18	1970	1967	Cal. 2	35 c	45 cf	29 be	18 ij
19	1967	1967	Cal. 3	37 bc	44 df	22 be	36 bi
20	1968	1967	Cal. 3	51 ac	41 df	39 ab	57 ac
21	1969	1967	Cal. 3	44 ac	43 df	25 be	30 cj
22	1970	1967	Cal. 3	43 ac	48 bf	25 be	42 ai
23	1967	1967	Cal. 4	36 bc	42 df	24 be	41 ai
24	1968	1967	Cal. 4	48 ac	43 df	32 ae	27 dj
25	1969	1967	Cal. 4	47 ac	43 df	24 be	30 cj
26	1970	1967	Cal. 4	40 ac	43 df	30 be	29 cj
27	1971	1967	Cal. 4	46 ac	45 cf	28 be	21 gj
28	1968	1968	Cal. 5	50 ac	47 bf	36 ac	27 dj
29	1969	1968	Cal. 5	41 ac	45 cf	33 ae	46 ah
30	1970	1968	Cal. 5	38 ac	48 bf	26 be	38 ai
31	1971	1968	Cal. 5	50 ac	50 af	34 ae	36 bi
32	1970	1970	Cal. 6	50 ac	45 bf	30 be	27 dj
33	1971	1970	Cal. 6	45 ac	45 bf	27 be	29 dj
34	1970	1970	Cal. 7	43 ac	40 df	28 be	23 fj
35	1971	1970	Cal. 7	46 ac	47 bf	32 ae	19 hj
36	1970	1968	Cal. 8	42 ac	41 df	29 be	18 hj
37	1970	1970	Cal. 8	41 ac	42 df	29 be	26 dj
38	1970	1970	Cal. 8	42 ac	43 df	26 be	21 gj
39	1967	1967	Idaho	43 ac	48 bf	33 ae	18 ij
40	1968	1967-68	Idaho	45 ac	38 f	32 ae	41 ai
41	1969	1967	Idaho	36 bc	50 af	18 e	31 bi
42	1969	1967-68	Idaho	42 ac	46 bf	22 be	33 bi
43	1970	1967	Idaho	44 ac	44 cf	24 be	30 bi
44	1970	1967-68	Idaho	43 ac	47 bf	26 be	41 ai
45	1971	1967	Idaho	44 ac	45 cf	29 be	35 bi
46	1969	1968	Idaho	51 ac	43 df	27 be	30 bi
47	1970	1968	Idaho	45 ac	42 df	22 be	28 dj
48	1969	1968	Idaho	35 c	42 df	23 be	32 bi
49	1971	1968	Idaho	50 ac	45 bf	28 be	36 bi
50	1969	1968	Utah	36 bc	41 df	24 be	30 bi
51	1970	1968	Utah	40 ac	49 bf	20 ce	25 ej
52	1971	1968	Utah	45 ac	54 ad	28 be	32 bi
53	1968	1968	Wash.	51 ac	44 cf	28 be	37 bi
54	1971	1968	Wash.	47 ac	59 ac	26 be	32 bi
55	1969	1969	Wash.	51 ac	41 df	36 ad	52 ae
56	1971	1969	Wash.	50 ac	46 bf	32 ae	42 ai
57	1970	1968-69	Wash.	44 ac	49 bf	25 be	65 a
58	1970	1970	Wash.	42 ac	45 cf	27 be	33 bi
59	1971	1970	Wash.	46 ac	49 bf	28 be	30 bi
Miscellaneous certified lots, composited to produce DCC72							
27	1971	1967	Cal. 4	46 ac	46 cf	28 be	21 gj
52	1971	1968	Utah	45 ac	54 ad	28 be	32 bi
59	1971	1970	Wash.	46 ac	49 bf	28 be	30 bi
60	1971	----	**Idaho C17**	**42 ac**	**43 df**	**26 be**	**49 ag**
61	1971	----	Idaho C18	46 ac	54 ae	34 ae	50 af
62	1971	----	Idaho C19	39 ac	43 df	28 be	25 ej
63	1971	----	Nebr. H.	49 ac	42 df	29 be	40 ai
64	1971	----	Nebr. G.	49 ac	43 df	22 be	54 ad
65	1971	----	S. Dak.	43 ac	38 f	30 be	35 bi
Checks							
66	1967		Dawson DCC67	44 ac	47 bf	27 be	28 dj
67	1971		Dawson DCC72	46 ac	38 ef	28 be	37 bi
68	1971		Kanza KCC72	55 a	50 af	26 be	37 bi
69	1971		Saranac SCC72	38 ac	0 g	0 g	37 bi
70	1971		Vernal VCC72	0 d	0 g	0 f	52 ae
Bacterial wilt test checks							
Du Puits 6							3 j
Ranger AR132							35 bi
Vernal F.C.33696							44 ai

* Means followed by the same letter within a column do not differ at the 5% level of probability according to Duncan's multiple range test.

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