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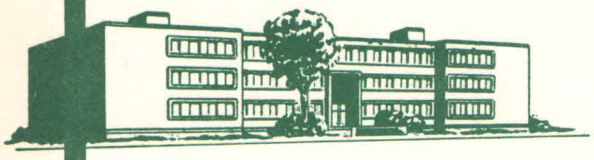

Measured Crop Performance

Influence of Management Practices and Variety of Small Grain on the Establishment and Yield of Annual Lespedeza

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RALEIGH, N. C.

(a) Assoc. Prof. Field Crops. N.C. Former graduate assistant N. C., now Assoc. Agronomist, S. C. Agricultural Experiment Station. Prof. Field Crops N. C. Former Agronomist North Carolina Experiment Station, now Head, Alfalfa Section, ARS Beltsville, Md., and Research Agronomist, ARS, N. C. State College.

SUMMARY

Experiments were conducted in North Carolina to study the influence of management of small grain and lespedeza on hay and seed yield of lespedeza and to study the differences among small grain varieties in their effect on the establishment and yield of annual lespedeza. A summary follows:

1. Much higher yields of seed and hay of annual lespedeza were obtained when the small grain was harvested prior to maturity. The highest yields of lespedeza seed and hay resulted from removing the small grain when 8 to 10 inches growth had been produced.

2. Seed yields of both Kobe and Korean lespedeza were practically doubled by harvesting the lespedeza 3 to 4 weeks earlier than the usual harvest date practiced in the area. In some instances earlier harvesting would necessitate artificial drying of the seed depending on the moisture content and amount of green seed.

3. No consistent relationship was found between lespedeza hay yields and the grain yields of the associated small grains.

4. No consistent relationship was found between lespedeza hay yields and maturing date of the small grains. In certain cases such as Arlington oats, the late maturing varieties of small grains were associated with a high yield of lespedeza.

5. Varieties of small grains were not consistent in their competitive relationships with lespedeza. Certain varieties, as noted from the data, did appear more competitive during the limited course of these investigations.

INTRODUCTION

At present, approximately one-half million acres of annual lespedeza are grown for hay or seed each year in North Carolina, practically all of this acreage being planted in association with small grain.

The frequent failures of lespedeza with the new vigorous growing varieties of small grain used in conjunction with higher fertilization have led to widespread speculation that certain of these new varieties may not be desirable in a small grain-lespedeza rotation.

With these points in mind experiments were initiated with the following objectives:

(1) to determine the influence of management of small grain and lespedeza on hay and seed yield of lespedeza.

(2) to determine differences among small grain varieties in their effect on the establishment and yield of lespedeza.

(3) to evaluate some small grain characters as to their effect on the establishment of stand and yield of lespedeza.

RESULTS AND DISCUSSIONS

Management of Small Grain-Lespedeza

Studies were conducted on the influence of management of small grain and lespedeza on subsequent lespedeza seedling establishment, forage yield, seed yield and weed establishment, Tables 1, 2, 3, and 4. Details of procedure are presented in the Appendix.

Much higher yields of seed and hay of lespedeza were obtained when the small grain was harvested prior to maturity, Tables 1 and 2. In 1951, Table 2, a complete stand failure resulted when the small grain was permitted to mature, whereas fair to good yields of hay and seed were obtained when the small grain was cut and removed in the boot stage or when 8 to 10 inches tall. In 1950, Table 1, at the same location much less drastic reductions resulted from permitting the small grain to mature. In fact, Korean yielded approximately the same regardless of time of removing the grain. The rainfall at McCullers for May 1950 and May 1951 was 4.01 and 1.79 inches, respectively, Table 6. May is generally considered one of the critical months for the establishment of annual lespedeza when seeded with small grain.

The highest yields of lespedeza seed and hay were usually obtained following the small grain which had been clipped whenever 8 to 10 inches of growth had been produced.

Although seeding lespedeza alone resulted in good initial stands, weed competition usually caused a reduction in hay and seed yields of the lespedeza, Table 1. Less weeds were present in plots when small grain and lespedeza were seeded in mixture, Table 1.

The total yields of seed and hay of Kobe lespedeza were reduced more than for Korean lespedeza if the small grain were allowed to reach the boot stage before harvest, Tables 1 and 2. However, as shown by stand counts in June and July, Korean was also reduced in stand when the small grain reached boot stage before harvest.

The seed yields of both Kobe and Korean were practically doubled by harvesting the lespedeza at "early harvest date", Tables 3 and 4. The "late harvest date" was approximately 3 to 4 weeks after the "early harvest date". The "late harvest date" was considered as the average date at which farmers in the area usually harvest lespedeza for seed.

Seed yields were greatly reduced by clipping the lespedeza at either of two stages and heights of growth. The clip to 2 inches when 4 to 6 inches high was made July 25 and the clip to 4 inches harvest was made August 15 in 1950, Table 1.

Stand counts made 2 to 4 weeks after the grain was harvested reflected the deleterious competitive effect of small grain when the grain was permitted to mature. For example, an average of 5 seedlings of Kobe lespedeza were established per square foot when the oats were allowed to mature; whereas 25 were established per square foot where the oats were clipped and removed when approximately 10 inches of vegetative growth had been made.

In 1951 the general observation was made at McCullers near Experiment II (Table 2) that Kobe lespedeza, seeded on the same date outside of the experimental area lower down on the terrace, established itself satisfactorily even when the grain was allowed to reach maturity. A slight change in topography was the difference between a complete stand failure and an adequate stand. Evidently moisture was the critical factor.

The small grains produced excellent growth in both years (Table 4). Approximately 1 1/2 tons per acre of straw and grain was produced.

In order to obtain hay and seed yields of lespedeza from the same plots the hay lespedeza was necessarily cut past the desirable stage. Harvest for hay and seed were on the same date, the harvests being made early in the morning to prevent shedding of leaves.

A series of studies were conducted at various locations to determine differences among small grains in their effect on the establishment and yield of lespedeza. These results with oats, barley and wheat are presented below. Rainfall data for the Statesville location are presented in Table 6.

Oat Varieties with Lespedeza

The yield of lespedeza hay following the different oat varieties are given in Tables 7, 9, 10, 11 and 12. In Experiment IV, in 1950, Table 7, lower yields of lespedeza hay were obtained following the higher yielding oat varieties, however, other experiments did not show a relationship between the yield of oat varieties and the yield of lespedeza. In Experiment VI, Table 9, Victorgrain 48-93 and Southland oats yielded 94.5 and 101.1 bushels, while the associated Kobe lespedeza hay production was 1785 and 703 pounds per acre respectively.

In Experiment IV and Experiment VI the yield of lespedeza was approximately the same following either Arlington or Fulgrain oats. In these two experiments Arlington yielded about 20% more grain than Fulgrain.

In Experiments VII and VIII, Tables 10 and 11, Arlington yielded almost twice as much grain as Fulgrain, however, similar yields of lespedeza hay were obtained following the two varieties. Higher grain yields were also obtained in Experiment IX from Arlington than Fulgrain. In this experiment, Table 12, more lespedeza was produced following the Arlington oats.

Even though Arlington yielded from approximately 20 to 100 percent more grain than Fulgrain in the various experiments, the yield of lespedeza with Arlington was usually as high or higher than Fulgrain. Arlington is medium in maturity and tall while Fulgrain is early and short. Fulgrain was usually harvested about ten days earlier than Arlington, and it seems possible that some benefit to the lespedeza may have resulted from the shading by the almost mature straw of Arlington during the hot June weather. As noted below the difference in early spring growth of the small grain may have influenced the performance of the lespedeza.

Early spring growth estimates were made in one test, Table 9, and in general the oats varieties which produced the heaviest growth at this

early spring period were followed by the lowest yield of lespedeza hay. Stand counts of lespedeza seedlings in June did not substantiate this relationship, since similar stands were obtained with the varieties producing heavy and light vegetative growth. Even so, the possibility exists that the lespedeza seedlings were weaker in vigor following the small grain with heavy spring growth. There was no consistent relationship between heading dates, maturity date and height and the subsequent lespedeza yield for any of the small grains tested in Experiment VI. However, Arlington oats which is later, taller and frequently more productive than Fulgrain, was usually followed by equal or higher lespedeza yields.

Barley Varieties with Lespedeza

Yields of various barley varieties and the yield of the associated lespedeza hay are presented in Tables 8, 9 and 10. No consistent relationship was found between lespedeza hay yields and the grain yield of the associated barley varieties. In two tests, Tables 9 and 10, the highest barley yield was associated with the lowest yield of lespedeza hay, however, wide ranges in subsequent lespedeza hay yields were noted in these tests, Tables 8 and 10, among barley varieties which yielded the same.

Less lespedeza hay was produced following Colonial 2 barley than other barleys tested in two of the three tests conducted, Tables 9 and 10. In these two tests Colonial 2 barley yielded consistently more grain than the other varieties.

Lespedeza seedling counts made in June or July following removal of the small grain did not always reflect the subsequent low yields obtained when associated with certain barley varieties. Even though the seedlings were not reduced in number each time following certain varieties, they were probably weakened. In certain tests, Table 10, the yields of lespedeza hay were closely correlated with seedling counts.

Wheat Varieties with Lespedeza

Yield of wheat varieties and associated lespedeza are presented in Tables 9 and 10.

In the 1951 tests, Table 9, Redhart and Atlas 50 produced the highest yields of grain and as much or more lespedeza hay was produced with these varieties as others tested. In another year, 1952, Table 10, only one-half as much lespedeza hay was produced following Atlas 50 as

following Redhart, Leap or Tenn. 46. Seedling counts made in July showed a marked reduction in lespedeza seedling numbers following Atlas 50.

General Comparisons, Oats, Barley, Wheat

In general there seemed to be a tendency toward higher production of lespedeza following oats than following barley or wheat. (Tables 9 and 10). Insufficient data were taken on the relationship between amount of straw plus grain and lespedeza yield to draw conclusions, Table 9.

Different seeding rates of Kobe and Korean lespedeza were studied in conjunction with two oat varieties. Increasing the rates of Kobe or Korean beyond 30 pounds tended to increase the lespedeza hay yields when grown with Arlington but not with Fulgrain.

Table 1. Influence of management of oats and lespedeza on subsequent lespedeza seedling establishment, forage yield, seed yield and weed establishment. McCullers Branch Station. 1950. Experiment I.

Management of oats and lespedeza*	Seedlings/ sq.ft. June 8	Lespedeza hay lbs/A	Lespedeza seed lbs/A	Weeds lbs/A
		Kobe lespedeza		
1. Clip 0 in spring at 8-10" (Repeat) - Clip L for seed.	25	2197	378	1711
2. Clip 0 in spring at boot stage - Clip L for seed.	5	1019	222	2028
3. Clip 0 for grain - Clip L for seed	5	604	136	1937
4. Clip 0 for grain - Clip L to 2" when L is 4-6"- also for seed.	5	1396	47	722
5. Clip 0 for grain - Clip L to 4" when L is 8-10"- also for seed.	6	2068	45	954
6. No oats - Clip L for seed.	22	896	219	3593
		Korean lespedeza		
1. Clip 0 in spring at 8-10" (Repeat) - Clip L for seed.	25	1988	507	2359
2. Clip 0 in spring at boot stage - Clip L for seed.	16	2218	430	2886
3. Clip 0 for grain - Clip L for seed.	21	2358	470	1924
4. Clip 0 for grain - Clip L to 2" when L is 4-6"- also for seed.	17	1819	54	746
5. Clip 0 for grain - Clip L to 4" when L is 8-10"- also for seed.	17	2247	74	1063
6. No oats - Clip L for seed.	45	1617	352	1684

*All treatments for Kobe lespedeza harvested Nov. 9.
Tr. No. 1, 2, 3, 6 for Korean lespedeza harvested Oct. 12.
Tr. No. 4, 5 " " " " Oct. 19.
0 denotes Victorgrain oats, L denotes lespedeza

Table 2. Influence of management of wheat on subsequent lespedeza seedling establishment, forage yield and seed yield. McCullers Branch Station. 1951. Experiment II.

Management of wheat**	Seedlings/ sq. ft. July 4	Lespedeza hay lbs/A	Lespedeza seed lbs/A
		Kobe lespedeza	
Clip W in spring at 8-10" (Repeat)	16	1828	282
Clip W in spring at boot stage	4	1345	151
Clip W for grain	*	*	*
No wheat	7	1522	216
		Korean lespedeza	
Clip W in spring at 8-10" (Repeat)	21	1350	272
Clip W in spring at boot stage	7	1312	221
Clip W for grain	4	*	*
No wheat	15	1485	265

* Only trace of lespedeza established.
** W denotes Atlas 50 wheat.

Kobe lespedeza harvested Nov. 14. Korean lespedeza harvested Oct. 22. All lespedeza in this test harvested at stage generally considered as early maturity.

Table 3. Influence of date of seed harvest on forage yield, seed yields and weed establishment. McCullers Branch Experiment Station 1950.

Date of Harvest	Seedlings/ sq. ft. June 8	Lespedeza hay* lbs/A	Lespedeza seed lbs/A	Weeds lbs/A
		Kobe lespedeza		
November 9	5	604	136	1937
November 28	5	1154	59	2814
		Korean lespedeza		
October 12	21	2358	470	1924
November 9	18	935	254	1610

*Hay yields are not absolute since time of harvest different and considerable shedding of leaves resulted from late harvest. All lespedeza was seeded with Victorgrain oats which was harvested for grain.

Table 4. Influence of date of seed harvest on hay and seed yields of Korean lespedeza. Siler City, N. C. 1953. Experiment III.

Date of harvest	Yield per acre		%
	Total hay*	Seed	Germination
October 8	4136	321**	93.5
October 22	4147	318	93.3
November 9	3870	195	92.9
November 28	3902	134	93.5
L.S.D. (.05)	N.S.	49.7	N.S.
C.V.	13.9%	17.5%	

* At time of seed harvest. Contained about 20% wheat stubble.
** About 15% of the seed pods were greenish in appearance.

Table 5. Yield of small grain straw and straw plus grain grown on plots seeded to lespedeza-small grain management experiments presented in Tables 1 and 2. (pounds dry matter per acre)

McCullers Experiment 1950

	April 4	May 8	May 23	Total
		With Kobe lespedeza		
Clip 0 in spring at 8-10" (Repeat)	1378	927		2305
Clip 0 in spring at boot stage		3539		3539
Clip 0 for grain			2898	2898**
		With Korean lespedeza		
Clip 0 in spring at 8-10" (Repeat)	1541	997		2538
Clip 0 in spring at boot stage		3804		3804
Clip 0 for grain			2900	2900*

McCullers Experiment 1951

	April 5	May 5	May 23	Total
		With Kobe lespedeza		
Clip W in spring at 8-10" (Repeat)	1140	593		1733
Clip W in spring at boot stage		3360		3360
Clip W for grain			3020	3020*
		With Korean lespedeza		
Clip W in spring at 8-10" (Repeat)	1124	570		1694
Clip W in spring at boot stage		3012		3012
Clip W for grain			2900	2900*

* 0 denotes Victorgrain oats and W denotes Atlas 50 wheat.
** Represents average production of small grain (grain plus straw) of all treatments where small grain was harvested for grain.

Table 6. Seasonal distribution of rainfall in inches per month.

	McCullers Branch Station		Piedmont Research Station, Statesville, N. C.		
	1950	1951	1950	1951	1952
Jan.	3.11	1.56	2.54	1.76	4.74
Feb.	1.84	1.80	2.60	2.21	3.42
Mar.	2.93	3.21	6.01	4.20	10.78
Apr.	1.15	3.48	2.41	4.88	3.78
May	4.01	1.79	13.10	.78	3.78
June	2.77	4.93	5.37	3.77	2.17
July	8.24	3.96	7.06	5.18	3.17
Aug.	1.53	2.15	4.04	3.21	10.31
Sept.	3.68	1.73	3.30	2.51	1.05
Oct.	3.75	2.01	2.85	.55	.66
Nov.	1.41	2.87	1.50	3.39	2.01
Dec.	2.88	2.96	2.94	5.11	3.39
Total	37.30	32.45	53.72	37.55	49.26

Table 7. The influence of oat varieties on the subsequent yield of lespedeza hay and the yield of grain for each variety. Statesville, North Carolina, 1950. Experiment IV.

Oat Variety	Yield of lespedeza hay in lbs/Acre	Yield of grain in bushels per acre
Fullbright	1912	33.6
R.R.P.B.C. 4601-2906	1771	29.4
Taggart	1753	27.0
C.I. 4316-62	1729	31.7
Stanton	1726	25.5
L.x F. 4336-690	1696	22.3
Southland	1636	37.7
Victorgrain	1603	34.7
L.x F. 4289	1549	23.3
Taggart + Lemont	1543	45.2
Fulgrain + Letoria	1540	43.7
Lee + Victorgrain	1495	36.2
Fulghum 708	1483	37.5
L.x F. 4336-693	1462	28.5
Letoria	1441	31.9
LeConte	1362	48.8
Lee 5	1344	26.8
L. x F. 4336-679	1338	24.4
Atlantic	1278	51.9
C.I. 4316-347	1272	49.7
L.x F. 4436-677	1224	47.1
Lemont	1209	38.6
Fulgrain	1203	42.9
C.I. 4316-105	1152	43.7
Arlington	999	55.3
L.S.D. (.05)	414	13.0
(.01)	549	17.3

Table 8. The influence of barley varieties on the subsequent yield of lespedeza hay and the yield of grain for each variety. Statesville, North Carolina, 1950. Experiment V.

Barley Variety	Yield of lespedeza hay in lbs/Acre	Yield of grain in bushels per acre
Sunrise	2248	26.3
Wintex x Texan 8-43-311	2227	17.3
N.Y. 56a13-4-1	2185	54.9
Wintex x M.E.B. 943-95	2158	37.6
Wintex x Texan 8-43-76	2098	27.3
Kentucky 1	2092	43.3
Calhoun 3	2080	33.4
N.Y. 565a2-1-18	2074	30.4
Wong	2059	43.1
Hooded 16 x Sunrise Y743	2017	32.0
Colonial 2	1993	33.1
Sunrise x Bolivia 4038	1993	45.9
Jackson 1	1987	40.1
Calhoun M450-4	1972	30.6
Colonial	1945	31.9
Fayette	1909	48.5
Sunrise x Hooded 16	1879	29.3
Smooth Awn 86	1831	25.5
Oklahoma 1-35-216	1792	44.9
Piedmont	1744	43.2
Texan	1696	21.3
Sunrise x Bolivia 3778	1675	48.5
Sunrise x Bolivia 1027	1570	38.2
Iredell x Bolivia 1122	1390	35.4
Iredell x Bolivia 1112	1248	35.1
L.S.D. (.05)	516	10.7
(.01)	NS	14.2

Table 9. Relationship of varieties of small crops and certain varietal characters with the number of lespedeza seedlings established and the yield of lespedeza hay when grown at Pittsboro, North Carolina, in 1951. Experiment VI.

Crops and Variety	Lespedeza yield lbs/A	Lespedeza Seedlings per sq. ft. in June	Grain bu./A	Grain lbs/A	Straw + grain lbs/A	Early spring growth 1/	Maturity date of grain	Heading date of grain	Height of grain in Centimeters Apr. 28	Height of grain in Centimeters May 11
Oats										
Victorgrain 48-93	1785	38	94.5	3025	3814	2.0	6-3	4-24	78	104
Taggart	1406	28	81.7	2614	3785	2.5	6-5	3-23	80	113
Arlington	1270	32	95.6	3058	4051	2.0	6-8	4-28	83	120
Lemont	1063	23	87.9	2814	4142	2.5	6-9	4-30	75	114
Fulghum 708	968	23	80.3	2570	4003	3.0	6-5	4-23	86	121
Fulgrain	932	35	85.1	2723	3789	4.0	5-24	4-20	72	96
DeSoto	903	27	86.1	2754	3989	3.0	6-13	4-29	68	98
Southland	703	40	101.1	3238	4051	4.0	6-7	4-26	80	108
Barley										
Iredell-Bolivia 1122	964	24	49.9	2397	3793	3.0	5-31	4-23	96	125
Piedmont	684	35	39.5	1894	3095	2.5	5-29	4-20	116	111
Sunrise	501	30	56.2	2697	3401	2.5	5-23	4-18	109	116
Colonial 2	479	38	65.3	3133	3593	2.5	5-23	4-19	104	104
Wheat										
Atlas 50	668	24	36.3	2178	7656	3.0	6-9	4-29	78	116
Tennessee 46	481	36	26.4	1586	6400	2.0	6-13	5-4	64	92
Redhart	423	22	42.7	2562	8685	3.0	6-6	4-25	90	124
Leap	365	35	25.4	1525	6183	2.0	6-12	5-3	62	90
L. S. D. (.05)	535	N. S.	-	540	1458					
(.01)	714	N. S.	-	720	N. S.					

1/ Early spring growth, as to the relative amount of ground cover, was taken in late March. A rating of 2 was given for the small amount, 3 intermediate, and 4 for the heaviest growth. The values given are averages for four replications.

Table 10. The influence of small grain variety on the subsequent stand and yield of Kobe lespedeza. Statesville, N. C. 1952. Experiment VII.

Variety	Lespedeza		Small grain	
	Hay yield lbs/A	Seedlings/ sq.ft. July 10	Bu./A	lbs/A
Oats Arlington	2180	22	71.4	2287
" Fulghum 708	2695	26	54.3	1740
" Lemont	1843	23	67.3	2152
" Desoto	1831	19	58.7	1878
" Vict. 48-93	2511	24	50.3	1611
" Taggart	2292	26	40.7	1303
" Fulgrain	1942	29	41.5	1329
Barley 1XB1122	1471	14	38.1	1827
" Piedmont	1779	20	39.9	1915
" Colonial 2	926	11	56.5	2714
" Sunrise	2020	21	38.4	1845
Wheat Atlas 50	948	8	41.6	2500
" Tenn. 46	2063	24	37.8	2267
" Leap	1804	18	35.5	2133
" Redhart	2318	25	39.9	2393
L. S. D. (.05)	907	8		558
(.01)	N. S.	11		746
C. V. %	33	27		20

Table 11. The influence of oat varieties and rate of seeding of lespedeza on the subsequent stand and yield of Kobe and Korean lespedeza. Statesville, N. C. 1952. Experiment VIII.

	Lespedeza		Oats grain	
	Hay yield lbs/A Sept. 24	Seedlings/ sq.ft. July 10	Bu./A	lbs./A
Arlington - Kobe 15*	1262	10	65.2	2086
" - " 30	1601	16	77.5	2480
" - " 60	1885	22	72.7	2327
Ave.	1583	16		
" - Korean 15	1793	22	80.1	2561
" - " 30	2012	36	63.8	2045
" - " 60	2518	56	82.3	2633
Ave.	2108	38		
Fulgrain - Kobe 15	1144	14	36.5	1168
" - " 30	1590	22	43.0	1377
" - " 60	1560	24	34.8	1115
Ave.	1431	20		
" - Korean 15	1335	22	27.8	1210
" - " 30	2057	33	35.6	1142
" - " 60	2143	62	38.4	1229
Ave.	1845	39		
L. S. D. .05	529	19		500
.01	709	26		670
C. V. %	21	47		20

*Seeding rate for lespedeza in pounds per acre

Table 12. Influence of variety of oat companion crop on number of lespedeza seedlings established and yield of lespedeza hay when grown at Pittsboro, North Carolina, 1951. Experiment IX.

Oat Variety	Yield of lespedeza lbs./A	Lespedeza seedlings per sq.ft.	Grain yield lbs./acre	Straw plus grain yield lbs./acre
Arlington	924	29	1911	5061
Fulgrain	448	30	1667	4647
L. S. D. (.05)	266	N. S.	134	274
(.01)	359		179	366

APPENDIX

Outline of Procedure

Experiment I (Tables 1 and 3)

McCullers Branch Station Experiment 1950.

This experiment was located on a Chesterfield sandy clay loam. The soil was limed in 1959 with 1 ton of dolomitic limestone per acre, and 500 pounds per acre of 6-8-6 were applied at the time of seeding oats. The oats were topdressed with 30 pounds per acre of elemental nitrogen as sodium nitrate on April 19, 1950.

Victorgrain oats were drilled Oct. 15, 1949 at 2 bushels per acre and lespedeza was broadcast and raked in with a potato hoe Feb. 15, 1950. Korean and Kobe lespedeza were seeded at 30 and 40 pounds per acre, respectively.

The individual plots were 5 feet x 25 feet in size and an area 2 x 23 feet was harvested from each plot. Lespedeza stand counts were made on three areas each consisting of 3 sq. feet, in each plot, at random within each one-third area of the plot.

The hay harvests do not represent true absolute yields since the lespedeza was harvested late in the season for hay in order to get both seed and hay yields. Considerable leaves had shattered, and the lespedeza was harvested early in the morning to prevent excessive loss of leaves. The yields, however, represent the relative yields of forage between the various plots. A 20 per cent sample was taken for botanical separation and the weeds and lespedeza components were hand separated.

The data from this experiment are presented in Tables 1 and 3, however, the various treatments were compared in a single experiment.

A split block design was used, with lespedeza species being the whole plots and management treatments the sub-plots. There were 4 replications.

Experiment II (Table 2)

McCullers Branch Station Experiment 1951

This experiment was located on a Norfolk sandy loam. The soil was limed with 1 ton of dolomitic limestone per acre, one year prior to seeding

and 500 pounds per acre of 5-10-10 fertilizer was applied at the time of seeding wheat. The wheat was topdressed with 25 pounds of elemental nitrogen per acre as sodium nitrate in March.

Atlas 50 wheat was drilled in early November 1950 at 1 1/2 bushels per acre and lespedeza was broadcast and raked in with a potato hoe on February 27, 1951. Korean and Kobe lespedeza were seeded at 30 and 50 pounds per acre, respectively.

General design of experiment and management techniques were similar to the experiment discussed above.

Experiment III (Table 3)

This experiment was located in a farmer's field near Siler City. Six replications were utilized and an area 9 square feet in area was harvested from each plot.

Experiments IV and V. (Tables 7 and 8)

This study was made at Statesville, North Carolina, in 1950 to determine whether varieties of oats and barley differed in their effects as companion crops for lespedeza. The varieties tested were those of interest at the time of this study. This material consisted of locally adapted high yielding varieties, experimental lines, and some lower yielding varieties as standards. These varieties differed widely as to their yielding ability, maturity date, and growth characteristics. The study included 25 varieties of oats and 25 varieties of barleys.

The soil was fertilized at seeding with 400 pounds of 3-12-6 fertilizer per acre and top dressed with the equivalent of 32 pounds of elemental nitrogen in early March. The field in which the test was located was seeded uniformly with Korean lespedeza at the rate of 30 pounds per acre. A strip of lespedeza 2 feet wide and 16 feet long was harvested from each plot which was 3 feet wide and 16 feet long, with an alley of 4 feet. Each treatment was replicated four times with a 5 x 5 simple lattice design for the oats and a 7 x 7 simple lattice for the barley. However, since only 25 plots of barley were harvested it was treated as a randomized block design.

The lespedeza was placed in bags and dried by the use of forced hot air and wrights were determined for each plot.

The data were analyzed by conventional analysis of variance method.

Experiment VI. (Table 9)

In the fall of 1950, an experiment was set up at Pittsboro, North Carolina, consisting of eight varieties of oats and four each of wheat and barley. Varieties within a crop varied widely in growth habit, height at heading and maturity, heading date, and maturity date. All were potentially high yielding varieties. They were seeded according to recommendation and were fertilized at seeding with 400 pounds of 3-12-6 fertilizer and were top dressed March 3 with 300 pounds of sodium nitrate. This experiment was conducted on a Georgeville Silty Clay Loam soil.

All entries were replicated four times with a randomized block design. The plots were 6 feet wide and 25 feet long with an alley 5 feet wide. The grain was drilled in rows 8 inches apart.

Korean lespedeza was seeded uniformly at the rate of 30 pounds per acre on March 3.

Observations were made on early spring growth and rated as to the relative amount of ground cover and total growth. Dates of heading and maturity were recorded. Heights of varieties were determined on two dates by measuring the highest culm in centimeters on ten plants taken at random to get an average for each variety. Yield of grain and yield of straw plus grain were taken on 3 rows 25 feet long. After all varieties were harvested an estimate of the number of lespedeza seedlings were made by counting the seedlings in 3 areas selected at random within the plot by using a fram 1.5 x 2 feet within which all seedlings were counted.

A strip of lespedeza 3 feet wide and 25 feet long was harvested. After the weeds were taken out by hand, the samples of lespedeza were dried by forced hot air, and weighed.

An analysis of variance was conducted on lespedeza yield, lespedeza seedling numbers, yield of grain, and yield of grain plus straw.

Experiment VII and VIII. (Tables 10 and 11)

These two studies were seeded at Statesville, N. C. The small grain was seeded Oct. 1, 1951 and the Kobe lespedeza was seeded in late Feb. 1952. The soil, a Davidson clay loam, was raked with a potato hoe before and after seeding the Kobe lespedeza.

The plot size, design (randomized block), and fertilization were similar to Experiment VI reported above, and the same harvest and stand count procedures were followed.

Kobe lespedeza was seeded at the rate of 40 pounds per acre in Experiment VI.

Experiment IX. (Table 12)

The location, plot size, fertilizer treatment, and design (randomized blocks with 4 replications) was the same as described in Experiment VI above.

Agricultural Experiment Station

North Carolina State College

Raleigh, N. C.

R. L. Loworn, Director of Research

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