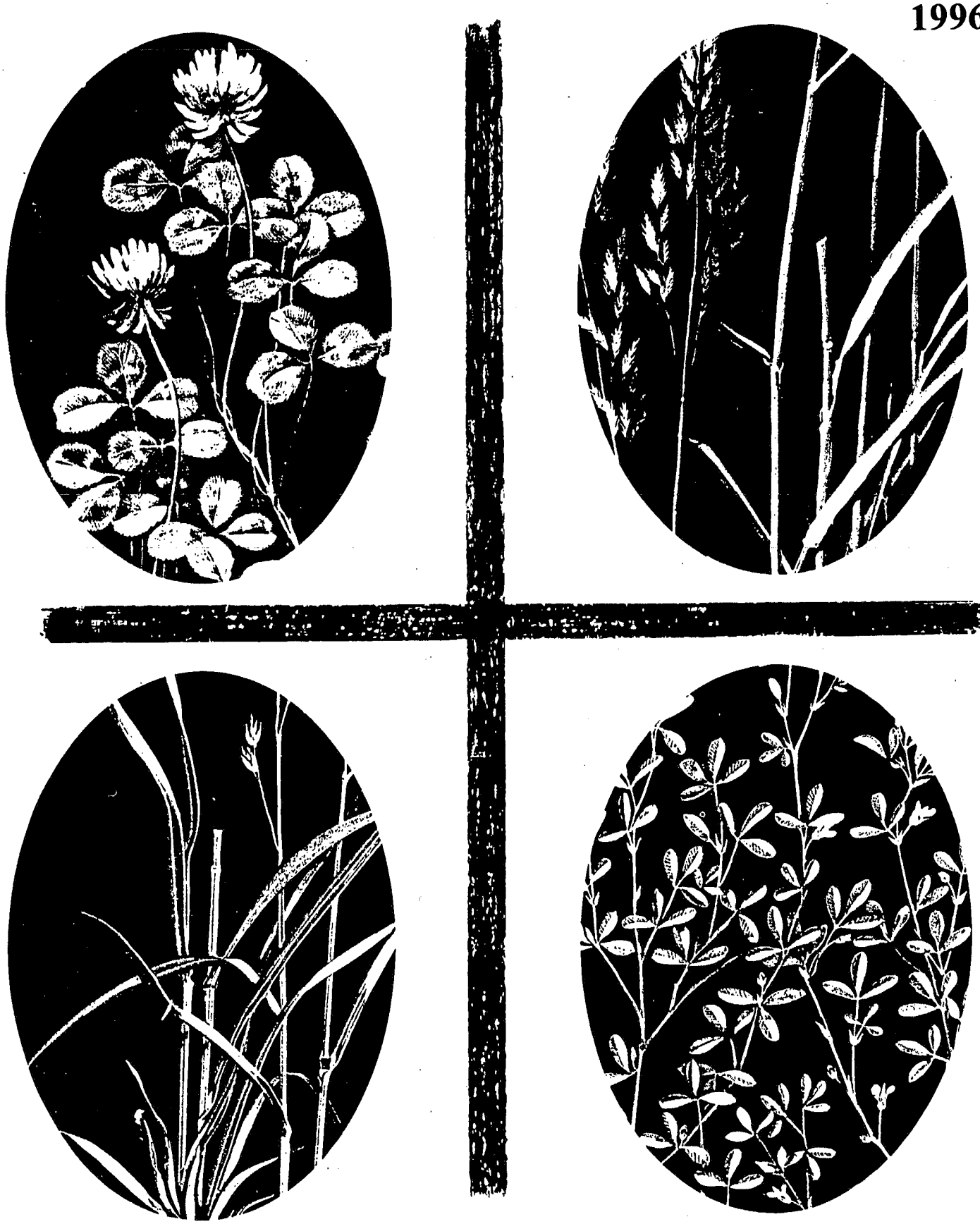
FORAGE

CROPS VARIETY TESTING

1996



CROP SCIENCE REPORT NO. 164 **MARCH 1997**

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INTRODUCTION

Evaluation of Forage Crop Varieties in North Carolina

New forage cultivars and hybrids are constantly being released from public and private sources. In addition, forage breeders are continually interested in testing experimentals under various growing conditions. In order to determine adaptability and productivity, it is necessary that these forages be tested under North Carolina growing conditions. The purpose of this publication is to present comparative data on forages tested in North Carolina during 1996.

The varieties tested are classed into three major groups: *winter annuals* (rye, wheat, oats, barley and ryegrass); *summer annuals* (sudangrass, pearl millet, and sorghum -sudan hybrids) and *perennial forages* (alfalfa, orchard grass, tall fescue, and bermuda grass). All varieties were managed on a multiple cut system. Most varieties were clipped at least three times to simulate rotational grazing or hay cutting. Dry forage yields are reported for all entries tested.

Experimental lines are sponsored through the USDA-ARS, state agricultural experiment stations and privately owned companies. These lines may not be available for farm use. All entries from privately owned companies (experimental lines or commercial varieties) are tested on a fee basis. The Crop Science Department, N. C. State University often enters varieties of interest or proven varieties to be used as standards. All varieties are from certified sources or from sources which would be able to verify origin. This ensures the purity of the entries tested and that the results reported here could be reproduced.

All forage tests were conducted on North Carolina State University Lake Wheeler Road Field Laboratory in 1996. Weather measuring instruments were located approximately one mile from the test site. Climatological data are listed in the appendices.

Most computations and statistical analyses were conducted in the Statistical Laboratory and Computing Center at North Carolina State University. These operations were supervised by Mrs Sandra Donaghy and Mrs Joy Smith. We appreciate their cooperation and assistance.

Determining Differences Between Varieties

In order to decide if true differences exist in a set of varieties being tested, field trials are designed so that statistical procedures can be used to determine whether observed differences are most likely real or due to chance. Measured differences among varieties can result from influences other than their true genetic character. These effects, which may include variation in soil fertility, moisture, temperature, etc. are always present to some degree. Experimental design and statistics help in deciding whether true differences exist. There is always a chance that an observed difference between varieties will be due to chance alone and not due to true varietal differences. Most experimenters will accept chance odds of 5% or less thus the chance of concluding falsely is about one in twenty.

In this publication the Waller-Duncan L.S.D. (least significant difference) test is used to determine if real differences exist among varieties. In most tables where yields are presented, the L.S.D. values are listed below each yield column. Yield differences between varieties must exceed the L.S.D. values for the difference to be statistically significant. An example of the use of the Waller-Duncan L.S.D. is given below.

Table 1. Example of use of the L.S.D. value.

Variety	Yield (lb/acre)
1	1600+
2	1570++
3	1450
4	1410
LSD	50

L.S.D. Waller Duncan K Ratio = 100
+Highest yield.
++Not different from highest yield.

By using the LSD value in the above example, it can be determined that:

a. Variety 1 is not different from variety 2 because the yield difference (30) does not exceed the LSD value of 50.

b. Variety 1 is different from varieties 3 and 4 since the yield difference exceeds the LSD value.

C. Based on similar comparisons, varieties 3 and 4 are not different, but variety 2 is different from varieties 3 and 4.

It is important to note that the data collected over several years provides a better indication of a variety's potential than single year test results.

EXPERIMENTAL PROCEDURES

Recommended small plot techniques and cultural practices were employed on all tests. Fertilizer, seeding rates, dates etc. are listed with each table. Cultural practices of prior years for perennial forages are given in the appendix tables.

The experimental design used for all tests was a randomized complete block with three, four, or five replications (reps). Drilled plots were 20 feet long and three feet wide. Broadcast plots were 20 feet long and five feet wide. Blocks were separated by six feet and tests were bordered by material comparable to that included in the trial.

The row number and row spacing of the specially designed cone planter was changed from three rows 9 inches apart to five rows 4.5 inches apart in the fall of 1993. All annual and perennial trials seeded since the fall of 1993 are on the 4.5 inch spacing. The cone planter allows each entry to be adjusted to 100% germination based on germination tests conducted just prior to planting.

Plots were harvested with a self-propelled, flail-knife chopper (Carter harvester). It was designed specifically for small plot work with the wheels spaced so the harvest rows and the stubble were not damaged during harvesting.

Each plot was evaluated for weed percentage. When estimated to be greater than 5% of the harvested forage dry matter, weed contribution was subtracted from total herbage weight. Thus, dry forage yields listed in this publication are on a weed-free basis.

Dry yield determination included drying either the whole plot sample or a subsample. When subsampling, dry matter concentration was determined for each variety in two reps and this average was used to adjust for dry matter in the other reps. Dry yield for each variety was determined by multiplying green weight by dry matter concentration for a particular variety. Subsampling was necessary in some cases due to the bulk of green material being handled and a shortage of drying space. Samples were dried in a forced air drier at 130°F for 24 to 48 hours. Moisture remaining in the samples was determined to be from 2 to 4%. Thus, the term "dry forage" as stated in the table refers to oven-dry forage containing 2 to 4% moisture.

Table 1 Names and addresses of agencies sponsoring winter annual forage entries in the 1995-1996 trial.

Sponsor	Address	Brand	Cultivar Designation
DLF Trifolium	PO Box 742 Albany, Or 97321	DLF Trifolium	Rustmaster RG Hurricane RG*
Green Seed	PO Box 29247 Atlanta, GA 30359	Green Seed	WinterKing II Rye
NC Agricultural Extension Service	Raleigh, NC 27695		Elbon Rye Brooks Oat Boone Barley Jackson Wheat NCSU 91 Ryegrass
Pennington Seed,Inc	PO Box 290 Madison, GA 30650	Pennington	Passerel Ryegrass
Production Services International, Inc.	4854 Jefferson-Marrion Turner,OR 97392	Prod. Ser.	Croa 25 Oat Croa 30 B Oat Charisma Oat
Smith Seed Ser.	PO Box 288 Halsey, OR 97348	Smith Seed	Big Daddy Ryegrss Tetrablend 444 RG SSEB IS49 ARG RG SSEB PZ42 ARG RG
Southern States Cooperative	PO Box 26234 Richmond, VA 23260	SS	Wheeler Rye Pastar Rye Early Graze Rye
U.S.Dept.of Agri.	Forage and Turf Research Unit Tifton, GA 31793	USDA	Grazer Ryegrass
Univ. of Fla.	Bldg. 107 Gainsville, FL 32611	Univ of Fla.	NC/Fla X 1995 LR RG Fl/Or X 1994 LR RG Florida 80 RG Surrey RG
Wax Company Inc.	PO Box 60 Amory, MS 38821	Wax	Marshall RG ME 94 RG Jackson RG
Willamette Valley Plant Breeders	36100 Hy. 228 Brownsville,OR 97327	WVPB	AR-90-300 RG AR-R-3 RG AR-92-401 RG AR-93-101 RG AR-A-9 RG AR-ETCO-8-88 RG AR-F-11 RG AR-A-13 RG

*Note: Hurricane RG Tested in prior years as AR-90

Table 2 Dry forage yield of rye, wheat, oats, barley and annual ryegrass, 1995-1996.

Sponsor	Variety	Harvest Dates				
		16 Nov	13 Mar	3 Apr	2 May	Total
		Dry Forage (lbs/acre)				
Wax Co.	Marshall RG	520	338	1051	2614	4523
Wax Co.	ME 94 RG	551	389	1084	2363	4387
WVPB	AR-R-3 RG	472	541	965	2202	4180
DLF Trifolium	Rustmaster RG	483	373	1177	2126	4159
WVPB	AR-90-300 RG	517	312	988	2240	4056
DLF Trifolium	Hurricane RG	446	410	913	2231	4000
WVPB	AR-92-401 RG	584	667	1082	1665	3998
Smith Seed	Tetrablend 444 RG	486	625	965	1892	3968
Univ.of Fla.	NC/Fla X 1995 LR RG	340	360	959	2264	3924
Univ.of Fla.	Surrey RG	572	597	933	1774	3876
Wax Co.	Jackson RG	631	298	863	2077	3869
Smith Seed	SSEB IS49 ARG RG	537	638	935	1744	3854
WVPB	AR-93-101 RG	523	562	1127	1632	3845
Smith Seed	SSEB PZ42 ARG RG	551	462	966	1858	3837
Green Seed	Winter King II Rye	550	627	1136	1507	3820
Univ.of Fla.	Fla. 80 RG	453	596	979	1791	3818
Univ.of Fla.	Fla/Or X 1994 LR RG	460	383	1073	1901	3817
Sou.States	Early Graze Rye	549	933	751	1526	3759
Smith Seed	Big Daddy RG	534	681	766	1731	3711
WVPB	AR-F-11 RG	414	498	900	1875	3687
Pennington	Passerel RG	405	406	1084	1781	3676
Sou.States	Wheeler Rye	532	329	868	1939	3667
USDA	Grazer RG	472	496	858	1811	3638
NCSU	NCSU 91 RG	505	276	1111	1684	3576
WVPB	AR-A-13 RG	462	394	1032	1676	3564
NCSU	Elbon Rye	442	746	1033	1341	3563
WVPB	AR-ETCO-8-88 4N RG	524	680	871	1486	3560
Sou.States	Pastar Rye	312	227	748	2253	3540
NCSU	Jackson Wheat	330	513	840	1799	3481
NCSU	Brooks Oat	739	451	688	1550	3427
NCSU	Boone Barley	352	238	904	1781	3275
Prod. Service	Croa 30 B Oat	610	276	580	1724	3191
WVPB	AR-A-9 RG	407	296	903	1465	3071
Prod. Service	Croa 25 Oat	701	240	565	1464	2970
Prod. Service	Charisma Oat	752	320	470	1162	2704

Table 2 continued.

Mean of Test	506	462	919	1827	3714
LSD	160	121	210	327	410
se	128	97	168	261	328
Error d.f.	136	136	136	136	136
CV%	25	21	18	14	9

Seeded September 19,1995 on a Cecil clay loam soil at rate of: Rye-112lb/a, Oats-90lb/a, Ryegrass-40lb/a, Wheat-120lb/a, and Barley-96lb/a.

Soil Analysis: pH 6.0, P-I 90, K-I 63, HM% 0.3

Fertilizer: Preplant (lb/acre) 50 N, 50 P_2O_5, 50 K_2O; Postplant (lb/Acre) March 13 50N, April 3 50N

Average of five replications
* Hurricane RG tested in prior years as AR-90.
RG = Ryegrass

Table 3 Dry forage yield of rye, wheat, oats, barley and annual ryegrass over three years, 1994-1996.

Sponsor	Variety	1996 Total	1995 Total	1994 Total	2-Year Average	3-Year Average
		Dry Forage (lbs/acre)				
Wax Co.	Marshall RG	4523				
Wax Co.	M E 94 RG	4387				
WVPB	AR-R-3 RG	4180	3035		3608	
DLF Trifolium	Rustmaster RG	4159	2918		3539	
WVPB	AR-90-300 RG	4056	3705	7530		5046
*DLF Trifolium	Hurricane RG	4000	3348	7924		5040
WVPB	AR-92-401 RG	3998	3627	6514		4666
Smith Seed	Tetrablend 444 RG	3968	3210		3589	
Univ.of Fla.	NC/Fla X 1995 LR RG	3924				
Univ.of Fla.	Surrey RG	3876	3275	6944		4651
Wax Co.	Jackson RG	3869				
Smith Seed	SSEB IS49 ARG RG	3854				
WVPB	AR-93-101 RG	3845	3069	6790		4522
Smith Seed	SSEB PZ42 ARG RG	3837				
Green Seed	Winter King II Rye	3820				
Univ.of Fla.	Fla. 80 RG	3818	2192	6985		4288
Univ.of Fla.	Fla/Or X 1994 LR RG	3817				
SS	Early Graze Rye	3759				
Smith Seed	Big Daddy RG	3711				
WVPB	AR-F-11 RG	3687				
Pennington	Passerel RG	3676				
SS	Wheeler Rye	3667	4025	5824		4460
USDA	Grazer RG	3638	2910		3274	
NCSU	NCSU 91 RG	3576	3435		3506	
WVPB	AR-A-13 RG	3564				
NCSU	Elbon Rye	3563				
WVPB	AR-ETCO-8-8 RG	3560	3231		3396	
SS	Pastar Rye	3540	2884	5462		3922
NCSU	Jackson Wheat	3481				
NCSU	Brooks Oat	3427	4803	5483		4525
NCSU	Boone Barley	3275	3701	4791		3883
Prod. Service	Croa 30 B Oat	3191				
WVPB	AR-A-9 RG	3071	3729		3400	
Prod. Service	Croa 25 Oat	2970				
Prod. Service	Charisma Oat	2704	4493		3599	

Average of five replications
* Hurricane RG tested in prior years as AR-90.

Table 4 Names and addresses of agencies sponsoring summer annual forage entries in the 1996 trial.

Sponsor	Address	Brand	Cultivar Designation
DeKalb Genetics Corporation	Route 2 Box 56 Lubbock TX 79415	DeKalb	Sudax SX-15 SS** Sudax SX-17 SS
Green Seed	PO Box 29247 Atlanta, GA 30359	Green Seed	Green Graze Supreme SS Leafy Green PM+
Pennington Seed,Inc	PO Box 290 Madison, GA 30650	Pennington	Leafy 22 PM SummergrazerIII SS
Northrup King Co. International, Inc.	PO Box 249 Grifton,NC 28530	NK	Millex 32 PM Sordan 79 SS Trudan 8 Sudan++
Seed Resources,Inc.	PO Box 326 Tulia, TX 79088	Seed Resources	Mil-Hy 400 PM
Southern States Cooperative	PO Box 26234 Richmond, VA 23260	SS	FFR 211A SS FFR 120 Sudan 3-Mil-X II PM
U.S.Dept.of Agr.	Forage and Turf Research Unit PO Box 748 Tifton, GA 31793	USDA	Tift Exp #1PM Tifleaf 2 PM Tifleaf 3 PM Tift Exp #4 PM Tift Exp #5 PM

*Note: Tifleaf 3 PM tested in prior years as Exp.No.2
+PM = Pearl Millet
**SS = Sorghum Sudan Hybrid
++Sudan = Hybrid Sudangrass

Table 5 FVT261. Dry matter yield of sorghum sudan hybrids, hybrid sudan-grass and pearl millet, 1996.

Sponsor	Variety	Harvest Dates 24 Jun	18 Jul	12 Aug	16 Sep	1996 Total
		Dry Forage (lbs/acre)				
DeKalb 9	SX-15 SS	3470	1381	2713	1514	9078
Green Seed	Leafy Green PM	2678	1694	2226	2192	8790
USDA	Tifleaf 3 PM	2031	2191	2368	1671	8261
USDA	Tift Exp # 4 PM	2597	1676	2168	1800	8241
USDA	Tifleaf 2 PM	2409	1716	2326	1716	8167
USDA	Tift Exp # 5 PM	2003	1543	2105	2368	8019
NK	Sordan 79 SS	2687	1119	2210	1359	7376
NK	Millex 32 PM	2332	1498	2262	1265	7357
Pennington	Leafy 22 PM	1489	1497	2356	1913	7256
USDA	Tift Exp # 1 PM	1653	1509	2213	1873	7248
Green Seed	G Graze Supreme SS	2478	1187	2115	1445	7225
Sou. States	FFR 211A SS	2070	1439	2123	1525	7157
Pennington	Summergrazer III SS	2495	1178	2153	1298	7124
Sou. States	3-Mil-X II PM	1561	1793	2110	1585	7049
Seed Res.	Mil HY 400 PM	1884	1548	2158	1406	6997
DeKalb	SX-17 SS	2460	1035	2111	1296	6902
Sou. States	FFR 120 Sudan	2444	1231	1980	1143	6798
NK	Trudan 8 Sudan	2622	1173	1920	871	6585
Mean of Test		**2298**	**1467**	**2201**	**1569**	**7535**
LSD		746	446	399	364	883
s.e.		563	336	258	302	705
Error d.f.		68	68	68	68	68
CV%		24	23	12	19	9

1996 Cultural Practices: Seeded May 14, 1996 on a Cecil loam soil, 40 lbs/acre

Soil Analysis: pH 6.0, P-I 34, K-I 48, HM% 0.3

Fertilizer (lb/acre): At seeding 50N, 50 P_2O_5, 50 K_2O, June 24-50N, July 18-50N, August 12-50N. Average of five replications.

Table 6 Names and addresses of agencies sponsoring perennial forage entries in the 1996 trials.

Sponsor	Address	Brand	Cultivar Designation
Agripro Biosciences Inc.	Route 3 Ames, IA 50010	Agripro	Innovator+Z Alf
Cal/West Seeds	PO Box 1428 Woodland, CA 95776	Cal/West	C/W-2040 Alf C/W-2043 Alf C/W-2032 Alf
Cascade International Seed Co.	8483 W Stayton Rd Awnsville, OR 97325	Cascade	Gala Brome EA18 Fescue EG1 OG
Dairyland Seed Co.	PO Box 958 WestBend, WI 53095	Dairyland	DS 764 Alf Magnagraze Alf
DeKalb Genetics	3100 Sycamore Road DeKalb, IL 60115	DeKalb	DK 127 Alf DK 133 Alf
FFR Cooperative	4112 E. St Rd 225 West Lafeyette, IN 47906	FFR	Resistar Alf Multistar Alf A9008 Alf
Forbes Seed & Grain	PO Box 85	Forbes	Enforcer Fescue
Great Plains Research Co. Inc.	3624 Kildaire Farm Rd Apex, NC 27502	Grt Plains	Key Alf Cimarron VR Alf Ram Alf Haygrazer Alf Cimarron Alf Dual Alf
Green Seed	PO Box 29247 Atlanta, GA 30359	Green	Cattleclub Fescue Shiloh Orchardgrass
International Seeds Inc.	PO Box 168 Halsey, OR 9734		FTF 9077 Fescue FTF 8872 Fescue OG-90134 Orchardgrass

Table 6 continued

NC Agricultural Extension Service	NC State University Raleigh, NC 27695		Ky 31 fescue Cajun Fescue Rebel II Fescue Phyter Fescue Bison Per. Ryegrass Coastal Bermuda Tifton Bermuda Pato Rico Bermuda Tierra Verde Bermuda Guymon Bermuda Pensacola Bahia Tifton 9 Bahia Laurel Springs Bermuda
Northrup King Co.	PO Box 249 Grifton, NC 28530	NK	Tahoe Alf Crockett Alf Multiking I Alf
Pennington Seed Inc.	PO Box 290 Madison, GA 30650	Pennington	Georgia 5 Fescue
Pioneer Hi-Bred International	1000 W Jefferson St Tipton, IN 46072	Pioneer	5454 Alf
Smith Seed Services	PO Box 288 Halsey, OR 97348	Smith Seed	WVPB 89-19 OG
Southern States Cooperative Inc.	PO Box 26234 Richmond, VA 23260	Sou. States	Benchmark OG Stargazer Fescue
Willamette Valley	36100 Hy. 228 Brownsville, OR 97327	WVPB	WVPB OG-89-37 WVPB OG-89-35 PS-1 WVPB OG-89-309
W-L Research Inc.	8701 W. US Hy 14 Evansville, WI 53536	W-L	WL 252 HQ Alf WL 322 HQ Alf WL 323 Alf

Table 7 FVT 255. Dry forage yield of alfalfa, 1996.**

Brand or Sponsor	Variety	Harvest Dates 1996				1996 Total
		8 May	4 June	2 July	8 Aug	
		Dry Forage (lbs/acre)				
FFR	Multistar	2754	2204	1745	2606	9309
Agripro	Innovator+Z	3101	2399	1609	2190	9299
Great Plains	Key	3117	2350	1355	2469	9290
Cal/West	C/W 2043	3067	2246	1446	2517	9276
WL	WL 322 HQ	2884	2363	1403	2497	9147
Great Plains	Dual	3156	2089	1545	2313	9104
Cal/West	C/W 2040	2967	2459	1345	2318	9088
Pioneer	5454	2897	2381	1378	2392	9048
Dairyland	Magnagraze	2955	2390	1250	2443	9038
FFR	A9008	3031	2460	1121	2378	8990
Great Plains	Cimarron VR	2894	2231	1264	2565	8954
Dairyland	DS 764	3101	2214	1266	2275	8857
DeKalb	DK 133	2908	2239	1161	2530	8838
Great Plains	Ram	3018	2157	1093	2531	8800
DeKalb	DK 127	2916	2279	1197	2258	8651
Great Plains	Haygrazer	2804	2067	1262	2458	8590
WL	WL 323	2556	2328	1201	2483	8568
WL	WL 252 HQ	2912	2385	1103	2114	8515
FFR	Resistar	2800	2207	1109	2372	8488
Great Plains	Cimarron	2665	2124	1183	2474	8446
Northrup King	Crockett	2677	2136	1084	2394	8292
Cal/West	CW 2032	2764	2029	1266	2149	8208
Northrup King	Multiking I	2692	1953	1182	1990	7817
Northrup King	Tahoe	1895	1437	768	2551	6651
Mean of Test		**2856**	**2214**	**1264**	**2386**	**8719**
LSD		288	246	426	480	728
s.e.		236	201	287	270	585
Error d.f.		92	92	92	92	92
CV%		8	9	23	11	7

1996 Cultural Practices: Soil Analysis pH 6.3, P-I 72, K-I 70, HM% 0.6
Fertilizer (lb/acre): March 5, 60 P_2O_5, 60 K_2O, 2 B
Insect Control (lb/acre a.i.) Apr 1, 18lb 0.5 Furadan

** Test sprayed August 12 with unknown material which eliminated trial, only four harvests in 1996. Average of five replications.

Table 8 FVT 253. Dry forage yield of tall fescue, ryegrass and brome, 1996.

Brand or Sponsor	Variety	1996 Harvest Dates				1996 Total
		19 Apr	30 May	19 Aug	22 Oct	
		Dry Forage (lbs/acre)				
International	FTF 9077	2416	2019	799	2228	7462
Sou. States	Stargrazer	2288	1984	902	2124	7298
NCSU	Ky 31	2324	2246	729	1913	7213
Cascade	EA 18	2352	1949	855	2022	7178
International	FTF 8872	2422	1787	817	2128	7153
Green Seed	Cattleclub	2205	2429	709	1797	7139
DLF Trifolium	Dovey	2053	1848	914	2305	7120
NCSU	Phyter	2098	2220	662	1971	6952
Forbes	Enforcer	1901	2199	738	2084	6921
NCSU	Cajun	2259	1730	856	2003	6848
Pennington	Georgia 5	2272	1646	684	2056	6658
NCSU	Rebel II	1743	2139	637	1842	6361
NCSU	AU Triumph	2129	1552	650	1788	6120
NCSU	Bison Per.R.G.	1749	1681	486	585	4501
Cascade	Gala Brome	1208	1598	441	793	4041
Mean of Test		**2095**	**1935**	**725**	**1842**	**6598**
LSD		274	426	203	330	622
s.e.		231	317	156	284	539
Error d.f.		56	56	56	56	56
CV%		11	16	21	15	8

1996 Cultural Practices: Soil Analysis pH 6.1, P-I 35, K-I 34, HM% 0.4

Fertilizer (lb/acre): March 5, 75N, 60 P_2O_5, 60 K_2O, August 22 75N
Average of five replications.

Table 9 Dry forage yield of tall fescue, ryegrass and brome over three years, 1994-1996.

Sponsor	Variety	1994 Total	1995 Total	1996 Total	3 Year Average
		Dry Forage (lbs/acre)			
DLF Trifolium	Dovey	6975	10006	7120	8034
Sou. States	Stargrazer	6951	9033	7298	7761
International	FTF 9077	6673	9045	7462	7727
NCSU	Cajun	6781	9535	6848	7721
NCSU	KY 31	6572	8802	7213	7529
Cascade	EA 18	6144	8889	7178	7404
Forbes	Enforcer	6612	8566	6921	7367
International	FTF 8872	5924	8870	7153	7312
NCSU	AU Triumph	6592	9043	6120	7252
Pennington	Georgia 5	6506	8569	6658	7245
Green Seed	Cattleclub	6054	8494	7139	7229
NCSU	Phyter	5079	7899	6952	6643
NCSU	Bison Per.R.G.	7347	7148	4501	6332
NCSU	Rebel II	4568	7309	6361	6079
Cascade	Gala Brome	5070	5033	4041	4715
Mean of Test		**6257**	**8416**	**6598**	**7090**
LSD		540	992	622	1179
s.e.		540	839	539	635
Error d.f.		56	56	56	28
CV%		7	10	8	9

Average of five Replications.

Table 10 FVT253. Dry forage yield of orchardgrass, 1996.

Brand or Sponsor	Variety	1996 Harvest Dates				1996 Total
		24 Apr	30 May	19 Aug	22 Oct	
		Dry Forage (lbs/acre)				
Cascade	EG 1	3359	1233	1020	959	6571
Green Seed	Shiloh	3150	1418	945	915	6428
Sou. States	Benchmark	3353	1199	1049	764	6365
WVPB	WVPB 89-37	2763	1611	996	825	6195
International	OG-90134	2968	1305	992	830	6095
WVPB	89-35 (PS-1)	2558	1563	1046	788	5955
Smith Seed	WVPB OG 89-19	2558	1697	817	711	5783
WVPB	WVPB 89-309	2616	1263	1035	842	5755
Mean of Test		**2916**	**1411**	**988**	**829**	**6144**
LSD		552	205	274	NS	NS
s.e.		396	162	149	159	492
Error d.f.		28	28	28	28	28
CV%		14	12	15	19	8

1996 Cultural Practices: Soil Analysis pH 6.1, P-I 35, K-I 34, HM% 0.4
Fertilizer (lb/acre): March 5, 75N, 60 P_2O_5, 60 K_2O, August 22, 75N
Average of five replications.

Table 11 Dry forage yield of orchardgrass over 3 years, (1994-1996).

Sponsor	Variety	1994 Total	1995 Total	1996 Total	3-Year Average
		Dry Forage (lb/acre)			
Sou. States	Benchmark	5480	9094	6365	6980
Green Seed	Shiloh	5607	8887	6428	6974
Cascade	EG 1	5043	8740	6571	6785
WVPB	WVPB89-37	4937	8273	6195	6468
WVPB	WVPB89-309	4245	8478	5755	6160
International	OG-90134	4958	7705	6095	6253
WVPB	89-35(PS-1)	4134	8097	5955	6062
Smith Seed	WVPB OG 89-19	4865	7246	5783	5965
Mean of Test		**4909**	**8315**	**6144**	**6456**
LSD		509	797	824	657
s.e.		407	609	492	509
Error d.f.		28	28	28	14
CV%		8	7	8	8

Average of five Replications.

Table 12 FVT245. Dry forage yield of bermuda and bahiagrass, 1996.

Variety	Species	1996 Harvest Dates				1996 Total
		31 May	19 July	13 Aug	19 Sept	
		Dry Forage (lbs/acre)				
Tifton 44	Bermuda	2757	1248	2770	2344	9120
Coastal	Bermuda	2600	1407	2377	2299	8684
Tifton 9	Bahia	1408	1599	2915	2541	8462
Laurel Springs	Bermuda	2724	962	1762	1090	6539
Pensacola	Bahia	653	2150	1557	1905	6265
Tifton 78	Bermuda	1490	1166	1674	1791	6120
Pasto Rico	Bermuda	2120	912	1452	1228	5712
Guymon	Bermuda	1649	455	1647	1596	5347
Tierra Verde	Bermuda	2060	801	1069	1175	5106
Callie	Bermuda	****	***	****	****	****
Mean of Test		**1940**	**1189**	**1914**	**1774**	**6817**
LSD		387	424	736	345	1206
s.e.		330	349	577	292	1002
Error d.f.		32	32	32	32	32
CV%		17	29	30	16	15

1996 Cultural Practices: Soil Analysis pH 5.7, P-I 94, K-I 40, HM% 0.7 Fertilizer (lb/acre): March 5 140 K_2O, April 18 75N, May 31 50N, July 19 50N, Aug 13 50N.

Yield data represents weed-free yield. Weed composition estimated on last two harvests.

****Variety Callie Bermuda had 95% stand loss due to winter injury in 1996. Average of five replications.

Table 13 Dry forage yield of bermuda and bahia grass over four years (1993-1996).

Variety	Species	1993 Total	1994 Total	1995 Total	1996 Total	4 Year Average
		Dry Forage (lb/acre)				
Tifton 44	Bermuda	7220	8559	12638	9120	9384
Coastal	Bermuda	7563	7769	12139	8684	9039
Tifton 9	Bahia	4487	7593	10801	8462	7836
Laurel Springs	Bermuda	5049	6851	10208	6539	7162
Tifton 78	Bermuda	5817	6176	10230	6120	7086
Tierra Verde	Bermuda	2357	4938	8684	5106	5271
Pasto Rico	Bermuda	2654	4282	8116	5712	5191
Guymon	Bermuda	1962	4311	7964	5347	4895
Pensacola	Bahia	490	2791	6379	6265	3981
Callie	Bermuda	6710	6042	9759	****	961
Mean of Test		**4431**	**5931**	**9692**	**6817**	**7473**
LSD		1352	1500	1235	1206	1103
s.e.		1160	1249	1235	1002	1212
Error d.f.		36	36	36	32	16
CV%		26	21	13	15	16

Average of five Replications.
**** Winter killed.

Table 14 Dry forage yield of switchgrass under two cutting managements, 1993-1996.

Variety/ Treatment	1996 Harvest Dates 10 Jul	4 Nov	1996 Total	1995 Total	1994 Total	1993 Total	4-Year Average
	Dry Forage (lbs/acre)						
Two Cut Management							
NC 1	15251	5663	20914	16578	14377	457	13082
Kanlo	13913	4948	18861	15951	14735	6561	14027
Alamo	12044	6533	18577	15645	14467	7335	14006
Cave-in-rock	12422	4593	17015	12015	12681	6835	12137
NC 2	12043	4945	16988	12727	13305	895	10979
Shelter	10682	4357	15039	10536	10805	4801	10295
One Cut Management							
NC 2		16667	16667	11786	9644	791	9722
NC 1		15727	15727	11901	10270	518	9604
Kanlo		15449	15449	10711	12770	5105	11009
Alamo		13919	13919	12278	12323	5750	11068
Shelter		9401	9401	5625	6608	3005	6160
Cave-in-Rock		8397	8397	7131	8305	3963	6949
Mean of Test	**17158**	**7018**	**15572**	**11907**	**11698**	**3911**	**10753**
LSD	5054	1727	2830	2553	2143	1105	
s.e.	2687	1327	2152	1765	683	724	
Error d.f.	15	33	33	33	29	24	
CV%	16	19	14	15	13	19	

1996 Cultural Practices: Soil Analysis pH 6.0, P-I 166, K-I 150, HM% 0.6
Fertilizer (lb/acre): April 18 90N to one cut mgt.; 45N to two cut mgt.; July 11 45N to two cut mgt.
Weed control (lb/acre a.i.): April 18 2.0 AAtrex
Insect Control (lb/acre a.i.): July 11 1.25 Sevin
Average of four replications.

APPENDICES

Appendix 1: Temperature and Precipitation for Wake County 1995-96.

	Temperature (°F)					Precipitation(inches)		
Month	**Mean**	**Max**	**Min**	**High**	**Low**	**Total**	**1-Day Max**	**No.days >0.10"**
1995								
November	47.8	58.3	37.3	73	25	4.57	1.66	10
December	38.6	49.8	27.4	71	19	1.58	1.08	3
1996								
January	38.2	46.4	29.2	68	18	4.72	1.12	11
February	44.7	54.5	34.2	79	1	2.67	0.8	6
March	47.7	58.3	36.7	75	16	3.94	1.23	7
April	60.3	71.9	48.1	83	32	5.07	2.36	10
May	69.5	81.0	57.6	93	39	2.44	0.69	7
June	76.1	86.4	65.1	95	49	3.3	1.36	6
July	78.4	87.6	68.6	95	55	8.53	2.65	9
August	75.3	84.3	65.8	89	61	3.13	1.21	6
September	71.0	79.2	62.3	84	51	1.98	8.32	12
October	61.7	72.5	50.3	83	39	4.00	3.05	2
November	46.8	56.0	37.3	75	24	2.96	0.67	6
December	46.7	55.9	37.0	76	17	2.91	0.88	7

1996 9 month precipitation total was 46.06 inches

Appendix 2: Supplemental information for forage test locations.

Location: Lake Wheeler Rd Field Laboratory, Raleigh, Wake County, East Central Piedmont, NC.

Soil: Appling Cecil Association
Gray Sandy Loam soil, red firm clay subsoil.

Appendix 3: Cultural practices and fertilization for perennial forages.

A. FVT 245: Bermuda (Wake Co)

Planted May 1991. Tifton 78, Tifton 33, Callie, Coastal and Laurel Springs bermudas were established by sprigging. All others were broad-cast seeded in plots 10'X 20'.

Soil test at planting: pH 5.6, P-I 094, K-I 60, HM% 1.1
Soil test 1994: pH 5.7, P-I 080, K-I 44, HM% 0.8
Soil test 1995: pH 5.7, P-I 32, K-I 50, HM% 0.3
Soil test 1996: pH 5.7, P-I 94, K-I 40, HM% 0.7

Fertilizer (lb/acre)

Date	N	P_2O_5	K_2O	Lime
5/9/91	25	50	50	
2/16/93		50	100	1000
3/31/93	50			
5/10/93	45			
7/2/93	50			
7/29/93	50			
2/22/94	50	50	50	
6/22/94	50			
7/20/94	50			
3/6/95		120	120	2000
4/3/95	75			
7/10/95	50			
8/1/95	50			
3/5/96			140	
4/18/96	75			
5/31/96	50			
7/19/96	50			
8/13/96	50			

Weed control (lb/acre a.i.)

3/31/93	1.5 AAtrex	1.0 2,4-D
4/15/94	1.5 AAtrex	
3/3/95	1.5 AAtrex	

B. FVT 253: Fescue and orchardgrass (Wake County)

Seeded September 16, 1993 at rate of 20 lb/acre for orchardgrass and 25lb/acre for fescue. Due to dry weather and poor stand, reseeded October 21, 1993 at original rate.

Soil test at planting pH 5.8, P-I 30, K-I 54, HM% 0.3
1995 soil analysis: pH 6.1, P-I 35, K-I 34, HM% 0.4
1996 soil analysis: pH 6.1, P-I 35, K-I 34, HM% 0.4

Fertilizer (lb/acre)

Date	N	P_2O_5	K_2O
9/16/93	25	50	50
3/7/94	50		
7/21/94	75		
3/6/95	100	50	50
9/4/95	75		
3/5/96	75	60	60
8/22/96	75		