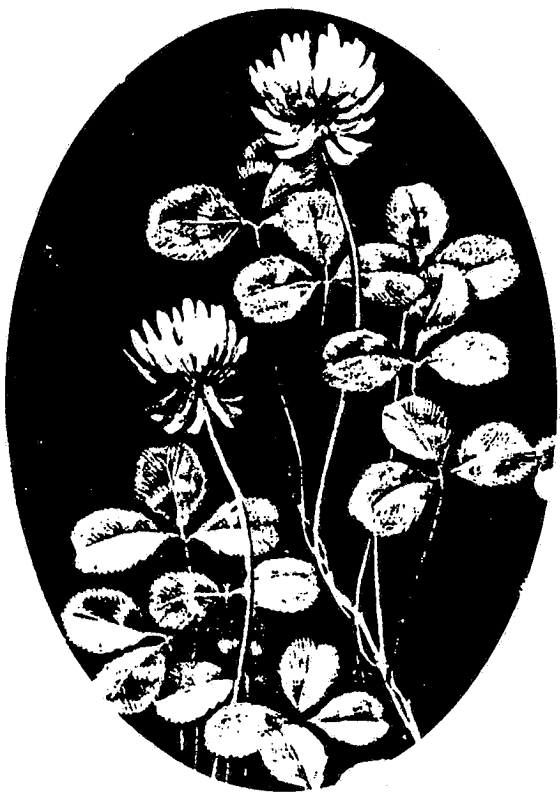
FORAGE

CROPS VARIETY TESTING

1994



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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 1994.

The varieties tested are classed into three major groups: winter annuals (such as rye, wheat, oats, barley and ryegrass); summer annuals (such as sudangrass, pearl millet, and sorghum-sudan hybrids) and perennial forages (such as alfalfa, orchardgrass, tall fescue, and bermudagrass). All varieties were managed on a multiple-cut system with most varieties being clipped three or more times to simulate rotational grazing or haying conditions. 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 gives assurance as to the purity of the entries tested and that results reported here could be reproduced.

All forage tests were conducted on North Carolina State University Lake Wheeler Road Field Laboratory in 1994. Weather-measuring instruments were located approximately one mile from the test site. Climatological data are listed in the appendix tables.

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 only to chance. Measured differences among varieties can result from influences other than their true genetic character. These random 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. It is up to the experimenter to choose the odds that he is willing to accept. Most experimenters will accept chance odds of 5% or less. In other words, 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 (chance odds of about 5%). 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 considered statistically significant. An example of the use of the Waller-Duncan L.S.D. is given below.

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

Variety	Yield (Lbs/A)
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 L.S.D. value in the above example, it can be determined that:

a. Variety 1 is not different from variety 2 because the observed difference (30) does not exceed the L.S.D. value of 50.

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

c. Likewise, based on similar comparisons, varieties 3 and 4 are not different, but variety 2 is different from varieties 3 and 4.

In studying the information presented in this publication, it should be emphasized that data collected over several years are a better indication of a variety's potential than single year test results. If the reader desires to review data for each harvest for previous years, check the publication for those years.

EXPERIMENTAL PROCEDURES

Recommended small-plot techniques and cultural practices were employed on all tests. Fertilization, seeding rates, dates, and other cultural information of a given test are listed in the table which gives dry matter yields by harvest for the current year. 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 annuals 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 degrees Fahrenheit 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. Supplemental information for forage variety test locations.

Location	Cooperating Personnel	Soil	Long Term Average Growing Season (Days)	Long Term Average Annual Rainfall (Inches)
Lake Wheeler Road Field Laboratory Raleigh, NC East Central Piedmont Wake County Approx. Elev. 400 feet	Wallace Baker Ken Snyder	Appling-Cecil Association Gray Sandy Loam soil red, firm clay subsoils	200	46

Table 2. Names and addresses of agencies sponsoring winter annual forage entries in the 1993-1994 trials.

Sponsor	Address	Brand	Cultivar Designation
Green Seed Company	P. O. Box 29247 Atlanta, GA 30359	Green Seed	Winter King Rye
N. C. Agriculture Extension Service	Raleigh, NC 27695		Abruzzi Rye NCSU 90 Ryegrass Brooks Oat Boone Barley Wakefield Wheat Gulf Ryegrass
Seed Production, Inc.	P. O. Box 290 Madison, GA 30650	Seed Production	Wintergrazer 70 Rye
Southern States Cooperative	P. O. Box 26234 Richmond, VA 23260	So. States So. States	Wheeler Rye Pastar Rye
University of Florida	Bldg. 107 Gainesville, FL 32611	Univ. of Fla. Univ. of Fla. Univ. of Fla.	Florida 80 Ryegrass Surrey Ryegrass FL/or X 1993 LR Ryegrass
The Wax Company, Inc.	P. O. Box 60 Amory, MS 38821	Wax Wax	Marshall Ryegrass Jackson Ryegrass
U. S. Dept. Agri.	Forage & Turf Reserch Unit Tifton, GA 31793	USDA	Grazer Ryegrass
Willamette Valley	36100 Hwy. 228 Brownsville, OR 97327	Willamette Valley Willamette Valley Willamette Valley Willamette Valley	AR-90-300 Ryegrass AR-90-1 Ryegrass AR-92-401 Ryegrass AR-93-101 Ryegrass

Table 3. FVT 252 Dry forage yield of rye, wheat, oats, barley and annual ryegrass at North Carolina State University, Lake Wheeler Road Field Laboratory, Wake County, N.C. 1993-94[1].

Brand or Sponsor	Variety	Harvest Dates 11/11	2/9	4/4	4/25	5/26	Total
		Pounds Per Acre Dry Forage[2]					
Wax	Marshall Ryegrass	296	809	2844	1817	2945	8712+
WVPB	AR-90-1 Ryegrass	351	666	2617	1583	2709	7924++
WVPB	AR-90-300 Ryegrass	690	733	2247	1380	2481	7530
USDA	Grazer Ryegrass	470	721	2533	1634	2077	7434
Wax	Jackson Ryegrass	800	547	2278	1624	2151	7400
NCSU	NCSU 90 Ryegrass	673	403	2317	1434	2422	7248
Univ. of Florida	FL/ORX1993LR Ryegrass	552	620	2487	1087	2416	7163
Univ. of Florida	Florida 80 Ryegrass	672	650	2310	1321	2032	6985
Univ of Florida	Surrey Ryegrass	390	727	2302	1248	2276	6944
WVPB	AR-93-101 Ryegrass	439	680	2142	1272	2258	6790
WVPB	AR-92-401 Ryegrass	474	447	1906	1514	2174	6514
NCSU	Gulf Ryegrass	635	929	1797	1418	1727	6507
NCSU	Abruzzi Rye	801	1699	2248	1084	399	6232
Seed Production	Wintergrazer 70 Rye	802	1110	2637	954	527	6030
Southern States	Wheeler Rye	623	679	2151	1509	861	5824
NCSU	Brooks Oat	1194	1014	1197	1290	788	5483
Southern States	Pastar Rye	823	699	1877	1382	681	5462
Green Seed	Winter King Rye	825	1034	2126	984	490	5460
NCSU	Wakefield Wheat	1068	1007	1656	980	584	5296
NCSU	Boone Barley	455	636	2137	918	646	4791
Mean of Test		**652**	**791**	**2190**	**1322**	**1632**	**6586**
L.S.D. Waller Duncan K Ratio=100		278	311	475	353	291	829
s.e.		224	255	378	276	260	707
Error d.f.		76	76	76	76	76	76
C.V.		34	32	17	21	16	11

[1]Seeded September 16, 1993 on a Cecil clay loam soil at rate of: Rye - 112 lb/A Oats - 90 lb/A, Ryegrass - 40 lb/A, Barley 96 lb/A and wheat - 120 lb/A
Soil Analysis - pH 5.8, P-I 30, K-I 54, HM% 0.3
Fertilization - Preplant (lb/A): 25N, 50 P_2O_5, 50 K_2O, Postplant (lb/acre): February 15 - 50N, April 5 - 50N, April 28 - 50N

[2]Average of five replications. +Highest yield. ++Not different from highest yield.

Table 4. Over years dry forage yield of rye, wheat, oats, barley and annual ryegrass at North Carolina State University, Lake Wheeler Road Field Laboratory, Wake County, N.C.[1]

Brand or Sponsor	Variety	Test Years 1994	1993	1992	Three Year Average[2]
		Pounds Per Acre Dry Forage			
Wax	Marshall Ryegrass	8712+	6583++	5783+	6956
WVPB	AR-90-1 Ryegrass	7924++	6275	5457++	6486
WVPB	AR-90-300 Ryegrass	7530	6388++	5420++	6382
USDA	Grazer Ryegrass	7434	2/		
Wax	Jackson Ryegrass	7400			
NCSU	NCSU 90 Ryegrass	7248	6388++	5239++	6229
Univ. of Florida	FL/ORX1993LR Ryegrass	7163			
Univ. of Florida	Florid 80 Ryegrass	6985	6515++	5414++	6242
Univ. of Florida	Surrey Ryegrass	6944	7072++	5277++	6367
WVPB	AR-93-101 Ryegrass	6790			
WVPB	AR-92-401 Ryegrass	6514	6673++		6594
NCSU	Gulf Ryegrass	6507	6647++	5587++	6185
NCSU	Abruzzi Rye	6232			
Seed Production	Wintergrazer 70 Rye	6030	5597	4208	5226
Southern States	Wheeler rye	5824	5294	4487	5150
NCSU	Brooks Oat	5483	6305	4954	5525
Southern States	Pastar Rye	5462	5244	3654	4739
Green Seed	Winter King Rye	5460	6131	4531	5320
NCSU	Wakefield Wheat	5296	5789		5543
NCSU	Boone Barley	4791	5837	3534	4673

[1]Average of five replications. Entries with missing values indicate the cultivar was not tested that year.
[2]The values are averaged only for the years the variety was tested.
+Highest yield. ++Not different from highest yield.

Table 5. Names and addresses of agencies sponsoring summer annual forage entries in the 1994 trials.

Sponsor	Address	Brand	Cultivar Designation
Ciba Seeds	P. O. Box 18300 Greensboro, NC 27407	Ciba	FP-5 SS
		Ciba	FP-6 SS
		Ciba	Facon SS
DeKalb Genetics Corporation	Route 2, Box 56 Lubbock, TX 79415	DeKalb	Sudax SX-17 SS
		DeKalb	Sudax SX-15 SS
Green Seed	P. O. Box 29247 Atlanta, GA 30359	Green	Leafy Green PM
Northrup King Co.	P. O. Box 249 Grifton, NC 28530	NK	Sordan 79 SS
		NK	X9299 SS
		NK	X8888 PM
		NK	Millex 24 PM
Pennington Seed Inc.	P. O. Box 290 Madison, GA 30650	Pennington	Summergrazer III SS
		Pennington	Leafy 22 PM
Pioneer Hi-Bred International	1000 W. Jefferson St. Tipton, IN 46072	Pioneer	855F SS
Southern States Cooperative, Inc.	P. O. Box 26234 Richmond, VA 23260	FFR	FFR 120 Sudan
		FFR	3-Mil-X PM
		FFR	Mil-Hy 300 PM
		FFR	FFR 211 SS
U.S. Dept. Agri.	Forage & Turf Res. Unit P.O. Box 748 Tifton, GA 31793	USDA	Tifleaf 2 PM
		USDA	Expt 1 PM
		USDA	Expt 2 PM
		USDA	TX623A X RDC Dwarf SS
		USDA	TX623A X DWF GA337 SS
		USDA	TX623A X GA337 SS
	USDA-ARS N. C. State University Box 7631 Raleigh, NC 27695	USDA	Barchet SB
		USDA	Laredo SB
		USDA	Gasoy 17 SB
		USDA	Peking SB
		USDA	Johnston SB
		USDA	Cook SB

SS = Sorghum sudan hybrid, PM = Pearl millet.
SB = Soybeans

Table 6. FVT 254 Dry matter yield of summer annuals on North Carolina State University Lake Wheeler Road Field Laboratory in Wake County, North Carolina[1]

Sponsor	Variety	Harvest Dates - 1994 6/21	7/12	8/2	8/23	9/29	1994 Total	1993 Total	Two-Year Average
		Pounds Per Acre Dry Forage[2]							
Southern States	FFR-120 Sudan	1348	2813	1991	968	1719	8838+	6468++	7653
DeKalb	Sudax SX-15 SS[3]	1296	2553	2120	828	1723	8521++	6128++	7325
Pennington	Leafy 22 PM[3]	982	3418	1751	1057	1195	8403++		
Green	Leafy Green PM	1081	3221	1751	1137	1167	8357++		
USDA	Tifleaf 2 PM	875	3245	1820	1294	1091	8325++	5825++	7075
Northrup King	X8888 PM	1274	3278	1499	1009	1125	8185++		
Northurp King	Sordan 79 SS	1481	2930	1651	629	1444	8136++		
Southern States	FFR 211 SS	1489	2493	1725	556	1862	8126++	5918++	7022
Northrup King	X9299 SS	1571	2729	1596	534	1634	8064++		
Pioneer	855F SS	1607	2703	1671	686	1342	8008++	5609	6809
USDA	TX 623A X DWF Ga 337 SS	1220	2910	1697	623	1550	8001++		
Ciba	FP-6 SS	1456	2848	1561	690	1407	7961++	6349++	7155
Pennington	Summergrazer III SS	1331	2756	1545	766	1445	7844++		
USDA	TX 623A X GA 337 SS	1512	2493	1729	696	1382	7812++		
DeKalb	Sudax SX-17 SS	1466	2577	1595	610	1550	7799++	7823+	7261
Ciba	FP-5 SS	1267	2850	1541	614	1393	7665++	5621	6643
USDA	Tift Exp No 2 PM	853	3008	1737	1010	1026	7634++	5538	6586
Ciba	Facon SS	1277	3169	1476	540	1145	7607++		
USDA	Tift Exp No 1 PM	804	2918	1647	1031	1051	7451	6088++	6770
Southern States	3-Mil-X PM	747	2971	1369	1002	1120	7209	4838	6024
Southern States	Millhy 300 PM	929	2956	1385	838	1066	7195	5186	6191
USDA	TX 623A X RDC Dwarf SS	528	2692	1524	711	1721	7175		
Northrup King	Millex 24 PM	944	2798	1359	863	1164	7127		
Mean of Test		**1189**	**2884**	**1641**	**813**	**1362**	**7889**	**5816**	
L.S.D. Waller Duncan K-Ratio=100		348	668	379	159	495	1254	1012	
s.e.		284	407	259	137	347	749	648	
Error d.f.		88	88	88	88	88	88	56	
C.V.		24	14	16	17	25	9	12	

[1]1994 Cultural Practices Seeded May 17, 1994
Soil Analysis pH 6.6, P-I 89, K-I 30, HM% 0.4
Fertilization (lb/acre) May 17 - 25N, 50 P_2O_5, 50 K_2O, June 22 - 50 N, July 14 - 50 N, August 23 - 50N
[2]Average of five replications
[3]SS=Sorghum Sudan Hybrid, PM=Pearl Millet
+Highest yield. ++Not different from highest yield.

Table 7. FVT 254 Dry forage yield of forage soybeans on North Carolina State University Lake Wheeler Road Field Laboratory in Wake County, North Carolina[1]

Variety	Harvest Dates 7/20	9/21	1994 Total	Pod Maturity Last Harvest
	Pounds Per Acre Dry Forage[2]			
Johnston	2197[3]	5624	7821	Mature
Cook	2107	5419	7527	Mature
Gasoy 17	2006	5128	7134	Mature
Peking	2050	5063	7114	Mature
Laredo	2256	4656	6911	Early Pod
Barchet	1790	4805	6595	Early Pod
Mean of Test	**2068**	**5116**	**7184**	
LSD Waller Duncan K-Ratio = 100	445	N.S.	N.S.	
s.e.	202	610	706	
Error d.e.	10	10	10	
C.V.	10	12	10	

[1]1994 Cultural Practices Soil Analysis pH 6.6, P-I 089, K-I 30, HM% 0.4
Fertilization (lb/acre) at seeding. May 17, 1994 25N, 50 P_2O_5, 50 K_2O
Seeding Seeded May 17, 1994 at rate of 75 lb/acre
[2]Average of three replications.
[3]All plants vegetative on this date.

Table 8. Names and addresses of agencies sponsoring entries in the 1994 North Carolina Perennial Forage Trials.

Sponsor	Address	Brand	Cultivar Designation
AgraTech Seeds, Inc	P. O. Box 2210 Atlanta, GA 30301	AgraTech	8607 Alfalfa
America's Alfalfa	P.O. Box 2955 Shawnee Mission KS 66201	Americas	Alfagraze Alfalfa
			AmericasAggressor Alfalfa
		Americas	Apollo Supreme Alfalfa
Allied Seed Cooperative Inc.	1917 E. Fargo Nampa, ID 83687	Allied Seed	Asset Alfalfa
Mike Braxton Seed, Inc.	P. O. Box 308 Ames, IA 50010	Braxton	MBS 2152 Alfalfa
Cascade International Seed Company	8483 W. Strayton Rd. Aumsville, OR 97325	Cascade	Gala Brome
		Cascade	EA18 Fescue
		Cascade	EG1 Orchardgrass
Ciba Seeds	P. O. Box 18300 Greensboro, NC 27419	Ciba	C-G2833 Alfalfa
Dairyland Research	RR 1, Box 129 Clinton, WI 53525	Dairyland	Magnum III Alfalfa
DeKalb-Pfizer	3100 Sycamore Road DeKalb, IL 60115	DeKalb	DK 125 Alfalfa
		DeKalb	DK 135 Alfalfa
Forbes Seed and Grain	P. O. Box 85 Junction City, OR 97448	Forbes	Enforcer Fescue
Garst Seed Co.	Box 300 Coon Rapids, IA 50058	Garst	Garst 630 Alfalfa
		Garst	Garst 645 Alfalfa
Great Plains Research Co., Inc.	3624 Kildaire Farm Road Apex, NC 27502	Great Plains	Cimarron VR Alfalfa
Green Seed Company	P. O. Box 29247 Atlanta, GA 30359	Green Seed	Legacy Alfalfa
		Green Seed	Cattle Club Fescue
		Green Seed	Shiloh Orchardgrass
International Seeds Inc.	P. O. Box 168 Halsey, Oregon 97348	International	FTF 9077 Fescue
		International	FTF 8872 Fescue
		International	OG-90134 Orchardgrass

Table 8. Continued.

Sponsor	Address	Brand	Cultivar Designation
N. C. Agricultural Extension Service	N. C. State University Raleigh, NC 27695	NCSU	Ky 31 Fescue Cajun Fescue Rebel II Fescue Triumph Fescue Bison Per Ryegrass Coastal Bermuda Tifton 44 Bermuda Callie Bermuda Tifton 78 Bermuda Pasto Rico Bermuda Tierra Verde Bermuda Guymon Bermuda Pensacola Bahia Tifton 9 Bahia Laurel Springs Bermuda
Northrup King Company	P. O. Box 885 Grifton, NC 28530	NK NK NK	Crockett Alfalfa Fortress Alfalfa Multiking I Alfalfa
Pennington Seed Production, Inc.	P. O. Box 290 Madison, GA 30650	Pennington	Georgia 5 Fescue
Pioneer Hi-Bred International, Inc.	1000 W. Jefferson St. Tipton, IN 46072	Pioneer Pioneer Pioneer	5331 Alfalfa 5373 Alfalfa YAL06 Alfalfa
Smith Seed Services	P. O. Box 288 Halsey, OR 97348	Smith Seed	WVPB 89-19 Orchardgrass
Southern States Cooperative, Inc.	P. O. Box 26234 Richmond, VA 23260	So. States So. States So. States So. States So. States So. States	Anstar Alfalfa Benchmark Orchardgrass Haymark Alfalfa Phyter Fescue Resistar Alfalfa Stargrazer Fescue
Vista	P. O. Box 1428 Woodland, CA 95695	Vista	VS 9060 Alfalfa
Willamette Valley	36100 Hyw 228 Brownsville, OR 97327	Willamette Valley Willamette Valley Willamette Valley	WVPG-OG-89-37 Orchardgrass WVPB-OG-89-35 Orchardgrass WVPB-OG-89-309 Orchardgrass

Table 9. FVT 244 Dry forage yields of alfalfa on North Carolina State University Lake Wheeler Road Field Laboratory in Wake County, North Carolina[1]

Brand or Sponsor	Variety	Harvest Dates 1994						1994 Total
		4/26	6/7	6/28	8/1	9/9	11/11	
		Pounds Per Acre Dry Forage						
Northrup King	Crockett	2847	2435	1648	1710	2533	1223	12396+
Pioneer Exp.	Yalog	3043	2485	1654	1659	2500	1037	12378++
Green Seed	Legacy	2844	2348	1562	1781	2403	1140	12079++
AgraTech	AgraTech 8607	2692	2363	1557	1755	2423	1199	11990++
Great Plains	Cimarron VR	3041	2337	1480	1651	2415	1057	11980++
Allied Seed	Asset	2945	2376	1537	1652	2364	1097	11970++
America's Alfalfa	Aggressor	3151	2342	1498	1365	2465	1084	11905++
Dairyland Seed	Magnum III	2732	2448	1698	1409	2446	1071	11804++
Ciba	C-G 2833	2699	2460	1544	1604	2432	1030	11770++
Garst Seed	Garst 630	2912	2451	1559	1495	2341	1006	11763++
Southern States	Anstar	3003	2312	1438	1589	2458	927	11726++
America's Alfalfa	Apollo Supreme	2867	2244	1470	1580	2444	936	11542++
DeKalb	DK 125	3066	2188	1351	1433	2447	1032	11517++
Vista	VS 9060	2860	2261	1400	1409	2413	1150	11494++
Southern States	Resistar	3043	2275	1351	1357	2422	1043	11490++
Garst Seed	Garst 645	2824	2185	1452	1754	2256	982	11453++
Southern States	Haymark	2700	2250	1476	1827	2276	865	11394++
Northrup King	Fortress	2856	2292	1370	1540	2315	981	11354++
Pioneer Variety	5331	2802	2159	1484	1472	2374	971	11261++
Mike Braxton Seed	MBS 2152	2407	2326	1501	1553	2202	1192	11181++
Pioneer Variety	5373	2897	2272	1448	1255	2305	926	11103
America's Alfalfa	Alfagraze	2984	2106	1358	1419	2332	824	11023
Northrup King	Multiking I	2782	2148	1514	1503	2181	881	11009
DeKalb	DK 135	2624	2044	1374	1291	2199	921	10452
Mean of Test		**2859**	**2296**	**1488**	**1544**	**2373**	**1024**	**11585**
L.S.D. Waller Duncan K-Ratio=100		429	422	305	766	297	153	1253
s.e.		264	216	168	332	166	119	745
Error d.f.		92	92	92	92	92	92	92
C.V.		9	9	11	22	7	12	6

[1]Seeded September 5, 1991.
1994 Cultural Practices: Soil Analysis pH 5.9, P-I 39, K-I 26
Fertilization (lb/acre) February 22, 1994 100 P_2O_5, 100 K_2O, 3 Boron
Insect Control (lb/acre a.i.) March 24 - 0.5 Furadan
[2]Average of five replications.
+Highest yield. ++Not different from highest yield.
For earlier years cultural practices - See Appendix Table 2.

Table 10. FVT 244 over years averages of dry forage yield of alfalfa on North Carolina State University Lake Wheeler Road Field Laboratory, Wake County, N.C.

Brand or Sponsor	Variety	Test Years 1994	1993	1992	Three Year Average
		Pounds Per Acre Dry Forage[1]			
Northrup King	Crockett	12396+	12619+	10877+	11964+
Green	Legacy	12079++	12338++	10731++	11716++
America's Alfalfa	Aggressor	11905++	12453++	10644++	11668++
Pioneer Exp	Yalog	12378++	12212++	9775++	11455++
Great Plains	Cimarron VR	11980++	11492++	10749++	11407
Ciba	C-G 2833	11770++	11912++	10442++	11375
Southern States	Anstar	11726++	11806++	10524++	11352
Dairyland Seed	Magnum III	11804++	12090++	10116++	11337
Allied Seed	Asset	11970++	12118++	9852++	11314
Garst Seed	Garst 630	11763++	12334++	9687++	11261
Southern States	Resistar	11490++	11580++	10320++	11130
America's Alfalfa	Apollo Supreme	11542++	11842++	9930++	11105
Vista	VS 9060	11494++	11225+	10297++	11005
Pioneer Variety	5373	11103	11831++	10010++	10981
DeKalb	DK 125	11517++	11407++	9830++	10918
AgraTech	AgraTech 8607	11990++	11276++	9488	10918
Pioneer Variety	5331	11261++	11418++	9929++	10869
Southern States	Haymark	11394++	11324++	9756++	10825
Northrup King	Fortresss	11354++	11132	9973++	10820
Northrup King	MultiKing I	11009	11369++	9855++	10744
Garst Seed	Garst 645	11453++	11453++	9124	10677
America's Alfalfa	AlfaGraze	11023	10923	9971++	10638
Mike Braxton Seed	MBS 2152	11181++	11399++	9233	10605
DeKalb	DK 135	10452	11021	10035++	10503
Mean of Test		**11585**	**11691**	**10048**	**11108**
LSD Waller Duncan K-Ratio = 100		1253	1352	1296	553
s.e.		745	793	757	765
Error d.f.		92	92	92	276
C.V.		6	7	8	7

[1]Average of five replications.
+Highest yield. ++Not different from highest yield.
For earlier years cultural practices, see Appendix Table 2.

Table 11. FVT 253 Dry forage yield of fescue on North Carolina State Univeristy Lake Wheeler Road Field Laboratory in Wake County, North Carolina[1]

Brand or Sponsor	Variety	Harvest Dates - 1994 4/8	4/28	6/7	8/22	11/9	1994 Total
		Pounds Per Acre Dry Forage[2]					
NCSU	Bison Perennial Ryegrass	3517	1020	1422	858	531	7347+
Dlf Trifolium	Dovey Fescue	1265	755	787	2267	1900	6975++
Southern States	Stargrazer Fescue	1025	921	827	2083	2095	6951++
NCSU	Cajun Fescue	1442	949	680	1850	1860	6781
International	FTF 9077 Fescue	1339	964	684	1931	1756	6673
Forbes	Enforcer Fescue	1140	963	810	1948	1751	6612
NCSU	AU Triumph Fescue	1505	722	655	1807	1904	6592
NCSU	KY 31 Fescue	1101	1096	734	1834	1807	6572
Pennington	Georgia 5 Fescue	1335	921	595	1800	1855	6506
Cascade	EA 18 Fescue	1343	831	651	1544	1774	6144
Green	Cattleclub Fescue	1146	996	832	1601	1478	6054
International	FTF 8872 Fescue	1246	821	634	1498	1725	5924
NCSU	Phyter Fescue	759	708	671	1526	1415	5079
Cascade	Gala Brome	1645	1020	776	915	714	5070
NCSU	Rebel II Fescue	992	801	549	939	1287	4568
Mean of Test		**1387**	**899**	**754**	**1627**	**1590**	**6257**
L.S.D. Waller Duncan K Ratio=100		216	122	133	238	223	540
s.e.		191	101	115	207	195	540
Error d.f.		56	56	56	56	56	56
C.V.		14	11	15	13	12	7

[1]1993 Cultural Practices Soil Analysis - pH 5.8, P-I 30, K-I 54, HM% 0.3
Fertilization (lb/acre) At seeding: (September 16, 1993) 25N, 50 P_2O_5, 50 K_2O, March 7, 1994 50N, July 21, 1994 75N
Seeded September 16, 1993 at rate of 20 lb/acre. Due to dry weather and poor stand, reseeded October 21, 1993 at rate of 20 lb/acre.
[2]Average of five replications.
+Highest yield. ++Not different from highest yield.

Table 12. FVT 253 Dry forage yield of orchardgrass on North Carolina State Univeristy Lake Wheeler Road Field Laboratory in Wake County, North Carolina[1]

Brand or Sponsor	Variety	Harvest Dates - 1994					1994 Total
		4/8	4/28	6/7	8/22	11/9	
		Pounds Per Acre Dry Forage[2]					
Green	Shiloh	1180	1947	553	1471	455	5607+
Southern States	Benchmark	1256	1661	445	1570	547	5480++
Cascade	EG1	1077	1563	414	1496	493	5043
International	OG-90134	1084	1608	399	1404	463	4958
Willamette Valley	OG-89-37	874	1536	400	1669	457	4937
Smith Seed	WVPB OG 89-19	968	1609	421	1357	511	4865
Willamette Valley	OG-89-309	605	1337	447	1367	489	4245
Willamette Valley	OG-89-35 (PS-1)	591	1294	455	1421	373	4134
Mean of Test		**954**	**1569**	**442**	**1469**	**474**	**4909**
L.S.D. Waller Duncan K Ratio=100		307	156	77	327	123	507
s.e.		237	129	56	188	77	407
Error d.f.		28	28	28	28	28	28
C.V.		25	8	13	13	16	8

[1]1993 Cultural Practices Soil Analysis - pH 5.8, P-I 30, K-I 54, HM% 0.3
Fertilization (lb/acre) At seeding: (September 16, 1993) 25N, 50 P_2O_5, 50 K_2O, March 7, 1994 50N, July 21, 1994 75N
Seeded September 16, 1993 at rate of 15 lb/acre. Due to dry weather and poor stand, reseeded October 21, 1993 at original rate.
[2]Average of five replications.
+Highest yield. ++Not different from highest yield.

Table 13. FVT 253 Dry forage yield of orchardgrass and fescue with AZO-Green and without AZO-Green treatment on North Carolina State University Lake Wheeler Road Field Laboratory in Wake County, North Carolina[1]

Brand	Treatment	Harvest Dates 1994					1994 Total
		4/8	4/28	6/7	8/22	11/9	
		Pounds per Acre Dry Forage[2]					
Green	Shiloh Orchardgrass With AZO[3]	1463	1842	464	1758	926	6453+
Green	Shiloh Orchardgrass Without AZO	1461	1782	441	1790	897	6341++
Green	Cattleclub Fescue With AZO	952	1647	318	1396	1164	5477
Green	Cattleclub Fescue Without AZO	941	1575	315	1395	1022	5247
Mean of Test		**1204**	**1711**	**385**	**1585**	**944**	**5879**
L.S.D. Waller Duncan K Ratio=100		287	N.S.	74	212	N.S.	884
s.e.		213	265	55	157	191	612
Error d.f.		12	12	12	12	12	12
C.V.		18	15	14	10	19	10

[1]1994 Cultural Practices: Soil Analysis - pH 5.8, P-I 30, K-I 54, HM% 0.3
Fertilization lb/acre: At Seeding (September 16, 1993) 25 N, 50 P_2O_5, 50 K_2O
March 7, 1994 50N, July 21, 1994 75N
Seeded September 16, 1993 at rate of: Fescue 20 lb/acre, Orchardgrass 15 lb/acre. Due to dry weather and poor stand, reseeded October 21, 1993 at original rate.
[2]Average of five replications. +Highest yield. ++Not different from highest yield.
[3]AZO=Azospirillum

Table 14. FVT 245 Dry forage yields of Bermuda and Bahiagrass on North Carolina State University Lake Wheeler Road Field Laboratory in Wake County, North Carolina[1]

Variety	Species	Harvest Dates - 1994[2] 5/26	6/22	7/18	8/5	9/22	1994 Total	1993 Total	2-Year Average
		Pounds Per Acre Dry Forage[3]							
Tifton 44	Bermuda	1971	1267	2118	1323	1880	8559+	7220++	7890+
Coastal	Bermuda	1747	1382	2039	1092	1509	7769++	7563+	7666++
Tifton 9	Bahia	913	1167	1420	1649	2444	7593++	4487	6040++
Laurel Springs	Bermuda	1880	758	1482	1138	1592	6851	5049	5950
Tifton 78	Bermuda	672	1214	1630	1259	1402	6176	5817	5996++
Callie	Bermuda	602	1531	1426	1205	1278	6042	6710++	6376++
Terra Verde	Bermuda	893	806	1226	874	1138	4938	2357	3647
Guymon	Bermuda	352	682	1201	1001	1075	4311	1962	3136
Pasto Rico	Bermuda	844	679	1103	742	914	4282	2654	3468
Pensacola	Bahia	84	302	469	530	1406	2791	490	1640
Mean of Test		**996**	**979**	**1411**	**1081**	**1464**	**5931**	**4431**	**5181**
L.S.D. Waller Duncan K-Ratio=100		430	213	494	487	490	1500	1352	1936
s.e.		365	183	398	359	391	1249	1160	1205
Error d.f.		36	36	36	36	36	36	36	72
C.V.		37	19	28	33	27	21	26	23

[1]1994 Cultural Practices: Soil Analysis pH 5.6, P-I 080, K-I 44, HM% 0.8
Fertilization (lb/acre) February 22 - 50N, 50 P_2O_5, 50 K_2O; April 18 - 50N, June 22 - 50N, July 20 - 50N
Weed Control (lb/acre a.i.) April 15 1.5 AAtrex

[2]Represents weed free weights on all entries and all harvests. Weed composition estimated on each plot, each harvest.

[3]Average of five replications. +Highest yield. ++Not different from highest yield.
For earlier years cultural practices, See Appendix Table

Table 15. Biomass: Switchgrass variety/management trial--Dry forage yields of switchgrass on Lake Wheeler Road Field Laboratory in Wake County, North Carolina.[1]

Variety/Treatment	1994 Harvest Dates 7/1	11/16	1994 Total	1993 Total	Two Year Average
	Pounds Per Acre Dry Forage				
Two Cut Management					
Kanlow	7591	7144	14735	6561	10648
Alamo	8037	6430	14467	7335	10901
NC 1	5626	8751	14377	467	7422
NC 2	6340	6965	13305	895	7100
Cave-In-Rock	6519	6162	12681	6835	9758
Shelter	6251	4554	10805	4801	7803
One Cut Management					
Kanlow		12770	12770	5105	8938
Alamo		12323	12323	5750	9037
NC 1		10270	10270	518	5394
NC 2		9644	9644	791	5218
Cave-In-Rock		8305	8305	3963	6134
Shelter		6608	6608	3005	4807
Mean of Test	**6727**	**8327**	**11698**	**3911**	**6876**
L.S.D. Waller Duncan K-Ratio=100	1607	1965	2143	1105	
s.e.	613	1374	683	724	
Error d.f.	29	29	29	24	
C.V.	16	16	13	19	

[1]1994 Cultural Practices Soil test pH 6.3, P-I 166+, K-I 68, HM% 0.8
Fertilization (lb/acre) April 18 90N to one cut management, 45N to two-cut management, July 1 45N to two cut management.
Weed Control (lb/acre) a.i. April 15 2.0 AAtrex
Insect Control (lb/acre a.i.) July 6 1.25 Sevin

[2]Average of four replications.

APPENDIX

Appendix Table 1. Temperature and precipitation for Wake County 1993-1994.

Month	Temperature (°F)						
	Mean	Mean Max.	Mean Min.	Highest	Day	Lowest	Day
1993							
November	52.7	63.6	41.8	84	15	28	29+
December	42.1	53.0	31.3	67	4	14	31
1994							
January	39.3	50.4	28.2	69	26	2	19
February	44.9	56.0	33.7	74	9	21	3
March	53.4	65.5	41.3	78	8	24	17
April	63.7	77.2	50.1	87	26	34	2
May	64.9	76.6	53.1	89	24	45	19+
June	77.1	87.0	67.2	97	16	58	4
July	79.3	87.8	70.8	94	16	67	30+
August	75.0	84.5	65.5	90	14+	57	25+
September	69.4	79.1	59.8	87	1	46	30
October	60.3	71.5	49.2	82	1	33	28
November	55.0	66.0	43.9	76	9+	27	24
December	48.2	57.0	39.2	75	7	26	20

Month	Precipitation				
	Total	Departure from long term mean	Greatest in 24 hours	Day	Number days with precipitation 0.10 inches or over
1993	inches				
November	2.84	- .56	1.12	27	4
December	1.99	-1.35	.73	15	5
1994					
January	4.23	.39	1.01	2	5
February	3.30	- .45	1.38	24	4
March	6.27	2.18	2.31	2	9
April	.52	-2.79	.40	16	2
May	3.36	- .16	1.35	4	4
June	3.24	- .96	1.60	17	6
July	6.46	1.62	1.50	21	10
August	5.53	1.10	1.86	5	6
September	2.93	- .90	2.10	2	5
October	5.56	2.44	4.10	14	4
November	3.16	- .24	.79	27	7
December	1.42	-1.92	.33	23	6
1994 Total	45.98				

+Also an earlier date or dates.

Appendix Table 2. Cultural practices and fertilization for perennial forages.

A. FVT 244 ALFALFA (WAKE COUNTY)

Seeded September 5, 1991 at rate of 20 lb/acre on a Cecil soil.
Soil test at planting: pH 6.0, P-I 084, K-I 98, HM% 0.7.
Fertilization (lb/acre)

Date	N	P_2O_5	K_2O	Lime	Boron
September 5, 1991	16	96	96	--	3
February 16, 1993	-	50	100	1000	3

Insect Control (lb/acre a.i.)

Date	
April 14, 1992	1 lb. Furadan
March 31, 1993	0.5 lb. Furadan

B. FVT 245 BERMUDA (WAKE COUNTY)

Planted May 1991. Tifton 78, Tifton 44, Callie, Coastal, and Laurel Springs Bermudas were established by sprigging. All others were broadcast seeded.
Soil test at planting: pH 5.6, P-I 094, K-I 60, HM% 1.1.

Fertilization (lb/acre)

Date	N	P_2O_5	K_2O	Lime
May 9, 1991:	25	50	50	
February 16, 1993	--	50	100	1000
March 31, 1993	50	--	--	--
May 10, 1993	45	--	--	--
July 2, 1993	50	--	--	--
July 29, 1993	50	--	--	--

Weed Control (lb/acre a.i.)

Date	
March 31, 1993	1.5 AAtrex
	1.0 2, 4-D

Appendix Table 3.

C. Biomass - Switchgrass (Wake County) Seeded May 22, 1992. NC1 and NC2 reseeded on June 8, 1993.

Fertilization (lb/acre).

Date	N	P_2O_5	K_2O	Lime
March 31, 1993	--	125	125	
May 10, 1993	45			
July 2, 1993	50			

Weed Control (lb/acre a.i.)

March 31, 1993	1.5 AAtrex
April 29, 1993	1.5 Princep

Insect Control (lb/acre a.i.)

July 20, 1993	1.5 Sevin

1993 Soil Test pH 6.3, P-I 166+, K-I 70, HM% 0.8

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