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Evaluation of Temperate Annual Clovers

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SUMMARY

Twelve species of temperate annual clovers and one *Medicago* species were evaluated for early and total forage production at College Station in 1980-81. Berseem, persian and rose clovers made the best early growth. The best total production was by berseem and subterranean clovers, exceeding 7,000 pounds per acre, followed by rose clover with over 6,000 pounds per acre. Differences within species for both early and total production indicate potential for improvements by breeding.

Introduction

Legumes are needed in forage production because their nitrogen requirements can be met through biological nitrogen fixation. Perennial temperate legumes are generally poorly adapted in Texas because of the hot, dry summer climate. Self-seeding temperate annuals may meet part of the requirements. They have good forage quality and may extend the growing season several weeks when seeded in conjunction with warm-season grasses. This study was conducted to determine the potential of several species and sources within species for early and total forage production.

Experimental Procedure

Twenty-seven cultivars and plant introductions representing 12 *Trifolium* species and one *Medicago* species were planted on October 10, 1980 in plots consisting of 5 30-cm rows, 6 m long, 4 replications, on Norwood sandy loam soil. The fall and winter were mild, permitting above average plant growth. Three center rows, 5.1 m long, from each plot were harvested with a flail mower at about 4 cm height on March 25, 1981 for dry matter yield determination. On May 12, 1981, a 0.4 m² plant sample was removed from each plot at the soil surface level to estimate total dry matter development exclusive of the previously harvested material.

Results and Discussion

Berseem clover (*T. alexandrinum*) made the best early growth, followed closely by persian (*T. resupinatum*), rose (*T. hirtum*) and arrowleaf (*T. vesiculosum*). *Trifolium diffusum* also made good early growth. If total plant top development had been measured at the first harvest, likely subterranean clover also would have shown good early production. Much of its development was likely below the mower height.

KEYWORDS: Temperate legumes, forage production, early production.

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The best total production was by berseem and subterranean clover followed by rose, T. balansae and T. diffusum. Arrowleaf production has been in the range of 6,000 to 7,000 kg/ha in previous studies but totaled only 4,300 to 4,900 kg/ha in this study. Arrowleaf is normally later in maturing than May 12, but made very little growth after that date in 1981.

Seedling vigor and early production is related to some extent to seed size. This could explain the superior early performance of berseem and rose clover and likely subterranean, had total top growth been measured. However, persian clover has smaller seed than arrowleaf, yet early growth equivalent to rose clover. Thus, its ability to emerge and grow rapidly after emergence is not dependent on seed size.

Several species including T. cherangeniense, T. striatum, and T. studeneri were entered in the test because they appear to be perennials. They remain green longer into the summer than other T. species observed at this location. However, none survived the extremely hot and dry conditions encountered in 1980 nor the much milder conditions encountered in 1981. Because of their failure to persist and their low early and total production, they will not be continued. T. diffusum, T. balansae, and T. petrisarvi appear to be about equal to some rose and arrowleaf sources. There may be conditions under which one or more of these species will be superior.

Table 1. Dry matter yield of temperate, annual legumes, College Station, 1981.

Entry number	Species	Cultivar or P.I.	Kg DM/ha		Total
			3/25	5/12	
20	<i>T. alexandrium</i>	Winterhardy	3410ab	4330bcd	7740
25	<i>T. subterraneum</i>	Nangella	1320jklm	5790a	7110
24	<i>T. subterraneum</i>	Woogenellup	1820ghijk	5200ab	7020
1	<i>T. alexandrium</i>	251213	3900a	3060efg	6860
26	<i>T. subterraneum</i>	Mt. Barker	1770ghijk	4570bc	6340
17	<i>T. subterraneum</i>	Miss. Sel.	1050lm	5220ab	6270
21	<i>T. resupinatum</i>	Abon	2370defg	3740cde	6110
27	<i>T. resupinatum</i>	Resel. Abon	2500def	3560def	6060
9	<i>T. resupinatum</i>	173974	2700cde	3000efg	5700
5	<i>T. hirtum</i>	311485	2790bcde	2880efg	5670
8	<i>T. resupinatum</i>	141503	3090bc	2310ghi	5400
2	<i>T. balansae</i>	120159	2320efgh	3000efg	5320
4	<i>T. diffusum</i>	120144	3010bcd	2310ghi	5320
23	<i>T. hirtum</i>	Wilton	3030bcd	2180ghi	5210
13	<i>T. vesiculosum</i>	233782	2320efgh	2660fgh	4880
7	<i>T. petrisarvi</i>	279926	3310abc	1570ij	4880
18	<i>T. vesiculosum</i>	Amclo	2750cde	1760hi	4610
16	<i>T. vesiculosum</i>	Yuchi	2840bcde	1590ij	4430
19	<i>T. vesiculosum</i>	Meehec	1930fghij	2360ghi	4290
6	<i>T. lappaceum</i>	120153	2410defg	1460ij	4070
10	<i>T. species</i>	383738	2110fghi	1740hi	3850
14	<i>T. vesiculosum</i>	233816	1530ijklm	2220ghi	3750
3	<i>T. cherangiense</i>	226101	980m	2660fgh	3640
22	<i>T. hirtum</i>	Kondinin	3350abc	100k	3450
11	<i>T. striatum</i>	226676	1030m	1660hi	2690
12	<i>T. studeneri</i>	262239	1270klm	640jk	1910
15	<i>M. obicularis</i>	197351	1680hijkl	100k	1780

¹Values followed by a common letter are not significantly different at the 0.05 level.