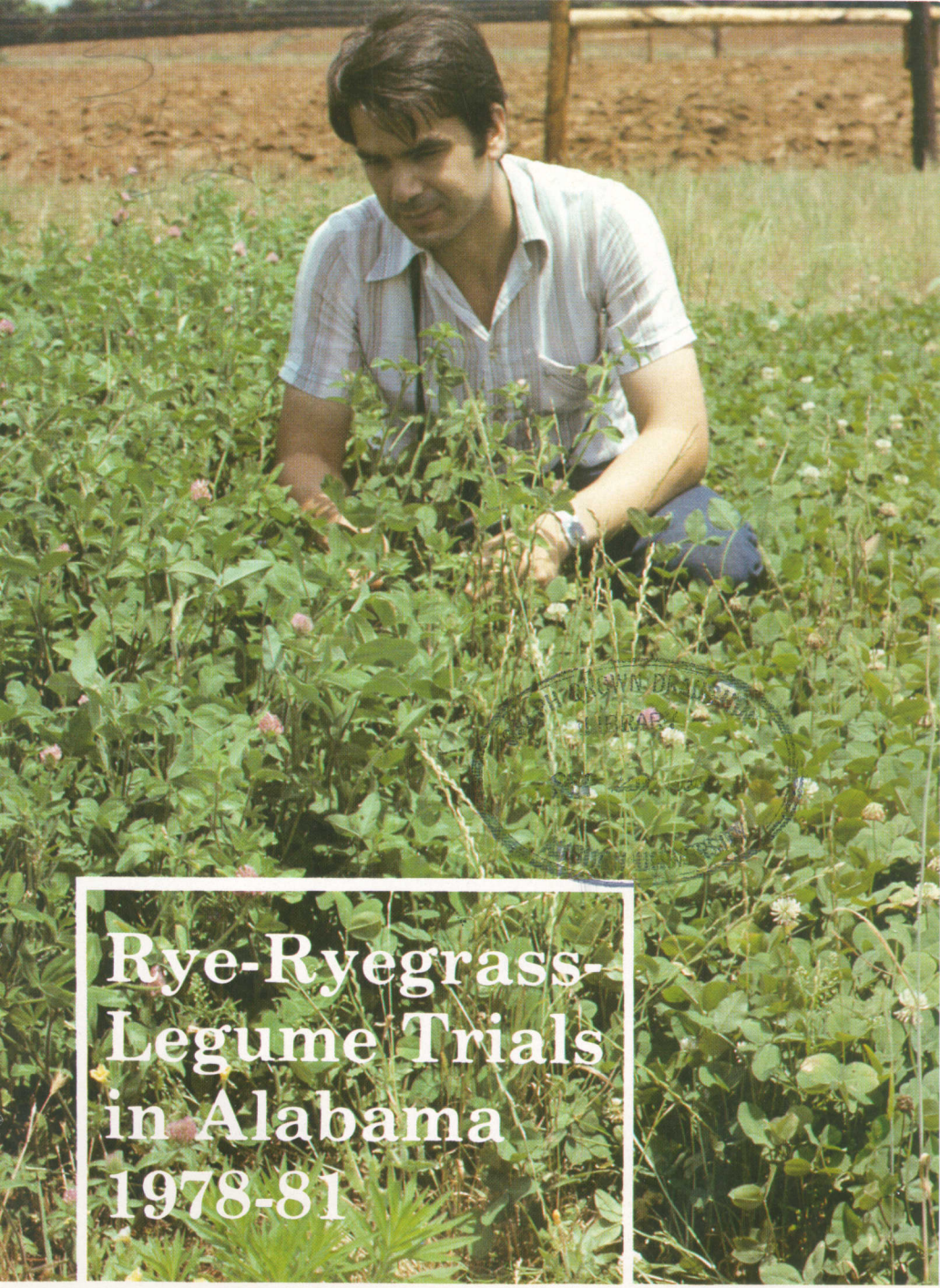

# Rye-Ryegrass-Legume Trials in Alabama 1978-81

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ALABAMA AGRICULTURAL EXPERIMENT STATION AUBURN UNIVERSITY

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*Information contained herein is available to all without regard to race, color, sex, or national origin.*

**COVER PHOTO. Redland red clover (left) and Regal ladino-rye-ryegrass (right), photographed June 22, 1979, at the Tennessee Valley Substation, Belle Mina.**

# Rye-Ryegrass-Legume Trials in Alabama, 1978-81

Carl S. Hoveland and M. W. Alison, Jr.[1]

RYE AND RYEGRASS are often planted on prepared land to produce high quality pasture during the fall, winter, and spring in Alabama. Legumes added to the rye-ryegrass mixture can supply nitrogen, maintain nutritive quality, and extend the grazing season in late spring. Many legumes are available for planting in mixtures with cool-season annual grasses, but little is known about their performance. Some of these are new legumes that have been selected from foreign introductions. Others are new releases that have not been adequately tested in rye-ryegrass-legume mixtures.

Eight rye-ryegrass-legume trials were conducted by the Alabama Agricultural Experiment Station during the years 1978-81. Wrens Abruzzi rye was planted in rows 6 inches apart and Gulf ryegrass and legumes were broadcast-seeded, using plots 4 x 20 feet with four replications. The tests were planted in September or early October and harvested with a flail harvester four to eight times each year. A sample of green forage was collected from each plot at each harvest and was oven dried for dry matter determination.

All test plots were fertilized with 50 pounds of N per acre at planting. No additional nitrogen fertilizer was applied to pasture mixtures containing legumes, whereas additional N applications were made in November, February, and March to rye-ryegrass plots without legumes.

Legume entries in the trials were:

Redland red clover (*Trifolium pratense*): A southern anthracnose-resistant variety with tolerance to powdery mildew and northern anthracnose, developed at the University of Illinois and marketed by North American Plant Breeders, Ames, Iowa.

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Regal ladino clover (*Trifolium repens*) : A summer-persistent, high-yielding, ladino clover that flowers sparsely in Alabama, developed at Auburn University and marketed by Cal West Seed Co., Woodland, California.

Autauga crimson clover (*Trifolium incarnatum*) : A local, high-yielding variety from central Alabama with good reseeding ability.

Yuchi arrowleaf clover (*Trifolium vesiculosum*) : A long-season, productive, reseeding, seldom-bloating variety selected at Auburn University.

Mt. Barker subterranean clover (*Trifolium subterraneum*) : A mid-season maturity variety selected in southwestern Australia; subterranean has leaves similar to crimson clover but the flowers develop a burr around the seed and are then pulled into the soil surface.

Cahaba White vetch (*Vicia sativa* x *V. cordata*) : A semi-prostrate, compact, white-flowered, nematode-resistant, reseeding, bruchid-resistant variety that was developed at Auburn University; it makes more winter growth than hairy vetch, but is less cold hardy.

Turkish clover (*Trifolium mutabile*) : A dense, compact, leafy clover with leaves resembling arrowleaf clover; experimental variety selected at Auburn University from P.I. 369053 originally from Turkey; tolerates grazing well and has better natural reseeding than arrowleaf clover.

Big ball clover (*Trifolium nigrescens*) : A vigorous, tall-growing clover with small white flower heads, selected at Auburn University from P.I. 304380 collected in Turkey.

Winter hardy berseem clover (*Trifolium alexandrinum*) : A long-season, erect-growing clover selected for winter hardiness from Italian germplasm at Mississippi State University.

Rose clover (*Trifolium hirtum*) : Selection made at Auburn University from P. I. 348886, brought from Australia.

*Trifolium purpureum* clover: Selected at Auburn University from P.I. 287174 from Turkey; characterized by elongated blue-green leaflets, long bright purple flower heads, and semi-erect growth.

*Trifolium pallidum* clover: Selected at Auburn University from P.I. 249868 from Greece and 201213 from Australia; late

maturing and very leafy, with large leaflets and cream colored flower heads.

Seradella (*Ornithopus sativus*): A leafy legume with hairy leaves resembling vetch, selected at Auburn University from P.I. 274640 collected in Poland.

## RESULTS

At the Tennessee Valley Substation, growing legumes in the rye-ryegrass mixture resulted in forage yields equal to or more than those obtained with rye-ryegrass alone fertilized with 200 pounds N per acre, table 1. Red clover was most productive, followed by ladino, turkish, and arrowleaf clovers. Seradella made poor growth at this location. During the 1 year it was tested, winter hardy berseem clover survived the winter and equaled the yield of other legumes.

In central Alabama, at the Plant Breeding Unit, mixtures containing legumes such as ladino and arrowleaf clover made about the same yield as the grass-nitrogen treatment, table 2. Mixtures containing subterranean clover, red clover, and vetch were lowest yielding. At the Prattville Field, legume stands were generally thin, resulting in lower yields for legume-grass mixtures than the grass-nitrogen system, table 3. In limited testing at the Black

TABLE 1. THREE-YEAR FORAGE YIELD OF WRENS ABRUZZI RYE — GULF RYEGRASS — LEGUME MIXTURES AT TENNESSEE VALLEY SUBSTATION, BELLE MINA

| Legume | Dry forage yield per acre | | | |
|---|---|---|---|---|
| | 1978-79 | 1979-80 | 1980-81 | Average |
| | *Lb.* | *Lb.* | *Lb.* | *Lb.* |
| Redland red clover | 7,600 a* | 6,180 a | 4,790 a | 6,190 a |
| Regal ladino clover | 6,660 b | 6,010 b | 4,800 a | 5,820 ab |
| Turkish clover | 6,410 bc | 5,200 cd | 4,950 a | 5,520 b |
| Yuchi arrowleaf clover | 6,060 c | 5,430 bc | 5,050 a | 5,510 b |
| *T. purpureum* clover | 5,910 c | ——— | 4,912 a | ——— |
| Cahaba White vetch | 5,340 d | 4,960 cde | 5,180 a | 5,160 c |
| Autauga crimson clover | 5,350 d | 4,920 cde | 4,820 a | 5,030 c |
| Rose clover | 5,230 d | 4,820 cde | ——— | ——— |
| Winter hardy berseem clover | ——— | ——— | 5,020 a | ——— |
| Big ball clover | 5,220 d | ——— | 4,760 a | ——— |
| Mt. Barker subterranean clover | 5,180 d | 4,820 cde | 4,570 a | 4,855 cd |
| *T. pallidum* clover | ——— | 5,020 cde | 4,660 a | ——— |
| None + 200 lb. N/acre | 5,100 d | 4,380 ef | 4,650 a | 4,710 d |
| Seradella | ——— | 4,080 f | 4,480 a | ——— |
| *C.V., percent* | *6* | *8* | *11* | *6* |

*Means within a column followed by the same letter are not significantly different at the 5 percent level.

TABLE 2. THREE-YEAR FORAGE YIELD OF WRENS ABRUZZI RYE- GULF RYEGRASS-LEGUME MIXTURES AT PLANT BREEDING UNIT, TALLASSEE

| Legume | Dry forage yield per acre | | | |
|---|---|---|---|---|
| | 1978-79 | 1979-80 | 1980-81 | Average |
| | *Lb.* | *Lb.* | *Lb.* | *Lb.* |
| *T. pallidum* clover | ——— | 6,329 a | 5,366 abc | ——— |
| No legume + 200 lb. N/acre | 5,349 b* | 5,936 abcd | 5,944 a | 5,743 a |
| Regal ladino clover | 6,272 a | 6,012 abc | 4,463 d | 5,582 a |
| Yuchi arrowleaf clover | 4,847 cd | 5,784 bcde | 5,656 ab | 5,429 ab |
| Turkish clover | 4,985 bc | 6,088 ab | 4,941 bcd | 5,338 b |
| *T. purpureum* clover | 5,097 bc | 5,539 cde | 5,226 abcd | 5,287 b |
| Seradella | ——— | 5,539 cde | 4,931 bcd | ——— |
| Autauga crimson clover | 4,985 bc | 5,788 bcde | 4,708 cd | 5,160 bc |
| Redland red clover | 4,664 cde | 5,374 e | 5,107 bcd | 5,048 c |
| Mt. Barker subterranean clover | 4,503 de | 5,751 bcde | 4,740 cd | 4,998 c |
| Cahaba White vetch | 4,396 e | 5,425 e | 5,072 bcd | 4,964 c |
| Rose clover | 4,434 de | 5,461 de | ——— | ——— |
| Winter hardy berseem clover | ——— | ——— | 4,679 cd | ——— |
| Big ball clover | 3,987 f | ——— | 4,683 cd | ——— |
| *CV, percent* | *6* | *5* | *10* | *6* |

*Means within a column followed by the same letter are not significantly different at the 5 percent level.

TABLE 3. THREE-YEAR FORAGE YIELD OF WRENS ABRUZZI RYE - GULF RYEGRASS - LEGUME MIXTURES AT PRATTVILLE EXPERIMENT FIELD, PRATTVILLE

| Legume | Dry forage yield per acre | | | |
|---|---|---|---|---|
| | 1978-79 | 1979-80 | 1980-81 | Average |
| | *Lb.* | *Lb.* | *Lb.* | *Lb.* |
| None + 200 lb. N/acre | 4,249 a* | 7,116 a | 6,795 a | 6,053 a |
| *T. pallidum* clover | ——— | 6,373 bc | 4,961 def | ——— |
| Yuchi arrowleaf clover | 3,434 b | 6,212 bcd | 5,956 b | 5,200 b |
| Winter hardy berseem clover | ——— | ——— | 5,134 cde | ——— |
| Autauga crimson clover | 3,380 bc | 5,865 cdef | 5,945 b | 5,063 b |
| Turkish clover | 3,205 bcd | 6,625 ab | 5,275 cde | 5,035 b |
| Seradella | ——— | 4,992 gh | 4,540 f | ——— |
| Cahaba White vetch | 3,329 bc | 5,207 fgh | 5,521 bc | 4,702 bc |
| Redland red clover | 3,219 bcd | 5,556 defg | 4,857 ef | 4,544 c |
| Regal ladino clover | 3,055 bcd | 5,917 cde | 4,628 f | 4,533 c |
| Mt. Barker subterranean clover | 2,967 cd | 5,504 defg | 4,963 def | 4,478 c |
| *T. purpureum* clover | 3,357 bc | ——— | 5,455 cd | ——— |
| Rose clover | 3,200 bcd | 5,341 efg | ——— | ——— |
| Big ball clover | 2,905 d | ——— | 4,778 ef | ——— |
| *C.V, percent* | *6* | *7* | *6* | *7* |

*Means within a column followed by the same letter are not significantly different at the 5 percent level.

Belt Substation, winter hardy berseem clover showed excellent promise, table 4. Yields were generally low at the Lower Coastal Plain Substation, table 5.

Winter annual mixtures are widely grown in southern Alabama. At the Wiregrass Substation, crimson clover was the most produc-

TABLE 4. TWO-YEAR FORAGE YIELD OF WRENS ABRUZZI RYE- GULF RYEGRASS — LEGUME MIXTURES AT BLACK BELT SUBSTATION, MARION JUNCTION

| Legume | Dry forage yield per acre | | |
|---|---|---|---|
| | 1979-80 | 1980-81 | Average |
| | *Lb.* | *Lb.* | *Lb.* |
| Winter hardy berseem clover | —— | 6,443 a | —— |
| No legume + 200 lb. N/ acre | —— | 5,895 ab | —— |
| Cahaba White vetch | 3,669 a* | 5,316 bcd | 4,492 a |
| *T. pallidum* clover | —— | 5,279 bcd | —— |
| Yuchi arrowleaf clover | —— | 5,125 cde | —— |
| Autauga crimson clover | —— | 5,100 cde | —— |
| Big ball clover | —— | 5,021 cde | —— |
| *T. purpureum* clover | 3,617 a | 4,964 cde | 4,290 a |
| Redland red clover | 3,975 a | 4,889 de | 4,432 a |
| Seradella | —— | 4,875 de | —— |
| Mt. Barker subterranean clover | —— | 4,876 de | —— |
| Regal ladino clover | 3,897 a | 4,543 e | 4,220 a |
| Turkish clover | —— | 4,541 e | —— |
| *CV, percent* | *11* | *17* | |

*Means within a column followed by the same letter are not significantly different at the 5 percent level.

TABLE 5. TWO-YEAR FORAGE YIELD OF WRENS ABRUZZI RYE- GULF RYEGRASS — LEGUME MIXTURES AT LOWER COASTAL PLAIN SUBSTATION, CAMDEN

| Legume | Dry forage yield per acre | | |
|---|---|---|---|
| | 1978-79 | 1979-80 | Average |
| | *Lb.* | *Lb.* | *Lb.* |
| No legume + 200 lb. N/acre | 4,652 a* | 5,262 a | 4,957 a |
| *T. pallidum* clover | —— | 4,280 b | —— |
| Seradella | —— | 4,192 b | —— |
| Autauga crimson clover | 4,155 ab | 3,964 b | 4,059 b |
| Yuchi arrowleaf clover | 3,902 bc | 4,220 b | 4,051 b |
| *T. purpureum* clover | 3,991 b | —— | —— |
| Regal ladino clover | 3,828 bcd | 3,955 b | 3,891 b |
| Turkish clover | 3,912 bc | 3,835 b | 3,873 b |
| Rose clover | 3,227 det | 4,322 b | 3,774 b |
| Mt. Barker subterranean clover | 3,331 cde | 4,098 b | 3,714 b |
| Redland red clover | 2,919 e | 4,422 b | 3,670 b |
| Cahaba White vetch | 3,002 e | 4,236 b | 3,619 b |
| Big ball clover | 2,710 e | —— | —— |
| *CV, percent* | *11* | *10* | *10* |

*Means within a column followed by the same letter are not significantly different at the 5 percent level.

TABLE 6. THREE-YEAR FORAGE YIELD OF WRENS ABRUZZI RYE - GULF RYEGRASS — LEGUME MIXTURES AT WIREGRASS SUBSTATION, HEADLAND

| Legume | Dry forage yield per acre | | | |
|---|---|---|---|---|
| | 1978-79 | 1979-80 | 1980-81 | Average |
| | *Lb.* | *Lb.* | *Lb.* | *Lb.* |
| No legume + 200 lb. N/acre | 7,402 abc* | 4,848 a | 7,857 a | 6,702 a |
| Autauga crimson clover | 7,885 a | 4,429 abcd | 7,141 ab | 6,485 a |
| *T. purpureum* clover | 7,762 ab | ——— | 6,167 bcd | ——— |
| Winter hardy berseem clover | 7,762 ab | ——— | 6,167 bcd | ——— |
| Yuchi arrowleaf clover | 7,663 ab | 4,210 bcd | 5,705 d | 5,859 b |
| Turkish clover | 6,929 bcd | 4,408 abcd | 4,906 cd | 5,748 b |
| Cahaba White vetch | 6,398 d | 4,627 ab | 5,996 cd | 5,674 b |
| Big ball clover | 5,262 e | ——— | 6,039 cd | ——— |
| Regal ladino clover | 6,432 d | 4,307 bcd | 5,936 cd | 5,558 bc |
| Mt. Barker subterranean clover | 6,698 cd | 4,112 cd | 5,779 cd | 5,530 bc |
| Redland red clover | 6,009 de | 4,138 bcd | 5,973 cd | 5,373 c |
| Seradella | ——— | 4,138 bcd | 6,536 bcd | 5,337 c |
| Rose clover | 6,718 cd | 3,934 d | ——— | ——— |
| *T. pallidum* clover | ——— | 4,254 bcd | 5,958 cd | ——— |
| *CV, percent* | *8* | *7* | *10* | *9* |

*Means within a column followed by the same letter are not significantly different at the 5 percent level.

TABLE 7. THREE-YEAR FORAGE YIELD OF WRENS ABRUZZI RYE - GULF RYEGRASS — LEGUME MIXTURES AT BREWTON EXPERIMENT FIELD, BREWTON

| Legume | Dry forage yield per acre | | | |
|---|---|---|---|---|
| | 1978-79 | 1979-80 | 1980-81 | Average |
| | *Lb.* | *Lb.* | *Lb.* | *Lb.* |
| No legume + 200 lb. N/acre | 4,293 a* | 6,203 a | 4,773 a | 5,090 a |
| Yuchi arrowleaf clover | 3,878 bc | 5,574 abc | 4,460 ab | 4,637 ab |
| Turkish clover | 3,711 c | 5,937 ab | 4,125 bc | 4,591 ab |
| *T. purpureum* clover | ——— | 5,157 bcde | 3,751 cd | ——— |
| Autauga crimson clover | 4,353 a | 4,557 def | 4,443 ab | 4,451 abc |
| Regal ladino clover | 3,802 bc | 5,287 bcd | 4,069 bc | 4,386 bc |
| Seradella | ——— | 4,634 def | 4,127 bc | ——— |
| Mt. Barker subterranean clover | 3,783 bc | 5,519 abc | 3,770 cd | 4,357 bc |
| Redland red clover | 3,675 c | 4,785 cref | 4,073 bc | 4,178 c |
| Rose clover | 4,039 ab | 4,305 f | ——— | ——— |
| Cahaba White vetch | 3,800 bc | 4,434 ef | 4,102 bc | 4,112 c |
| *T. pallidum* clover | 3,750 bc | ——— | 3,992 bc | ——— |
| Winter hardy berseem clover | ——— | ——— | 3,748 cd | ——— |
| Big ball clover | 3,755 bc | ——— | 3,528 cd | ——— |
| *CV, percent* | *15* | *10* | *10* | *10* |

*Means within a column followed by the same letter are not significantly different at the 5 percent level.

TABLE 8. THREE-YEAR FORAGE YIELD OF WRENS ABRUZZI RYE - GULF RYEGRASS — LEGUME MIXTURES AT GULF COAST SUBSTATION, FAIRHOPE

| Legume | Dry forage yield per acre | | | |
|---|---|---|---|---|
| | 1978-79 | 1979-80 | 1980-81 | Average |
| | *Lb.* | *Lb.* | *Lb.* | *Lb.* |
| Yuchi arrowleaf clover | 6,627 a* | 6,762 ab | 6,252 ab | 6,547 a |
| None + 200 lb. N/acre | 6,164 ab | 6,634 ab | 6,191 ab | 6,330 ab |
| *T. purpureum* clover | 5,801 b | ——— | 6,667 a | ——— |
| Redland red clover | 4,767 c | 7,112 a | 6,185 ab | 6,021 bc |
| Turkish clover | 6,077 ab | 6,685 ab | 5,881 b | 6,214 ab |
| Seradella | ——— | 5,945 bcd | 6,234 ab | 6,089 bc |
| Winter hardy berseem clover | ——— | ——— | 6,072 ab | ——— |
| *T. pallidum* clover | ——— | 5,932 bcd | 6,008 ab | ——— |
| Autauga crimson clover | 5,625 b | 5,531 d | 6,229 ab | 5,795 c |
| Regal ladino clover | 4,882 c | 6,151 bcd | 5,790 b | 5,608 c |
| Cahaba White vetch | 4,520 c | 5,787 cd | 5,997 ab | 5,435 c |
| Mt. Barker subterranean clover | 4,893 c | 5,545 d | 5,829 b | 5,422 c |
| Rose clover | 4,385 c | 5,706 cd | ——— | ——— |
| Big ball clover | 4,346 c | ——— | 5,658 b | ——— |
| *CV, percent* | *7* | *9* | *10* | *8* |

*Means within a column followed by the same letter are not significantly different at the 5 percent level.

tive legume, although most others performed well, table 6. *T. purpureum* grew well in the 2 years it was in the test there. At the Brewton Experiment Field, arrowleaf, turkish, and crimson clovers were the top producing legumes, with the grass-legume mixtures producing yields nearly equal to the grass-nitrogen treatment. Drought reduced yields at this location. At the Gulf Coast Substation, mixtures containing arrowleaf, red, and turkish clovers equalled or exceeded the yield of grass-nitrogen, table 8. Winter hardy berseem appeared promising in one year of the test.

When all locations with 3 years of testing were averaged, it was obvious that grass-legume mixtures resulted in nearly as much forage as grass-nitrogen treatments, table 9. Arrowleaf, turkish, crimson, ladino, and red clovers generally performed well. Lower yields of vetch and subterranean clovers may be partially attributed to the harvesting methods. Vetch growth recovery is much better in a grazing system than under clipping where the lower buds are removed. Subterranean clover grows in a thick mat on the ground, and much of this growth is not harvested with a mowing machine. However, animals grazing this clover would be able to utilize much of the dense low herbage.

Estimates of legume composition of the forage made at each harvest were used to calculate approximate yields of legumes at four locations, table 10. Crimson, arrowleaf, and turkish clovers

TABLE 9. FORAGE YIELD OF RYE-RYEGRASS-LEGUME MIXTURES AT SIX ALABAMA LOCATIONS OVER A 3-YEAR PERIOD

| Legume | Dry forage yield per acre | | | | | | |
|---|---|---|---|---|---|---|---|
| | Tenn. Valley Sub. | Plant Breeding Unit | Prattville Exp. Field | Wiregrass Sub. | Brewton Exp. Field | Gulf Coast Sub. | 3-year average |
| | *Lb.* | *Lb.* | *Lb.* | *Lb.* | *Lb.* | *Lb.* | *Lb.* |
| None + 200 lb. N/acre | 4,710 | 5,743 | 6,053 | 6,702 | 5,090 | 6,330 | 5,771 |
| Yuchi arrowleaf clover | 5,510 | 5,429 | 5,200 | 5,859 | 4,637 | 6,547 | 5,530 |
| Turkish clover | 5,520 | 5,338 | 5,035 | 5,748 | 4,591 | 6,214 | 5,408 |
| Autauga crimson clover | 5,030 | 5,160 | 5,063 | 6,485 | 4,451 | 5,795 | 5,331 |
| Regal ladino clover | 5,820 | 5,582 | 4,533 | 5,558 | 4,386 | 5,608 | 5,248 |
| Redland red clover | 6,190 | 5,048 | 4,544 | 5,373 | 4,178 | 6,021 | 5,226 |
| Cahaba White vetch | 5,160 | 4,964 | 4,702 | 5,674 | 4,112 | 5,435 | 5,008 |
| Mt. Barker subterranean clover | 4,855 | 4,998 | 4,478 | 5,530 | 4,357 | 5,422 | 4,940 |

TABLE 10. THREE-YEAR AVERAGE FORAGE YIELDS OF LEGUMES IN RYE-RYEGRASS-LEGUME MIXTURES AT FOUR LOCATIONS

| Legume | Dry forage yield per acre | | | | |
|---|---|---|---|---|---|
| | Tenn. Valley Sub. | Plant Breeding Unit | Wire-grass Sub. | Gulf Coast Sub. | Average all locations |
| | *Lb.* | *Lb.* | *Lb.* | *Lb.* | *Lb.* |
| Autauga crimson clover | 1,387 | 925 | 3,968 | 1,916 | 2,049 |
| Yuchi arrowleaf clover | 1,731 | 935 | 2,413 | 2,024 | 1,776 |
| Turkish clover | 1,739 | 1,066 | 1,670 | 1,581 | 1,514 |
| Regal ladino clover | 1,927 | 1,420 | 1,446 | 622 | 1,354 |
| Mt. Barker subterranean clover | 1,247 | 673 | 2,184 | 471 | 1,144 |
| Redland red clover | 2,171 | 773 | 327 | 1,172 | 1,111 |
| Cahaba White vetch | 899 | 294 | 1,947 | 376 | 879 |

were generally the most productive, except at the Tennessee Valley Substation and Plant Breeding Unit where ladino and red clovers yielded well.

Seasonal distribution of forage is often more important than total yield. For example, at the Tennessee Valley Substation, red clover had by far the longest productive season, followed by ladino clover, table 11. In late spring, green leafy legumes maintain high forage quality much better than grasses. Thus, the early spring production of rye-ryegrass + nitrogen will contain a considerable amount of low quality rye stalks, making forage quality much lower than legume-grass mixtures. At the Gulf Coast Substation, arrowleaf and turkish clovers provided the longest productive season, followed by red clover, grass-nitrogen, and ladino

TABLE 11. SEASONAL DISTRIBUTION OF FORAGE PRODUCTION FROM RYE-RYEGRASS-LEGUME MIXTURES AT TENNESSEE VALLEY SUBSTATION, BELLE MINA, 3-YEAR AVERAGE

| Legume | Dry forage yield per acre | | | |
|---|---|---|---|---|
| | Autumn, Oct. - Dec. | Winter, Jan. - mid Mar. | Early spring, mid Mar. - mid May | Late spring, mid May - June |
| | *Lb.* | *Lb.* | *Lb.* | *Lb.* |
| Redland red clover | 2,010 | 749 | 2,258 | 1,879 |
| Regal ladino clover | 1,980 | 829 | 2,490 | 1,036 |
| Turkish clover | 2,078 | 732 | 2,572 | 424 |
| Yuchi arrowleaf clover | 2,073 | 994 | 2,438 | 238 |
| Autauga crimson clover | 2,124 | 883 | 2,124 | 0 |
| Mt. Barker subterranean clover | 1,976 | 871 | 2,156 | 0 |
| Cahaba White vetch | 2,156 | 947 | 2,051 | 0 |
| None + 200 lb. N/acre | 1,985 | 885 | 1,869 | 0 |

TABLE 12. SEASONAL DISTRIBUTION OF FORAGE PRODUCTION FROM RYE-RYEGRASS-LEGUME MIXTURES AT GULF COAST SUBSTATION, FAIRHOPE, 3-YEAR AVERAGE

| Legume | Dry forage yield per acre | | | |
|---|---|---|---|---|
| | Autumn, Oct. - Dec. | Winter, Jan. - mid Mar. | Early spring, mid Mar. - mid May | Late spring, mid May - June |
| | *Lb.* | *Lb.* | *Lb.* | *Lb.* |
| Yuchi arrowleaf clover | 737 | 2,062 | 1,578 | 2,316 |
| Turkish clover | 794 | 2,043 | 1,404 | 2,136 |
| Redland red clover | 751 | 1,924 | 1,627 | 1,637 |
| None + 200 lb. N/acre | 724 | 2,199 | 2,083 | 1,404 |
| Regal ladino clover | 830 | 1,986 | 2,824 | 1,290 |
| Autauga crimson clover | 687 | 1,903 | 1,950 | 1,038 |
| Mt. Barker subterranean clover | 848 | 1,928 | 1,478 | 966 |
| Cahaba White vetch | 816 | 2,029 | 1,373 | 926 |

clover, table 12. Crimson clover matures early, so its late spring forage would be expected to be lower in nutritive quality than that from green leafy clovers, similar to that from grass-nitrogen treatments.

## SUMMARY

Rye-ryegrass-legume tests were conducted at eight locations for 2 to 3 years. With good stands of legume in the rye-ryegrass mixture, total yields were often nearly equal to yield of rye-ryegrass alone fertilized with 200 pounds of N per acre. In the Tennessee Valley, red and ladino clovers with rye-ryegrass furnished higher total yield and a substantially longer productive season (October through June) than other winter annual legumes or rye-ryegrass + 200 pounds of N per acre. Further south in the State, winter annual legumes such as arrowleaf, turkish, and crimson clovers were equally productive.

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