

PERFORMANCE OF
Orchardgrass
Varieties
IN ALABAMA

November 1981

Alabama Agricultural Experiment Station
Department of Agronomy and Soils
Departmental Series No. 69
Auburn University
Auburn University, Alabama
Gale A. Buchanan, Director

PERFORMANCE OF ORCHARDGRASS VARIETIES IN ALABAMA

C. S. Hoveland, R. L. Haaland, W. B. Webster,
V. H. Calvert II, J. T. Eason, M. E. Ruf,
R. A. Moore, L. L. Walker, and H. C. Hoyle^{1/}

Orchardgrass is a perennial forage grass adapted to northern Alabama. It is a bunch-type grass with a dull green color. Orchardgrass produces higher quality and more palatable forage than tall fescue. Animal toxicity problems, encountered with tall fescue, are not a problem with orchardgrass. It is less competitive than tall fescue, thus making it easier to grow legumes in association with it. Orchardgrass is more specific in its growth requirements than tall fescue, requiring higher fertility, higher soil pH, better drainage, and better grazing management. It often does not persist well in Alabama, especially when planted south of Birmingham. Orchardgrass is highly susceptible to nematodes so it does not persist in sandy soils of central and southern Alabama.

Four orchardgrass variety trials were conducted in Alabama during the years 1977-80. Orchardgrass entries were planted in rows 6 inches apart using plots 4 x 20 feet with four replications. The tests were planted in late September or early October and harvested with a flail-type harvester two to four times each year. A sample of green forage was collected from each plot at each harvest and oven dried for dry matter determination.

^{1/}Respectively, Professor (resigned) and Associate Professor (resigned), Department of Agronomy and Soils; Superintendent and Assistant Superintendent, Tennessee Valley Substation; Superintendent and Associate Superintendent, Sand Mountain Substation; Superintendent, Upper Coastal Plain Substation; and Superintendent and Technician, Plant Breeding Unit.

Orchardgrass entries in the trials were as follows:

- Able Selected by Farmers Forage Research Cooperative, West Lafayette, Indiana, for late maturity, good persistence, seed yield, and resistance to leaf diseases.
- Aries Selected in France for low winter dormancy and more winter production. Imported by North American Plant Breeders.
- Boone Selected by the Kentucky Agricultural Experiment Station for yield and persistence. Some resistance to rust.
- Calder Selected by Northrup King and Co., Minneapolis, Minn.
- Crown Selected by North American Plant Breeders, Ames, Iowa, out of Potomac variety for rust resistance and cold hardiness.
- Dart Selected for winter hardiness by Land O'Lakes Seed Co., Webster City, Iowa.
- Dayton Selected by North American Plant Breeders, Ames, Iowa, for rust and leaf blight resistance, winter hardiness, and yield.
- Frode Selected by Swedish Seed Association, Svalof, Sweden, for winter hardiness, yield, leafiness, and late maturity.
- Hallmark Selected by Farmers Forage Research Cooperative, West Lafayette, Indiana, for high yield, good recovery after mowing, good seedling vigor, and resistance to leaf diseases.
- Hawk Selected by North American Plant Breeders, Ames, Iowa, for hybrid vigor, winter hardiness, and rust and leaf disease resistance.
- NK-K5-191 Selected by Northrup King Co., experimental from Italy.
- NK-K5-107 Selected by Northrup King Co., experimental.
- NAPB OX 1 Selected by North American Plant Breeders, experimental.
- Napier Selected by North American Plant Breeders, Ames, Iowa, for high yield, winter hardiness, and rust and leaf blight resistance.
- OG-65 J Selected by South Carolina Agr. Exp. Sta., Clemson, South Carolina.

OG-715 Selected by South Carolina Agr. Exp. Sta., Clemson, South Carolina.
Piedmont Selected by South Carolina Agr. Exp. Sta., Clemson, South Carolina.
Potomac Selected by USDA Station, Beltsville, Maryland, for persistence,
leafiness, vigor, and rust resistance.
Saborto Imported from England by Northrup King Co., Minneapolis, Minnesota.
Sylvan A European variety selected for soft leaves. Imported by Northrup
King Co., Minneapolis, Minnesota.

RESULTS

Orchardgrass is well adapted to clay soils of the Tennessee Valley area. At the Tennessee Valley Substation on Decatur clay soil, all varieties performed well each of the 3 years, table 1-3. Crown and Hallmark appeared to produce more early spring forage than other varieties.

Forage yields were high at Sand Mountain Substation on a Hartsells fine sandy loam soil, tables 4-7. Hallmark and Boone generally were the highest yielding varieties. Even during the fourth year, forage yields of Hallmark were 7,500 pounds per acre, table 7. Piedmont and Boone also were highly productive the fourth year.

Total forage yields at the Upper Coastal Plain Substation were generally low, tables 8 and 9. During the second year, yields of some varieties were only about one-half that of the more productive entries, such as Piedmont, Hallmark, and Boone.

Orchardgrass is not adapted to the Plant Breeding Unit on Cahaba fine sandy loam where nematodes are a serious problem. The low yields both years indicate the lack of adaptation at this central Alabama location, tables 10 and 11. Even so, Hallmark and Boone were at the top of the list on total yield the second year.

When average forage yields for northern Alabama locations are considered, Hallmark and Boone were most productive, table 12. A number of other entries, such as Piedmont, Potomac, and Napier, also gave acceptable yields.

SUMMARY

1. Orchardgrass variety trials were conducted at four locations in northern and central Alabama for 2 to 4 years.
2. Forage yields of orchardgrass were highest at the Sand Mountain Substation, intermediate at the Tennessee Valley Substation, and lowest at the Upper Coastal Plain Substation and Plant Breeding Unit.
3. In northern Alabama, most orchardgrass varieties gave similar forage yields. At the Sand Mountain Substation, persistence of orchardgrass was good the fourth year with Hallmark, Piedmont, and Boone yielding over 7,000 pounds per acre dry forage. Yields were low in central Alabama.
4. Acceptable orchardgrass varieties are Hallmark, Boone, Piedmont, Potomac, Napier, and Crown.

Table 1. First Year Yield of Orchardgrass Varieties at Tennessee Valley Substation, Belle Mina, Alabama, 1978

Variety	Pounds of dry forage per acre			
	Apr. 27	May 31	Aug. 23	Total
Crown	885 a*	2,144 a	1,549 ab	4,578 a
Hallmark	718 ab	2,117 a	1,622 ab	4,456 a
Piedmont	645 abc	1,845 a	1,679 a	4,169 a
OG-715	651 abc	1,840 a	1,678 a	4,169 a
Sylvan	666 abc	1,729 a	1,516 ab	3,911 a
Hawk	624 abc	1,931 a	1,352 ab	3,907 a
Napier	562 abc	1,795 a	1,526 ab	3,883 a
Boone	541 abc	1,850 a	1,238 b	3,629 a
Frode	353 bc	1,807 a	1,334 ab	3,494 a
Calder	454 abc	1,449 a	1,449 ab	3,352 a
Saborto	145 c	1,364 a	1,455 ab	2,964 a
C. V., pct.	50	37	16	23

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

Planted September, 1977.

Table 2. Second-year Forage Yield of Orchardgrass Varieties at Tennessee Valley Substation, Belle Mina, Alabama, 1979

Variety	Pounds of dry forage per acre				
	Apr. 3	Apr. 27	May 30	Oct. 5	Total
Saborto....	1,038 ab*	2,382 a	1,209 a	1,547 a	6,176 a
Piedmont...	1,155 a	222 a	984 abc	1,476 ab	5,837 a
OG-715.....	1,000 ab	2,337 a	1,001 ab	1,353 ab	5,691 a
Crown	1,205 a	2,318 a	853 cd	1,258 ab	5,634 a
Boone	893 ab	2,525 a	898 bcd	1,267 ab	5,583 a
Hallmark ..	1,198 a	2,459 a	691 d	1,189 ab	5,537 a
Napier.....	1,030 ab	2,312 a	1,050 abc	1,089 b	5,481 a
Frode	626 b	2,250 a	1,174 ab	1,335 ab	5,385 a
Sylvan	635 b	2,214 a	1,061 abc	1,326 ab	5,236 a
Hawk	861 ab*	2,382 a	1,209 a	1,547 a	6,176 a
Calder	869 ab	1,986 a	1,044 abc	1,282 ab	5,181 a
C. V.,pct. ...	33	16	17	19	

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

Planted September 1977.

Table 3. Third-year Forage Yield of Orchardgrass Varieties at Tennessee Valley Substation, Belle Mina, Alabama, 1980

Variety	Pounds of dry forage per acre			
	Apr. 16	May 5	May 21	Total
Hallmark.....	1,198 a*	1,148 a	822 c	3,168 a
Crown	1,183 a	1,126 a	822 c	3,131 a
OG-715	901 ab	1,121 a	965 abc	2,987 a
Hawk	839 ab	1,030 a	1,011 abc	2,880 a
Napier	722 ab	1,118 a	975 abc	2,815 a
Boone	841 ab	1,068 a	896 bc	2,805 a
Calder	807 ab	1,014 a	901 bc	2,722 a
Piedmont	846 ab	933 a	925 bc	2,704 a
Sylvan	720 ab	927 a	1,049 ab	2,696 a
Frode.....	598 b	845 a	1,181 a	2,624 a
Saborto	501 b	851 a	1,088 ab	2,440 a
C. V., pct.....	39	24	14	16

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

Planted September, 1977.

Table 4. First-year Forage Yield of Orchardgrass Varieties at Sand Mountain Substation, Crossville, Alabama, 1977.

Variety	Pounds of dry forage per acre			
	Apr. 26	June 20	Nov. 17	Total
Piedmont.....	1,816 ef*	3,288 b	2,333 a	7,437 a
OG-65 J.....	1,708 f	3,680 a	1,927 abcd	7,315 a
Boone.....	2,721 a	2,623 c	1,847 abcd	7,191 a
Hallmark.....	2,560 ab	2,446 c	2,161 ab	7,167 a
Potomac.....	2,300 bc	2,870 c	1,847 abcd	7,017 a
Napier.....	2,192 cd	2,672 c	1,899 abcd	6,763 ab
Dart.....	2,003 de	2,681 c	2,017 abc	6,701 ab
Dayton.....	2,199 cd	2,551 c	1,904 abcd	6,654 abc
NAPB OX 1.....	1,834 ef	2,709 c	1,505 de	6,048 bcd
Able	1,592 fg	2,646 c	1,647 cde	5,885 bcd
Aries.....	2,153 cd	1,857 d	1,736 bcde	5,746 cd
C. V., pct.....	11	11	19	11

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

Planted September, 1976.

Table 5. Second-year Forage Yield of Orchardgrass Varieties at Sand Mountain Substation, Crossville, Alabama, 1978

Variety	Pounds of dry forage per acre			
	May 2	June 1	Oct. 19	Total
Boone.....	2,200 a*	1,594 abcd	1,614 bcd	5,408 a
Dart.....	1,685 bc	1,634 abc	1,907 abc	5,226 a
Hallmark.....	1,843 b	1,669 abc	1,681 bc	5,193 a
Napier.....	1,789 b	1,653 abc	1,535 c	4,977 ab
Potomac.....	1,921 ab	1,547 bcde	1,374 c	4,842 abc
Piedmont.....	1,411 cd	1,604 abc	1,630 bc	4,645 abc
Dayton.....	1,572 bc	1,529 cde	1,506 c	4,607 abc
NAPB OX 1.....	1,174 de	1,490 cde	1,585 bc	4,249 bc
OG-65 J.....	833 ef	1,923 a	1,489 c	4,245 bc
Able.....	1,009 ef	1,893 ab	1,328 c	4,230 bc
C. V., pct.....	20	16	28	13

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

Planted September, 1976.

Table 6. Third-year Forage Yield of Orchardgrass Varieties at Sand Mountain Substation, Crossville, Alabama, 1979

Variety	Pounds of dry forage per acre		
	May 17		Total
Hallmark.....	4,709 a*	2,274 a	6,983 a
Boone.....	4,970 a	1,835 ab	6,804 a
Napier.....	4,382 a	1,902 ab	6,284 ab
Dayton.....	4,414 a	1,731 b	6,145 abc
Dart.....	4,202 ab	1,846 ab	6,048 abc
Potomac.....	4,284 ab	1,744 b	6,028 abc
Able.....	3,492 b	1,911 ab	5,403 bcd
Piedmont.....	3,579 b	1,636 bc	5,215 bcd
Aries.....	3,530 b	1,550 bc	5,080 ce
NAPB OX 1.....	3,547 b	1,214 c	4,761 d
OG-65 J.....	2,667 c	2,025 ab	4,702 d
C. V., pct.	15	19	15

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

Planted September, 1976

Table 7. Fourth-year Forage Yield of Orchardgrass Varieties at Sand Mountain Substation, Crossville, Alabama, 1980

Variety	Pounds of dry forage per acre				
	Apr. 17	May 15	July 1	Oct. 2	Total
Hallmark.....	1,635 abc*	3,163 ab	1,616 bc	1,105 b	7,519 a
Piedmont.....	981 ef	3,145 ab	2,410 a	752 def	7,288 ab
Boone.....	1,832 a	2,880 b	1,442 cde	1,030 bc	7,184 ab
Potomac.....	1,683 a	2,876 b	1,410 cde	1,133 b	7,102 abc
Napier.....	1,421 cd	3,334 a	1,331 cde	744 def	6,830 bc
OG-65 J.....	1,349 d	3,024 ab	1,471 bcde	888 bcd	6,732 bc
Aries.....	1,459 bcd	2,341 c	1,220 de	1,559 a	6,579 bc
Dayton.....	1,279 d	3,333 a	1,376 cde	579 a	6,567 bc
Able.....	929 f	3,269 cb	1,755 b	530 fg	6,483 bc
Dart.....	1,195 de	3,181 ab	1,364 cde	690 def	6,430 bc
NAPB OX 1	1,008 ef	3,314 a	1,160 e	403 g	5,885 c
C. V., pct.....	15	10	15	21	13

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

Planted September, 1976.

Table 8. First-year Forage Yield of Orchardgrass Varieties at Upper Coastal Plain Substation, Winfield, Alabama, 1979

Variety	Pounds of dry forage per acre			
	Apr. 10	May 7	June 21	Total
Boone.....	1,049 a*	1,638 a	699 ab	3,386 a
Crown.....	1,016 a	1,554 ab	649 abc	3,219 ab
Piedmont.....	924 ab	1,446 abc	793 a	3,163 ab
Hallmark.....	906 ab	1,502 ab	663 abc	3,071 abc
Hawk.....	573 cd	1,416 abc	649 abc	2,638 abc
Napier.....	451 cd	1,464 abc	614 abc	2,529 abc
Frode.....	513 cd	1,179 abcd	669 abc	2,361 bcd
OG-715.....	671 bc	1,040 bcde	573 abc	2,284 cd
Sabarto.....	342 d	954 cde	358 bc	1,654 de
Calder.....	291 d	578 ef	415 bc	1,284 c
Sylvan.....	295 d	425 f	338 c	1,058 e
C.V., pct.....	33	28	36	23

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

Planted September, 1978

Table 9. Second-year Forage Yield of Orchardgrass Varieties at Upper Coastal Plain Substation, Winfield, Alabama, 1980.

Variety	Pounds of dry forage per acre				
	Apr. 8	Apr. 29	May 27	June 25	Total
Piedmont.....	924 ab*	1,184 ab	1,700 a	475 a	4,283 a
Hallmark.....	993 a	1,189 ab	1,465 ab	509 a	4,156 ab
Boone.....	976 ab	1,241 a	1,337 abc	502 a	4,056 ab
Crown.....	945 ab	1,076 ab	1,178 ab	409 abc	3,608 abc
Napier.....	477 c	1,210 a	1,066 bc	383 abc	3,136 abcd
Frode.....	312 c	946 abc	1,435 ab	332 abc	3,025 bcde
OG-715.....	452 c	898 abcd	1,149 abc	435 ab	2,934 bcde
Hawk.....	407 c	710 bcde	963 bc	407 abc	2,488 cdef
Calder.....	541 bc	442 de	894 bc	240 bc	2,117 def
Saborto.....	497 c	573 cde	876 c	224 c	2,110 def
C. V., pct.....	48	38	34	33	27

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

Planted September, 1978.

Table 10. First-year Forage Yield of Orchardgrass Varieties at Plant Breeding Unit, Tallassee, Alabama, 1977

Variety	Pounds of dry forage per acre		
	Mar. 23	Sept. 21	Total
NK KO-191.....	1,525 a*	741 bcdefg	2,266 a
Piedmont.....	1,111 bcde	1,049 abc	2,160 ab
Hallmark.....	1,162 bcde	986 abcde	2,148 ab
Boone.....	1,265 abc	833 abcdefg	2,098 abc
Aries.....	1,013 cdefgh	1,080 abc	2,093 abc
Dart.....	1,041 bcdefg	1,012 abcd	2,053 abcd
NK-K5-107.....	1,312 ab	674 cdefg	1,986 abcd
Calder.....	1,001 cdefgh	865 abcdef	1,866 abcde
OG-65 J.....	730 h	1,115 a	1,845 abcde
Hawk.....	1,161 bcde	600 defg	1,761 abcde
Napier.....	1,060 bcdefg	701 bcdefg	1,761 abcde
Crown.....	1,209 bcd	454 fgh	1,663 abcde
Dayton.....	1,123 bcdef	454 fgh	1,577 bcde
Sylvan.....	1,064 bcdefg	457 fgh	1,521 bcde
Saborto.....	841 fgh	639 defg	1,480 cde
Napier.....	839 fgh	640 defg	1,479 cde
Potomac.....	946 defgh	498 fg	1,444 de
Able.....	812 gh	425 g	1,237 e
C. V., pct.....	21	45	26

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

Planted September, 1976.

Table 11. Second-year Forage Yield of Orchardgrass Varieties at Plant Breeding Unit, Tallassee, Alabama, 1978

Variety	Pounds of dry forage per acre		
	Apr. 6	May 12	Total
Hallmark.....	931 ab*	1,789 a	2,720 a
Boone.....	976 a	1,677 ab	2,653 ab
OG-65 J.....	703 cd	1,680 ab	2,383 abc
Piedmont.....	732 bcd	1,594 abc	2,326 abcd
Crown.....	737 bcd	1,534 abcd	2,271 abcde
NK-K0-191.....	781 abc	1,437 bcde	2,218 bcde
NK-K5-107.....	721 bcd	1,484 abcd	2,205 bcde
Hawk.....	511 def	1,608 abc	2,119 cde
Aries.....	974 a	991 f	1,965 cdef
Dart.....	550 de	1,414 bcde	1,964 cdef
Dayton.....	469 efg	1,431 bcde	1,900 def
Napier.....	376 efg	1,491 abcde	1,867 defg
Potomac.....	391 efg	1,427 bcde	1,818 efg
Napier.....	312 fg	1,492 abcd	1,804 efg
Calder.....	517 def	1,282 cdef	1,799 efg
Saborto.....	394 efg	1,384 bcde	1,778 efg
Able.....	303 fg	1,229 def	1,532 fg
Sylvan.....	280 g	1,134 ef	1,414 g
C.V., pct.....	30	17	18

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

Planted September, 1976

Table 12. Average Forage Yield of Orchardgrass Varieties at Three Locations in Northern Alabama

Variety	Pounds of dry forage per acre, average			Average of Locations
	Tennessee Valley Sub. 3 years	Sand Mountain Substation 4 years	Upper Coastal Plain Sub. 2 years	
Hallmark.....	4,387	6,715	3,613	4,905
Boone.....	4,006	6,647	3,721	4,791
Piedmont.....	4,188	6,007	3,723	4,639
Napier.....	4,060	6,213	2,831	4,368
Potomac.....	-	6,247	-	-
Dart.....	-	6,101	-	-
Dayton.....	-	5,993	-	-
OG 65 J.....	-	5,887	-	-
Aries.....	-	5,390	-	-
NAPB OX 1.....	-	5,236	-	-
Able.....	-	5,500	-	-
Crown.....	4,448	-	3,412	3,930
OG-715.....	4,282	-	2,609	3,445
Hawk.....	4,006	-	2,563	3,284
Frodé.....	3,834	-	2,693	3,263
Saborto.....	3,860	-	1,882	2,871
Calder.....	3,752	-	1,700	2,726
Sylvan.....	3,948	-	1,331	2,640

*Information contained herein is available to all persons regardless
of race, color, sex, or national origin.*