ALABAMA AGRICULTURAL EXPERIMENT STATION AUBURN UNIVERSITY
GALE A. BUCHANAN, DIRECTOR AUBURN UNIVERSITY, ALABAMA

CIRCULAR 259
MAY, 1982

Oasis Phalaris

A new cool season perennial grass

CONTENTS

First Printing 4M, May 1982

OASIS PHALARIS

A New Cool Season Perennial Grass

C. S. HOVELAND, R. L. HAALAND, C. D. BERRY, and J. F. PEDERSEN*

INTRODUCTION

PHALARIS (*Phalaris aquatica L.*) is a cool-season perennial grass widely grown for pasture in the winter rainfall regions of southern Australia. It is also an important grass in winter-rainfall, dry-summer areas of California where it is known as "hardinggrass." In addition, it is grown in Chile, Uruguay, Argentina, South Africa, New Zealand, and a number of Mediterranean countries.

Trials with California and Australia phalaris varieties have generally been disappointing in the Southeastern United States (3). Poor summer persistence has been a problem in the humid South. The reasons for declining stands are complex: summer weed competition, nematode susceptibility, and failure to reduce defoliation in late spring to allow carbohydrate storage in root corms.

Phalaris has many advantageous characteristics such as good seedling vigor, excellent autumn and winter forage production, high nutritive quality, and drought tolerance. Screening of phalaris plant introductions was begun in Alabama during 1959. Several nonselected phalaris introductions produced nearly twice as much winter (November to February) forage as Ky-31 tall fescue *(Festuca arundinacea Schreb.)* or Auburn reed canarygrass *(Phalaris arundinacea L.)* over a 4-year period in central Alabama (4). In 1969, a phalaris breeding project was initiated at Auburn University.

*Professor (resigned, now at Agronomy Dept. Univ. of Georgia), Associate Professor (resigned), Associate Professor (resigned), and Assistant Professor, Department of Agronomy and Soils, respectively.

DEVELOPMENT OF OASIS PHALARIS

The phalaris cultivar, Oasis, (previously reported as AP-2) was developed by mass selection. Space plants grown from phalaris plant introductions were evaluated for vigor, winter growth, regrowth potential, and disease resistance. An open-pollinated progeny trial, grown and harvested for 3 years, was used to evaluate forage yield distribution. Clonal selections were made from the following PI's: 240280 (Portugal), 236482 (Australia), 240284 (Italy), 207960 and 207960 (South Africa), 219636 (Iraq), 240242 (Algeria), and PS-68-264 from an old grass nursery; and placed in isolation. Seed from the clonal selections were planted into an expansion block at the Plant Breeding Unit in Alabama and will serve as the source of breeder's seed.

CHARACTERISTICS OF OASIS PHALARIS

Winter Forage Production

Winter forage yields of Oasis phalaris in Alabama have averaged 41 percent more than Ky-31 tall fescue with differences being much greater at locations in the southern part of the State, table 1. Oasis phalaris is not adapted to northern Alabama. Winter forage is more valuable than late spring production since it reduces the need for expensive stored forage, figure 1. Winter productivity of phalaris is a result of rapid development of new leaves and rapid leaf expansion during short periods of favorable temperature (5).

TABLE 1. WINTER FORAGE PRODUCTION OF OASIS PHALARIS AND KY-31 TALL FESCUE AT SIX LOCATIONS IN ALABAMA

Location	Years tested	Winter growth period	Dry forage yield per acre	
			Oasis	Ky-31
			Lb.	*Lb.*
Tennessee Valley Substation, Belle Mina	2	Late Feb.-early April	610	1,300
Piedmont Substation, Camp Hill	2	Late Feb.-early April	1,710	1,380
Prattville Exp. Field, Prattville	2	Feb.-mid-March	1,210	700
Plant Breeding Unit, Tallassee	3	Jan.-Mid-March	1,630	640
Black Belt Substation, Marion Junction	2	Late Feb.-early April	2,130	1,930
Gulf Coast Substation, Fairhope	2	Jan.-mid-March	2,990	1,340
Average			1,710	1,210

FIG. 1. Excellent winter forage growth of Oasis phalaris at Black Belt Substation (March 13, 1981).

Oasis phalaris has been superior in autumn production to Wintergreen phalaris, developed in Texas, and Ky-31 tall fescue, table 2. Autumn forage production of Oasis phalaris is especially advantageous since high-quality grazing can supply the needs of dairy cattle and growing beef calves when small grain pasture is not available.

TABLE 2. SEASONAL FORAGE DISTRIBUTION OF OASIS PHALARIS WINTERGREEN PHALARIS, AND KY-31 TALL FESCUE IN A FAVORABLE YEAR, SECOND YEAR AFTER ESTABLISHMENT AT PLANT BREEDING UNIT, 1973-74

Grass*	Dry forage yield per acre							
	Sept. 11	Oct. 10	Nov. 29	Jan. 21	Feb. 12	Apr. 16	May 28	Total
	Lb.	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*
Oasis phalaris	2,290	1,700	980	1,060	830	1,240	3,080	11,180
Ky-31 tall fescue	1,410	1,480	550	490	730	1,100	3,600	9,360
Wintergreen phalaris	950	800	540	910	820	2,540	3,330	9,890

*Fertilized with 200 pounds N per acre annually.

Mixtures With Other Species

Phalaris can be seeded in dallisgrass *(Paspalum dilatatum Poir.)* sod to extend to the productive season. At the Black Belt Substation, overseeding Oasis phalaris almost doubled total forage yield and lengthened the productive season by 3 months over that of dallisgrass alone fertilized with nitrogen (9).

Oasis phalaris is a bunch-type grass and competes less severely than tall fescue with legumes. Clover grows well with phalaris, figure 2.

FIG. 2. Good ladino clover in Oasis phalaris pasture at Black Belt Substation (April 2, 1979).

Response of Management

Oasis phalaris is highly responsive to nitrogen fertilizer and can utilize up to 300 lb. N per acre annually either under frequent defoliation or cutting at hay stage (10). Ladino clover grows better and persists longer in association with Oasis phalaris than tall fescue because of its bunch-type growth and summer dormancy, thus creating less competition with clover during stress periods (9).

Late spring and summer cutting or grazing of phalaris reduces storage carbohydrates and can reduce autumn forage yields (2). The relatively low level of carbohydrates stored in

FIG. 3. Oasis phalaris with seed heads (Black Belt Substation, May 9, 1974).

root corms, especially with high nitrogen fertilization, can be reduced by 50 percent with late spring and summer defoliation (10). Thus, to achieve its high autumn and winter yield potential, grazing pressure on oasis phalaris should be reduced during heading, figure 3.

Cold Tolerance

Oasis phalaris is best adapted from central Alabama southward. It will survive in northern Alabama but low winter temperatures cause considerable damage to leaf tissue after warm periods have stimulated new growth.

Pests

Nematodes are the only serious pest problem on Oasis phalaris. On sandy soils, nematodes can sharply reduce autumn and early winter forage yields (8). Under drought conditions on sandy soils, destruction of roots by nematodes may cause stand losses. Nematode susceptibility of Oasis phalaris is less serious than for reed canarygrass (*Phalaris arundinacea L.)* (7). Because of nematode susceptibility, Oasis phalaris is best adapted to clay soils or wetland where nematodes cause less damage. This grass is especially well-adapted to clay soils that occur in the Black Belt of Alabama and Mississippi.

Forage Quality

Forage invitro dry matter digestibility during autumn and winter has ranged from 63 to 74 percent (10). Digestibility has remained above 60 percent up to inflorescence emergence but declined rapidly with further maturity. Although digestibility of Oasis phalaris declines with maturity, the quality is still generally superior to that of warm season perennial grasses.

Crude protein of Oasis phalaris forage is often high, ranging from 17 to 25 percent (10). However, nitrate levels of forage have been below potential toxic levels. Alkaloids have been a problem on phalaris pastures in Australia, particularly with sheep. However, Oasis phalaris has low alkaloid levels so animal toxicity is unlikely (1).

Animal Peformance

Beef steer performance on Oasis phalaris has been good, figure 4. In a 3-year grazing trial at the Black Belt Substation, the average daily gain of steers was 1.73 pounds and beef gain per acre was 347 pounds (6). The average daily gain obtained on phalaris is similar to that obtained on high quality small grain pastures.

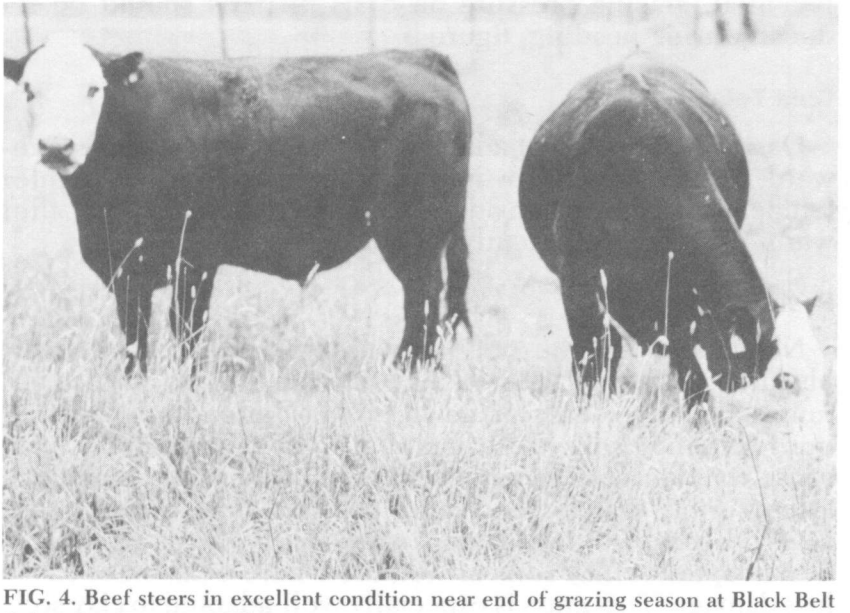


FIG. 4. Beef steers in excellent condition near end of grazing season at Black Belt Substation (June 2, 1978).

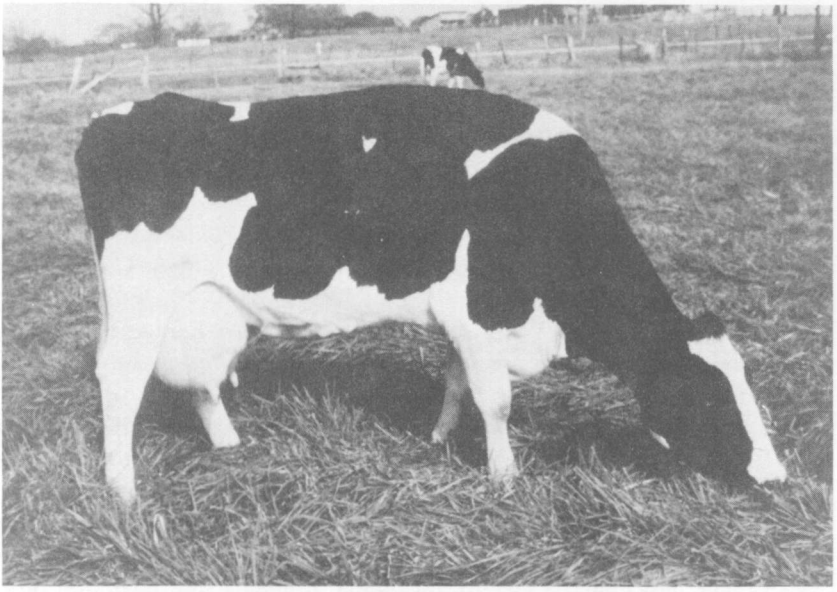


FIG. 5. Good quality autumn grazing is available to dairy cow at Black Belt Substation (Nov. 12, 1975).

Oasis phalaris has been particularly useful for dairy cow pasture since it furnishes high quality forage in early autumn when no other high-quality pasture is available, figure 5. It is cheaper to grow than winter annuals and produces a firm sod to reduce "pugging" by cattle during wet weather.

Breeder's seed is produced and maintained by the Alabama Agricultural Experiment Station, Auburn University. Certified seed of Oasis phalaris are produced and marketed on an exclusive basis by International Seeds, Halsey, Oregon. Seed may be available to farmers in 1984.

SUMMARY

Oasis phalaris is a new cool-season perennial grass for the Southeastern United States that has several valuable characteristics: good yield of high quality forage in autumn and winter; animal daily gain is equal to that on annual ryegrass and generally superior to that obtained on tall fescue; bunch type grass that offers less competition than tall fescue to associated clovers; Oasis phalaris is best adapted to clay soils or wet land in areas such as central Alabama. It is not cold-hardy in northern Alabama.

LITERATURE CITED

(1) BALL, D. M. AND C. S. HOVELAND. 1978. Alkaloid Levels in *Phalaris aquatica* as Affected By Environment. Agronomy J. 70:977-981.

(2) BERRY, R. F. AND C. S. HOVELAND. 1969. Summer Defoliation and Autumn Winter Production of *Phalaris* Species and Tall Fescue Varieties. Agronomy J. 61:693-497.

(3) HOVELAND, C. S. 1974. Possibilities for the Genus *Phalaris* in the South. Proc. Southern Pasture and Forage Crop Improvement Conference. 31:155-160.

(4) _____ and W. B. ANTHONY. 1971. Winter Forage Production and In-vitro Digestibility of Some *Phalaris aquatica* Introduction. Crop Sci. 11:461-463.

(5) _____, H. W. FOUTCH, AND G. A. BUCHANAN. 1974. Response of *Phalaris* Genotypes and Some Other Cool Season Grasses to Temperature. Agronomy J. 66:686-690.

(6) _____, R. L. HAALAND, C. C. KING, JR., W. B. ANTHONY, J. A. MCQUIRE, L. A. SMITH, H. W. GRIMES, and J. L. HOLLIMAN. 1979. Tall Fescue and Phalaris Pasture for Steers. Alabama Agr. Exp. Sta. Bull. 515.

(7) _____, and R. RODRIGUEZ-KABANA. 1979. Forage Production of *Phalaris* Species as Affected by Nematode Populations. Nematropica 9:22-27.

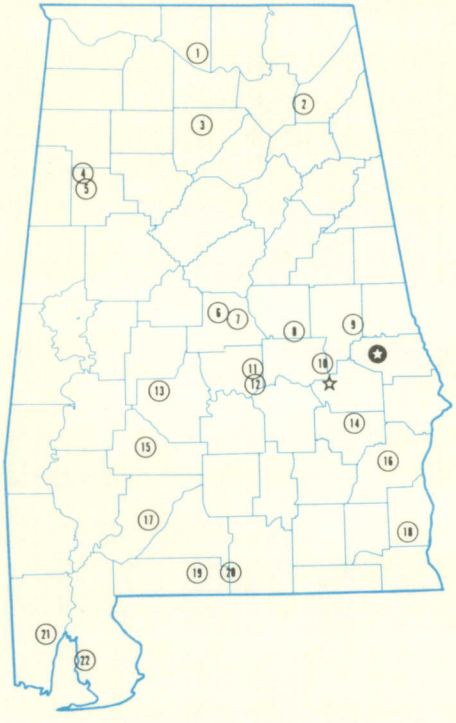
(8) _____, R RODRIGUEZ-KABANA, and C. D. BERRY. 1975. Phalaris and Tall Fescue Forage Production as Affected by Nematodes in the Field. Agronomy J. 67:714-717.

(9) _____, L. A. SMITH, AND H. W. GRIMES. 1979. Tall Fescue and Phalaris on Dallisgrass Sod in the Black Belt. Alabama Agr. Exp. Sta. Bull. 514.

(10) SALIBRO, J. C., C. S. HOVELAND, AND J. C. WILLIAMS. 1978. Forage Yield and Quality of Phalaris as affected by N Fertilization and Defoliation Regimes. Agronomy J. 70:497-500.

Alabama's Agricultural Experiment Station System
AUBURN UNIVERSITY

With an agricultural research unit in every major soil area, Auburn University serves the needs of field crop, livestock, forestry, and horticultural producers in each region in Alabama. Every citizen of the State has a stake in this research program, since any advantage from new and more economical ways of producing and handling farm products directly benefits the consuming public.



Research Unit Identification

★ Main Agricultural Experiment Station, Auburn.
☆ E. V. Smith Research Center, Shorter.

1. Tennessee Valley Substation, Belle Mina.
2. Sand Mountain Substation, Crossville.
3. North Alabama Horticulture Substation, Cullman.
4. Upper Coastal Plain Substation, Winfield.
5. Forestry Unit, Fayette County.
6. Foundation Seed Stocks Farm, Thorsby.
7. Chilton Area Horticulture Substation, Clanton.
8. Forestry Unit, Coosa County.
9. Piedmont Substation, Camp Hill.
10. Plant Breeding Unit, Tallassee.
11. Forestry Unit, Autauga County.
12. Prattville Experiment Field, Prattville.
13. Black Belt Substation, Marion Junction.
14. The Turnipseed-Ikenberry Place, Union Springs.
15. Lower Coastal Plain Substation, Camden.
16. Forestry Unit, Barbour County.
17. Monroeville Experiment Field, Monroeville.
18. Wiregrass Substation, Headland.
19. Brewton Experiment Field, Brewton.
20. Solon Dixon Forestry Education Center, Covington and Escambia counties.
21. Ornamental Horticulture Field Station, Spring Hill.
22. Gulf Coast Substation, Fairhope.