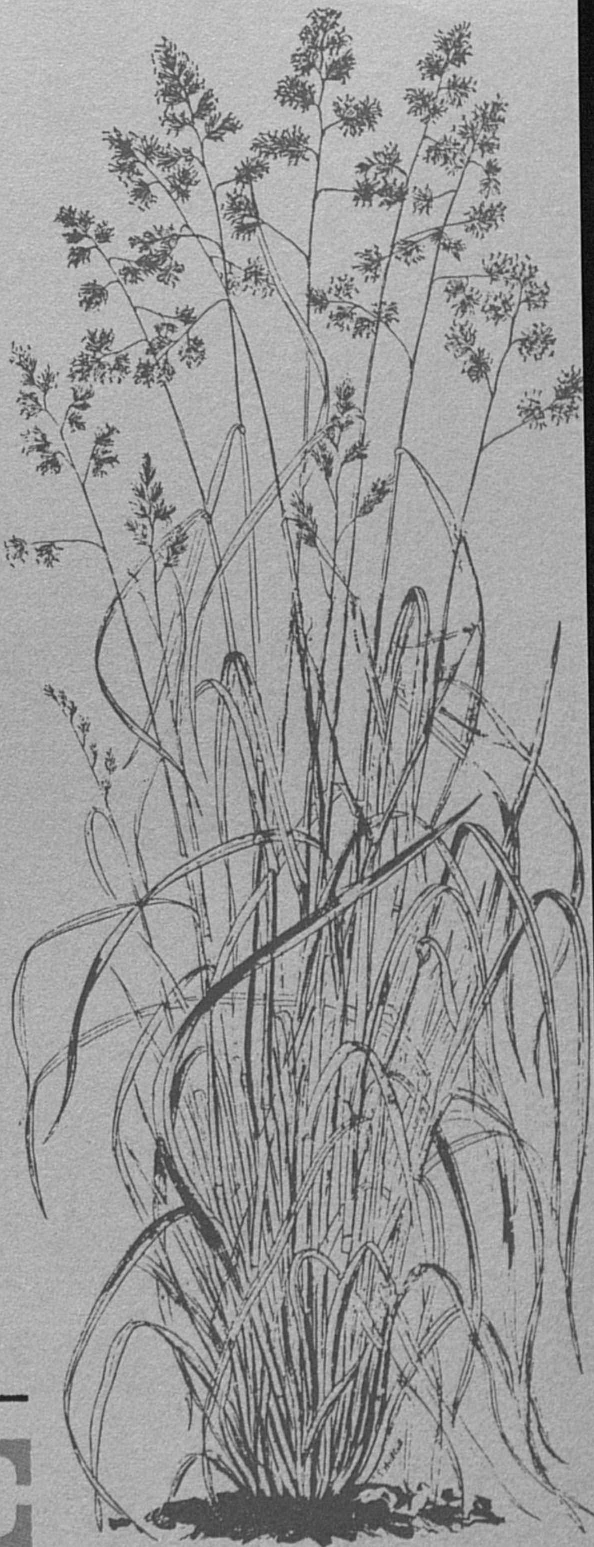
Circular 606 • By Robert C. Buckner, W. H. Stroube and P. H. Burrus, II



BOONE Orchardgrass

UNIVERSITY OF KENTUCKY

AGRICULTURAL EXPERIMENT STATION
DEPARTMENT OF AGRONOMY • Lexington

Boone Orchardgrass

CHARACTERISTICS AND MANAGEMENT[1]

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Although orchardgrass is a native of Europe, it has been in the United States since colonial times. It was introduced into Kentucky from Virginia about 1830 and a short time later seed was produced on a commercial basis in Oldham county, Kentucky, for the first time in the United States.

Orchardgrass is an important pasture, hay and silage crop throughout central United States. It is a high-yielding, palatable, nutritious grass that grows well in mixtures with other grasses and legumes.

Virginia, Kentucky and Missouri are the major seed-producing states. The annual production for these three states is from 10 to 15 million pounds of clean seed per year. Almost all the seed produced in this area is of unimproved domestic origin. The United States imports between 5 and 7 million pounds of seed annually from Europe. Tests in Kentucky have shown that domestic seed grown for many generations in the state is superior in general adaptation, yield, and persistence in stand, to seed imported from Europe and also to most named varieties.

The Boone variety was developed cooperatively by the Kentucky Agricultural Experiment Station and the Crops Research Division, ARS, U.S. Department of Agriculture. The variety was developed to provide a known source of seed of a well adapted variety for Kentucky and surrounding states.

DESCRIPTION

The Boone variety was developed by mass selection of plants from naturalized strains that traced to farms in the orchardgrass-seed-producing area of Kentucky. The strains had been grown on these farms

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[1] Cooperative investigations at Lexington, Kentucky, of the Crops Research Division, Agricultural Research Service, U.S. Department of Agriculture, and the Department of Agronomy, University of Kentucky Agricultural Experiment Station.

[2] Research Agronomist and Associate Professor; Associate Professor; and (Agent) Agronomist (Research Assistant), Crops Research Division, Agricultural Research Service, U.S. Department of Agriculture, and University of Kentucky Agricultural Experiment Station, respectively.

a minimum of 15 years. Stands of 25 strains were established on the Kentucky Agricultural Experiment Station farm and subjected to intensive clipping treatments for 3 years. Approximately 400 superior, surviving plants were selected from the 7 highest yielding strains. The 400 selected plants were polycrossed under isolation. Equal amounts of seed from each of the 400 plant selections were blended and used to establish a breeder seed block. Seed from the breeder seed block was evaluated and later formed the Boone variety.

Boone has been evaluated in Kentucky and throughout most of the United States in the U.S. Department of Agriculture Regional Grass Testing Program.

Although the Boone variety is equal or superior to naturalized and named varieties in relatively new stands (Table 1), it is particularly outstanding when compared in old stands (Table 2). The yield data presented in Tables 1 and 2 were obtained from stands on fertile soils normally considered to be well suited to good growth of orchardgrass.

Table 1. — Relative yields of dry matter expressed in percentage of Boone of varieties and Danish commercial orchardgrass at different locations in Kentucky. Figures are based on 3-year average yields.

	Location of Tests			
Variety[1]	Lexington, Ky.	Woodford Co.	Princeton, Ky.	Mean
Boone	100	100	100	100.0
Ky. Select	101	98	94	97.7
Potomac	87	92	87	88.7
Danish	67	30	74	57.0
L. S. D. at 0.05	6	1	6	
L. S. D. at 0.01	8	2	8	

[1] Ky. Select is a naturalized variety from Jefferson county, Kentucky.

Table 2. — Yields in pounds of dry matter per acre of orchardgrass varieties established in 1957, 1958, and 1961 on the Kentucky Agricultural Experiment Station farm, Lexington, Ky.

	Year of Harvest		
Variety	1961[1]	1961[2]	1965[3]
Boone	4,137	4,623	2,598
Ky. Select	3,755	4,261	1,937
Potomac	3,987	4,392	....
Danish	3,657	3,826	664
L. S. D. at 0.05	76	86	697
L. S. D. at 0.01	102	117	979

[1] Test seeded in 1957.
[2] Test seeded in 1958.
[3] Test seeded in 1959.

Boone was not selected for resistance to diseases; however, the variety is superior to both Ky. Select, a naturalized variety, and Danish commercial orchardgrass for leaf rust resistance (Table 3).

The performance of Boone in other states indicates that the variety is well adapted throughout much of the area where orchardgrass is grown for forage purposes.

Table 3 — Susceptibility to leaf rust of varieties and Danish commercial orchardgrass at different locations in Kentucky.

	Location of Tests[1]		
Variety	Lexington, Ky.	Woodford Co.	Shelby Co.
Boone	5.4	3.8	4.0
Ky. Select	6.1	6.1	6.5
Potomac	3.9	2.2	3.0
Danish	5.9	....	5.0
L. S. D. at 0.05	....	1.8	1.1
L. S. D. at 0.01	....	2.5	1.5

[1] 1=most; 7=least resistance.

MANAGEMENT AND UTILIZATION

The management and utilization of the Boone variety are comparable to those for other orchardgrass.

Although the variety is less exacting in soil requirements than timothy and Kentucky bluegrass and will succeed on light soil of medium fertility; best performance is obtained on soils that have been properly treated (based on soils tests) to correct any deficiencies of lime, phosphorus, and potassium.

The variety should be seeded on a firm, well-prepared seedbed and the seed covered lightly. Fall and spring seedings are equally effective for obtaining good stands. The variety should be seeded at the rate of 10 to 14 pounds per acre when seeded alone and at the rate of 5 to 10 pounds per acre when sown in association with legumes. Best stands are obtained when 30 to 40 pounds per acre of elemental nitrogen is applied broadcast just prior to or at the time of seeding.

One or more legumes should be seeded with Boone when it is to be used for hay or pasture. Legumes normally seeded with orchardgrass are common and Ladino white clover; Korean and Kobe lespedeza; alfalfa; red and alsike clover. Certified seed of adapted varieties of legumes should be seeded.

If the Boone variety is seeded in late summer or early fall, it will provide pasture the following year. Successful management of grass-legume combinations requires heavy stocking in early spring to prevent the grass from being too competitive with the legume. Orchardgrass develops rapidly in the early spring and tends to produce seed heads even though it is stocked heavily. Prompt clipping will help maintain the grass in a palatable, nutritious condition.

Legumes tend to disappear from orchardgrass stands for various reasons even under the best of management conditions. Maintenance of legumes in orchardgrass pastures is important for best animal performance. When legumes disappear from the stand they may be re-established by renovation of the grass sod. The following practices will help re-establish the legumes: (1) correct the soil fertility (based on soil test) by fertilizing to maintain medium-to-high levels of phosphorus (P_2O_5) and potassium (K_2O) and a pH of from 6.0 to 7.0; (2) graze or clip the grass closely; (3) disk or cultivate to destroy one-third to one-half of the sod; and (4) inoculate the legume seed and distribute it evenly over the field, then cover the seed lightly. Early spring (late February–early March) seedings generally are more satisfactory for securing good stands of legumes because severe droughts frequently are encountered in the fall. The grass should be grazed moderately during the spring to prevent undue competition to the legume.

SEED PRODUCTION

The seed production capability of Boone has not been compared under test conditions with that of other orchardgrass varieties or with domestic orchardgrass. The average production during 1965 of clean seed in Kentucky for domestic orchardgrass was 260 pounds per acre. The average production of clean seed of the Boone variety during 1965 was 201 pounds per acre; however, one 18-acre field of Boone produced 408 pounds per acre of clean seed. Thus, it is unlikely that Boone is different from domestic orchardgrass in seed production capability.

Highest seed yields are obtained from pure stands of orchardgrass. Mixing legumes with orchardgrass often decreases seed yields. Light rates of broadcast seeding are frequently superior to heavy rates and row seedings are superior to broadcast seedings. Rates of 3 to 5 pounds per acre in rows and 8 to 10 pounds per acre broadcast should provide adequate stands for seed production. Medium-to-high soil fertility levels (preferably based on soil tests) of P_2O_5 and K_2O and a pH of between 6.0 and 7.0 should be maintained for optimum seed yields. Topdress with 45 to 60 pounds per acre of elemental nitrogen in late February or early March. Nitrogen applied at this rate after March 15 causes lodging and excessive vegetative growth at the expense of seed yields. After seed harvest, mow to a height of 3 or 4 inches, remove excess growth and graze moderately until early winter.

Until recently, the orchardgrass seed crop was harvested with a grain binder, tied in small bundles, and shocked in the field until dry. The crop was harvested when a few seeds would shatter when the seed heads were struck across the hand. The grain binder has been largely replaced by the combine on the majority of farms. Combine harvesting of orchardgrass seed presents serious difficulties because of losses from shattering. This problem may be overcome somewhat by cutting the grass at about the time it is normally harvested with a binder and windrowing it in a rather wide, thin swath. The grass should be cut above the foliage and placed on top of the stubble to achieve maximum drying. When the seed heads have cured, the grass can be picked up from the swath by a pickup attachment on the combine and threshed.

CHEMICAL CONTROL OF WEEDS IN THE SEED CROP[3]

Recommendations for the control of broadleaf weeds in orchardgrass stands may be obtained from U.K. Coop. Extension Misc. 113, "Chemical Control of Weeds in Farm Crops in Kentucky." For the safety of the operator and to prevent damage to cultivated crops and plants, all precautions mentioned in Misc. 113, as well as those of the manufacturers of the herbicides, should be observed.

Cheat seedlings and red sorrel, troublesome weeds that commonly occur in orchardgrass seed fields, *are not controlled* with 2, 4-D. Dicamba (Banvel-D 4E) gives good cheat and sheep sorrel control when applied at the rates of 2 quarts (2 pounds active) and 1 quart (1 pound active), respectively, in 20 gallons of water per acre.

Apply the herbicide during early April before the orchardgrass has reached the boot stage of maturity. Treatment during the boot stage or after flower heads emerge may result in lowered seed yields and/or quality. Dicamba (Banvel-D) has not been approved for use on feed and forage crops; consequently, livestock should not be permitted to graze or feed on the forage, aftermath, straw or threshings of orchardgrass sprayed with this herbicide.

Seed fields of Boone, to qualify for certification, must be isolated from other orchardgrass. Normally, this can be done by clean cultivation of land in adjoining fields or by mowing other orchardgrass to

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[3] To simplify information in this publication, trade names of some products are used. No endorsement is intended, nor is criticism implied of similar products not named.

prevent seed head production. Unwanted orchardgrass in fence rows and other difficult-to-mow or to cultivate areas may be controlled by spraying with bromacil (Hyvar-X) or dalapon (Dowpon). Bromacil at the rate recommended sterilizes the soil for a period of approximately one year. Dalapon is a translocated herbicide that does not sterilize the soil when used at recommended rates. Bromacil should be applied at the rate of 12½ pounds per acre (5 ounces per 1000 square foot) of the 80% wettable powder. The dalapon grass killer should be used at the rate of 27 pounds per acre (11 ounces per 1,000 square foot) of the 85% wettable powder. Use approximately 30 to 50 gallons of water per acre to adequately wet the foliage. Unwanted orchardgrass should be sprayed with either bromacil or dalapon sometime during April for greatest effectiveness.

CERTIFICATION

Certified seed of Boone orchardgrass is produced on a limited generation basis. Classes of seed are: (1) breeder, (2) foundation, (3) registered, and (4) certified. The foundation and registered classes of seed are used to produce certified seed. The certified class of seed can be planted for forage purposes only and cannot be used to produce certified seed.

Information regarding certification requirements for the production of certified seed of Boone orchardgrass may be obtained from the Kentucky Seed Improvement Association, 929 South Limestone Street, Lexington, Kentucky 40503.

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