



Crop Science Report

RESEARCH/EXTENSION

BENTGRASS SEED PRODUCTION IN OREGON

Harold Youngberg & Gale Gingrich¹

The bentgrasses are well adapted for turf purposes and are widely used for putting greens and in quality mixtures with other grasses for lawns in the northern half of the U.S. Several varieties are widely used for turf purposes in Europe.

Oregon is the leading producer of bentgrass seed in the United States. The Willamette Valley acreage accounts for nearly all the 6.5 million-pound annual U.S. production. Agrostis tenuis (Colonial bentgrass) is the most widely grown bentgrass grown for seed in the state. It is grown primarily on the well drained hill land soils in eastern Marion County; but some seed is also produced on the poorly drained clay soils in the southern Willamette Valley. Agrostis palustris (Creeping bentgrass) and Agrostis canina (Velvet bentgrass) species are grown both on the well drained and the poorly drained soils in the southern Willamette Valley. The Agrostis species are often grown for seed on acid, low-fertility, marginal soils not well adapted to other crops.

Bentgrass is characterized by small seed. The seed size must be taken into consideration in planting, harvesting and processing. Agrostis canina (Velvet bentgrass) has 515,450 seeds per ounce while Agrostis tenuis (Colonial bentgrass var. Highland) has 358,850.

Varieties

Many improved bentgrass varieties have been developed for turf uses. Their use ranges from general home lawns to high quality specialty putting greens. The following varieties have been approved for seed certification in Oregon:

¹ Extension Agronomist, Oregon State University and former Marion County Extension Agent, respectively.

Colonial bentgrass (Agrostis tenuis) - Astoria, Bardot, Exeter,
Highland, Holfior, Tracenta

Creeping bentgrass (Agrostis palustris) - Smaragd (Emerald),
Penncross, Prominent, Seaside, Penneagle

Velvet bentgrass (Agrostis canina) - Kingstown

The Highland variety is the most widely grown in Oregon.

Cultural Practices

Land preparation practices vary according to the region. A fine, firm seedbed is essential because of the small seed size. The small bentgrass seedling cannot emerge if buried much below the soil surface. The soil must be firm if soil moisture is to be kept near the seed and developing seedling. Plantings are usually made in the spring (May) or the early autumn (September). Early autumn (early September) plantings will usually produce a small seed crop in the first season.

TABLE 1
SUGGESTED BENTGRASS SEEDING
RATES AND SPACING

Crop	Row Spacing (inches)	Rate/Acre (lbs)	Number Seeds Per Foot of Drill Row
Colonial	6	0.5 - 2.0	33 - 135
Creeping	12-14	0.5 - 2.0	70 - 280

Seeding rates and row spacing vary with the crop. Bentgrass grown for seed production is planted in 6- to 12-inch rows (see Table 1). A vegetative planting (using stolons) of creeping bentgrass is made in 24- to 36-inch rows.

Lime should be applied and incorporated before seeding on soils with a pH below 5.3. Lime applied to established fields is not as effective.

Nitrogen is the most important nutrient affecting the seed yield of bentgrass. A total annual application of 100-120 pounds per acre per year is recommended on established seed fields. Applications are usually split with 20-30 pounds in the autumn with the balance applied between mid-March and mid-April.

Phosphorus and potassium applications are based on soil tests according to Bray, et al, 1945 and Peach, et al, 1947. When needed, applications should be made in the fall. Rates are shown in Table 2.

TABLE 2
PHOSPHORUS AND
POTASSIUM APPLICATIONS

<u>Soil Test</u> (ppm)	<u>Application</u> (lbs/acre)
<u>Phosphorus</u>	<u>P₂O₅</u>
0-15	40-60
Over 15	None
<u>Potassium</u>	<u>K₂O</u>
0-100	60
Over 100	None

Soils in Oregon are generally deficient in sulfur. A minimum of 10-15 pounds sulfur per acre should be applied annually.

Weed Control

Turf seed markets require high seed of very high purity. Seed growers must pay careful attention to weed control. The first step in weed control is to select a field free of weeds for seed production, particularly perennial grass weeds. Creeping velvetgrass (Holcus mollis) is one of the most serious and difficult to control weeds in bentgrass seed crops.

In the spring-planted fields, a winter chemical fallow program using IPC/CIPC followed by paraquat or Roundup prior to planting will help insure general field cleanliness. In fall-planted fields, the use of the carbon banding technique coupled with an application of paraquate or Roundup just prior to crop emergence will greatly enhance weed control.

Several herbicides are recommended for use in bentgrass seed production. (See Table 3).

TABLE 3
ANNUAL GRASS CONTROL IN BENTGRASS
(Highland or Astoria Varieties)

<u>Chemical</u>	<u>Rate</u>	<u>Comments</u>
IPC CIPC	4.0 lbs/acre 3.0 lbs/acre	Apply after fall germination of weeds, and before November 1. Use 10 or more gallons of water per acre.
Simazine	2.0 lbs ai/acre	Apply as soon as fall rains start.
Diuron	1.6-2.4 lbs ai/acre	Apply after fall germination of weeds and before weeds are well established, usually between October 1 and mid-November. Caution: use only on well-established plants.
Ethofumestate	1.0-1.5 lbs ai/acre	Apply to moist soil surface after fall rains start.

Bensulide at 8-10 lbs. per acre and Nortron at 1.0 lb. active ingredient (a.i.) per acre is used on creeping bentgrass for control of annual bluegrass (Poa annua). It is applied after harvest, prior to first fall rains and before weed germination. Ethofumestate is also used at the same rates as on Highland bentgrass.

Broadleaf weeds may be controlled with 2,4-D at 0.50-0.75 lbs a.i. per acre or Dicamba at 0.25 lbs a.i. per acre. These materials are applied alone or in combination. Spray applications for broadleaf control are made in the spring. Bentgrass seedlings must be in the 4- to 5-leaf stage before spraying with these materials. Bromoxynil at 0.75-0.50 lb a.i./acre can be used for broadleaf control if applied when weeds are in the 2- to 3-leaf stage.

Insect and Disease Control

Field sanitation by post-harvest burning has been most effective in control of major insect and disease problems. In the absence of post-harvest burning, certain insect and disease problems are encountered. These problems and controls are summarized in Table 4.

TABLE 4
INSECT AND DISEASE PROBLEMS IN
BENTGRASS IN OREGON

<u>Insect</u>	<u>Symptoms</u>	<u>Control</u>
Grasshopper Thrip	Young and adults feed on seed heads.	Diazinon 0.5 lb ai/acre Sevin 1.0 lb ai/acre Malathion 1.0 lb ai/acre
"Silver Top" (produced by plant bugs)	Inflorescence turns white and stem shrinks just above uppermost node; seed is sterile.	No registered chemical. Post-harvest burning of residue.
<u>Disease & Other</u>		
Grass seed Nematode <u>Anguina agrostis</u>	Infected seeds are 3-5 times normal size. Galls containing immature nematodes replace normal seeds.	Use seed free of infection. Post-harvest burning of residue.

Harvest

Bentgrasses mature later in the season than most grass seed crops in the area, usually between August 15 and September 15. Bentgrasses may be swathed, seed allowed to mature and dry, then combined. Bentgrass seed does not shatter as readily as many grass seed crops, therefore, some seed producers prefer to harvest the crop directly without swathing. Since bentgrass is harvested later in the season, there is a greater risk of rain than with earlier maturing grass seed crops. Standing bentgrass will dry more rapidly than in a swath. However, caution is needed in direct harvest to assure that the direct harvest seed does not contain high moisture material that will cause heating in bulk storage. Heating will lower germination or possibly shorten storage life of the seed.

Standard combines are used to harvest the seed. Creeping bentgrasses are often combined more than once because of the high seed value and the difficulty of getting seed from the heads. The residue is dropped from the first combine operation into swaths and recombined immediately.

Post-harvest Management

Residue remaining in colonial bentgrass fields is burned immediately after harvest. Creeping bentgrass and velvet bentgrass seed fields are not burned because these species can be severely damaged by burning. The straw and stubble must be removed from the fields as a first step in preparing the stand for the next seed crop. Thorough residue removal will help control weeds, diseases, insects, and rodents.

Yields

Bentgrasses have averaged 220 to 330 lbs per acre seed yields at Hyslop Farm, Corvallis. Commercial growers of Highland bentgrass have produced seed yields equal or higher than these experimental averages.

Once established, bentgrass fields can be expected to produce a good seed crop for 5 or more years provided that weeds are not allowed to invade the stand. Post-harvest burning of straw or complete mechanical removal of all residue after harvest is essential to the maintenance of high seed yields and a uniform vigorous stand.

References

- Bray, R. H., and . T. Kurtz, 1945. Determination of total organic and available forms of phosphorus in soils, Soil Science, 59:39-45.
- Gardner, H., et al 1975. Fertilizer Guide Highland Bentgrass Seed (also Astoria and Exeter) (Western Oregon - West of Cascades) FG 7. Oregon State University Extension Service.
- Peach, M. L., T. Alexander, L. A. Dean, and J. F. Reed, 1947. Methods of soil analysis for soil fertility investigations, USDA Circ. 757.
- William, R. D. Ed. for 1982. Oregon Weed Control Handbook. Oregon Extension Service. Oregon State University, Corvallis, Oregon.