Alternative
Field Crops Manual
University of Wisconsin-Extension, Cooperative Extension
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Annual Canarygrass

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I. History:

Annual Canarygrass (*Phalaris canariensis* L.) or canaryseed is a grain crop with production practices and a life cycle similar to that of spring wheat or oat. The plant is native to the Mediterranean regions, and is grown on large acreages in the Middle East, Europe, and Argentina, with some production in the northern Red River Valley of North Dakota and Minnesota, U.S.A., and the western provinces of Canada. Production in these latter areas has periodically had significant effects on world production and markets. Commercial production in the U.S. developed after World War 11 in MN and ND, and shifted into Manitoba and later Saskatchewan. In 1987, over 180,000 acres of canarygrass were produced in Western Canada, 85% in Saskatchewan. Less than 3,000 acres annually have been contracted in Minnesota and North Dakota in recent years. It is grown under contract as a specialty crop in these regions, and is used primarily as birdfeed hence the name "canarygrass." The largest consumers are Japan and other countries of East Asia and Europe.

II. Uses:

The primary market for canarygrass is currently birdfeed, but other uses, including human food have been proposed. As a birdfood, the florets are sold and the birds dehull the florets before consumption. It is widely recognized as a superior canary-feed.

Annual Canarygrass seed is similar to oat in mineral composition. The caryopsis is higher in ash, oil, and phosphorus but lower in fiber than concentrations common in corn, pea, or fieldbean. Canarygrass caryopses have higher concentrations of all eight essential amino acids than does wheat or corn, and are higher in sulfur-containing amino acids than pea or fieldbean. In spite of this encouraging nutritional profile, the value of canarygrass in human food has not been adequately explored.

III. Growth Habits:

Annual canarygrass (a grain crop) is often confused with reed canarygrass (*Phalaris arundinacea* L.) which is a perennial forage crop and wild grass. Although heads of both crops are panicles, annual canarygrass heads are spike-like and resemble club wheat. Most cultivars tiller profusely and lodge when soil fertility and moisture is plentiful. The compact, oval-shaped panicles retain seed firmly so that shattering losses are usually small. The plant grows 36 in. high, heads in approximately 65 days, and matures in 104 to 107 days (similar to spring wheat).

IV. Environment Requirements:

A. Climate:

Regions with long, warm days and cool nights, such as the Northern Red River Valley in Minnesota, North Dakota, and Manitoba are well suited for canarygrass. It is generally considered a cool season crop with areas of adaptation similar to hard red spring wheat. Canarygrass has shown sensitivity to high temperatures which are common in May and June, and yields are substantially reduced under these conditions. It is more sensitive to heat and less drought tolerant than wheat.

B. Soils:

Canarygrass will grow on many types of soils but has performed well on heavier, clay loam soils of medium-high fertility. Canary seed requires ample moisture to obtain maximum yields, and so does more poorly on sandier soils. Some growers in Alberta have found canarygrass more tolerant of saline soils than wheat.

V. Cultural Practices:

A. Soil Preparation:

Tillage influences canarygrass stand and yield. Grain yields have been higher and weed control better with moldboard plowing rather than chisel plowing or rototilling.

B. Seeding Date:

Canarygrass is planted very early in the spring, as early as the ground can be worked. This corresponds to late March or early April in southern Minnesota or central Wisconsin, or early May in more northern locations. Yields are lower with later sowings.

C. Method and Rate of Sowing:

Plant canarygrass in 4 to 7 in. rows with a grain drill. Studies conducted at several locations in Minnesota indicate that seeding rates above 1,500,000 seeds/acre are needed for adequate stands, but very little yield increase occurred with densities greater than this (Figure 1). Current recommended seeding rates in the Upper Midwest are 30 lb/acre viable seeds or 40 seeds/ft^2 (1,742,000 seeds/acre). Plant seeds 1/2 to 1 1/2 in. deep, depending upon moisture conditions. A bushel of seed weighs 50 pounds.

D. Fertility:

In Minnesota research, canarygrass shows no response to nitrogen-fertilizers on the rich soils of the

Red River Valley (Figure 2). Lodging is often a problem at higher nitrogen levels. On poorer soils, N is more likely to be limiting. Research conducted in Saskatchewan indicated top yields were obtained with the addition of 45 to 67 lb of N/acre. The seed and straw yields of canarygrass are below those of other spring sown cereals, and so nutrient uptake is likely to be somewhat less.

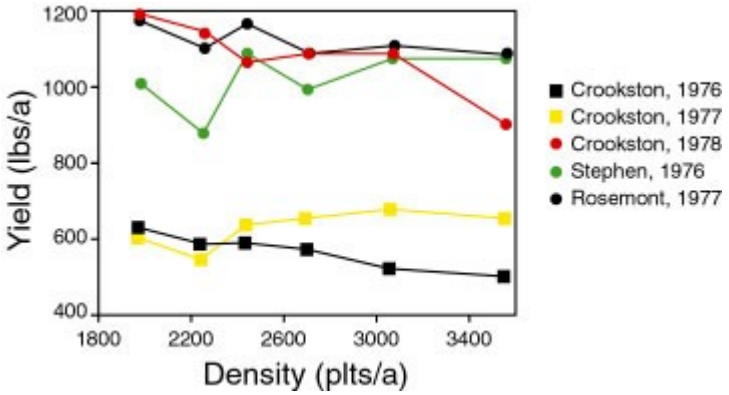

Figure 1. Effect of plant density on seed yield of annual canarygrass.
Data courtesy of Dr. R.G. Robinson, University of Minnesota.

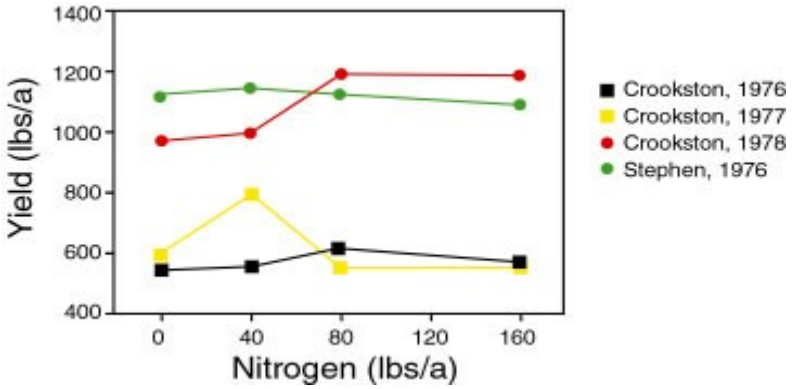

Figure 2. Effect of nitrogen fertilizer (Urea) on annual canarygrass seed yield.
Data courtesy of Dr. Robert G. Robinson, University of Minnesota.

Annual canarygrass is likely to respond to fertility similarly to reed canarygrass or spring-sown cereals in most soil situations. Nitrogen recommendations for soils with a range of organic matter are shown in Table 1.

Table 1: Nitrogen recommendations for annual canarygrass for a yield goal of 1000 to 1200 lb/acre.

Soil Organic Matter Content			
%			
<2	2-4.9	5.0-10	>10
amt. of N to apply, lb/acre			
50	20	10	0

On high organic matter soils or on soils following a legume or fallow, no nitrogen is recommended.

Soil test recommendations for phosphorus and potassium would be similar to other medium demand field crops (Demand level 4), see UWEX Publication A2809, and are shown in Table 2.

Table 2: Phosphate (P_2O_5) and potash (K_2O) recommendations for annual canarygrass.

Soil Test Interpretation				
Very low	Low	Medium	High	Excessively high
lb P_2O_5/acre to apply				
45	40	30	15	0
lb K_2O /acre to apply				
90	80	60	30	0

E. Variety Selection:

Many lines of canarygrass have been tested in northern Minnesota for yield, adaptation and agronomic characteristics. Three varieties currently recommended are Alden, Keet and Elias. Yields and characteristics are provided on Tables 3 and 4. Elias and Keet are higher yielding than Alden, and have better lodging resistance.

Table 3: Yields of annual canarygrass varieties at four Minnesota locations.

Variety	Crookston 1979-85	Stephen 1979-84	Rosemount 1979-84	Becker[1] 1982-84	Average 22 trials
	lbs/acre				
Alden	1516	1162	1081	910	1218
Elias	1810	1554	1224	918	1459
Keet	1660	1318	1142	925	1325
Checks 2	1454	1026	919	736	1093
LSD	128	127	99	80	25

[1]Irrigated.

Table 4: Characteristics of annual canarygrass varieties in Minnesota.

Variety	Planting to heading (days)	Planting to maturity (days)	Lodging (score[1])	Height (in)	Seeds (no./lb)	Test weight (lb/bu)

Alden	66	107	3.9	36	60,500	48
Elias	64	106	2.6	36	58,200	51
Keet	63	104	2.8	35	61,300	49
Checks[2]	64	107	3.9	34	56,000	49

[1]1= erect, 9 = flat.

[2]1984-85 data of progeny of old seedlots and varieties.

Variety Descriptions:

Alden—Medium yield, medium maturity and height. Poor lodging resistance. Medium size seed of medium test weight. Developed cooperatively by Minnesota Agricultural Experiment Station and Minn-Dak Growers Association. Released in 1973.

Elias—High yield, medium maturity and height. Fair lodging resistance. Medium size seed of very high test weight. Released by Minnesota Agricultural Experiment Station in 1983.

Keet—High yield, early, medium height. Fair lodging resistance. Medium size seed of high test weight. Released by Minnesota Agricultural Experiment Station in 1979.

F. Weed Control:

Canary seed is very susceptible to Treflan and Eptam damage, and so fields treated the previous year with these herbicides should be avoided. There are currently no herbicides for annual canarygrass registered in the U.S., and so cultural practices for weed control are required.

G. Diseases and Insects:

To date, insects, and diseases have not been a major problem in annual canarygrass production. Aphids are occasionally a problem during seed fill. Several pesticides have been registered in Canada for this purpose.

H. Harvesting:

Maturity occurs when the kernels are hard and the head has turned white-beige in color. The panicle of annual canarygrass resists shattering and so allow the crop to fully mature before harvest. Straight combining is the preferred harvest method but swathing just prior to combining is also effective.

Dehulling the seed is undesirable, and may result in dockage, and so a cylinder speed of 500 to 750 rpm is recommended. Combine clearance of 5 to 9mm (front) and 3 to 5mm (rear) is recommended and a low wind speed (similar to flax) should be used. The dust from canarygrass is irritating, especially on hot days, and dust masks may be required.

VI. Yield Potential and Performance Results:

Yield potential of canarygrass at four locations in Minnesota is provided in Table 3. Yields tend to decline at southern Minnesota locations and with hot weather conditions.

VII. Economics of Production and Markets:

Production costs are less than for spring wheat primarily because of reduced fertilizer and herbicide costs. Recent prices paid for annual canarygrass seed have ranged from 8 to 9 cents/pound. In Minnesota, several markets exist in the northwestern part of the state and in Minneapolis. Northern Sales in Winnepeg, Canada and Min-Dak Growers, Inc. Grand Forks, ND also contract or purchase annual canarygrass seed. Several area and local markets exist in other states, but should be identified before planting the crop.

VIII. Information Sources:

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