



Buckwheat Production

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Buckwheat is a psuedo-cereal used for human food.

It belongs to the Polygonaceae family of plants. The species of buckwheat grown commercially for food in the United States is "*Fagopyrum sagittatum*." This crop was grown in China before 1000 AD, and was introduced into Europe in the 15th Century and the United States in the 17th Century. The name buckwheat originated from the Anglo-Saxon words boc (beech) and whoet (wheat). The three-sided angular seed resembles a small beechnut.

Adaptation

Buckwheat grows best in a cool, moist climate under a wide range of soil conditions. It is sensitive to spring and fall frost, high temperatures, drying winds and drought. Stress factors can reduce yield, especially if they occur during the blooming period. Wind, heavy rainfall and excessive soil nitrogen

can cause buckwheat to lodge, which makes it difficult to harvest and may result in yield loss.

Buckwheat should be planted when danger of spring frost has passed. It requires 10 to 12 weeks after planting to reach maturity. Buckwheat has an indeterminate growth habit with the top of the plant flowering while seed at the base of the plant may be already mature. When planted on low fertility soils, buckwheat may outperform most small grains. On high fertility soils with good water holding capacity, small grains are usually more productive.

Buckwheat has a taproot with numerous lateral roots that may extend to a depth of 3 to 4 feet. The root system is small, usually comprising only 3 percent of the total plant weight compared to 6 to 14 percent in cereal grains. Adequate soil moisture must be available from early July through August during the time the crop is blossoming and producing seed in order to produce good yields. Dry conditions, hot winds, and other stress during blossoming can drastically reduce buckwheat yields by causing high levels of flower and seed abortion.

Buckwheat flowers are self-sterile and require cross pollination. Bees, other insects, and wind are required to distribute pollen.

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Rotation

Buckwheat is not usually included in a regular rotation. It is a heavy feeder of mineral fertilizers, especially phosphate and this should be considered in fertilizing the crop following buckwheat. Buckwheat stubble adds very little organic matter and leaves the soil loose and more subject to erosion than small grain crops. Avoid planting buckwheat on canola, mustard or sunflower ground because these crops readily produce volunteer plants which are impossible to control in growing buckwheat.

Buckwheat drops seed readily before harvest and volunteer growth often occurs in the following crop. A grower should be careful to select a crop that has buckwheat control options available. Bromoxynil, dicamba, Curtail M, and Harmony Extra herbicides easily control volunteer buckwheat in small grain. Growers should select a crop in which these type of herbicides are labeled and can be safely used.

Disease problems are rarely encountered in buckwheat. As a precaution, however, a minimum of three years should be left between successive buckwheat crops in a rotation.

Seedbed

Buckwheat is most easily established on a well-prepared, firm seedbed similar to that for flax or other small seeded crops. June planting permits adequate control of several weed seedling flushes prior to seeding. Under good growing conditions, buckwheat will germinate and shade the ground quickly. Cultural control of weeds is important as there are no herbicides currently labeled for weed control in buckwheat.

Date of Seeding

Young seedlings are very sensitive to frost, so seeding should be delayed until all danger of spring frost is past. Buckwheat seed germinates best when the soil temperature is about 80 F but will germinate at any temperature between 45 F and 105 F. Seeding from May 25 to June 10 is

suggested. Uniform stands are sometimes hard to obtain due to cool soil temperatures. Seeding after May 25 in North Dakota allows additional time for weed control tillage and for soil to warm up. Buckwheat seeding should be timed to allow plant growth to take place in warm weather and seed to form in the cool weather of late summer. Any type of stress, especially at flowering, can result in a poor seed set. Delayed seeding, however, does increase risk of fall frost damage. When seeding is delayed beyond mid-June, severe yield reductions may occur (*Figure 1 and 2*). Later dates of planting result in a shorter growth period, shorter plants, slightly lighter seed, lower bushel weights and reduced seed yield.

Rate and Depth of Seeding

Buckwheat is usually sown with a grain drill or air seeder at the rate of 40 to 50 pounds of pure live seed per acre. Good stands help prevent lodging. Buckwheat does not tiller; each seed produces a single stem that branches toward the top as field space permits. The preferred seeding depth is 1 to 1.5 inches if there is adequate soil moisture for germination. Seeding deeper than 2 inches should be avoided.

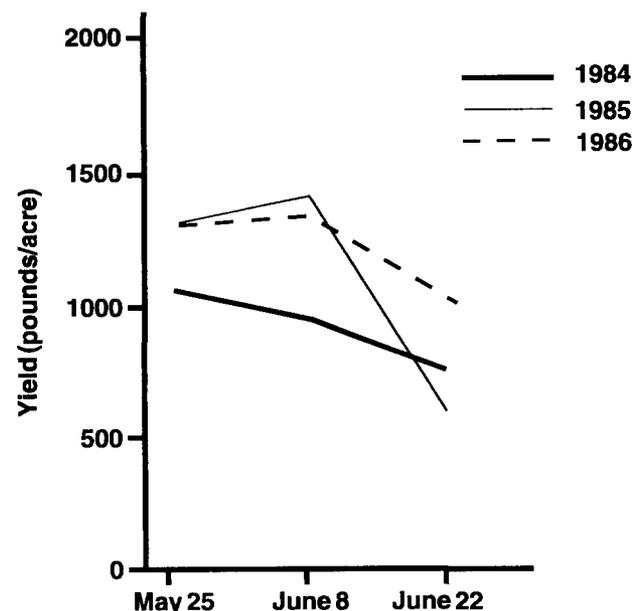


Figure 1. Planting date effect on yield of Mancan buckwheat during three growing seasons at Langdon, N.D.

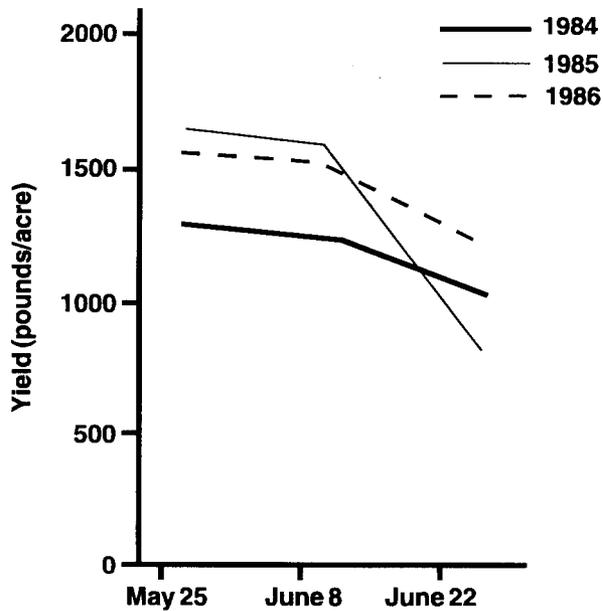


Figure 2. Planting date effect on yield of Manor buckwheat during three growing seasons at Langdon, N.D.

Fertilizer

Buckwheat's response to phosphate fertilizer is similar to that of small grains. It is a heavy user of phosphate and application of phosphate at levels similar to those for wheat is suggested. Nitrogen levels should remain relatively low because of the tendency of the crop to lodge.

For more information on fertility needs of buckwheat, see NDSU Extension Service publication SF-724 "Fertilizing Buckwheat"

Harvesting

The crop begins to flower four to five weeks after planting and continues to flower and produce seed until freeze up. The crop should be swathed prior to a killing frost at a stage when it appears the crop will produce the largest seed yield. A killing frost on a standing crop results in considerable harvest difficulty plus yield loss due to shattering and lodging. Swathing is sometimes made difficult by the succulent nature of the stalks.

Research conducted in Canada indicates the optimum time for swathing to obtain maximum yields is when flowering is near completion and about 25 percent of the seeds are still green. If shattering becomes severe, the crop should be swathed immediately. The crop should be swathed in the morning when the crop is wet with dew or in damp periods to avoid seed shattering. Stalks are succulent and require considerable time to dry. A frost while the crop is in the swath speeds drying.

Buckwheat is threshed with a combine set at a cylinder speed of 600-800 rpm. Care must be taken in threshing, or cracking can result. If excessive cracking or hulling occurs, decreased cylinder speed or wider concave clearance may be necessary.

Buckwheat can be stored safely at 13 percent moisture content for long-term storage. For shorter-term storage when environmental conditions are cool (under 50 F), buckwheat can be stored at 15 percent moisture or less. If the crop must be dried, the maximum drying temperature is 110 F. Never under any circumstances mix old crop and new crop buckwheat, as market grades differ, and market discounts or loss of contract may occur.

Pests

Buckwheat suffers relatively little damage from either diseases or insects. The diseases most common are leaf spot and root rot. Wireworms and aphids occasionally attack buckwheat.

Weed Control

No herbicides are currently cleared for use on buckwheat in North Dakota. Since no herbicides are available, plant buckwheat on land that is relatively weed free. However, under normal conditions weed pressure usually is not great. When planted in warm soils with rapid emergence and growth, buckwheat is a strong competitor with most annual weeds. Avoid planting in fields with a history of perennial weed infestation.

Yield

Grain yields at various experiment station locations in North Dakota over the past few years have varied significantly depending on the growing season (*Tables 1 and 2*). Local growers have reported yields of 0 to 2,000 pounds per acre.

Table 1. Buckwheat Agronomic Traits (average over all locations¹).

Variety	Days to First Flower	Plant Height	Lodging ²	Test Weight
		(inches)		
Mancan	35	45	5.8	43.5
Koban	35	43	5.7	42.6
AC Manisoba	35	44	5.8	41.5
AC Springfield	34	44	5.9	40.7
Koto	35	44	5.0	44.2

¹ Locations include NDSU Research Center sites at Langdon, Carrington, Williston, Minot and Prosper.

² Lodging: 0 = flat; 9 = erect.

Since buckwheat is so sensitive to many stress factors, it is hard to predict yield. Weather is the most limiting yield factor.

Marketing

Buckwheat is almost always grown under contract with seed of the preferred variety furnished by the contracting company. Buckwheat must be marketed the year it is produced so most buckwheat is sold under contract. Not all local grain elevators handle buckwheat. Inquiries should be made as to possible contracts and market outlets before beginning a production program. Buckwheat is sold by the hundredweight.

The North Dakota State Seed Department has established market-grading factors for buckwheat. Contact that office for grading standards information.

Table 2. Buckwheat variety performance data.

Variety	Seed Yield (lb/acre)					2002 Average	2-Year Average*	3-Year Average**
	2002							
	Langdon	Carrington	Williston	Prosper	Minot			
Mancan	652	1702	1214	1921	717	1241	1283	1101
Koban	559	1392	1255	1962	755	1185	1253	1089
AC Manisoba	744	1349	1138	1918	639	1158	1195	1068
AC Springfield	585	1730	1092	1976	968	1270	1338	1122
Koto	643	1182	1244	1940	856	1173	1228	1087
Mean	613	1520	1187	1958	787	—	—	—
LSD 5%	NS	297	188	NS	NS	—	—	—

* Locations for 2001 data include NDSU Research Center sites at Langdon, Carrington, Williston, Prosper, and Minot.

** Locations for 2000 data include NDSU Research Center sites at Langdon, Carrington, Williston, Minot and Hettinger.

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For more information on this and other topics, see: www.ag.ndsu.nodak.edu



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