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Buckwheat: A Minor Crop in South Dakota

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Buckwheat is primarily an emergency crop in South Dakota; however, buckwheat is considered a full-season crop in Minnesota, North Dakota, and Manitoba. Buckwheat probably originated in China. It was first introduced to the United States by Dutch colonists in the Hudson River Valley in the early 1600s.

Buckwheat has many niche markets and uses:

- Flour:
 - Pancakes, breakfast cereals, breads, and poultry stuffing are made from the flour in the United States and Canada.
 - In Japan, buckwheat flour is combined with wheat flour to produce soba, a buckwheat noodle.
 - Because buckwheat flour is gluten free and high in protein, it is in demand at health and organic food stores.
- Groats are used whole in European porridges, soups, and breakfast cereals.
- Straw and hulls:
 - Used as mulches to protect the roots of plants
 - Used as pillows for humans.
- The pollen is used by bees to make buckwheat-flavored honey.
- Seeds, stems, leaves, and flowers are a source of the drug rutin. Rutin is used to reduce high blood pressure and in the treatment of radiation injury.
- Grain and forage is fed to cattle, sheep, pigs, and wildlife.

- Buckwheat is planted as
 - a smother crop to stop weed growth,
 - a cover crop to prevent soil erosion,
 - a green manure to add humus to soil.

Buckwheat yields less food and feed than other grain crops and because of its unique flavor is not readily accepted as a food in the American diet. Consequently, agronomic research in buckwheat has been limited. Even so, South Dakota produced 20,492 bushels on 708 acres (28.9 bu/a) for 2007, according to 2007 USDA Agricultural Census data.

Although buckwheat has a variety of niche markets, potential buckwheat producers are cautioned that very few elevators handle buckwheat. Be sure to lock in a market outlet before planting.

Adaption Buckwheat is a tap-rooted plant that grows better under a wider range of soil conditions than most other grain crops. It does best in well-drained sandy loam soil but will often grow well on heavier soils when seeding is delayed as a result of wet conditions. It is prone to lodging resulting from high winds or heavy rainfall and does not recover from lodging as well as other crops.

Buckwheat is planted later than other crops because it is very sensitive to frost and is a very poor weed competitor when planted early. In South Dakota, buckwheat will generally mature within 75 to 80 days after planting.

Buckwheat usually produces more per acre on low-fertility soils but less per acre on fertile soils than other small grains. Adequate soil moisture is critical to buckwheat throughout early July and August when the plants are producing both flowers and seed. Low soil moisture and hot winds at this time may cause drastic reductions in yield.

Varieties Buckwheat is cross-pollinated; therefore, variety designations will vary and may not be valid except for certified seed lots. Buckwheat flowers are self-sterile and require bees and other insects for pollination. Present varieties have about the same yield capacity and lodging resistance to those the pioneers planted.

Buckwheat Varieties (Björkman, 2009)

Keukett

Keukett is a new variety licensed to Birkett Mills for which seed is being increased to perform commercial trials.

Koto

Koto became available to growers in the northeast for the first time in 2002. It was developed in a joint project between Cornell University and Kade Research, and funded by Birkett Mills. Koto was in commercial trials in New York annually from 1999 through 2001. It has outyielded Manisoba by 13% on average and is more stress tolerant.

Manisoba

Manisoba has outperformed Manor by about 10% in New York trials since 1995, and has been contracted since 2000. It is a superior variety that is the mainstay of northeast production.

Manor

Manor was the dominant variety through the 1990s. It has large seeds that are required by customers making whole groats or soba noodles and meets the international market grade.

Common

Common buckwheat is smaller seeded and used by mills to make flour and pancake mix. It is also grown for cover-crop seed.

Presently there is no buckwheat yield data available from South Dakota. Yield and field data from North Dakota are included in tables 1–4 (see pg. 3).

Seedbed Preparation A well-prepared firm seedbed that is free of weeds is critical for buckwheat establishment. Late seeding reduces frost injury and permits cultivation for weed control before seeding. Presently, there are no herbicides labeled for weed control in buckwheat.

Seeding Date Seeding must be delayed until there is no danger of spring frost, but must be completed at least 12 weeks before danger of the first killing frost in the fall. Buckwheat germinates within a soil temperature range of 45°F to 105°F with an optimum soil temperature of 80°F. An early seeding date of June 15 and a latest seeding date of July 10 is suggested.

Seeding Depth and Rate Buckwheat is generally sown with a grain drill in rows 6 to 7 inches apart. It can also be broadcast if it is covered with soil by spike-tooth, coil-spring, or disk harrowing, depending on seedbed firmness. The crop should be seeded at a depth of 1 inch, but not deeper than 2 inches. A seeding rate of 40 lbs/acre (small varieties) to 50 lbs/acre (large-seeded varieties) is recommended.

Fertilizer Buckwheat is a heavy user of phosphate and a light user of nitrogen. The University of Minnesota Soil Testing Laboratory groups buckwheat with oats and barley in its nitrogen, phosphorus, and potash recommendations. The laboratory's recommendations range from 0 to 60 lbs/acre each for N, P₂O₅, and K₂O. Avoid using higher N rates or the crop may lodge. Fertilizer should be either broadcast or placed in bands away from the seed. Direct contact between banded fertilizer and seed will often result in a substantial reduction in seedling emergence.

Harvesting Buckwheat exhibits indeterminate growth: flowers will be blooming near the top of the plant when ripe seeds are already present on the lower branches. Timely harvest is critical in buckwheat if pre-harvest shattering is to be avoided. The optimum harvest time is when the plant has a large number of developed seeds and 75% of them are brown or black.

The crop may be direct combined following a frost or if the crop is sufficiently dry. Otherwise, windrowing is necessary to allow some ripening of immature seeds in the windrow. Shattering loss may be minimized by windrowing when dew is present in the early morning.

Table 1. Days to Flower at Five North Dakota Test Locations. (Endres and Kandel, 2011)

Variety	Days to Flower					
	Location					Average
	Langdon	Carrington	Prosper	Minot	Williston	
Koma	39	33	29	35	41	35
Koto	38	32	29	34	39	34
Manor	37	31	28	33	38	33
Mean	38	32	29	34	39	-
LSD _{0.05}	1	1	NS	1	1	-

Table 2. Plant Height and Lodging Score at Five North Dakota Test Locations. (Endres and Kandel, 2011)

Variety	Plant Height (inches)/Lodging (0–9)					
	Location					Average
	Langdon	Carrington	Prosper	Minot	Williston	
Koma	44/7.3	45/0.3	46/8.0	35/7.0	26	39/5.7
Koto	48/6.3	49/0.0	47/7.5	37/6.0	28	42/5.0
Manor	45/7.5	47/1.0	47/8.0	38/5.0	28	41/5.4
Mean	46/7.0	47/0.4	47/7.8	37/6.0	27	-
LSD _{0.05}	NS/1.0	4/0.9	NS/NS	NS/NS	NS	-

Table 3. Test Weight in Pounds Per Bushel at Six North Dakota Test Locations. (Endres and Kandel, 2011)

Variety	Test Weight (lb/bu)								
	Location						Average		
	Langdon	Carrington	Prosper	Minot	Hettinger	Williston	2010	2-yr	3-yr
Koma	46.1	47.1	45.7	41.0	36.3	40.3	42.9	45.0	43.0
Koto	46.4	46.2	47.0	39.0	35.4	39.1	42.2	44.2	-
Manor	44.5	45.9	46.5	39.0	37.0	39.4	42.1	43.5	42.0
Mean	45.7	46.6	46.4	39.7	36.2	39.6	-	-	-
LSD _{0.05}	0.9	NS	NS	NS	1.2	NS	-	-	-

Table 4. Yield in Pounds Per Acre at Six North Dakota Test Locations. (Endres and Kandel, 2011)

Variety	Yield (lb/bu)								
	Location						Average		
	Langdon	Carrington	Prosper	Minot	Hettinger	Williston	2010	2-yr	3-yr
Koma	2,197	800	2,331	1,239	1,688	1,951	1,701	1,952	1,605
Koto	2,616	717	2,017	1,203	1,385	1,759	1,616	1,856	-
Manor	2,377	761	2,148	1,643	1,917	1,919	1,794	1,855	1,597
Mean	2,397	759	2,165	1,362	1,663	1,876	-	-	-
LSD _{0.05}	NS	NS	NS	NS	191	NS	-	-	-

A moisture content of 16% is considered safe for storage. If mechanical drying is necessary, a maximum drying temperature of 110°F is recommended.

Use in Rotation Planting buckwheat on summer fallow or legume stubble (like soybeans) is ideal. Seeding buckwheat following wheat, barley, oat, or small-seeded legumes may pose contamination problems unless adequate tillage has minimized volunteer establishment of these crops. Buckwheat following corn is risky if atrazine was on the corn; buckwheat is extremely sensitive to residual atrazine.

The easily shattered buckwheat seed may cause volunteer buckwheat problems in subsequent crops. Buckwheat also leaves the soil loose and subject to erosion. It is also a heavy feeder of phosphorus, which needs to be considered when fertilizing the following crop.

SUMMARY

Although a minor crop, buckwheat has a place in South Dakota agriculture. When considering a niche market, a cropping system change, a rotational program, or an emergency crop, buckwheat is a viable option.

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