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New York State Agricultural Experiment Station

9th Annual Northeast Buckwheat Field Day

August 19, 2003

New York Crop Research Facility, Batavia

Organized by Thomas Björkman
Dept. of Horticultural Sciences
NYSAES, Cornell University.

Hosted by ACDS Research

Schedule

1:00 Introductions
1:15 Effect of 2003 weather on establishment and growth
1:30 Koto performance, variety comparisons.
1:45 Patents and breeders rights for Koto
Cliff Orr, The Birkett Mills
2:00 Soil Health- Effect of buckwheat on soil.
2:15 Break
2:30 Cornell Soil Health Program
Alan Erb
Cornell Cooperative extension, Lake Plain Vegetable Program
3:00 Assessing soil quality and the effect of buckwheat
Bob Schindelbeck,
Dept. of Crops and Soil Science, Cornell Univ.

Seeding Depth

Two major factors play a role in determining seeding depth.

- Weed competition
- Seed rot.

Buckwheat does not share a field well with other plants. It either dominates or is dominated. For buckwheat to be the winner, and to give good weed control, it must emerge quickly. To beat the weeds, **the seed should be deep enough to be covered, and in moist soil.** The precise depth depends on the soil conditions at planting, and can vary within a field. Lumpy soil requires deeper seeding to cover the seed, but that can slow emergence. Dry surface soil is a common reason for going deeper. Soil preparation that brings moisture closer to the surface allows shallower sowing and faster emergence.

The most common cause of lost stands of buckwheat is seed rot. Usually the seeds rot because the seed zone soil is saturated with water for a few hours in the days after seeding. **The seed should be at a depth where water can percolate quickly.** Silty soils often form a wet crust at the surface after a hard rain. The seed needs to be below where the crust will form. Soils with a plow pan will remain wet deeper. Based on your knowledge of the soil estimate the depth that will drain quickly after a thunderstorm.

Varieties

All of the buckwheat varieties on display were bred by Dr. Clayton Campbell of Morden, Manitoba. They were released either through Agriculture Canada or Kade Research.

Manor

This variety was released in 1983, and it was the dominant variety in the Northeast through the 1990s.

Manor has a larger seed than NYS common buckwheat, which had been dominant before. The seed size was preferred for more efficient processing. The seed is generally brownish with stripes common.

The search for higher and more stable yields drove research to develop new varieties. The two below were identified in that process.

Manisoba

This variety was released in 1994 under patent from Agriculture Canada. NY variety trials identified it as consistently higher yielding that Manor.

Manisoba seed are more uniform in size than Manor, with most of the seed being the size of the largest Manor seeds. This also results in some processing efficiencies. Sometimes the hull is large but the kernel doesn't fill it completely, causing the test weight to suffer. The test weight is equal to or slightly lower than Manor.

It has a specified proportion of red-hulled fruit to identify the variety

Koto

This variety was released in 1998 through exclusive contracts with Kade Research. It was identified in NYS breeding trials as a superior genotype for the Northeast, and recommended for release.

Koto is faster to cover the ground with its leaves, resulting in better weed control and more rapid growth before flowering. It also tolerates dry periods better, with some ability to put on some extra seeds when it rains again.

Koto has a black seed coat with narrow seams on the corners. It has a higher test weight than Manor. It has a different proportion of red-hulled fruit to identify the variety.

Assessing seed set

The first flowers are on node 4 and 5. The higher parts of the plant grow out later. If there is light enough low in the plant, branches will form from node 3 and lower.

Under ideal conditions, there should be a lot of developing seed on the short branches on node 4 and 5. More seeds will form later on the upper clusters and on the upper parts of the branches.

Heat blasting early: dead flowers on node 4 and 5, but no seeds. New kernels developing higher and lower on the plant.

High abortion: There are many false kernels Seeds that will abort look lighter and more transparent than those that will fill.

Seed fill has just begun in a July 3 planting in Geneva. In Batavia, the planting was July 9.

For good yield, plants with one branch and reaching the canopy should make 30 to 40 seeds.

Timeline of seed development

4 days after pollination: tip of hull is longer than sepals.

10 days after flowering: The hull is full length, and show the first signs of swelling.

14 days after flowering: the seed is full size, but filled with mostly water.
18 days after flowering: the seed begins to turn brown.

Buckwheat and soil health

Buckwheat is appreciated for its benefits in a rotation. It has a strong reputation for leaving the soil mellow, and for suppressing certain weeds.

Mellowing the soil. Buckwheat has very fine roots that secrete the polysaccharides that help hold soil aggregates together, and that feed the bacteria that are important for stabilizing aggregates. In addition, the late planting date means that the ground can be worked when the soil moisture is ideal. That protects aggregates and creates a good crumb that can be maintained by the buckwheat crop. Bob Shindelbeck's demonstration this afternoon will show the importance of these aggregates in a healthy soil.

Reduces weeds. Buckwheat suppresses weeds in three ways. First, preparing the ground in June disrupts summer perennials. Quackgrass is the one that is most mentioned. Second, buckwheat germinates fast, and has horizontal leaves that shade the ground. A vigorous stand of buckwheat will shade out many weeds. Third, buckwheat stems contain compounds that are toxic to certain weeds, especially pigweed.

Erosion protection. For many Northeastern soils, raindrops hitting the soil causes a degradation called "erosion in place." Such erosion leads to crusting and poor percolation. Buckwheat's horizontal leaves break the impact of the rain and can eliminate such erosion during the time that thunderstorms are most common.

Rapid decomposition. Buckwheat straw and fine roots break down quickly. It is possible to plant a fall crop soon after harvest. Most crop residue needs at least 2 weeks to break down in order to establish the next crop, and that may be too late for many fall crops. If the next crop is in the spring, the decomposition of the residue lets the ground warm up and dry early.

But,
No nematode suppression. Buckwheat has little effect on the population of most nematodes, and it *increases* the population of root-lesion nematodes

A letter from one old Virginia farmer to another:
George Washington to Thomas Jefferson, October 4, 1795

"It has always appeared to me that there were two modes in which Buckwheat might be used advantageously as a manure. One, to sow early; and as soon as a sufficiency of seed ripened to stock the ground a second time, to turn that in also before the seed begins to ripen: and when the fermentation and putrification cease, to sow the ground in that state, & plough in the wheat."