UNIVERSITY OF DELAWARE
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Buckwheat

Introduction

Buckwheat (*Fagopyrum esculentum* Moench), although not a major crop, can be an important feed crop for wildlife; an excellent source crop for honey bees; a smother crop for weeds; a cover crop in orchards, vineyards, and other fruit crops; and a grain source for humans and livestock. Buckwheat can be grown under many climatic conditions, planted almost anytime during the growing season, and on a wider variety of soil types than any other grain crop. For this reason, the grower needs information on cultural practices required to grow the crop.

Although thought of as a cereal, this plant is not a member of the grass family, in which the true cereal crops belong. The crop belongs to the family Polyganaceae, or buckwheat family. Other family members include weeds such as dock, sorrel, knotweed, and black bindweed. Petalless flowers are borne in racemes (essentially an elongated flower stem of stalked flowers) at the ends of each branch or on short stems called pedicels that arise from the axils of the leaves. The crop is indeterminate so that the seeds do not all ripen at the same time. Blossoming continues as long as conditions permit. Buckwheat is cross-pollinated. Insects are the major pollinators.

Buckwheat is an annual that can grow from 2 to 5 feet tall. The plant consists of a single, erect stem and usually has many branches. Leaf blades are 2 to 4 inches long and are triangular and heart-shaped. The plant has a shallow taproot and numerous short side roots. The root system seldom goes more than 3 feet deep. Roots comprise only 3 percent of total plant weight as compared with 6 to 14 percent for other cereal grains.

Crop Requirements

Buckwheat grows best under cool, moist conditions and can mature in 10 to 12 weeks. If planted later in the season, maturity can occur in 8 to 9 weeks. Although best planted after the last frost, in Delaware the crop can be planted from late April until the first of August. The crop germinates best at 80o F but will germinate at any temperature between 45o to 105 o F. Yield performance of early plantings can sometimes be adversely affected by hot, dry weather when it occurs during bloom.

If the crop is combined, a cover crop should be established before winter. Buckwheat leaves the surface soil in a loose, friable state that is more subject to erosion than soil planted to other grain crops.

Soil Requirements

Buckwheat is tolerant of a wide range of soil condtions, possibly more than any other grain crop. The crop produces a poor yield on heavy, wet soils. If climatic conditions favor grain development, the crop will produce a better crop than any other grain on infertile, poorly tilled soil. Buckwheat tolerates very acid soil conditions but will respond to appropriate applications of lime. On light, well-drained soils, such as those found in much of Delaware, lodging can be a problem with buckwheat and can cause significant yield reductions. Once lodged, buckwheat will not recover to a near upright position as will some crops such as corn.

Seedbed Preparation

In the Deep South, the crop is often sown on poorly or hastily prepared land or on land so rough and stony that good preparation is impossible. Under such poor establishment conditions, buckwheat is still capable of producing fair crops. Buckwheat will respond to good seedbed preparation. When conditions permit, a weed-free, smooth, well-prepared seedbed should be established before the crop is seeded. If established weeds are controlled with an appropriate burndown chemical program, the crop can be seeded in stale seedbeds or in crop residues using no-till techniques.

Soil Fertility/Crop Fertilization

When possible, a soil test should be obtained prior to seedbed preparation. If soil test levels of phosphorus and potassium are medium or better (50 or greater on the University of Delaware soil test index system), additional applications of phosphorus and potash will not be needed. If soil test results are not available, apply from 100 to 300 lbs/A of a complete fertilizer such as 3-12-6, 3-12-12, or 5-10-10, or apply about 100 to 150 lbs/A of an 8-24-24.

Buckwheat does not need a lot of nitrogen (N) and will lodge if too much nitrogen fertilizer is used. Nitrogen rates should be limited to 10 to 20 lbs N/A. If poultry manure is used as a fertilizer source, manure rates should be limited to 0.5 to 1 ton/A. If poultry manure is applied to buckwheat, additional applications of phosphorus and potash will not be needed.

Buckwheat is tolerant to a wide range of soil acidity. However, if the soil pH is below 5.5, a light application of ground limestone will be beneficial. For lime applications, consider a pH of 5.5 to 6.0 as the target pH. Lime should be applied several months in advance of seeding to allow for neutralization of soil acidity.

Variety Selection

In the past, several recognized varieties have been available for production. These include "Japanese," "Silverhull," and "Common Gray." In many cases, seed of unknown or no variety designation will be all that's available. All seed should be tagged with the results of a recent germination test. If germination is less than 70 percent, seeding rates should be increase to account for germination.

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Some varieties available around the county include Mancan, Manor, Royal, and Tokyo (a smaller seeded variety).

Another sometimes available variety is called Tartary buckwheat (*F. tataricum* Gaertner). This variety is a very poor honey producer and should not be used in bee production. Tartary buckwheat is also called "Indiawheat" and "Duckwheat" and, although closely related to buckwheat, is a separate species. Tartary is similar to buckwheat but smaller and more slender. It is considered more hardy than buckwheat.

Seeding Depth and Rate

Buckwheat can be drill-seeded using a conventional grain drill or other type of drill (including reduced-tillage drills) capable of seeding small-seeded species. For drill seeding, plant 36 to 60 lbs/A. The crop also can be seeded broadcast. For broadcast seedings, plant at the higher rate per acre. Seed normally germinates in about 6 days.

Tartary buckwheat seed is about 40 percent smaller than common buckwheat. Tartary should be drilled at about 24 lbs/A.

Buckwheat should be seeded between 1 to 2 inches deep. In a finely prepared, loose seedbed, the seed should be placed shallower but preferably in moist soil. Buckwheat should not be seeded more than 2 inches deep.

Weed Control

No herbicides are registered for use on buckwheat. Weed control in buckwheat is thus limited to certain cultural practices that can help reduce the potential for weed problems. First, the crop should be seeded into a fine, firm, weed-free seedbed. Secondly, the seed should be placed into moist soil to ensure quick germination and emergence. These practices help the crop compete with any emerging weeds. Spring and very early summer-planted buckwheat are most susceptible to weed problems. Summer-planted buckwheat usually competes effectively with germinating weeds and can actually smother weeds.

Insects and Diseases

Buckwheat suffers little significant damage from either diseases or insects. The most frequently observed diseases on buckwheat are a leaf spot caused by the fungus, *Ramularia* species, a root rot caused by *Rhizoctonia*, and aster yellows. Wireworms and aphids are the most frequently observed insect pests on the crop. Many bird species, rabbits and other rodents, and deer can occasionally attack the crop.

Harvesting

As a wildlife crop, buckwheat is left in the field to provide winter feed for many species of birds as well as for other larger animals.

When harvested as grain, the crop can be combined after swathing or directly combined. If it is possible without encountering frost, windrowing should be delayed until flowering diminishes

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and about 75 percent of the seeds have matured. Swath immediately if shattering is seen in the standing crop. Swathing at night or early in the morning when humidity is higher can reduce shattering losses. Yields of 30 bu/A (48 lb bushel) are considered good. Since stems are often brittle when mature, timely harvest is needed to prevent lodging. The combine should be set as for oats using the same adjustments and screens. Generally, the grain is harvested at 17 percent moisture and is artificially dried to a storage moisture content of 12 to 13 percent to preserve grain quality. Dry with maximum air temperatures of 110 F.

Usages

The chemical composition of whole grain buckwheat is 2.35 percent fat, 11 percent crude protein, 12 percent fiber, 1.7 percent ash, and 60 to 64 nitrogen-free extract. The lysine percentage of the protein exceeds that of cereal grains. A bushel of buckwheat weighs 48 lbs and will mill 30 lbs of flour and 18 lbs of hulls.

Although grown primarily for human food, only the best quality grain is milled for food. The lesser quality grain is fed to livestock or poultry. Buckwheat shorts or middlings are used in mixed feeds for livestock. Hulls have little feeding value but can be useful as a mulch or as a packing material.

As a green manure crop, buckwheat can produce three crops within a growing season. Since it is not a legume crop, buckwheat does not fix nitrogen. However, the crop can increase soil organic matter levels and can help mobilize soil phosphorus.

The crop is an excellent temporary honey crop since buckwheat may bloom for 30 days or more. An acre of buckwheat blossoms can provide bees with enough nectar for 100 to 150 lbs of honey. Buckwheat honey is dark and has a distinctive (recognizable) flavor.

Buckwheat can be seeded in poor, infertile areas, along field margins, and on set-aside land as a wildlife feed. For this purpose, the crop can be seeded in late July and produce a winter feed crop. Deer and small rodents, such as rabbits, are reported to feed on buckwheat plantings.

Cautions

In humans, a continued heavy diet of buckwheat cakes results in development of a skin rash in certain people who are allergic to buckwheat protein. Animals fed a buckwheat ration also develop a rash, but the effect is confined to white-haired animals that are exposed to light. It is also reported that livestock with an unpigmented skin are susceptible to buckwheat poisoning.

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