Proso Millet Research

Description
Millet is a general term used to categorize a wide range of small-seeded cereals. It is also called Panicum miliaceum, hog millet, and yellow hog. Proso millet is a warm-season grass capable of producing seed.

The harvested grain is a seed enclosed in a hull that is typically white or creamy-white, yellow or red, but may be gray, brown, or black. White-seeded varieties are most often grown, followed by red-seeded varieties.

Plant height ranges from 12 - 48". Plant stems are stout and erect; and both stems and leaves are hairy. The panicle (flower head) is large, open, and drooping, similar to oats. There are three variety classes, based on the shape of the panicle: (1) spreading, (2) loose and one-sided, and (3) erect.

Uses
There are many different uses of this crop. It can be used for human consumption and livestock feed. It is also commonly used in the United States for bird seed. Millet is desirable for human food because it is easily digestible and gluten-free. It can be ground into flour, used to bake flatbreads, used to make tabbouleh, a southwest Asian salad, or for brewing beer. The feed value of proso millet for cattle and swine is generally considered equal to grain sorghum or milo (and corn when less than 50 percent of the ration's corn is replaced).

Proso grain should be processed to crack the hard seed coat, allowing for better livestock digestion. For swine and poultry, proso millet, like most other cereal grains, should be supplemented with lysine. The grain is cleaned and further processed and used for bird seed. Some proso undergoes a dehulling process to supply both human and animal needs.

Proso millet is often planted as an emergency cash crop for situations where other crops have failed, been hailed out or were never planted due to unfavorable conditions. Historically, it has been grown as a replacement crop planted when the winter wheat crop failed, but it is now an important part of crop rotations in eastern Colorado.

In a rotation, it has the advantage of enhancing weed control, especially with winter annual grasses in winter wheat. Growers wishing to avoid summer fallow frequently use proso as a transition for a full-season summer crop back to winter wheat. Proso is versatile in that it can be successfully grown on many soil types and is probably better adapted than most crops to “poor” land, such as land with soils having low water holding capacity and low fertility.

Harvest
Internationally, proso millet has been grown in China, the former Soviet Union, Afghanistan, Romania, Turkey, and India, to name just a few of the many countries. In the United States, the Central Great Plains states of Colorado, Nebraska, and South Dakota are the major producers. Other states producing proso include Kansas, Wyoming, Minnesota, and North Dakota. Proso production in the U.S. has dramatically increased in the past ten years.

Proso millet is a short season crop; the number of days from planting to harvest is between 60 and 100. Usual harvest is in September. The crop is swathed and usually during September. The crop is swathed and allowed to dry and cure in windrows. Swathing too late results in reduced yield and test weight. Swathing too soon allows to dry and cure in windrows. Swathing too late results in reduced yield and test weight. Swathing too soon reduces yield and test weight. Swathing too soon reduces yield and test weight. Swathing too soon reduces yield and test weight. Swathing too soon reduces yield and test weight.

Proso millet is harvested when the seed in the head is 13% or less. Proso millet stores well when the moisture content of the seed is 13% or less.

Planting
Planting date ranges from May 15 - June 30. For no-till systems, early to mid-June is best. For conventional

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Production systems, mid-May is optimal because soil temperatures rise sooner than in no-till. Optimum soil temperature for planting ranges from 55°F to 65°F. Late planting may yield less grain due to early fall freezes. Heavy rains soon after planting can bury seed and cause soil crusting, resulting in a poor stand. Soil pH and weed control at planting time are concerns. The crop is typically planted using a grain drill (7" disk) at a rate of 8 - 20 lb per acre, higher seeding rates are recommended. Planting depth is ½ - ¾". Common row spacing is 7, 10 or 12 inches. The number of plants per acre ranges from 850,000 to 1,400,000.

Fertilizer Use
Nitrogen deficiency in soil is common in proso production areas, especially when planted following winter wheat. Normal application rates range from 40 - 60 lb per acre. Phosphorous may also be needed and is normally applied at a rate of 20 lb per acre. Zinc is required in some cases. Nitrogen, phosphorous and sulfur are applied in eastern Colorado for proso millet production. It is recommended to band nitrogen with or near the seed.

Irrigation
Proso millet is grown as a dryland crop without any supplemental irrigation. However, there are a very small number of acres produced in the state that are irrigated.

Harvest
The seeds do not mature uniformly and shattering of early ripening seeds is a common problem. Because of this, proso millet is usually mowed (swathed) and cured in a windrow prior to combining.

Proso millet is harvested when the seed in the upper half of the panicle are mature. In Colorado this is usually during September. The crop is swathed and allowed to dry and cure in windrows. Swathing too soon reduces yield and test weight. Swathing too late results in losses due to lodging and shattering. Proso cannot be direct combined because (1) the seed shatters soon after it is ripe, (2) proso lodges when left standing, and (3) the straw moisture content is too high at harvest time. Normal test weight is 56 pounds per bushel. Seed moisture content of 13% or less is optimal.

Storage
Proso millet stores well when the moisture content of the seed is 13% or less.

Insect Pests
- Banks grass mite
- European corn borer
- Grasshoppers
- Greenbug
- Thrips
- Wheat stem maggot

Weeds
- Key Weeds Buffalo bur
- Common and Netseed lambsquarters
- Common sunflower
- Downy brome
- Field sandbur
- Green foxtail
- Kochia
- Prostrate knotweed
- Puncturevine
- Redroot pigweed
- Russian thistle
- Volunteer wheat
- Wild buckwheat

Disease
- Bacterial Stripe Disease
- Head Smut
- Kernel smut

All information above and more can be found with the following references:

Crop Profile for Proso Millet In Colorado
Colorado State University
http://www.extsoilcrop.colostate.edu/CropVar/documents/prosomillet/Crop_profile_for_prosomillet_co.pdf

Agricultural Marketing Resource Center
http://www.agmrc.org/commodities__products/grains__oilseeds/proso-millet/

Producing and Marketing Proso Millet in the Great Plains
University of Nebraska-Lincoln
http://ianrpubs.unl.edu/live/ec137/build/ec137.pdf

Producing and Marketing Proso Millet in the High Plains
University of Nebraska Cooperative Extension EC 95-137-C
http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=170&context=extensionhist