

Unit D: Production of Field Crops

Lesson 3: Cereal Crops: Rice, Millet, Barely, and Rye

Terms

- Continuous flood
- Grain length
- Lowland rice
- Upland rice



Objective 1

Describe rice and wild rice
and discuss their value.

What are rice and wild rice and what are their values

- It is believed that rice cultivation began simultaneously in many countries over 6500 years ago. The first crops were observed in China (Hemu Du region) around 5000 B.C. as well as in Thailand around 4500 B.C.



What are rice and wild rice and what are their values

- Rice is a cereal grain grown on land flooded with shallow water.
- It is an important plant in Asia and Indonesia and is a source of food for half the world's population.
- Almost all rice is grown in Asia with some being grown in Africa and the United States.

What are rice and wild rice and what are their values

- Rice is grown on nearly 1,214,056.9 hectares each year and the average yield per one-half hectare is 3,137.75 kilograms.
- Rice is milled to remove the outer hull and polished into the white form we commonly see.

What are rice and wild rice and what are their values

- Rice is classified according to its grain length and cultural method.
- *Grain length* is the classification of rice by the length of the kernel.
 - Short-grained rice is less than half a centimeter long and is grown in milder climates.
 - Medium-grained rice is somewhere between 0.5 to 0.64 centimeters long and is also grown in milder climates.

What are rice and wild rice and what are their values

- Long-grained rice is 0.64 to 0.79 of a centimeter long and is grown in tropical climates.
- It has more starch, which makes it more light and fluffy when cooked.

What are rice and wild rice and what are their values

- Cultural method refers to how the rice is grown.
- *Lowland rice* is grown in large, flat fields that are flooded by irrigation and surrounded by dikes that direct the flow of water.
- *Upland rice* is grown in small fields on the sides of hills known as rice paddies.

What are rice and wild rice and what are their values

- Rice is planted so that the grain is formed during late summer.
- This helps reduce problems caused by slowed grain production on hot days.

What are rice and wild rice and what are their values

- Rice can be planted by drilling the seed into a dry seedbed, broadcasting onto a dry seedbed, or broadcasting into standing water.
- The dry seedbeds are flooded shortly after planting.

What are rice and wild rice and what are their values

- The time to plant rice depends more on the air temperature than the soil temperature.
- Shallow water warms quickly.
- Rice is planted in temperatures from 18.3° C to 21.1° C and from April to early July depending on the area in Afghanistan.
- The rice cycle is generally about three months long.

What are rice and wild rice and what are their values

- Rice can also be started in the nursery during the spring and then transplanted during the summer months.
- When the seeds have germinated they are transplanted by hand to the wet rice paddies.
- Depending on the environment and type of rice, this transplantation may occur from 20 to 80 days after planting the seeds

What are rice and wild rice and what are their values

- Rice is seeded at 51 to 56.75 kilograms per half a hectare when drilling or 68 to 85 kilograms per one half hectare when water seeding.
- All rice seedbeds need to be level.
- When dry seeding, large clods are removed.
- In water seeding, clods are left or grooves are made to ensure seed placement.
- During the growing phase the plant flowers and begins to develop four or five tillers along its main stem. Each tiller has a head, or panicle, that actually produces the grains of rice.

What are rice and wild rice and what are their values

- Water management is necessary in rice production and varies with the soil texture.
- Wells and pumps are used to maintain adequate water levels.
- *Continuous flood* is when the rice field is flooded throughout the growing season.
- Less water is needed when the field is continuously flooded.

What are rice and wild rice and what are their values

- Soil testing should be performed on rice fields at least every three years.
- Nitrogen is the most important nutrient in rice production.
- Fertilizers should be added when the fields are dry.

What are rice and wild rice and what are their values

- Rice has a number of pest problems including small aquatic animals.
- Crop rotations, chemicals, flooding the fields, and planting resistant varieties can help reduce the more common plant pest such as armyworms, grasshoppers, molds, and rots.
- Before rice can be harvested, the water is removed and the soil is allowed to dry.

What are rice and wild rice and what are their values

- When the rice is ready to be harvested, the paddies must be completely drained and the field allowed to dry.
- Harvesting has several steps: cutting the plants, moving the crop to another location, threshing (separating the grain from the rest of the plant), cleaning, and storage.

What are rice and wild rice and what are their values

- While harvesting can be accomplished using machinery, in many areas it is also carried out by hand in the traditional methods that have been used for generations.
- Rice kernels are harvested at 18 to 22 percent moisture.

What are rice and wild rice and what are their values

- Rice that we eat is actually a grain that is found inside the seed hull.
- During milling, the hull, or outside layer is removed, leaving brown rice.
- White rice is the result of more processing that removes the outer layers of bran until it is a translucent white grain.

What are rice and wild rice and what are their values

- Wild rice is a crop grown in shallow lakes and rivers.
- The plants grow to 61 to 71 centimeters tall and mature in 120 days.
- Wild rice is susceptible to a number of pests including small land and water animals.
- The cultural methods of wild rice are similar to those of common rice.
- Wild rice is considered a gourmet food in other parts of the world.

Planting upland rice



Rice field nursery



Nursery yield



Preparation of the field



Hands on Foot in Training



Repicking



Result



Objective 2

Describe millet and discuss its value.

What is millet and what is its value

- Both the wild ancestor and the location of domestication of proso millet are unknown, but it first appears as a crop in both Transcaucasia and China about 7000 years ago, suggesting that it may have been domesticated independently in each area

What is millet and what is its value

- Proso millet is the only variety of millet grown for grain. It has stout, erect stems that grow about 1.2 meters tall.
- The grain heads are similar to those of grain sorghum. The ripened grains are ovate and rounded.

What is millet and what is its value

- There are four forage millets commonly grown: pearl millet, brown top millet, foxtail millet, and Japanese millet.
- Pearl millet can grow up to 4.6 meters tall and has a grain head that looks like a cattail.
- Some species of foxtail millet are grown for birdseed.

What is millet and what is its value

- If frost is an issue, millet is planted after the last frost.
- It should be seeded at the a rate of 11.3 to 13.6 kilograms per 0.4 hectare in humid areas and 4.5 to 6.8 kilograms per 0.4 hectare in drier areas.
- Most millet is planted in prepared seedbeds and can be drilled or broadcast.

What is millet and what is its value

- Weed control need to be practiced in planting the millet crop even before sowing so that the plants grow without any weed competition from germination onwards.
- That means the first weed control activity starts even before sowing millet.
- Manual weeding is a very common practice to control weeds in the millet crop.

What is millet and what is its value

- Timely weeding is important than the frequency of weeding.
- It is necessary to keep the crop free during the first month of its growth through manual weeding or by using a hoe.

What is millet and what is its value

- Soil testing is needed to determine the need for N, P, and K.
- Millet used for hay is harvested while still in the growing stage.
- Millet used for grain is harvested after the heads have matured.
- To reduce shattering, millet is often mowed, raked, and combined.

Objective 3

Describe barley and discuss its value

What is barley and what is its value

- Barley is one of the oldest known grain crops. People first began to farm barley (instead of picking it wild) around 10,000 BC in West Asia.
- Barley is a crop that does well throughout the more temperate regions of the world, and is one of the most widely distributed of all cereals.
- Barley ranks fourth among major world crops.



What is barley and what is its value

- Barley is used as a grain and for forage.
- Some barley is used for making malt and livestock feed.
- It can be substituted for corn in livestock rations.
- The Grain comes in five colors: Red, White, Black, Purple, and Blue.
- Barley generally makes best growth after a cultivated crop such as corn, sugar beets or potatoes

What is barley and what is its value

- Barley looks like wheat and has the same growth requirements.
- Barley prefers a well-drained light soil.
- Barley is grown in cool climates and can be planted for winter or spring growth.

What is barley and what is its value

- Winter barley is planted in the fall. Spring barley should be planted as early as possible.
- In Afghanistan 80% of barley is spring-planted, with only 20% fall-planted, as barley varieties are less cold-tolerant.

What is barley and what is its value

- A distance of one-half a meter between the rows is ample for barley.
- Appropriate thinning for all kinds of barley is advisable. Do not permit plants to crowd one another in the row.
- Barley is seeded into prepared seedbeds at 54.5 kilograms per hectare.

What is barley and what is its value

- Barley responds well to fertilizers.
- Also, barley varieties grown are early-maturing, about 25 days before wheat harvest.
- Fall-planted barley, especially, is early, so birds attack it and can cause heavy damage.

What is barley and what is its value

- After the heads have dried, barley crops are harvested by hand tools such as sickle, scythe or just hand pulling, tractor mounted mower and combine.

Objective 4

Describe rye and discuss its value

What is rye and what is its value

- Rye is a cereal grain crop used for grain, hay, pasture, or as a cover crop.
- The major uses are for livestock feed and to make flour for baking.
- Cultivated rye is believed to have originated from a wild rye in southwestern Asia somewhere around 1800-1500 BC.

What is rye and what is its value

- Rye is similar to oats and barley but has lower yields. It is hardier than other small grains, can be planted in the fall or spring, and grows much like wheat.

What is rye and what is its value

- Rye is planted in prepared seedbeds with drills or broadcast.
- Nitrogen should be topdressed in early spring. Rye heads tend to shatter easily.
- Rye is also beneficial to the environment. It is used as a cover crop to reduce soil erosion, enhance soil water retention, contribute a green manure, and to reduce weed growth (reducing the need for herbicides).