

# Rice

## General Information

Rice is a staple crop all over the world, grown on every continent except Antarctica, but it is certainly not the first grain most people think of when they consider growing grains in the northeast. It can be produced here, but is a difficult crop for this climate and very little is known about its culture here in the northeast. Rice yields rely heavily on high temperatures and direct sunshine. Rice, as opposed to other grains, grows in aquatic conditions; this means that a man-made paddy must be created for rice cultivation. Because this is an unfamiliar method of agricultural production for most New England growers, and one that requires a large initial input of time and resources, interested farmers should carefully research the crop before beginning. There are varieties of upland rice available; these may grow on dry land in warmer regions of the northeast if irrigated in August and September. In addition, because rice is a new crop for this area, the methods described below may encompass only a few ways to grow rice here.

## Preparation & Planting

It is very important to note that you cannot turn an existing wetland into a productive rice paddy, either legally or practically. However, most farms have some marginal, water-logged land that may be efficiently transformed to grow rice. The construction of a rice paddy takes a lot of work, whether by hand on a small-scale or with heavy machinery; starting with level land will help. The rice paddy should be carefully and deliberately designed to both grow rice and create and promote healthy wildlife habitats.

Clayey soils create a hardpan that will hold irrigation water without percolation; topsoil is removed from that hardpan and the subsoil is leveled.

Topsoil is then added back into the paddy, which is flooded and leveled to

prepare the seedbed. Rice is a heavy-feeding grain and requires adequate nitrogen, phosphorous, and potassium; soils intended for rice production should be tested and evaluated accordingly. An irrigation pond or other large, reliable supply of water is needed to control the level of water needed in the paddy; this may be an opportunity to use nutrient-rich storm water from animal paddocks or other areas on a farm.



Rice grows in hillside paddies at Whole Systems Design in Moretown, VT.

Obtaining rice seed is difficult unless you can find a grower in New England from whom you can buy seed or seedlings directly. Choose a variety with minimal days to maturity for the

northeast region's short growing season. Medium- or short-grain rice varieties are more suited to temperate climates; whereas long-grain rice does well in the tropics. There are a few seed-banks in the U.S. that distribute seed (including the National Small Grains Collection), but this is generally for research purposes only. Varieties that do well in cold climates are generally originated in northern Japan, and the USDA's restrictions on importing rice seed are extremely strict. Imported seed must be meticulously documented and then quarantined for a year before being planted. For more information on this process, contact the USDA's Plant Protection and Quarantine program.

Rice seedlings should be started indoors in a greenhouse in late April or May. Rice seeds germinate best at about 80-90°F. Start by soaking seeds and then sowing them, transplanting, flooding the trays, and hardening off the seedlings. Carefully transplant plugs ½" deep into the paddy in late May, when the soil temperature is at least 50°F. At that point the soil in the paddy should be fully saturated, but not flooded. For the first few weeks, water should be quite shallow (¾-1") to develop short, strong plants with sturdy roots.

### Cultural Practices

Reliable water supply is crucial for growing rice in the northeast, as well as the infrastructure and ability to control flooding of the paddy. While the weather is still cool, especially at night, flooding the paddy and allowing the sun to warm its water will protect the small rice plants from frost damage. A 1-2" layer of standing water will warm the rice plants. To grow healthy, short rice plants, you need a growing season with warm temperatures and bright light in the form of direct sunshine. If temperatures are cool, the plants' leaves may begin to turn yellowish; in addition, cloudy, low-light conditions will yield tall and weak plants.

As the plant grows, it will tiller and develop multiple stems, then begin to flower. At flowering, plant height should be uniform throughout the paddy or variety, and there should be no lodging. Beginning at the flowering stage, most rice varieties will take about 30 days to ripen; warm and sunny weather during this period will quicken ripening. Rice plants require more water than usual for seed head development and are also sensitive to cold during the booting stage; growers should control flooding to consistently achieve about 6-12" of water in late June and July.



Close-up of rice plant. (Photo: Whole Systems Design, LLC)

To control weeds, growers can hand-weed or "rogue" their rice paddies, or use mechanical cultivation in very shallow water with a rotary weeder specifically designed for aquatic agriculture. Maintaining appropriate water depth will assist with weed control as well, since most grasses will not grow in standing water. Duckweed often builds up on the surface of the water, but the duckweed does not compete aggressively for nutrients, and the floating layer of

vegetation may indeed increase insect populations, improve water quality, and create habitat for small aquatic animals. Because rice is a relatively new crop for the northeast, insect and disease damage is low.

Interseeding rice with a legume (such as white clover) is another method of controlling weeds. Rice production that utilizes this double-cropping strategy, as well as minimal tillage and less water than traditional paddy cultivation, is often called Fukuoka-style production, after the farmer and philosopher Masanobu Fukuoka. Rice does not necessarily need to be underwater for the duration of its growing season, but much more research and cultivation should be done before growing rice in this climate.



Rice hangs at the Akaogis' house in Westminster, VT.

### Harvesting & Storing

Two to three weeks before expected harvest, growers should stop adding water to the rice paddy and allow it to dry out. At this point, warm weather is needed to fully ripen and dry the rice to an appropriate level for harvesting. Rice is harvested in the northeast in September, when the seed head has developed and the majority of the plants' panicles are brown, but before the weather turns cold enough to damage the plant, since rice cannot tolerate frost. Rice should not be harvested with a moisture content of 20% or greater. Small-scale growers can often harvest by hand and dry the rice plants by hanging them in a greenhouse or other protected area. Thresh the seeds from the stems by hand, with a foot-powered thresher, or with larger-scale processing equipment, then store rice in bins or containers that are inaccessible to rodents and mice and monitor regularly for deterioration in quality. Rice should be stored at 14-15% moisture.

Rice can be very productive in the northeast, yielding as much as 2 tons per acre of rough rice. Removing the hull of the whole rice kernel will yield unprocessed brown rice, which can then be milled into white rice by removing its bran. Many different methods exist for cooking with rice, and they often vary by the kind of rice used and its level of amylose.

### References:

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