Yield of Massachusetts Grown Paddy Rice

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Rice is a staple food for over half of the world's population. Over 90% of the total world rice production is grown in Asia. Rice is commonly characterized as a semiaquatic crop, well adapted to submerged anaerobic soil culture. Some cultivars are well adapted to dryland cultivation on hilly fields like any other cereal. The greatest proportion of the world rice crop, about 80%, is not irrigated and is dependent on natural rainfall. This includes rain-fed paddy fields and dryland upland rice.

Widespread increases in rice yields have been achieved through a number of accomplishments, especially in breeding programs at the International Rice Research Institute (IRRI) and at other places for short-stature, stiff-strawed, fertilizer-responsive and photo-neutral cultivars. Such cultivars were early maturing and tolerant to attacks of major insect pests and disease pathogens, and contributed to the Green Revolution.

Rice requires a high growing temperature and cannot tolerate frost in any of its growth stages. It may be a surprise to think of rice grown at equivalent to north of Maine in other countries such as China. While it is grown from the tropics to the warm temperate zones, up to 40° S and 50° N of the equator, the highest yields and best quality rice are recorded between 30° and 45° N of equator and the average yield per acre generally increases as the countries are situated farther away from the equator. Because we believe rice has never been evaluated as a potential crop for Massachusetts, our objective was to evaluate 6 rice varieties in paddy culture at the UMass Agronomy Research Farm.

Paddy rice varieties were seeded in mid-May in the greenhouse and were transplanted on June 15, 2002 at the UMass Agronomy Research Farm in South Deerfield. The paddy rice seedlings were transplanted into a traditional paddy for growth under almost continuous flooded conditions typical of lowland rice culture. The same varieties are also being grown in semi-dryland conditions where supplemental irrigation is used to prevent drought stress. The first of the paddy rice varieties began flowering on July 20, and all were ready to harvest in late August early September.

Yields of rough paddy rice from 2002 ranged from 110 bu/ac to 205 bu/ac (Figure 1). The bushel weight for rice is 45 lbs. These yields were very good and comparable with yields in north China. Yields of same varieties grown in dryland with supplemental irrigation were less than half these yields and maturity of the grain was uneven and with many aborted and partially filled grains. Inputs to the paddy rice were minimal, with only the addition of nitrogen and maintenance of water. The dryland rice probably suffered from too much water stress and considerable weed pressure. Dryland plots were hand weeded once, but this was insufficient. Virtually no weeds occurred in the paddy rice culture even though the soil used was adjacent to the dryland plots.

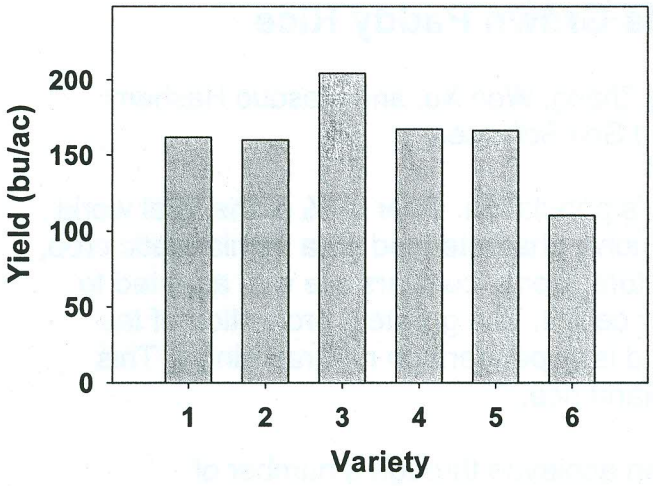

Figure 1. Yield of 6 rice varieties grown in paddy culture in Massachusetts in 2002.

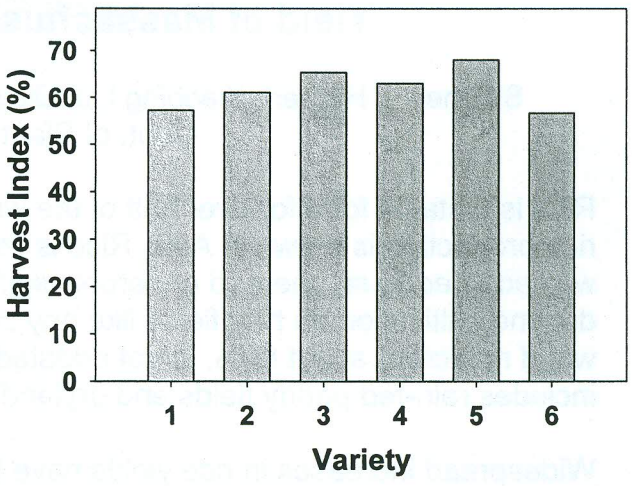

Figure 2. Harvest index for 6 rice varieties grown in paddy culture in Massachusetts in 2002.

Harvest index (grain as a percentage of total above ground weight) of all varieties were high, ranging from 57% to 68% (Figure 2) indicating the superior genetics of these varieties. Typically corn hybrids used for silage have less than 50% grain.

Figure 3. Rice growing in Massachusetts mid-August 2002.

Our tentative conclusion is that Massachusetts grown, high quality rice, if it commanded a niche market and high price, could be a viable new cash crop for some innovative growers. The experiment continued in 2003 and the combined results will be available for next year's research report.