

Growing Paddy and Irrigated Dryland Rice in Massachusetts

Wen Xu, Xiaobing Liu, Stephen J. Herbert, Masoud Hashemi, and Yinggang Ou
Dept. of Plant and Soil Sciences

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. The establishment of the International Rice Research Institute (IRRI) in 1960 and the release of high yielding rice and wheat cultivars led to the Green Revolution. Dramatic and widespread increases in rice yields were achieved through a number of accomplishments, especially in breeding programs 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.

Rice is commonly characterized as a semiaquatic crop, well adapted to submerged anaerobic soil culture. This is, agriculturally, its most important characteristic. Some cultivars are well adapted to dryland cultivation on aerobic soils and can be grown on hilly fields like any other cereal. By far the greatest proportion of the world rice crop, about 80%, is not irrigated and is dependent on natural rainfall. Such cultivation is sometimes called upland rice, and largely refers to rice grown on flat and sloping fields.

Rice needs a high growing temperature and cannot tolerate frost in any of its growth stages. Rice grows from the tropics to the sub tropical and warm temperate countries up to 40° S and 50° N of the equator. The highest yields are recorded between 30° and 45° N of equator and the average yield per acre generally increases as the countries are situated further away from the equator. In China, huge areas of rice are grown in paddy culture in the north at a latitude equivalent to Bangor, Maine. We believe rice has never been evaluated as a potential crop for Massachusetts. Thus, our objective for growing rice is to evaluate paddy and upland rice varieties in both systems of culture under Massachusetts climate conditions. Rice grown in northern regions is of better quality than rice from regions at lower latitudes. Massachusetts grown, high quality rice might command a niche market and high price, and thus may be a viable new crop for some innovative growers.

Six paddy varieties and one upland rice varieties are being compared. Paddy rice varieties were seeded in early June 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 upland rice variety was seeded June 10 in the greenhouse and was transplanted on June 28. This upland rice variety was also sown directly at the Research Farm on June 21. The first of the paddy rice varieties began flowering on July 20 and flowering of other paddy rice varieties is proceeding. All varieties are expected to complete flowering by mid-August perhaps with the exception of the upland rice variety.