

Purdue Methods: Rice

2007 Study Materials and Methods:

A study was initiated 7 July 2007 to compare growth of rice in differing root media, watering methods and fertilization schedule. Seeds of *Oryza sativa japonica* 'Nipponbare' were sown into 10 different root media and placed in a Purdue greenhouse in West Lafayette, IN. One seed was planted per pot with extra pots sown per treatment to ensure 5 replicates were available for comparison. The pots used are described in the commercial industry as "5-inch azalea" (ITML Horticultural Products, Inc. Brantford, ON, Canada), having a 12.5-cm diameter and a 9-cm height. They were filled to the inner lip for an approximate volume of 982 cc. All pots were irrigated until germination by letting the pots stand in tap water at a depth of 1-3 cm using 10-cm x 50-cm trays without drainage holes ("white display trays", T.O. Plastics, Minneapolis, MN).

The root media compared were a locally dug sandy loam mineral soil of pH 6.2; Pro-Mix 'BX' commercial soilless mix (Premier Horticulture Inc, Quakertown, PA); 'Profile Greens' and 'Turface MVP' calcined clay granules (Profile Products LLC, Buffalo Grove, IL); and 1:1 by volume combinations of soil/Profile, soil/Turface, soil/Pro-Mix, Profile/Pro-Mix and Turface/Pro-Mix. For the pots containing only soil or only Profile, the bottom of the pots were lined with filter paper to keep these fine-grained materials from leaking out the drainage holes. Fertilizer was applied to all seedlings on 17 July, using a solution of (in mg per liter) 200 N, 29 P, 167 K, 67 Ca, 30 Mg, and micronutrients supplied from a commercial fertilizer formulation (Miracle Gro® Excel® 15-5-15 Cal-Mag; The Scotts Co., Marysville, OH). Adjustment of pH to range 5.7 - 6.0 and alkalinity reduction was achieved via 93% sulfuric acid (Ulrich Chemical, Indianapolis) at 0.08 ml per liter.

Watering and fertilization treatments commenced on 24 July. Half the plants were kept under constant sub-irrigation with tap water as during germination, while half were irrigated with the same water using drip irrigation (Netafim USA, Fresno, CA) initiated by a timer two times per day for two minutes. Within both of these watering methods groups, sets of each root media type were split so that half were fertilized with the solution described above one time per week; the other half, two times per week. Fertilizer solution was applied by filling up the reservoir in the pot from the inner lip to the rim twice, for a total approximate volume of solution of 245 cc.

Plants were grown under natural lighting at a temperature of 24C day and 18.3C during the night. Germination success was counted on 17 July. Tiller count and plant height were recorded on 15 August as well as a visual rating of chlorosis. A number was assigned to each plant according to this ranking: 4-no chlorosis; 3-slight chlorosis; 2-moderate chlorosis without scorch of tips or margins; and 1-moderate to severe chlorosis with tip or margin scorch.

2008 Study Materials and Methods:

Building from knowledge gained from a 2007 study, a new study was initiated on 23 January 2008 to compare growth and flowering of rice in differing pot size and fertilization schedule. Seeds of *Oryza sativa japonica* 'Nipponbare' were sown into 3 different container sizes filled with Profile Greens calcined clay granules (Profile Products LLC, Buffalo Grove, IL). The bottom of the pots were lined with filter paper to keep these fine-grained materials from leaking out the drainage holes. The container sizes were all from the same manufacturer (ITML Horticultural Products, Inc. Brantford, ON, Canada) and referred to by US trade names consisting of diameter and shape: 3-inch square, 4-inch square and 5-inch azalea-style round. The 3-inch square pots were 7.0 cm in diameter and 6.5 cm deep, and filled to the inner lip for an approximate volume of 300 cc. The 4-inch square pots were 9.0 cm in diameter and 7.5 cm deep, and filled to the inner lip for an approximate volume of 567 cc. The 5-inch round pots had a diameter of 12.5 cm diameter and a 9.0 cm height, and filled to the inner lip for an approximate volume of 982 cc. Two seeds were sown per pot and later thinned to one plant per pot. All pots were irrigated until germination by letting the pots stand in tap water at a depth of 1-3 cm using 10-cm x 50-cm trays without drainage holes ("white display trays", T.O. Plastics, Minneapolis, MN) underneath the pots.

On 15 February, fertilizer treatments were initiated. Half the plants were kept under constant sub-irrigation with tap water as during germination, and fertilized twice per week. Fertilizer solution was applied by filling up the reservoir in the pot from the inner lip to the rim twice, for a total approximate volume of solution of 245 cc. The other half of the plants were sub-irrigated continuously with the same fertilizer solution. These plants also received the twice weekly application in order to keep the fertilizer salts from accumulating near the surface of the pots.

Both treatment groups received the same fertilizer solution of (in mg per liter) 200 N, 29 P, 167 K, 67 Ca, 30 Mg, and micronutrients supplied from a commercial fertilizer formulation (Miracle Gro® Excel® 15-5-15 Cal-Mag; The Scotts Co., Marysville, OH). Adjustment of pH to range 5.7 - 6.0 and alkalinity reduction was achieved via 93% sulfuric acid (Ulrich Chemical, Indianapolis) at 0.08 ml per liter.

Plants were grown under natural lighting at a temperature of 26.1C day and 22.2C during the night. Supplemental lighting was provided by 1000W high pressure sodium lighting at 100 $\mu\text{mol}/\text{m}^2/\text{s}$ for 16 hours. Germination success was counted on 15 February. Panicle count and plant height were recorded on 12 May through 15 May. Seeds from each treatment group were collected, dried and weighed to determine yield.

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