

What is the best root medium?

The greatest plant height and tiller number were achieved with the Profile "Greens" calcined clay granules, when fertilized twice weekly. These granules are made for the golf course industry to improve drainage.

This treatment also resulted in a "no chlorosis" ranking, though several others achieved this color ranking. Other root media that resulted in vigorous growth were Pro-Mix 'BX'/Profile and Pro-Mix/Turface, each at a 1:1 ratio by volume, though these media did result in some chlorosis.

Plants failed to thrive in the clay loam mineral soil by all growth measures. This is a significant outcome, as many research institutions grow rice in this root media to avoid chlorosis. Of course, mineral soil varies by what can be dug locally, but there is no reason to believe this soil is not conducive to growth, being pH balanced to 6.2 and capable of growing other grass crops in our university greenhouses. We suggest that changing this production component alone may optimize growth of greenhouse rice for many research projects.

An observation that will come as no surprise to rice researchers is the poor growth observed in a peat-based soil-less mix. Severe chlorosis developed, which would have required multiple micronutrient applications to correct. Without these corrective applications, chlorosis worsened, resulting in short plants and fewer tillers than other treatments.

Germination was suitable in all the root media, but slower in mineral soil and Profile. At day 10 of the study, germination was 42-96% in the other media, but just 17% in the mineral soil and 21% in the Profile. This low percentage in the Profile medium did not result in less vigorous plants as the study continued, however. Profile calcined clay granules do seem like a radical departure from the media our researchers are use to; we often recommend to start with a Pro-Mix 'BX'/Profile medium (1:1 by volume) to get use to growing in it and then move to the Profile medium to achieve optimum growth potential.

For experiments requiring mineral soil component or for researchers reluctant to change methodology, we recommend augmenting mineral soils with Turface to improve drainage.

Note that both Profile and Turface are clay products so have a high cation exchange capacity: They are not inert like some soil mix components such as perlite.

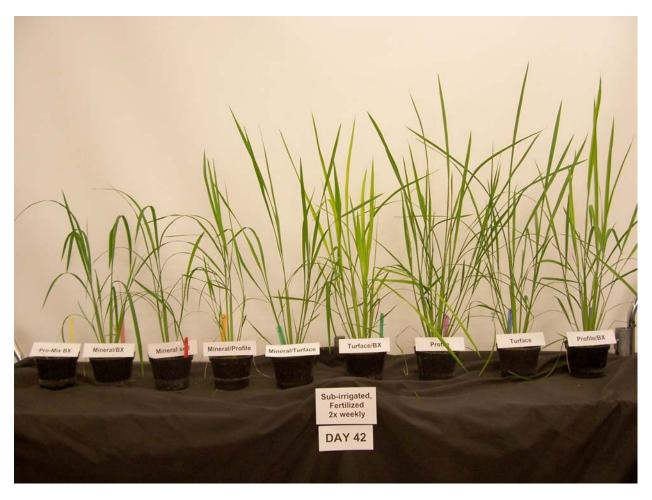


Figure 1. From left to right: Rice plants grown in Pro-Mix 'BX' (barely visible); Mineral soil/ 'BX'; Mineral soil; Mineral soil/ Profile; Mineral soil / Turface; Turface/ 'BX'; Profile; Turface; Profile/ 'BX'. All mixtures are at 1:1 by volume.



Figure 2. Profile 'Greens' and Turface 'MVP' calcined clay granules. These products are made for the golf course and athletic field industry to improve drainage. They are clay, therefore have a high cation exchange capacity.

Plant Height

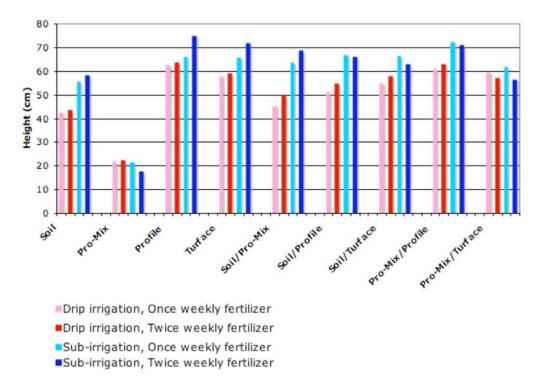


Figure 3. Rice plant height at day 78 in differing media and under differing fertilization schedules.

Tiller Count

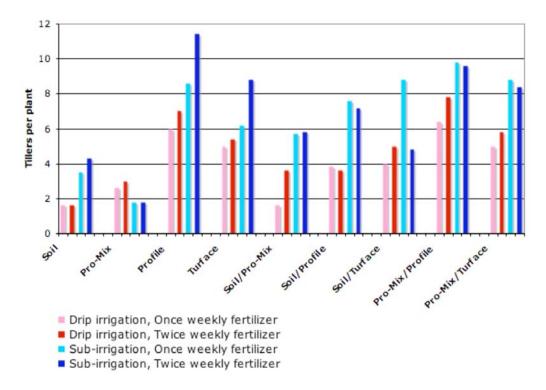


Figure 4. Rice plant tiller count at day 78 in differing media and under differing fertilization schedules.

Leaf Color Rating

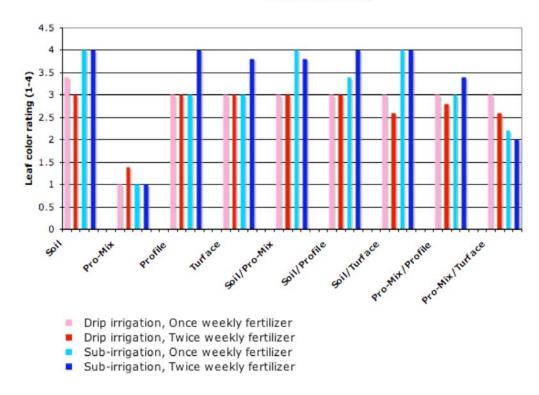


Figure 5. Rice plant leaf color at day 78 in differing media and under differing fertilization schedules. Color rating: 1=severe chlorosis; 2=moderate; 3=mild; 4=no chlorosis.



Figure 6. Rice plants growing in mineral soil (left) and Profile at day 42 (top) and day 78.



Figure 7. Roots of plants grown in various media.