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# Optimizing Greenhouse Rice Production: What Is the Best Watering Method?

Robert Eddy

*Purdue University*, [robeddy@purdue.edu](mailto:robeddy@purdue.edu)

Daniel T. Hahn

*Purdue University*, [dhahn@purdue.edu](mailto:dhahn@purdue.edu)

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## **Comments**

The information presented in this document may be out of date. The updated version is "[What is the best watering and fertilization method?](#)".

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## **Suggested Citation**

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## **Purdue Methods: Optimizing Greenhouse Rice Production**

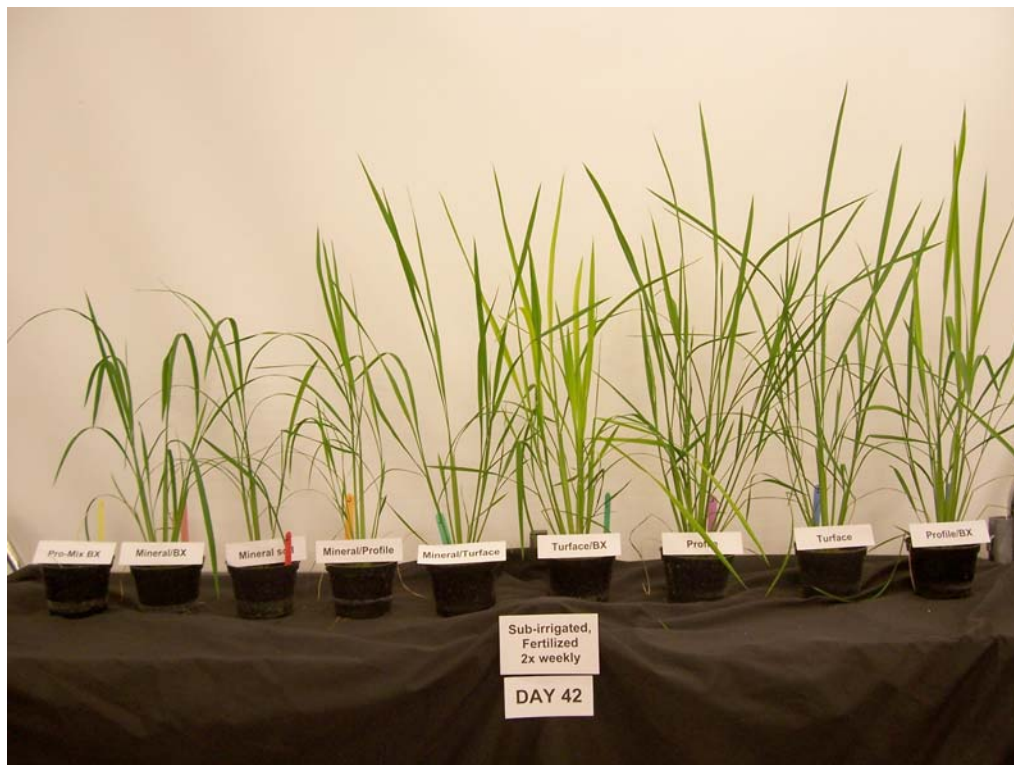
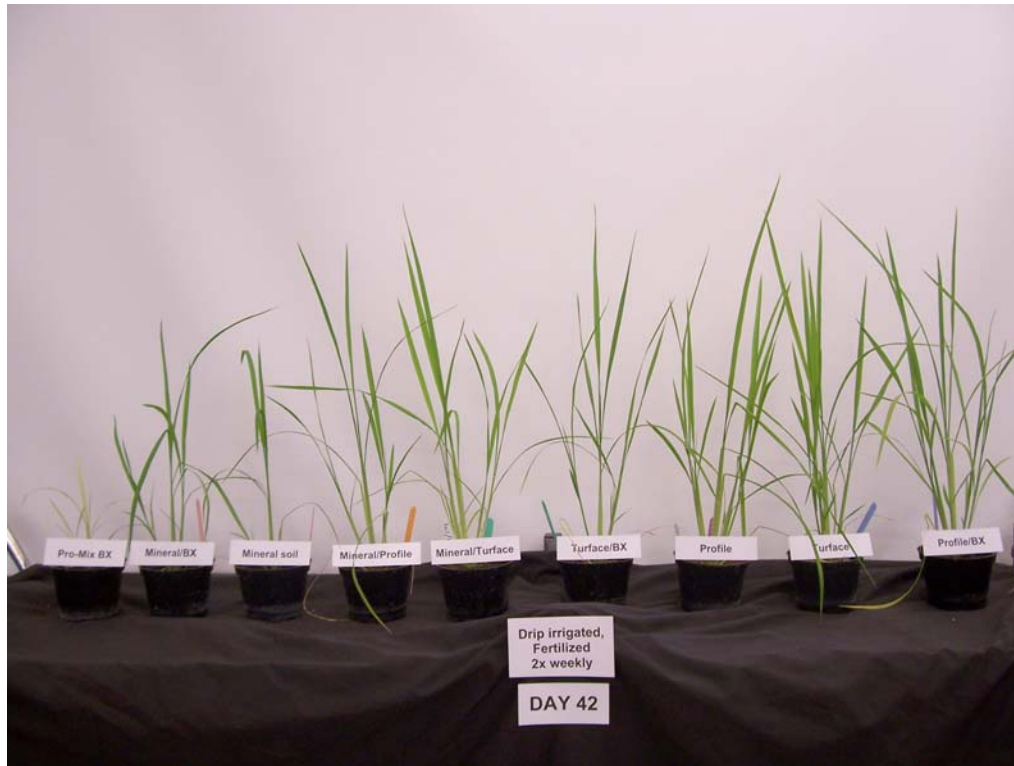
### **What is the best watering method?**

In this study, we compared drip irrigation and constant sub-irrigation by keeping a 3-cm tray filled with 1-3 cm solution. Constant sub-irrigation resulted in best growth.

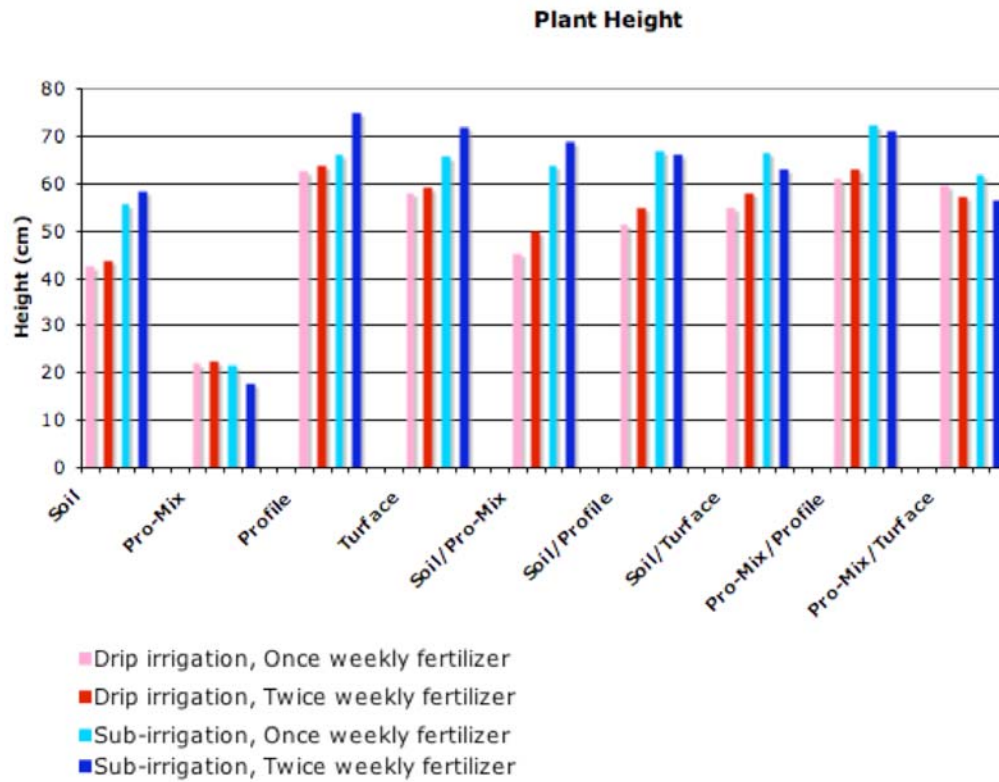
Drip irrigation was a suitable watering method but did not result in plants as vigorous as those using the sub-irrigation method. Plant height was greater in sub-irrigated plants over drip-irrigated plants in all but three root media and fertilizer frequency treatments. Tiller number was greater in sub-irrigated plants over drip-irrigated plants in all but two root media and fertilizer frequency treatments. Likewise, chlorosis occurred less in sub-irrigated plants over drip-irrigated plants in all but two treatments. The only plants that grew better with drip-irrigation over their sub-irrigated counterparts were grown in Pro-Mix.

One likely explanation for the less vigorous growth using drip irrigation was that the twice daily irrigation with clear water leached away nutrients. A growing system could most likely be devised utilizing drip irrigation for rice if the problems of wasted water and nitrogen run-off could be addressed, perhaps with one or a combination of slow-release fertilizer, water recirculation or low-volume application. Our findings go against the conventional wisdom that rice requires constant sub-irrigation—simulating paddy culture—to survive.

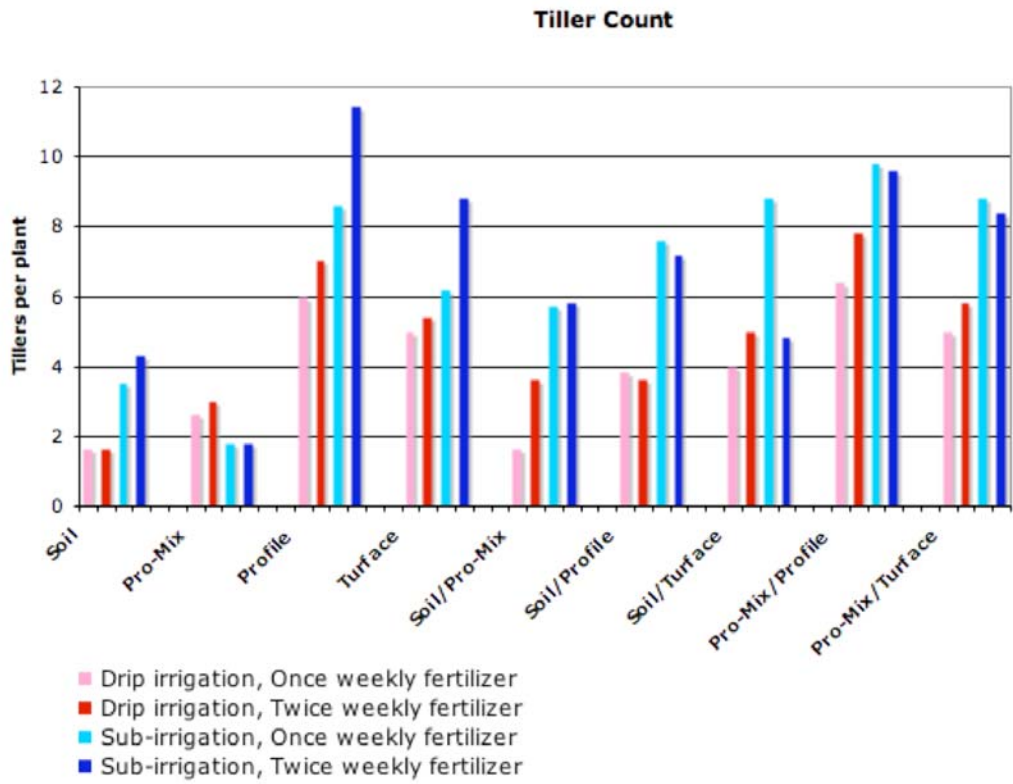
Because of the poor suitability of the drip-irrigation used in this study, results discussed in this and other reports of “Optimizing Greenhouse Rice Production” for root media and fertilizer application frequency will be solely from the sub-irrigated plants. Plant responses to root media and fertilizer frequency were relatively similar between the two irrigation types, only less vigorous for the drip irrigation group except where noted.



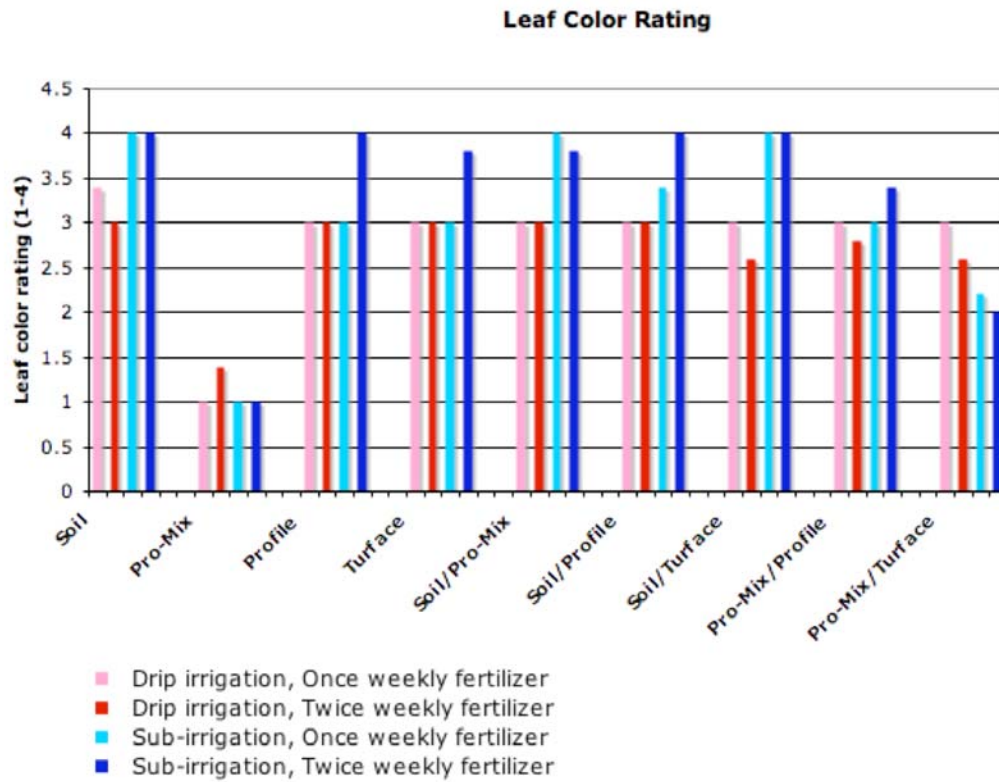
**Figure 1. Rice growing in nine differing soil media irrigated by drip irrigation (top) and constant sub-irrigation.**



**Figure 2. Rice plant height at day 78 in differing media, fertilization schedules and irrigation practices.**



**Figure 3. Rice plant tiller count at day 78 in differing media, fertilization schedules and irrigation practices.**



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