Does root cutting in seedlings before transplanting affect growth and yield of lowland rice (*Oryza sativa* L.)?

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Introduction

Lowland rice cultivation is just beginning to take root in much of Sub-Sahara Africa, but transplanting is unpopular as it is labor-intensive and labor is becoming scarce and expensive. A substantial share of labor and time goes into preparing rice seedlings before transplanting, including carefully uprooting and washing the seedlings to minimize root injury. This study examined whether cutting the roots of rice seedlings before transplanting affects growth and yield of lowland rice.

Materials and methods

Pre-germinated seed of K-85 were grown on a wet bed nursery for 21 days, when rice seedlings are ready for transplanting. The seedlings were then carefully uprooted and visible roots cut back to varying lengths at the time of transplanting (Fig. 1). Three seedlings were transplanted per hill in a well watered and puddled field, at a spacing of 0.3 m x 0.15 m. A randomized complete block design was used with 3 replications. Area of each experimental plot was 12 m^2. Four hills were periodically sampled from each plot using a root core sampler for root and shoot observations. Root and shoot dry matter weights were taken after oven drying at 70° C for 72 h. Paddy yield was determined from 20 hills, and expressed in kg ha^{-1} at 14% moisture content.

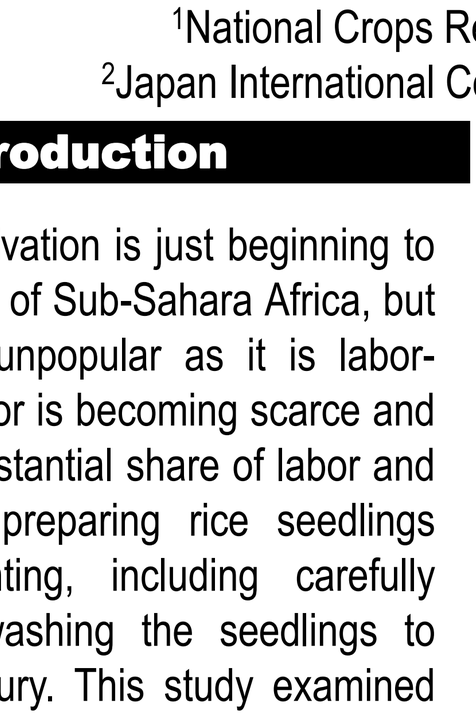

Fig. 1. Root cutting treatments

Results and discussion

We did not find significant differences ($p = 0.05$) in root and shoot growth among the treatments at just 14 days after transplanting (Fig. 3). Consequently, cutting roots of rice seedlings before transplanting did not have a significant effect on paddy yield (Fig 2).

These findings are consistent with those of Ikeda *et al*. (2007) who showed that root pruning only affects growth and yield of lowland rice when seedlings are transplanted in extremely stressful conditions, where standing water is absent.

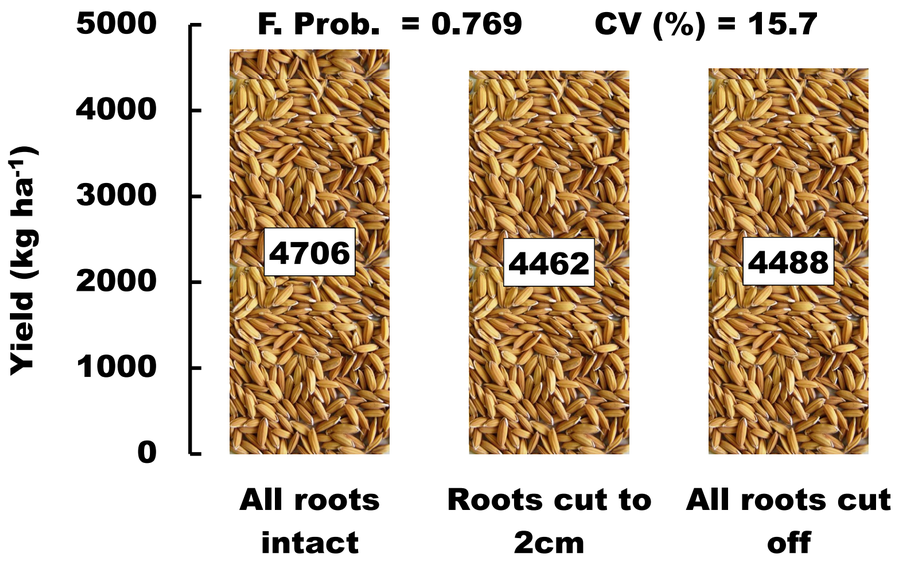

Fig. 2. Paddy yield of lowland rice in which roots were cut back at time of transplanting

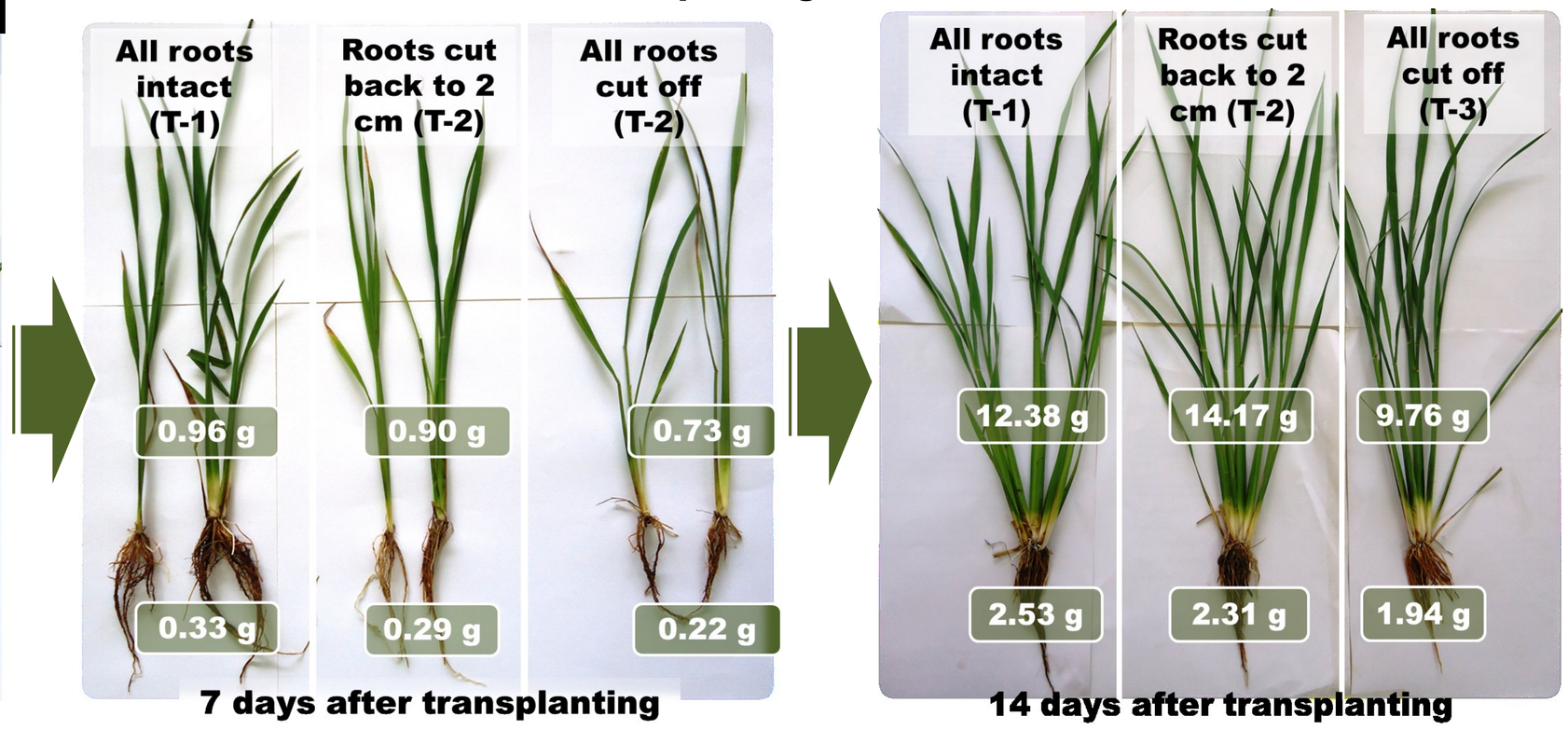

Fig. 3. Root growth of lowland rice in which roots were cut back at time of transplanting. Inset are average root and shoot dry matter weights per hill.

Conclusion

Our findings show that rice seedlings can quickly recover normal root growth when transplanted in a well-watered and puddled field, even if all visible roots are cut off at the time of transplanting.

This suggests that farmers can quickly dredge up rice seedlings from nurseries, using a sharp implement (Fig. 4), mindless of the consequences of any roots cut, thus minimize labor requirements and ensure timely transplanting.

Fig. 4. A farmer dredges up rice seedlings using a machete

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Reference

Ikeda H, Kamoshita A, and Manabe T. 2007. Genetic analysis of rooting ability of transplanted rice (*Oryza sativa* L.) under different water conditions. J. *Exp. Bot.* 58 (2): 309–318.

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