

Author:  [ADVANCED](#)Volume  Page Keyword:   [TOP](#) > [Available Issues](#) > [Table of Contents](#) > [Abstract](#)

ONLINE ISSN : 1349-1008

PRINT ISSN : 1343-943X

## Plant Production Science

Vol. 8 (2005) , No. 2 209-215

[\[PDF \(508K\)\]](#) [\[References\]](#)

### Seedling Growth and Dry-Matter Production under Drained Conditions in Rice Direct-Sown into Puddled and Levelled Soil

[Toru Sato](#)<sup>1)</sup> and [Sachio Maruyama](#)<sup>2)</sup>

1) Niigata Agricultural Research Institute Sado Agricultural Technology Center

2) University of Tsukuba

(Received: July 29, 2004)

**Abstract:** Drainage after sowing promotes plant growth and enhances seedling establishment in rice direct-sown into puddled and leveled soil. We studied the effect of drainage on seedling growth and on dry weight of the plant parts. We also examined carbohydrate, chlorophyll, and protein content of the seedlings grown under flooded and drained conditions to see which factors control plant growth during seedling establishment. Drainage for 10 days after sowing enhanced root elongation but inhibited shoot growth until seedlings emerged above ground. Drainage promoted leaf development and shoot elongation after seedlings emerged but affected root growth only slightly at this stage. Although the dry weight of grain decreased and that of shoot and root increased more rapidly in the drained plot than in the flooded one, the utilization efficiency of grain reserve for shoot and root growth was similar in both plots. Growth analysis indicated that the difference in growth rates between the drained and flooded plots was attributable to the amount of carbohydrates supplied from grain reserve until seedlings emerged, but to the photosynthate after seedlings emerged. Sugar contents of shoot and root in the drainage plot were rather lower than those in the flooded plot as seedlings emerged. In contrast, chlorophyll and protein contents of shoot in the drained plot were markedly higher than those in the flooded one after seedlings emerged. These results suggest that drainage promotes leaf development, increases chlorophyll and protein contents of shoot, accelerates photosynthesis, and enhances dry-matter production after seedlings emerged.

**Keywords:** [Carbohydrates](#), [Chlorophyll](#), [Direct sowing](#), [Drainage](#), [Dry-matter production](#), [Oryza sativa L.](#), [Proteins](#), [Rice](#)

[\[PDF \(508K\)\]](#) [\[References\]](#)



Download Meta of Article [\[Help\]](#)

[RIS](#)

[BibTeX](#)

To cite this article:

Toru Sato and Sachio Maruyama: "Seedling Growth and Dry-Matter Production under Drained Conditions in Rice Direct-Sown into Puddled and Leveled Soil". *Plant Production Science*, Vol. **8**, pp.209-215 (2005) .

---

doi:10.1626/pps.8.209

JOI JST.JSTAGE/pps/8.209

Copyright (c) 2005 by The Crop Science Society of Japan



---

[Japan Science and Technology Information Aggregator, Electronic](#)

