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### Agrochemical-Free, Direct-Sowing Culture of a Paddy with Non-woven Fabric Mulch—Timing of Puddling and Leveling and Basal Fertilizer Application—

[Shaikh Tanveer HOSSAIN](#)<sup>1)</sup>, [Hideki SUGIMOTO](#)<sup>2)</sup>, [Jun YAMASHITA](#)<sup>2)</sup> and [Joel M. ALCARAZ](#)<sup>1)</sup>

1) The United Graduate School of Agricultural Sciences, Ehime University

2) Faculty of Agriculture, Ehime University

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#### Abstract

In direct-sowing rice culture using cloth mulch, puddling and leveling (P & L) is usually done 2 days before the mulching (sowing). However, the mulching is very difficult, due to the muddy condition of the soil. Comparative studies were made to observe the effects of the timing of P & L, that is, P & L 10 days before mulching (P10) vs. P & L 2 days before the mulching (P2), on the operator's physical stress, the rice growth, and grain yield. Basal fertilizer was applied 2 days before the mulching in the P2 treatment (P2-B2), and topdressing was applied at 29 days before heading in all treatments. For the P10 treatment, timing of the basal fertilization was set at 14 (P10-B14) or 3 (P10-B3) days before the mulching.

Results revealed that the timing of basal fertilization had no significant effect on the growth and grain yield between P10-B14 and P10-B3 treatments. The operator's physical stress was very low due to higher soil hardness in the P10-B14 treatment ; however the grain yield was 12% lower than that of the P2-B2 treatment due to lower percentage of ripened grain. Because of the lower inorganic nitrogen of the soil, the growth of leaf area was suppressed and dry matter production was lower in the P10-B14 treatment, which resulted in lower percentage of ripened grain. To increase the grain yield of the P10-B14 treatment, future research is needed to consider the application amount and timing of topdressing, and also to reduce the gap between P & L time and mulching.

**Key words**

[Dry matter production](#), [fertilization](#), [inorganic nitrogen in the soil](#), [non-woven fabric mulch](#), [Oryza sativa](#), [physical stress](#), [puddling and leveling](#), [yield components](#)

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