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Path Analysis of Tiller Density of Winter Wheat Demonstrates the Importance of Practices that Manipulate Clod Size Based on Soil Moisture at Seeding in the Rice–Wheat Cropping System

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Abstract: The moisture of paddy soil after rice cropping is a major impediment to the establishment, tillering and yield of winter wheat in the rice–wheat (R–W) cropping system. We examined the seedling establishment ratio, based on soil moisture at seeding by path analysis of nine soil/plant traits in the farmer’s fields in Western Japan where the R–W cropping system was being used, to establish a strategy for improving tiller density by optimizing the seedling establishment ratio. The clod size of surface soil, which showed a significant positive correlation with soil moisture at seeding, had a significant negative direct effect on the seedling establishment ratio. The reduction in seedling establishment ratio, together with fewer tillers per plant, resulted in a significant decrease in tiller density. The sum total of contribution of soil moisture contents to tiller density via clod size was smaller than that of seeding rate, and similar to that of the amount of nitrogen (N) basal dressing. This indicates that manipulating clod size based on soil moisture at seeding provides an opportunity for maintaining tiller density, as well as changing the amount of N basal dressing with the soil moisture conditions after rice cropping.

Keywords: [Emergence depth](#), [Seeding rate](#), [Seedling establishment ratio](#), [Site-specific management](#), [Tiller](#)

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