

Entry No. IRRC-0217

Category	: International Rice Research Conference
Select Theme	: Sustainable and equitable farming systems
Endorsement email	:
Keyword 1	: Nutrient management
Keyword 2	: Mechanization
Keyword 3	: Precision Agriculture
Title of Entry	: Preliminary Research to Evaluate Rice Fertigation Technique
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Select only one type of presentation	: 3-5 minute flash talk
Abstract	: A single application of bulk blend fertilizers containing controlled-release fertilizer (CRF; coated Urea) base application before transplanting or sowing has been widely used for rice production in Japan since the 1990s. This replaces the labor of multiple top-dressing applications and has become the major nitrogen nutrient management in Japan. While this single-application technique has been widely accepted, the importance of on-demand top-dressing regains the spotlight because of recurrent high-temperature injury during grain-filling period, cost-consciousness of large-scale rice growers and development of remote sensing technology.

However, there is no inexpensive labor or technique to provide multiple top-dressing solution. We developed an apparatus that provides fertigation in rice. The system enables the dissolution of water-soluble fertilizers (nitrogen, phosphate and potassium) at one location out of the field and supplies the solution continuously through irrigation to the rice field. We compared two treatments, both with same total nitrogen applied (1st treatment: 106, 45 and 30 kg N, P₂O₅ and K₂O, 2nd treatment: 100, 60 and 60 kg N, P₂O₅ and K₂O). The first, as farmers' practice, included chicken manure applied as basal and one top dressing of urea (50 days after transplanting). The second treatment, as fertigation, consisted of applying all nutrients (N, P and K) through fertigation in 4 applications (6, 33, 57 and 73 days after transplanting). The results showed a comparatively even distribution of nutrients in the fertigation plot. However, the fertigation treatment caused an over-luxuriant growth characterized by wider leaf blades and hanged leaf tips at maximum tillering stage. This caused also a yield reduction of approx. 16% as compared to the control. We assume that the reduction in yield observed in this preliminary work was caused by various factors that need to be adapted when using fertigation. A much better nitrogen use efficiency (as in fertigation) may be affected by multiple P and K inputs and less N loss, while suggesting possible reduction of the N applied. More research is planned to identify the cause of the over-luxuriant growth as well as optimizing nutrient levels required for higher yields.

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