Agronomic Characters of Rice Cultivation with Reference to Top-dressed N Efficiency

Edaphlogy Innocent Bisangwa

Introduction: To achieve self-sufficiency in rice production by 2018 in Rwanda, the National Rice Development Strategy (NRDS) aims to increase the yield per unit area from the current yield 5.8 to 7.0 t ha^{-1}. On the other hand, the sector of agriculture is still facing a number of problems which are seriously affecting the sustainable development of the entire Rwandan economy. Adoption of variable rate and timing of fertilizer among different planting pattern in rice marshland in recent years, have been driven by yield declined due to the lack of suitable fertilizer practices.

Objective: To gain a better understanding of how N topdressing performance over planting pattern, timing and rate methods affected the rice yield without disturbance.

Materials and methods: three field experiments with four replication as denoted two planting pattern, rectangular and square planting with the same plant density (Rectangular planting = 30 cm x 15 cm, Square planting= 21.3 cm x 21.3 cm), three N topdressing timing (30 days before heading (DBH), 20 DBH and 10 DBH), and three N topdressing application rates (10, 20 and 30 kg/ha) were conducted. The experiment was laid out in randomized complete design (CRD) in the 2012 and 2013.

Results: Plating pattern (Experiment I): 1. No difference in rice yield was observed between rectangular and square planting. 2. No difference in N recovery efficiency was observed in both planting pattern. N topdressing timing (Experiment II): 1. Significant difference in rice yield was observed in 20DBH compared with 10 DBH. 2. No difference in rice yield was observed between 10DBH and 30DBH, and between 30 DBH and 20 DBH. N topdressing rate (Experiment III): No difference in rice yield was observed among the topdressing N rates of 10, 20, and 30 kg ha^{-1}. All experiments: 1. Sink size (spikelet number x average grain weight) was linear function of rice yield in all experiments. 2. N topdressing timing and rate were largely contributed to high sink size rather than planting pattern.

Conclusion: 1.Planting pattern was not significant factor for achieving the highest performance of N topdressing. 2. N topdressing timing of 20-30 DBH was more influential on increasing yield. 3. A larger dose of N topdressing was not necessarily; the 10 kg ha^{-1} was optimum rate to get the maximum rice yield. 4. Sink size was more regulated by N topdressing timing condition in determining the yield potential rather than N topdressing rate and planting pattern. One possible reason is that N topdressing timing can primarily influenced the yield sink through the number of panicles and also through the spikelets per panicle.