

Response of irrigated direct-seeded rice yields to different nitrogen rates and precipitation patterns

ABSTRACT

In Peninsular Malaysia, irrigated direct-seeded lowland rice cultivation results in higher yields during the off-season (April-July) as compared to the main-season (October-January). However, farmers still apply the same amount of nitrogen(N) at both growing seasons. A study was conducted to assess the response of rice yield components to different N rates and different precipitation patterns. This work was conducted in a 27-acre field with six N treatments, i.e. 0, 80, 120, 160, 200 and 240 kg N ha⁻¹ in three continuous planting seasons from October-2012 to January-2014. In the first planting during main-season (S1), treatment with 120 kg N ha⁻¹ showed significantly higher panicle number per m² (PM), 1000-grain weight (GW) and estimated grain yield (GY). Meanwhile, treatment with 200 kg N ha⁻¹ significantly increased panicle number m⁻², spikelet number per panicle (SP), percentage of filled spikelet (FP) and estimated grain yield (GY) in the second planting during off-season (S2). In the third planting during main-season (S3), 120 kg N ha⁻¹ still showed significantly higher PM, spikelet number per m² (SM), GW and GY. S3 showed the highest grain yield per input of N, followed by S1 and S2. In all three seasons, grain yield was positively correlated with PM, SP and SM. This study indicates that 120 kg ha⁻¹ produces the highest grain yield during the main-season, which typically receives more rain water that contributes additional N to the rice field throughout the planting season. During the off-season, however, 200 kg ha⁻¹ is required as the optimal N rate.

Keyword: Nitrogen; Precipitation; Rice; Main-season; Off-season