

## Effect of different soil nitrogen levels on growth, yield and yield contributing attributes of promising rice (*Oryza sativa* L.) line at 13 2715 and standard variety at 311

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### Abstract

Nitrogen (N) is an essential plant nutrient being a component of amino acids, nucleic acids, nucleotides, chlorophyll, enzymes, and hormones. It promotes plant growth yield and quality of grains through increased tillering, leaf area development, grain formation, grain filling and protein synthesis. Application of N fertilizer for rice facilitates growth as well as post-harvest attributes of grains. A research study was conducted at research field of the Rice Research Station, Ambalantota, Sri Lanka during 2019 yala season to investigate the effect of different nitrogen application rates on grain quality, growth and yield parameters of rice. The experiment was established with four nitrogen levels such as 50, 100, 150 and 200 kg N ha<sup>-1</sup> along with control treatment (0 kg N ha<sup>-1</sup>) under irrigated water condition and two red pericarps three-month rice varieties (promising rice line At 13 2715 was developed by crossing between At 362 and PSPRC 28 and standard variety At 311). Treatments were arranged in a split plot design with three replicates. The gross plot and net plot area of each experimental unit were 18 m<sup>2</sup> and the 12.96 m<sup>2</sup>. Main plots were separated by a ridge (40 cm in width). Phosphorus (45 kg ha<sup>-1</sup> P<sub>2</sub>O<sub>5</sub> - triple super phosphate) was applied at the basal fertilizer application and potassium (20 kg ha<sup>-1</sup> K<sub>2</sub>O as Muriate of potash) was applied to all experimental plots after four and six weeks from seed sowing. Grain yield (t/ha), plant height (cm), tiller count, filled and unfilled grain count per panicle, spikelet count per panicle, 1000 grains weight (g) and straw weight (kg/12.96 m<sup>2</sup>) were determined. Analysis of variance was performed using STAR for Windows version 2.0.1. Different soil nitrogen application rates were responded differently on rice crop where zero nitrogen level (0 kg N ha<sup>-1</sup>) was given the lowest response of both At 13 2715 and At 311. Rice cultivated with higher rate of nitrogen (≥100 kg N ha<sup>-1</sup>) was given higher grain filling and growth of both varieties. Application of 100 kg N ha<sup>-1</sup> rate was recognized as the significant level for growth, yield and some yield contributing attributes. However, further increasing of soil nitrogen (≥100 kg N ha<sup>-1</sup>) was not significantly ( $p > 0.05$ ) improved the growth, grain yield and yield parameters of both rice varieties At 13 2715 and At 311.

**Keywords:** Nitrogen, Quality, Rice, Yield attributes

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