

# Studies on The Availability of Azolla N and Urea N for Rice Growth Using $^{15}\text{N}$

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## Abstract

Field experiments (20 m<sup>2</sup> plots) were conducted to compare Azolla and urea as N sources for rice (*Oryza sativa* L.) in both the wet and dry seasons. Parallel microplot (1 m<sup>2</sup>) experiments were conducted using  $^{15}\text{N}$ . A total of approximately 60 kg N ha<sup>-1</sup> was applied as urea, Azolla, or urea plus Azolla. Urea or Azolla applied with equal applications of 30 kg N ha<sup>-1</sup> at transplanting (T) and at maximum tillering (MT) were equally effective for increasing rice grain yields in both seasons. Urea at 30 kg N ha<sup>-1</sup> at T and Azolla 30 kg N ha<sup>-1</sup> at MT was also equally effective. Urea applied by the locally recommended best split (40 kg at T and 20 kg at MT) gave a higher yield in the wet season, but an equal yield in the dry season. The average yield increase was 23% in the wet season, and 95% in the dry season. The proportion of the N taken up by the rice plants which was derived from urea (%NdfU) or Azolla (%NdfAz) was essentially identical for the treatments receiving the same N split. Recovery of  $^{15}\text{N}$  in the grain plus straw was also very similar. Positive yield responses to residual N were observed in the succeeding rice crop following both the wet and dry seasons, but the increases were not always statistically significant. Recovery of residual  $^{15}\text{N}$  ranged from 5.5 to 8.9% for both crops in succeeding seasons. Residual recovery from the urea applications was significantly higher than from Azolla in the crop succeeding the dry season crop. Azolla was equally effective as urea as an N source for rice production on a per kg N basis.

**Keywords:** *Azolla pinnata* var. *pinnata* - dry season -  $^{15}\text{N}$  recovery - residual effect - rice - succeeding crop - wet season