EFFECT OF NITROGEN FERTILIZER RATES ON THE GROWTH AND YIELD OF BORO RICE IN THE HAOR AREA OF SYLHET

MS Thesis

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Sylhet

June 2026

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A Thesis

Submitted to
Sylhet Agricultural University, Sylhet
In Partial Fulfillment of the Requirements for the Degree of
Master of Science
in
Agronomy

By
Md. Rafiqul Islam
Roll No. 1801
Registration No.: 0456 Session: 2023–2024



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May 2026

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ABSTRACT

Write the abstract as ONE paragraph of 250 to 300 words in single line spacing. Give the purpose, the methods, the major findings and the main conclusions. No figures, tables or citations. If more than one hypothesis was tested, say so.

A field experiment was conducted at the Agronomy Field Laboratory, Sylhet Agricultural University, during the boro season to determine the effect of nitrogen fertilizer rates on the growth and yield of boro rice in the haor area of Sylhet. Five nitrogen rates were tested in a randomized complete block design with three replications. Plant height, tillers per hill, panicle length, grains per panicle, thousand-grain weight and grain yield were recorded. Grain yield increased with nitrogen up to an intermediate rate and declined at the highest rate. The results identify the rate that gave the highest yield under haor conditions and suggest further trials across seasons and varieties.

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Chapter 1

INTRODUCTION

Give the background of the research, focused on the topic investigated, and convince the reader that the work matters. Include the historical basis for choosing the problem and the missing pieces of information the study addresses, so the reader is fully familiar with the problem.

Rice is the staple food of Bangladesh, and boro rice grown in the dry season supplies more than half of the national production. In the haor basins of Sylhet, boro is often the only crop of the year, so the right nitrogen rate decides both the yield and the farmer's margin. Rates recommended for the floodplains may not suit the heavy, poorly drained soils of the haor, where early flash floods also limit the season.

1.1 Objectives

Objectives may sit inside the Introduction or follow it as a separate section. Make them specific and quantifiable, and do not confuse them with the ultimate goal of the work.

The present study was undertaken with the following objectives:

1. to determine the effect of nitrogen rates on the growth and yield components of boro rice in the haor area; and
2. to find the nitrogen rate that gives the highest grain yield under haor conditions.

Chapter 2

REVIEW OF LITERATURE

Cover the published literature related to the topics studied. Be comprehensive but not over-elaborate: cite the works most important to your study rather than every remotely connected paper. Prefer current, primary sources, and include work whose theories or results conflict with yours. Evaluate each study critically. Every piece of information must be cited: presenting someone else's work as your own is plagiarism.

Cite in the traditional name-and-year system. A single-author study is cited as (Stützel, 1995), two authors as Parker and Riches (1993), and three or more as Rabidas et al. (2012). Crop simulation approaches to crop and weed interactions are reviewed by Kropff and Lotz (1992).

2.1 Nitrogen and the growth of rice

Organise the review under sub-headings that follow your objectives.

2.2 Rice production in the haor basin

Summarise what is known for your study area and where the gaps are.

Chapter 3

MATERIALS AND METHODS

Describe the materials, methods and experimental design so that another worker could repeat the study. The sections below follow a field experiment; adapt them to your own study. Give precise descriptions of devices and methods, with citations.

3.1 Site characteristics

Geography, climate and soil properties of the experimental site.

3.2 Design of the experiment

The experiment was laid out in a randomized complete block design with five nitrogen rates and three replications.

3.3 Agronomic practices

Plant material, fertilization, irrigation and treatments.

3.4 Observations and sampling

Phenological stages, measurements, sampling methods and harvest.

3.5 Statistical analysis

Describe the analysis in relation to the hypotheses tested, clearly enough that a reader can verify the results. Cite the statistical tests and the software used.

Data were analysed by analysis of variance, and treatment means were compared at the 5% level of significance. Simulation runs used ModelMaker (ModelKinetix, 2001).

Chapter 4

RESULTS

Organise the data in tables, graphs and photographs before you write. Present results logically rather than in the order the work was done, with sub-headings for different experiments. Do not repeat tabulated data in the text; point out the main features and trends. After each result give the test statistic, level of significance, degrees of freedom and sample size in brackets.

4.1 Yield components

Plant height and the number of effective tillers per hill increased with the nitrogen rate (Table 1).

Table 1: Effect of nitrogen rate on yield components and grain yield of boro rice

Nitrogen (kg ha^{-1})	Plant height (cm)	Tillers hill^{-1}	Grain yield (t ha^{-1})
0	82.4	8.1	3.62
60	89.7	10.4	4.85
120	95.3	12.6	5.91
180	97.1	12.9	5.74

4.2 Grain yield

Grain yield reached its highest value at 120 kg N ha^{-1} (Figure 1).

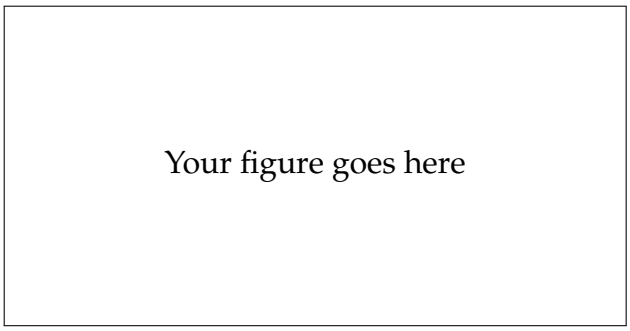


Figure 1: Grain yield of boro rice at four nitrogen rates

Chapter 5

DISCUSSION

Interpret the results in the light of what is already known. Do not discuss data that were not presented in the Results, and do not bring in new data here. Not every result needs discussion. A good discussion gives the key message of the work, interprets the findings, compares them with the findings of others to show how they fit the current state of knowledge, and explains any departures. Qualify the results with the limitations of the experiments.

The decline in yield above 120 kg N ha^{-1} agrees with the response curves reported for other crops by Penning de Vries et al. (1989).

SUMMARY

A concise summary of the whole work.

The study tested four nitrogen rates on boro rice in the haor area of Sylhet. Growth and yield components rose with nitrogen up to 120 kg N ha^{-1}, which gave the highest grain yield.

CONCLUSIONS

Conclusions are not a second summary. Write short, numbered statements of what the study allows you to infer, tied to your objectives and ordered from the most to the least important. End with the future direction of research, so others can take the work further.

1. A nitrogen rate of 120 kg N ha^{-1} gave the highest grain yield of boro rice under haor conditions.
2. Rates above 120 kg N ha^{-1} did not increase yield.
3. Trials over more seasons and varieties are needed before a rate is recommended for the haor basin.

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Appendix 1

ANALYSIS OF VARIANCE FOR GRAIN YIELD

Put here material that would make the main text too long but is needed to support the results: large data tables, program listings, detailed maps.

Table 2: Analysis of variance for grain yield of boro rice

Source of variation	df	Sum of squares	Mean square	F
Replication	2	0.142	0.071	1.18
Nitrogen	3	9.874	3.291	54.85
Error	6	0.360	0.060	