EFEECT OF VARIETY AND NITROGEN LEVELS ON THE FOLIAGE YIELD OF CORIANDER (*Coriandrum sativum* L.)

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CERTIFICATE

This is to certify that the thesis entitled, **"EFEECT OF VARIETY AND NITROGEN LEVELS ON THE FOLIAGE YIELD OF CORIANDER (*Coriandrum sativum* L.)"** submitted to the Faculty of Agricultural Botany, Sher-e-Bangla Agricultural University, Dhaka, in the partial fulfilment of the requirements for the degree of **MASTER OF SCIENCE (M.S.) IN AGRICULTURAL BOTANY,** embodies the result of a piece of *bona fide* research work carried out by **MAHMUDA AKTER,** Registration No. **06-01886** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

I further certify that such help or source of information, as has been availed during the course of this investigation has been duly acknowledged and style of this thesis have been approved and recommended for submission.

Dated: **(Prof. Asim Kumar Bhadra)**

Place: Dhaka, Bangladesh **Supervisor**

DEDICATED TO
MY
BELOVED PARENTS

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The Author

EFFECT OF VARIETY AND NITROGEN LEVELS ON THE FOLIAGE YIELD OF CORIANDER (*CORIANDRUM SATIVUM* L.)

ABSTRACT

A field experiment on coriander (*Coriandrum sativum* L.) was conducted at the Agricultural Botany farm of Sher-e-Bangla Agricultural University (SAU), Shere-e-Bangla Nagar, Dhaka during the *rabi* season of December 2012 to January 2013 to find out the appropriate variety and suitable nitrogen dose for the maximum foliage yield of the crop. The experiment was laid out in factorial randomized complete block design with three replications. The treatment consisted of five varieties, namely, Champak super one, Rosina, Green Beauty, Multicut 5X and Faridpur local, and four nitrogen doses viz. control (no nitrogen), 30, 60 and 90 kg Nha^{-1}. The treatment effects were found significant in most of the parameters studied. The maximum plant height, plant spread, number of leaves $plant^{-1}$, length of the longest leaf; single plant weight and fresh plant weight m^{-2} were obtained from the variety Rosina and 90 kg N ha^{-1}. Application of 60 and 90 kg N ha^{-1} gave statistically similar results in respect of the above foliage yield contributing parameters. The variety Rosina and 90 kg N ha^{-1} independently as well as in combination gave the highest foliage yield of coriander. The nitrogen doses of 60 kg and 90 kg ha^{-1} were identical in producing foliage per hectare. The performance of the variety Faridpuri or Local was the poorest in terms of foliage yield and yield contributing characters.

CONTENTS

CONTENTS (Cont'd)

CONTENTS (Cont'd)

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

LIST OF ACRONYMS

AEZ	=	Agro- Ecological Zone
AIS	=	Agriculture Information Service
BARC	=	Bangladesh Agricultural Research Council
BBS	=	Bangladesh Bureau of Statistics
B:C	=	Benefit Cost ratio
BINA	=	Bangladesh Institute of Nuclear Agriculture
BRRI	=	Bangladesh Rice Research Institute
cm	=	Centi-meter
cv.	=	Cultivar
DAT	=	Days after transplanting
^{0} C	=	Degree Centigrade
DF	=	Degree of freedom
EC	=	Emulsifiable Concentrate
et al.	=	and others
etc.	=	Etcetera
FAO	=	Food and Agricultural Organization
g	=	Gram
HI	=	Harvest Index
hr	=	hour
IRRI	=	International Rice Research Institute
Kg	=	kilogram
LV	=	Local variety
LYV	=	Low yielding varieties
LSD	=	Least significant difference
m	=	Meter
m^2	=	meter squares
MV	=	Modern variety
mm	=	Millimeter
viz.	=	As follows
ns	=	Non significant
%	=	Percent
CV %	=	Percentage of Coefficient of Variance
ppm	=	Parts per million
SAU	=	Sher-e- Bangla Agricultural University
BAU	=	Bangladesh Agricultural University
t ha^{-1}	=	Tons per hectare

Chapter 1

INTRODUCTION

Chapter 1

INTRODUCTION

Coriander (*Coriandrum sativum* L.) is, an important spice crop known as 'Dhonia' in Bangla is normally cultivated in winter season throughout Bangladesh. It is grown throughout the country for the leaves as well as seeds (Islam *et al*., 2004). Seeds of the crop are used as spice while its tender green leaves are used as culinary herb. It has found to be a remunerative crop. The entire plant of young coriander is used as appetizer in preparing fresh chutneys and sauces. Fresh leaves are used to flavor food, curries, soups, fish sauce, cream sauce for chicken, etc. (Janardhanan and Thoppil, 2004; Tiwary and Agarwal, 2004).

At present the cultivation of coriander has been increased for leaf purpose. But there is no recognized commercial variety except BARI Dhonia-1, which is used for seed production. Still there has not been developed any variety suitable for leaf (foliage) production.

At present, there are many high yielding (foliage/leaf) coriander varieties imported from abroad through different seed companies in Bangladesh. Among the various factors responsible for high yield, the variety itself plays a great role. There is a wide scope for increasing the foliage yield of this crop with the use of varieties that are suitable for cultivation in Bangladesh. For this reason prior to recommendation for the farmers, their performances need to be determined.

For successful crop production, all necessary nutrients must be supplied to the plants judiciously in a sufficient amount. Among different major plant nutrients, nitrogen is required in large amounts by plants because it is a constituent of macromolecules, such as protein. Nitrogen encourages cell elongation, above ground vegetative growth, and imparts green colour of plant leaves (Brady, 1990) and this macronutrient makes the plant leaves succulent

and soft. Being a leafy crop, it has a great demand to nitrogenous fertilizer. It is a short duration crop and is generally harvested within 35 to 50 days after sowing (Badgujar *et al.*, 1987; Dhanasekar *et al.*, 2000; Oliveira *et al.*, 2003). Moreover, the nutrients like nitrogen should be applied in optimum dose and proper method in order to reduce nitrogen loss and increase yield and nitrogen use efficiency of the crop (BARC, 2005). The requirement of nitrogen, which varies according to environmental conditions, has to be determined by actual field trial for any particular soil and climate. Therefore, keeping the above facts in view the present experiment was carried out with the following objectives:

1. To find out the appropriate variety for maximum coriander foliage yield.

2. To determine the suitable nitrogen dose for higher coriander foliage yield.

Chapter 2

REVIEW OF LITERATURE

Chapter 2

REVIEW OF LITERATURE

Nitrogen fertilizer is an important factor as it influences the growth and development of the crops. Variety is also an important factor for growth and yield of coriander. Considering the above points, available literature was reviewed under different coriander varieties and nitrogen levels.

2.1 Effect of variety

2.1.1 Plant height

Inan *et al.* (2014) conducted a study to find out the best variety and they found that plant height varied significantly due to various varieties of coriander.

Kirici (1999) also concluded that the plant height varied significantly among the different varieties collected from different locations.

Kizil and Ipek (2004) conducted a study to find out the eeffects of different row spacing on yield, yield components and essential oil content of some coriander *(Coriandrum sativum* L.) lines. They also found significant variation of plant height among various coriander lines.

Moniruzzaman *et al.* (2013) conducted a study to find out the suitable coriander genotypes for foliage yield and its attributes. They reported that plant height varied among the various coriander genotypes.

2.1.2 Number of leaves plant^{-1}

Moniruzzaman *et al.* (2013) conducted a study to find out the suitable coriander genotypes for foliage yield and its attributes. They reported that number of leaves plant^{-1} varied among the various coriander genotypes.

2.1.3 Single plant weight (g)

Moniruzzaman *et al.* (2013) conducted a study to find out the suitable coriander genotypes for foliage yield and its attributes. They reported that single plant weight varied among the various coriander genotypes.

2.1.4 Number of plants m^{-2}

Moniruzzaman *et al.* (2013) conducted a study to find out the suitable coriander genotypes for foliage yield and its attributes. They reported that number of plants m^{-2} varied among the various coriander genotypes.

2.1.5 Weight of plants (g m^{-2})

Moniruzzaman *et al.* (2013) conducted a study to find out the suitable coriander genotypes for foliage yield and its attributes. They reported that the maximum weight of green plants was found in CS003 genotypes which are mainly contributed by maximum days to plant harvest (55.33 days), the highest plant height, leaves/plant and single plant weight.

Rahman (2000) conducted a study to assess the morphological characters and yield potential of different coriander genotypes. He reported that weight of plants varied significantly among coriander genotypes.

Badguzar *et al.* (1987) conducted a study to find out the response of coriander to foliar application of urea and they also found significant variation of weight of coriander plant among various genotypes.

2.1.6 Foliage yield (t ha^{-1})

Moniruzzaman *et al.* (2013) conducted a study to find out the suitable coriander genotypes for foliage yield and its attributes. They found significant variation of foliage yield of coriander among various genotypes.

Mohideen *et al.* (1984) in a study reported that the variation in foliage yield of coriander was due to the variation of genetic inheritance.

Chow *et al.* (1984) reported that the leaf yield of USA cultivar 'Sunbless' and local cultivar (13 and 8 t ha^{-1}, respectively) harvested in winter after 6-7 weeks of seed sowing.

2.2 Effect of nitrogen level

2.2.1 Plant height

Moniruzzaman *et al.* (2014) conducted a study to find out the influence of different rates and methods of nitrogen application on foliage yield of coriander. They found that the maximum plant height was recorded from of 80 kg N ha^{-1}, being closely followed by 60 kg N ha^{-1}. The minimum plant height was noticed in plots where no N was applied.

Yousuf *et al.* (2014) conducted a study to find out the effect of nitrogen, phosphorus, potassium, and sulphur on the growth and seed yield of coriander (*Coriandrum sativum* L.). They found tallest plant from nitrogen application at the rate of 70 kg N ha^{-1} along with other fertilizers while no fertilizer treatments produced the smallest plants.

Oliveira *et al.* (2003) concluded that plant height varied significantly due to various nitrogen levels and plant height was increases with the increase of nitrogen levels.

2.2.2 Number of leaves $plant^{-1}$

Moniruzzaman *et al.* (2014) conducted a study to find out the influence of different rates and methods of nitrogen application on foliage yield of coriander. They reported that the number of leaves/plant increased with the increase of N dose up to 80 kg ha^{-1} in foliage coriander.

Moniruzzaman *et al.* (2009) conducted a study to find out the effect of nitrogen levels on quality of 'Bangladhonia'. They concluded that the maximum number

of leaves plant^{-1} was obtained from the highest dose of N in 'Bangladhonia'(*Eryngium foetidum* L.).

2.2.3 Single plant weight (g)

Moniruzzaman *et al.* (2014) conducted a study to find out the influence of different rates and methods of nitrogen application on foliage yield of several coriander genotypes. They found that the single plant weight increased with increasing rate of N application up to 80 kg ha^{-1}.

BARI (2010) reported that the maximum individual plant weight (fresh weight/plant) of 'Batishak' was recorded at 80 kg N ha^{-1}.

Moniruzzaman *et al.* (2009) conducted a study to find out the effect of nitrogen levels on quality of 'Bangladhonia'. They found that the maximum fresh weight/plant from the highest dose of nitrogen in 'Bangladhonia'.

2.2.4 Number of plants m^{-2}

Moniruzzaman *et al.* (2014) conducted a study to find out the influence of different rates and methods of nitrogen application on foliage yield of coriander. They concluded that number of plant m^{-2} did not vary significantly due to nitrogen level.

2.2.5 Weight of plants (g m^{-2})

Moniruzzaman *et al.* (2014) conducted a study to find out the influence of different rates and methods of nitrogen application on foliage yield of several coriander genotypes. They recorded the maximum weight of foliage m^{-2} from 80 kg N ha^{-1}, which was similar to 40 and 60 kg N ha^{-1} for both the genotypes.

Moniruzzaman *et al.* (2006) concluded that the weight of spinach plants increased with the increase in nitrogen levels up to the highest level.

Oliveira *et al.* (2003) concluded that the weight of plants increased with the increase in nitrogen levels.

2.2.6 Foliage yield (t ha^{-1})

Moniruzzaman *et al.* (2014) conducted a study to find out the influence of different rates and methods of nitrogen application on foliage yield of several coriander genotypes. They found that the fresh foliage yield increased significantly with the increase in nitrogen level up to 40 kg N ha^{-1}. The maximum foliage yield was recorded at 80 kg N ha^{-1}, which was similar to 60 and 40 kg N ha^{-1}.

Moniruzzaman *et al.* (2009) conducted a study to find out the effect of nitrogen levels on quality of 'Bangladhonia'. They reported that the highest fresh yield of Bangladhonia was recorded from with the application of the highest dose of nitrogen.

BARI (2010) where it was reported that the maximum fresh yield of Batishak was obtained at 80 kg N ha^{-1} and no significant difference was observed among 40 and 80 kg N ha^{-1}

Yousuf *et al.* (2014) conducted a study to find out the effect of nitrogen, phosphorus, potassium, and sulphur on the growth and seed yield of coriander (*Coriandrum sativum* L.). They found highest yield from nitrogen application at a rate of 70 kg N ha^{-1} along with other fertilizers.

Chapter 3

MATERIALS AND METHODS

Chapter 3

MATERIALS AND METHODS

This chapter presents a brief description about experimental period, site description, climatic condition, crop or planting materials, treatments, experimental design and layout, crop growing procedure, fertilizer application, intercultural operations, data collection and statistical analyses.

3.1 Experimental period

The experiment was conducted at the Agricultural Botany Farm of Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, and Dhaka, Bangladesh during the *rabi* season of December 2012 to January 2013.

3.2 Site of the experiment

The experimental site is geographically situated at 23°41N latitude and 90°22′E longitude at an altitude of 8.6 meter above sea level. For better understanding the experimental site has been shown in the Map of AEZ of Bangladesh in Appendix-I.

3.3 Climate

The experimental site is under the sub-tropical climate that is characterized by high temperature, high relative humidity and heavy rainfall with occasional gusty winds in Kharif season (April-September) and scanty rainfall associated with moderately low temperature during rabi season (October-March). The weather data during the study period at the experimental site are shown in Appendix II.

3.4 Characteristics of the soil

The soil of the experimental field belongs to the General soil type, Shallow Red Brown Terrace Soils under Tejgaon Series. The land was above flood level and

sufficient sunshine was available during the experimental period. Soil samples from 0-15 cm depths were collected from the experimental field. The soil analyses were done at Soil Resource and Development Institute (SRDI), Dhaka. The physicochemical properties of the soil are presented in Appendix III.

3.5 Treatments of the experiment

The experiment consisted of two factors which are as follows:

Factor- A (Variety)	**Factor- b (Nitrogen levels)**
V_1 = Champak super one	N_0= 0 kg Nha^{-1}
V_2 = Rosina	N_1= 30 kg Nha^{-1}
V_3 = Green Beauty	N_2= 60 kg Nha^{-1}
V_4 = Multicut 5X	N_3= 90 kg Nha^{-1}
V_5 = Faridpur local	

Thus, five varieties in combination with four nitrogen levels made 20 treatment combinations which are as follows:

V_1N_0	V_2N_0	V_3N_0	V_4N_0	V_5N_0
V_1N_1	V_2N_1	V_3N_1	V_4N_1	V_5N_1
V_1N_2	V_2N_2	V_3N_2	V_4N_2	V_5N_2
V_1N_3	V_2N_3	V_3N_3	V_4N_3	V_5N_3

3.6 Design and Layout of the experiment

The experiment was laid out in a randomized complete block design (RCBD) having twenty treatments (5 varieties x 4 N levels) with three replications. The unit plot size was 3m x 1m (3.0 m^2). The whole experimental area was first divided into three blocks which was considered as replication and each block

was further divided into 20 plots which were considered as unit plots. The block to block distance was 1m and the plot to plot distance was 50 cm.

3.7 Planting materials

The location of seed collection of five varities which were used as plant materials are given in Table 1.

Table 1. Sources and location of collected seeds of coriander varieties

Sl. No.	Name of the variety	Location of seed collection
1	Chamak super one	Samrat Seed Vandar, Siddik Bazar, Dhaka
2	Rosina	Manik Seed Bitan, Siddik Bazar, Dhaka
3	Green Beauty	Manik Seed Bitan, Siddik Bazar, Dhaka
4	Multicut 5x	Samrat Seed Vandar, Siddik Bazar, Dhaka
5	Faridpuri/Local	Manik Seed Bitan, Siddik Bazar, Dhaka

3.8 Land preparation

The land was opened by disc plough 15 days before seeding. Thereafter, the land was prepared thoroughly by ploughing and cross ploughing followed by laddering and harrowing to have good tilth. Weeds and stubbles of the previous crops were collected and removed from the field during land preparation. Soil clods were broken and plots were prepared as 15 cm raised seedbed so that irrigation and rain water easily could drain out and seeds could easily be germinated.

3.9 Manuring and Fertilization

Manures and fertilizers were applied at the following doses as par Moniruzzaman (2011). Fertilizer doses were as follows:

Fertilizers	Doses
Cowdung	5 t/ha
Nitrogen (N)	As per treatment
Phosphorus (P)	11 kg/ha
Potassium (K)	25 kg/ha

The entire amount of cow dung, phosphorus from TSP, and potassium from MOP, with one half of nitrogen was applied during final land preparation. The rest of the nitrogen was applied at 25 days after sowing of seeds as top dress.

3.10 Seed sowing

The seeds (fruits) were rubbed for separating the two mericarps (seeds) and were soaked in water for 24 hours to enhance germination. Seed were also treated with Bavistin at the rate of 2g per kg of seeds before sowing. The seeds were sown in rows 10 cm apart continuously by hand @ 40 kg ha-1 (Moniruzzaman *et al*., 2013). To allow uniform sowing in rows seeds were mixed with some loose soil (about four to five times of weight of seeds). The seeds were covered with good pulverized soil just after sowing and gently pressed by hands. The seed sowing of different varieties was done on December 3, 2012 with slight watering just to supply sufficient moisture needed for quick germination.

3.11 Seedling emergence

The apparent, fifty and hundred percent seedling emergence took place within 8, 12 and 15 days after sowing, respectively.

3.12 Weeding

The field was kept free by hand weeding. Weeding was done alter 25 days alter sowing (DAS).

3.13 Crop protection

There was no insect and pathogen attack to the crop. So measurement was not taken for crop protection**.**

3.14 Irrigation

For good germination water was given to the plots every three days by water can with fine mashed nozzle till good germination. Twice irrigations were given at 25 and 35 days after sowing.

3.15 Harvesting

Harvesting of of young plants of the varieties Champak Super one, Rosina, Green beauty and Multicut 5X before bolting was done from 1 m^2 area of the unit plot at 39 DAS and the local variety was done at 32 DAS just beneath the soil with the help of khurpi for data recording. The young plants of the rest of the plot were harvested at 25 and 46 days after days after sowing for recording the required plant parameters.

3.16 Collection of data

Data were collected from the inner rows of each plot to avoid the border effect. In each unit plot 10 plants were selected randomly for recording data on different yield contributing characters for foliage. The data were recorded on the following parameters:

3.16.1. Plant height

Plant height was measured at 25, 32, 39 and 46 DAS in centimeter from the base (ground level) of the plant to the tip of the longest leaf with the help of a meter scale from randomly selected 10 plants from each plot. The mean of 10 plants were counted as plant height.

3.16.2. Plant spread

The spread of the plant was measured at 25, 32, 39 and 46 DAS in centimeter with the help of a meter scale from randomly selected 10 plants from each plot. Ten randomly selected plants from each plot were measured north-south and east-west direction and average was calculated.

3.16.3. Leaves per plant

Number of leaves per plant was counted at 25, 32, 39 and 46 DAS from randomly selected 10 plants from each plot. The mean of all plants were counted as number of leaves per plant.

3.16.4. Length of the longest leaf

The length of the longest leaf was measured at 25, 32, 39 and 46 DAS in centimeter from the base of the leaf up to the tip of the longest leaf with the help of a meter scale from randomly selected 10 plants from each plot. The mean of 10 plants were counted length of the longest leaf.

3.16.5. Single plant weight

Randomly selected 10 fresh plants were harvested at 25, 32, 39 and 46 DAS from each plot and they were weighed in gram and mean of all plants was recorded as single plant weight. Plants were cut just beneath the soil. Roots were not included.

3.16.6. No. of plants per m^2

The entire seedling of 1 m^2 area of the middle portion of unit plot (3 m x 1 m) were harvested and counted.

3.16.7. Plant weight per m^2

The entire seedling of 1 m^2 area of the middle portion of unit plot (3 m x 1 m) were harvested and weighed by electric balance in gram. Plants were cut just beneath the soil. Roots were not included.

3.16.8. Foliage yield per hectare

Fresh plants of the varieties Champak Super one, Rosina, Green beauty, Multicut 5X and Faridpuri/Local were harvested at 46 DAS by cutting just beneath the soil with the help of Khurpi from each plot. Harvested plants were cleaned, soil particles, dead leaves and other debris were removed and weight of all plants measured with an appropriate spring scale balance and thus plot yield was obtained in kg. Then plot yield was converted to yield per hectare in tons.

3.17 Data analysis:

All the data were compiled properly and analyzed statistically by MSTAT-C program. The mean comparison was done following the Duncan's Multiple Range Test (DMRT) at 5% level of probability.

Chapter 4

RESULTS AND DISCUSSION

Chapter 4

RESULTS AND DISCUSSION

The present study was conducted to examine the effect of variety and nitrogen levels on the foliage yield of coriander. The results were presented, discussed and possible interpretations were made under the following heads:

4.1Plant height (cm)

4.1.1 Effect of variety

Significant variation was observed among the varieties in respect of plant height of coriander (Figure 1 and Appendix IV). It was observed that the variety Rosina produced the highest plant height at 25, 32, 39 and 46 days after sowing (DAS). The variety Faridpuri (V_5) produced the lowest plant height at 25, 32, 39 and 46 DAS. Moniruzzaman *et al.* (2013) and Inan *et al.* (2014) also reported that the plant height varied significantly among the various coriander genotypes.

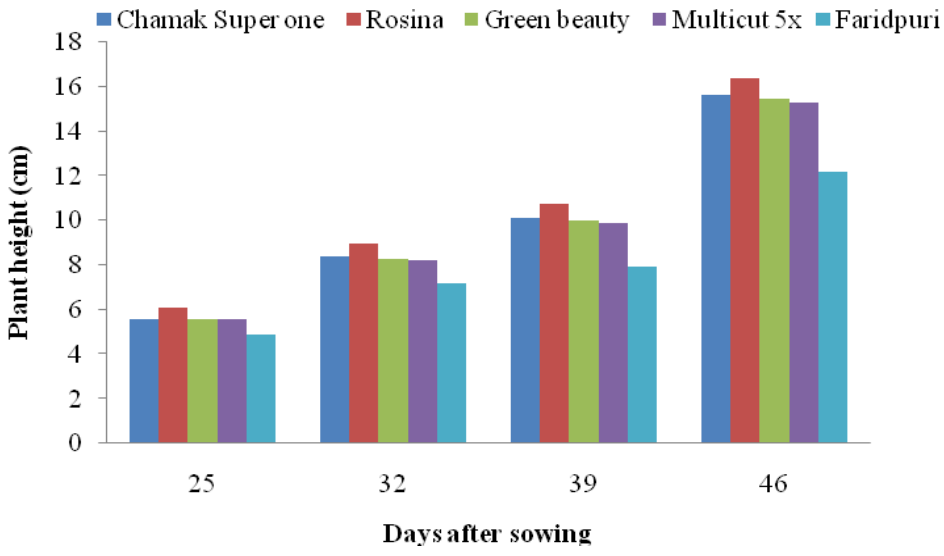

Figure 1. Effect of variety on the plant height of coriander at different days after sowing.

4.1.2 Effect of nitrogen level

Plant height of coriander varied significantly due to various nitrogen levels (Figure 2 and Appendix IV). It was observed that application of 90 kg N ha^{-1} produced the highest plant height at 25, 32, 39 and 46 DAS closely followed by 60 kg N ha^{-1}. Application of no nitrogen produced the lowest plant height at 25, 32, 39 and 46 DAS. This is in agreement with the reports of Moniruzzaman *et al.* (2014), Yousuf *et al.* (2014) and Oliveira *et al.* (2003).

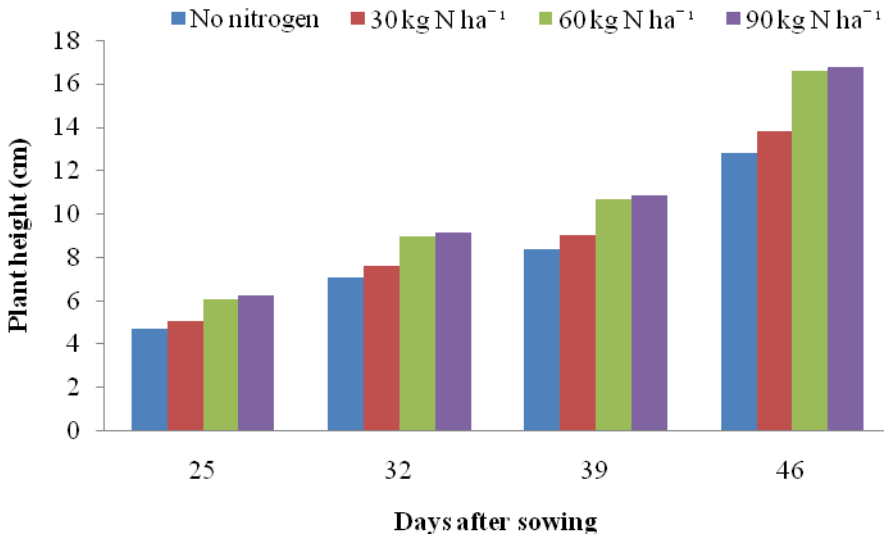

Figure 2. Effect of nitrogen levels on the plant height of coriander at different days after sowing.

4.1.3 Interaction effect of variety and nitrogen level

The treatment combinations of variety and nitrogen levels had non-significant effect on the plant height of coriander (Table 2).

Table 2. Interaction effect of variety and nitrogen level on the plant height of coriander at different days after sowing

Treatments	Days after sowing			
	25	32	39	46
V_1N_0	4.81	7.21	8.73	13.34
V_1N_1	5.13	7.78	9.41	14.40
V_1N_2	6.16	9.82	11.10	17.28
V_1N_3	6.27	9.46	11.30	17.50
V_2N_0	5.15	7.72	9.34	14.01
V_2N_1	5.69	8.33	9.99	15.13
V_2N_2	6.67	9.07	11.79	18.16
V_2N_3	6.84	9.93	11.87	18.35
V_3N_0	4.75	7.12	8.61	13.17
V_3N_1	5.13	7.69	9.29	14.29
V_3N_2	6.16	9.04	10.96	17.06
V_3N_3	6.35	9.15	11.27	17.33
V_4N_0	4.70	7.05	8.53	13.05
V_4N_1	5.08	7.61	9.21	14.09
V_4N_2	6.10	9.04	10.86	16.91
V_4N_3	6.33	9.22	10.98	17.07
V_5N_0	4.13	6.19	6.80	10.40
V_5N_1	4.46	6.68	7.34	11.24
V_5N_2	5.35	7.88	8.66	13.47
V_5N_3	5.60	8.06	8.87	13.63
LSD $_{0.05}$	0.37	0.34	0.47	0.56
SE	0.13	0.12	0.16	0.20
CV (%)	4.02	2.54	2.90	2.27

Means in a column without letter are not significant at 5% level of probability by DMRT.

V_1= Chamak Super one, V_2= Rosina, V_3= Green beauty, V_4= Multicut 5X, V_5= Faridpuri, N_0= No nitrogen, N_1= 30 kg N ha^{-1}, N_2= 60 kg N ha^{-1}, N_3= 90 kg N ha^{-1}, ns = not significant

4.2 Plant spread (cm)

4.2.1 Effect of variety

The variety had significant effect on plant spread (Figure 3 and Appendix V)). The variety Rosina produced the highest plant spread at 25, 32, 39 and 46 DAS. At 32 DAS the Rosina was statistically similar with the Chamak Super one in terms of plant spread and Chamak Super one produced the second highest plant spread. The variety Faridpuri produced the lowest plant height at 25, 32, 39 ant 46 DAS.

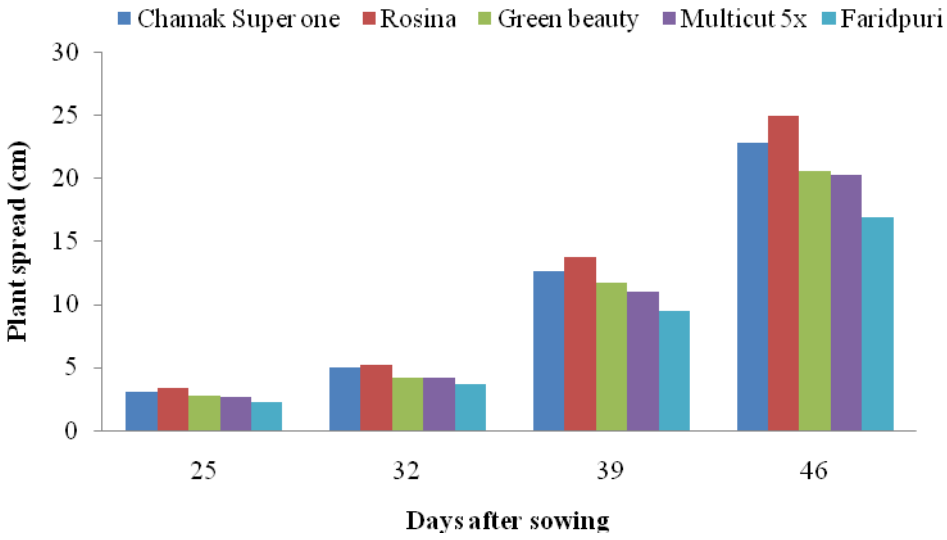

Figure 3. Effect of variety on the plant spread (cm) of coriander at different days after sowing.

4.2.2 Effect of nitrogen level

Plant spread varied significantly due to various nitrogen levels (Figure 4 and Appendix V). At 25 DAS application of 90 kg N ha^{-1} produced the highest plant spread but at 32 DAS application of 60 kg N ha^{-1} produced the highest plant spread which was statistically similar with 90 kg N ha^{-1}. At 39 and 46 DAS application of 90 kg N ha^{-1} produced the highest plant spread which was statistically similar with 60 kg N ha^{-1}).

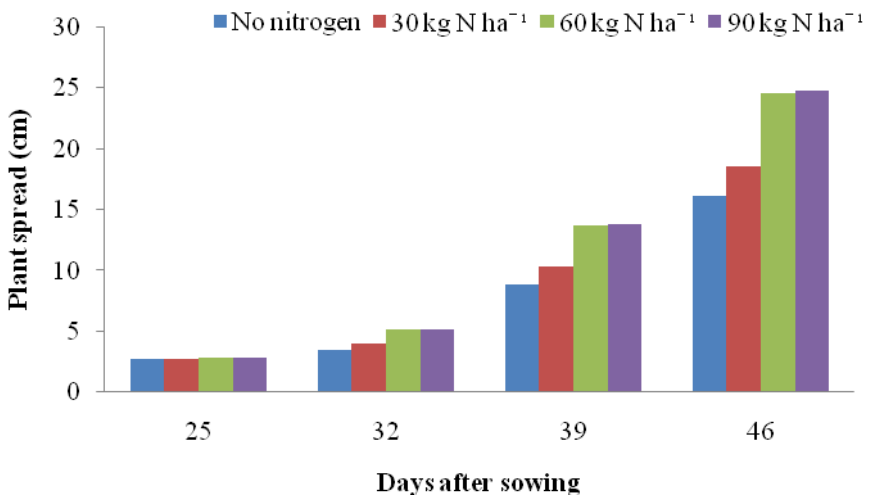

Figure 4. Effect of nitrogen levels on the plant spread (cm) of coriander at different days after sowing.

4.2.3 Interaction effect of variety and nitrogen level

Combined effect of variety and nitrogen levels influenced significantly on plant spread at 46 days after sowing (DAS), but exerted no significant effect on the plant spread at 25, 32 and 32 DAS (Table 3). However, at 25, 32 and 39 DAS plant spread increased gradually with the increased nitrogen levels irrespective of varieties. At 46 DAS, the maximum plant spread was recorded from V_2N_3 (29.09 cm) closely followed by V_2N_2 (28.96 cm) and its lowest value from V4N0. It also revealed that the combinations V_2N_3 and V_2N_2 gave the highest at par results in respect of plant spread irrespective of varieties.

Table 3. Interaction effect of variety and nitrogen level on the plant spread (cm) of coriander at different days after sowing

Variety x nitrogen level	Days after sowing			
	25	**32**	**39**	**46**
V_1N_0	3.02	3.90	9.75	17.55 h
V_1N_1	3.05	4.48	11.20	20.15 e
V_1N_2	3.06	5.83	14.75	26.55 b
V_1N_3	3.12	5.91	14.86	26.89 b
V_2N_0	3.35	4.29	10.73	19.31 f
V_2N_1	3.35	4.35	12.20	22.17 d
V_2N_2	3.43	**6.23**	15.93	**28.96 a**
V_2N_3	3.44	5.95	15.99	**29.09 a**
V_3N_0	2.72	3.91	8.78	15.80 i
V_3N_1	2.74	4.12	10.30	18.52 g
V_3N_2	2.75	4.69	13.86	23.90 c
V_3N_3	2.81	4.74	13.97	24.13 c
V_4N_0	2.56	2.84	8.28	15.08 ij
V_4N_1	2.59	3.61	9.52	17.34 h
V_4N_2	2.60	5.01	13.12	24.16 c
V_4N_3	2.66	4.88	13.16	24.21 c
V_5N_0	2.11	2.88	6.82	12.98 k
V_5N_1	2.20	3.32	8.51	14.92 j
V_5N_2	2.27	4.20	11.06	19.65 ef
V_5N_3	2.40	4.24	11.33	19.93 ef
LSD $_{0.05}$	0.15	0.78	0.60	0.74
SE	0.05	0.28	0.21	0.26
CV (%)	3.10	10.71	3.13	2.13

Means in a column without letter are not significant at 5% level of probability by DMRT V_1= Chamak Super one, V_2= Rosina, V_3= Green beauty, V_4= Multicut, V_5= Faridpuri, N_0= No nitrogen, N_1= 30 kg N ha^{-1}, N_2= 60 kg N ha^{-1}, N_3= 90 kg N ha^{-1}

4. 3 Number of leaves plant^{-1}

4.3.1 Effect of variety

Significant variation was observed among different varieties of coriander in respect of number of leaves plant^{-1} (Figure 5 Appendix VI). Number of leaves plant^{-1} increased with time and the variety Rosina produced the highest number of leaves plant^{-1} at 25, 32, 39 and 46 DAS. The variety Faridpuri gave the minimum number of leaves plant^{-1} at 25, 32, 39 and 46 DAS. Moniruzzaman *et al.* (2013) reported that number of leaves plant^{-1} varied among the various coriander genotypes.

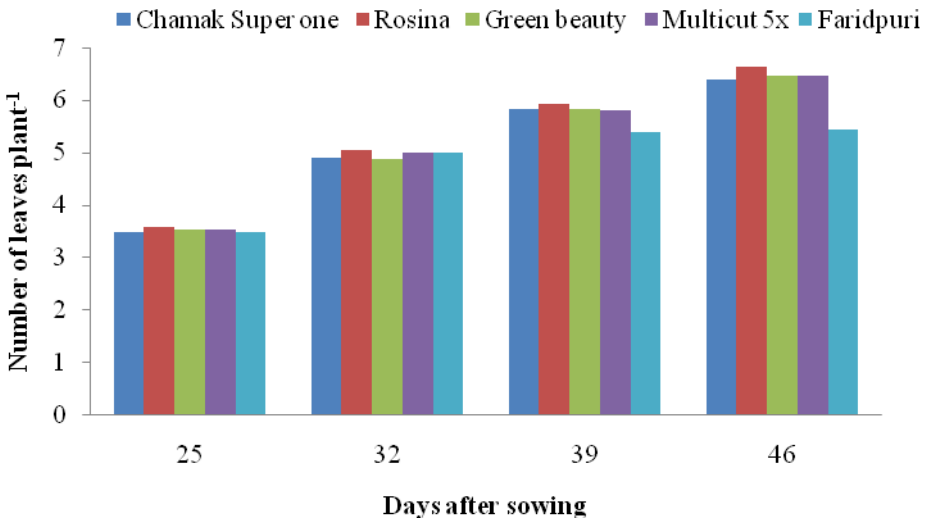

Figure 5. Effect of variety on the number of leaves pant^{-1} of coriander at different days after sowing

4.3.2 Effect of nitrogen level

Number of leaves plant^{-1} was significantly influenced by various nitrogen levels (Figure 5 and Appendix VI). Application of 90 kg N ha^{-1} produced the highest number of leaves plant^{-1} at 25, 32, 39 and 46 DAS closely followed by. 60 kg N ha^{-1}. No nitrogen produced the lowest number of leaves plant^{-1} at 25, 32, 39 and 46 DAS. This is in line with the reports of Moniruzzaman *et al.* (2014).

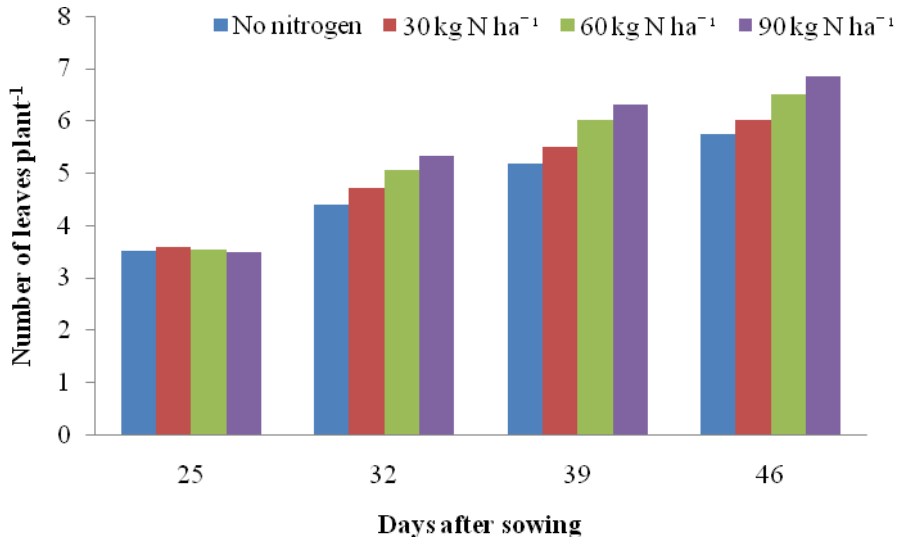

Figure 6. Effect of nitrogen levels on the number of leaves pant^{-1} of coriander at different days after sowing .

4.3.3 Interaction effect of variety and nitrogen level

Combined effect of variety and nitrogen levels put non-significant effect on the number of leaves plant^{-1} of coriander at 25, 32 and 46 days after sowing (DAS) but exerted significant influence on number of leaves plant^{-1} at 39 DAS (Table 4). The maximum number of leaves plant^{-1} was obtained from V_2N_3 combination (6.49) closely followed by V_3N_3 and V_4N_3 combinations. The N_2 level gave the better performance after N_3 level irrespective of coriander varieties.

Table 4. Interaction effect of variety and nitrogen level on the number of leaves plant^{-1} of coriander at different days after sowing

Variety x Nitrogen level	Days after sowing			
	25	32	39	46
V_1N_0	3.43	4.37	5.28 h	5.83
V_1N_1	3.53	4.76	5.53 def	6.08
V_1N_2	3.56	5.11	6.08 c	6.68
V_1N_3	3.55	5.37	6.38 a	7.01
V_2N_0	3.60	4.47	5.36 fgh	6.00
V_2N_1	3.63	4.96	5.62 de	6.29
V_2N_2	**3.67**	5.24	6.18 bc	6.92
V_2N_3	3.63	**5.48**	**6.49 a**	**7.27**
V_3N_0	3.47	4.40	5.31 gh	5.93
V_3N_1	3.60	4.62	5.53 def	6.25
V_3N_2	3.63	4.04	6.08 c	6.69
V_3N_3	3.60	5.38	6.39 a	7.02
V_4N_0	3.47	4.47	5.36 fgh	5.98
V_4N_1	3.60	4.83	5.49 efg	6.19
V_4N_2	3.64	5.16	6.05 c	6.68
V_4N_3	3.65	5.47	6.34 ab	7.03
V_5N_0	3.53	4.27	4.57 i	5.03
V_5N_1	3.55	4.42	5.28gh	5.26
V_5N_2	3.57	4.72	5.70 d	5.52
V_5N_3	3.60	4.89	5.98 c	5.93
LSD $_{0.05}$	0.21	0.30	0.19	0.21
SE	0.07	0.11	0.07	0.07
CV (%)	3.59	3.78	2.96	2.04

Means in a column without letter are not significant at 5% level of probability by DMRT.

V_1= Chamak Super one, V_2= Rosina, V_3= Green beauty, V_4= Multicut 5X, V_5= Faridpuri, N_0= No nitrogen, N_1= 30 kg N ha^{-1}, N_2= 60 kg N ha^{-1}, N_3= 90 kg N ha^{-1}

4.4 Length of the longest leaf (cm)

4.4.1 Effect of variety

The variety had significant effect on the length of the longest leaf (Figure 7 and Appendix VII). The Rosina variety produced the longest leaf at 25, 32, 39 and 46 DAS. Faridpuri (V_5) variety produced the shortest length of the longest leaf at 25, 32, 39 and 46 DAS.

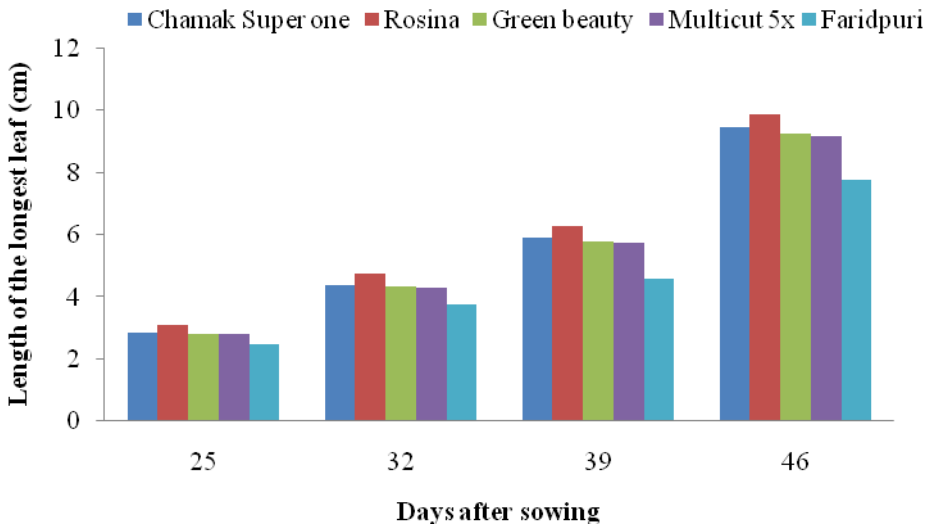

Figure 7. Effect of variety on the length of longest leaf (cm) of coriander at different days after sowing .

4.4.2 Effect of nitrogen level

Length of the longest leaf was significantly influenced by various nitrogen levels (Figure 8 and Appendix VII). Application of 90 kg N ha^{-1} produced the highest length of the longest leaf at 25, 32, 39 and 46 DAS which was statistically similar with 60 kg N ha^{-1}. However, no nitrogen produced the lowest length of the longest leaf at 25, 32, 39 and 46 DAS.

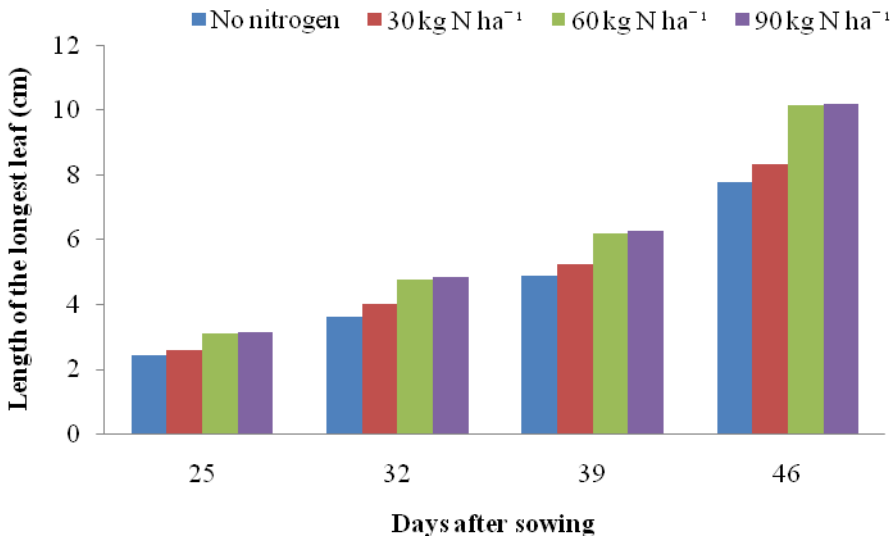

Figure 8. Effect of nitrogen levels on the length of longest leaf (cm) of coriander at different days after sowing.

4.4.3 Interaction effect of variety and nitrogen level

Combined effect of variety and nitrogen level exerted non-significant effect on the length of the longest leaf of coriander at different days after sowing (DAS) (Table 5). However, the length of the longest leaf increased progressively with the increase of nitrogen levels irrespective of varieties. The combinations V_2N_3 and V_2N_2 gave the higher length of the longest leaf compared to other combinations.

Table 5. Interaction effect of variety and nitrogen level on the length of the longest leaf (cm) of coriander at different days after sowing

Treatments	Days after sowing			
	25	32	39	46
V_1N_0	2.45	3.68	5.06	8.37
V_1N_1	2.63	4.10	5.46	8.64
V_1N_2	3.14	4.87	6.44	10.37
V_1N_3	3.17	4.92	6.55	10.45
V_2N_0	2.63	3.94	5.48	8.41
V_2N_1	2.89	4.53	4.79	9.08
V_2N_2	3.40	5.20	6.84	10.90
V_2N_3	3.43	5.27	6.90	10.99
V_3N_0	2.42	3.65	4.99	7.90
V_3N_1	2.56	4.08	5.39	8.57
V_3N_2	3.14	4.81	6.36	10.24
V_3N_3	3.17	4.84	6.42	10.28
V_4N_0	2.40	3.60	4.95	7.83
V_4N_1	2.59	3.93	5.34	8.45
V_4N_2	3.11	4.79	6.30	10.15
V_4N_3	3.15	4.83	6.35	10.21
V_5N_0	2.11	3.16	3.94	6.24
V_5N_1	2.22	3.45	4.26	6.75
V_5N_2	2.73	4.18	5.02	8.98
V_5N_3	2.79	4.22	5.12	9.03
LSD $_{0.05}$	0.19	0.20	0.25	0.92
SE	0.07	0.07	0.09	0.32
CV (%)	4.08	2.80	2.79	6.12

Means in a column without letter are not significant at 5% level of probability by DMRT.

V_1= Chamak Super one, V_2= Rosina, V_3= Green beauty, V_4= Multicut 5 X, V_5= Faridpur local, N_0= 0 kg ha^{-1}(No nitrogen), N_1= 30 kg N ha^{-1}, N_2= 60 kg N ha^{-1}, N_3= 90 kg N ha^{-1}, ns = not significant

4.5 Single plant weight (g)

4.5.1 Effect of variety

The variety significantly influenced the single plant weight of coriander (Figure 9 and Appendix VIII). It revealed that the Rosina variety produced the highest single plant weight at 25, 32, 39 and 46 DAS and Faridpuri variety produced the lowest single plant weight at 25, 32, 39 and 46 DAS. Moniruzzaman *et al.* (2013) reported that single plant weight varied among the various coriander genotypes.

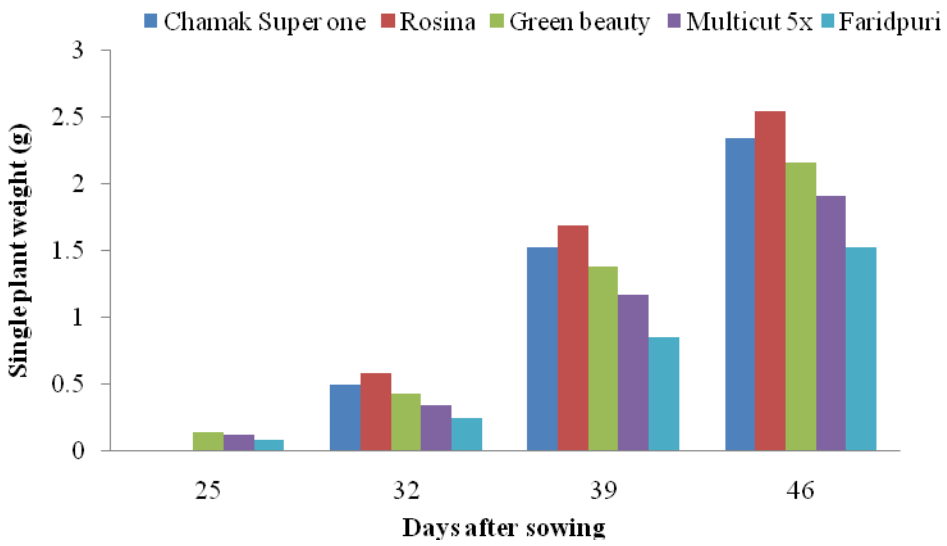

Figure 9. Effect of variety on the single plant weight (g) of coriander at different days after sowing.

4.5.2 Effect of nitrogen level

Single plant weight was significantly influenced by various nitrogen levels (Figure 10 and appendix VIII). At 25 DAS application of 60 kg N ha^{-1} produced the maximum single plant weight but at 32, 39 and 46 DAS application of 90 kg N ha^{-1} produced the highest single plant weight. The control treatment (no nitrogen) produced the lowest single plant weight at 25, 32, 39 and 46 DAS. Single plant weight of coriander increased with increasing

rate of N application up to 80 kg ha $^{-1}$ (Moniruzzaman *et al.*, 2014). BARI (2010) and Moniruzzaman *et al.* (2009) reported the same in batisak and bangla dhonia, respectively..

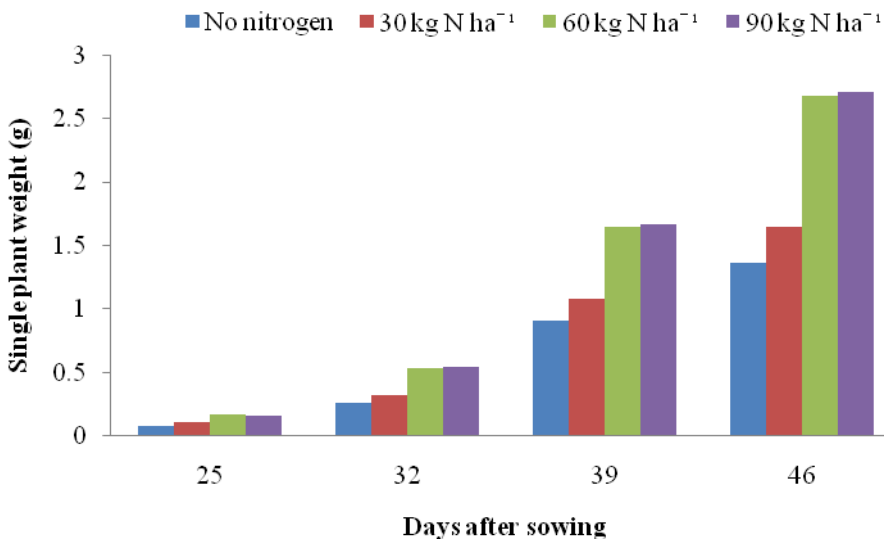

Figure 10. Effect of nitrogen levels on the single plant weight (g) of coriander at different days after sowing.

4.5.3 Interaction effect of variety and nitrogen level

Combined effect of variety and nitrogen level had significant effect on the single plant weight of coriander at 25, 32 and 39 DAS, but no significant effect on single plant weight at 46 DAS (Table 6). The treatment combination of V_2N_3 produced the highest single plant weight at 25, 32 and 39 DAS which was statistically similar with the treatment combination of V_2N_2. The control treatment (without nitrogen) gave the lowest values of single plant weight at all DAS when interacted with any variety of coriander. It is clear from the Table 6 that N2 levels produced the highest single plant weight irrespective of coriander varieties.

Table 6. Interaction effect of variety and nitrogen level on the single plant weight (g) of coriander at different days after sowing

Treatments	Days after sowing			
	25	32	39	46
V_1N_0	0.09 i	0.31 hij	1.04 fgh	1.55
V_1N_1	0.13 fg	0.39 ef	1.25 e	1.88
V_1N_2	0.20 b	0.63 b	1.89 b	2.97
V_1N_3	0.18 c	0.65 b	1.93 b	2.96
V_2N_0	0.12 gh	0.37 fg	1.16 ef	1.74
V_2N_1	0.14 ef	0.46 d	1.39 d	2.09
V_2N_2	0.22 a	0.73 a	2.08 a	3.10
V_2N_3	0.23 a	0.77 a	2.14 a	3.25
V_3N_0	0.09 ij	0.26 ijk	0.94 h	1.39
V_3N_1	0.11 h	0.33 gh	1.12 f	1.69
V_3N_2	0.18 c	0.55 c	1.74 c	2.79
V_3N_3	0.16 d	0.56 c	173 c	2.78
V_4N_0	0.08 ij	0.21 kl	0.80 i	1.18
V_4N_1	0.09 i	0.26 jk	0.95 gh	1.44
V_4N_2	0.15 de	0.44 de	1.46 d	2.51
V_4N_3	0.14 ef	0.44 de	1.47 d	2.50
V_5N_0	0.05 k	0.15 m	0.60 j	0.95
V_5N_1	0.07 j	0.19 lm	0.69 ij	1.12
V_5N_2	0.11 h	0.31 hij	1.07 fg	2.01
V_5N_3	0.09 i	0.32 ghi	1.05 fgh	2.03
LSD $_{0.05}$	0.02	0.05	0.12	0.28
SE	0.01	0.02	0.04	0.10
CV (%)	10.82	8.26	5.28	8.40

Means in a column having different letters are significant at 5% level of probability by DMRT.

V_1= Chamak Super one, V_2= Rosina, V_3= Green beauty, V_4= Multicut 5x, V_5= Faridpuri, N_0= 0 kg ha-1 (No nitrogen), N_1= 30 kg N ha^{-1}, N_2= 60 kg N ha^{-1}, N_3= 90 kg N ha^{-1}

4.6 Number of plants m^{-2}

4.6.1 Effect of variety

The variety treatments had no significant effect on the number of plants m^{-2} of coriander (Figure 11 and Appendix IX).

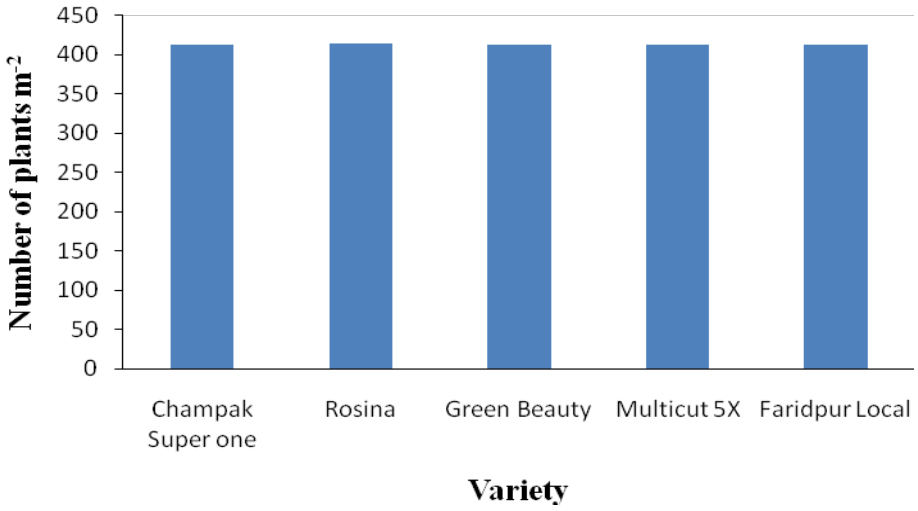

Figure 11. Effect of variety on the number of plant m^{-2} of coriander.

4.6.2 Effect of nitrogen level

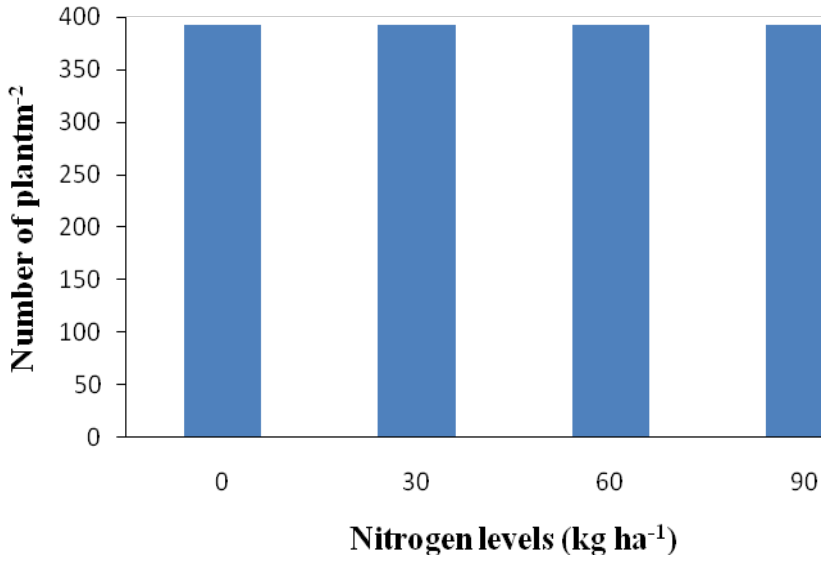

Fig. 12. Effect of nitrogen levels on the number of plant m^{-2} of coriander.

Number of plant m^{-2} did not vary significantly due to various nitrogen levels (Figure 12 and Appendix IX).

4.6.3 Interaction effect of variety and nitrogen level

The variety and N levels in combination had no significant effect on number of plant m^{-2}.

4.7 Weight of plants m^{-2}

4.7.1 Effect of variety

The variety had significant effect on the weight of plants of coriander (Figure 13 and Appendix IX). The Rosina variety produced the highest weight of plants and Faridpuri variety produced the lowest weight of plants of coriander. Moniruzzaman *et al.* (2013), Rahman (2000) and Badguzar *et al.* (1987) reported that weight of plants varied significantly among coriander genotypes.

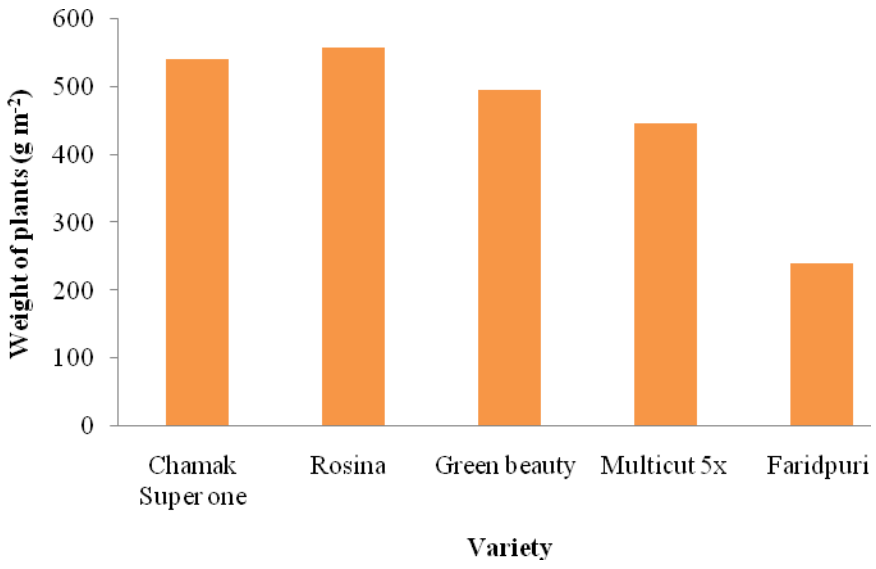

Figure 13. Effect of variety on the weight of plant of coriander.

4.7.2 Effect of nitrogen level

Weight of plants m^{-2} was significantly influenced by various nitrogen levels treatments (Figure 14 and Appendix IX). It revealed that application of 90 kg N ha^{-1} gave the highest weight of plants which was statistically similar with 60 kg N ha^{-1}. The lowest weight of plants was produced when nitrogen was not applied to the crop. This corroborates the results of Moniruzzaman *et al.* (2006) and Oliveira *et al.* (2003).

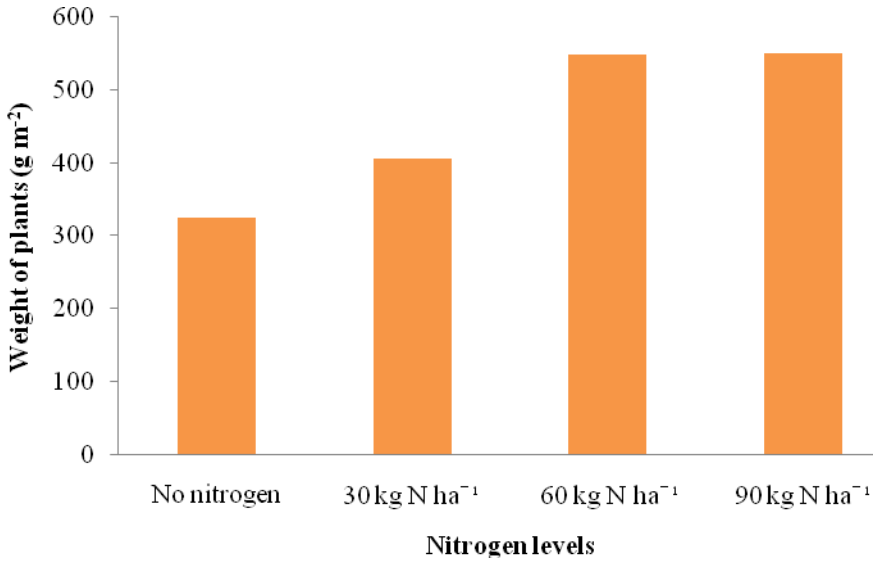

Figure 14. Effect of nitrogen levels on the weight of plant of coriander.

4.7.3 Interaction effect of variety and nitrogen level

The interaction of variety and nitrogen levels had significant effect on weight of plants m^{-2} (Table 7). The treatment combinations of V_2N_3 produced the maximum weight of plants m^{-2} (668.7 g) which was statistically similar with the treatment combinations of V_2N_2 (665.8g), and V_1N_2 (652.0 g). The combination V_5N_0 produced the lowest weight of plants m^{-2} of coriander (167.2 g).

Table 7. Interaction effect of variety and nitrogen level on the number of plants m^{-2}, weight of plants (g m^{-2}) and foliage yield (t ha^{-1}) of coriander at different days after sowing

Treatments	Number of plants m^{-2}	Weight of plants (g m^{-2})	Foliage Yield (t ha^{-1})
V_1N_0	405.0	381.0 fg	3.81 fg
V_1N_1	405.0	480.3 d	4.80 d
V_1N_2	405.3	652.0 a	6.52 a
V_1N_3	405.3	653.7 a	6.54 a
V_2N_0	413.0	401.1 f	4.01 f
V_2N_1	412.0	501.3 d	4.72 d
V_2N_2	413.3	**665.8 a**	**6.66 a**
V_2N_3	416.7	**668.7 a**	**6.69 a**
V_3N_0	414.0	352.5 g	3.52 g
V_3N_1	414.0	437.1e	4.38 e
V_3N_2	412.3	597.9 b	5.98 b
V_3N_3	412.7	598.6 b	6.00 b
V_4N_0	412.0	317.7 h	3.18 h
V_4N_1	413.3	397.0 f	3.97 f
V_4N_2	413.3	534.6 c	5.35 c
V_4N_3	415.3	538.1 c	5.38 c
V_5N_0	317.3	167.2 j	1.67 j
V_5N_1	319.7	213.0 i	2.13 i
V_5N_2	319.0	290.4 h	2.90 h
V_5N_3	319.0	291.9 h	2.92 h
LSD $_{0.05}$	23.65	30.20	0.29
SE	8.26	10.55	0.10
CV (%)	3.67	4.00	3.88

Means in a column having different letters are significant at 5% level of probability by DMRT.

V_1= Chamak Super one, V_2= Rosina, V_3= Green beauty, V_4= Multicut 5X, V_5= Faridpuri, N_0= No nitrogen, N_1= 30 kg N ha^{-1}, N_2= 60 kg N ha^{-1}, N_3= 90 kg N ha^{-1}

4.8 Foliage yield (t ha^{-1})

4.8.1 Effect of variety

The variety had significant effect on the foliage yield of coriander (Figure 15 and Appendix IX)). The variety Rosina produced the highest foliage yield which was statistically similar with Chamak Super one. The variety, Faridpuri gave the lowest foliage yield of coriander. Moniruzzaman *et al.* (2013) and Chow *et al.* (1984) found significant variation of foliage yield of coriander among various genotypes. Foliage yield varied among the varieties because of variation of genetic inheritance (Mohideen *et al.*, 1984).

Figure 15. Effect of variety on the foliage yield of coriander.

4.8.2 Effect of nitrogen level

Foliage yield per hectare was significantly influenced by different nitrogen levels (Figure 16 and Appendix IX). The maximum foliage yield ha^{-1} was recorded at 90 kg N ha^{-1} closely followed at 60 kg N ha^{-1}. The lowest foliage yield ha^{-1} was produced when nitrogen was not applied to the crop. This is in agreement with the reports of Moniruzzaman *et al.* (2014) in coriander, BARI (2010) in batisak and Moniruzzaman *et al.* (2009) in blati dhonia.

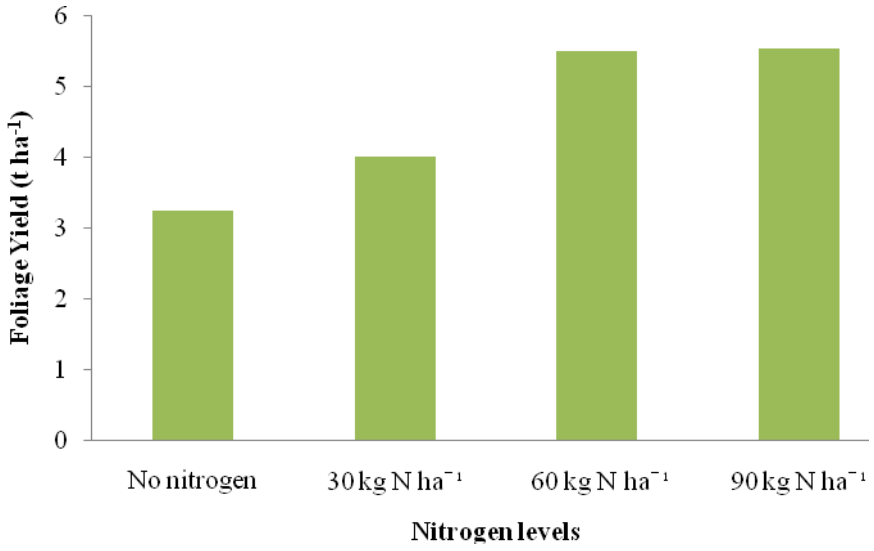

Figure 16. Effect of nitrogen levels on the foliage yield of coriander.

4.8.3 Interaction effect of variety and nitrogen level

The variety in combination with nitrogen levels exerted significant influence on foliage yield per hectare (Table 7). The maximum foliage yield was obtained from V_2N_3 treatment (6.69 t ha^{-1}) closely followed by V_2N_2 (6.66 t/ha) and V_1N_2 (6.52 t ha^{-1}) and V_1N_2 (6.54 t ha^{-1}). It is evident from the Table 7 that the nitrogen levels of N_3 and N_2 produced the highest foliage yield per hectare irrespective of varieties. All the varieties when interacted with zero nitrogen gave the lower foliage yield. The treatment combination V_5N_0 produced the minimum foliage yield (1.67 t ha^{-1}).

Chapter 5

SUMMARY AND CONCLUSION

Chapter 5

SUMMARY AND CONCLUSION

The experiment was conducted on coriander (*Coriandrum sativum* L.) at the Agricultural Botany Farm of Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, Dhaka, Bangladesh during the Rabi season of December 2012 to January 2013. The main objective of this study was to find out appropriate varieties of coriander and suitable nitrogen dose for higher foliage yield of coriander. The experiment consisted of two factors (variety and nitrogen levels). There were five varieties (Champak Super one, Rosina, Green Beauty, Multicut 5X and Faridpur local) and four nitrogen levels (0, 30, 60 and 90 kg Nha^{-1}) which in combination made twenty treatment combinations. The experiment was laid out in factorial randomized complete block design with three replications.

The variety significantly influenced the plant height of coriander. It was observed that the variety Rosina produced the highest plant height wheras Faridpuri variety produced the lowest plant height at 25, 32, 39 and 46 days after sowing (DAS). Nitrogen dose at 90 kg ha^{-1} produced the highest plant height closely followed by 60 kg ha^{-1} while no nitrogen (control) produced the lowest plant height at different DAS. The combinations of variety and nitrogen levels had no significant effect on the plant height of coriander.

Plant spread varied significantly due to various varietal treatments. It was observed that the variety Rosina produced the highest plant spread whereas Chamak Super one produced the second highest plant spread at different DAS. Faridpuri variety produced the lowest plant height at different DAS. At 25 applications of 90 kg N ha^{-1} produced the highest plant spread but at 32 DAS application 60 kg N ha^{-1} gave the highest plant spread which was statistically similar with 90 kg N ha^{-1}. However, at 39 and 46 DAS application of 90 kg N ha^{-1}

produced the highest plant spread which was statistically similar to 60 kg N ha^{-1} Combined effect of variety and nitrogen level exerted no significant effect on the plant spread of coriander.

Significant variation was observed due to various varietal treatments of coriander in number of leaves $plant^{-1}$. Number of leaves $plant^{-1}$ increased with time and the variety Rosina produced the highest number of leaves $plant^{-1}$ at 25, 32, 39 and 46 DAS. The maximum number of leaves was produced at 90 kg N ha^{-1} closely followed by 60 kg N ha^{-1} However, application of no nitrogen produced the lowest number of leaves $plant^{-1}$. Combined effect of variety and nitrogen level exerted no significant effect on the number of leaves $plant^{-1}$ of coriander.

Various varietal treatments had significant effect on the length of the longest leaf at different DAS. The Rosina variety produced the longest leaf and Faridpuri) variety produced the shortest length of the longest leaf. The maximum length of the longest leaf was produced at 90 kg N ha^{-1} which was similar at 60 kg N ha^{-1} and no nitrogen produced the lowest length of the longest leaf. Combined effect of variety and nitrogen level exerted no significant effect on the length of the longest leaf of coriander

Single plant weight was significantly influenced by different varieties of coriander. The variety Rosina gave the maximum single plant weight and Faridpuri variety produced the lowest single plant weight. At 25 DAS application 60 kg N ha^{-1} produced the maximum single plant weight but at 32, 39 and 46 DAS application of 90 kg N ha^{-1} produced the highest single plant weight and no nitrogen produced the lowest single plant weight. Combined effect of variety and nitrogen level exerted significant effect on the single plant weight of coriander. The variety Rosina coupled with 90 kg N ha^{-1} gave the maximum single plant weight which was statistically similar with the same variety Rosina and 60 kg N ha^{-1}.

The variety put significant effect on the weight of plants m^{-2} of coriander. It revealed that the variety Rosina produced the maximum weight of plants m^{-2} and Faridpuri variety produced the minimum weight of plants m^{-2} of coriander. It was observed that the maximum weight of plant m^{-2} was recorded at 90 kg N ha^{-1} closely followed by 60 kg N ha^{-1}. Weight of plants m^{-2} varied significantly due to various treatment combinations of variety and nitrogen levels. The treatment combinations of V_2N_3 produced the maximum weight of plants m^{-2} which was statistically similar with the treatment combinations of V_3N_3, V_2N_2, V_4N_3 and V_3N_2..Various varietal treatments had significant effect on the foliage yield of coriander. The variety Rosina gave the maximum foliage yield. The maximum foliage yield was obtained from 90 kg N ha^{-1}. Foliage yield varied significantly due to various treatment combinations of variety and nitrogen levels. The maximum foliage yield was obtained from V_2N_3 treatment closely followed by V_2N_2, and V_3N_2. All the varieties when interacted with no nitrogen gave the lower yield.

Based on the above results the following conclusion might be drawn:

1. The foliage yield contributing characters viz. plant height, plant spread, number of leaves $plant^{-1}$, length of the longest leaf, single plant weight and fresh plant weight m^{-2} were found maximum from the variety Rosina as well as from the application of nitrogen @ 90 kg ha^{-1}. Application of 60 kg Nha^{-1} was statistically similar with 90 kg N ha^{-1} in respect of the above foliage yield contributing characters.
2. The variety Rosina and 90 kg N ha^{-1} singly produced the maximum foliage yield of coriander. The identical foliage yield was obtained from the application of 60 and 90 kg N ha^{-1}.

3. The variety Rosina in combination with 90 kg Nha^{-1} gave the highest coriander foliage yield which was statistically similar with the combination of the same variety Rosina and 60 kg N ha^{-1}.

Chapter 6

Recommendation

Chapter 6

RECOMMENDATION

1. For foliage (leaf) production of coriander, the variety Rosina and 60 kg Nha^{-1} are suitable for obtaining the maximum fresh foliage yield.
2. The findings obtained from the present investigation should be confirmed by conducting similar type of experiments in different Agro-ecological Zones (AEZs) of Bangladesh.

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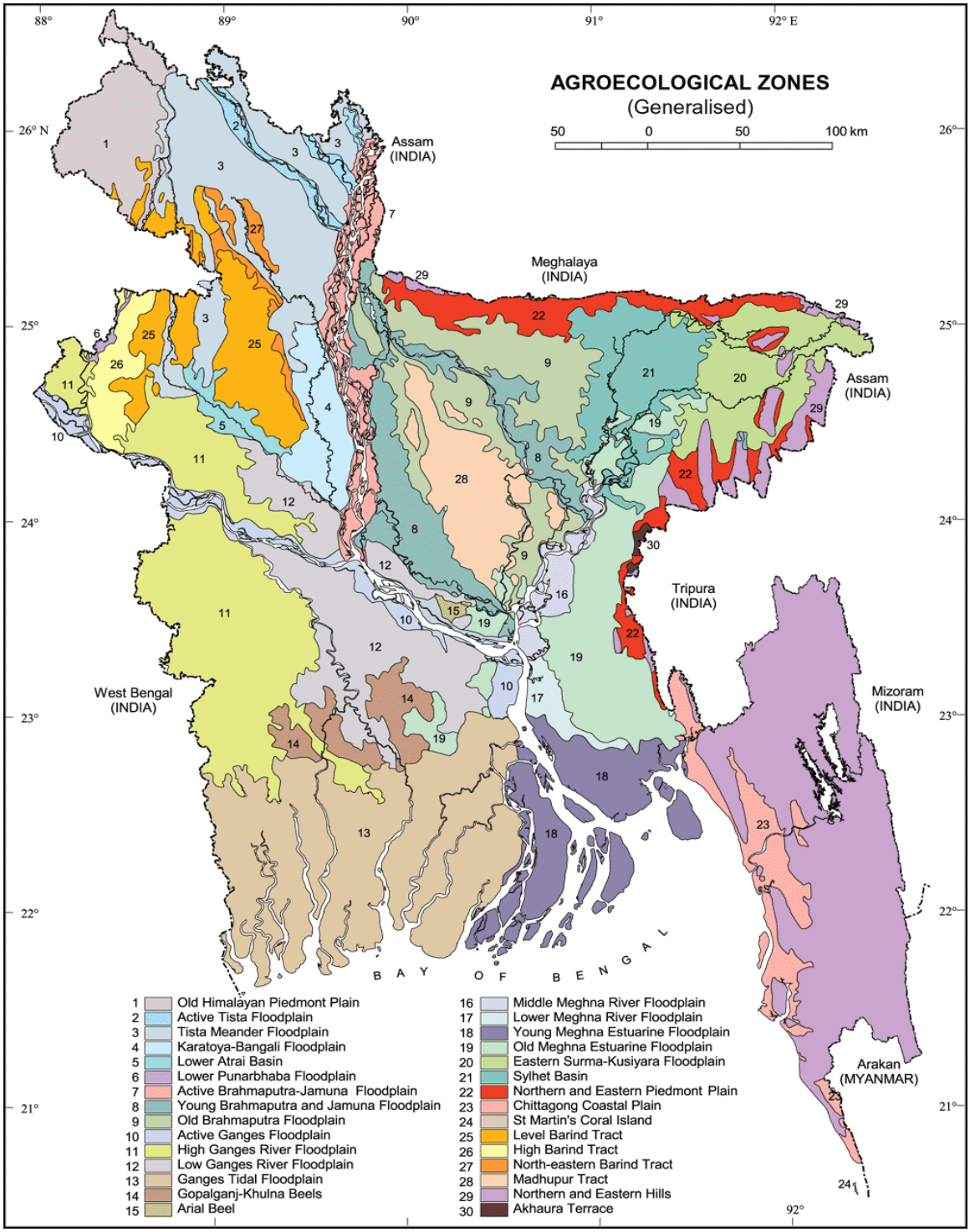
APPENDICES

APPENDICES

Appendix I. Experimental location on the map of Agro-ecological Zones of Bangladesh



Appendix II. Monthly average temperature and total rainfall of the experimental site during the period from December 2012 to January 2013

Year	Month	Air temperature (^{0}C)		Total rainfall (mm)
		Maximum	Minimum	
2012	December	25.87	15.1	35
2013	January	24.57	14.53	65

Source: Metrological Centre, Agargaon, Dhaka (Climate Division)

Appendix III. physical and chemical characteristics of soil of the experimental site as observed prior to experimentation (0-15 cm depth).

Constituents	Percent
Sand	26
Silt	45
Clay	29
Textural class	Silty clay

Chemical composition:

Soil characters	Value
Organic carbon (%)	0.45
Organic matter (%)	0.78
Total nitrogen (%)	0.027
Phosphorus	6.3 µg/g soil
Sulphur	8.42 µg/g soil
Magnesium	1.17meq/100 g soil
Boron	0.88 µg/g soil
Copper	3.54 µg/g soil
Zinc	1.54 µg/g soil
Potassium	0.10 µg/g soil

Source: Soil Resources Development Institute (SRDI), Khamarbari, Dhaka

Appendix IV. Mean square values for plant height of coriander at different days after sowing

Sources of variation	DF	Mean square values at different days after sowing			
		25 DAS	32 DAS	39 DAS	46 DAS
Replication	2	0.07	0.07	0.12	0.35
Variety (A)	3	8.661*	16.07*	21.948*	59.37*
Nitrogen level (B)	4	2.205*	4.812*	13.806*	31.813*
Variety (A) x Nitrogen level (B)	12	0.01ns	0.021ns	0.046ns	0.143ns
Error	38	0.05	0.04	0.08	0.12
CV (%)		4.02	2.54	2.90	2.27

*Significant at 5% level, ns = Not significant

Appendix V. Mean square values for plant spread of coriander at different days after sowing

Sources of variation	DF	Mean square values at different days after sowing			
		25 DAS	32 DAS	39 DAS	46 DAS
Replication	2	0.03	0.16	0.06	0.11
Variety (A)	3	0.048*	11.165*	93.453*	286.524*
Nitrogen level (B)	4	2.393*	5.059*	31.659*	108.329*
Variety (A) x Nitrogen level (B)	12	0.005ns	0.197ns	0.162ns	1.091*
Error	38	0.01	0.23	0.13	0.20
CV (%)		3.10	10.71	3.13	2.13

*Significant at 5% level, ns = Not significant

Appendix VI. Mean square values for number of leaves plant^{-1} of coriander at different days after sowing

Sources of variation	DF	Mean square values at different days after sowing			
		25 DAS	32 DAS	39 DAS	46 DAS
Replication	2	0.07	0.39	0.0.23	0.0.30
Variety (A)	3	0.024ns	2.423*	3.952*	3.612*
Nitrogen level (B)	4	0.023ns	0.383*	0.528*	2.751*
Variety (A) x Nitrogen level (B)	12	0.005ns	0.021ns	0.029*	0.021ns
Error	38	0.02	0.03	0.01	0.02
CV (%)		3.59	3.78	2.96	2.04

*Significant at 5% level, ns = Not significant

Appendix VII. Mean square values for length of the longest leaf of coriander at different days after sowing

Sources of variation	DF	Mean square values at different days after sowing			
		25 DAS	32 DAS	39 DAS	46 DAS
Replication	2	0.02	0.03	0.06	0.40
Variety (A)	3	2.083*	5.249*	7.106*	23.589*
Nitrogen level (B)	4	0.602*	1.499*	4.724*	7.581*
Variety (A) x Nitrogen level (B)	12	0.003ns	0.01ns	0.013ns	0.069ns
Error	38	0.01	0.02	0.02	0.31
CV (%)		4.08	2.80	2.79	6.12

*Significant at 5% level, ns = Not significant

Appendix VIII. Mean square values for single plant weight of coriander at different days after sowing

Sources of variation	DF	Mean square values at different days after sowing			
		25 DAS	32 DAS	39 DAS	46 DAS
Replication	2	0.00	0.00	0.00	0.06
Variety (A)	3	0.026*	0.314*	2.266*	7.242*
Nitrogen level (B)	4	0.016*	0.21*	1.28*	1.871*
Variety (A) x Nitrogen level (B)	12	0.001*	0.006*	0.029*	0.018ns
Error	38	0.001	0.001	0.01	0.03
CV (%)		10.82	8.26	5.28	8.40

*Significant at 5% level, ns = Not significant

Appendix IX. Mean square values for number of plants m^{-2}, weight of plants and foliage yield

Sources of variation	DF	Number of plants m^{-2}	Weight of plants (g m^{-2})	Foliage yield (t ha^{-1})
Replication	2	69.32	1304.82	0.06
Variety (A)	3	6.372ns	186674.607*	19.343*
Nitrogen level (B)	4	20765.692ns	198351.98*	19.456*
Variety (A) x Nitrogen level (B)	2	4.247ns	2687.69*	0.293*
Error	38	207.81	333.72	0.03
CV (%)		3.67	4.00	3.88

*Significant at 5% level, ns = Not significant