The Agriculturists 9(1&2): 63-72(2011) ISSN-1729-5211
A Scientific Journal of Krishi Foundation

Effects of Mimosa (*Mimosa invisa)* Compost and Phosphorus on the Yield and Yield Components of Lentil (*Lens culinaris* L.)

R. Barua[1*], M. S. U. Bhuiya[2], M. M. Kabir[2], S. Maniruzzaman[3] and Z. Ahmed[4]

[1]*Adaptive Research &* [3]*Training Divisions of Bangladesh Rice Research Institute, Gazipur.*
[2]*Depts. of Agronomy and* [4]*Genetics & Plant Breeding, Bangladesh Agril. Univ., Mymensigh.*

**Corresponding author and Email: rajbd112@yahoo.com*

Received: 8 April 2011 Accepted: 26 November 2011

Abstract

An experiment was conducted at the Agronomy Field Laboratory of Bangladesh Agricultural University, Mymensingh, during November 2008 to March 2009 to examine the effects of mimosa *(Mimosa invisa*) compost and phosphorus on the yield and yield components of lentil variety BARI Masur6. Two factors were: a) *Mimosa invisa* compost and b) phosphorus fertilizer. *Mimosa invisa* compost were used in four rates- 1 (M_1), 5 (M_2), 10 (M_3) and 15 (M_4) t ha^{-1}. Five rates of phosphorus fertilizer were: 'no' phosphorus (P_0), 25% RDP (P_1), 50% RDP (P_2), 75% RDP (P_3) and 100% recommended dose phosphorus (TSP @ 85 kg ha^{-1}) (P_4). The experiment was laid out in a factorial randomized complete block design with three replications. *Mimosa invisa* compost had significant effect on the crop characters except number of branches plant^{-1}. The highest seed yield (1435.33 kg ha^{-1}) was observed in M_2 treatment (5 t ha^{-1}) and the lowest seed yield (1220 kg ha^{-1}) was observed in M_4 treatment (15 t ha^{-1}). Phosphorus had a significant effect on all the plant characters. The highest seed yield (1464.17 kg ha^{-1}) was observed in P_4 treatment (100% RDP) and the lowest was observed in P_0 treatment. The interaction effect of *Mimosa invisa* compost and phosphorus on the yield of lentil was significant. The highest seed yield was observed (1630 kg ha^{-1}) in $M_2 \times P_4$ treatment and the lowest was in $M_3 \times P_0$ treatment (1000 kg ha^{-1}).

***Keywords*: Lentil, *Mimosa invisa* compost, phosphorus, yield and yield components**

1. Introduction

Lentil (*Lens culinaris* L. Medik) is one of the most important pulse crops grown in Bangladesh. However, the average yield of lentil is very low (804 kg ha^{-1}) and it covers 30 percent of the total area of pulse in the country (BBS, 2008). Total production of lentil in Bangladesh during 2007-2008 was 71535 t from an area of 72613 hectares with an average yield of 0.40 t ha^{-1} (BBS, 2008). It occupies a unique position in the world of agriculture by virtue of its high protein content and capacity of fixing atmospheric nitrogen. In developing countries like Bangladesh, pulse constitutes the major concentrate source of dietary protein. It is considered as poor man's meat as well as the cheapest source of protein for under privileged people who can not afford animal protein (Gowda and Kaul, 1982).

In Bangladesh, per capita day^{-1} consumption of pulse is only 12 g (BBS, 2008) while the World Health Organization (WHO) recommends at least 45 g pulses per capita day^{-1} (BARI, 2008). It clearly indicates that consumption of pulses by Bangladeshi people in their daily diet is far below the recommendation. The protein contents of lentil seed vary from 25.70 to 33.40 percent (Singh and Saxna, 1986). The stover of the plants together popularly known as bhushi is a highly protein rich feed to cattle, horse, pig and sheep (Tomar *et al*., 2000).

The maintenance of soil organic matter of 2.5 to 3.0 percent is desirable for satisfactory crop production (Sum and Hrich, 1992) and a good soil has an organic matter content of more than 3 percent (BARC, 1999). It has been reported that the average percentage of organic matter in Bangladesh's soil ranges from 0.31 to 3.56 (Islam, 1988; Miyan, 1992). In order to achieve high productivity goal, the soil must be enriched with organic matter and mineral nutrients through development and adoption of appropriate agronomic management practices. Among the various agronomic practices, use of organic manure like compost could increase the fertility status of soil as well as crop yield.

Lentil needs less nitrogen as it can absorb atmospheric nitrogen through rhizobial symbiosis. *Mimosa invisa* is a newly introduced leguminous crop in Bangladesh. The possibilities of increasing soil organic matter and supplying the nutrients to the subsequent crop through green manuring of *Mimosa invisa* has been investigated and positive response in enhancing soil organic matter has already documented (Barman *et al*., 2005). It can easily be composted as it produces huge biomass. It can supply more nutrient in comparion with other sources of compost (Barman *et al.,* 2007). Some reports show that mimosa compost has 2.352 percent nitrogen (Table 1).

Mimosa compost can be used for lentil production without deteriorating the environment. Phosphorus has a significant effect on pulse crop yields as it enhances nodulation which helps to fix more nitrogen from air through their root nodules. In Bangladesh, the low yield of lentil may be attributed to many reasons such as lack of quality seeds, optimum seed rate, using local varieties as planting material, inappropriate sowing time, lack of judicious fertilizer application and specially low organic matter content in the soil (Gowda *et al.*, 1982). In view of the above discussion, the present study was undertaken to determine the effect of different amounts of *Mimosa* compost and different levels of phosphorus fertilizer and their interaction effect on the yield and yield components of lentil.

2. Materials and Methods

The experiment was carried out at the Agronomy Field Laboratory of Bangladesh Agricultural University, Mymensingh, during November 2008 to March 2009. The land was medium high having sandy loam soil belonging to Sonatola series under the non-calcareous dark-grey floodplain soil of Old Brahmaputra floodplain (AEZ-9) (UNDP and FAO, 1998). The soil pH was 6.7. The lentil variety BARI Masur6 was used in this experiment as plant material.

Two factors were : a) *Mimosa* compost, and b) phosphorus fertilizer. *Mimosa* compost was used at four rates- 1 (M_1), 5 (M_2), 10 (M_3) and 15 t ha^{-1} (M_4). Five rates of phosphorus fertilizer were- 'no' phosphorus (P_0), 25% RDP (P_1), 50% RDP (P_2), 75% RDP (P_3) and 100% recommended dose phosphorus (TSP @ 85 kg ha^{-1}) (P_4).

Table 1. Nutritional status of different organic composts

Source of compost	Nitrogen (%)	Phosphorus (%)	Potassium (%)	Sulphar (%)
Mimosa invisa	2.352	0.126	0.411	0.180
Sesbania rostrata	1.736	0.949	0.565	0.197
Water hyacinth	1.176	0.119	0.565	0.169

Source: Barman *et.al.*, 2007

Mimosa invisa was grown in the Agronomy Filed Laboratory for research purpose. Sixty-day old green mimosa (*Mimosa invisa*) was cut into small pieces and put into the trance under the soil on 27 July 2007 and the compost preparing machanism was followed. Sample of *Mimosa invisa* compost was collected for chemical analysis before application. The compost samples were supplied to the Soil Science Departmental Laboratory for chemical analysis and the nutrient status was as: 2.352, 0.126, 0.411, 0.180 % of Nitrogen, Phosphorus, Potassium and Sulphur, respectively.

The experiment was laid out in a factorial randomized complete block design (RCBD) with three replications. The land was prepared with the compost prepared from *Mimosa invisa* in different plots and different doses of phosphorus fertilizer were applied in different plots. Seeds of lentil were sown uniformly in lines continuously at 30 cm row spacing at a rate of 40 kg ha^{-1} and were covered with soil by manually. The unit plot size was 5 m^2. After emergence of seedlings foot rot disease was controlled by spraying Sadid 250 EC @ 20 ml per 5 decimal during the growing period. Weeds were controlled manually.

The crop was harvested at full maturity and the harvested crop was brought to the threshing floor and dried for three days. Seeds and straw were separated and cleaned. The clean seeds were dried in sun for 3-4 consecutive days. The yield of seeds was adjusted at 12 % moisture level. The data on yield contributing characters were recorded from 5 randomly selected plants from each plot. Plant population by placing a 1 m^{-2} quadrate. Seed and straw yields were recorded from individual plot and were converted into t ha^{-1}. Data were analyzed statistically using analysis of variance technique with the help of computer package MSTAT and mean differences were adjudged by Duncan's Multiple Ranged Test (DMRT) following Gomez and Gomez (1984).

3. Results and Discussion

3.1. Effect of Mimosa invisa compost

3.1.1. Plant population (m^{-2})

Plant population was found to be significantly influenced by compost treatments (Table 2). The highest plant population (103.10 m^{-2}) was observed in M_1 treatment (1 t ha^{-1}) which was similar to that in M_2 (5 t ha^{-1}) and were followed by M_4 (15 t ha^{-1}) and M_3 (10 t ha^{-1})

3.1.2. Plant height (cm)

Compost treatment had significant effect on plant height (Table 2). It was observed that the highest plant height (45.28cm) was observed in M_4 treatment which was followed by M_3 (42.58), M_1 (41.48) and M_2 (40.45) (Table 2). The tallest plants were found where (M_4) *Mimosa* compost was used at 15 t ha^{-1}. This indicates that larger amount of compost application promoted plant height, which is partially supported by Aga *et al.* (2004).

3.1.3. Number of branches plant^{-1}

Number of branches plant^{-1} depends on the supply of nutrients and plant population. When the nutrient supply is more the plants produce more branches. Again, when the plant population is less the plant produces more branches due to wide spacing. The number of branches plant^{-1} was not significantly affected by compost treatments (Table 2). The highest number branches 26.56 was observed in M_3 treatment which was statistically similar to M_4 (23.01) and the lowest number of branches (22.65) was observed in M_2 treatment (Table 2). The highest number of branch was observed where the compost rate was high and plant population was less.

3.1.4. Number of pods plant^{-1}

Number of pods plant^{-1} often depends on the number of branches plant^{-1}. If the number of branches is more and plant gets sufficient nutrient then the number of pods will be increased. The pods plant^{-1} was influenced by compost treatments (Table 2). The highest number of pods 197.56 was observed in M_3 treatment which was followed by M_1, M_2, M_4. However, the lowest number of pods (135.84) were observed in M_4 treatment and which might be due to less number of branches plant^{-1} (Table 2).

3.1.5. Number of filled pods plant^{-1}

The number of filled pods plant^{-1} was significantly influence by the compost treatment (Table 2). The highest number of filled pods plant^{-1} (160.70) was observed in M_3 which was followed by M_1 and M_2. The lowest number of filled pods plant^{-1} (75.86) was observed in M_4 treatment (Table 2). When the plant uptake excess nutrient the plant produces huge biomass but at the same time produce less number of filled pods (Islam, 2009).

3.1.6. Number of seeds pod^{-1}

The number of seeds pod^{-1} was significanly increased due to compost treatments (Table 2). The highest number of seeds pod^{-1} (2.82) was observed in M_4 which was statistically similar to M_2 and M_1 treatment. The lowest number of seeds pod^{-1} (1.89) was observed in M_3 treatment.

3.1.7. 1000-seed weight (g)

The 1000-seed weight was significantly influenced due to compost treatments (Table 2). The highest 1000 seed weight (25.29g) was observed in M_1 treatment, which was statistically similar to M_3 and followed by others. The lowest 1000-seed weight (24.66g) was observed in M_2 treatment (Table 2).

3.1.8. Seed yield (kg ha^{-1})

The seed yield was significantly influenced due to compost treatments (Table 2). The highest seed yield (1435.33 kg ha^{-1}) was obtained in M_2 which was statistically identical to M_1 treatment (Table 2). This was due to more plants, seeds pod^{-1}, and pods plant^{-1} and 1000-seed weight in this treatment. The lowest seed yield (1220 kg ha^{-1}) was observed in M_4 treatment (Table 2). This is may be due to lowest plant population (m^2), seeds plant^{-1} and filled pod plant^{-1}.

Table 2. Effect of *Mimosa* compost on the yield and yield components of lentil

Compost Levels	Plant population (m^{-2})	Plant height (cm)	No. of branches plant^{-1}	No. of pods plant^{-1}	No. of filled pods plant^{-1}	No. of seeds pod^{-1}	1000-seed weight (g)	Seed yield (kg ha^{-1})
M_1	103.10a	41.48bc	24.52	158.69b	141.23b	2.79a	25.29a	1429.33a
M_2	96.00ab	40.45c	22.65	157.80b	134.27c	2.81a	24.66c	1435.33a
M_3	91.33b	42.58b	26.56	197.56a	160.70a	1.89b	25.28a	1232.00b
M_4	92.49b	45.28a	23.01	135.84c	75.86d	2.82a	24.89b	1220.00b
$S_{\bar{X}}$	2.78	0.47	1.19	2.00	1.78	0.05	0.07	23.26
Level of significance	*	**	NS	**	**	**	**	**

[N. B. In a column, figures with same letter or without letter do not differ significantly, whereas figures with dissimilar letter differ significantly (as per DMRT); * and ** represent significant at 5 & 1% level, respectively; NS = Not significant. M_1 = 1 t ha^{-1}, M_2 = 5 t ha^{-1}, M_3 = 10 t ha^{-1} and M_4 = 15 t ha^{-1}]

3.2. Effect of applied phosphorus

3.2.1. Plant population (m^{-2})

The plant population was influenced significantly due to phosphorus fertilizer treatment (Table 3). The highest plant population (102.91) was observed in P_2 (50% RDP) treatment which was statistically similar to P_0, P_1 and P_4. The lowest plant population (84.64) was observed in P_3 (75% RDP) treatment (Table 3).

3.2.2. Plant height (cm)

Plant height was found to be influenced significantly due to phosphorus treatment (Table 3). It was observed that the highest plant height (46.09cm) was observed in P_4 treatment which was followed by P_3 (44.24 cm), P_2 (42.23 cm) P_1 (42.39 cm) and P_0 (37.29 cm). Comparable results on the increased plant height with the increased level of phosphorus fertilizer were reported by others (Siag *et al*., 1990).

3.2.3. Number of branches plant^{-1}

The number of branches plant^{-1} was significantly influenced by applied phosphorus fertilizer (Table 3). The highest number of branches (28.77) was observed in P_3 which was statistically similar to P_4 treatment. The lowest number of branches (19.40) was observed in P_0 treatment (Table 3). Number of branches plant^{-1} increased almost steadily with the increased level of phosphorus fertilizer. Application of phosphorus fertilizer increased the number of branches plant^{-1} in other work (Panda, 1979).

3.2.4. Number of pods plant^{-1}

The effects of different P levels on the number of pods plant^{-1} was significant (Table 3). The largest number of pods (197.85) was observed in P_3 treatment which was followed by P_4 (172.53), P_2 (160.36) and the others. The lowest number of pods (135.63) was observed in P_1 treatment (Table 3). It indicates that pods plant^{-1} was increased with the increased level of phosphorus fertilizer. Number of pods plant^{-1} was increased due to application of phosphorus (Khan *et al.*, 1990).

3.2.5. Number of filled pods plant^{-1}

The number of filled pods plant^{-1} was increased significantly due to phosphorus treatment (Table 3). The highest number of filled pods (155.37) was observed in P_3 treatment, which was followed, by P_4 (141.71) and P_2 (131.70). The lowest number of filled pods plant^{-1} (92.25) was observed in P_0 treatment (Table 3). Phosphorus fertilizer increased the filled pod plant^{-1} in other experiment too (Khan *et al*., 1990).

3.2.6. Number of seeds pod^{-1}

The number of seeds pod^{-1} was increased significantly due to phosphorus treatment (Table 3). The highest number of seeds pod^{-1} (3.30) was observed in P_4 treatment, which was followed by P_3, P_2 and the others. The lowest number of seeds pod^{-1} (1.92) was observed in P_1 treatment (Table 3). Seeds pods^{-1} was increased with the increased level of phosphorus fertilizer as reported by Zeidan (2007).

3.2.7. 1000-seed weight (g)

Phosphorus fertilizer had little effect on 1000-seed weight (Table 3). The highest 1000- seed weight (25.16 g) was observed in P_4 treatment which was statistically similar to P_3, P_2 and was followed by P_0 and P_1. The lowest 1000-seed weight (24.81g) was observed in P_1 treatment (Table 3).

3.2.8. Seed yield (kg ha^{-1})

The seed yield was significantly influenced by phosphorus treatment (Table 3). The highest seed yield (1464.17 kg ha^{-1}) was observed in P_4 treatment which was closely followed by P_3, although P_3 was statistically similar to P_2 and P_1 (Table 3). This might be due to more number of branches plant^{-1}, plant population (m^{-2}), seeds pod^{-1}, pods plant^{-1} and 1000-seed weight. The lowest seed yield (1145 kg ha^{-1}) was observed in P_0 treatment (Table 3).

Table 3. Effect of Phosphorus fertilizer levels on the yield and yield components of lentil

Phosphorus Levels	Plant population (m^{-2})	Plant height (cm)	No. of branches plant^{-1}	No. of pods plant^{-1}	No. of filled pods plant^{-1}	No. of seeds pod^{-1}	1000-seed weight (g)	Seed yield (kg ha^{-1})
P_0	98.79a	37.29d	19.40c	145.99d	93.25e	1.92e	25.10a	1145.00c
P_1	96.48a	42.39c	22.67bc	135.63e	118.04d	2.09d	24.81b	1375.00b
P_2	102.91a	42.23b	24.57b	160.36c	131.70c	2.68c	25.07a	1316.67b
P_3	84.64b	44.24b	28.77a	197.85a	155.37a	2.91b	25.01ab	1345.00b
P_4	95.83a	46.09a	25.52ab	172.53b	141.71b	3.30a	25.16a	1464.17a
$S_{\bar{X}}$	3.10	0.53	1.33	2.24	1.99	0.05	0.08	26.01
Signif.level	**	**	**	**	**	**	*	**

In a column, figures with same letter or without letter do not differ significantly whereas figures with dissimilar letter differ significantly (as per DMRT); * and ** represent significant at 5 & 1% level, respectively; NS = Not significant; P_0 = Control (0), P_1 = 25% RDP, P_2 = 50% RDP, P_3 = 75% RDP, P_4 = 100% RDP (Recommended Dose of Phosphorus 85 kg ha^{-1})

3.3.7. 1000-seed weight (g)

The 1000-seed weight was significantly influenced due to phosphorus treatments in combination with mimosa compost (Table 4). The highest 1000-seed weight (25.16 g) was observed in P_4 treatment which was statistically similar to P_3, P_2 and was followed by P_0 and P_1.

3.3.8. Seed yield (kg ha^{-1})

Seed yield was significantly influenced by interaction of compost and phosphorus treatments. The highest seed yield (1630 kg ha-1) was observed in M_2P_4 treatment which was statistically similar to M_2P_3, M_1P_4, M_2P_1 and M_1P_1 and was followed by M_1P_2, M_1P_3, M_2P_2 and others (Table 4). This is may be due to taller plants, large number of branches plant^{-1} and 1000-seed weight. This was correlated with total no. of seed per unit area (Fig. 1). The lowest number of seed yield was observed (1000 kg ha-1) in M_3P_0 treatment. This is may be due to lowest plant height, pods plant^{-1}, filled pod plant^{-1}, seeds plant^{-1}, seeds pod^{-1}, plant population.

3.3. Interaction effects of Mimosa invisa compost and phosphorus fertilizer

3.3.1. Plant height (cm)

Table 4 shows that the interaction effect of compost and phosphorus fertilizer on plant height was significant. The highest plant height (49.32 cm) was obtained in M_4P_1 treatment which was statistically similar to M_4P_4, M_2P_4, and M_1P_4 and was followed by M_2P_3, M_4P_3 and others.

3.3.2. Number of branches plant^{-1}

The interaction effect of mimosa compost and phosphorus fertilizer treatment on the number of branches plant^{-1} was statistically significant (Table 4). The highest number of branches plant^{-1} (33.33) was observed in M_3P_3 combination which was statistically similar to M_3P_1, M_3P_0, M_2P_4, M_2P_3, M_1P_4 and M_1P_2.

3.3.3. Number of pods plant^{-1}

The number of pods plant^{-1} was found to be significantly influenced by the interaction of compost and phosphorus fertilizer treatments (Table 4). The highest number of pods plant^{-1} (239.60) was observed in M_3P_3 treatment which was statistically identical with M_3P_1.

Table 4. Interaction effect of *Mimosa* compost and Phosphorus fertilizer levels on the yield and yield components of lentil

Interaction	Plant Population (m^2)	Plant height (cm)	No. of branches plant^{-1}	No. of pods plant^{-1}	No. of filled pods plant^{-1}	No. of seeds Pod^{-1}	1000-seed weight (g)	Seed yield (kg ha^{-1})
$M_1 \times P_0$	89.33cd	35.70i	17.73efg	117.16g	93.30h	1.70f	25.56ab	1280.00cde
$M_1 \times P_1$	124.58a	40.47gh	20.40c-g	123.47g	105.53g	2.24e	25.06b-e	1473.33ab
$M_1 \times P_2$	72.00de	42.13e-h	31.60ab	179.66d	164.87d	3.07bcd	24.91cde	1400.00bc
$M_1 \times P_3$	120.23ab	40.93fgh	25.93a-f	162.27e	144.93e	3.25b	25.14b-e	1366.67bcd
$M_1 \times P_4$	109.33abc	48.19ab	26.93a-d	210.87c	197.50b	3.73a	25.78a	1626.67a
$M_2 \times P_0$	121.33ab	31.88j	13.20g	140.30f	76.33i	1.72f	24.20f	1200.00def
$M_2 \times P_1$	81.33de	38.90h	17.23fg	90.62i	81.07i	2.26e	24.13f	1500.00ab
$M_2 \times P_2$	106.67abc	40.13gh	24.13b-f	138.80f	124.93f	3.07bcd	24.93cde	1366.67bcd
$M_2 \times P_3$	78.67de	45.23b-e	28.80abc	210.87c	195.67b	3.23bc	24.71e	1480.00ab
$M_2 \times P_4$	92.00cd	46.09a-d	29.87ab	208.42c	193.33b	3.78a	25.34abc	1630.00a
$M_3 \times P_0$	76.00de	39.47gh	28.00abc	216.58bc	154.36de	1.39f	25.37abc	1000.00g
$M_3 \times P_1$	114.67ab	40.87fgh	29.93ab	229.13ab	213.60a	1.39f	25.32abc	1193.33def
$M_3 \times P_2$	109.33abc	44.20c-f	22.67b-f	204.96c	181.48c	1.44f	25.51ab	1366.67bcd
$M_3 \times P_3$	75.67de	45.57b-e	33.33a	239.60a	198.60b	2.33e	25.42abc	1266.67c-f
$M_3 \times P_4$	81.00de	42.80d-g	18.87d-g	97.52hi	55.49j	2.90bcd	24.78de	1333.33bcd
$M_4 \times P_0$	108.50abc	42.10e-h	18.67d-g	109.93gh	49.00j	2.89cd	25.27a-d	1100.00fg
$M_4 \times P_1$	65.33e	49.32a	23.13b-f	99.28hi	71.95i	2.44e	24.73e	1333.33bcd
$M_4 \times P_2$	123.63a	42.47efg	19.87c-g	118.00g	55.53j	3.15bcd	24.93cde	1133.33efg
$M_4 \times P_3$	64.00e	45.23b-e	27.00a-d	178.67d	82.28hi	2.82d	24.78de	1266.67c-f
$M_4 \times P_4$	101.00bc	47.30abc	26.40a-e	173.32de	120.54f	2.80d	24.75de	1266.67c-f
$S_{\bar{X}}$	6.21	1.06	2.67	4.47	3.99	0.11	0.16	52.02
Signf. level.	**	**	**	**	**	**	**	*

[N. B. In a column figures with same letter or without letter do not differ significantly whereas figures with dissimilar letter differ significantly (as per DMRT), * and ** represent significant at 5 & 1% level, respectively; NS = Not significant; M_1 = 1 t ha^{-1}, M_2 = 5 t ha^{-1}, M_3 = 10 t ha^{-1} and M_4 = 15 t ha^{-1}; P_0 = Control (0), P_1 = 25% RDP, P_2 = 50% RDP, P_3 = 75% RDP, P_4 = 100% RDP (Recommended Dose of Phosphorus 85 kg ha^{-1})]

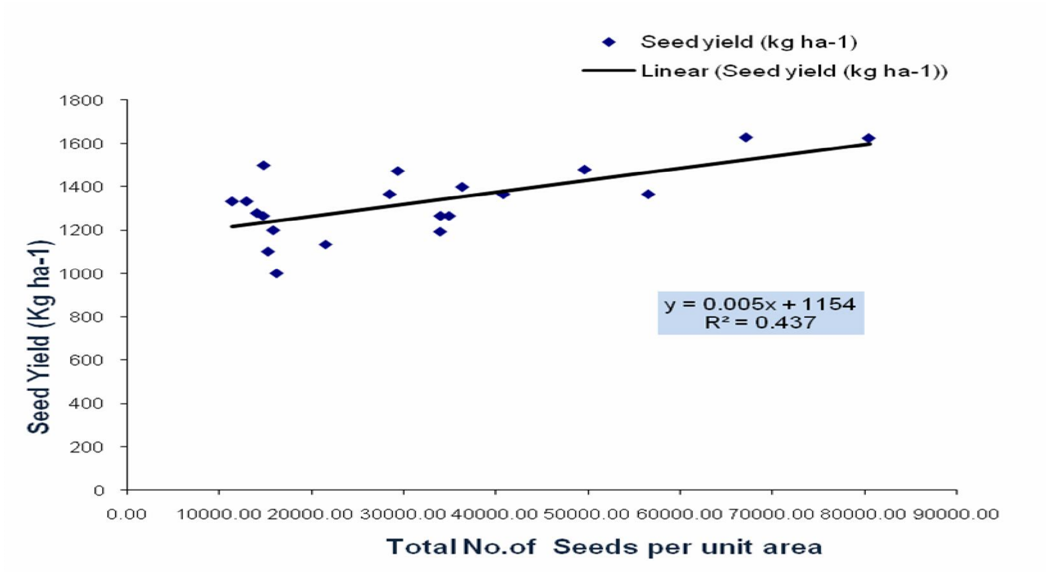

Fig. 1. Showing the correlation between seed yield (Kg ha-1) and total number of seeds per unit area [Seed yield (Kg ha-1) and total number of seeds per unit area we will get the following relationship was closely correlated.]

3.3.4. Number of filled pods plant^{-1}

Table 4 shows that the interaction of compost and phosphorus fertilizer treatment on the number of filled pods plant^{-1} was statistically significant. The highest number of filled pods plant^{-1} (213.60) was observed in M_3P_1 treatment which was very closely followed by M_3P_3, M_2P_4 and M_2P_3.

3.3.5. Number of seeds pod^{-1}

The interaction effect of compost and phosphorus fertilizer treatment on the number of seeds pod^{-1} was statistically significant (Table 4). The highest seeds pod^{-1} (2.9) was observed in M_3P_4 and M_4P_2 treatments, which was followed by the others. The lowest number of seeds pod^{-1} (1.39) was observed in M_3P_0 and M_3P_1 treatments (Table 4).

3.3.6. Number of seeds plant^{-1}

The interaction effect of compost and phosphorus fertilizer treatment on the number of seeds plant^{-1} was statistically significant (Table 4). The highest seeds plant^{-1} (308.60) was observed in M_3P_3 treatment which was statistically similar to M_3P_1, M_3P_2 and was followed by the others (Table 4).

4. Conclusions

From the results of the present study, it reveals that both the *Mimosa* compost and phosphorus fertilizers significantly influenced on the yield and yield components of lentil. Application of compost at the rate of 5 t ha^{-1} appeared to be the best dose irrespective of seed yield. Incase of phosphorus, it is noticed that 85 kg ha^{-1} produced the highest yield. Combination of 5 t ha^{-1} compost with 85 kg ha^{-1} phosphorus resulted in best yield of lentil. Therefore, it may be suggested to cultivate lentil with 5 t ha^{-1} *Mimosa* compost in combination with 85 kg ha^{-1} phosphorus fertilizer.

References

Aga, F. A. J. K., Singh, D. K. and Peer, F. A. 2004. Effect of different levels of compost on growth and yield of rice. *Environment and Ecology*, 22(2): 353-356.

BARC (Bangladesh Agricultural Research Council). 1999. Fertilizer Recommendation Guide-1999. Bangladesh Agril. Res. Coun. Farmgate, New Airport Road, Dhaka. 30-178 pp.

BARI (Bangladesh Agricultural Research Institute). 2008. Annual Report (2007-2008). Bangladesh Agril. Res. Inst., Joydebpur, Gazipur. 17-20 pp.

Barman, N. K., Uddin, M. R., Salam, M. A., Bhuiya, M. S. U. and Sarkar, M. A. R. 2005. Effect of nitrogen and compost from *Mimosa invisa* on the performance of wheat. *Bangladesh Journal of Crop Science*, 16(1): 45-50.

Barman, S., Bhuiya, M. S. U. and Haque M. Z. 2007. Effect of variety and source of compost on the yield and yield component of lentil. *Journal of Agroforestry Environment*, 3(1): 13-15.

BBS (Bangladesh Bureau of Statistics). 2008. Statistical Year Book of Bangladesh. Bangladesh Bur. Stat., Stat. Div., Min. Plan. Govt. People's Repub. Bangladesh. 131 p.

Gomez, K. A. and Gomez, A. A. 1984. Statistical Procedures for Agric. Res. 2nd Edn. John Willey and Sons. New York. 207-215 pp.

Gowda, C. L. L. and Kaul, A. K. 1982. Pulses in Bangladesh, BARI and FAO publication. 6(1): 27-29.

Islam, M. S. 1988. Nutrient status of Bangladesh soils. Annual report for 1988. Bangladesh Agril. Res. Inst., Gazipur, Bangladesh. 82-85 pp.

Islam, N. 2009, Professore, Department of Agronomy, Bangladesh Agricultural University, Mymensingh, 2202.

Khan, M. K., Ali, M. I. and Hoque, M. S. 1990. Effect of phosphorus and sulphar on the growth and yield of peanut in presence and absence of urea- N and *Rhizobium* moculation. *Bangladesh Journal of Soil Science*, 4(1): 36-41.

Miyan, M. S. 1992. *Rhizobium* inoculation of *Sesbania rostrata* and the influence of its incorporation on plant association N fixation and yield of wetland rice. *M. S. Thesis*, Univ. Philippones loss Banos, 102-113 pp.

Panda, N. 1979. Response of crops to phosphorus in India (Eastern Region) Orissa Uni. of Agric. and Tech. Bhubaneswar, Orissa. 25-27 pp.

Pulse Research Center (PRC), 1995, Annual report of pulses research center for the year 1995-96, BARI, Gazipur.

Siag, R. K., Verma, B. L. and Sidhu, B. 1990. Effect of irrigation requires and phosphorus levels on yield and water use efficiency of chickpea. *Indian Journal of Pulses Research*, 3(1): 31-35.

Singh, V. and Saxna, D. V. 1986. Effect of phosphorus on yield and quality of lentil. *Annals of Plant Physiology*, 1(2): 227-232.

Sum, P. M. H and Hrich, S. C. 1992. The establishment of sustainable agricultural system in Taiwan. Sustainable Agriculture in Asia and Pacific Region, Paper delivered in the 11th meeting of the technical advisory committee of the food and fertilizer technology centre of the Asia and Pacific Region. 59-75 pp.

Tomar, S. K., Tripathi, P. and Rajput, A. L. 2000. Effect of genotype, seedling method and diammonium phosphate on yield and protein and nutrient uptake of lentil (*Lens culinaris* L. Medik). *Indian Journal of Agronomy,* 45(1): 148-152.

Singh, V. and Saxna, D. V. 1986. Effect of phosphorus on yield and quality of lentil. *Annals of Plant Physiology,* 1(2): 227-232.

UNDP (United Nations Development Programme) and FAO (Food and Agricultural rganization). 1998. Land Resources Appraisal of Bangladesh for Agric. Development. Report No. 2. Agro-Ecological Regions of Bangladesh. U. N. Dev. Prog. and Food and Agric. Org. 212-221 pp.

Zeidan, M. S. 2007. Effect of organic manure and phosphorus fertilizers on growth, yield and quality of lentil plants in sandy soil. *Research Journal of Agriculture and Biological Science,* 3(6): 748-752.