Journal of Novel Applied Sciences
Available online at www.jnasci.org
©2014 JNAS Journal-2014-3-4/367-370
ISSN 2322-5149 ©2014 JNAS

Effect of Organic Fertilizer on quantitative yield of mung beam (*Vigna radiata* L)

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ABSTRACT: Crop yield of Mung bean is more dependent on an adequate supply of water than on any other single environmental factor. The bio-organic fertilizers can increase the quality and improve the output paving the way for sustainable agriculture. They are less expensive, highly biodegradable, non-pollutants to both aquatic and terrestrial ecosystems. The field experiment was laid out in randomized complete block design with split plot design with three replications. Irrigation intervals (6 day, 9 day, 12 day) allocated to main plots and Organic fertilizer (without Organic fertilizer (control), humic acid, Phosphate fertilized 2, humic acid + Phosphate fertilized 2) was allocated to sub plots. The variance analysis of the studied traits showed a significant effect of irrigation and organic fertilizers on plant height, number of sub branch and Number of pods per plant.

***Keywords*:** humic acid, organic fertilizers, Plant height, sub branch.

INTRODUCTION

Mung beam is a warm season crop requiring 90–120 days of frost free conditions from planting to maturity. Adequate rainfall is required from flowering to late pod filling in order to ensure good yield. Drought problems for Mug beans are worsening with the rapid expansion of water stressed areas of the world including 3 billion people by 2030 (Postel, 2000). Crop yield of Mung bean is more dependent on an adequate supply of water than on any other single environmental factor (Kramer and Boyer 1997). One of the agro technical events permitted in biological production is the use of products obtained as a result of composting of organic waste with the help of various types of earthworms (Clive. 2006, Gutiérrez-Miceli. 2007, Singh. 2008). The bio product obtained as a result of the vital activity of these worms improves soil fertility (Karbauskiene 2000) and has a very strong stimulating impact on the growth and development of plants (Atiyeh. 2000, Makulec 2002, Arancon. 2004). Some studies showed that N fertilization increases the total quantity of flour proteins, resulting in an increase in both gliadins and glutenins (Dupont and Altenbach 2003; Johansson et al. 2001; Johansson et al. 2004; Martre et al. 2003; Triboi et al. 2000). Contribution of pulses to agriculture and daily life has been tremendous besides being one of the important constituents of our diet. An important feature of the mung bean crop is it has the potential of producing higher yield depending on the genotypes studied (Ullah. 2011). Bio fertilizers are ecofriendly and source of multiple nutrients inputs of biological origin for plant growth. The Bio-organic fertilizers can increase the quality and improve the output paving the way for sustainable agriculture. They are less expensive, highly biodegradable, non-pollutants to both aquatic and terrestrial ecosystems (Mahajan and Gupta, 2009). Using Humic and fulvic acids are considered to be compounds increasing permeability of cellular membranes in plants to vitamins within the cell (Kaya, 2005). More recently, workers have reported increases in the growth of crops grown in planting media amended with humic acids that were extracted from vermicompost. These reports hypothesized that plant growth hormones may become adsorbed on to humic fractions so the plant growth response is a combined hormonal/humic one (Arancon, 2003; Atiyeh, 2002). Under no-till (NT) surface application of phosphate fertilizers and the maintenance of plant residues on the soil surface leads to P concentration gradients across the top layers of the soil profile, with

larger amounts of labile organic and inorganic forms of P close to the soil surface (Schlindwein and Anghinoni, 2000; Selles et al., 1997).

MATERIALS AND METHODS

The experiment was conducted at the University of Zabol (new pardis) which is situated between 52° North latitude and 36° East longitude and at an altitude of 481 m above mean Sea Level. Composite soil sampling was made in the experimental area before the imposition of treatments and was analyzed for physical and chemical characteristics. The field experiment was laid out in randomized complete block design with split plot design with three replications. Irrigation intervals (6 day, 9 day, 12 day) allocated to main plots and Organic fertilizer (without Organic fertilizer (control), humic acid, Phosphate fertilized 2, humic acid + Phosphate fertilized 2) was allocated to sub plots. A week after emergence, seedlings were thinned to maintain two plants per hill. Final thinning was done two weeks after emergence to maintain only one healthy seedling per hill. Final thinning was done two weeks after emergence to maintain only one healthy seedling per hill. Data collected were subjected to statistical analysis by using a computer program MSTATC. Least Significant Difference test (LSD) at 5 % probability level was applied to compare the differences among treatments` means.

Table 1. Soil characteristics of the experiment during 2012 area growing season

Year	Depth of soil (cm)	pH	Ec(ds /m)	N (%)	Ca(ppm)	K(ppm)
2012	0-30	8.16	3.75	4.77mg/lit	11.5	140

RESULTS AND DISCUSSION

Plant height

The variance analysis of the studied traits showed a significant effect of irrigation and organic fertilizers on plant height (Table 2). Nevertheless, the plant height, which was longest in 29.26, was significantly Shorter in samples taken from 01.24 (Table 3). Comparison showed that the combined use of humic acid and phosphate fertilized 2 with a mean of 29.26 cm height allocated to the most fertile humic acid and phosphate were followed by (Table 3). Plant height reduction due to drought stress is one of the most prominent symptoms. Farokhnia et al, (2011) also reported that water stress during the vegetative growth stage, plant height is often reduced. It seems that more plant height, grain yield under drought stress will reduce the price. Stress reduction through photosynthesis and thus caused a shortage of trained SAP shorter plant height and the yield is reduced. Probably due to the high stimulation of auxin-like substances. In this regard, height, eggplant, okra, tomatoes, and organic manures have been affected (Aranconet, 2005). In a study of maize inoculated with three strains of the bacterium Pseudomonas fluorescents in terms of plant height compared to a control treatment (no inoculation) was significantly greater (Fankem, 2008).

Table 2. Analysis of Variance characteristics mung bean under the influence of organic fertilizers and irrigation

S.O.V	df	Plant height	Number of sub branch	Number of pods per plant
Replication	2	1.04	82.50	8.96
irrigation	3	147.98^{**}	2.01^{ns}	9.79^{ns}
Error a	4	2.12	11.007	14.75
organic fertilizers	2	8.22^{**}	31.5^{ns}	38.98^{**}
interaction	6	4.28^{ns}	0.74^{ns}	4.57^{ns}
Error b	18	2.19	2.08	5.13
Cv%	-	5.85	12.56	12.86

ns, (*) and (**) represent not significant and significant difference over control at $p<0.05$ and $p<0.01$, respectively

Number of sub branch

Experimental results showed that the number of branches was not affected by drought and the use of organic fertilizers (Table 2). The investigation revealed that the stress on the number of branches per plant of safflower with an average 3.12 branches had no significant effect (Esendaetl, 2008). Sirosmehret et al,, (2008) stated that crop irrigation levels and significant effect on the number of branches which does not correspond with our results in this study.

Number of pods per plant

The results of the analysis of variance showed that the number of pods per plant was affected by organic fertilizers were used (Table 2). Grain yield, pod number per unit area of grain production is associated with a flower

and seed pods producing that can be converted into pods fit. The yield depends on the number of flowers produced and the loss of flowers or pods inversely. One of the critical yield stresses, plant, according to the sensitivity of mung bean cultivars to drought stress, number of flowers and pods shed produced by different (Callum, 2000). Organic fertilizers increased the number of pods per plant. As is clear from Table 3, humic acid, phosphate combination of both fertile and increase, respectively, 24.18, 16.20 and 91.24% in the control had the trait. The result of this study, the role of humic substances as soil fertilizer to improve soil structure and micro-organisms that are (OzdamarUnlu, 2011). The researchers also reported increased growth and number of pods per plant, biological fertilizers and increasing CO2 due to plant soybeans and soybean are the result of increased photosynthesis (mirakhondi, 2009).

Table 3. Mean comparison characteristics mung bean under the influence of organic fertilizers and irrigation

Treatments organic fertilizers	Plant height	Number of sub branch	Number of pods per plant
control	A24.01	A12.01	C14.65
Humic acid (h)	Ab25.05	A13.06	B17.92
Phosphate fertilized (f)	Ab25.55	A13.96	B18.35
H*f	B26.29	A12.72	A19.51
irrigation			
6 day	A28.85	A13.71	A17.47
9 day	B25.32	A12.09	A18.57
12 day	C21.83	A13.35	A16.78

* Values followed by the same letter within the same columns do not differ significantly at p =1% according to DMRT

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