

Effect of Farmyard Manure (FYM) on Growth and Development of New Emerging Broadleaf Weed *Malva neglecta* Wallr.

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Abstract – Scarified seeds of *M. neglecta* resulted in significantly higher weed emergence as compared to unscarified seeds within different FYM levels. Maximum weed emergence was observed in plots where 20 t/ha FYM was added, whereas least weed emergence was recorded in control plots (where no FYM was added). Weed plant height and number of branches produced per weed plant differed significantly between scarified and unscarified seed conditions at different levels of FYM. An increasing trend in these growth parameters of weed was observed with increase in levels of FYM under scarified and unscarified seed conditions during both years of study. Dry matter accumulation by weed increased with increase in level of FYM added. Maximum weed dry matter accumulation of 604.1 g and 281.2 g/m² was observed where FYM 15 t/ha was added whereas least dry matter accumulation of 326.6 g and 150.5 g/m² was obtained in control plots under scarified conditions during 2004-05 and 2005-06, respectively.

Keywords – *Malva neglecta*, Farm Yard Manure, Scarified, Unscarified, Weed Seeds.

I. INTRODUCTION

Wheat (*Triticum aestivum* L. emend. Fiori and Paol.) occupies prime position among the food crops of the world in terms of acreage and production and is the second most important cereal crop of India (next to rice). It covers an area of 26.54 million hectares with a production of 72 m tonnes with an average yield of 2718 kg /ha [1]. Punjab, "the wheat bowl of the country" covers 3.5 m ha producing 14.49 m tonnes of wheat grains with an average yield of 4179 kg /ha [2]. Among the various factors responsible for low yield of wheat crop, weed infestation is the major one. Depending upon the type of weed flora, intensity and competition offered to the crop, reductions in wheat grain yields to the extent of 10-45 per cent have been reported by [3] Weeds cause maximum damage during the early stages of crop growth. Among the dicot weeds affecting wheat crop, *Malva neglecta* Wallr. is a new emerging problematic weed. It is commonly known as common mallow/button weed/cheese plant/cheese weed and belongs to mallow family (Malvaceae). It is broadleaf winter annual weed. *M. neglecta* is characterized by hard seed coat dormancy which breaks down over time and due to this it accumulates for many years before the problem becomes apparent. Primarily, it was a weed of gardens, waste places and farmyard manure is the chief source of its spread. It was also reported as the one of the worst weeds of gardens in the United States [4]. Recently, it has become troublesome in field crops causing yield losses

upto 30 per cent in wheat and up to 90 per cent in flax [5]. Recent weed surveys have also shown mallow to occur as weed of field crops including wheat, lentil and flax on the prairie soils [6]. So day by day infestation of this weed is increasing in wheat crop along other field crops where farmers are applying FYM as a source of nutrients. Keeping this in view a field study was carried out to see the effect of FYM on growth and development of this weed.

II. MATERIALS AND METHODS

Investigations were carried out at the Students' Research Farm of the Department of Agronomy during 2004-05 and 2005-06 in the *rabi* season. The soil of the experimental field was sandy loam in texture, normal in normal reaction and electrical conductivity, low in organic carbon and available nitrogen whereas medium in available phosphorus and potassium. The experiment was carried out with mechanically scarified and unscarified weed seeds which were subjected to different FYM levels (0, 5, 10, 15 and 20 t ha⁻¹) to see how FYM affects emergence and growth behaviour of *M. neglecta*. Scarification was done by using sand paper and seed was scarified until the outer papery shell got removed. During both the years, the experiment was conducted in small sized plots of 2 m x 2 m each. Unscarified seed weighing 5.1 g and scarified seed weighing 3.6 g was added to respective scarified and unscarified seed plots. The seeds were sown on Nov. 16, 2004 and Nov. 21, 2005 in randomized block design with four replications and experiment was terminated on 5th April, 2005 and 20th March, 2006 respectively. Data on emergence and growth behaviour of weed under different FYM levels were recorded at maturity of weed plant.

III. RESULTS AND DISCUSSION

A. Emergence count

Emergence count differed significantly between scarified and unscarified seeds within different FYM levels and also significant differences were observed in weed emergence between different FYM levels (Table I). In general, an increasing trend in emergence count was observed with increase in levels of FYM. Maximum emergence was observed in lots where 20 tha⁻¹ FYM was added, whereas least weed emergence was observed in control plots (where no FYM was added) both under scarified and unscarified conditions during 2004-05 and 2005-06 respectively. Different levels of FYM (5, 10, 15

and 20 tha^{-1}) significantly produced higher weed population over the control plots. It was also reported at Seehausen that FYM encouraged relatively large weed infestation when applied in wheat monocultures, but its influence on weeds in the other rotational situations showed no marked trends [7].

B. Weed plant height

Height of weed plants was recorded at maturity and presented in table I. Significant differences were observed in weed plant height between scarified and unscarified seed conditions at different levels of FYM. Also there was an increase in height of *M. neglecta* with the increase in the level of farmyard manure. During 2004-05, height of weed plants was more than 2005-06. The plant height of 62.2 cm and 41.8 cm was recorded in plots supplied with 20 tha^{-1} FYM during first and second year under scarified conditions, respectively whereas, the height of weed plant was 49.5 and 31.8 cm for 2004-05 and 2005-06, respectively under unscarified conditions. This might be due to fact that during second year, there was attack of mosaic virus and fungus *Gloeosporium* sp. which caused the shortening, shrivelling and death of weed plants. Similar findings are also present in literature that mycoherbicide consisting of spores of a fungal pathogen, *Colletotrichum gloeosporioides* (Penz) Sacc. f. sp., malvae (c.g.m), gave excellent selective control of round leaved mallow in wheat, lentil, and flax at a number of different locations in Saskatchewan and Manitoba [8].

C. Number of branches

Branches produced per plant had some positive correlation with the height of weed plant. As the weed height increased, number of branches also increased (Table I). Branches produced per plant differed significantly at all the levels of FYM under scarified and unscarified conditions. Also significant differences were observed in branches production when no FYM was applied and where 5 tha^{-1} FYM was applied to plots. However, the differences were non-significant between FYM₁₀, FYM₁₅ and FYM₂₀ under scarified and unscarified conditions in respect of branches production.

D. Dry matter accumulation

The combined effects of emergence count, height of weed plants and branches produced per plant ultimately get recorded in dry matter accumulated by weed at maturity. In general, weed dry matter increased with the increase in level of FYM added (Table I). This might be due to increase in weed population, weed height and number of branches with FYM manure levels. Also, differences for weed dry matter accumulation were found to be significant under scarified and unscarified seed conditions. Higher weed dry matter accumulation (532.6 g, 245.5 g m^{-2} and (604.1, 281.2 gm^{-2}) were observed in FYM₁₅ and FYM₂₀ over control plots (326.6 g and 150.5 g m^{-2}) for scarified conditions during 2004-05 and 2005-06, respectively. At Palampur, it was observed that application of FYM at 12 tha^{-1} resulted in significantly more weed density and their growth in terms of dry matter accumulation [9].

Flower initiation was observed after 90 days of weed emergence. Then within 10-12 days, 50 per cent flower

initiation completed. After flower initiation, weed plant took 8-10 days for button formation followed by 9-10 more days for maturity of seed. So, maturity of buttons took place in a range of 17-20 days after flower initiation. It was also reported that seed maturation occurred within 16 to 18 days after flowering [10]. But when experiment was terminated during both seasons, some weed plants were showing immature buttons, whereas at the same time, matured buttons were present on other plants. So, maturity of this weed plant is not uniform and buttons on one plant do not mature in unison [11].

IV. CONCLUSION

An increasing trend was observed in growth and development parameters of *M. neglecta* with increase in levels of FYM application. So, where farmers depend upon FYM as a source of nutrients, this weed is likely to become a problem in future.

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AUTHOR'S PROFILE



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Table I: Influence of FYM levels on growth parameters of *M. neglecta*

FYM (t/ ha)	Emergence count (No./ m ²)			Height (cm)			Number of branches/ plant			Dry matter accumulation (g /m)		
	2004-05	2005-06	Mean	2004-05	2005-06	Mean	2004-05	2005-06	Mean	2004-05	2005-06	Mean
FYM ₀ -S	6.78 (46)	7.46 (55)	(50.5)	40.2	18.3	29.2	19.6	9.9	14.7	18.1 (326.6)	12.3 (150.5)	(238.5)
FYM ₀ -US	3.15 (9)	3.45 (11)	(10.0)	25.1	12.9	19.0	12.8	7.4	10.1	14.0 (195.0)	10.1 (103.0)	(149.0)
FYM ₅ -S	8.98 (80)	9.63 (92)	(86.0)	47.6	22.9	35.2	23.1	12.0	17.5	19.9 (395.0)	13.5 (181.2)	(288.1)
FYM ₅ -US	5.84 (35)	6.75 (46)	(40.5)	33.2	17.4	25.3	15.1	9.5	12.3	15.7 (245.5)	11.3 (126.7)	(186.1)
FYM ₁₀ -S	12.0 (145)	12.5 (157)	(151.0)	52.0	30.2	41.1	26.8	15.5	21.1	21.6 (465.5)	14.7 (215.1)	(340.3)
FYM ₁₀ -US	9.74 (95)	10.2 (105)	(100.0)	39.0	20.9	29.9	21.4	11.6	16.5	17.4 (301.7)	12.5 (155.2)	(228.4)
FYM ₁₅ -S	13.9 (192)	14.6 (217)	(204.5)	57.6	36.1	46.8	28.2	17.4	22.8	23.1 (532.6)	15.7 (245.5)	(389.0)
FYM ₁₅ -US	11.1 (123)	12.0 (145)	(134.0)	44.6	26.8	35.7	23.2	12.8	18.0	18.0 (323.0)	13.2 (173.2)	(248.1)
FYM ₂₀ -S	15.3 (235)	16.0 (257)	(246.0)	62.2	41.8	52.0	30.1	18.9	24.5	24.6 (604.1)	16.8 (281.2)	(442.6)
FYM ₂₀ -US	12.5 (157)	13.3 (177)	(167.0)	49.5	31.8	40.6	25.1	14.2	19.6	18.4 (337.5)	14.2 (200.6)	(269.0)
LSD (P=0.05) YM)	1.33	1.24	-	3.4	3.2	-	2.1	2.0	-	1.63	1.17	-
LSD (P=0.05) (S vs US)	0.84	0.78	-	2.1	2.0	-	1.3	1.2	-	1.10	0.80	-

FYM₀, FYM₅, FYM₁₀, FYM₁₅ and FYM₂₀ refers to no FYM applied, FYM applied at 5, 10, 15 and 20 t ha⁻¹
 Figures in parentheses are original values, data is transformed to $\sqrt{x+1}$ (sq. root).