

# Effects of Various Concentrations of Rogor and Nuvan on Plant Growth Parameters of *Vigna Mungo*



**Lalit Singh**

Assistant Professor,  
Deptt. of Botany,  
D.B.S. (P.G) College,  
Dehradun, Uttarakhand



**T.S. Dhaka**

Associate Professor,  
Department of Botany,  
D.A.V.(P.G) College,  
Muzaffarnagar, U.P.

## Abstract

For the present study, field experiments were conducted to find out the effect of various concentrations of pesticides on plant growth. The plant selected for field experiments is *Vigna mungo*, and the commonly available pesticides selected were Rogor(Dimethoate) and Nuvan(Dichlorovos). *Vigna mungo* plants were treated with different concentrations of rogor and nuvan i.e. ., 0.0%, 0.5%, 1.0%, 1.5%, 2.0%, 2.5%, 5.0%, 7.5% and 10.0%. It was observed that the plant grow well in low pesticide concentration while the plant growth decreases at high pesticide concentration, no growth obtained at 10% pesticide concentration. It can be concluded that low pesticide concentration is good for plant growth, which gives best yield and has high effect on the pests.

**Keywords:** Vigna, Rogor, Nuvan.

## Introduction

Today, agricultural production has increased very much by the use of chemical fertilizers. Our agriculture is therefore heavily dependent upon the use of chemical fertilizer and pesticides. However the use of such agricultural chemicals is not always beneficial to the human beings. Indiscriminate use of these chemicals for protecting plants from pests may cause some deteriorating effects on crops and also on environmental quality and ecological stability. The pesticides used and selected for present study chemical pesticides are ROGOR and NUVAN. These pesticides control many pests of legume crops.

*Vigna mungo* is important pulse crop which is used in India as food. It is commonly known as urd, black gram, or mast. It is a highly prized pulse very rich in phosphoric acid. It is an annual food legume. Black gram shows both erect and crawling growth habit. There are several distinct characters between black gram and mung bean.

Flower color of black gram is bright yellow while that of mung bean is pale yellow. Black gram has long pocket on the keel. Pod of black gram is shorter than that of mung bean. Pod of black gram attaches upright to the peduncle, while mung bean pod attaches sideward or downward to the peduncle. Urd bean is consumed as dal in most of the places, it is also used in preparing *papad* and *barian* . With rice it is used to prepare *dosa* and *idli*. For the present study, field experiments were conducted to find out the effect of various concentrations of pesticides on plant growth.

## Aim of the Study

The aim of the current study is to find Effects of various concentrations of rogor and nuvan on Plant growth parameters of *Vigna mungo*.

## Materials and Methods

To study the plant growth in the selected crop, the pesticides were diluted with distilled water to prepare different concentrations, viz., 0.0%, 0.5%, 1.0%, 1.5%, 2.0%, 2.5%, 5.0%, 7.5% and 10.0%. The distilled water alone served as control.

For plant growth, samples were collected on 21<sup>st</sup>, 28<sup>th</sup> and 35<sup>th</sup> day of radicle emergence. The plants were measured for the length of root and shoot and leaf area. Fresh weight and dry weight of these plants were also recorded.

## Review of Literature

Ali A., et.al. in the year 2006 studied the effect of different levels of potash on growth yield and protein content of Mung bean varieties. Rai UN, Gupta DK, Akhtar M, Pal Amit (2003) studied the Performance of seed germination and growth of *vicia faba* .Pandey GC, Neraliya S in the year

2002 worked on Distillery effluent induced alterations on the seed germination, seedling growth, chlorophyll and protein contents of Bengal gram *Cicer arietinum*. In the year 2002 Mishra V and Pandey S D analyzed the effect of distillery effluent and of industrial sludge on the germination of black gram.

### Results and Discussion

The effect of different pesticide concentrations on plant growth were studied on *Vigna mungo* variety "Type-9".

The results for effect of rogor plant growth of *Vigna mungo* is shown in table 1 and figure 1(A, B, C, D). The observations were taken at 21<sup>st</sup>, 28<sup>th</sup> and 35<sup>th</sup> day of plant growth with different concentrations of pesticide (rogor), i.e., 0.0%, 0.5%, 1.0%, 1.5%, 2.0%, 2.5%, 5.0%, 7.5% and 10.0%.

The results of table 1 and figure 1 (A, B, C, D) show shoot length 9.52, 13.24, 18.0 cm, and 8.54, 11.0, 17.4 cm, and 7.25, 10.1, 16.0 cm, and 6.63, 9.52, 14.3 cm, and 6.10, 7.83, 11.99 cm, and 5.14, 7.16, 9.00 cm, and 3.63, 5.70, 7.82 cm respectively at respective sampling days and with respective pesticide concentrations. The shoot length were 9.51, 13.59, 18.70 cm for control plants. The data for root length showed 3.50, 5.40, 8.20 cm values for control plants as compared to 3.60, 5.20, 7.90 cm, and 2.90, 4.87, 7.60 cm, and 3.60, 4.65, 7.60 cm, and 2.70, 4.60, 6.90 cm, and 2.40, 3.40, 6.30 cm, and 2.10, 3.64, 5.10 cm, and 2.30, 3.20, 4.10 cm at respective days for different increasing pesticide concentrations respectively. No results were obtained for 10.0% concentration of the pesticide.

The data for leaf area for the above plants were recorded as 149.0, 157.0, 164.1 cm<sup>2</sup> for control plants as compared to 144.0, 152.3, 164.0 cm<sup>2</sup>, and 124.0, 134.0, 154.0 cm<sup>2</sup>, and 116.0, 127.0, 134.0 cm<sup>2</sup>, and 104.0, 119.0, 124.0 cm<sup>2</sup>, and 96.5, 106.0, 118.4 cm<sup>2</sup>, and 79.4, 86.4, 97.6 cm<sup>2</sup>, and 53.1, 66.4, 79.6 cm<sup>2</sup> respectively for different increasing concentrations of pesticide. No results were obtained for 10.0% concentration. The fresh weights were as follows.

The values for increasing concentrations were 3.70, 5.80, 6.40 gm, and 3.50, 5.24, 5.79 gm, and 3.20, 4.87, 5.48 gm, and 2.70, 4.51, 5.06 gm, and 2.79, 3.84, 4.24 gm, and 2.57, 3.54, 3.79 gm, and 1.94, 2.48, 2.94 gm respectively at respective sampling days. The control plant fresh weight for 21<sup>st</sup>, 28<sup>th</sup> and 35<sup>th</sup> days were 4.3, 5.69, 6.78 gm. The data for dry weights were observed as 0.52, 0.74, 1.06 gm, and 0.48, 0.67, 0.94 gm, and 0.46, 0.67, 0.86 gm, and 0.38, 0.6, 0.74 gm, and 0.34, 0.46, 0.63 gm, and 0.27, 0.36, 0.59 gm, and 0.21, 0.27, 0.49 gm respectively for different increasing concentrations of pesticide rogor. The data observed for control plants were 0.571, 0.762, 1.04 gm at 21<sup>st</sup>, 28<sup>th</sup> and 35<sup>th</sup> day respectively.

The results depicted in table 2 and figure 2(A, B, C, D) were for effect of different concentrations of nuvan on *Vigna mungo*. During the sampling, the same trends of the responses to various concentrations of pesticide were shown by plant growth parameters as in previous Samples. The shoot length as compared to control plants, i.e., 8.64,

12.3, 17.5 cm at 21<sup>st</sup>, 28<sup>th</sup>, 35<sup>th</sup> days were recorded as 8.54, 12.40, 17.50 cm, and 7.54, 10.23, 16.50 cm, and 7.23, 9.50, 15.60 cm, and 5.46, 8.52, 13.50 cm, and 6.18, 6.97, 11.40 cm, and 4.18, 6.24, 9.80 cm, and 2.49, 4.63, 6.87 cm respectively at various concentrations used.

The length of roots as observed as 3.70, 5.60, 7.60 cm, and 3.40, 4.78, 7.50 cm, and 3.60, 4.53, 7.40 cm, and 2.87, 4.60, 6.90 cm, and 2.56, 3.70, 6.30 cm, and 2.47, 3.47, 5.34 cm, and 2.40, 3.70, 4.80 cm respectively at various concentrations used, while the control concentration values were 3.70, 5.40 and 8.20 cm in 21<sup>st</sup>, 28<sup>th</sup> and 35<sup>th</sup> days respectively.

The leaf area as observed from the data were 145.0, 150.3, 165.0 cm<sup>2</sup>, and 127.0, 137.4, 154.0 cm<sup>2</sup>, and 116.0, 127.0, 134.0 cm<sup>2</sup>, and 117.0, 119.0, 124.0 cm<sup>2</sup>, and 82.4, 106.0, 116.4 cm<sup>2</sup>, and 78.6, 89.4, 96.4 cm<sup>2</sup>, and 54.3, 64.3, 76.4 cm<sup>2</sup>, respectively for different increasing concentrations of pesticide at respective sampling days while the data for control concentration were 140.3, 153.2, 164.1 cm<sup>2</sup> respectively. The fresh weights for increasing pesticide concentrations were 3.40, 5.67, 6.61 gm, and 3.70, 5.26, 5.94 gm, and 3.64, 4.86, 5.47 gm, and 2.70, 4.60, 5.00 gm, and 2.79, 3.84, 4.56 gm, and 2.34, 3.34, 3.87 gm, and 1.97, 2.48, 2.94 gm, and the control plants showed 4.56, 5.74, 6.59 gm values at 21<sup>st</sup>, 28<sup>th</sup> and 35<sup>th</sup> day respectively. The dry weights as observed from the data followed the same trend as fresh weights. The control plants showed 0.54, 0.76, 1.07 gm weight as compared to other increasing concentrations of pesticide, i.e., 0.56, 0.74, 1.08 gm, and 0.48, 0.67, 0.94 gm, and 0.46, 0.64, 0.87 gm, and 0.39, 0.54, 0.76 gm, and 0.34, 0.46, 0.64 gm, and 0.26, 0.34, 0.57 gm, and 0.214, 0.290, 0.490 gm respectively. No results were obtained at 10.0% concentration.

### Conclusion

The results for the present study showed that legume, i.e. *Vigna mungo* showed almost same trends of responses to plant growth parameters with various concentrations of pesticides (rogor and nuvan). There was general inhibition of plant growth at higher concentrations of both the pesticides and less effect on plant growth was seen at lower concentrations, i.e., 0.5% and 1%. No growth occurred at 10.0% pesticides concentration. The plant growth gradually decreased after 0.5% concentration with increasing concentrations of both the pesticides. The results of the present study very much coincide with the results of Udaiyan et al. (1995).

It may be concluded from the present study that pesticides like rogor and nuvan are toxic to plants in higher concentrations and these may be used for agriculture crop protection only in low concentrations like 0.5% which affects insect pest.

### References

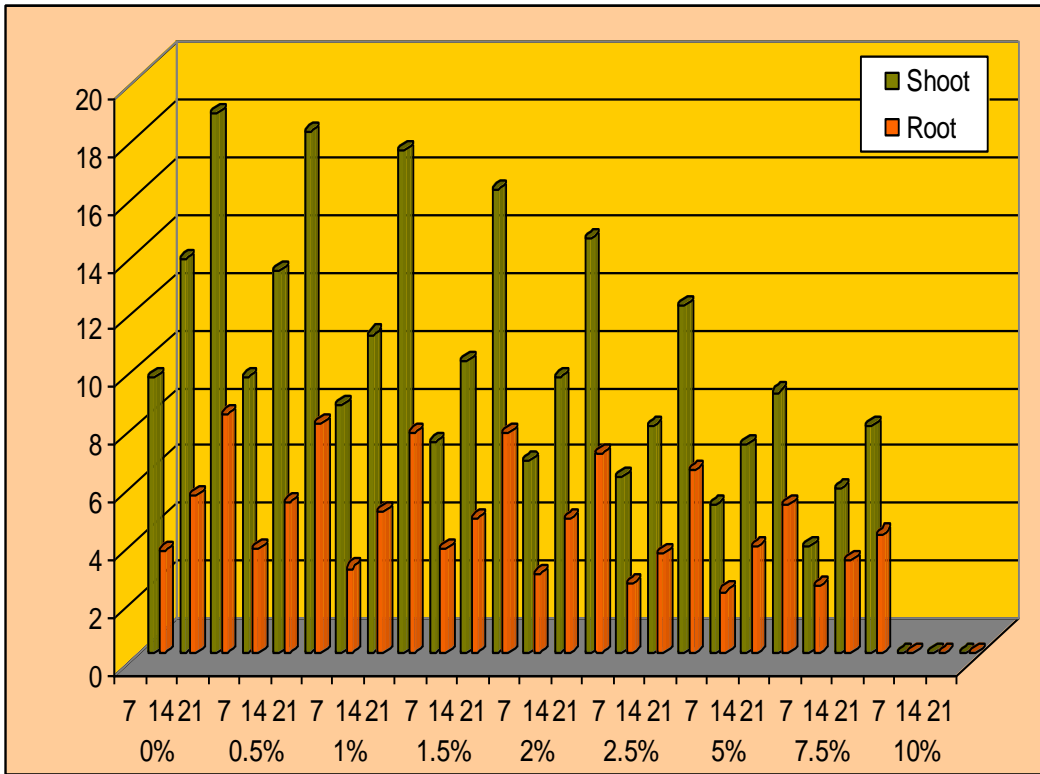
1. Ali A., Muhammad Athar, Nadeem, Muddassar Maqbool and Muhammad Ejaz (2006), Effect of different levels of potash on growth yield and protein content of Mung bean varieties, J. Agric. Res., 44(3).

2. Rai UN, Gupta DK, Akhtar M, Pal Amit (2003). Performance of seed germination and growth of vicia faba L. in Fly ash amended soil. *J Environ Bio*. 24(1)200: 9-15.
3. Pandey GC, Neraliya S (2002), Distillery effluent induced alterations on the seed germination, seedling growth, chlorophyll and protein contents of Bengal gram *Cicer arietinum* Linn. *Himalayan J Env Zoo*, 16(1):77-81.
4. Mishra V and Pandey S D (2002) Effect of distillery effluent and of industrial sludge on the germination of black gram (*Cicer arietinum*). *Pollu. Res*. 21(4): 461-467.
5. Neogy Mala Datta Jayanta, Roy Amit Kumar, Mukherjee Subhendu, (2002), Studies on phytotoxic effect of aluminium on growth and some morphological parameters of *Vigna radiata* L. *Wilczek J Environ Bio* 23(1) : 111-116
6. Chidambaram Coll pillai S, Pugazhendi N, Lakshmanan C, Shanmugasundaram R. (1996) Effect of chemical industrial waste water on germination, growth and some bio chemical parameters of *Vigna radiata* L. *Wilczek and Vigna mungo* L. *Heppter. J Env Polln* 3 (3&4): 131-134.

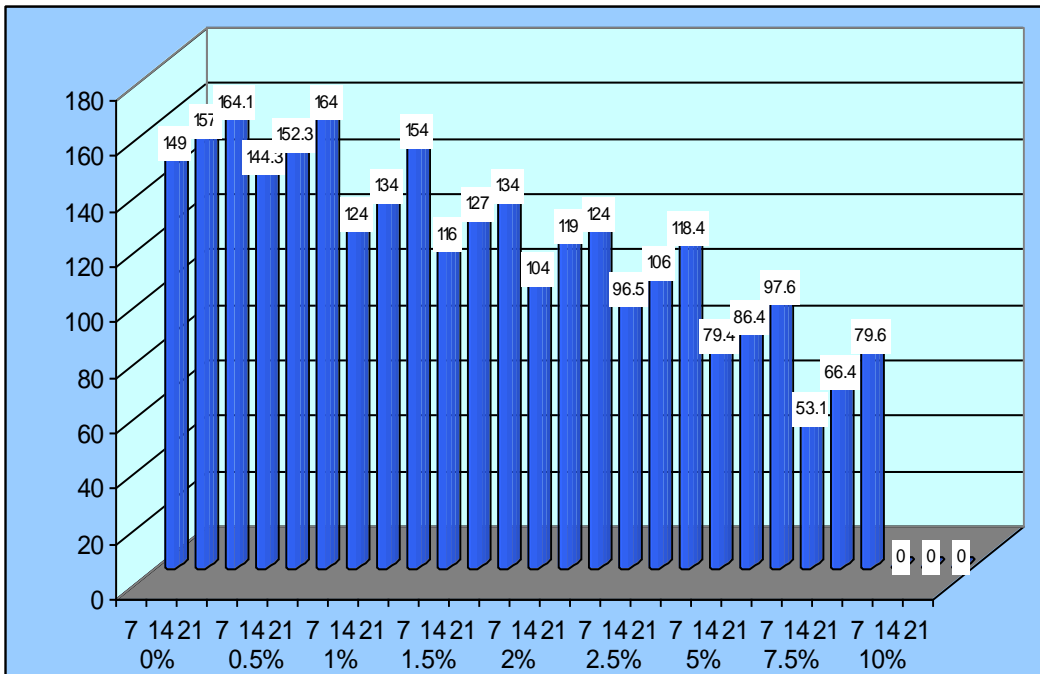
**Table 1 Effect of Various Concentrations of Rogor on *Vigna Mungo* Plant Growth**

Plant part	Concentration of Rogor in Percentage																										
	0%			0.5%			1.0%			1.5%			2.0%			2.5%			5.0%			7.5%			10.0%		
	21	28	35	21	28	35	21	28	35	21	28	35	21	28	35	21	28	35	21	28	35	21	28	35	21	28	35
Shoot length (cm)	9.51	13.59	18.70	9.52	13.24	18.00	8.54	11.00	17.40	7.25	10.10	16.00	6.63	9.52	14.30	6.10	7.83	11.99	5.14	7.16	9.00	3.63	5.70	7.82	0.00	0.00	0.00
	±1.20	±0.90	±0.15	±0.21	±0.64	±0.04	±0.75	±0.02	±0.03	±0.22	±0.34	±0.14	±0.15	±0.17	±1.20	±0.64	±0.02	±0.03	±0.05	±0.03	±0.03	±0.05	±0.06	±0.07	0.00	0.00	0.00
Root length (cm)	3.50	5.40	8.20	3.60	5.20	7.90	2.90	4.87	7.60	3.60	4.65	7.60	2.70	4.60	6.90	2.40	3.40	6.30	2.10	3.64	5.10	2.30	3.20	4.10	0.00	0.00	0.00
	±0.01	±0.04	±0.02	±0.04	±0.03	±0.04	±0.06	±0.01	±0.02	±0.03	±0.15	±0.03	±0.04	±0.01	±0.01	±0.01	±0.02	±0.05	±0.05	±0.06	±0.07	±0.15	±0.16	±0.18	0.00	0.00	0.00
Leaf Area (cm <sup>2</sup> )	149.00	157.00	164.10	144.00	152.30	164.00	124.00	134.00	154.00	116.00	127.00	134.00	104.00	119.00	124.00	96.50	106.00	118.40	79.40	86.40	97.60	53.10	66.40	79.60	0.00	0.00	0.00
	±1.20	±1.30	±1.43	±1.33	±1.22	±1.21	±1.50	±1.21	±1.31	±0.94	±0.95	±1.22	±1.23	±1.41	±1.50	±1.14	±1.17	±1.19	±1.01	±1.03	±1.04	±1.01	±0.92	±1.95	0.00	0.00	0.00
Fresh Weight (gm)	4.30	5.69	6.78	3.70	5.80	6.40	3.50	5.24	5.79	3.20	4.87	5.48	2.70	4.51	5.06	2.79	3.84	4.24	2.57	3.54	3.79	1.94	2.48	2.94	0.00	0.00	0.00
	±7.64	±3.92	±5.35	±5.31	±5.51	±3.24	±4.48	±5.64	±3.79	±3.84	±4.81	±4.82	±4.88	±5.10	±7.61	±7.77	±8.11	±9.12	±6.33	±5.11	±4.88	±5.10	±2.71	±2.22	0.00	0.00	0.00
Dry Weight (gm)	0.571	0.762	1.040	0.520	0.740	1.060	0.480	0.670	0.940	0.460	0.670	0.860	0.380	0.600	0.740	0.340	0.460	0.630	0.270	0.360	0.590	0.210	0.270	0.490	0.00	0.00	0.00
	±0.05	±1.57	±2.67	±3.31	±2.11	±2.20	±1.97	±1.87	±0.95	±0.81	±1.81	±1.89	±1.82	±1.95	±2.22	±2.21	±2.23	±2.28	±1.97	±1.09	±1.68	±1.97	±1.85	±2.10	0.00	0.00	0.00

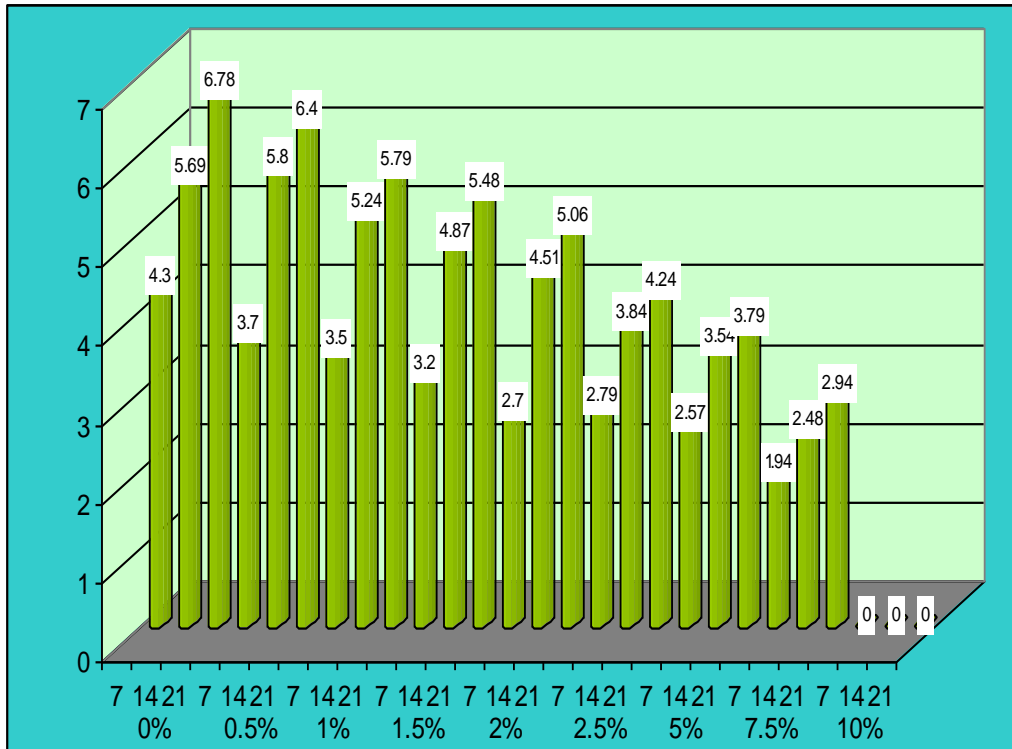
**Fig. 1A Effect of Various Concentrations of Rogor on Plant Length of *Vigna mungo***



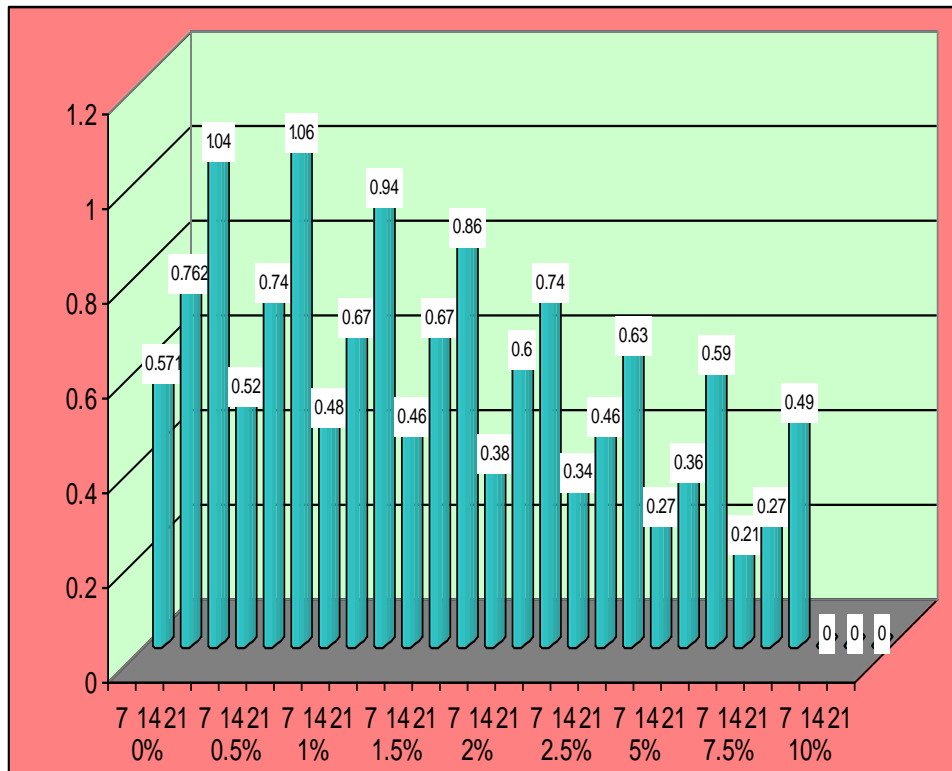
**Fig. 1B Effect of Various Concentrations of Rogor on Leaf Area of *Vigna mungo***



**Fig. 1C Effect of Various Concentrations of Rogor on Fresh Weight of *Vigna mungo***



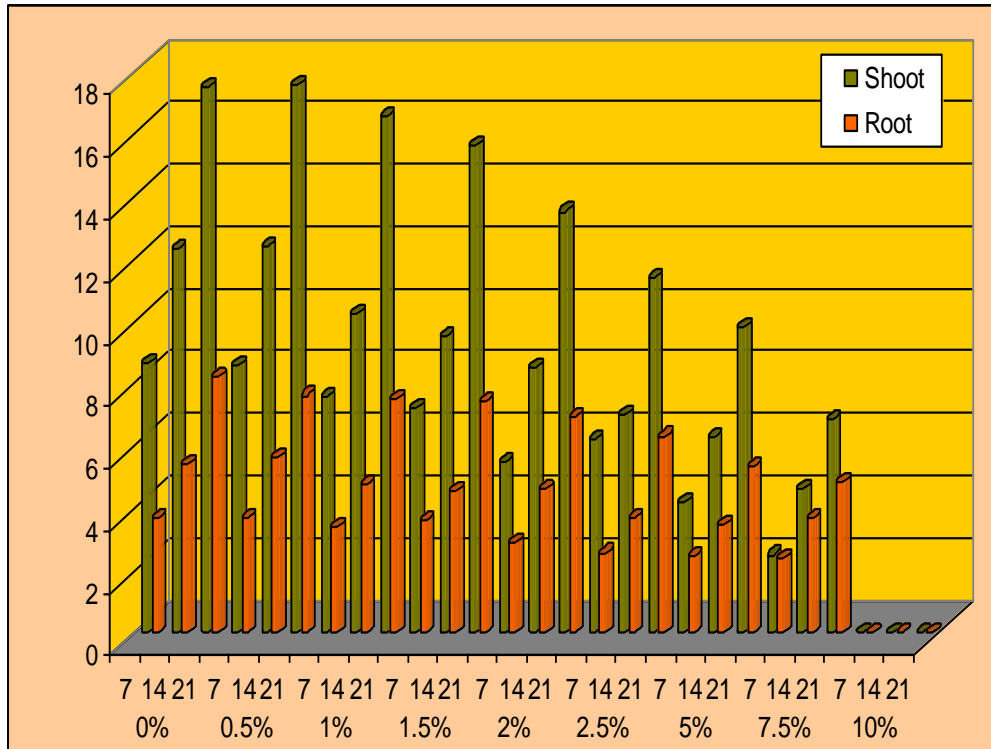
**Fig. 1D Effect of Various Concentrations of Rogor on Dry Weight of *Vigna Mungo***



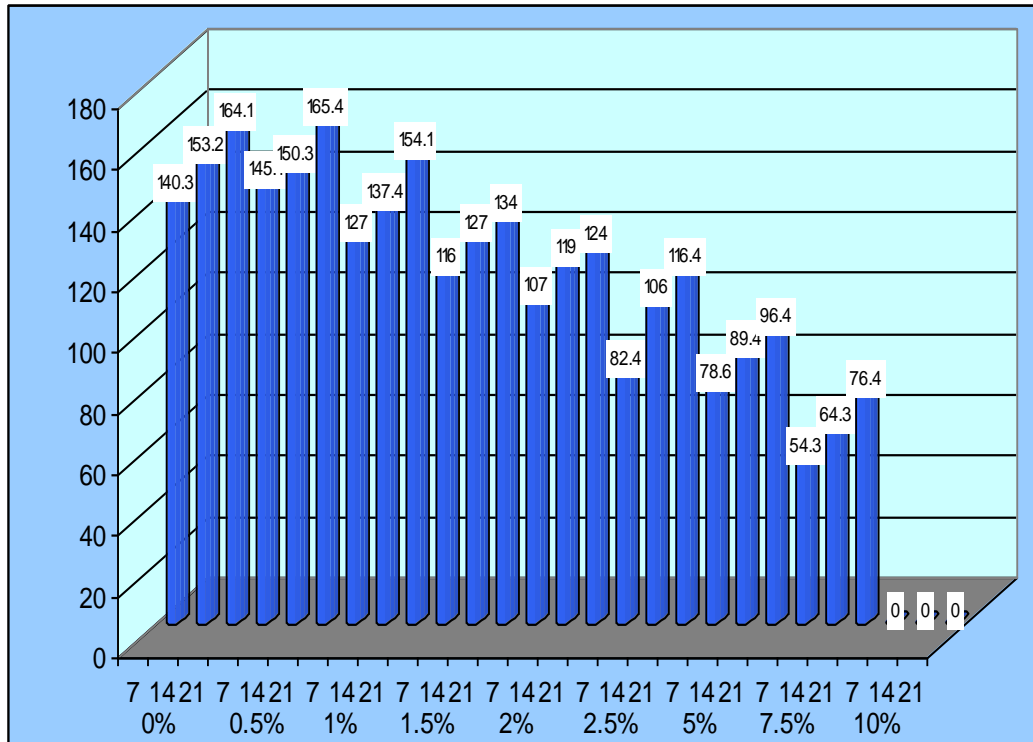
**Table 2 Effect of various concentrations of Nuvan on *Vigna mungo* plant growth**

Plant part	Concentration of Nuvan in percentage																										
	0%			0.5%			1.0%			1.5%			2.0%			2.5%			5.0%			7.5%			10.0%		
	21	28	35	21	28	35	21	28	35	21	28	35	21	28	35	21	28	35	21	28	35	21	28	35	21	28	35
Shoot length (cm)	8.64	12.30	17.50	8.54	12.40	17.50	7.54	10.23	16.50	7.23	9.50	15.60	5.46	8.52	13.50	6.18	6.97	11.40	4.18	6.24	9.80	2.49	4.63	6.87	0.00	0.00	0.00
	±0.05	±0.02	±0.03	±0.05	±0.01	±0.80	±0.04	±0.78	±1.50	±1.30	±0.06	±0.05	±0.02	±0.06	±0.04	±0.07	±1.20	±1.10	±1.11	±1.20	±0.06	±0.03	±0.01	±0.05	0.00	0.00	0.00
Root length (cm)	3.70	5.40	8.20	3.70	5.60	7.60	3.40	4.78	7.50	3.60	4.53	7.40	2.87	4.60	6.90	2.56	3.70	6.30	2.47	3.47	5.34	2.40	3.70	4.80	0.00	0.00	0.00
	±0.03	±0.04	±0.10	±0.02	±0.03	±0.00	±0.03	±0.02	±0.03	±0.10	±0.03	±0.01	±0.05	±0.04	±0.03	±0.04	±0.05	±0.04	±0.06	±0.04	±0.01	±0.03	±0.02	±0.01	0.00	0.00	0.00
Leaf Area (cm <sup>2</sup> )	140.30	153.20	164.10	145.00	150.30	165.00	127.00	137.40	154.00	116.00	127.00	134.00	107.00	119.00	124.00	82.40	106.00	116.40	78.60	89.40	96.40	54.30	64.30	76.40	0.00	0.00	0.00
	±1.30	±1.60	±1.20	±1.40	±0.98	±0.30	±1.12	±1.13	±1.20	±1.20	±1.35	±1.44	±0.98	±1.30	±1.20	±1.40	±1.50	±1.20	±1.30	±1.20	±1.25	±1.50	±1.21	±1.31	0.00	0.00	0.00
Fresh Weight (gm)	4.56	5.74	6.59	3.40	5.67	6.61	3.70	5.26	5.94	3.64	4.86	5.47	2.70	4.60	5.00	2.79	3.84	4.56	2.34	3.34	3.87	1.97	2.48	2.94	0.00	0.00	0.00
	±1.56	±1.90	±5.20	±6.32	±4.52	±2.40	±2.48	±2.67	±5.10	±4.60	±7.12	±5.13	±4.21	±4.28	±9.60	±8.91	±8.65	±10.00	±4.56	±3.54	±4.52	±5.12	±5.23	±5.65	0.00	0.00	0.00
Dry Weight (gm)	0.54	0.76	1.07	0.56	0.74	1.08	0.48	0.67	0.94	0.46	0.64	0.87	0.39	0.54	0.76	0.34	0.46	0.64	0.26	0.34	0.57	0.214	0.29	0.49	0.00	0.00	0.00
	±0.05	±1.23	±1.61	±1.32	±3.26	±3.50	±3.59	±2.45	±4.21	±1.00	±0.70	±1.23	±0.05	±0.08	±1.23	±1.12	±1.21	±2.20	±1.21	±1.40	±1.46	±1.25	±1.50	±4.56	0.00	0.00	0.00

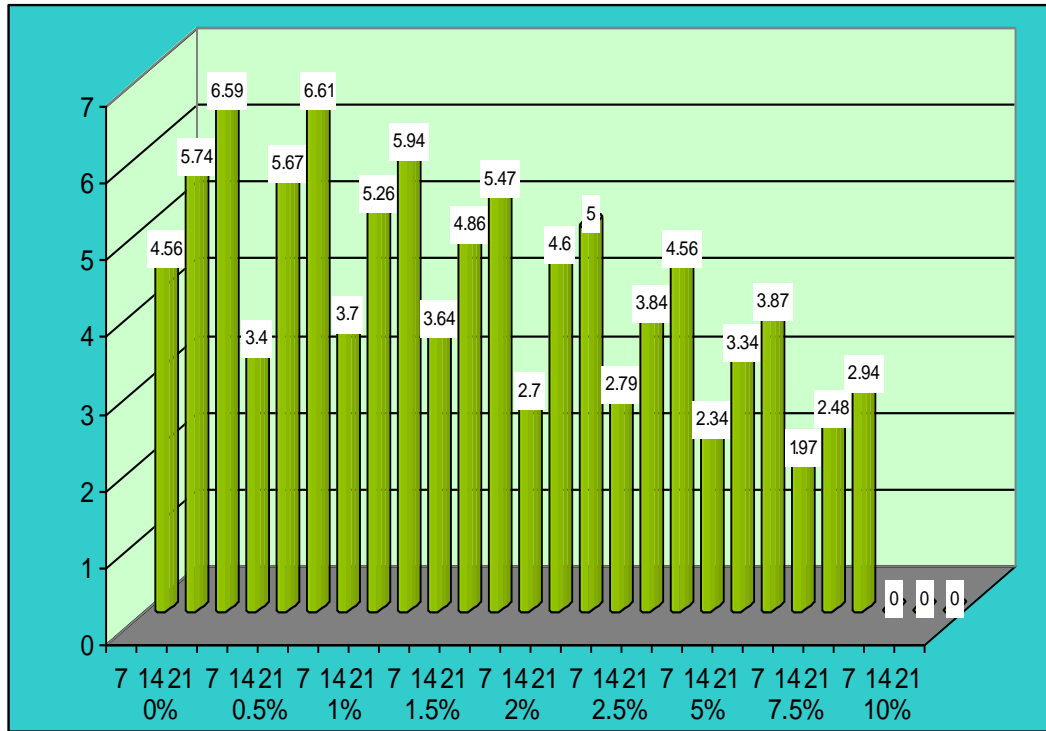
**Fig. 2A Effect of Various Concentrations of Nuvan on Plant Length of *Vigna Mungo***



**Fig. 2B Effect of Various Concentrations of Nuvan on Leaf Area of *Vigna Mungo***



**Fig. 2C Effect of Various Concentrations of Nuvan on Fresh Weight of *Vigna Mungo***



**Fig. 2D Effect of Various Concentrations of Nuvan on Dry Weight of *Vigna Mungo***

