Effect of some weed extracts on seed germination and seedling development of *Vigna aconitifolia* (Jacq).

Khade Hemlata N. and Patil Bhimarao J.
Department of Botany and Plant Protection,
Sadguru Gadage Maharaj College, Karad- 415124.
Maharasthra, India.

Abstract:-

Weeds are undesirable plant growing in an area where they are not wanted. These plants are generally highly competitive and adaptable to very wide environmental conditions. While competing with crop plants for light, nutrients and moisture contents of the soil, many weeds have allelopathic effects on crop plants. Effect of ten weeds leaf extract at different concentration such as 5, 10, 15 and 20% were tested on seed germination and seedling development of *Vigna aconitifolia* (Jacq). The distilled water was used as a control. The *Portulaca oleracea* L., *Euphorbia hirta* L., *Lagerra decurren* showed stimulatory effect as concentration increases. *Tribulus terrestris* L. has shown inhibitory effect while *Sphagneticola trilobata* L., *Oxalis corniculata* L., *Strobilanthes callosus*, *Gomphrena serrate* L., *Ageratum conyzoides* L., *Phyllanthus amarus* L. have moderate inhibitory effect on seed germination, root length, shoot length and seedling growth of *Vigna aconitifolia* L. This indicates that allelochemical present in aqueous extract of ten different weeds have shown inhibitory or stimulatory effect on plant growth.

Keyword:

Vigna aconitifolia, seed germination, weed, leaf extract.

Introduction:

Weeds are known to be one of the most significant agronomic problems, mostly in organic farms where herbicides are not allowed to control weed. Alongside mechanical weed control, use of organic residues as mulch is an alternative method of weed control in agriculture throughout the world. (Batish et al., 2001). Every weed has its own chemical with primary and secondary metabolites. Several studies have indicated that large number of metabolites occur in different parts of plant and may have positive or negative effects on seed germination and seedling growth of other plants. This generally refered that phenolic compounds at low concentration are stimulatory to germinate and plant growth. (Hegab et al., 2008). Weed extracts can affect on many cultivated plants including *Vigna aconitifolia* (Jacq) by various ways. *Vigna aconitifolia* (Jacq) is a drought resistant legume commonly known as moth bean, it belongs to family Fabaceae. Moth bean sprouts and protein rich seed crop grown in India for both human consumption and as a forage crop.

Materials and Methods:

Fresh leaves of *Portulaca oleracea* L., *Euphorbia hirta* L., *Lagerra decurren*, *Tribulus terrestris* L., *Sphagneticola trilobata* L., *Oxalis corniculata* L., *Strobilanthes callosus*, *Gomphrena serrate* L., *Ageratum conyzoides* L., *Phyllanthus amarus* L. in its vegetative stage were collected from Y. C. College campus Karad, District Satara. Leaves were instantly separated and washed with tap water to remove soil particles, blot properly and shade dried for a week. The dried leaves were ground into a fine powder separately using a mixer grinder. Leaf powder was weighed in 5, 10, 15 and 20 gm. and soaked in 100 ml. of distilled water separately and mixed thoroughly by keeping in rotatory shaker. Keep it over night at the room temperature. After 24 hrs of soaking, extracts were filtered through double layered muslin cloths. The filtrate was a stock solution and then prepared 5, 10, 15 and 20% extract with distilled water. Collection of seed samples of *Vigna aconitifolia* (Jacq) was obtained from local area of Satara. Healthy uniform seeds of *Vigna aconitifolia* (Jacq) were surface sterilized with 1% Sodium Hypo-Chloride for 10 minutes. Then rinsed with

distilled water for several times to remove excess of chemical. Then 100 seeds were soaked separately in different concentrations of plant extract for 9 hrs in 100 ml beaker. Seeds soaked in distilled water were treated as control. Then 30 treated seeds were placed in petri plates containing wet blotting papers. At each concentration triplicate sets were arranged at room temperature (25± 2^0c) for germination. After the completion of 7 days of seed soaking, further parameters were analysied i.e. percentage of seed germination, root length, shoot length, lateral root number and fresh/dry weight. Calculated values were presented in observation table.

Statistical Analysis:

The analysis was carried out in three replicates for all determinations. The mean and standard deviation were calculated. The data were analyzed by one way analysis of variance (ANOVA). A multiple comparison procedure of the treatment means was performed by Duncan's new multiple range test.

Result and Discussion:

From the observation table it is clear that some plant extracts play the role in stimulation while some plays the role in supperation. Plant extracts of *Oxalis corniculata* L, *Gomphrena serrate* L, *Sphagneticola trilobata* L, *Phyllanthus amarus* L showed stimulatory effect in seed germination at lower concentration as compare to control. But increasing concentration decreases the germination percentage. *Sphagneticola trilobata* L and *Euphorbia hirta* L showed stimulatory effect in root length as compared to control. The increasing concentration decreases the seed germination percentage in *Sphagneticola trilobata* L but increases in *Euphorbia hirta* L, *Lagerra decurren* and *Portulaca oleracea* L showed stimulatory effect in shoot length as compare to control. Increasing concentration of *Euphorbia hirta* L, *Lagerra decurren* and *Portulaca oleracea* L increases shoot length but in other treatments it is decreases. In case of lateral root number only *Oxalis corniculata* L extract showed slightly stimulatory effect in lower concentration and *Euphorbia hirta* L, *Lagerra decurren* and *Portulaca oleracea* L showed stimulatory effect in only higher concentration.

Many plant species release allelochemicals that influence on germination (positive or negative), growth and development of other plants (Kadioglue et al., 2005 & Madane and Patil, 2017). Similar result was obseved in *Euphorbia hirta* L where stimulation in root length and shoot length as concentration increases in wheat. (Ghodake et al., 2012). According to (Dhole et al., 2011) the aqueous extract of *Portulaca oleracea* L. was found to be stimulatory towards seed germination, root length, shoot length and seedling growth on *Sorghum vulgare* Pers. (Dhumal and Bhalerao 2004), (Jadhav 2006), (Vaidya 2007), claimed that various types of stimulatory allelochemical, PGRs like substance and mineral nutrients might be helping for improving the yield quality at lower concentration treatment in sorghum, chickpea, mungbean and wheat. Several workers have reported on the allelopathic potential of common weeds on germination, seedling growth and yield of several crop species (Inderjit and Dakshini, 1998), (Singh et al., 2003), (Kong et al., 2007), (Ilori et al., 2010 and (Otusanya, 2014).

Conclusion:

The experimental results clearly demonstrated that most of the weed species inhibited seed germination, root and shoot growth while some weed species showed stimulatory effect in *Vigna aconitifolia* (Jacq). Those weeds showed positive result could be beneficial for seed treatment in advanced organic farming.

Reference:

[1] Batish, D. R., Singh, H. P., Kohli, R. K., Kaur, S. 2001. Crop allelopathy and its role in ecological agriculture. 121-161 in R. K. Kohli, H. P. Singh, and D. R. Batish, Eds. Allelopathy in Agroecosystems. Binghamton, NY: Haworth Press.

[2] Dhole, J. A., Bodke, S. S., and Dhole, N. A. 2011. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*, July-September, RJPBCS, 2(3), 142.

[3] Dhumal, K. N. and Bhalerao, E. B. 2004. Allelopathic potential of fern frond extracts for sustainable improvement of grain yield and quality of Sorghum IVth International Conference Allelopathy in Sustainable Terrestrial and Aquatic Ecosystems. Pp. 84.

[4] Ghodake, S. D., Jagtap, M. D. and Kanade, M. B. 2012. *Annals of Biological Reasearch*, 3(10), 4801 - 4803.

[5] Hegab, M. M., Khodary, S. E. A, Hammouda, O. and Ghareib, H. R. 2008. Autotoxicity of chard and its allelopathic potentiality on germination and some metabolic activities associated with growth of wheat seedlings. Afr. J. Biotech, (7) : 884-892.

[6] Ilori, O. J., Otusanya, O. O., Adelusi, A. A. and Sanni, R. O. 2010. Allelopathic activities of some weeds in the Asteraceae family. International Journal of Botany, 6:161-163.

[7] Inderjit, D. and Dakshini, K. M. M. 1998. Allelopathic interferences of chickweed (Stellaria media) with seedling growth of wheat (Triticum aestivum). Can. J. Bot., 76:1317-1321.

[8] Jadhav, S. S. 2006. Allelopathic potential of some dominant aquatic weeds of Mula and Mutha rivers and their bioprospecting. Ph. D. Thesis submitted to university of Pune.

[9] Kadioglue, L., Yamhar, Y. and Asav, U. (2005). Allelopathic effects of weed leachates against seed germination of some plants. *J. of Env. Biol*., 26:169 -173.

[10] Kong, C. H., Wang, P. and. Xu, X. H. 2007. Allelopathic interference of Ambrosia trifida with wheat (Triticum aestivum). Agric. Ecosyst. Environ., 119 : 416 - 420

[11] Madane, A. N. and Patil, B. J. 2017. Allelopathic effect of *Eupatorium odoratum* L. on amylase activity during seed germination of *Cicer arietinum* L. and *Cajanus cajan* L. Millsp. Bioscience Discovery, 8(1):82-86.

[12] Otusanya, O. O., Sokan-Adeaga, A. A. and Ilori, O. J. 2014. Allelopathic effect of the root exudates of Tithonia diversifolia on the germination, growth and chlorophyll accumulation of Amaranthus dubius l. and Solanum melongena L., Research Journal of Botany, 9 : 13-23.

[13] Singh, H. P., Batish, D. R. Kaur, S. and Kohli, R. K. 2003. Phytotoxic interference of Ageratum conyzoides with wheat (Triticum aestivum). J. Agron. Crop Sci., 189: 341-346.

[14] Vaidya, R. R. and Dhumal, K. N. 2007. Utilization of dominant forest weed biomass for improvement of growth and yield in sorghum and mungbean. National Seminar on “Current Trends in Plant Bioresource Utilization”, Pp.75.

Effect of plant extracts on seed germination and seedling development of *Vignaaconitifolia* (Jacq) at 9 hrs soaking period.

Sr No	Treatment	Germination (%)				Root Length (cm)				Shoot Length (cm)				Lateral Root No.			
		Leaf extract (%)															
		5	**10**	**15**	**20**	**5**	**10**	**15**	**20**	**5**	**10**	**15**	**20**	**5**	**10**	**15**	**20**
1	*Lagerradecurrens*(Vahl)	60 ± 0.94	75 ±0.816	80 ± 0.816	**91** ± 2.62	6.36 ±0.30	10.50 ± 0.32	11.06 ± 0.41	13.1 ± 0.37	12.36 ± 0.30	15.40 ± 0.80	13.32 ±0.45	**15.60** ± 0.82	8.0 ± 0.01	11.0 ± 2.44	12.00 ± 2.05	**15.00** ± 0.05
2	*Tribulusterrestris L.*	86 ± 0.81	81 ±1.24	63.39 ± 0.06	32 ± 2.16	9.93 ±0.12	9.3 ± 0.16	7.4 ± 0.21	1.8 ± 0.42	15.46 ± 0.44	13.83 ± 0.24	11.1 ± 0.08	3.96 ± 0.16	7.33 ± 0.47	7.00 ± 0.81	6.33 ± 0.47	2.60 ± 0.38
3	*Sphagneticolatrilobata*L.	**96.69** ± 0.05	93.38 ±0.062	79 ± 0.816	60 ± 0.81	14.53 ±0.32	10.73 ± 0.32	6.73 ± 0.16	4.73 ± 0.16	13.73 ± 0.16	12.23 ± 0.24	12.03 ± 0.41	11.30 ± 0.14	9.66 ± 1.24	9.33 ± 1.24	7.0 ± 0.81	5.66 ± 0.47
4	*Oxalis corniculata*L.	**99.33** ± 0.47	91.33 ±2.624	81 ± 2.943	69 ± 2.94	8.4 ±0.08	7.5 ± 0.32	5.7 ± 0.21	4.63 ± 0.12	13.36 ± 0.12	12.26 ± 0.47	10.1 ± 0.16	9.53 ±0.28	**10.66** ± 1.24	8 .0 ± 0.8	7.66 ± 1.24	7.0 ± 0.81
5	*Strobilanthescallosus(Nees)*	91 ± 2.62	84.33 ± 1.69	69 ± 2.94	60.33 ± 2.05	10.4 ±0.35	9.9 ± 0.57	7.96 ± 0.12	7.5 ± 0.40	12.23 ± 0.24	11.5 ± 0.37	10.80 ± 0.37	10.16 ± 0.04	7.0 ± 0.81	6.0 ± 1.63	6.66 ± 1.24	5.33 ± 0.47
6	*Euphorbia hirta*L.	80.33 ± 2.05	91.66 ±1.247	93.37 ± 0.027	**96.45** ± 0.10	**14.83** ±0.24	15.56 ± 0.28	15.76 ± 0.12	**16.43** ± 0.32	13.06 ± 0.12	13.60 ± 0.14	13.93 ± 0.30	**14.30** ± 0.14	9.33 ± 0.46	10.66 ± 1.24	12 ± 0.81	**14.66** ± 0.94
7	*Gomphrenaserrata*L.	**96.56** ± 0.04	95.66 ±0.043	92.25 ± 0.183	79 ± 0.81	9.86 ±0.24	8.6 ± 0.18	7.63 ± 0.30	7.3 ± 0.14	**15.5** ± 0.35	13.9 ± 0.49	11.63 ± 0.30	9.5 ± 0.08	7.0 ± 0.81	6.66 ± 1.24	11.63 ± 0.30	4.33 ± 0.47
8	*Ageratum conyzoides*L	90.33 ± 1.24	83.39 ±0.049	80.33 ± 0.124	73.33 ± 1.69	12.96 ±1.54	9.96 ± 0.41	7.5 ± 0.37	5.66 ± 0.26	8.76 ± 0.83	6.33 ± 0.44	4.96 ± 0.59	4.33 ± 0.18	8.33 ± 0.47	6.66 ± 0.47	4.0 ± 0.87	9.86 ± 0.24
9	*Phyllanthusamarus*L.	**96.74** ± 0.06	83.43 ±0.078	73.66 ± 1.247	59 ± 1.24	13.50 ±0.42	10.53 ± 0.47	7.63 ± 0.83	6.36 ± 0.41	8.16 ± 0.20	6.8 ± 0.29	5.9 ± 0.24	4.4 ± 0.74	7.0 ± 0.81	4.33 ± 0.47	3.33 ± 0.47	2.66 ± 0.47
10	*Portulacaoleracea*L	59.33 ± 0.47	80.66 ± 1.69	92.66 ± 2.05	**97.35** ± 0.02	12.60 ±0.29	14.30 ± 0.69	16.40 ±0.50	**17.46** ± 0.44	14.40 ± 0.35	15.33 ± 0.41	17.23 ±0.20	**18.20** ± 0.08	7.66 ± 0.47	9.33 ±0.47	11.0 ± 0.81	**12.33** ± 0.47
11	Control	**85.64** ± 0.036				**13.03** ± 0.464				**12.26** ± 0.262				**10.20** ± 0.571			

Bottom values are Mean ± S.D.