



ALLELOPATHIC EFFECT OF *ARGEMONE MEXICANA* L. ON GERMINATION AND SEEDLING GROWTH CHARACTERISTICS OF LENTIL (*LENS CULINARIS*)

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Weeds are considered unwanted plants that cause damage to agricultural crop plants. They compete with crops, harbour diseases and insects and act as alternate host when present in the fields. *Argemone mexicana* L. is a notorious weed and is found growing abundantly along with many crop plants. Little work has been done to evaluate its allelopathic effect (Pandey *et al.* 1980). Molisch (1973) coined the term allelopathy which refers to all the biochemical interactions (stimulatory or inhibitory) among the plants. The present investigation deals with the study of allelopathic effect of *A. mexicana* on germination and seedling growth characteristics of lentil.

Argemone plants were collected from the Rajshahi University Campus and leaf and root extracts were prepared separately from the fresh plant materials. The extracts were prepared by cutting the plant parts into small pieces and soaking in distilled water for 24 hours at room temperature (20-26°C). Three concentrations of the extracts (20, 40 and 60%) were prepared. The experiment was laid out in a complete randomized block design with 3 replications. Ten seeds of lentil (*Lens culinaris*) cv. BARI-4 were placed in 10 cm diameter petri dishes. Ten ml of distilled water was added to the control petri dishes and 10 ml of root and leaf extracts of *Argemone* was applied at concentrations mentioned above. On alternate day, 10 ml of distilled water was added to the control and 10 ml of extract was added to the treatment petri dishes. Number of seeds germinated on each day was recorded. On the 10th day, lengths of main root and shoot were measured in and dry weight of seedlings was recorded. Collected data were statistically analyzed and the treatment effects were compared by LSD test. Percentage values were angularly transformed before analysed for analysis of variance (ANOVA).

Mean squares from the ANOVA indicated that the treatment effect was significant and replication item was non-significant for all the characters except percentage of germination (Table 1). Although not statistically significant, both the root and leaf extracts inhibited percentage of germination with the increase of concentration (Table 1). Main root length, shoot length and seedling dry weight also decreased with the increase of concentration of extracts. In case of root growth, leaf extract of *Argemone* was more detrimental than the root extract. But similar effects of root and shoot extracts were observed for shoot length and seedling dry weight.

Pande *et al.* (1980) reported that the extracts of roots, leaves, stem and unripe fruit of *Argemone* were growth regulatory and root extract was more phytotoxic. Pandit *et al.* (1980) also reported that root extract of *Trianthema* was more inhibitory. The inhibitory allelopathic effects of *Datura* root extract on germination of soybean was noted by Oudhia (2000). However, Kalita and Dey (1998) found that shoot extract had higher inhibitory activity than the root extract of *Ageratum conyzoides*, *Borreria hispida*, *Cynodon dactylon* and *Cyperus rotundus* on growth of rice.

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In the present study, isolation of allelochemicals from the extracts was not done. However, the inhibitory allelopathic effects as observed during the study might be due to the presence of water soluble allelochemicals present in the extracts.

Table 1. Mean value of germination percentage and seedling growth characters of lentil as affected by root and leaf extracts of *Argemone*

Characters/ Treatment	% of germination (angular values)	Percent inhibition	Main root length (mm)	Percent inhibition	Seedling length (mm)	Percent inhibition	Dry weight (mg)	Percent inhibition
0%	79.5		101.3		178.7		82.0	
	79.5		101.0		179.0		82.0	
20%	71.5	10	84	17	147.2	18	78.5	4
	79.5	0	57	44	140.0	22	79.0	4
40%	67.4	16	83	18	140.7	21	65.0	21
	63.4	21	53	48	126.0	30	75.0	9
60%	60.1	25	82.2	19	128.0	28	44.0	46
	63.4	21	52.0	49	121.0	32	66.0	20
Mean	69.6	13	87.6	13	148.6	17	67.3	18
	71.4	11	66.0	35	141.0	21	75.0	9
LSD 5%	NS		4.4		6.8		4.4	
	NS		1.6		4.2		4.5	

ANOVA

Characters/Item	df	% of germination (angular values)	Main root length (mm)	Seedling length (mm)	Dry weight (mg)
Replication	2	26.1	31.4	0.8	5.1
		7.3	1.02	2.8	2.1
Treatment	3	193.6	252.8**	1394.2**	889.7**
		259.2	1701.5**	2079**	95.8**
Error	6	31.8	5.1	12.3	5.1
		60.2	0.68	4.7	5.3

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