



Allelopathic Effect of *Euphorbia dracunculoides* on Seed Germination and Seedling Growth of Chick Pea

Dr. Sunil Kumar

Associate Professor, Botany

Govt. Girls College, Sri Ganganagar, India

ABSTRACT

Allelopathy concerns the effects of one plant on another due to chemicals released by them, or the breakdown products of their metabolites. The allelochemicals are produced by all kinds of plants and plant parts although roots and leaves are mainly responsible for their production and release. Allelopathic effect of 3% aqueous extracts of fresh leaves of *Euphorbia dracunculoides* was studied on seed germination and seedling growth of chick pea. Seeds were allowed to grow in petri-dishes containing 3% aqueous extracts of fresh leaves of *E. dracunculoides*. The result indicated that seed germination and seedling growth was suppressed.

KEY WORDS: Allelopathy, Leaf extracts, Germination, Growth.

INTRODUCTION

A successful establishment of a weed in any ecosystem is attributed to several reasons, such as high growth rate, high reproductive potential, adaptive nature and above all interference by resource depletion and allelopathy (Kohil and Rani, 1994). Allelopathy concerns the effects of one plant on another due to chemicals released by them, or the breakdown products of their metabolites (Willis, 1994). The allelochemicals are produced by all kinds of plants and plant parts although roots and leaves are mainly responsible for their production and release (Bansal, 1992). Allelopathy plays a major role in influencing the productivity of agroecosystem through inhibitory or stimulatory interactions. *Euphorbia dracunculoides* L (family : Euphorbiaceae) is a prominent weed of rabi crops in canal irrigated area of North-West Rajasthan. Therefore an experiment was conducted to investigate the allelopathic effect of leaf extracts of *E. dracunculoide* on seed germination and seedling growth of chick pea (*Cicer arietinum* L).

MATERIALS AND METHODS

Fresh leaves of *E. dracunculoides* in its vegetative stage were collected from agricultural field. Three gram leaves was ground, mixed with 100 ml distilled water and left for 24 h in dark at the room temperature for extraction. Aqueous extract was obtained as filtrate of the mixture and final volume was adjusted to 100 ml, this gave 3% aqueous extract. Chick pea seeds were germinated in distilled water (control) and 3% aqueous extracts of fresh leaves of *E. dracunculoides* in sterilized petri-dishes lined double with blotting papers and kept at room temperature and diffused light during day for one week with three replications. Ten seeds were taken in each replicate. After one week, number of germinated seeds were counted and, the root and shoot length were measured. All seedlings from each petri-dish were oven dried to get dry weight of seedlings. Significance of the difference in germination, root and shoot length of seedlings under different treatments was tested and compared using Analysis of Variance (ANOVA) by direct method.

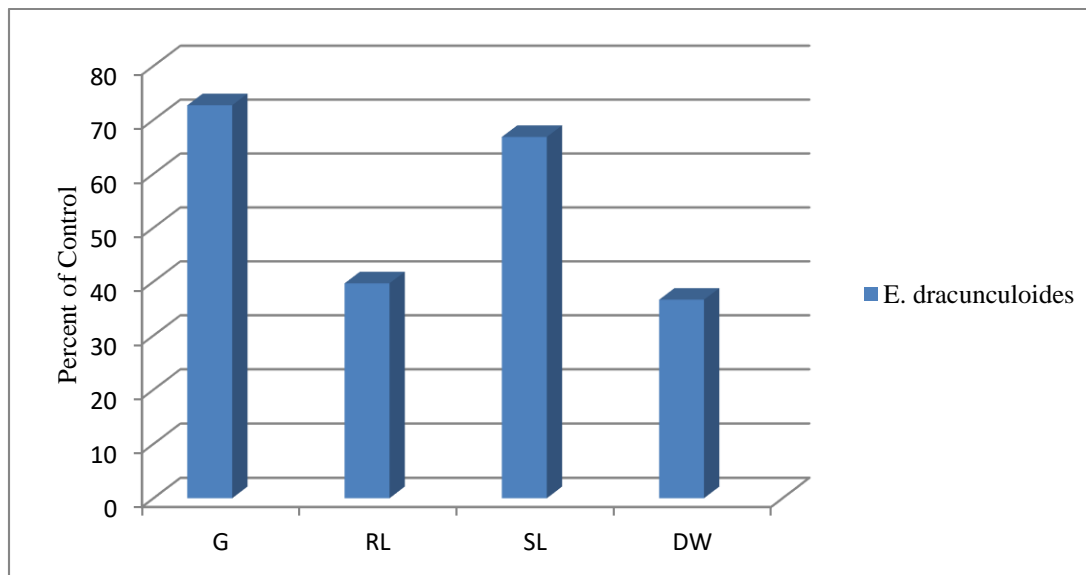
RESULT AND DISCUSSION

The effect of leaf extracts of *E. dracunculoides* on seed germination and seedling growth of chick pea is presented in table 1. The results indicated that *E. dracunculoides* significantly decreased germination and seedling growth.

Table No. 1: Impact of aqueous extract of leaves of *E. dracunculoides* on seed germination and seedling growth of chick pea

Growth parameters	Control	<i>E. dracunculoides</i>
Germination (%)	73.33	53.50
Root length (cm)	4.46±0.21	1.77*±0.09
Shoot length (cm)	3.65±0.12	2.14*±0.08
Total dry weight (g)	0.221±0.008	0.081*±0.006

Mean ± SE, * - Significant at 5% level



G- %Germination, RL- Root length (cm), SL- Shoot length (cm), DW- Dry weight

Figure 1: Impact of aqueous extracts of leaves of *E. dracunculoides* on chick pea

The % germination was 73% of control and root length decreased to 40% of control in *E. dracunculoides*. In case of shoot the length was 67% of control and dry weight also decreased to 37% of control in *E. dracunculoides* (Fig. 1).

Earlier works have also reported the allelopathic potential of *E. dracunculoides*. Shanee et al, 2011 reported the inhibitory effects of *E. dracunculoides* on germination and growth of chick pea crop. Tanveer et al, 2012 also revealed that *E. dracunculoides* inhibit germination and growth of chick pea and wheat. The present study confirmed the allelopathic potential of *E. dracunculoides*. Germination and seedling growth of chickpea is inhibited by many weeds like *Parthenium hysterophorus* L., *Phragmites australis* (Cav.) Trin., *Datura alba* L., *Cyperus rotundus* L. and *Convolvulus arvensis* L. (Khan and Khan, 2015).

CONCLUSIONS

This study indicates inhibitory potential of leaves of *E. dracunculoides* on seed germination and seedling growth of chick pea. Pot experiments and field experiments are, however, necessary before any final conclusions are drawn on allelopathic effect of this weed species

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