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A Study Of Aqueous Extracts Of Asphodelous Tenuifolius On Seed Germination And Seedling Growth Of Mustard

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ABSTRACT

Weeds are the plants, which grow where they are not wanted. Weeds are competitive and adaptable to all the adverse environment. 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 above ground and below ground part of *Asphodelus tenuifolius* Cav. were studied on seed germination and seedling growth of mustard (*Brassica campestris* L.). Seeds were allowed to grow in petri-dishes containing 3% aqueous extracts of fresh above ground and below ground part of *Asphodelus tenuifolius.* The result indicated that seed germination and seedling growth was suppressed by both above ground and below ground part of *Asphodelus tenuifolius.*

KEY WORDS: Allelopathy, Extracts, Seed germination, Seedling growth.

INTRODUCTION

Weeds can also refer to as plants out of place. Weeds produced a large number of seeds. Weeds seeds have wider adaptability so they can survive under adverse condition. 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). Weeds are common, dominant and undesirable plants that compete with cultivated crops for water, nutrient and sunlight and produce harmful or beneficial allelopathical effect on cultivated crops (Qasem and Foy, 2001). Allelopathy concerns the effects of one plant on another due to chemicals released by them, or the breakdown products of their metabolites (Willis, 1994). All plant parts of the weed including leaf stem, root and fruit have allelopathic potential and their efficacy on germination and seedling growth of crops varies from weed to weed (Tinnin and Muller, 2006). The allelopathic effects of various parts of the same weed also differ for their effects on germination and initial growth of plants (Aziz et al, 2008). 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. *Asphodelus tenuifolius* Cav. (family: Liliaceae) is a prominent weed of mustard fields of North-West Rajasthan. Therefore an experiment was conducted to investigate the allelopathic effect of above ground and below ground part of *A. tenuifolius* on seed germination and seedling growth of mustard (*Brassica campestris* L.).

MATERIALS AND METHODS

Fresh above ground and below ground part of *A. tenuifolius* in its vegetative stage were collected from agricultural field. Three gram of above ground part of *A. tenuifolius* was ground, mixed with 100 ml distilled water and left for 24 h in dark at the room temperature (average during day: 25ºC) for extraction. Aqueous extract was obtained as filtrate of the mixture and final volume was adjusted to 100 ml, this gave 3% aqueous extract. The same procedure was repeated for obtaining 3% aqueous extract of below ground part of *A. tenuifolius.* Mustard seeds were soaked in 2% sodium hypochlorite for 15 minutes and thoroughly washed with distilled water. The seeds were germinated in distilled water (control) and 3% aqueous extracts of fresh above ground and below ground part of *A. tenuifolius* 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 at 70ºC for 48

h 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.

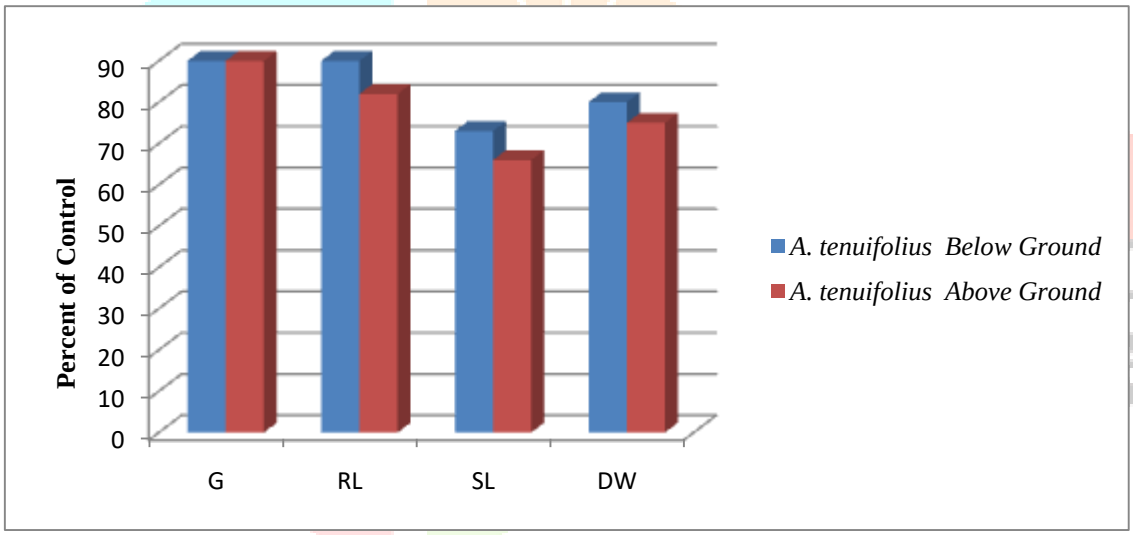
RESULTS AND DISCUSSION

The effect of 3% aqueous extracts of fresh above ground and below ground part of *A. tenuifolius* on seed germination and seedling growth of mustard is presented in table 1. The results indicated that both above ground and below ground part of *A. tenuifolius* significantly decreased seedling growth.

Table 1: Impact of 3% aqueous extracts of fresh above ground and below ground part of *A. tenuifolius* on seed germination and seedling growth of mustard.

Growth parameters	Control	*A. tenuifolius* Below Ground	*A. tenuifolius* Above Ground
Germination (%)	96.66	87.50	87.50
Root length (cm)	3.54±0.11	3.17±0.05	2.92±0.09
Shoot length (cm)	4.59±0.13	3.37*±0.16	3.05*±0.14
Total dry weight (g)	0.61±0.011	0.49±0.018	0.46±0.016

Mean ± SE, * - Significant at 5% level



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

Fig. 1: Impact of 3% aqueous extracts of fresh above ground and below ground part of *A. tenuifolius* on mustard

The % germination was 87% of control in both above ground and below ground part of *A. tenuifolius.* The root length was 90% of control in below ground part whereas; it remained only 82% in above ground part. In case of shoot the length was 73% and 66% of control in below ground and above ground part of *A. tenuifolius*. Likewise dry weight was 80% in below ground part while it remained only 75% of control in above ground part (Fig. 1). Earlier works have also reported the allelopathic potential of *A. tenuifolius*. Jabeen and Ahmed, 2009 reported the inhibitory effects of *A. tenuifolius* on germination and growth of maize crop. Jabeen et al, 2011 also revealed that *A. tenuifolius* inhibit germination and growth of *Triticum aestivum.* The present study confirmed the allelopathic potential of *A. tenuifolius*.

CONCLUSIONS

This study indicates inhibitory potential of above ground and below ground part of *A. tenuifolius* on seed germination and seedling growth of mustard. 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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