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Allelopathic effect of *Parthenium hysterophorus* L. on wheat

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Abstract
Aqueous shoot extracts of all strength (2.5%, 5%, 7.5%, 10% concentrations) inhibited both germination and seedling growth of the wheat. The inhibitory effect increased as the strength of extract increased and there was no germination in seed treated with concentration of aqueous shoot extract.

Keywords: aqueous shoot extract, germination, petridishes, seedling growth

Introduction
Allelopathy plays significant role in agriculture, forestry, plant pathology, horticulture and natural ecosystem. *Parthenium hysterophorus* L. (Asteraceae) is an aggressive herbaceous weed of tropical and sub-tropical habitats. This species is native to Gulf of Mexico and Central South America and has become widespread in North America, South America, Asia and Australia. In Nepal it is primarily found in the wastelands, vacant areas, parks, roadsides and even invades agricultural fields in terai and mid-hill regions. The weed species threatens human and animal health by causing allergic contact dermatitis, hay fever and respiratory problems (Aneja *et al* 1991) [1]. The species contains several allelochemicals that have ecological implications on species diversity (Bhowmik *et al*. 2007) [3]. In the present study effect of aqueous shoot extracts of *P. hysterophorus* was studied on the germination and seedling growth.

Materials and methods
Shoots of *P. hysterophorus* were collected from the Post Graduate Campus garden, dried in oven at 65^0C to a constant weight and the powder containing 2.5, 5 7.5 and 10 grams of plant material were prepared. These sachets were placed in separate beakers containing 100 ml. of distilled water for 24 hours. Petri dishes were arranged in triplicate in 5 sets and in each petri dish ten healthy wheat seeds were placed on the moist filter papers. The first set of petri dishes received 5ml distilled water and was treated as control. In the remaining four sets of petri dishes, one set received 2.5%, next 5%, next 7.5% and the last 10% solution of the shoot extract of *P. hysterophorus*. The petri dishes were placed at laboratory conditions for 7 days before recording germination and seedling growth of wheat.

Result and discussion
Table 1. depicts the results. Wheat seeds treatment with 2.5% aqueous extract had 65% germination than control and other treatments, 10% aqueous extract completely inhibited germination in wheat.

Table 1: Effects of aqueous shoot extract of *Parthenium hysterophorus* L. on germination and seedling growth of wheat.

Concentration of aqueous extract	Germination (%)	Seedling growth	
		Radical(cm)	Hypocotyl (cm)
Control	55	5.48	6.93
2.5%	65	3.59	5.73
5.0%	60	2.60	5.23
7.5%	45	0.60	2.10
10.0%	00	0.00	0.00

The radical and hypocotyls lengths were maximum in control than the treatments. There was drastic reduction in radical growth as the concentration of aqueous extract increased. Similar trend was also observed in hypocotyls growth.
Allelopathy is a type of plant interactions which play important role in the survival of species and vegetation pattern. Plants may interact by competition for the supply of some particular environmental factor but may also influence each other directly by secretion of toxic metabolic products into the environment. In general there are three possible mechanisms for plant interference: (a) Competition for necessary growth factors, (a) possession of herbivore toxicant or repellent substances that prevent grazing (allelomediation) and (c) addition of toxic factors to the environment (allelopathy).
In the present study inhibition of germination and seedling growth due to aqueous extract of *P. hysterophorus* may be attributed to various allelochemicals present in plant shoot.

Reduction in germination and seedling growth of wheat may be attributed to reduction in cell division (Avers and Goodwin 1956) [3], activity of growth retarding hormones (Geissman and Phinnx 1972) [5] or to direct interference with oxidative phosphorylation (Demos *et al*. 1975) [4].

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References

1. Aneja KR, Dhwan SR, Sharma AB. Deadly Weed - Parthenium hysterophorus L. and its distribution. Indian Journal of weed Science. 1991; 23:14-18.
2. Avers CJ, Goodwin RH. Studies on roots I.V. effects of coumarin and Scopoletin on the standard root growth pattern of Phleum Pratense. American Journal of Botany. 1956; 43:612-620.
3. Bhowamik PCD, Sarkar Yaduraja NT. The status of Parthenium hysterophorus and its practical management. Ecoprint. 2007; 14:1-17.
4. Demos EK, Woolvine M, Wilson RH, Mc Millan C. the effects of 10 phenolic compounds of hypocotyl growth and mitochondrial metabolism in Mungbean. American Journal of Botany. 1975; 62:97-102.
5. Geissman TA, Phinny BO. Tannins as gibberellin antagonists. Plant Physiology. 1972; 49:323-330.