Phytotoxicity Effect of Three Invasive Plant Species: *Mimosa Pigra*, *Parthenium Hysterophorus*, *Ulex Europaeus*

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Introduction

Secretions and metabolites of some plant species which show allopathic effect might have the ability to affect as a phytotoxic on another plant.In that case invasive plant category might become a salient plant type. Invasive plants are the plants that have an ability to thrive and spread aggressively outside its natural range. They adversely affect the habitats and invade those habitats while causing economic and environmental losses. However they have an ability to inhibit the growth of other plant species by means of phytotoxicity.

Phytotoxicity is defined as a delay of seed germination, inhibition of plant growth or any adverse effect on plants caused by specific substances (phytotoxins) or growing conditions (Baumgarten *et al.*, 2004).

The selected invasive species are recently reported and are observed to have a virulent phytotoxicity effect. In addition, relatively lesser researches are published regarding those three invasive plant species. Therefore, *Parthenium hysterophorus, Mimosa pigra, Ulex europaeus* have been selected for the experiment.

Methodology

The phytotoxicity effect of selected invasive plant species were tested *in vitro* under the laboratory conditions using selected test species.

Plant Extraction Procedure

Parts of plants, leaves and flowers from each mature species *Parthenium hysterophorus, Mimosa pigra, Ulex europaeus* were separately collected and dried at room temperature (25 °C – 30 °C). The collected plant materials were subjected to water extraction. The fresh materials were directly taken for the extraction and the rest of the collected materials were air dried for fourteen days. A 50 g of plant materials from each dry and fresh category was taken to the extraction in room temperature with sterile distilled water, in 1:10 ratios and kept 24-48 hours and filtered. Aqueous extract was obtained as the filtrate of the mixture. The concentrates obtained were transferred to Stopped bottles and stored under refrigerator conditions until required for bioassay (Maharjan *et al.*, 2007).

Seeds Culturing

Five uniform and surface sterilized seeds (2% sodium hypochlorite for 15 min) of each test species were kept for germination in sterilized food jars with 10 mL of different concentrations of aqueous extracts (1/2 to 1/10). For each treatment, 3 replicates, each with 5 seeds of each test species were maintained. The petri dishes were incubated at 25°C for one week (Maharjan *et al.*, 2007).

Results and Discussion

The number of germinated green grams was quantified in each replicates after 24 hours soaking time and calculated the mean germination value.

Table 1: Mean germination rate percentage of green gram, soaked in six different extraction types of selected plants at 24 hours soaking time

Extraction Type	Concentration % (V/V)				
	100	50	20	10	0
PH - FF	66.7	80	73.33	100	100
PH - DL	100	26.67	80	80	100
MP - FF	86.67	100	100	100	100
MP - DL	66.67	66.67	100	100	100
UE - FF	93.33	100	100	100	100
UE -DL	93.33	100	100	100	100

According to the table 3.1 germination rates were decreased along with the concentration. Germination is decreasing with the increment of concentration. The highest germination reduction was recorded in 50% concentration of *Parthenium hysterophorus* dry leaves. Germination rate of the green gram seeds was not affected by both fresh flowers and dry leaves extraction of *Ulex europaeus*.

According to the results which were obtained from the statistical analysis there is an interaction among three factors. Plant part, plant species, and concentration of plant extraction were significantly affected to the growth of seedling of the green gram.

The treatments which were not significantly different from the treatment which shows highest phytotoxic effect are shown in below table.

Table 2: The treatments which were not significantly different from the treatment which shows highest phytotoxic effect, obtained through the pairwise comparison test

Sample	Plant Species	Plant Part	Concentration % (V/V)
01	PH	DL	50
02	PH	DL	20
03	PH	DL	10
04	PH	FF	20
05	PH	FF	10
06	PH	FF	50
07	MP	DL	100
08	MP	FF	50
09	MP	FF	20
10	UE	DL	100
11	UE	DL	50

Figure 1 shows that the length of seedlings in green gram was altered with the concentration of different plant parts of the different plant species. The minimum length of the seedlings was recorded at the 100% concentration of the extraction. Both flowers and

leaves of *Parthenium hysterophorus* have shown the least length of seedlings comparing with others even at the 10% of concentration.

PH - *Parthenium hysterophorus*
MP - *Mimosa pigra*
UE - *Ulex europaeus*
DL – Dry leaves
FF – Fresh flowers

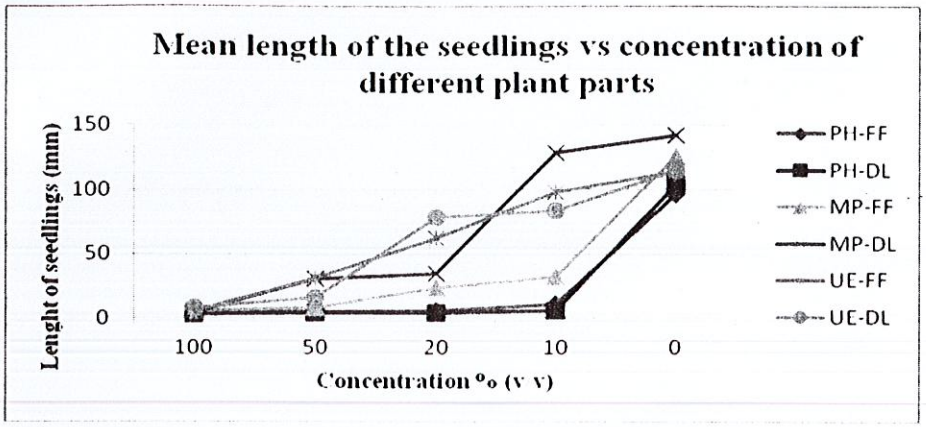

Figure 1: Mean length of the seedlings of green gram with different concentration of plant parts at one week soaking time.

Conclusion

The highest germination reduction was recorded in 50% concentration of *Parthenium hysterophorus* dry leaves. According to the results which were obtained from the experiment best treatment was stock solution of *Parthenium hysterophorus* leaves extraction.

References

Maharjan, S., Shrestha, B.B., and Jha, P.K. ,2007. Allelopathic Effects of Aqueous Extract of Leaves of *Parthenium hysterophorus L.* on Seed Germination and Seedling Growth of Some Cultivated and Wild Herbaceous Species.

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