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Plant-plant suppression of *Parthenium hysterophorus* by potential weeds

Jai Knox
Department of Botany, Wilson College, University of Mumbai, Mumbai, Maharastra, India

Abstract
Shoot-Cut Bioassay and Seedling Bioassay was analysed on *Parthenium hysterophorus* L. by the shoot leachates of *Withania somnifera* and *Calotropis procera* at different concentrations including control. 100% concentration of *Calotropis* shoot leachates against *Parthenium* in the phytochemical damage rating scale has shown highest inhibition and was found to be significant.

Keywords: congress grass, small crown flower plant, allelopathy, biochemical interaction

Introduction
White top weed that is *Parthenium hysterophorus* L. is an obnoxious annual herb luxuriantly growing along roadsides and overgrazed pastures. It has the capability to grow more than 2.5 metres high. *Parthenium* weed has the capability to grow in barren lands and is highly allergic to farmers and researchers working close to this weed and they may develop allergic symptoms (McFadyen & Cruttwell, 1992) [2]. The immunoglobulin- E triggers in these types of allergies.
Many plants release some allelochemicals during different growth stages which may affect the growth and development of *Parthenium*. Based on the field survey it has been observed that *Withania somnifera* and *Calotropis procera* is showing strong allelopathic potential against *Parthenium*. Therefore, this study is performed to assess the potential of above selected weeds on the target weed.

Materials and Methods
100 grams of shoot tips were collected from the selected weeds and were soaked in 500ml of double distilled water under aseptic conditions. It was then filtered through three layers of muslin cloth and again refiltered. Leachates of different concentrations were prepared with sterilized distilled water and then used for experimentation process.

Shoot Cut Bioassay
Parthenium shoots were washed in tap water and then dipped in 1% Sodium hypoclorite solution. With an inclined cut on *Parthenium*, the shoots were placed in test tubes containing 10 ml of shoot leachates of different concentrations of selected weeds and the test-tubes were sealed. Effect of leachates was observed after 72 hours at room temperature.

Seedling Bioassay
The viable seedlings of *Parthenium* were raised in plastic pots containing sterilized soil, sand and peat. These seedlings were sprayed with shoot leachates of different concentrations of selected weeds. Observations regarding the toxicity of seedlings were assessed after 72 hours.

Statistical analysis
Two way Analysis of Variance was applied to test the level of significance.

Results and Discussion
Shoot Cut and Seedling Bioassay
Table-1 revealed that maximum phytotoxic damage on the rating scale was inflicted in shoot leachates of *Calotropis procera* i.e. 5.00 against shoots of *Parthenium*, followed by *Withania somnifera* plant in which phytotoxic damage on the rating scale was found to be 4.20. In control, no effect was observed that is 0.0±0.0. Table-2 revealed that maximum phytotoxic damage on the rating scale was observed in shoot leachates of *C. procera* at 100% concentration that is 4.0 against seedlings of *Parthenium*, followed by *W. somnifera* in which 3.20 damage was observed and was found to be significant. As per Oudhia and Tripathi (1998), this problematic weed grows in barren lands and show lethal allelopathic effect. In a field study of Mamatha and Mahadevappa (1992) reported that some varieties of *Cassia* restricted *Parthenium* invasion in many states in India.
Seed germination and seedling growth were significantly inhibited in the order: leaf > stem > root (Singh and Thapar, 2004). There was variability in germination percentage, shoot and root growth of seedling due to the

treatments. The degree of phytotoxicity of senescent leaves was more as compared to green leaves in germination of *Parthenium* and *Amaranthus*. The leachates of senescent leaves also reduced the shoot length and root length of both the weeds (Sindhu *et. al*., 2004).

Conclusion

With the above results it can be suggested that the selected test plants has the potential to inhibit the realm of *Parthenium hysterophorus* without affecting the natural flora and fauna.

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Table 1: Shoot-Cut Bioassay of selected weeds on activity of target weed

Selected weeds	9th day extract after72 hours exposure time			
	25%	50%	75%	100%
P_1	3.2±0.2	4.3±0.3	4.3±0.7	5.0±0.0
P_2	1.3±0.4	3.6±0.3	3.8±0.2	4.2±0.0
Control	0.0±0.0			

0 = No inhibition, 5 = Highest inhibition

P_1= *Calotropis procera*

P_2= *Withania somnifera*

Table 2: Seedling Bioassay of selected weeds on activity of target weed

Selected weeds	9th day extract after 72 hours exposure time			
	25%	50%	75%	100%
P_1	1.0±0.0	2.0±0.4	2.8±1.4	4.0±0.0
P_2	0.3±0.0	1.6±0.1	1.8±0.2	3.2±0.0
Control	0.1±0.0			

0 = No inhibition, 5 = Highest inhibition

P_1= *Calotropis procera*

P_2= *Withania somnifera*

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