

## Efficacy of shoot leachates of potential allelopathic plants on famine weed

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Famine weed (*Parthenium hysterophorus* L.) is an annual herbaceous plant supposed to have originated in North East Mexico and during the last ten years it has spread to Ethiopia, Pakistan and Nepal. Presence of certain strong allelochemicals in allelopathic plants like *Cassia occidentalis*, *Calotropis procera* and *Croton bonplandianum*, have subsequent influence and appears to affect *Parthenium* to some extent. Shoot leachates of allelopathic plants in both solvents (methanol and ethanol) showed significant inhibition on seed germination, plumule and radicle length.

### METHODOLOGY

The experiment was conducted in St. John's College, Agra (2013-2014). Fresh leaves of *C. occidentalis*, *C. procera* and *C. bonplandianum* were collected from six different sites of Agra (Figure 1) and washed with tap water and then distilled water to remove dirt and dust and dried naturally. The fresh leaves (20 g) were soaked in 100 ml of both methanol and ethanol solvents each under aseptic conditions for 15 days and placed in conical flask under refrigeration at 8±1°C. After the stipulated period, the solvent leachates were filtered through three layers of muslin cloth/ cheese cloth to remove debris. Two different concentrations (50 and 100%) of leachates were prepared and used for bioassay. Pure methanol and ethanol blanks were used as control. Seeds of *Parthenium* were collected from different sites of Agra, thoroughly washed with tap water, sterilized with 0.1% HgCl<sub>2</sub>

for 10 minutes and again washed with distilled water for 4 – 6 times. Viable *Parthenium* seeds were divided into 6 replicates of 15 seeds each and were placed on filter paper in sterilized petridishes, moistened with distilled water and 5 ml of methanol and ethanol shoot leachates of different concentrations were used for further moistening and treatment. All the seed lots were allowed to germinate in 12 cm petridishes. Petridishes were covered and placed in sealed polythene bags to prevent further loss of volatile compound (allelochemicals) and kept undisturbed for 15 days at 25±2°C. The number of germinated seeds, growth of plumule and radical was also recorded after 15 days.

### RESULTS

The significant reduction in seed germination of *Parthenium* (4.75%) was obtained in 100% ethanol shoot extract of *C. occidentalis* fb *C. procera* (5.5%), and *C. bonplandianum* (7.25%). The significant inhibition in plumule length was observed in *C. occidentalis* (4.5 cm) at 100% concentration of leachate in ethanol whereas minimum (10.15 cm) was observed in *C. bonplandianum* at 50% concentration of methanol shoot extract. The significant inhibition in radicle length was observed in *C. occidentalis* (3.9 cm) at 100% concentration of leachate in ethanol whereas minimum (9.98) was observed in *C. bonplandianum* at 50% concentration of methanol shoot extract (Table 1). Jaggi *et al.* (2010) also observed the similar results.

**Table 1. Effect of methanol and ethanol shoot leachates of competitive plants shoots, on seed germination and seedling growth of *Parthenium***

Competitive Plants	Concentration (%)	Germination (%)		Methanol shoot leachates		Ethanol shoot leachates	
		Methanol	Ethanol	Plumule length (in cm)	Radicle length (in cm)	Plumule length (in cm)	Radicle length (in cm)
<i>C. occidentalis</i>	50	6.50±(2.3)	5.24±(1.8)	6.15±(3.0)	5.15±(1.5)	4.75±(1.5)	4.00±(0.5)
	100	5.12±(0.5)	4.75±(1.5)	5.75±(1.5)	4.95±(2.3)	4.50±(2.0)	3.90±(1.5)
<i>C. procera</i>	50	8.24±(0.5)	6.10±(2.3)	8.00±(2.0)	7.90±(2.0)	5.98±(0.5)	5.00±(1.2)
	100	6.00±(1.5)	5.50±(2.0)	7.55±(0.5)	7.00±(0.5)	5.75±(2.0)	5.00±(1.5)
<i>C. bonplandianum</i>	50	10.25±(1.5)	9.15±(1.8)	10.15±(1.2)	9.98±(1.3)	9.00±(0.2)	8.90±(1.5)
	100	8.75±(2.3)	7.25±(0.5)	9.25±(2.0)	9.15±(1.3)	8.95±(0.2)	8.25±(0.5)
Control	-	93.33±(0.0)	90±(0.0)	13.14±(1.3)	9.00±(0.2)	12.35±(2)	10.75±(1.5)

Values in parenthesis are ± SD of mean.

### CONCLUSION

It was concluded that allelopathic plants does have some potential in curbing the population of this obnoxious weed.

### REFERENCES

Jaggi D, Knox J, Mayank, Paul MS and Prasad FM. 2010. Allelopathic effects of *Calotropis procera* shoot leachates on some other weeds. *Annals of Plant and Soil Research* **12**(2): 144-146.