



Effect Of Aqueous Extracts Of *Trianthema Portulacastrum* L. On Seed Germination Of *Gossypium Hirstum* L. and *Arachis Hypogaea* L

KEYWORDS

Allelopathic, *Trianthema portulacastrum* L., *Gossypium hirstum* L., *Arachis hypogaea* L., Decreases, Increases.

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ABSTRACT

The experiment was designed the allelopathic effect of various parts of *Trianthema portulacastrum* L. on seed germination of *Gossypium hirstum* L. and *Arachis hypogaea* L. Aqueous extract of the leaf was found to have the most inhibitory effect, followed by the stem and root after two days. All aqueous extracts inhibited seed germination of cotton and ground nut when compared with distilled water.

INTRODUCTION:

Allelopathy is defined as the direct or indirect, harmful or beneficial effects of one plants to another through the production of chemical compounds that escape into the environment (Rice, 1984). Many of the phytotoxic substance that are suspected of causing germination and growth inhibition have been identified from plant tissues and soil. These substances are called allelochemicals. An allelochemical that inhibits the growth of some species at certain concentration, might stimulate the growth of same or different species at lower concentration (Oudhia and Tripathi,1998). Even reduction in photosynthetic rate due to reduced leaf may also lead to reduction in root length and shoot length (Meissner et.al.,1979).

Weed cause greater losses in the production of cereals, pulses and oil seeds than any other pest and diseases, (Norris,1991 and Bridges and Davide,1992.) Most research on allelopathy has focused on the effect of interaction among weed species, weed and crop (Rice, 1984), and among crop species (Chung and Miller,1995).

Trianthema portulacastrum L. (horse purslane) is one of the serious weeds of cotton and maize crops in Pakistan. It could reduce crop yields by 32% (Balyan & Bhan, 1989) and the losses may be grater if weed is not properly checked.

Gossypium hirstum L. is also affected with weeds like *Amaranthus spinosus* L., *Tribulus terrestris* L., *Achyranthes aspera* L., *Cleome gynandra* L., *Cyperus rotundus* L., *Euphorbia hirta* L., *Indigofera linnaei* Ali., *Abutilon indicum* (L.) Sw., *Boerhavia diffusa* L., *Commelina benghalensis* L., *Cynodon dactylon* (L.) Pers., *Leucas cephalotes* (Roxb. ex Roth) Spr., *Tridax procumbens* L., *Vernonia cinerea* (L.) Less., *Bidens bipinnata* L., *Chenopodium album* L., *Cleome viscosa* L., *Tephrosia purpurea* (L.)Pers., *Eclipta prostrata* (L.) L. Mant., *Launaea procumbens* (Roxb.) Ram. & Raj., *Amaranthus lividus* L., *Xanthium strumarium* L. and *Cyperus cyperoides* (L.) O. Ktze.

Arachis hypogaea L. is also affected with weeds like *Amaranthus lividus* L., *Euphorbia hirta* L., *Eclipta prostrata* (L.) L. Mant., *Launaea procumbens* (Roxb.) Ram. & Raj., *Asphodelus tenuifolius* Cav., *Borreria articularis* (L. f.) F.N. Will., *Cyperus cyperoides* (L.) O. Ktze., *Eragrostis ciliaris*

(L.) R. Br., *Leucas cephalotes* (Roxb. ex Roth) Spr., *Portulaca oleracea* L., *Acalypha ciliate* Forsk., *Cressa cretica* L., *Parthenium hysterophorus* L., *Portulaca suffruticosa* Wt., *Boerhavia diffusa* L., *Corchorus aestuans* L., *Evolvulus alsinoides* (L.) L., *Phyla nodiflora* (L.) Greene., *Bacopa monnieri* (L.) Pennell., *Commelina benghalensis* L., *Crotalaria retusa* L., *Echinochloa colonum* (L.) Link., *Indigofera linnaei* Ali., *Tephrosia purpurea* (L.) Pers., *Vernonia cinerea* (L.) Less., and *Cassia occidentalis* L. in crop field. The common weed control methods include hand hoeing, inter-row tillage and use of weedicides can not be used during rains. Further more, herbicides may enhance soil and environment pollution.

The search for natural weed control methods is emphasized world over. Allelopathy has been recognized as new a days natural weed control approach (Hardwood,1979; Rice,1984).

MATERIALS AND METHODS:

Aqueous extracts of the leaf, stem and root were prepared by digesting 10gm of air dried *Trianthema portulacastrum* L. material in 100ml distilled water for 24h at 250C±50C. It was filtered though whatmann filter paper no.1 of the volume of filtrate made to 100ml. Different dilution of the extracts i.e., 2%, 4%, 6%,and 10% were prepared from this stock solution. Seeds of cotton (*Gossypium hirstum* L.) and ground nut (*Arachis hypogaea* L.) were soaked for 24h in different concentration of the extracts. For control, seeds were soaked only in distilled water.

The seeds of oil crops were sterilized by dipping in the solution of 0.1%Hgcl₂ for 1 min, followed by 3-4 washing under running tap water to remove residues of Hgcl₂, and dried in folds of ordinary filter papers. In each petri dish containing a whatman no.1 filter paper kept at bottom, seed were arranged on top of the filter paper. The petri dishes were covered with glass covering. They were incubated for 5 days. The whole set of experiment was kept undisturbed at a room temperature of 250C±50C.

RESULT AND DISCUSSION:

The processes of seed germination decreases as the concentration in the medium increases from 2% to 10%. When the use of 10% concentration of leaf extract, reported seed germination was 60% in *Gossypium hirstum* L. and

50% in *Arachis hypogaea* L., however low concentration of the extract 2% stimulated seed germination by 80% in *Gossypium hirsutum* L. and 82% in *Arachis hypogaea* L., 98% seed germination was reported in *Gossypium hirsutum* L. in DDW. While in *Arachis hypogaea* L. it was 97%. Extract of leaf showed inhibitory effect, and the degree of inhibition increased with the increased extract concentration (Table 1).

The use of 10% concentration of stem extract seed germination was 70% in *Gossypium hirsutum* L. and 65% in *Arachis hypogaea* L., however low concentration of the extract 2% stimulated seed germination by 85% in *Gossypium hirsutum* L. and 83% in *Arachis hypogaea* L. Extract of stem also showed inhibitory effect, and the degree of inhibition increased with the increased extract concentration (Table 1).

Seed germination was reported in root extract of *Trianthema portulacastrum* L., in the 10% concentration seed germination was 80% in *Gossypium hirsutum* L. and 75% in *Arachis hypogaea* L., however low concentration of the extract seed germination was 88% in *Gossypium hirsutum* L. and *Arachis hypogaea* L. also. Extract of root showed inhibitory effect, and the degree of inhibition increased with the increased extract concentration (Table 1).

Results indicate that when the concentration of weed extracts increases the germination decreases and inhibition increases in all percent concentration. So weed has harmful effect on cotton and groundnut seed germination.

TABLE 1: Effect of aqueous extracts of *Trianthema portulacastrum* L. on seed germination of *Gossypium hirsutum* L. and *Arachis hypogaea* L.

OIL CROPS	Effect of <i>Trianthema portulacastrum</i> L. on seed germination of <i>Gossypium hirsutum</i> L. and <i>Arachis hypogaea</i> L.												
	D	Leaf extract				Stem extract				Root extract			
	D W	2%	4%	6%	10%	2%	4%	6%	10%	2%	4%	6%	10%
<i>Gossypium hirsutum</i> L.	98	80	75	76	60	85	82	75	70	88	85	82	80
<i>Arachis hypogaea</i> L.	97	82	80	70	50	83	80	75	65	88	84	80	75

Plate 1.1 Effect of *Trianthema portulacastrum* L. on seed germination of *Gossypium hirsutum* L.

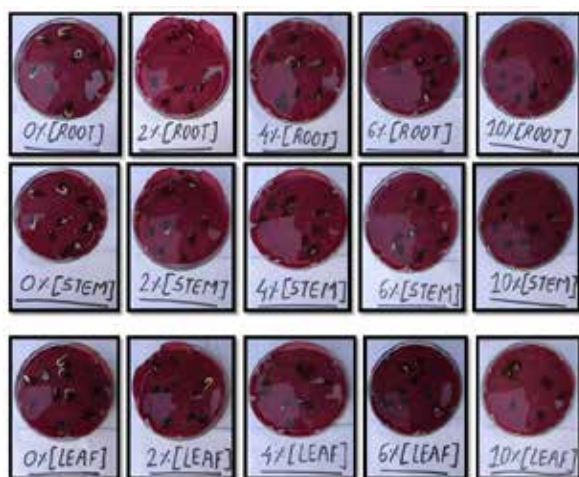


Plate 1.2 Effect of *Trianthema portulacastrum* L. on seed germination of *Arachis hypogaea* L.



CONCLUSION:

At the highest extract concentration, all aqueous extracts significantly reduced seed germination compared to distilled water. In order of effectiveness was Leaf>Stem>Root.

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