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ALLELOPATHIC EFFECT OF *ARUNDO DONAX* ON CHICK PEA CROP

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ABSTRACT

Allelopathy plays an significant role in the agroecosystems most important to a broad range of connections among crop-crop and crop-weed. Generally, these relations are injurious to the recipient plants but provide a selective benefit to the donor. The aquatic macrophytes are well known to reveal allelopathy. Arundo donax was screened for their allelopathic prospective to the increase of chick pea seedlings. The 3% aqueous leachate was weathered for seed germination of chick pea (Cicer arietinum) in petriplates as well as pot culture. The Arundo donax was initiate to improve the enlargement of chick pea seedlings. The chick pea seedlings be planted in pots through soil mixed with 3% (w/w) dried matter (Ag and Bg parts) of Arundo donax. The growth of chick pea seedlings was extremely promoted. This revision suggested the potential prospects of the included management of chick pea crop by the likely of allelopathic potential of Arundo donax.

Keywords: *Allelopathic Prospective, Leachate and Aquatic Macrophytes, Monoculture*.

Introduction

Allelochemicals twisted by the plants endogenously are chemicals, which after being released into the surroundings, afterward modify and alter the increase and development of neighbouring plants[1]. These are biomolecules released starting various plant parts by means of volatilization, leaching, decomposition of residue and root exudation[2].

The *Arundo donax* weed increasing in the downstream areas of the reservoirs. The dominate nature of increasing macrophytes is frequently associated with the enlarge of allelochemicals in the muddy places mainly in monospecific stand over a long period[3]. The *Arundo donax* is known to discharge phenolic compound and show allelopathic relations. Thus, the use of phytochemicals of *A.donax* in the form of dried out plant substance in the field of chick pea can replace the dangerous chemical nourishment for superior ecofriendly grain yield[4].

Materials and Methods

Collection of Plant Material

Above soil and below soil plant portions of *Arundo donax* was collected from canal near Dr. Bhim Rao Ambedkar Govt. College Sri Ganganagar. The above soil and below soil plant sample were clean with spongy brush and dried up. These samples were wash gently with tap water and distilled water afterward and dried up on porous paper.

In Vitro Seed Germination and Seedling Growth Lab Bioassay

The *in vitro* seed germination and seedling growth bioassay experiments were performed in petriplates to search the phytotoxicity of aqueous leachates of *A.donax* at 3% concentration on the enlargement of test crop chick pea in laboratory environment. The leachate of three percent concentration (dry weight/volume) of *A.donax* was set by soaking 3g plant material in 100 ml of distilled water, each for 24h and after that filtered. The seeds of crops were exterior sterilized with 0.1 % HgCl2 solution for one minute and washed thereafter 4-7 times with sterilized distilled water and dried with filter

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paper. The pre-sterilized petriplates (9 cm) were feint with two filter papers. Ten vigorous seeds of chick pea crop were positioned at equidistance on pinnacle of the filter paper in petriplates. Each treatment was replicated 3-5 times for each test species. As per management, each petriplate received 5 ml of leachate on first day and 3 ml leachate on 2, 4 and 6 days after sowing (DAS). The petriplates were kept in BOD incubator at 20-22oC at 35-40oC. The seedlings were harvested 7 days after sow and germination of seeds, lengths of shoot and root of seedlings be measured. Subsequently, these were kept in an oven for drying at 80oC for 24 h and weighed thereafter for total dry weight. The pot culture experiment was manner to meet the objectives of i*n vitro* seed germination and seedling growth lab bioassay.

Observations

The fact accessible in Table 1 shows the impact of aqueous leachate of 3% (w/v) concentration of on top of ground (Ag) and below ground (Bg) plant parts of *A.donax* on germination and enlargement of chick pea seedlings. The aqueous leachate of together Ag and Bg parts of *A.donax* successfully augmented the germination and development of chick pea seedlings. The support was extra pronounced in Bg part than Ag part.

The % germination was 104% of control in both Ag and Bg parts. The root length remained only 75% of control in Ag part on the other hand it penetratingly increased to 150 % of control in Bg part. In case of shoot, the length was 122 and 145% of control in Ag and Bg parts in that order. Likewise, total dry weight also show an augment and experimental 127% of control in Ag and 162% of control in Bg part at 7 DAS.

Discussion

Arundo donax was screened for exploration of their allelopathic probable chick pea seed germination and seedling growth bioassay in laboratory as well as pot experiment. In the present study, *A.donax* has revealed significant affirmative impact on the growth of chick pea in pot culture experiments. The sets with dry matter (3% w/w) and aqueous leachate (3% w/ v) of *A.donax* drastically improved the growth of chick pea seedling up to 147 and 125% of control, in that order. The shoot length measured up to 124 and 119% of control in sets treated with dry matter and aqueous leachate of *A.donax,* in the same way. The total dry weight was also found 128 and 118% of control in that order. Hence, the current study established that the *A.donax* plant has positive impact on chick pea.

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Table

Table 1: Allelopathic Impact of 3 % (w/v) Aqueous Leachate of above Soil and below Soil Plant Parts of *PHRAGMITES Karka* on Test Crop chick Pea

Growth parameters	Control	*P. karka*		LSD
		Above Soil	Below Soil	
Germination (%)	90.00 ± 5.77	93.3 ± 3.33	93.33 ± 3.33	12.30
GIR	-	-3.70	-3.70	-
Root length (cm)	1.81 ± 0.12	1.35 ± 0.02*	210 ± 0.12*	0.21
Shoot length (cm)	1.76 ± 0.17	1.96 ± 0.03*	198 ± 0.17*	0.28
Total dry weight (g)	0.028 ± 0.00	0.038 ± 0.00*	0.042 ± 3.33*	0.00

Mean ± SE, GIR -Germination inhibition rate, LSD -Least significant differences, * Significant at 0.05 % level by Dunnett's test applied after ANOVA

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