



“Effect of Allelopathy of *Parthenium hysterophorus L.* and *Lantana Camara L.* in different concentration with distill water on *Phaseolus radiatus L.* with special reference to Morphological aspects.”

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Abstract

Parthenium hysterophorus L. and *Lantana Camara L.* are collected and their extract of leaf and shoot are mixed and prepared with distilled water in different concentration 5%,10%,15%,20% distilled water is taken as control now this extract is used on the crop *Phaseolus radiatus L.* which is a leguminous plant the material chosen for the study includes *Parthenium hysterophorus L.* and *Lantana camara L.* the leaf and shoot of these plants are collected, chopped into small pieces, dried and crushed in a mixture grinder. After that, the extract is mixed and soaked in distilled water for 24 hours. Then, following concentrations of extract in distilled water are prepared: 5:95%, 10:90%, 15:85%, 20:80%. Distilled water is used as control respectively.

Now, the different concentration of extract is used on *Phaseolus radiatus L.* on seed and crop at different intervals. Then, the seed of *Phaseolus radiatus L.* is sown in field on sterilized soil. The extract in different concentration is sprayed on *Phaseolus radiatus L.* at different time intervals, and seven parameters of *Phaseolus radiatus L.* are studied, and results are calculated by a statistical method. The parameters which are observed and calculated are: 1. Plant height, 2. Leaf no., 3. Branch no., 4. Flower no., 5. Pod no., 6. Seed weight of ten seeds, 7. Root length, recorded.

The data are taken and collected through a static method. It is observed that from the above work, the allelopathic effect of *Parthenium hysterophorus L.* & *Lantana Camara L.* with distilled water, with increasing concentration, all seven parameter values decrease. Thus, it is observed that if we use the extract of both plants, the allelochemicals of both plants inhibit the growth of *Phaseolus radiatus L.*

Introduction

Allelopathy, from the Greek word *allelo* [one another or mutual] and *pathy* (suffering), refers to the release of chemicals by one plant that have some type of effect on another plant. The term is attributed to an Austrian professor Hans. Molisch, who coined it in his 1937 book “The effect of plant on each other (Molisch)¹.”

In India, two weeds are found enormous and everywhere in agriculture fields grow with crops as a weed and causing very much inhibition of commercial crops and the

production is reducing very much these two Plants are *Parthenium hysterophorus L.* & *Lantana Camara L.* Plant has Allelochemicals and due to this allelochemicals they inhibit other Plants growth and *Parthenium hysterophorus L.* & *Lantana Camara L.* are spreading all over in our country *Parthenium hysterophorus L.* & *Lantana Camara L.* have no use to humans and animals also *Parthenium hysterophorus L.* causes skin disease to humans *Parthenium hysterophorus L.* & *Lantana Camara L.* can't be edible by animals also nor they are destroyed by insects or other microorganisms many research going on to get best use of *Parthenium hysterophorus L.* & *Lantana Camara L.*

Ecological studies on allelopathic potential of *Parthenium hysterophorus L.* in relation to *Phaseolus aureus L.* and *Triticum aestivum* is observed and inhibition is seen due to the allelochemicals produced by *Parthenium hysterophorus L.* (Agarwal, C. Anand, A. 1992)². The chemical can be given off by different part of plant or can be release through natural decomposition Allelopathy is a survival mechanism that allow certain plants to compete with and often destroyed nearby plant by inhibiting Seed Sprouting, root development or nutrient uptake.

Parthenium hysterophorus is a species of flowering plant in the aster family Asteraceae which is a noxious weed in America Asia Africa and Australia. This is on annual herb *Parthenium hysterophorus* scientific name *Parthenium hysterophorus L.* common name carrot weed.

Lantana Camara L. is a significance weed *Lantana Camara L.* is a native from the tropical region of central and south America *Lantana* is a heavily branched shrub species name- *Lantana camara L.* family Verbenaceae.

Both *Parthenium* and *Lantana* are extremely easy to grow requiring little attention and is seldom bothered by pest or disease. It has low water requirement *Lantana camara* this plant has poison characteristic also. The different parts of *Lantana camara L.* contains allelochemicals aromatic alkaloids and phenolic compounds (Ambika et al., 2003)³.

The allelopathic effect of 22 plant extract on seed germination of nine different weed was done. The plant extract obtained processed with Methanol acetone (10%) was used as control. *Lolium perenne l.* seed germination is inhibited by *Saliva officinalis L.* *Laurus nobilis L.* and *Artemisia vulgaris L.* and the germination of *Abutilon theophrastis L. medik,* *Amaranthus retroflexus L.* *Avena sterlis L.* *Rumex crispus L.* and *Trifolium repens L.* inhibits by the extract of some plants *Lepidium sativum L.* was slightly effects by weed extract. *Lolium temulentum L.* stimulate the seed germination of *Descurania Sophia L.* so weed can

be used as Herbicide to control other weeds this result was obtained (Izzet kadioglu and Yusuf yahar 2004)⁴.

Allelopathic Impact of *Lantana Camara L.* on Vegetative Growth and Yield Components of Green Gram (*Phaseolus radiatus L.*) the germination and growth of Green Gram (*Phaseolus radiatus L.*) is retarded and it decrease the growth. (P.K. Gantayet et. al., 2014)⁵.

Allelopathic effect of leaf, stem, flower and fruit of *Lantana Camara L.* extract on growth of *Parthenium hysterophorus L.* was observed and the results were *Lantana camara* extract inhibits the seed germination *Parthenium hysterophorus L.* (Mishra A & Singh, R 2009)⁶. According to this *Lantana Camara L.* allelochemicals can inhibits the *Parthenium hysterophorus L.* germination and growth but we know *Lantana Camara L.* and *Parthenium hysterophorus L.* both are noxious weed so we have to search for better option for better results

Material and methodology

Preparation of aqueous extracts: -

The material chosen for the study includes *Parthenium hysterophorus L* and *Lantana camara L.* shoot after flowering of these plant is collected chopped in small pieces dried and crushed in mixture grinder after that the extract is mixed and soaked in distilled water for 24 hours then following concentration of aqueous extract of *Parthenium hysterophorus L.* and *Lantana camara L.* are taken and mixed then prepared different concentration of extract and distilled water in following ratio 5:95,10:90,15:85,20:80. Distilled water is used as control. Now the different concentration of extract is used on *Phaseolus radiatus L.* on seed and crop on different intervals then the seed of *Phaseolus radiatus L.* is sown in field on sterilized soil the extract in different concentration is sprayed on *Phaseolus radiatus L.* on different time intervals and seven parameters of *Phaseolus radiatus L.* are studied and results are calculated by statical method the parameters which are observed and calculated are 1. Plant height 2. Leaves no. of a Plant 3. Branch no. of a Plant 4. Pod no. of a Plant 5. Seed no. in a Plant 6. Seed weight of ten seeds 7. Root length of plant is calculated.

Result and Discussion

Parthenium hysterophorus L and *Lantana camara L* aqueous extract is mixed with Distil water and different concentration in following ratio 5:95,10:90,15:85,20:80. Distilled water is used as control. Allelopathic effect of different concentration were observed on *Phaseolus radiatus L.* The different morphological parameters of *Phaseolus radiatus L.* are

calculated and observed the different Parameters are 1. Plant height 2. Leaves no. of a Plant 3. Branch no. of a Plant 4. Pod no. of a Plant 5. Seed no. in a Plant 6. Seed weight of ten seeds 7. Root length.

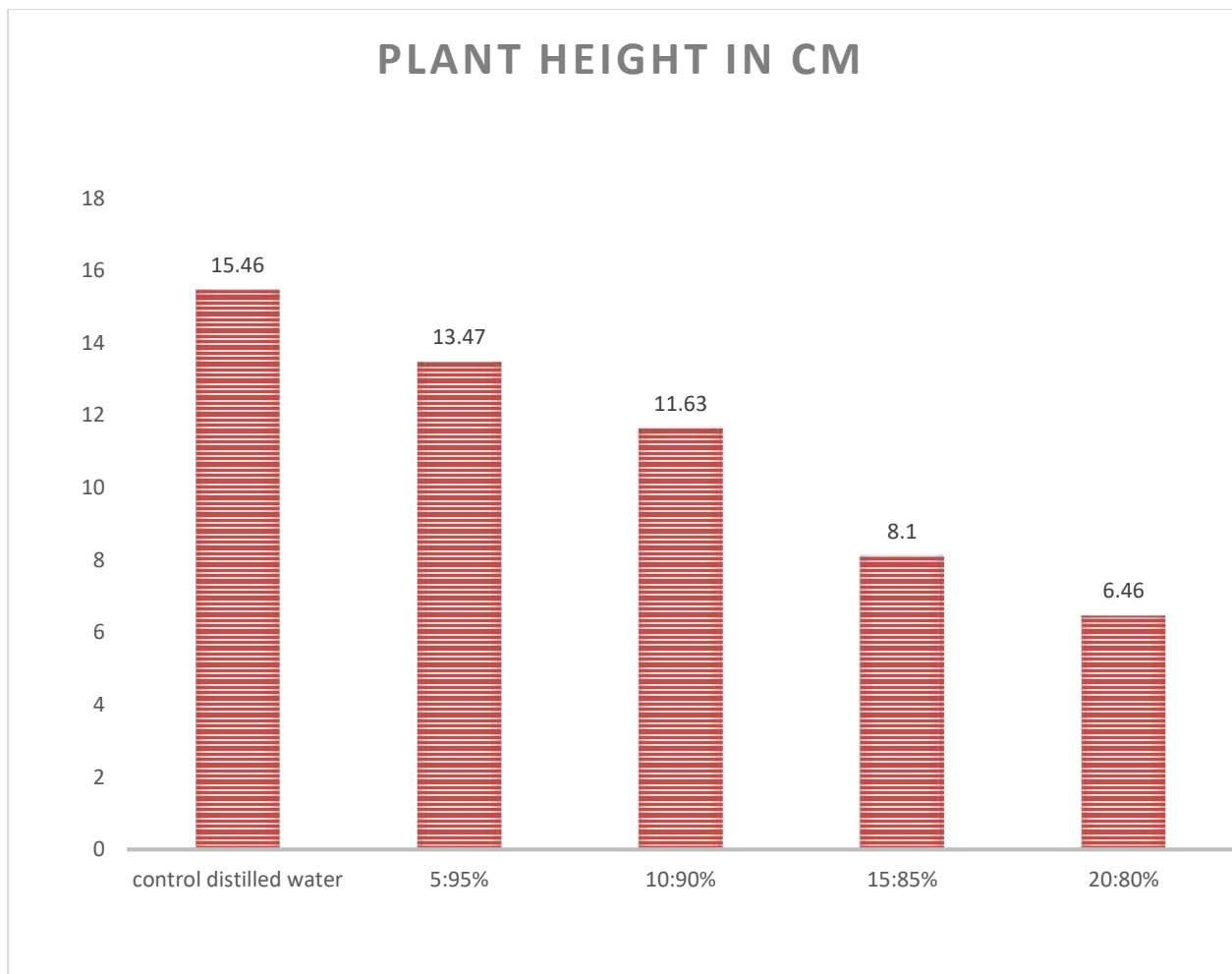
Allelopathic effect of *Parthenium hysterophorus L.* and *Lantana camara L.* aqueous extract with Distil Water on *Phaseolus radiatus L.* on different Plant Parameter.

Mean value of plant morphological parameters with different concentration with distilled water

Plant Parameters/Treatment	control- distilled water	5:95%	10:90%	15:85%	20:80%
Plant height	15.46 cm	13.47cm	11.63cm	8.1cm	6.46cm
Leaves no. of a plant	6.4	6	5.2	4.1	3
Branch no. of a plant	9.2	5	6.8	5.9	4.6
Pod no. of a plant	18.2	16.7	14.4	6.3	4.8
Seed no. in a Pod	8.3	6.9	6.6	5.7	5.5
Seed weight of ten seeds	0.439gm	0.41gm	0.376gm	0.326gm	0.266gm
Root length	4.07cm	3.79cm	2.98cm	2.45cm	2.38cm

Allelopathic effect of *Parthenium hysterophorus L.* and *Lantana camara L.* aqueous extract with Distil Water on *Phaseolus radiatus L.* (Plant Height).

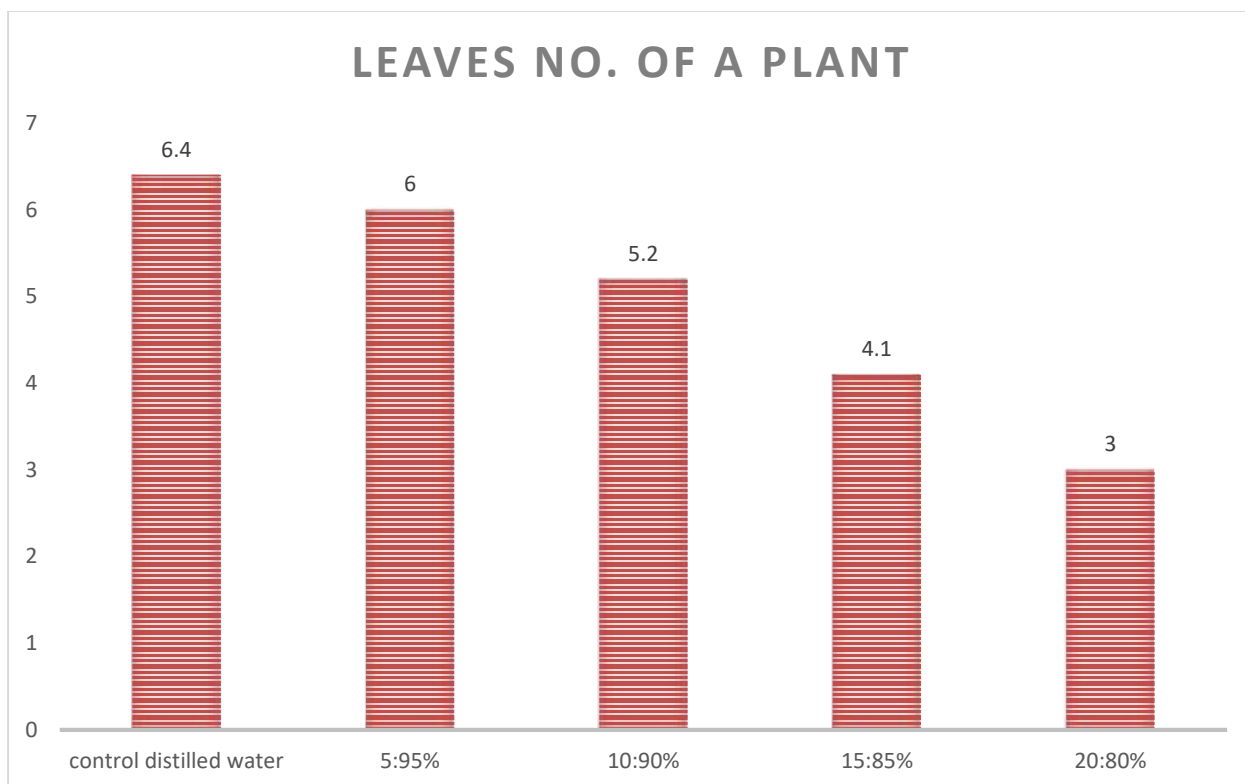
The highest Plant height of *Phaseolus radiatus L* we see in control Distilled Water is 15.46 cm and at 5:95% Plant height of *Phaseolus radiatus L* is 13.47 cm and 10:90% Plant height of *Phaseolus radiatus L* is 11.63 cm at 15:85% Plant height of *Phaseolus radiatus L* we got 8.1 cm in 20:80% the plant of height of *Phaseolus radiatus L.* is 6.46 cm



Treatments

Allelopathic effect of *Parthenium hysterophorus L.* and *Lantana camara L.* aqueous extract with Distil Water on *Phaseolus radiatus L.* (Leaves no. of a Plant)

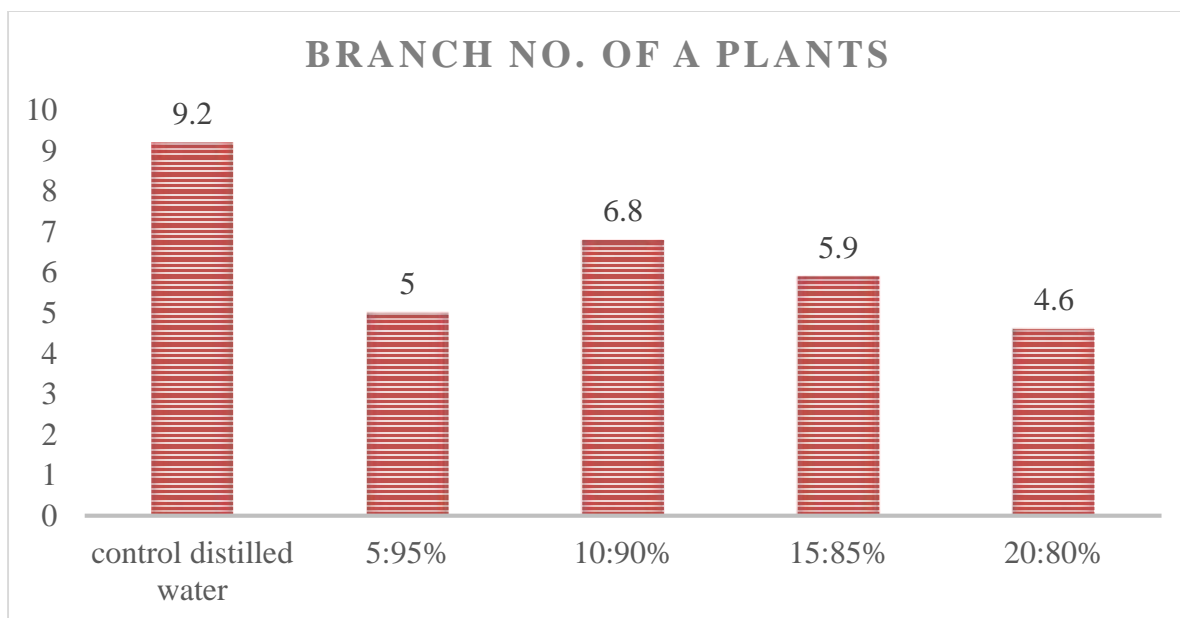
The highest Leaves no. of *Phaseolus radiatus L* we see in control Distilled Water is 6.4 and at 5:95% Leaves no. Of *Phaseolus radiatus L* is 6 In 10:90% Leaves no. of *Phaseolus radiatus L* is 5.2 at 15:85% Leaves no. of *Phaseolus radiatus L* we got 4.1 and in 20:80% the Leaves no. of *Phaseolus radiatus L.* is 3



Treatments

Allelopathic effect of *Parthenium hysterophorus L.* and *Lantana camara L.* aqueous extract with Distil Water on *Phaseolus radiatus L.* (Branch no. of a Plant)

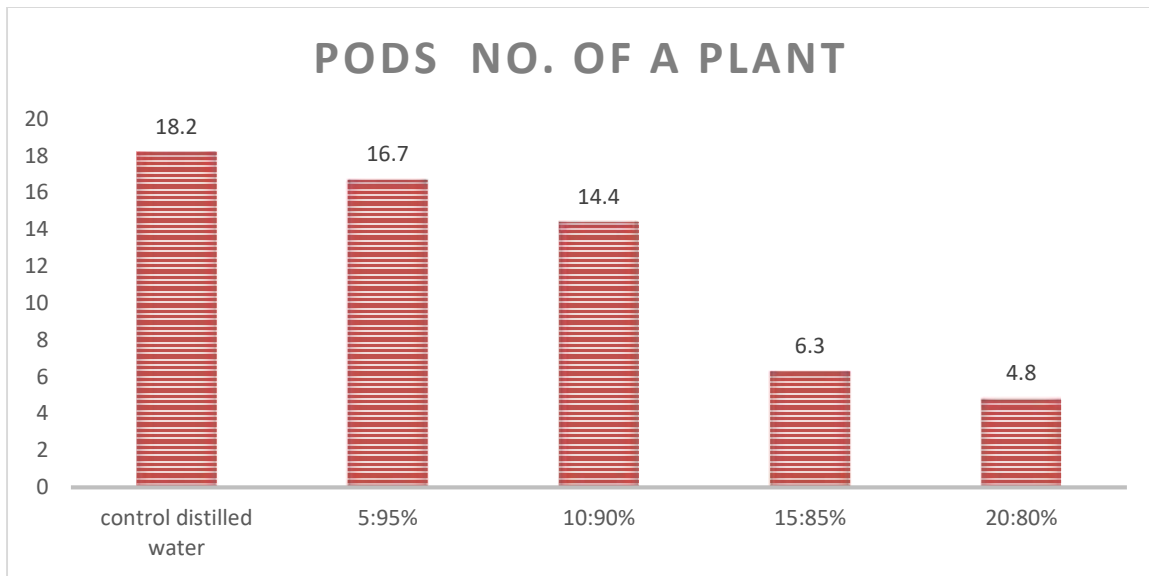
The highest Branch no. of *Phaseolus radiatus L.* we see in control Distilled Water is 9.2 and at in 10:90% Branch no. of *Phaseolus radiatus L.* is 6.8 at 15:85% Branch no. of *Phaseolus radiatus L.* we got 5.9 at 5:95% Branch no. of *Phaseolus radiatus L.* is 5 in 20:80% the Branch no. of *Phaseolus radiatus L.* is 4.6



Treatments

Allelopathic effect of *Parthenium hysterophorus L.* and *Lantana camara L.* aqueous extract with Distil Water on *Phaseolus radiatus L.* (Pod no. of a Plant)

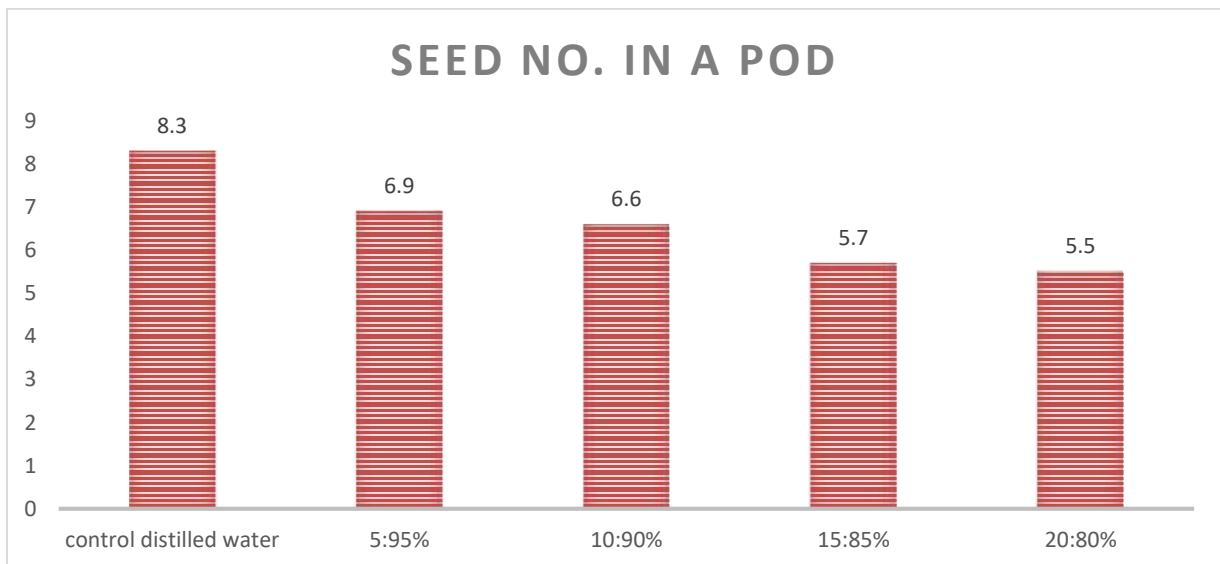
The highest Pod no. of *Phaseolus radiatus L.* we see in control Distilled Water is 18.2 and at 5:95% Pod no. of *Phaseolus radiatus L.* is 16.7 in 10:90% Pod no. of *Phaseolus radiatus L.* is 14.4 at 15:85% Pod no. of *Phaseolus radiatus L.* we got 6.3 and in 20:80% the Pod no. of *Phaseolus radiatus L.* is 4.8



Treatments

Allelopathic effect of *Parthenium hysterophorus L.* and *Lantana camara L.* aqueous extract with Distil Water on *Phaseolus radiatus L.* (Seed no. in a Pod)

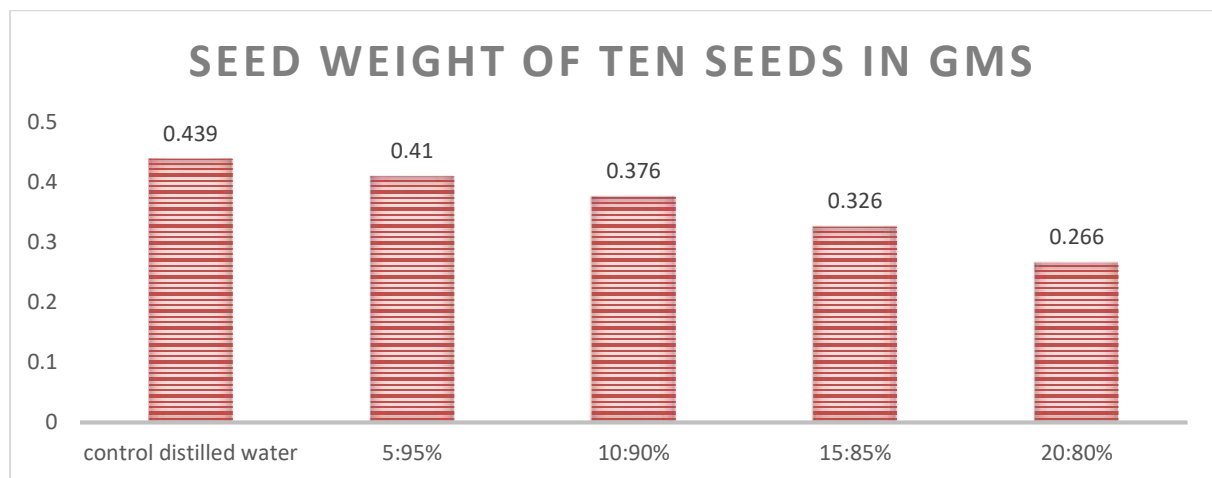
The highest Seed no. in a pod of *Phaseolus radiatus L.* we see in control Distilled Water is 8.3 and at 5:95% Seed no. in a pod of *Phaseolus radiatus L.* is 6.9 in 10:90% Seed no. in a pod of *Phaseolus radiatus L.* is 6.6 at 15:85% Seed no. in a pod of *Phaseolus radiatus L.* we got 5.7 and in 20:80% the Seed no. in a pod of *Phaseolus radiatus L.* is 5.5



Treatments

Allelopathic effect of *Parthenium hysterophorus L.* and *Lantana camara L.* aqueous extract with Distil Water on *Phaseolus radiatus L.* (Seed weight of ten seeds)

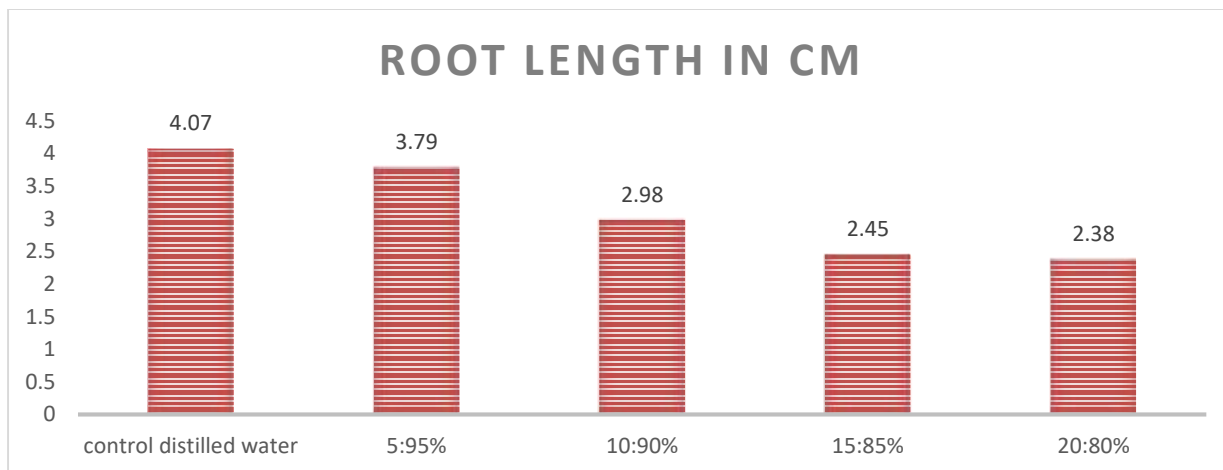
The highest Seed weight of ten seeds of *Phaseolus radiatus L.* we see in control Distilled Water is 0.439 gm and at 5:95% Seed weight of ten seeds of *Phaseolus radiatus L.* is 0.41gm in 10:90% Seed weight of ten seeds of *Phaseolus radiatus L.* is 0.376 gm at 15:85% Seed weight of ten seeds of *Phaseolus radiatus L.* we got 0.326 gm and in 20:80% the Seed weight of ten seeds of *Phaseolus radiatus L.* is 0.266 gm.



Treatments

Allelopathic effect of *Parthenium hysterophorus L.* and *Lantana camara L.* aqueous extract with Distil Water on *Phaseolus radiatus L.* (Root length)

The highest Root length of *Phaseolus radiatus L.* we see in control Distilled Water is 4.07 cm and at 5:95% Root length of *Phaseolus radiatus L.* is 3.79 cm in 10:90% Root length of *Phaseolus radiatus L.* is 2.98 cm at 15:85% Root length of *Phaseolus radiatus L.* we got 2.45 cm and in 20:80% the Root length of *Phaseolus radiatus L.* is 2.38 cm



Treatments

The highest Plant height of *Phaseolus radiatus L* we see in control Distilled Water is 15.46 cm The highest Leaves no. of *Phaseolus radiatus L* we see in control Distilled Water is 6.4. The highest Branch no. of *Phaseolus radiatus L*. we see in control Distilled Water is 9.2. The highest Pod no. of *Phaseolus radiatus L*. we see in control Distilled Water is 18.2. The highest Seed no. in a pod of *Phaseolus radiatus L*. we see in control Distilled Water is 8.3. The highest Seed weight of ten seeds of *Phaseolus radiatus L*. we see in control Distilled Water is 0.439 gm. The highest Root length of *Phaseolus radiatus L*. we see in control Distilled Water is 4.07 cm.

Both Plants we are using *Parthenium hysterophorus L* and *Lantana camara L*. contain allelochemicals which have toxin and inhibitory effect on *Phaseolus radiatus L*. *Parthenium hysterophorus L* has allelochemical parthenin of sesquiterpene lactones group phenolics such as caffeic acid, vanilic acid, p-cumaric acid, anisic acid, p-anisic acid, ferulic acid and chlorogenic acid (Rajan 1973; Mersie and Singh 1988)^{7and 8}. The *Lantana camara L*. plant has allelochemicals are phenolics, with umbelliferone, methylcoumarin, and salicylic acid being the most phytotoxic. In addition to phenolics, a recent report indicates lantadene A and B as more potent allelochemicals (Sharma et., al 2007)⁹. Parthenin, ferulic acid and chlorogenic acid are the primary inhibitors present in the plant (Kanchan and Jayachandra, 1979)¹⁰.

Allelochemicals might inhibit the photosynthesis in intact plant and microorganisms. Inhibition of photosynthetic process results in depletion of food reserve i.e., carbohydrate and protein. Allelochemicals of *Lantana camara* damage to protein and alterations of some enzymatic activities Muscolo et al. (Muscolo et al., 2001)¹¹.

Thus, by increasing the concentration of both plants aqueous extract we prepared the growth of *Phaseolus radiatus L*. retards and all the seven parameters we took their growth

decreasing gradually at higher concentration of *Parthenium hysterophorus L* and *Lantana camara L*. aqueous extract the results we get minimum value.

Hence the positive point of this we can use *Parthenium hysterophorus L* and *Lantana camara L*. aqueous extract to control weed among plants and as a herbicide due to the allelochemicals present in it. And the another point we observed that is the both plants do not have any insect or other disease due to their allelochemicals so we can use *Parthenium hysterophorus L* and *Lantana camara L*. aqueous extract at the time of insect or any other crop disease on plants due to the toxins effect of their allelochemicals the insect and other disease cannot affect crops which are economically important for us.

References: -

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