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Allelopathic effects of Commelina bengalensis L on Soybean (Glycine max (Linn) Merr.)

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ABSTRACT

Commelina bengalensis is a commonly found weed in the fields of Soybean. The seeds of Soybean were treated with aqueous extracts of root and shoot of Commelina bengalensis. The concentration used in this study was 0.25%, 0.50% and 0.75%. The effect of this treatment was studied on the length of hypocotyls and length of root of Soybean. . It was observed that with the increase in concentration of both root and shoot extract there was decrease in the length of Soybean root. The present studies show that the extracts of root and shoot of Commelina bengalensis inhibited the germination of Soybean.

KEYWORDS :

Soybean (Glycine max L.) is a native of Eastern Asia. The principal zones of Soybean production in the orient are China, Manchuria, Korea and Japan. In India too Soybean is cultivated. Madhya Pradesh is the state which produces the bulk of Soybean in the country. It is cultivated in both tropical and temperate climates. The plant is sensitive to photoperiod and is classified as short-day or long night plant. In Madhya Pradesh Soybean is an important 'Kharif" crop.

Soybean crop is invaded by a variety of weed species which reduce crop productivity, either by producing bio-physical disturbances i.e., competition or by biochemical interactions with the crop plant i.e., allelopathy. Weeds are considered unwanted plants that cause damage to our crops, thus they compete with crops. Its harmful effects on several crops have been reported. Molisch coined the term **'allelpathy'**, which denotes the production of specific biomolecules by one plant that can induce suffering in, or give benefit to, another plant. However, it is most commonly used in the sense that an interactions in which one plant causes suffering to another plant. Although, allopathic science is relatively new field of study, there exists convincing evidence that allelopathic interactions between plants play a crucial role in both natural and manipulated ecosystems.

Coltn and Einhellig (1980) have discussed the allelopathic mechanisms of velvet leaf (Abutilon theophrasti) on Soybean. Drost and doll (1980) studied the allelopathic effect of yellow nut sedge (Cyperus esculentus) on Corn (Zea mays) and Soybean (Glycine max.). Patterson (1981) investigated the effect of Allelopathic chemicals on growth and physiological responses of Glycine max.

The present study was undertaken to study the allelopathic effect of Commelina bengalensis on germination and seedling characters of Soybean. The germination test of Glycine max was conducted using petridishes and filter papers in the Laboratory. The root and stem parts of Commelina bengalensis were used. Commelina bengalensis plants were collected from the fields and then divided in to shoot and root portions in the laboratory. In one experiment 5g of fresh shoot material of Commelina bengalensis was ground to a fine paste and diluted with distilled water and filtered through the muslin cloth. The filtrate was made up to 100 ml. In another experiment fresh root (5g) parts of Commelina bengalensis was ground to a fine paste and diluted with 100 ml distilled water.

The inhibitory effects of root and shoot extracts on Hypocotyl and root length have been presented in Table-I

Table-I Allelopathic effect of Commelina bengalensis on seedling growth of Soybean.

Treatment	Control	Shoot Extract			Root Extract		
		0.25%	0.50%	0.75%	0.25%	0.50%	0.75%
Hypocotly (cm)	9.76	7.98	7.16	6.71	7.95	7.51	6.08
Root (cm)	9.24	7.75	6.81	5.96	7.85	7.23	5.97

Length of Hypocotyl:

After treating with the root and shoot extract of Commelina bengalensis length of hypocotyls was measure on the sixth day. In control average length of hypocotyl was found to be 9.76 cm. The plants treated with 0.25%, 0.50% ,0.75% concentration of root extract exhibited decrease in the length of hypocotyl which was 7.95cm , 7.51cm and 6.08 cm respectively with the aforesaid concentrations. Similarly it was 7.98, 7.16 and 6.71cm respectively with the similar concentrations of the shoot extract.

Length of root:

After treating the Soybean seedlings with the root and shoot extract of C.bengalensis length of root was also measured. Average length of Soybean seedling root in control was found to be 9.24cm, whereas with 0.25%,0.50%,0.75% root and shoot extract treatment the root of Soybean seedling was measured. It was observed that with the increase in concentration of both root and shoot extract there was decrease in the length of Soybean root.

The present studies show that the extracts of root and shoot of Commelina bengalensis inhibited the germination of Soybean. Other inhibitory effects on germination have been reported by other workers like Usha Goel (1987) and Jayakumar and M.Eyini(1980). Khan et.al., (1993) have also reported similar results while working on allelopathic effect of Tridax procumbens on Cicer arietinum L.

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