Research Paper Botany

Allelopathic Effect of Weeds on Seed Germination Percentage of Soybean (Glycine Max (Linn) Merr.)

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ABSTRACT

Weeds adversely affect the crops by way of affording direct competition and also through their allelopathic effects. Soybean fields are encountered by number of weeds but in the survey it was revealed that only six common weeds are noticed in all the sites of the Soybean fields. In the present investigation reveals that out of the six weeds tested for the allelopathic effects on Soybean five were found to be inhibitory on the germination percentage but incidentally both root and shoot extract of Lagascea mollis were found to be promotary in nature.

KEYWORDS weeds, allelopathy, germination percentage.

Weeds adversely affect the crops by way of affording direct competition and also through their allelopathic effects. A perusal of literature reveals that the allelopathic effects of various plants on neighboring flora were studied as early as 1832 by de Candolle. He noted that certain species appeared to be specifically inhibitory to the growth of associated species, as for example Euphorbia versus Flax (Linum usitatissimum) and Thistles verses Oats. Schreiner and Reed 9 1908) investigated the toxic action of certain organic plant constituents on other plants. Schreiner and Shorey (1909) isolated harmful organic substances from soils in United States. Russel (1914) studied the effect of one growing crop on another. Livingston (1923) studied the physiological aspects of toxicity. Wilkins and Hughes (1934) carried out experiments to find out the effect of Sudan grass and of Soybean on yield of corn. Mallik et.al 91994) studied the allelopathic effect of Chenopodium album on Soybean.

In the survey it was revealed that the following weeds are commonly encountered in Soybean fields and therefore can be said to be the ecological associates of the said crop. The weeds are **Acalypha indica** L., **Euphorbia hirta** L., **Euphorbia geniculata** Orteg., **Impatiens balsamina** L., **Justicia diffusa** Willd., **Lagascea mollis** Cav., **Melilotus alba** Desr., **Parthenium hysterophorus** L and **Tridax procumbens** L., among dicots. The members of monocots are **Commenlina bengslensis** L., **Commelina kurzii** Cl., **Cynodon dactylon** L., **Eichloa procera** Retz and **Panicum javanicum** Poir.

These weeds were identified with the help of a standard published flora. Duthie (1960) and Oommachan (1976). Thus family Asteraceae, Euphorbiaceae and Poaceae are represented by three species each and Commelinaceae with only two species each where as families Acanthaceae, Balsaminaceae and Papilionaceae have only one species each. From among these weeds Euphorbia geniculata, Commelina bengalensis, Commelina kurzii, Acalypha indica, Lagascea mollis and Cynodon dactylon occurred consistently in all the sites selected for the present investigation. Therefore it was endeavored to investigate the allelopathic effects of the aforesaid six species on the germination percentage of Soybean.

The influence exerted by the substances that leach out form one plant on the growth of other plants, particularly the inhibitory effect, has come to be known as ' Allelopathy'. The germination test of Glycine max was conducted in the laboratory using petridishes and filter paper pads. The vegetative parts like root and stem of above six weeds were used in the present investigation. To study the allelopathic effect, 5g of fresh material of six weeds shoot and root was ground to a fine paste diluted with distilled water and filtered through Whattmann filter paper. The filtrate was made up to 100 ml and it was used for experiments. 5 ml of various extractsf together with control were added for treatment in petridishes provided with filter paper pads having 50 seeds each of Glycine max. The filter paper was moistened with the root and shoot extract as and when needed. Distilled water served as a control. The petridishes were kept under laboratory condition and germination was recorded after 24 hrs.

Table-I : showing percentage germination of Soybean treated with various concentrations of six weeds found in association with the crop in the fields.

S.No	Name of the weed	Control	Shoot extract (cm)			Root extract (cm)		
			0.25%	0.50%	0.75%	0.25%	0.50%	0.75%
	Acalypha indica Commelina bengalensis							
1	Commelina	100%	90%	88%	80%	88%	84%	80%
2	kurzii	100%	88%	86%	82%	84%	80%	70%
3	Cynodon	100%	92%	90%	86%	96%	90%	78%
4	dactylon	100%	100%	80%	86%	82%	80%	78%
5	Euphorbia geniculata	100%	86%	86%	80%	80%	78%	74%
6	Lagascea mollis	100%	100%	100%	82%	100%	100%	78%

In the present investigation it was reported that with the dilution of the extracts the inhibitory effect of germination percentage decreased. Soybean reported 100% germination in control. The least inhibitory effect was observed with 0.25% concentration of shoot and root extracts of Cynodon dactylon and Lagascea mollis which exhibited 100% germination. It was followed by 92% germination with the shoot extract of Commelina kurzii. However, the root extract at the same concentration exercised its inhibitory effect on Commelina bengalensis and Acalypha indica. It was not inhibitory in the case of Lagascea mollis root extracts both at 0.25% and 0.50% concentrations. The shoot and root extract of Euporbia geniculata at 0.25%, 0.50% and 0.75% concentration showed inhibitory effect on percentage germination of 86%, 86%, 80% under shoot extract 80%, 78% and 74% under root extract respectively. The decrease in the percentage germination of Soybean may be attributed to blockage of mitotic phase by the inhibitory alkaloids (Bukolora, 1971) or other inhibitors present therein.

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