



ALLELOPATHY OF *GLIRICIDIA SEPIUM* (JAEQ.) KUNTH EX WALP. ON *CYAMOPSIS TETRAGONOLOBUS* (L.) TAUB. VARIETY SADAFALI.

S.R. Bharate

Dadapatil Rajale Arts & Science College, Adinathnagar. Tal. Pathardi, Dist. Ahmednagar.

Corresponding Author: srbharate1969@gmail.com

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ABSTRACT:

The effects of aqueous leaf root stem and Flower extract of different concentrations (2.5%, 5% and 7.5%) of plant parts of *Gliricidia Sepium* (Jaeq.) Kunth Ex Walp from ' Garbhagiri hills of pathardi Tahsil (longitude19° 09'N, latitude 75° 10'E) were tested on germination and seedling growth of *Cyamopsis tetragonolobus* (L.) Taub. Variety *Sadafali*.

Key words: -Extracts, germination, *Gliricidia Sepium* (Jaeq.) Kunth Ex Walp seedling growth, *Cyamopsis tetragonolobus* (L.) Taub. Variety *Sadafali*.

INTRODUCTION:

Molisch (1937) introduced the word 'Allelopathy' (Greek words: 'allelon' means reciprocal and 'pathos' means that happens to one) for harmful as well as beneficial, biochemical and reciprocal interactions among plants including microorganisms. Allelopathy is defined as "any direct or indirect harmful/useful effect by one plant on another through the synthesis and secretion of chemicals into the environment."

Allelopathy is a current area of research. It may be useful in agriculture to increase yield, minimize some problems related to multiple cropping systems, soil productivity and availability of nutrients in soil. Allelopathy, a multidisciplinary subject and research in it will definitely establish a boon in agricultural and forestry production (Narwal and Tauro, 1994). Extracts of *Glyricidia maculata* L. retard seedling growth parameters of test crop plants viz. cowpea, green gram, black gram, sunflower, horse gram, rice, sorghum, finger millet, mustard, lablab and bean (Patil, 1994).

Volatile oil from the bark of *Gliricidia sepium* contains methyl-3(E) - pentyl ether, 3-methyl 2-butanol, 3-methoxy hexane, 1-(1-ethoxyethoxy) - 2-hexane, 2-decanol, Coumarin and hexadecanoic acid (Reddy and Jose, 2010).

MATERIAL & METHODS:

Extracts were obtained by crushing plant materials. 10% aqueous extracts (stock solution) obtained from plant parts (leaves, stem, roots, flowers) of *Gliricidia sepium* (Jacq.) Kunth. ex Steud. Extracts were filtered with muslin cloth and Whatman filter paper No.1, stored in refrigerator and further diluted with distilled water to get extracts of 2.5 %, 5 %, and 7.5 % (Narwal, 1994). Extracts were further used for bioassay in laboratory conditions.

Effect of these three concentrations on seedling growth parameters viz. seed germination (Ger), Shoot growth (Sg) , Root growth (Rg) and Total seedling growth(TSg) of test crop plant *Cyamopsis tetragonolobus* L. var. 'Sadafali' were recorded after 5th day. Seeds

of test plants were surface sterilized with 0.01% Mercuric chloride followed by thorough washing with distilled water before use.

Ten seeds/ plastic container were germinated in sterilized containers of 12cm diameter, using germination paper or Whatman No.1 filter paper. Triplicates of the containers were maintained. 10 ml of extract was added in the Petri dishes/containers containing 10 seeds each. The slight emergence of radical was considered as a sign of germination. Germination percentage was calculated. Photographs were taken with digital camera ('Sony'make). Percentage inhibition or stimulation of 'Ger' (seed Germination), 'Rg' (Root growth), 'Sg' (Shoot growth) and 'TSg' (Total seedling growth) over control was calculated from which graphs were drawn.

RESULT AND DISCUSSION:

1. Effect of leaf extract of *Gliricidia* on 'Sadafali' variety: Leaf extracts of *Gliricidia* exerted significant and concentration correlated inhibition of seedling growth parameters of the 'Sadafali' variety. 'Rg', 'Sg' and 'TSg' were inhibited by 9.31 to 96.36%, 51.13 to 83.56% and 61.07 to 88.13% over control respectively (Table NO1, Graph NO1 A).

2. Effect of stem extract of *Gliricidia* on 'Sadafali' variety: Stem extract of *Gliricidia*, except slight inhibition of 'Rg' by 8.50%, promoted seedling growth of 'Sadafali' variety. 'Rg', 'Sg' and 'TSg' of the test plant were promoted by 1.34 to 10.07%, 1.28 to 21.15% and 0.99 to 16.12% over control respectively. Promotion was not significant and concentration correlated. Seed germination was slightly inhibited by 3.33% over control (Table NO1, Graph NO 1 B).

3. Effect of root extract of *Gliricidia* on 'Sadafali' variety: Root extracts of *Gliricidia* inhibited seedling growth parameters of the test plant significantly at ($P < 0.05\%$). 'Ger', 'Rg', 'Sg' and 'TSg' were inhibited by 3.33 to 10.00%, 13.81 to

68.15%, 14.75 to 33.62% and 14.38 to 47.05% over control respectively. Inhibition was concentration correlated (Table NO1, Graph NO 1 C).

4. Effect of flower extract of *Gliricidia* on 'Sadafali' variety: Flower extracts of *Gliricidia* drastically inhibited seedling growth parameters viz. 'Rg', 'Sg' and 'TSg' by 69.43 to 80.89%, 31.79 to 58.01% and 47.86 to 67.71% over control respectively. Seed germination was inhibited slightly by 3.33%. Inhibition was significant ($P < 0.05\%$) and concentration correlated (Table NO 1, Graph NO 1 D).

CONCLUSION:

Leaf, stem, root and flower extracts of *Gliricidia sepium* (Jacq.) Kunth. ex Steud. inhibited all seedling growth parameters of 'Sadafali' varieties of *Cyamopsis tetragonolobus*(L) Taub. in an order: Leaf > flowers > root > stem. Leaf extracts exerted more inhibition than flowers, root, and stem extract. Stem extracts except slight inhibition of root growth, promoted seedling growth of 'Sadafali' variety.

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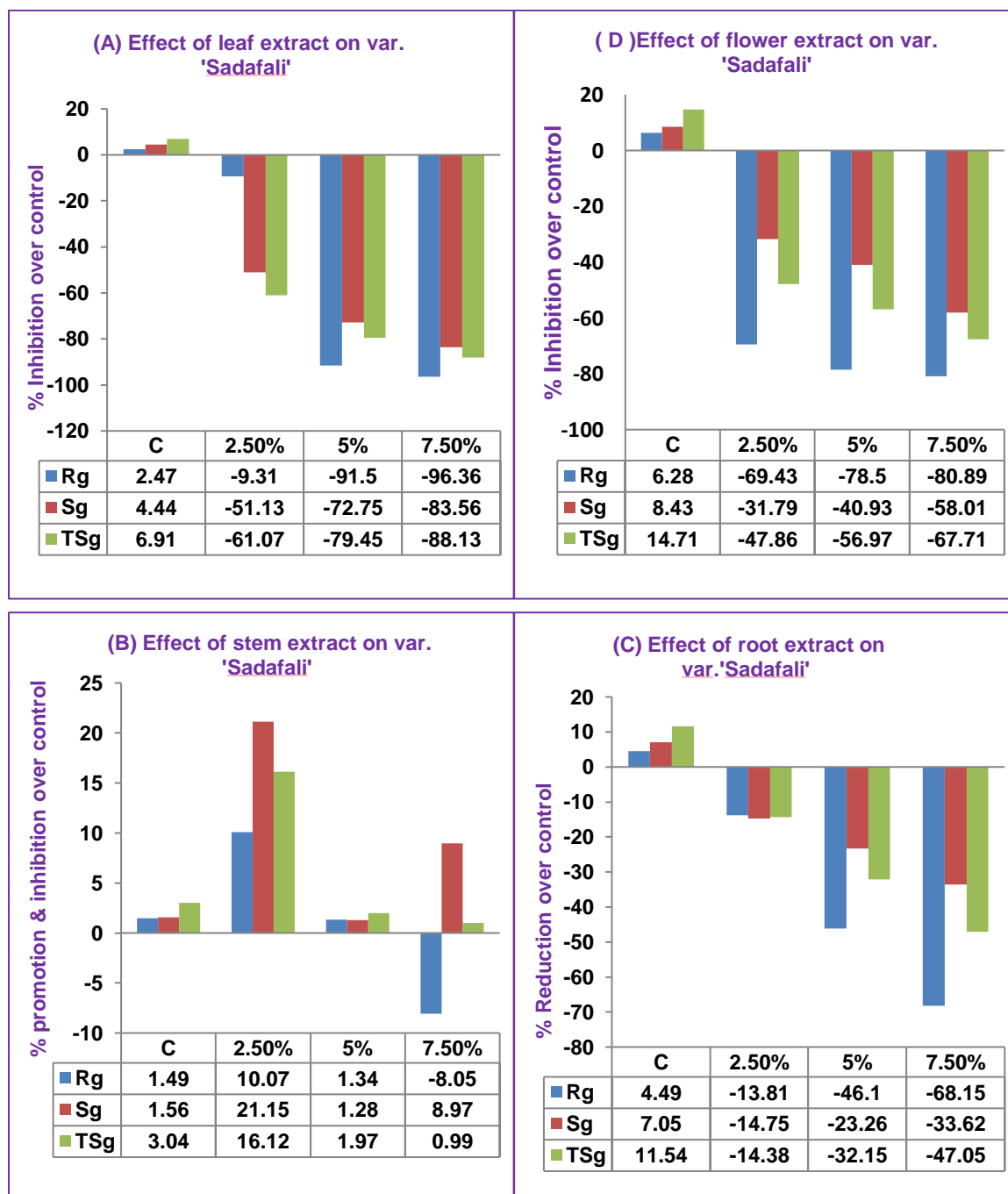
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Table No. 1.:- Effect of Leaf, stem , root and Flower extracts of *Gliricidia sepium* (Jacq.) Kunth ex steud. on seedling growth of varieties of *Cyamopsis tetragonolobus* (L.) Taub.

Extract	Cyamopsis Variety	Growth Parameters	Control	Extract concentration			CD at 0.05%	P-value at 0.05%
				2.50%	5%	7.50%		
Leaf	Sadafali	Rg	2.47a ± 0.33	0.52b ± 0.05 (-9.31)	0.21c ± 0.02 (-91.50)	0.09c ± 0.01 (-96.36)	0.32	7.60E-19
		Sg	4.44a ± 0.36	2.17b ± 0.30 (-51.13)	1.21c ± 0.12 (-72.75)	0.73d ± 0.10 (-83.56)	0.46	4.44E-19
		TSg	6.91a ± 0.65	2.69b ± 0.33 (-61.07)	1.42c ± 0.13 (-79.45)	0.82d ± 0.11 (-88.13)	0.46	8.22E-22
		Ger %	93.33	93.33 (0.00)	93.33 (0.00)	70.00 (-25.00)		
Stem	Sadafali	Rg	1.49a ± 0.19	1.64a ± 0.20 (10.07)	1.51a ± 0.20 (1.34)	1.37a ± 0.18 (-8.05)	0.34	0.10
		Sg	1.56a ± 0.18	1.89ab ± 0.17 (21.15)	1.58a ± 0.17 (1.28)	1.70a ± 0.18 (8.97)	0.33	0.51
		TSg	3.04a ± 0.36	3.53a ± 0.35 (16.12)	3.10a ± 0.36 (1.97)	3.07a ± 0.36 (0.99)	0.67	0.73
		Ger %	100.00	96.67 (-3.33)	100.00 (0.00)	101.00 (0.00)		
Root	Sadafali	Rg	4.49a ± 0.42	3.87b ± 0.40 (-13.81)	2.42c ± 0.21 (-46.10)	1.43d ± 0.13 (-68.15)	0.59	3.96E-10
		Sg	7.05a ± 0.42	6.01b ± 0.51 (-14.75)	5.41b ± 0.48 (-23.26)	4.68b ± 0.39 (-33.62)	0.85	0.003
		TSg	11.54a ± 0.76	9.88b ± 0.83 (-14.38)	7.83c ± 0.62 (-32.15)	6.11d ± 0.50 (-47.05)	1.29	9.07E-07
		Ger %	100.00	96.67 (-3.33)	96.67 (-3.33)	90.00 (-10.00)		
Flower	Sadafali	Rg	6.28a ± 0.79	1.92b ± 0.30 (-69.43)	1.35b ± 0.19 (-78.50)	1.20b ± 0.33 (-80.89)	0.86	1.90E-13
		Sg	8.43a ± 0.60	5.75b ± 0.57 (-31.79)	4.98b ± 0.61 (-40.93)	3.54c ± 0.48 (-58.01)	1.06	2.25E-07
		TSg	14.71a ± 1.21	7.67b ± 0.79 (-47.86)	6.33b ± 0.78 (-56.97)	4.75bc ± 0.71 (-67.71)	1.68	3.45E-12
		Ger %	100.00	100.00 (0.00)	86.67 (-13.13)	86.67 (-13.13)		

Data presented are means of three replicates; values within the same row with different letters are significantly different at 0.05% P-level by Single factor ANOVA test followed by CD & Tukey's test. [Figures in parentheses indicate % stimulation (+) and % inhibition (-) over control; Sg: shoot growth, Rg: root growth, TSg: total seedling growth and Ger: seed germination:]

Graph No: 1 Effect of Leaf, stem, root and Flower extracts of *Gliricidia sepium* (Jacq.) Kunth ex steud. on seedling growth of varieties of *Cyamopsis tetragonolobus* (L.) Taub.



[Where Rg: root growth, Sg: shoot growth, TSg: total seedling growth, figures indicate % inhibition (-) and % promotion (+) over control, (C), 2.50 to 7.50%: Extract concentration]