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EFFECT OF AQUEOUS AND ETHANOLIC EXTRACT OF COMMON WEEDS ON SEED HEALTH OF COTTON VAR. LOCAL

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ABSTRACT

The study was conducted to investigate the Effect of aqueous and ethanolic root, stem and leaf extract of common weeds such as *Alternanthera sessilis* (L.) R.Br, ex DC, *Amaranthus tricolor* L., *Cardiospermum helicacabum* L., *Corchorus olitorius* L., *Cyperus rotundus* L., *Euphorbia heterophylla* L., *Euphorbia hirta* L., *Phyllanthus amerus* Schumach. & Thonn., *Portulaca oleracea* L., *Vicoa indica* (L.) DC. on seed health (incidence of seed mycoflora, seed germination, seedling emergence, root and shoot lengths) of cotton using a laboratory bioassay. The result observed that the Aqueous extracts of *Vicoa indica* (L.) DC and *Portulaca oleracea* L. showed mínimum incidence of seed mycoflora and stimulatory for seed healths (seed germination and seedling emergence, root and shoot length) as compared to other extracts and control on cotton. But the extract of *Corchorus olitorius* L showed adverse effect on seed healths of cotton. Present work highlights the effect of allelochemical present in weed extracts on seed health of cotton and suggested that those weeds may affect cotton seed health due to inhibitory or stimulatory effect of allelochemicals which are present in the extract of weeds.

Keywords: Common Weeds, Seed Health, Cotton, Allelopathy, Aqueous and Ethanolic Extracts.

INTRODUCTION

A direct or indirect, stimulatory or inhibitory effect of one plant into another through release of chemical compounds into the environment is known as Allelopathy. Allelopathy and its role in agriculture have been evaluated with respect to effects of weed residues on crop yields [1-5]. Under selected environmental conditions, the active form may be released which cause the Allelopathic effects. Chemicals with Allelopathic potential are present in a variety of plant tissues, including leaves, flowers, fruits, stems, roots, rhizomes, and seeds [6]. Weeds cause annual losses of about 10% in agricultural production [7]. The annual loss caused by weeds in agricultural production is estimated at more than $18.2 billion, with about $12 billion of this amount is attributed to the production losses caused by weeds. Weeds generally compete with crop species for light space, water and nutrients [8, 9]. Some weed species supplement aggressiveness by production of phytotoxic or plant growth–inhibiting substances that adversely affect growth and development of other plants. These chemicals are released into the soil as root exudates of the living or dead plants.

Cotton (family-malvaceae) is a one of the kharif season crop and major cash crop of India. Almost about 60% of the country's $10 billion annual foreign exchange earnings through the export of raw cotton, garments and threads etc. [10]. No research has yet been conducted on the allelopathic effects on cotton crop. The main objectives of this research were to study the effects of root, stem and leaf extracts (aqueous and ethanolic) on Seed health's of Cotton var. local and to compare the allelopathic potential of various plant parts of weed extracts.

MATERIALS & METHODS

Collection and Identification

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The laboratory experiment had conducted in Department of Botany, Yeshwant Mahavidyalaya, Nanded to determine the effect of aqueous and ethanolic extract of common weeds on Seed health of Cotton var. local. Weeds were collected in Cotton field from kharif season for this experiment. The fresh weeds in its vegetative stage ware collected from Cotton fields. The collected plants are identified by using "The Flora of Marathwada" [11]. We have also made herbarium and stored in Herbarium Section of Department of Botany, Yeshwant Mahavidyalaya, Nanded (M.S.).

Preparation of powder

The collected weed separated in the form of root, stem and leaves air dried in shade for a week and prepare powdered. The powder of the weed biomass ware separately packed in polyethene bags and store at room temp before used for experiment.

Preparation of plant extracts

The aqueous and ethanolic extracts of the root, stem and leaf powders of the test weeds were prepared by Soxhlet extraction method as described by Khandelwal [12].

Experiments

From preliminary screening it was found that root, stem and leaf extracts had the strongest effect on seed health (incidence of seed mycoflora, seed germination, seedling emergence, root and shoot lengths), therefore first selected these three part of the weeds (root, stem and leaves) for the detail experiment in laboratory basis.

The seeds of cotton were soaked in 5% aqueous and ethanol extracts of the weed plants for 24 hours at room temperature. The soaked seeds were placed on moist blotter plates methods as described by Neergaard [13] and Agarwal [14], incubated for seven days at room temperature and the incidence of seed mycoflora, seed germination were studied. Similarly the soaked seeds were sown in trays/ pots filled with garden soil, incubated for ten days at room temperature and the seedling emergence (root length and shoot length) was studied. The seeds soaked in sterile distilled water were termed as control. The results obtained are presented in table and photo plates.

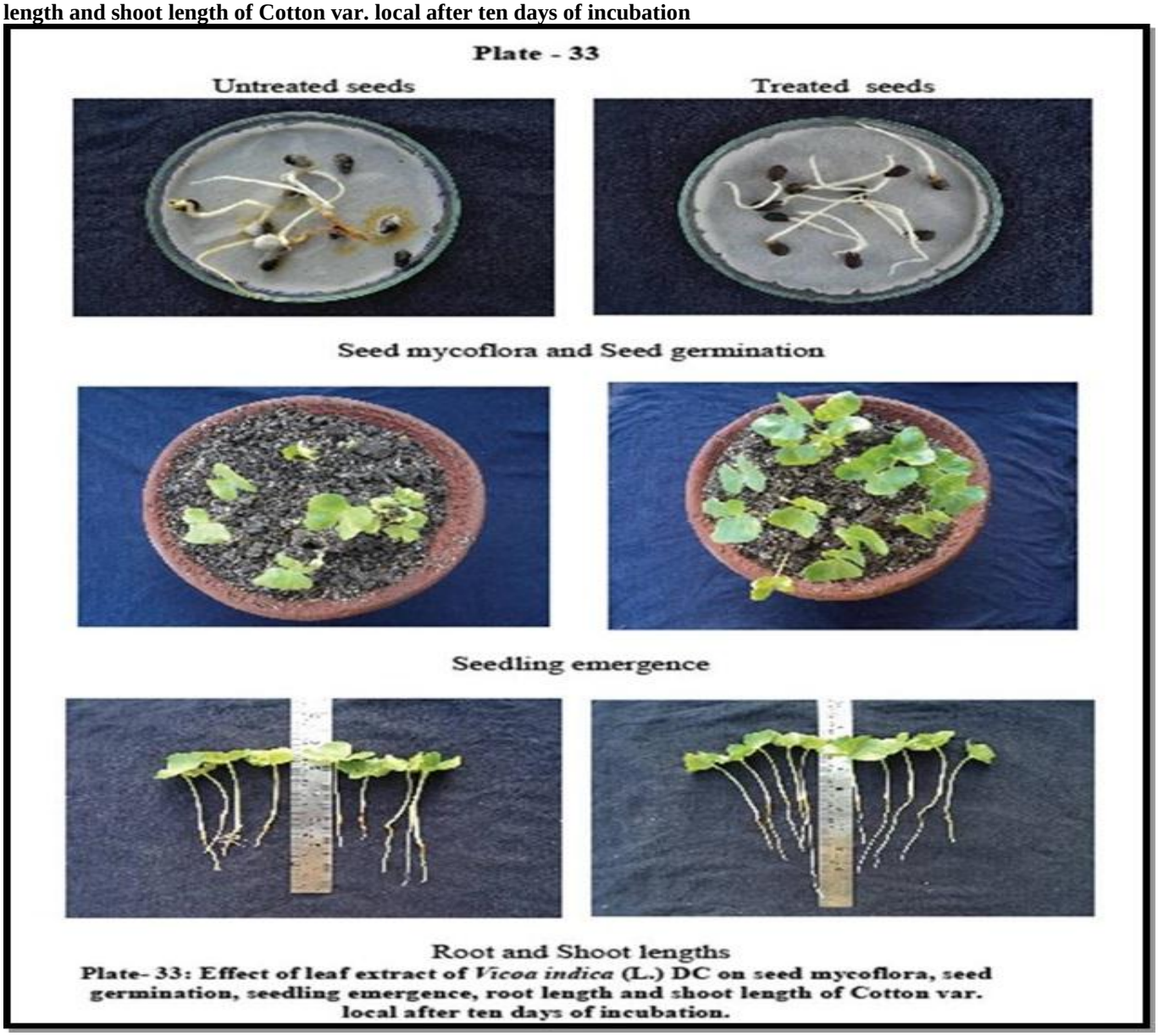
Table 1. Effect of aqueous and ethanolic extract of some common weeds on seed health (incidence of seed mycoflora, seed germination, seedling emergence, root and shoot lengths) of Cotton var. local after ten days of incubation

Sr. no.	Name of the source weed plant	Part used	Mycoflora		SG		RL		SL		SE	
			We	Ee	We	Ee	We	Ee	We	Ee	We	Ee
1.	*Alternanthera sessilis*(L.) R.Br,ex DC	Root	40	40	30	50	2.8	2.3	2.7	2.4	54	45
		Stem	90	80	50	60	2.4	2.5	2.5	2.8	55	49
		leaves	50	50	50	60	2.2	2.3	2.5	2.9	70	32
2.	*Amaranthus tricolor* L.	Root	50	50	40	70	2.7	2.9	2.5	2.3	58	57
		Stem	40	80	50	50	2.4	2.6	2.4	3.5	63	71
		leaves	60	60	50	50	3.1	3.4	2.8	2.9	43	50
3.	*Cardiospermum helicacabum* L	Root	40	80	50	40	1.8	2.0	1.3	2.5	64	50
		Stem	60	70	80	70	1.5	1.9	1.9	2.6	47	45
		leaves	80	70	50	50	1.3	1.7	1.8	1.5	41	53
4.	*Corchorus olitorius* L.	Root	100	80	40	30	2.8	2.0	2.2	2.5	29	28
		Stem	80	90	30	20	2.4	1.7	2.3	2.6	45	42
		leaves	70	90	10	10	2.9	1.9	2.5	2.2	43	30
5.	*Cyperus rotundus* L.	Rhizome	90	30	60	70	2.7	2.5	4.2	2.8	70	63
		leaves	70	30	60	70	4.6	2.6	2.9	2.4	76	68
6.	*Euphorbia heterophylla*L.	Root	70	30	60	50	3.2	2.8	2.3	2.5	75	60
		Stem	40	60	40	70	1.6	2.7	2.2	2.3	63	52
		leaves	50	40	40	60	2.5	3.2	2.1	2.8	72	63
7.	*Euphorbia hirta* L.	Root	50	40	60	70	2.8	1.6	2.1	2.4	75	65
		Stem	40	50	70	70	2.6	1.4	1.9	1.7	69	71
		leaves	40	50	65	60	1.2	1.3	1.6	1.9	71	68
8.	*Phyllanthus amerus* Schumach. &Thonn.	Root	50	40	70	60	3.8	3.8	2.7	2.9	78	60
		Stem	30	30	50	70	2.7	3.6	4.8	1.7	75	37

		leaves	40	30	70	80	2.6	3.7	3.9	3.5	80	53
9.	*Portulaca oleracea* L.	Root	10	00	90	90	3.7	3.2	2.9	2.8	89	72
		Stem	30	10	80	90	5.8	4.3	6.1	5.6	80	70
		leaves	10	20	70	80	5.3	5.8	5.8	4.5	85	79
10.	*Vicoa indica* (L.) DC.	Root	30	10	90	50	3.2	2.9	3.8	1.3	87	76
		Stem	50	20	80	50	4.3	3.4	3.6	1.5	86	70
		leaves	40	30	100	50	6.4	4.9	7.2	5.2	95	87
	Control	control	70	60	90	70	6.3	5.2	7.5	4.9	90	85

We = Water extract, Ee = Ethanol extract, SG= Seed germination, RL= Root Length,
SL= shoot Length, SE= Seedling Emergence

Figure 1. Effect of leaf extract of *Vicoa indica* (L.) DC on seed mycoflora, seed germination, seedling emergence, root length and shoot length of Cotton var. local after ten days of incubation



RESULTS & DISCUSSION

From the results presented in table and figure it is clear that, the root, stem and leaf extract of all the test weed plants were found to be inhibitory for the fungal incidence on the seeds. Some plant extracts were found stimulatory and some inhibitory for seed health of the Kharif season cotton crop.

It is clear from the results that, the seeds soaked in aqueous leaf extract of *Vicoa indica* (L.) DC showed in highly reduced incidence of seed mycoflora and stimulatory for seed germination and seedling emergence, shoot length and root length of cotton, followed by aqueous stem and leaves extract of *Vicoa indica* (L.) DC., aqueous and ethanolic root ,stem and leaf extract, *Portulaca oleracea* L., aqueous root and leaf extracts of *Phyllanthus amerus* Schumach. & Thonn., aqueous root extract of *Euphorbia heterophylla* L. The test weed extract were found to be inhibitory for the incidence of seed mycoflora and stimulatory for the seed germination, root length, shoot length and seedling emergence of the test crop in more or less degree, with few exceptions. The aqueous and ethanolic extract of *Corchorus olitorius* L. was found in stimulatory for seed mycoflora and inhibitory for the seed germination, seedling emergence, root length and shoot length. Ethanolic extract of all the test weed plants showed reduced incidence of seed mycoflora than the aqueous extract of all test weed plant and control.

Gonen and Uygur [15] observed *Euphorbia nutans* Lag. From cotton, corn and soyabean fields. Sida [16] recorded *Conyza bonariensis* and *Conyza triloba* as new alien species to the Czeeh Republic and Europe, in cotton field. Hussain et al. [17] reported 14.01% reduction in seed cotton yield in competition with *Cynodon dactylon* L. Due to interference of weeds mainly *Cyperus rotundus* L. 94.5% reduction in cotton Freitas et al. [18]. Allelopathy and its role in agriculture have been evaluated with respect to effects of weed residues on crop yields [1-5]. Similarly, Schumacher, et al. [19] found that water extracts from 23 common weed and crop species inhibited germination and growth of wheat seedlings. Holm [20] *Cyperus rotundus* L. was worst weeds in the world. Interference by *Cyperus rotundus* L. adversely affects the barley and cotton crop yields [21]. Elmore [22] reported that *Cyperus rotundus* L. caused the crop losses of cotton, maize, soybean, sorghum, ground nut and tobacco. Reports on seed mycoflora and effect of plant extracts on seed mycoflora, seed germination, root length, shoot length, seedling emergence, seedling vigor of different crops by different workers namely Anuradha et al. [23], Kotkar et al. [24], Prabha et al. [25], Aage et al. [26], Awasthi et al. [27], Stojahovic et al. [28], Dangat and Patil [29], Muhammad et al. [30].

CONCLUSION

Aqueous extracts of *Vicoa indica* (L.) DC and *Portulaca oleracea* L. showed mínimum incidence of seed mycoflora and stimulatory for seed healths (seed germination and seedling emergence, root and shoot length) as compared to other extracts and control on cotton. But the extract of *Corchorus olitorius* L showed negative effect on seed health of cotton. The extract of all the test weed plants were found to be inhibitory in more or less degree for the incidence of seed mycoflora. While with a few exceptions, they were found to be stimulatory for the seed germination and seedling emergence. However, more Research needed to confirm the essential effect of weed species on seed health of Cotton in natural environment.

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