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STUDIES ON UTILIZATION OF WEED BIOMASS FOR SEED HEALTH OF JOWAR VAR. LOCAL

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Abstract

During the present studies, the seeds of Jowar var. local were soaked in 5% aqueous and ethanolic extracts of the test common weed plants for 24 hours at room temperature. The soaked seeds were placed on moist blotter plates, incubated for ten days at room temperature and the incidence of seed mycoflora and seed germination similarly seedling emergence was also studied. For this the soaked seeds were sown in earthen pots filled with garden soil. The pots were incubated at room temperature for ten days. The jowar seeds soaked in aqueous and ethanolic root extracts of Portulaca oleracea L. showed much reduced incidence of seed mycoflora, and maximum seed germination, seedling emergence, root and shoot length as compared to the control. The root, stem and leaf extract of Corchorus olitorius L., Euphorbia heterophylla L., and Cardiospermum helicacabum L., were found to be more stimulatory for seed mycoflora and inhibitory for seed germination and seedling emergence of Jowar var. local.

Key Words: *Weed biomass, Seed health*

INTRODUCTION

Jethro in 1731, defined first time a term "Weed" as 'a plant growing where it is not desired' in his much esteemed book 'Horse Hoeing Husbandry'. This definition deciphered the weedy nature of a plant to the situation in which it occurs and the attitude of mankind towards it. A plant could be unwanted at one place and time or desirable at the other. The weeds are defined by many workers such as Roberts, 1982; Dayton, 1948; Thakur, 1984 and Rao, 1992.

In India many unwanted plants so called weeds are very common dominant and wide spread in the various crop fields. They also occupy almost all open spaces. They spread like wild fire and grow abundantly in the crop fields and harm to the main crops. Plant resources have made substantial contribution to human welfare (Marshall et al., 2003). The progress of human beings has been associated with the use of plant resources especially for the supply of food, fuel, fiber and medicine. In ancient Indian literature it is observed that every plant on

this planet is useful in industry, medicine and allelopathy (Sastry and Kavathekar 1990). Indian economy depends greatly on the number of wild plant species including weeds. The weed diversity in the crop fields would be a great source of medicines. By identifying the potential national and international markets of common medicinal weeds, farmers can earn additional income (Oudhia and Tripathi 1997, 1998). The diversity of weeds in crop fields may prove a huge resource for the coming new biotechnologies. The weed diversity may prove a boon to farmers (Oudhia and Tripathi 1997, 1998). It may be a frontier. Therefore the detail study of weed diversity of crop fields and its utilization is an urgent need of human beings.

In the Marathwada region of Maharashtra state most of the crops are grown in kharif (Rainy) and Rabi (winter) season. The diversity of unwanted plants so called weeds in crop fields in Marathwada is very common, dominant and easily available. The weed diversity and its utilization particularly in the welfare of crop plants is least reported. The study of weed diversity and its utilization particularly in the welfare of crop plants feels to be a most urgent need of this region. Considering these facts present work is undertaken in view to weed diversity and utilization of common, dominant and easily available weeds in the crop fields for the welfare of the crops.

MATERIALS AND METHODS

During the present studies plant extracts of ten common and dominant weeds from different crop fields were screened for the seed health (incidence of seed mycoflora, seed germination and seedling emergence) of Jawar. For this powder of root, stem and leaves of the test weeds were prepared. Aqueous and ethanolic extracts of the powders were prepared by Soxhlet extraction method. The efficacy of the plant extracts of the weeds was studied against seed heaths of the test crop.

Preparation of powder of different part of the test weeds:

During present studies root, stem and leaves of the test weeds were surface sterilized separately with 0.1% $HgCl_2$ and subsequently washed to remove disinfectant; with sterile distilled water. They were kept for drying in hot air oven at 60^oC for 48 hours. The dried plant parts were crushed separately in to fine powder with the help of mixer grinder. The powder of root, stem and leaf powders of the test weeds were stored in polythene bags for the further studies.

Preparation of plant extracts:

The plant extracts of the root, stem and leaf powders of the test weeds were prepared by Soxhlet extraction method as described by Khandelwal, (2010).

Effect of plant extracts of selected weeds on seed health of Jowar:

During the present studies the seeds of local varieties Jowar were soaked separately in the 5% plant extracts of the selected common weeds for 24 hours. The incidence of seed mycoflora and seed germination of the soaked seeds were studied by moist blotter plate method. Similarly seedling emergence of the soaked seeds of the test crop was studied by sowing the seeds in clay pots and trays. The seeds soaked in sterile distilled water were served as control.

Incidence of Seed mycoflora and Seed germination:

The Incidence of Seed mycoflora and Seed germination was studied by moist blotter plate methods as described by ISTA (1966), De Tempe (1970), Neergaard (1977) and Agarwal (1981),

Collection of seed samples:

The methods prescribed by Paul Neergaard (1977) have been adopted for the collection of seed samples.

Incidence of Seed mycoflora and Seed germination:

The incidence of seed-borne fungi on the seeds and seed germination of Jawar were studied by moist blotter plate methods as recommended by ISTA (1966), De Tempe (1970), Mathur et al., (1975), Neergaard (1977) and Agrawal (1981), Mukadam (1997).

Seedling emergence:

The seedling emergence was studied by sowing the seeds in clay pots and trays filled with garden soil. For this seeds of the test crops were soaked separately in 5% root, stem and leaf extracts of the test weeds for 24 hours at room temperature. The soaked seeds were sown in clay pots and trays of same size filled with garden soil. The pots or trays were irrigated by hand and incubated at room temperature for ten days. The seeds soaked in distilled water were served as control. 400 hundred seeds of each crop were employed in every experiment.

RESULTS AND DISCUSSION

From the result presented in table-1 and plate-24 it is cleared that, the plant extract of 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 of jowar var. local.

The jowar seeds soaked in aqueous and ethanolic root extracts of *Portulaca oleracea* L. showed much reduced incidence of seed mycoflora, and maximum seed germination, seedling emergence, root and shoot length as compared to the control. It is followed by the plant extract *Cyperus rotundus* L. (water extract), Amaranthus *tricolor* L., *Cardiospermum helicacabum* L.(ethanol extract), *Phyllanthus amerus* Schumach.& Thonn., *Alternanthera sessilis* (L.) R.Br,ex DC, *Euphorbia heterophylla* L. and *Cardiospermum helicacabum* L.

The root, stem and leaf extract of *Corchorus olitorius* L., *Euphorbia heterophylla* L., and *Cardiospermum helicacabum* L., were found to be more stimulatory for seed mycoflora and inhibitory for seed germination and seedling emergence of Jowar var. local.

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

Sr. no.	Name of the source weed plant	Part used	Mycoflora Incidence (%)		SG (%)		RL (cm)		SL (cm)		SE (%)	
			We	Ee	We	Ee	We	Ee	We	Ee	We	Ee
1.	*Alternanthera sessilis* (L.) R.Br,ex DC	Root	40	60	40	50	1.8	2.3	1.7	1.4	51	45
		Stem	90	70	50	60	2.4	2.5	2.5	2.8	53	49
		leaves	50	70	50	70	2.1	2.3	2.5	2.9	69	32
2.	*Amaranthus tricolor* L.	Root	50	50	30	70	2.7	2.9	2.5	2.1	62	57
		Stem	40	70	40	60	2.4	2.6	2.4	3.2	65	71
		leaves	60	50	50	60	3.1	3.4	2.8	2.7	47	50
3.	*Cardiospermum helicacabum* L	Root	40	60	60	30	0.8	1.0	1.2	1.5	63	50
		Stem	60	60	70	80	0.5	1.9	0.9	1.6	45	65
		leaves	80	50	50	40	0.6	1.2	1.3	1.5	40	53
4.	*Corchorus olitorius* L.	Root	100	80	10	00	0.5	00	1.2	1.5	29	18
		Stem	80	90	30	20	0.5	1.1	0.3	1.6	45	40
		leaves	70	90	20	10	0.9	0.7	0.5	1.2	31	25
5.	*Cyperus rotundus* L.	Rhizome	30	10	70	70	2.8	2.5	4.2	1.8	87	70
		leaves	40	30	60	80	4.9	2.6	2.9	1.4	80	85
6.	*Euphorbia heterophylla* L.	Root	70	30	60	45	1.2	1.8	2.3	2.5	48	30
		Stem	40	50	50	50	1.7	1.7	2.1	2.3	52	32
		leaves	50	40	40	70	1.5	1.2	2.1	2.7	50	43
7.	*Euphorbia hirta* L.	Root	50	60	45	60	1.8	1.6	2.1	2.4	65	61
		Stem	60	70	60	70	1.6	1.4	1.9	1.7	69	60
		leaves	40	50	75	40	1.2	1.3	1.6	1.9	61	65
8.	*Phyllanthus amerus*	Root	50	20	70	60	3.9	3.8	2.7	2.9	78	63

	Schumach. & Thonn.	Stem	40	30	80	80	2.9	3.6	4.8	1.7	75	39
		leaves	40	20	70	80	2.5	3.7	3.9	3.5	80	50
9.	*Portulaca oleracea* L.	Root	10	00	100	90	6.4	4.7	7.9	5.2	92	87
		Stem	30	00	90	80	5.9	4.8	6.1	6.6	80	85
		leaves	10	00	100	80	5.2	4.8	5.8	3.5	90	90
10.	*Vicoa indica* (L.) DC.	Root	30	00	60	50	3.2	2.9	3.8	1.3	57	59
		Stem	40	20	60	40	4.7	3.4	3.6	1.5	86	50
		leaves	40	10	50	50	3.6	4.9	2.9	2.8	89	57
	Control	control	70	60	90	70	6.3	5.2	7.5	4.9	97	85

We = Water extract

Ee = Ethanol extract

SG= Seed germination

RL= Root Length

SL= shoot Length

SE= Seedling Emergence

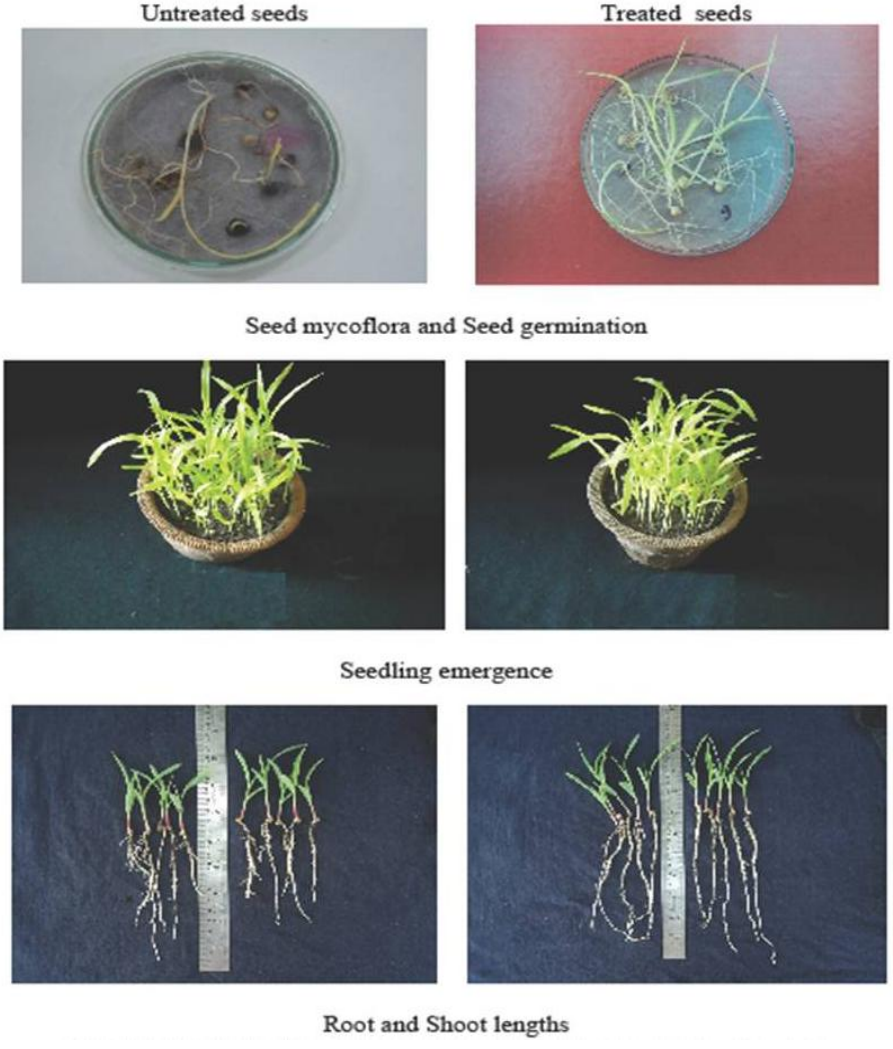

Plate-1: Effect of aqueous and ethanolic extract of some common weeds on seed health (incidence of seed mycoflora, seed germination and seedling emergence, root and shoot length) of Jowar var. local after ten days of incubation.

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