Indian Journal of Weed Science 42(1&2) : 107-108, 2010 **Short communication**

Germination and density of weeds as influenced by waste water irrigation in wheat

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ABSTRACT

The impact of waste water irrigation on weeds in wheat was studied during *rabi* season of 2008. It was observed that higher weed density was recorded in waste water irrigated sites as compared with tubewell water. The effect of untreated drain water was subsequently tested on major weed such as *Avena ludoviciana* in lab. The results revealed that the drain water increased the weed germination and promoted the shoot and root length of *A. ludoviciana* in wheat.

Key words: Weeds, *Avena ludovicianna,* Waste water irrigation.

Waste water has long been used for irrigating field and vegetable crops during dry season in peri-urban areas of India. The farmers also prefer to use this water because it is extremely valuable source for them as pumping cost from sewage drains is cheaper than a tube well, which makes the practice more accessible to them with fewer financial resources (Bakhsh and Hassan 2005). However, the indiscriminate use of untreated water on the farm lands has created the problems of weed infestation and pest incidences. The waste water has also been the mean for carrying weed seeds species in the fields through drains. Irrigation water was able to carry seeds over long distances without affecting viability (Dastgheib 2006). *Parthenium hysterophorus* was reported to be spread by seeds through waste water to agricultural fields (Sushilkumar and Vardhney 2007). High nitrate load in waste water also greatly increases the incidence of weeds. Therefore, an investigation was carried out to judge the effect of waste waters on germination and density of weeds in wheat crop irrigated with drain water at various contaminated sites of Jabalpur and adjoining areas.

The survey was carried out at various sites including Gohalpur, Ukhari, Urdhana, Panagar, Baldeobagh in Jabalpur and adjoining area during the winter season of 2008. Water samples were taken from different sites and assesed for water quality in contex to pH, electrical conductivity, chelorides, nitrates and phosphates. Weed samples were also collected from these fields using the quadrte of 50 cm^2. To confirm the weed infestation at farmers field sites, the seeds of *Avena ludoviciana* were collected for lab study. For seed germination test, on germination paper set in Petri dish, 10 ml of waste water was applied. Fifty seeds were kept in each Petri dish and incubated at 25^{0}C for 5 days, in three replicates. Tube well water was used as a control. Observations were recorded after 5 days.

The water quality parameters are given (Table 1). The germination of wild oat was observed under all waste waters in the range of 64-82.5% as compared to tube-well water (53.6%). Except at Ukhari site, higher shoot and root length of wild oat were recorded under all waste waters which was compared to tube well water (Table 2)**.** These results were in conformity with the results of Joseph *et al.* (2001) in respect of increased number of weeds grown in the waste water. The lower germination of wild oat under Ukhari water can be due to higher content of salts resulting

Table 1. Characteristics of waste water as a source of irrigation at different drain sites

Water properties	Sites of water source					
	Gohalpur	Panagar	Baldeobagh	Urdhana	Ukhari	Tube well water
pH	7.64	7.82	7.72	7.73	7.53	7.2
EC	1429	950	1128	1070	2430	1348
Chlorides (mg/ l)	120	90	150	110	130	50
Nitrates (mg/l)	10	20	10	10	10	ND
Phosphates (mg/l)	8	12	10	2	6	ND

ND=Not detected

Tables 2. Effect of waste water on germination, shoot and root length of *Avena ludoviciana* at 6 days.

Sites	Germination (%)	Shoot length (cm)	Root length (cm)
Gohalpur	82.5	3.36	3.60
Ukhari	64.0	2.03	2.29
Urdhana	78.6	3.48	3.74
Panagar	80.8	3.41	4.17
Baldeobagh	64.0	3.93	4.30
TW water	53.6	1.53	2.68
LSD (P= 0.05)	NA	0.40	0.68

higher electrical conductivity values touching to the moderate degree of restriction on its use (Pescod 1992). The quality parameters of waste water such as nitrates indicated the impact on wild oat (*Avena ludoviciana*) germination, shoot and root length in all waste waters as compared to the tubewell water (Table 3). Sexsmith and Pittman (1963) also reported the response of the wild oat in case of increased germination and growth to the nitrate nitrogen under both field and lab situation. The highest weed density was observed at Urdhana water followed by Panagar water while least density was observed at Ukhari site. The effect of waste water irrigation was found highly effective on the dry matter accumulation in the range of 25-67.6% in following decreasing order of weed density: Panagar > Urdhana > Ukhari > Gohalpur > Baldeobagh >Tube-well water. The higher weed dry weight in wheat recorded at Panagar site (80.2 g/m^2) was mainly due to the higher content of nitrates and phosphates and were in conformity with the results of Das and Yaduraju (1999). This showed that the nitrogen enhances the germination as well as growth of grassy weeds where as phosphorus plays a role in increasing the growth of broad leaf weeds. Similar impact of waste water on weed infestation were observed by the Maurer *et al.* (1995) in grape fruit and Gotz *et al.* (1985) in maize. It was found that waste water has the impact on weed infestation in terms of increased total weed density and total weed dry accumulation in general and on wild oat in particular.

Table 3. Total weed density in wheat as influenced by waste water irrigation

Sites irrigated with waste water	Weed infestation in wheat			
	Total weed density (no/m^2)	% increase over tube well water	Total weed dry weight (g/m^2)	% increase over tube well water
Gohalpur	25.0	24	33.0	22
Ukhari	20.0	5	39.0	33
Urdhana	38.0	50	72.5	64
Panagar	27.0	30	80.2	73
Baldeobagh	22.0	13	25.0	ND
Tube well water	19.0	-	26.0	-

ND=No difference

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