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Effect of Different Nitrates on Seed Germination of *Chenopodium* spp. (Linn.)

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Seed germination is essential for populations of annual species to maintain themselves. Seed dormancy may however result in poor germination. Dormancy in seeds can be caused by characteristics of the seeds or the environment. Dormancy in weeds is often highly developed, or it may be that certain plant species have become weeds because of the highly developed systems of dormancy that have evolved (Chancellor 1984). A large number of chemical substances have been tested for breaking dormancy of seeds, enhancing their permeability, inducing and hastening germination and thereby acting as chemical regulators for seed germination. According to Sen (1977), these chemical substances may behave as germination stimulators or inhibitors and their effects on imbibition and germination may vary. Among various chemical compounds, nitrate plays an important role in the germination behaviour of many weed species (Kumari et al. 1987, Mohammed 1988). An attempt was made to assess the effect of pretreatment of nitrates on seed germination of Chenopodium spp. in one year stored seeds collected frm three different habitats.

Seeds of *Chenopodium album* and *C. murale* were collected in 1986 and 1987 from three habitats, viz. New Campus, University of Jodhpur, Jodhpur, irrigated farmer's field near CAZRI (Central Arid Zone Research Institute) and Mandore, Jodhpur. The seeds were stored in polythene containers under laboratory conditions for breaking dormancy. One year old seeds of both species were used for germination studies. Germination studies were carried out in petri dishes lined with a single layer of filter paper and moistened with distilled water. The experiments were performed in 5 replicates with 20 seeds in each petri dishes and kept at 28±2°C. Seeds were soaked 48 h in different concentrations (50,100, 250, 500 and 1000 ppm) of ammonium, sodium and potassium nitrates. Observations for germination were taken at the end of 7 days and data were statistically analysed as per Gomez and Gomez (1984).

Among various chemicals, nitrates play an important role in breaking seed dormancy. Seeds of *C. album* and *C. murale* collected from different habitats exhibited maximum germination in 250 ppm NH_4NO_3. *C. murale* showed higher germination as compared to *C. album* (Table 1). It is clearly evident from the results that both Chenopodium spp. are nitrophilous in nature as they exhibited a remarkable enhancement of germination when treated with NH_4NO_3. *A remarkable* enhancement (80%) in germination of *Datyloctenium sindicum* seeds when treated with 1000 ppm NH_4NO_3. was observed by Kumari et al. (1987). Saini and Spencer (1987) observed 70% germination in *C. album* as compared to control (8%) when seeds were treated with 1000 ppm of KNO_3 . Kasera and Sen (1987) noticed that 50 ppm of NH_4NO_3. enhanced the germination percentage from 53.3 to 80% in one year old seeds in *Borreria articularis*. During the present studies, ammonium and sodium nitrates were found to promote the germination of both *Chenopodium* spp. pre-soaking treatment in 500 Ppm of KNO_3 and $NaNO_3$ resulted maximum germination in both *Chenopodium* spp. (Table 1). Seeds of *C. album* showed less germination in KNO_3 as compared to $NaNO_3$ Seeds of *C. murale* exhibited higher germination than *C. album* when seeds were soaked in different concentrations of all these three salts.

The seeds of *Chenopodium* spp. collected from three different habitats showed varying germination percentage, which have been caused by different kinds of dormancy, because dormancy is

Table 1. *Effect of different concentrations (ppm) of NH_4NO_3 (A), NaNo3 (B) and KNO3 (C) on seed germination (%) of C. album and C.murale from different habitats.*

onc. (ppm)	Campus			CAZRI			Mandore		
	A	B	C	A	B	C	A	B	C
	C. album								
0	33.3	33.3	33.3	43.3	43.3	43.3	30.0	30.0	30.0
50	43.3	33.3	30.0	50.0	56.6	53.3	23.3	30.0	26.6
100	50.0	–	–	53.3	–	–	26.6	–	–
250	56.6	43.3	43.6	56.6	60.0	66.6	46.6	56.6	36.6
500	40.0	50.0	56.6	50.0	76.6	50.0	36.6	70.0	60.0
1000	–	36.6	40.0	-	60.0	46.6	–	46.6	56.6
CD 5%	NS	NS	14.67	11.72	17.97	14.67	17.2	20.75	23.08
	C. murale								
0	66.6	66.6	66.6	70.0	70.0	70.0	46.6	46.6	46.6
50	70.0	80.0	76.6	80.0	73.3	76.6	63.3	56.6	56.6
100	70.0	–	–	83.3	–	–	70.0	–	–
250	90.0	83.3	76.6	90.0	76.6	83.3	90.0	60.0	73.3
500	80.0	90.0	86.6	80.0	86.6	86.6	76.6	76.6	76.6
1000	–	83.3	83,3	–	80.0	80.0	–	63.3	70.0
CD 5%	19.41	22.0	16.4	NS	NS	NS	22.01	19.41	11.6

NS = Non-significant and – = Not tested.

caused by seed characteristics or by a set of environmental conditions and different habitats. So, the result of the present study can be applied as an efficient method of weed control, if germination of weed seeds is manipulated (Chancellor 1981).

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