A REPORT ON POLYMORPHIC SEEDS IN HALOPHYTES I. *TRIANTHEMA TRIQUETRA* L. IN INDIAN DESERT

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ADAPTATION of plants to saline environment induces morphological, anatomical, phenological and eco-physiological changes. These changes are prominent in species growing at different habitats. Seed polymorphism is a common feature for adaptation which includes production of seeds, different in sizes, seed coat patterns, weight, dormancies and germination requirements[1]. A number of plant species growing in saline environments are found to develop some form of seed dimorphism or polymorphism[2,3]. The existence of a specificity of a variety of germination regulating mechanisms, seed form variation or polymorphism, and their frequent complexity are proofs of eco-physiological adaptations which increases the potential for survival of species in the normal pattern of evolution[4]. The present study deals with the occurrence of polymorphism in seeds of *Trianthema triquetra* L. collected from three localities with different germination behaviour.

During seed collection of *T. triquetra* from Jodhpur, Pachpadra and Didwana, (the latter two represent extreme saline areas) polymorphic seeds were discovered (figure 1), which differ in seed coat pattern, weight, size, viability and germination behaviour (tables 1 and 2).

Table 1 reveals that the seeds of *T. triquetra* at Jodhpur and Didwana are respectively black and deep black in colour, while they were light black at Pachpadra. Remarkable differences were observed in seed weight and size. The seeds of Jodhpur were heavier than those of Pachpadra and lighter than those from Didwana. On the basis of the weight, the

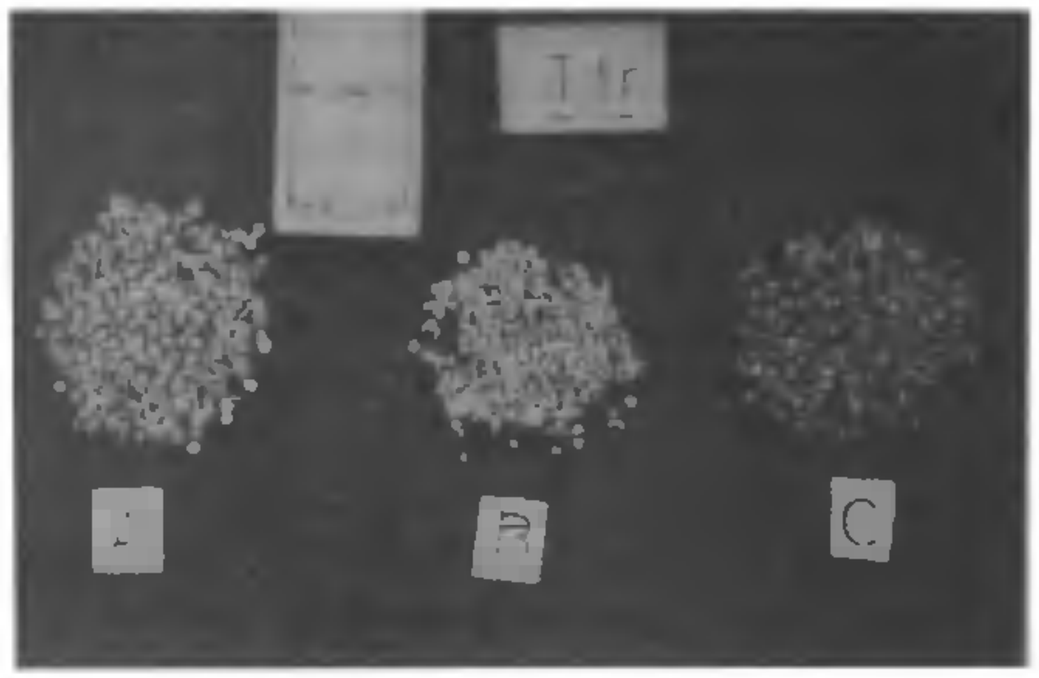

Figure 1. Polymorphic seeds from three localities in *T. triquetra*: Jodhpur (A), Pachpadra (B) and Didwana (C).

size of seeds at Pachpadra was also the lowest. There was no difference in seed shape. The viability of seeds was also different at the three sites (40, 80 and 70% from Jodhpur, Pachpadra and Didwana, respectively).

Germination study (table 2) revealed that the seeds of the three localities exhibited hard seed coat dormancies as 8.8%, 48.7% and 35% in seeds from Jodhpur, Pachpadra and Didwana, respectively in control. Slightly enhanced germination percentages were recorded when seeds were treated with NaCl and $MgSO_4$. The seeds of Pachpadra (small seeds) showed higher germination percentage than those from Jodhpur and Didwana. It is also clear that the seeds of the three different localities behave differently towards a particular salt solution.

Williams and Harper[5] demonstrated that polymorphic seeds differed in their germination requirements. Germination polymorphism is of significance because it provides alternate temporal and spatial germination situations. Two types of seeds were observed in *Cyperus rotundus*, the heavier ones showed a better germination percentage than the lighter samples[6]. In the present study heavier seeds showed less germination percentage compared to

Table 1 *Colour, weight, size and viability in polymorphic seeds of T. triquetra (shape: Orbicular and concave-convex)*

Locality	Colour	Weight (mg) (100 seeds)	Size (mm)		Viability (%)
			Length	Bredth	
Jodhpur	Black	35 ± 1.4	1.18 ± 0 08	1.10 ± 0 04	50 ± 10.0
Pachpadra	Light black	22 ± 2 0	0 98 ± 0 02	0.95 ± 0.009	80 ± 0.0
Didwana	Deep black	47 ± 1.41	1.17 ± 0 06	1.08 ± 0.03	70 ± 5 0

Table 2 *Effect of different concentrations of sodium chloride and magnesium sulphate on germination of polymorphic seeds of T. triquetra*

		Nacl				$MgSO_4$			
Locality	Control	0.01 (0.27)	0.1 (2.0)	0.5 (9.25)	1.0 (15.75)	0.01 (0.17)	0.1 (1.17)	0.5 (4.57)	1.0 (7.98)
Jodhpur	8.86 ± 1.96	10.0 ± 0.0	13.3 ± 5.7	6.6 ± 5.7	0	10 ± 0.0	10 ± 0.0	10 ± 0.0	0
Pachpadra	48.62 ± 6.36	43.33 ± 5.77	30.0 ± 17.3	16.6 ± 11.54	0	55 ± 21.21	50 ± 0.0	40 ± 0.0	25 ± 7.07
Didwana	35.0 ± 5.77	10.0 ± 0.0	20.0 ± 0.0	45.0 ± 15.0	20 ± 10	25 ± 7.07	35 ± 5.0	30 ± 0.0	10 ± 0

Figures in parentheses indicate electric conductivity (mmhos/cm at 25°C).

lighter seeds and this observation is contrary to that by Sen[6].

The seeds of *T. triquetra* were classified into three types on the basis of their weight. This difference may be due to different soil salinity levels at three localities. High salinity may account for the reduction in seed size. Salinity is known to affect many aspects of plant metabolism like anatomy, morphology and seed size[7].

Owing to this variability in seeds, the occurrence of polymorphism can lead to better establishment of the plant species in varied ecological conditions, especially in deserts; and hence a preliminary step towards evolution[8].

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A NEW CHROMOSOME NUMBER REPORT IN *CHLORIS BOURNEI* RANG AT TAD

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THE genus *Chloris* belongs to the tribe Chlorideae of the family poaceae (Gramineae) and comprises 27 sp. distributed in tropical Africa, America, South-East Asia and China. In India some species of *Chloris* are available at the Coromandal coast and gangetic plains. A preliminary survey of the Nagarjuna University campus grassland and the surrounding areas revealed the occurrence of the following three species (chromosome numbers in brackets): *C. barbata* (L.) SW, ($2n = 40$), *C. montana* SW ($2n = 40$) and *C. bournei* Rang at Tad ($2n = 60$). Among these *C. bournei* with $2n = 60$ was found to be a new report. According to the basic number 10 in the tribe chlorideae[1,2] this form is a hexaploid race of the species. *C. bournei* is well-differentiated

Table 1 *Morphological characters of C. bournei, 2n = 60*

Stem length (cm)	70.73 ± 21.63
Root length (cm)	18.72 ± 5.46
Number of leaves	52.33 ± 21.76
Number of tillers	5.6 ± 3.53
Leaf length (cm)	14.20 ± 5.45
Leaf breadth (mm)	5.2 ± 0.99
Flag leaf length (cm)	5.86 ± 2.73
Flag leaf breadth (mm)	3.00 ± 0.78
Internode length (cm)	21.28 ± 16.16
Stomatal index	28.78
Inflorescence number	2.53 ± 1.52
Number of spikes	6.56 ± 1.27
Length of spike (cm)	7.58 ± 0 94
Number of spikelets	56.46 ± 5.50
Pollen fertility	80.9%
Pollen grain size (μ)	24–32