2. Meyer, H., Preis, B. and Bauer, S., *Biochem. J.*, 1960, **76**, 27.
3. Clegg, J. S. and Evans, D. R., *J. Exp. Zool.*, 1961, **38**, 771.
4. Bursell, E., *J. Insect Physiol.*, 1963, **9**, 439.
5. Rakshpal, R., *Curr. Sci.*, 1973, **42**, 240.
6. Islam, A. and Roy, S., *Proc. Indian Natl. Sci. Acad.*, 1982, **B48**, 26.
7. Bailey, E., *Insect Biochemistry and Function*, Chapman and Hall, London, 1975, p. 91.
8. Bursell, E., *Nature (London)*, 1960, **187**, 778.
9. Gilmour, D., *Biochemistry of insecta*, Academic Press, New York and London, 1961, p. 101.
10. Schoffeniels, E. and Gilles, R., *Chemical zoology*, Vol. 5, Academic Press, New York and London, 1970, p. 199.
11. Lehninger, A. L., *Biochemistry*, Kalyani Publishers, Ludhiana, New Delhi, 1979, 559.
12. Winteringham, F. P. W., *Fourth Int. Cong. Biochem.*, 1959, **12**, 201.
13. Chefurka, W., *Physiology of insecta.*, Academic Press, New York and London, 1965, p. 669.
14. Meyer, R. J. and Candy, D. J., *J. Insect Physiol.*, **15**, 611.

EFFECT OF SALINITY ON PROTEIN CONTENT AND SEED (SIZE OF CHICKPEA (*CICER ARIETINUM* L.)*

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FROM the nutrition point of view, chickpea (*Cicer arietinum* L.) is the most important pulse crop in India. It is considered to be a hardy crop and is usually grown on marginal land that often has poor soils. In several parts of India chickpea is often grown on saline soils. Salinity not only reduces crop growth severely but in extreme conditions can also lead to complete failure of the crop[1]. Little is known about the effects of salinity on the characteristics of chickpea plants grown under extremely saline conditions. This note presents data on the protein content and seed size of chickpea grown on highly saline vertisols at ICRISAT Center, Patancheru, near Hyderabad in the post-rainy seasons of 1977–78 and 1979–80. Seed weights were estimated from one sample of 100 seeds from each plot with four replications. Protein contents were determined on whole seed samples by analysing for total nitrogen using a Technicon autoanalyser[2]. Differences between mean values were compared using a 't' test.

Salinity significantly reduced 100 seed weight and per cent seed protein in each of the three sets of materials tested in 1977/78 and 1979/80 (Table 1). Desi and Kabuli genotypes were similarly affected with respect to these two chracteristics although it is known that adverse soil conditions are more detrimental to kabuli than desi cultivars. The implications of the present study are very important from protein-calorie malnutrition point of view. Reduction in both protein per cent and seed size *per se* as a result of saline soil conditions will attribute to a decreased level of protein per seed and thereby the protein yield per unit area will be reduced. Also the reduced seed size will affect the consumer acceptance. These effects are also important in breeding programmes where salinity may cause unwanted variations in seed size and protein content and interfere with selection. Considering these implications and the indications that cultivaral

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TABLE 1

Mean values for 100-seed weight and protein per cent of chickpea genotypes grown in saline (S) and nonsaline (N) soils near Hyderabad, India.

Year	Desi/Kabuli	of genotypes		Soil conditions pH	EC	100 seed wt (g)	Protein (%)
1977–78	Desi	9	S	8.0	1.2–3.4	13.1 ± 0 12	12.0 ± 0.06
			N	8.2	<0.15	21.5 ± 0.75	21.3 ± 1.79
	Kabuli	9	S	8.0	0.55–0.60	14.2 ± 0.11	12.0 ± 0.08
			N	8.2	< 0.15	22.8 ± 0.42	21.4 ± 1.89
1979–80	Desi	15	S	8.8	1.5–3.4	13.8 ± 1.29	15.3 ± 0.50
			N	8.2	< 0.20	18.3 ± 1.87	22.7 ± 0.65

*pH and EC (Electrical Conductivity) were measured on a soil to water ratio of 1:2.

differences do exist, further studies to identify tolerant materials are needed.

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1. Chandra, S. 1979. In *Proc. Intl. Workshop on Chickpea Improvement*, Feb. 1979. pp 97, ICRISAT Hyderabad, India
2. Singh, U. and Jambunathan, R., *J. Sci. Food Agric.*, 1980, **21**, 247.

B-CHROMOSOME OCCURRENCE IN WEST AFRICAN POPULATIONS OF PEARL MILLET

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THE presence of B-chromosomes in populations of *Pennisetum typhoides* (Burm.) S & H (*Pennisetum americanum*, Leeke) from Sudan[1] and from Nigeria[2,3] was reported earlier. B-chromosomes (Bs) present in Sudanese populations of pearl millet were largely heterochromatic and numerically unstable. The Bs reported by Powell and Burton[2], were euchromatic and nucleblous organizing ones, and were unstable. These Bs were of different sizes, *viz.*, small, medium and large, the large ones according to them were isochromosomes. Burton and Powell[3] reported heterochromatic Bs in other populations of Nigerian origin, which resembled in behaviour those described by Pantulu[1]. Subba Rao and Pantulu[4], obtained two derivative Bs, *viz.*, deficient and iso Bs from standard Bs (the original) Bs obtained in Sudanese material by Pantulu[1] were designated since then standard Bs).

The Bs reported so far are from pearl millet populations of West African origin only. Studies from cultivars from South Africa, Rhodesia, Kenya, Ethiopia and India did not reveal the presence of Bs in them. With a view to finding out if more cultivars of West African regions would carry Bs and if present, whether all of them will be of similar type, a preliminary survey of accessions from Cameroon, Upper Volta, Mali and Niger has been carried out. Bs were observed in one population from Cameroon, two populations from Upper Volta and one population from Mali.

Cameroon Population: The Bs in this population resemble the standard Bs present in Sudanese material in their heterochromatic nature. These Bs show numerically less variation within plants (table 1) than of Sudanese Bs: though, between plants, the variation corresponds with that of Sudanese Bs. These Bs never pair with A-chromosomes, but pair among themselves to form multivalents, when present in higher numbers (figure.1).

Upper Volta-Population *1*: These Bs are largely heterochromatic, resembling the Bs present in Cameroon population. Within plant variation in B-number is less than even in Cameroon population (table 1). When Bs are present in higher numbers, they pair to give multivalent associations (figure.2).

TABLE 1

Frequency distribution of different B-classes in 4 populations, each one represented by a single plant

	Cameroon	Upper Volta-1	Upper Volta-2	Mali
Frequency distribution of different B-classes:				
0	0	—	1	1
1	3	—	7	45
2	288	—	42	233
3	29	—	0	15
4	—	—	6	17
5	—	145	14	38
6	—	4	2	1
7	—	—	1	—
Model B number	2	5	2	2
Mean number of Bs	2.08 ± 0.02	5.03 ± 0.01	2.79 ± 0.04	2.34 ± 0.07
Number of cells studied	320	149	73	350