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Effect of Salinity on Seed Emergence of Pearl Millet (*Pennisetum americanum*) and Sorghum (*Sorghum bicolor*) in *Kxari* and *Goradu* Soils.

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In crop production, the germination and emergence of the seed is a controlling factor because the plant population of the standing crop counts towards the yield.

The plant is ultimate result of the soil environmental conditions which affect growth and mineral content of plants Ayers (1952) reported that there are a number of factors that affect the germination in soil. The expansion and contraction, the cracking of soil, moisture content and the kind and amounts of ion present, all influence germination. On drying of soil, surface tension increases, which affect seed germination and plant growth. The physico-chemical effect of salinity and osmotic pressure upon the seed and seedlings have been shown by Uhvists (1946) and Ayers and Hayward (1949).

A green house experiment was therefore conducted in the Agricultural Chemistry and Soil Science Department at the B. A. College of Agriculture, Anand with an aim to test the effect of varying Na/Ca ratios (Salinity levels) on germinations in two different soils i.e. *Kyari* and *Goradu*.

The soils brought from the field were air dried and passed through a 2 mm sieve. 0.5 kg of dry soil was taken in to Buchner funnel and was leached with successive portions of N NH_4 Cl solution of pH-3 and filtered till the pH of the leachate reached a value of 3. Thereafter, by using the solution of N NH_4 Cl having pH value of 7, the above treated soil was treated with N $CaCl_2$ solution till it was free from ammonia. The chlorides of various exchangeable cations were removed by leaching with distilled water till free from chlorides. Thus Ca-soil was prepared. After drying the above Ca-soil it was passed through 2 mm sieve. Calculated quantity of sodium bicarbonate solution just sufficient to wet the soil was added to 5 kg of Ca-soil and was well mixed to prepare variable Na/Ca ratio (Salinity level) in the exchange complex of soil. The details of different Na/Ca ratios obtained and the required quantity of sodium bicarbonate added to achieve the same in *Kyari* and *Goradu* soils are presented in Table 1. Fifty seeds per pot of each crop were sown. The germination count was taken after 7th day of sowing upto 10th days. The seeds were considered as germinated when the plumule come out from sur-

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TABLE 1

Germination (%) of pearl millet and sorghum as affected by different salinity levels in *Kyari* and *Goradu* soils.

Treatment	*Kyari Soil*				*Goradu Soil*			
	Amount of $NaHCO_3$ added /5 kg of Ca-soil(g)	*Germination %*			*Amount of $NaHCO_3$ added /5 kg. of Ca-soil (g)*	*Germination %*		
		Pearl millet		*Sorghum*		*Pearl millet*		*Sorghum*
Control	00.00	100.00	(89.43)*	100.00 (89.43)	00.00	100.00	(89.43)	100.00 (89.43)
Ca Soil	00.00	100.00	(89.43)	100.00 (89.43)	00.00	100.00	(89.43)	100.00 (89.43)
0.20 (Na/Ca)	50.40	63.75	(53.14)	22.50 (27.96)	35.70	85.00	(67.35)	63.75 (53.14)
0.27 (Na/Ca)	105.00	31.25	(33.94)	00.00 (00.57)	52.50	63.75	(53.14)	63.75 (53.14)
0.33 (Na/Ca)	157.92	00.00	(00.57)	00.00 (00.57)	68.30	50.00	(45.00)	23.75 (28.91)
0.41 (Na/Ca)	212.06	00.00	(00.57)	00.00 (00.57)	86.10	31.25	(33.94)	22.50 (28.23)
S. Em.			0.95	6.15			0.85	5.07
C.D. @ 5%			2.80	18.40			2.50	14.96

*Transformed values

face of the soil and remained green upto 21 days.

The data (Table 1) revealed that germination of pearl millet and sorghum in both types of soils was hundred per cent in control and in Ca-soil. With increasing Na/Ca ratios (Salinity levels) there was decrease in germination in *Kyari* soil. The pearl millet failed to germinate when Na/Ca ratios were 0.33 and 0.41 (Salinity level) whereas the sorghum failed to germinate even at 0.27 Na/Ca ratio (Salinity level). This probably suggests that pearl millet can withstand higher Na/Ca ratio as compared to sorghum in *Kyari* soil.

In the case of *Goradu* soil, the germination was also affected with the increasing level of salinity. Pearl millet showed 31.25 per cent germination at the highest level of salinity, where as sorghum showed 22.50 per cent germination at the same Na/Ca ratio (salinity level) of 0.41. Thus, pearl millet was more salt tolerant than sorghum. Abhichandani and Bhatt (1965) have also reported that pearl millet was more salt tolerant than sorghum. The cause of injury may be attributed to increase osmotic pressure of the soil solution which may retard the entry of water in the cell or salt concentration may be toxic to the embryo of the seed. It may also increase surface tension forces acting on the soil.

The comparison of *Kyari* and *Goradu* soils indicated that the seeds ceased to germinate at low salinity level in *Kyari* soil, while in *Goradu* soil the germination decreased progressively upto the highest salinity level studied The cause may be due to the porosity and air space which might have decreased the germination with increased salinisation (Colmenares and Blasco, 1974). From textural view point such a decrease may completely affect the available oxygen in heavy soil. Hence, the germination may be decreased to a greater extent in *Kyari* soil as compared to *Goradu* soil at a particular salinity level.

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