

Table 1. Yield of and returns from pigeonpeas grown on an Alfisol with three irrigation treatments and six spacings at Hyderabad, A.P., India in 1979 and 1980.

Treatment	Seed yield (kg/ha)			Cost of cultivation (Rs/ha)	Net profit (Rs/ha) ^a	
	1979	1980	Mean			
<u>Irrigation levels</u>						
Two irrigations	815	734	775	2008	705	
Three irrigations	966	1095	1031	2068	1541	
Four irrigations	1219	1127	1173	2106	2000	
CD (5%)	68	168				
SE \pm	20	49				
<u>Plant spacing</u>						
Plant spacing	Plants/m ²					
30 x 10 cm	33	1172	1116	1144	2106	1898
45 x 10 cm	22	1132	1116	1124	2056	1878
30 x 20 cm	17	979	1045	1012	2057	1485
60 x 10 cm	17	994	986	990	2056	1409
45 x 20 cm	11	886	917	902	2007	1150
60 x 20 cm	8	835	735	785	1982	766
CD (5%)		40	71			
SE \pm		14	25			

^aPrice of pigeonpea Rs 3.50 per kg; One U.S. dollar approximately equals Rs 9.00.

the postrainy season in our part of peninsular India.

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Does Soil Cracking Reduce Pigeonpea Yields?

At Hyderabad, India, medium-duration pigeonpea cultivars planted at the normal time, in June or July with the onset of the monsoon, enter their reproductive phase after the cessation of the rains in September or October and mature around December.

They are then usually harvested by cutting the plant at ground level. However, if pods are picked from the plants (Sheldrake and Narayanan 1979), or if the plants are ratooned (Sharma et al. 1978), they go on to produce a second flush of pods, which matures around March.

In the absence of irrigation, the development of the second flush depends on the use of moisture stored within the soil. We have compared the second harvest yields of unirrigated pigeonpeas on red soils (Alfisols) and on deep black soils (Vertisols). The latter have a considerably higher water-holding capacity than the former. We therefore expected the second harvest yields to be greater on Vertisols than Alfisols. Over a period of 5 years, however, we have found that without exception the reverse was true

(Table 1). Over this period, the average first harvest yields were almost the same on both soil types, but second harvest yields were over three times higher on the Alfisols.

We have been unable to explain these surprising results in terms of nutrient or micronutrient deficiencies on Vertisols, nor can they be accounted for in terms of differential disease or pest attack on the two soil types.

We now think that the relatively low second harvest yields on Vertisols may be due to the deep cracks that develop in these soils as the dry season advances. Besides providing a ready avenue for the loss of soil moisture, soil cracking causes exten-

sive damage to roots, many of which are stretched or ruptured as the cracks widen. Such cracks do not appear in Alfisols.

Observations on chickpeas grown at ICRISAT Center on Vertisols during the postrainy season also suggest that soil cracking leads to yield reductions; indeed this may be a general phenomenon in crops grown on cracking soils.

We are at present conducting experiments to test the hypothesis that the rupturing of the roots is a major factor in reducing yields on cracking soils.

References

- SHARMA, D., SAXENA, K.B., and GREEN, J.M. 1978. Potential of ratooning in pigeonpea. *Field Crops Research* 1: 165-172.
- SHELDRAKE, A.R., and NARAYANAN, A. 1979. Growth, development and nutrient uptake in pigeonpeas (*Cajanus cajan*). *Journal of Agricultural Science (Cambridge)* 92: 513-526.
- A.R. Sheldrake and N. Venkataratnam (ICRISAT)

Table 1. First and second harvest yields of medium-duration pigeonpeas grown in different years on Alfisol and Vertisol at ICRISAT Center without irrigation. The first harvest yields were collected by picking the pods at normal time of harvest in December. The second harvest was taken in March.

Year	Cultivar	First harvest yield (kg/ha)		Second harvest yield (kg/ha)	
		Alfisol	Vertisol	Alfisol	Vertisol
1976-77	No.148 and AS-71-37 (mean)	1234	689	1024	339
1977-78	BDN 1	1581	1769	704	337
1978-79	BDN 1	1130	1607	531	152
1979-80	BDN 1	1315	1102	253	56
1980-81	BDN 1	699	690	785	85
Mean		1192	1171	659	194

Response to Irrigation in Postrainy-Season Pigeonpea

In India, pigeonpea is traditionally grown as a rainy-season crop. Reports on pigeonpea as a postrainy crop appeared in the literature as early as 1908. In recent years it has again been demonstrated that pigeonpea can be grown as a successful postrainy-season crop in areas where winter temperatures are relatively mild.

Crop growth and per plant yield of postrainy-season pigeonpea are drastically reduced because of their sensitivity to the short days at that time. To compensate for the reduced growth, it is necessary to increase the plant density from around 4 plants/m² in rainy season to 33 plants/m² and above in the postrainy season. Even then, the yields are low because the crop must grow only on the moisture stored in the soil profile from the preceding rainy season. This moisture recedes as the crop growth proceeds. In areas, however, where the water table is high or winter rains are good, the yields may be equal to that of a rainy-season crop. Water