

Factors contributing to low peanut yields in the South Burnett

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The static peanut yields in the South Burnett (approx. 1,200 kg ha⁻¹ over last 25 years) contrast with the increase in average yield from 900 kg ha⁻¹ to 3,500 kg ha⁻¹ recorded in the USA. The "package of production technology" that provides the framework for the improved USA productivity has been described (1). With the exception of cultivar improvement much of this package has been adopted locally without apparent yield effects. Experiments involving a range of technical inputs to identify factors limiting yield have begun. A major aim is to determine the extent to which soil physical properties influence crop performance.

Methods

The 1980 experiments were sited on a krasnozem soil with a 50-year history of peanut production and an average yield of below 1,200 kg ha⁻¹. The plants showed primary root distortion, thought to be due to a compacted layer 10-15 cm below the surface. This paper reports the effect on yield, plant mortality resulting from soil insects and disease, and root distortion of (i) deep ripping to 40 cm and (ii) soil fumigation (dazomet, a.i. 200 kg ha⁻¹).

Results and Discussion

Table 1. The effect of deep ripping and soil fumigation on peanuts.

	Yield ^(a) t/ha	Irrigated		Yield ^(a) t/ha	Non Irrigated	
		% Plant Mortality			% Plant Mortality	
		Soil ^{(a)(c)} Disease	Soil ^{(b)(d)} Insect		Soil ^{(a)(c)} Disease	Soil ^{(b)(d)} Insect
Ripped	2.32*	6.6	<1.0	1.44	7.4	2.7
Non Ripped	2.02	7.4	<1.0	1.42	9.2	3.1
Fumigated	2.32*	5.2	<1.0	1.51	6.3	2.8
Non Fumigated	2.01	8.8**	<1.0	1.35	10.4**	3.0

(a) Main effects differ significantly: *P < 0.05, **P < 0.01. (b) Data not analysed. (c) (i) Calonectria crotalariae, (ii) Diplodia natalensis, (iii) Aspergillus niger, (iv) Sclerotium rolfsii. (d) Graphognathus leucoloma.

Distortion of the primary root (observed in 44% of plants) was not influenced by deep ripping. The distortion was first observed in the hypocotyl before emergence and may result from seed damage. In Canada significant yield reduction from similar seed damage has been observed (2).

Deep ripping and soil fumigation improved yield under irrigated conditions although the effects were not additive. Damage to the mature peanut pod by scarab larvae (Heteronyx sp.) was also important in determining yield. The scarab damage recorded (15-30% of harvested pod number) was not influenced by treatment.

The effective control of diseases, insects and probably nematodes offer avenues for yield increase. Control of such organisms will be required, first to allow an assessment of the influence of soil physical deterioration as a result of intensive cultivation, and second to provide a suitable environment in which the advantages of improved cultivars can be realised.

1. Henning, R.J., McGill, J.E., Samples, L.E., Swann, C., Thompson, S.S., Womack, H. 1979. University of Georgia Bulletin 640.

2. Ablett, G.R., Roy, R.C. and Tanner, J.W. 1981. Peanut Sci. 8: 25-30.