The performance of a guar-triticale rotation on deep siliceous sands in South-East Queensland

J.A. Doughton

Queensland Wheat Research Institute,
Toowoomba, Old, 4350

Guar is an annual, summer growing grain legume adapted to semi-arid tropical and sub-tropical regions (1). Seeds of guar contain galactomannan gum, a commodity with many industrial uses in modern society.

Experience with guar in Australia has shown that the crop yields unreliably when grown on medium to heavy textured soils. Poor root penetration, variable nodulation, root diseases and susceptibility to waterlogging have all been implicated.

In the summer of 1981-82, experimental plantings of guar (cv. CP177) were made on a deep siliceous sand (Uc 1.21)(2) near Leyburn in south-east Queensland. This sand, with a 60-110 cm deep A horizon overlying red-yellow mottled clay, was selected as an extreme example of a freely draining, light textured soil and one on which several of the above problems might be avoided.

Methods

Before planting, a basal fertilizer dressing containing all major nutrients except nitrogen and the minor nutrients Cu, Zn, Mo, Mn and B was applied. On 5 November, 1981, guar was planted in 71 cm rows at 6, 12 and 18 kg/ha.

Other plots were maintained in fallow during the summer. Layout was a randomized block design with six replicates.

In the following winter, urea was applied at six rates to plots previously in fallow. These and the previous guar plots were then planted to triticale (cv. Dua at 35 kg/ha) on 17 July, 1982. Soil nitrate nitrogen was monitored throughout the experiment. Grain yields of both guar and triticale were measured.

Results and Discussion

Guar grew well on the sandy soil. Root growth, health and nodulation were excellent with plants maintaining a healthy, vigorous appearance.

Grain yields were not significantly different for the three planting rates and averaged 758 kg/ha. Guar had a marked effect on raising soil nitrate nitrogen levels. At the start of the trial there was no detectable nitrate in the soil's A horizon. However, when the triticale was planted, soil that had grown guar contained 37 kg nitrate nitrogen/ha compared with only 5 kg/ha in continuously fallowed plots. This difference, which was significant (P)0.05) was reflected in subsequent triticale grain yields. Triticale grown after fallow, with no applied nitrogen, yielded 1000 kg/ha whereas after guar it yielded 2004 kg/ha. The highest rate of nitrogen applied to the fallow soil, 71 kg N/ha, produced a yield of 1849 kg/ha. LSD (P = 0.05) for yield was 289 kg/ha.

These results indicate that guar is suited to light textured, free draining soils. The crop can yield well on such soil and provide substantial benefits to subsequent cereal crops. Similar siliceous sands are found throughout northern New South Wales and southern Queensland. They are cropped irregularly, mostly to cereal crops for winter grazing and have generally been considered unproductive. The results from this experiment indicate that with suitable crop rotations they need not remain so.

1. Jackson, K.J., Doughton, J.A. 1982. J. Aust. Inst. Agric. Sci. 48: 17-32.

2. Northcote, K.H. 1979. A Factual Key for the Recognition of Australian Soils. Rellim Technical Publications, Adelaide.