EFFECT OF PREVIOUS CROPPING WITH SOYBEANS ON THE NODULATION OF SOYBEANS ON THE DARLING DOWNS, QUEENSLAND

Bowen (1956) placed soybean (*Glycine max* (L.) Merr.) in the group of introduced legumes of the cowpea miscellany nodulating naturally in various parts of Queensland.

Persistent reports have been made of nodulation difficulty with soybeans when grown on the black soils of the Darling Downs. Several crops on a dark-brown clay loam at Hermitage Research Station on the south-eastern Darling Downs have been observed to show no nodulation after being sown with inoculated seed. However, volunteer plants in ground previously under soybeans have been observed to be well nodulated.

A pot experiment was set out using inoculated and uninoculated seed of the soybean variety Nanda. The soil used was a dark-brown clay loam from two locations at Hermitage. The first location was, as far as can be ascertained, virgin for soybeans. The second location was under soybeans in 1960-61: this crop had been inoculated at planting, but failed to nodulate.

Pot treatments applied on February 26, 1962, were:

(A) First-year soil; seed inoculated
(B) First-year soil; seed uninoculated
(C) Second-year soil; seed inoculated
(D) Second-year soil; seed uninoculated.

Each treatment was replicated four times. Six-inch plastic pots, undrained, were used for the experiment and watering was arranged so that each pot was periodically adjusted to approximate field capacity.

On May 14, 1962, roots were examined for nodulation, which was assessed by counting the nodules per plant root system; fresh weights of nodules and plant roots were also recorded. Results are shown in Table 1.

TABLE 1

RESULTS OF NODULATION TRIAL

Treatment	A	B	C	D
Number of plants ..	11	15	13	19
Number of nodules ..	15	nil	144	133
Weight of roots (g) ..	40·3	57·1	46·0	45·3
Weight of nodules (g)	0·67	—	8·18	8·60

On the first-year soil, poor nodulation was recorded with inoculated seed (1·3 nodules per plant), whereas nodulation was much improved on second-year soil using both uninoculated and inoculated seed (7-10 nodules per plant). Uninoculated seed planted in first-year ground failed to nodulate.

No differences in plant growth were observed between treatments during the seedling stage. At the time of root inspection, plants in Treatment B showed a definite yellowing in colour and slight stunting in growth indicative of a probable effect of no nodulation. Plants in Treatments C and D generally were of a greener colour than those in Treatments A and B, but as the soils were collected from different locations it would be unwise to ascribe this colour effect to differences in nodulation.

Results of the pot experiment indicated that the failure of soybeans to nodulate in new ground is a probable cause of the difficulty in obtaining satisfactory nodulation in the crop on the dark-brown clay soils of the Darling Downs. The strain of inoculum used appeared to be effective, but not in the first year.

REFERENCE

BOWEN, G. D. (1956).—Nodulation of legumes indigenous to Queensland. *Qd J. Agric. Sci.* 13:47-60.

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(Received for publication January 9, 1964)