

RHIZOBIUM INOCULATION AND OIL CONTENT OF SOYBEAN SEEDS *GLYCINE MAX* (L.)

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It is reported that the oil per cent of soybean seeds decreases with an increase in yield, resulting from *Rhizobium* inoculation¹⁻³. The results of two independent experiments with the strains of *R. japonicum* and their composites, presented in this paper, show that though, initially the oil per cent decreases with an increase in yield, at much higher yields, it becomes nearly constant. Field experiments were carried out at Bangalore⁴ using soybean (*Glycine max*) var. *Davis*, by raising plants after inoculating seeds by the usual procedure. The oil per cent of the samples was determined by the pulsed NMR technique⁵.

The results presented in Fig. 1 show that the oil per cent of the seeds decreases with increase in yield of grains and this in turn is related to the efficiency of *R. japonicum* strains. A quantitative

significantly with the increase in yield over the control, at much higher yields the oil per cent becomes nearly constant at a reduced level and does not decrease further with increase in the yield.

Table I provides data on oil production (oil per cent × yield) per hectare, which reveals the fact that in spite of the observed decrease in oil per cent due to *Rhizobium* inoculation, the net oil production per hectare in the inoculated series is far greater than uninoculated series. This is because the increase in yield due to the inoculation is much more than the decrease in the oil per cent.

TABLE I

Influence of Rhizobium inoculation on the oil content of soybean seeds (var. Davis)

Treatment	Oil production kg/ha* (oil per cent × yield)
Control plants (Uninoculated)	54.12
<i>Inoculated plants</i>	
Hissar (P 10)	77.40
E 177	92.06
E 188	98.79
Bose Institute (S 5)	202.58
Kanpur cult.	207.06
SB-6	208.22
UPAU 3	248.32
USDA 110	266.70
SB 16	268.41

* Results are the average of four replicates.

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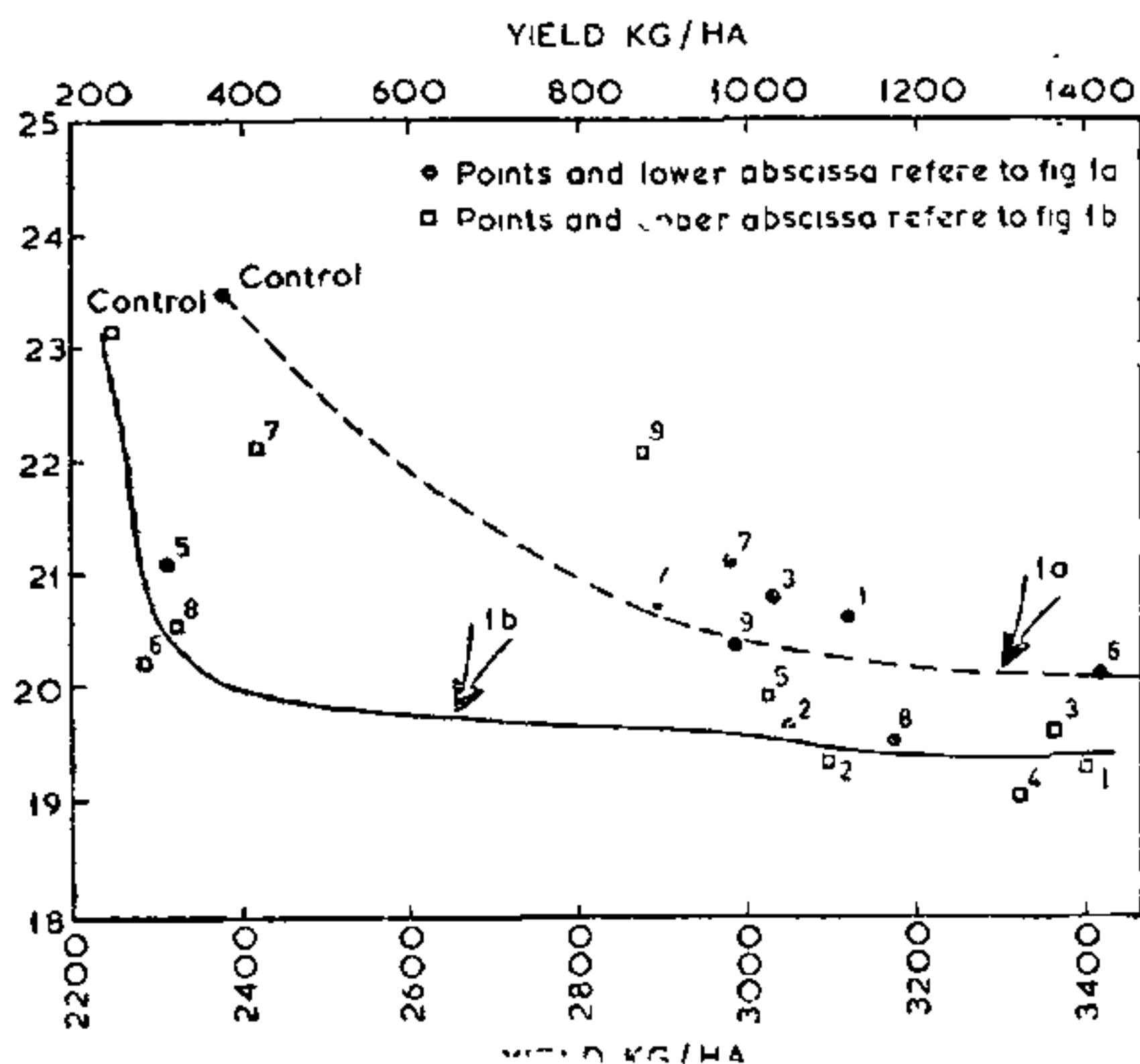


FIG. 1 a-b. Fig. 1 a. Oil content of soybean (var. *Davis*) in relation to yield due to inoculation with the following composites: (1) 'Nitragin', a mixed culture; (2) E 177 + E 188 + SB 6 + SB 16; (3) E 177 + E 188 + SB 6; (4) E 177 + SB 6; (5) E 177 + 188; (6) E 177 + SB 16; (7) E 188 + SB 6; (8) SB 6 + SB 16 and (9) SB 6 + SB 16 + USDA - 110. Fig. 1 b. Oil content of soybean (var. *Davis*) in relation to yield due to inoculation with different strains of *R. japonicum*: (1) USDA 10; (2) SB 6 (I.A.R.I.); (3) SB 16 (I.A.R.I.); (4) UPAU 3; (5) Kanpur cult.; (6) E 177-(J.N.K.V.V.); (7) E 188-(J.N.K.V.V.); (8) P 19 (Hissar) and (9) S 5 (Bose Institute, Calcutta).

examination of Fig. 1 a gives a value of 1.42 for the ratio of the highest yield to the control yield and the corresponding value for oil ratio is 0.81. A similar examination of Fig. 1 b gives a much higher value for the yield ratio (5.49) whereas, the corresponding oil ratio (0.84) is not lowered. This means that initially the oil per cent decreases