AGRICULTURE CANADA
Research Station Harrow
Ontario, Canada

1) Increasing phytophthora-rot severity in field screening.

Walters and Caviness (1968) reported that phytophthora-susceptible varieties in Arkansas were more prone to the disease than resistant varieties if sprayed with 2,4-DB at flowering time. This increase in disease severity suggests that 2,4-DB could be used to increase the effectiveness of natural and mass selection (cf. Buzzell and Haas, 1972) for disease resistance/tolerance to Phytophthora megasperma var. sojae (Pms).

A non-replicated observation test was established in a field known to be infested with Pms races 3, 7 and 9 (T. R. Anderson, unpublished results) at the Soils Substation, Woodslee, Ontario. There were four bordered four-row strips in the field with each of the 16 rows being a different variety; each strip contained at least one susceptible, one tolerant, and one resistant variety. Plots (12 m long and four rows wide) were staked in four ranges; diseased plants in each plot row were counted and removed on July 31, 1979. Treatments (check, 0.06 and 0.24 kg 2,4-DB/ha) were applied August 1 using a hand-held, small-plot sprayer pressurized with CO_2 to 200 kPa and set to deliver 375 L H_2O/ha; randomization was restricted so that each treatment occurred once in each strip and each range. In addition, BASF 9052 grass-killer was applied with the 2,4-DB to some of the plots but it did not seem to influence the soybean response to Pms.

The average level of disease for susceptible, tolerant, and resistant varieties was fairly similar prior to treatment (Table 1). The 2,4-DB at 0.06 kg/ha increased the prevalence of disease considerably in susceptible varieties and somewhat in tolerant varieties. The 0.24 kg/ha rate markedly increased disease in both susceptible and tolerant varieties. The resistant varieties were not affected.

In field screening of bulk populations segregating for resistance/tolerance in Pms, a higher rate of 2,4-DB appears desirable for material segregating for resistance, a lower rate appears better for material segregating for tolerance. Natural/mass selection in such a nursery would probably entail some selection for herbicide tolerance to 2,4-DB since Pms-tolerant/resistant varieties appeared to differ in their degree of herbicide susceptibility to the 2,4-DB. 'Toyosuzu' was quite susceptible; later-maturing varieties like

Table 1

Phytophthora rot in soybeans treated with 2,4-DB (Woodslee, 1979)

2,4-DB* kg/ha	Varieties	No. of diseased plants/ha: Emergence to July 31	No. of diseased plants/ha: Aug. 1 to Sept. 6
0.00†	S	12,100	22,900
	T	400	2,500
	R	0	0
0.06†	S	14,200	47,100
	T	800	7,100
	R	0	0
0.24	S	15,000	81,700
	T	1,200	56,300
	R	0	0

*Applied August 1.

†BAS 9052 post-emergent grass-killer applied at 0.60 kg/ha.

S = Beeson, Harosoy, Harwood, Wells.

T = Coles, Harcor, Jilin #8, Woodworth.

R = Toyosuzu, resistant to races 1-9; Beeson 80, Corsoy 79, Wells II, resistant to races 1-3, 6-9.

'Woodworth' were more susceptible than earlier-maturing ones; 'Coles' and 'Jilin #8' appeared to be fairly tolerant. Wax et al. (1974) reported that variety tolerance to 2,4-DB may be associated with tolerance to other herbicides such as bentazon.

References

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R. I. Buzzell
A. S. Hamill