ROW WIDTHS AND PLANT DENSITIES IN SOYBEANS

Stephen J. Herbert & Gerald V. Litchfield
Department of Plant & Soil Sciences
University of Massachusetts

Growth and seed yield of Evans soybeans in a row width-density experiment are shown in Figs. 1 and 2, and Table 1. The soybeans were planted May 29 in 1979 and May 22 in 1980. In both years harvest maturity was reached in late September.

Seed yield increased 12-16% when row width was narrowed from 20 inches to 10 inches, and 31% when narrowed from 30 inches to 10 inches. This response is common in northern regions of soybean adaptation. Leaf area index (area of leaf per unit area of soil) and total above ground soybean dry weight increased at the most narrow row spacing.

Low density plots of 84,000 plants per acre had smaller leaf area indices, less dry matter accumulation and lower seed yields than medium and high density plots. There was no yield advantage achieved by increasing plant density above 274,000 harvested plants per acre.

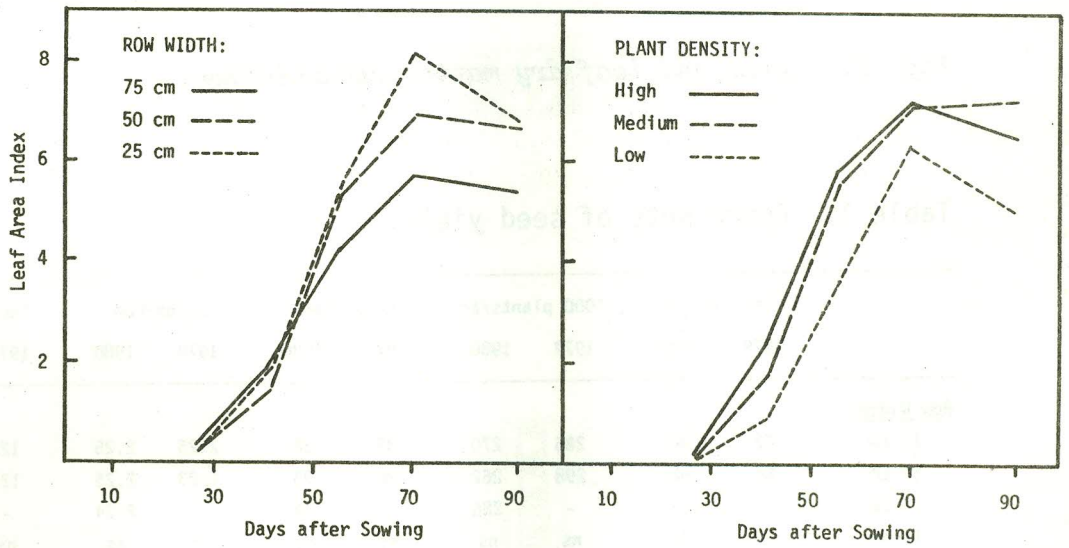

Fig. 1. Leaf area index.

The increased yield from narrow rows occurred because soybean plants in these plots had more pods than plants growing in wider row plots at equivalent densities (Table 1). Row width influences on other seed yield components (plant number, seeds per pod, seed weight) were small in comparison to larger relative differences in pod number per plant. Differences in seed yield among densities can also be attributed to differences in pod number per plant.

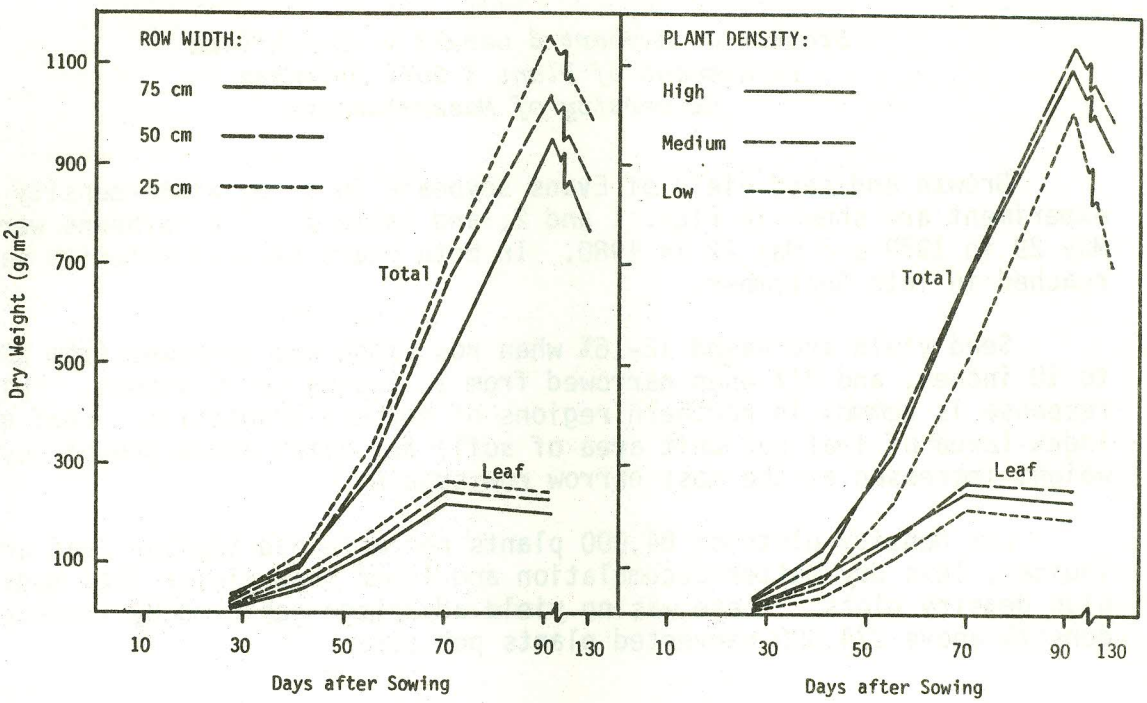

Fig. 2. Total and leaf dry matter accumulation.

Table 1. Components of seed yield.

	Seed Yield†		'000 plants/ac		Pods/Plant		Seeds/Pod		Seed Wt (mg)	
	1979	1980	1979	1980	1979	1980	1979	1980	1979	1980
Row Width:										
25 cm	73	96	286	270	36	36	2.25	2.25	128	164
50 cm	66	82	298	262	30	33	2.23	2.25	123	157
75 cm	-	73	-	286	-	24	-	2.24	-	175
Trend	*	L	ns	ns	ns	L	ns	ns	ns	Q
Density:										
Low	65	71	84	84	65	60	2.30	2.27	125	152
Medium	73	90	274	274	23	20	2.26	2.31	126	177
High	70	90	516	455	12	13	2.18	2.17	128	167
Trend	Q	Q	L	L	Q	Q	L	ns	ns	Q
SE_{diff}	21.9	16.3	7	4	4.6	3.6	0.06	0.07	6	5

† (bushels/acre 12% moisture)

Plant density had more effect on pod distribution on plants, than row width (Fig. 3). At low densities plants had more pods closer to soil level

than medium and high densities. This is important since on uneven surfaces pods may be positioned below the cutter bar. Successful soybean production should include narrow row spacing of 6-10 inches and a density of 150,000 to 200,000 plants per acre.

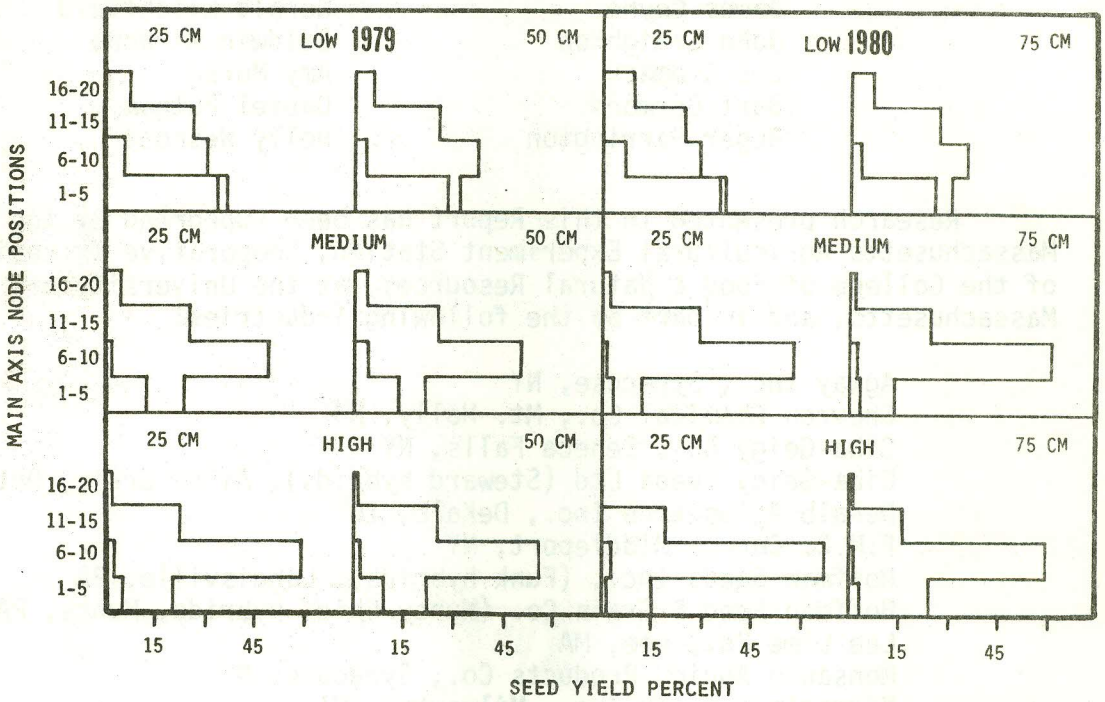

Fig. 3. Branch and total seed yield distribution at main axis nodes.

CONTROL OF SOYBEAN ABSCISSION WITH LIGHT

Lyle E. Craker & Stephen J. Herbert
Department of Plant & Soil Sciences
University of Massachusetts

Over 70 per cent of the flowers formed on a soybean plant may abscise and fall to the ground without producing seed. In addition, pods containing immature seed may also abscise before harvest. This tendency to abort normal healthy flowers, and pods limits ultimate soybean yields. The reasons for early flower and pod abscission are currently poorly understood.

In some plants (fruit trees, mungbeans) light has been demonstrated to inhibit the abscission process. However, the effects of light treatment on abscission processes of soybeans growing in the field are unknown. Research in the field plots containing the lights will measure the abscission of flowers and pods of soybean plants treated with red light. Comparison of light treatment with controls receiving no light will indicate if light can be used to prevent abscission in soybeans.