

Delayed planting of short-season soybeans in narrow rows and high densities

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Studies in southern N.S.W. (D.L. Chase unpublished) have shown that yields of "adapted" soybean varieties (U.S. maturity groups 3 and 4) are maximised by mid-November to mid-December sowings but that variety x sowing date interactions may occur. In general, sowing after December results in earlier flowering and a consequent reduction in plant size and yield. However, several studies in lower latitudes have indicated that the range of "adapted" varieties and sowing dates can be extended by the use of narrow rows and high plant densities.

Between 1974 and 1979 a series of field experiments were conducted at Agricultural Research Station, Leeton (lat. 34°30') aimed at investigating the effect of varying row widths (18 to 100 cm) and plant densities (12.5 to 100 plants m⁻²) on the yield of the early maturing variety Hark (U.S. maturity group 1) sown from mid-November to 4th January. Plot size was at least 4 rows x 11 metres with a central area 10 m hand harvested for yield. The appropriate density was obtained by oversowing and thinning.

Delaying sowing until January significantly ($P < 0.05$) reduced yield regardless of row width and plant density. This was probably caused by low temperatures during podfilling, but the degree of reduction varied between seasons depending on the time of advent of cool autumn temperatures during podfilling.

At all sowing dates highest yields were obtained in narrow row widths (18 and 35 cm). Although row widths greater than 75 cm reduced yields by between 12 and 20 per cent there was no significant interaction between sowing date and row width.

Plant densities below 20 plants m⁻² significantly ($P < 0.05$) decreased yields while the response to densities greater than 50 plants m⁻² varied depending on seasonal conditions and degree of lodging. Overall the increment in yield with higher density was quite small (approximately 200 kg ha⁻¹ or 6 per cent). Increasing density also increased the susceptibility to lodging.

With plantings after mid-December, plant height was reduced by up to 50 per cent and a considerable proportion of pods in wide row widths and low densities was borne within 10 cm of the soil surface. At the narrower row widths and higher densities, plant height and the height of the lowest pods were increased. If standard mechanical harvesting procedures had been employed the poor performance of the wider rows and lower densities would have been accentuated because of the probable increase in harvesting losses. Where lodging occurred harvesting efficiency would probably have been reduced and thus offset any advantage of the pods being set higher on the plant.

Although this investigation indicated that yields in excess of 3300 kg ha⁻¹ are possible from delayed plantings, short season culture in high densities and narrow rows will require optimum crop management and exceptional soil and environmental conditions at all stages. The requirement for such precise agronomy combined with the possibility of cool temperatures and prolonged wet weather during autumn make this system extremely risky commercially.