Dry season soybeans in northern Australia

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Soybeans have been established in Australia's low latitudes as a summer (wet season) crop. More recently, studies have been initiated into adaptation of soybeans to irrigated dry season cropping in the tropics. Greatly reduced insect pest problems and superior seed quality appear to be two advantages in the dry.

In 1981, ten promising accessions were sown in mid-April, May and June at 700 000 plants ha^{-1} in six-row beds in a study to identify physiological constraints to yield. Grain yields were encouraging (see table). However, plants were generally short statured and samples stratified by height indicated harvesting losses would be large. Among lines, seed yield was correlated (r = +.78) with total DM production which in turn was correlated (r = +.72) with crop duration. Over sowing dates, mean seed yield was not related to mean total DM partly because of severe lodging and some shattering in the June sowing.

Summary of 1981 dry season study

Sowing date	Yield (t ha^{-1})	Total DM (t ha^{-1})	Duration (days)
Mid-April	2.53	5.12	98
Mid-May	2.63	5.89	102
Mid-June	2.52	6.91	114
Mean and range among lines	2.56 (2.05-3.08)	5.97 (4.44-7.01)	105 (90-109)

Light interception measurements indicated an LAI of 3.5-4.0 was necessary to achieve full light interception on the beds. However, LAI values rarely reached these levels during flowering, indicating that higher LAI values would be needed to maximise crop growth. Compared to adapted wet season lines, stem nodes were few (range 6-9 among lines) so that yield potential may also have been directly limited by the number of potential podding sites. Seed sizes 10-40% higher than wet season produced seed support this possibility.

Further increases in total DM might be induced by increasing sowing density. However, density in this study was already high and lodging occurred in the June sowings. A second option would be to genetically extend crop duration. This option might also simultaneously increase stem node numbers and plant height. Sources of genetic lateness under very short daylengths have been identified in other studies. However, these lines show agronomic disadvantages, indicating hybridisation be necessary to combine longer duration with desirable agronomic traits.