## Some factors influencing yield accumulation in pigeonpea

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Pigeonpea (<u>Cajanus cajan (</u>L.) Millsp.), a short-lived perennial legume, flowers profusely but only a small proportion of flowers develop into mature pods. This study aims to identify some physiological factors limiting pigeonpea yield and the stage of growth at which they operate.

## Methods

The experiments were carried out at Redland Bay, south-east Queensland during three summer seasons between December 1981 and May 1984. Treatments were applied to increase and decrease assimilate supply at various growth stages. Only the responses to light reduction are reported here. Plant population was 400,000 pl. ha<sup>-1</sup> for the first experiment and 500,000 pl. ha<sup>-1</sup> for the second and third experiments. Shade cloth (50% transmission) was used at various growth stages to reduce assimilate supply.

## **Results and Discussion**

The preliminary study compared the effects of low light intensity during vegetative and reproductive periods. The results indicated that shading during vegetative stage had no effect on yield components or final yield. Shading during the reproductive stage severely limited yield.

The second experiment compared shading for 4 week periods during flowering to pod setting stage (4 weeks after flowering) and during seed filling to seed ripening stage (4 weeks before maturity). The results suggested that limitation of assimilate supply during the first 4 weeks of reproductive growth caused yield reductions resulting from a marked reduction in number of pods set. Shading during the second 4 weeks did not affect pod number per plant but seed size was significantly reduced.

The final study was designed to investigate pod formation in more detail. Plants were shaded for one week during each of the 4 weeks after 50% flowering. Seed yield and other growth parameters were measured. Only pod number and seed yield per plant are presented here (Table 1).

Control	50% Shading During				LSD	
shade)	Week 1*	Week 2	Week 3	Week 4	1%	5%
6.5 a 0.90a	26.1 c 7.96c	33.1 ab 10.04ab	28.0 bc 8.48bc	33.3 ab 9.87abc	8.29	5.98
	(no shade) 6.5 a 0.90a	Kino Week 1*   6.5 a 26.1 c   0.90a 7.96c	Khoo Week 1* Week 2   6.5 a 26.1 c 33.1 ab 33.1 ab   0.90a 7.96c 10.04ab	Kinde Week 1* Week 2 Week 3   6.5 a 26.1 c 33.1 ab 28.0 bc   0.90a 7.96c 10.04ab 8.48bc	Week 1* Week 2 Week 3 Week 4   6.5 a 26.1 c 33.1 ab 28.0 bc 33.3 ab 33.3 ab   0.90a 7.96c 10.04ab 8.48bc 9.87abc	Week 1* Week 2 Week 3 Week 4 1%   6.5 a 26.1 c 33.1 ab 28.0 bc 33.3 ab 8.29   0.90a 7.96c 10.04ab 8.48bc 9.87abc 2.80

## Table 1. The effects of shading during different periods after flowering

Reduction of photosynthetic source at any period during the first 4 weeks after 50% flowering led to yield reduction in pigeonpea. Shading during the first week after flowering was most detrimental to yield, and this occurred primarily because of a marked reduction in the number of pods per plant. This reduction in pod number was not compensated for at a later stage when assimilate supply was returned to normal. This may have been due to the perennial habit of pigeonpea, in which vegetative growth, flowering and pod setting occur simultaneously and compete for assimilates.