ROW SPACING EFFECTS ON TWO CULTIVARS OF MUNGBEAN (*VIGNA RADIATA*) AT GATTON

D.L. George and M. Barnes

School of Land and Food, University of Queensland, Gatton College

Abstract

Two mungbean cultivars (Emerald and Berken) were planted at four row spacings (25, 50, 75 and 100 cm) and plant population of 300,000 plants/ha at the University of Queensland, Gatton College, on January 16 1997. Narrow row spacings increased light interception, dry matter accumulation and grain yield through increased pod number. Increased light interception would arise from the more equidistant planting arrangement at narrow spacings (and constant population). Narrow spacing would also reduce weed competition and enhance harvesting. Emerald outyielded Berken in this high yielding environment. Emerald produced more seeds per pod but lower seed weight. The increased yield of Emerald may be related to the extended flowering period and increased light interception and dry matter accumulation.

Key Words: Mungbean, Vigna radiata, dry matter, light interception, grain yield, spacing

Introduction

Mungbean (*Vigna radiata*) has potential in the northern grain belt due to its ready market, nitrogen fixation, early maturity and ability to fit well into a crop rotation program.

Lawn (1) found equidistant spacings in mungbean increased initial rate of canopy development and water use. He found that mungbean planted at 100 cm spacing did not achieve a full canopy cover resulting in reduced light interception and depressed yields. Mungbean planted in narrow spacings competes more effectively with weeds and is easier to harvest.

The main objective of this study was to evaluate the effects of four row spacings (25, 50, 75 and 100 cm) on two cultivars of green gram mungbean (Emerald and Berken) for light interception, dry matter accumulation and grain yield and its components. The crop was planted at a population of 300,000 plants/ha in an alluvial black earth at the University of Queensland, Gatton College on January 16, 1997.

Results

Narrow row spacings intercepted the most light (Table 1). There was no significant difference between the 25 and 50 cm spacings although the 25 cm spacing tended to intercept the greatest amount of radiation, followed by the 50 cm, then the 75 cm and finally the 100 cm spacing.

For March 26, Emerald intercepted more light than Berken (88.7% v 86.0%) and on March 31 the trend was present (78.4% v 75.5%). As the flowering period for Berken was a week shorter than for Emerald, it started to senesce earlier on March 24, and consequently its light interception would be expected to reduce. Flowering for both cultivars began on March 2.

Dry matter yields tended to follow the same trend as for light interception (Table 2). For the first four harvests, dry matter yields were highest for the 25 cm spacing. Maximum dry matter yields were produced for March 24 when physiological maturity was reached and senescence had commenced. However, senescence in the 100 cm spacing was delayed. This may result from decreased early water usage compared with narrower spacings (1).

Table 1. Row spacing effects on light interception for eight dates

Row spacing (cm)	Light interception (%)							
?	Feb 26	Mar 2	Mar 8	Mar 12	Mar 17	Mar 22	Mar 26	Mar 31
25	81.9	97.2	98.7	95.6	93.5	93.5	92.4	81.5
50	73.9	95.7	97.7	95.7	92.9	94.0	91.9	86.4
75	66.3	93.4	95.8	93.1	83.8	88.4	87.0	71.5
100	57.3	90.6	91.9	85.4	77.3	87.5	77.9	68.4
lsd (p<0.05)	10.1	2.0	1.5	3.5	5.4	4.7	3.7	12.2

Table 2. Row spacing effects on dry matter accumulation for five dates

Row spacing (cm)	Dry matter (t/ha)				
?	Mar 3	Mar 10	Mar 17	Mar 24	Mar 31
25	2.94	3.92	5.29	7.83	7.22
50	1.54	2.90	4.03	6.45	6.07
75	1.57	2.67	2.96	4.63	4.02
100	1.19	1.83	2.49	3.35	4.10
lsd (p<0.05)	0.80	0.81	0.64	0.55	1.26

Table 3. Row spacing effects on grain yield and its components

Row spacing (cm)	Grain yield (t/ha)	Pod number/ha (x10^{12})	200 seed weight (g)	Seeds/pod
25	3.35	4.76	14.4	9.8

50	2.98	4.21	14.6	9.8
75	2.44	3.60	14.2	9.6
100	2.33	3.24	14.5	10.0
lsd (p<0.05)	0.37	1.51	ns	ns

Emerald produced higher dry matter yields than Berken for March 24 (5.80 v 5.33 t/ha) and March 31 (5.82 v 4.89 t/ha). Light interception was higher for Emerald than Berken and this extended flowering duration would be reflected in increased dry matter.

Grain yield for the 25 cm spacing was highest, followed by the 50 cm spacing, then the 75 cm and finally the 100 cm spacing which was not different to the 75 cm spacing. Increased yield appeared to be the result of increased pod number as seed weight and seeds/pod were not different for spacings. It appears the higher dry matter yields of the narrower spacings have translated into higher grain yields.

Emerald produced higher grain yield than Berken (2.90 v 2.66 t/ha; P=0.07). This was due to more seeds/pod (10.6 v 8.9) which counteracted the effect of lower 200 seed weight of Emerald (14.0 v 14.8 g). There was no effect of cultivar on pod number. Increased grain yield for Emerald may result from its extended flowering period which enabled it to intercept more light and thus produce more dry matter which was translated into higher grain yield.

Conclusions

Narrow row spacings increased light interception, dry matter accumulation and grain yield through increased pod number. Increased light interception would arise from the more equidistant planting arrangement at narrow spacings (and constant population). Narrow spacing would reduce weed competition and enhance harvesting.

Emerald outyielded Berken in this high yielding environment. Emerald produced more seeds per pod but lower seed weight. The increased yield of Emerald may be related to the extended flowering period and increased light interception and dry matter accumulation.

References

1. Lawn, R. J. 1983. *Aust. J. Agric. Res*., **34**, 505-515.