

CONFIDENTIAL*

MORLEY RESEARCH CENTRE**Spring field beans****Seedrates for cv Caspar***G M Palmer and D B Stevens***Summary**

A range of plant populations averaging from 12 to 63 plants/m² was established at a heavy land site in Suffolk. The optimum plant density in this high yielding crop was 32.6/m², mid-way between the extremes which gave a yield of 5.96 t/ha compared with 3.34 t/ha for the lowest population tested of 11.8 plants/m². There was no significant difference between 11.8 and 23.6 cm row spacings which gave yields of 4.96 and 5.07 t/ha respectively.

Object

To determine the optimum plant density and row width for the white flowered, low-tannin variety Caspar.

Method**Treatments**

All combinations of:

Seedrate

12.5 seeds/m² (target plant density = 10/m²)

18.8 " " " " 15

25.0 " " " " 20

37.5 " " " " 30

50.0 " " " " 40

62.5 " " " " 50

Row width

11.8 cm

23.6 cm

*Not for publication without the Director's consent. This report deals primarily with only one year's work, so any conclusions given are provisional.

Plots were sown on 11 March using a standard Nordstien drill calibrated to deliver the appropriate seed numbers to a good seedbed prepared by conventional farm power-harrows on ploughed land at a heavy soil site in Suffolk. The plots received normal farm inputs of fertilizer, herbicides and pesticides applied overall. An assessment of crop structure was made on 25 August and the trial was harvested by combine on 2 September.

The treatments were arranged randomised blocks with 4 replicates.

Results and discussion

Crop establishment averaged 86% of seed sown, and the experiment achieved plant populations close to the planned targets.

Crop structure

As in 1992, plant density had a significant effect on the height to the lowest pod and number of pods per plant. Podding commenced higher up the stem as density increased to 32.6 plants/m², while the number of pods/plant decreased with increasing plant density. The results appeared to confirm the trend towards fewer stems per plant with increasing plant density observed in 1992 but this was not statistically significant in 1993.

Row width had no significant effect on these parameters of crop structure.

Table 1. *Crop structure*

Plant population		Height to 1st pod(cm)	Stems /plant	Pods /plant
Target (seeds/m ²)	Actual (plants/m ²)			
Plant density				
12.5	11.8	31.4	3.1	30.4
18.8	17.0	33.1	3.1	29.2
25.0	22.4	36.0	3.2	26.3
37.5	32.6	39.3	2.7	23.9
50.0	42.0	39.7	2.5	19.2
62.5	51.6	39.3	2.4	17.2
LSD	3.16	3.36	NS	6.42
Row width				
11.8 cm	29.3	36.7	2.7	22.9
23.6 cm	29.8	36.2	2.9	25.8
LSD	NS	NS	NS	NS
SE per plot(33 df)	±3.11	±3.30	±0.64	±6.31
SE as %GM	10.5	9.0	22.2	25.9

Yields

Increasing plant density gave yield increases up to 32.6 plants/m² at which population the maximum margin of return over seed cost was achieved. Row width had no significant effect on yield.

Table 2. *Grain yield and economics*

Seedrate (seeds/m ²)	Seedrate (kg/ha)	Plant popn. (plants/m ²)	Yield (t/ha at 85% dm)	Margin over seed cost (£/ha)
Plant density				
12.5	67.8	11.8	3.34	310
18.8	102.0	17.0	4.14	378
25.0	135.7	22.4	4.59	412
37.5	203.5	32.6	5.96	525
50.0	271.4	42.0	5.96	501
62.5	339.2	51.6	6.02	483
LSD			0.504	
Row width				
11.8 cm	186.6	29.3	4.96	431
23.6 cm	186.6	29.8	5.04	439
LSD			NS	
SE per plot(33 df)			±0.495	
SE as %GM			9.9	

(Grain valued at £100/t and seed costed at £350/t)

Acknowledgements

Thanks are due to W Hamilton, the host farmer, and his staff and also to colleagues at Morley for their help in the conduct of this experiment.

Appendix

The following information is presented as an appendix which is available on request:

Field details
Method
Experiment diary

Field details

Site: W. Hamilton, Rosery Farm, Little Stonham, Suffolk

Field reference: O4 (S part)

Crop: Spring beans, cv Caspar

Previous crop: 1992 W. wheat
1991 W. wheat

Soil type and series: Sandy clay loam (Beccles series)

Seed: Commercial **Seedrate:** As treatments

Date sown: 11 March

Nutrients applied: Nil

Cultivations: Late November 1992 Ploughed and pressed, rolled
10 March 1993 Spring tine cultivator

Applications to crop:

Normal farm inputs of herbicide, fungicides and insecticide

Method

These are an abbreviated version of the Standard Operating Procedures used at Morley Research Centre.

Plot layout

Plots were sown with a standard Nordsten cereal drill. The drilled plots were 24 m long and 1.65 m wide from outside row to outside row (15 rows at 11.8 cm or 8 rows at 23.6 cm spacing). This gave an effective plot width for harvest yield calculations of 2.30 m after taking into account the interplot gap of 0.65 m.

Common treatments such as insecticides and herbicides were applied across all plots with farm machinery using wheelings, 24 m apart. For harvest purposes, plot length was reduced to 21.0 m.

Agronomic factors

Plant populations were determined by making 6 counts of a 0.5m x 0.5m quadrat at random across each plot. Plant structure was assessed on 5 plants selected at random from each plot.

Harvest details

Plots were harvested using a Claas Compact combine which was modified for plot work and used electronic weighing (Novatech M864 Loadmeter). Trials were harvested by replicate.

Post harvest determinations

Moisture content was determined by taking a 500 g subsample, oven drying for 40 hours at 100 -102° C and weighing at ambient temperature.

Experiment diary

Date	Operation
11 March 1993	Trial drilled
28 April	Bean population counts made
25 August	Crop structure assessed
2 September	Trial harvested