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FACTORS AFFECTING THE GROWTH OF *VICIA FABA* IN SOUTH AUSTRALIA

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STATEMENT

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SUMMARY

During the period 1977-1988, nine experiments were conducted to study the effects of date of sowing, crop density and manipulation of plant growth on the productivity of several faba bean accessions from the Waite Agricultural Research Institute. These accessions included the cultivar, Fiord.

Delay in seeding date over the period May to August reduced the length of the periods of vegetative growth, flowering and grain fill. For each day that seeding was delayed after early May, the period of vegetative growth was reduced by 0.25 days and average seed yields declined by nearly 1%. Delay in seeding date caused a reduction in crop height, number of flower and pod bearing nodes per main stem and the number of pods per plant. In some experiments, mean seed weights and the number of branches per plant were also reduced by delay in seeding date.

One experiment was conducted in an insect-proof glasshouse to study the effect of flower tripping on a range of accessions. All accessions, including the cultivar Fiord, were found to be auto-fertile.

In a field study on the pattern of dry matter accumulation with time for the cultivar Fiord, crop dry matter increased from 2000 kg ha^{-1} to 7000 kg ha^{-1} during the flowering period. Over 90% of the additional dry matter was stem and leaf material. Flower set was good, but pod retention poor, only 21% of the flowers had produced pods at maturity.

Three experiments were conducted with foliar sprays of the growth regulant paclobutrazol applied at the commencement of flowering to restrict the stem growth of Fiord. These treatments were compared with stopping the plants above the 6th and 4th flowering nodes and with a determinate accession.

All applications of paclobutrazol produced a significant reduction in crop height. Applications to early-sown crops improved pod retention but an increase in grain yield was only obtained when ample moisture was available to the crop during early pod development and grain fill.

Stopping plants improved pod retention but did not produce increased seed yields. The determinate accession yielded less than Fiord in all situations.

A range of crop densities was included in three of the date of sowing experiments. A fan design with radial rows and plants arranged in a square pattern was used in two of these experiments, with a constant row width of 18cm being used in the third. Yield responses to increasing density over the range 20-60 plants m^{-2} were obtained in the dry years from the experiments where the plants were grown in a square pattern, but no significant grain yield responses were obtained over the same density range in a wet year with plants grown in 18cm rows.

No crop density x date of sowing x accession interactions were recorded, other than with the determinate accession which became severely infected with the disease Ascochyta fabae at the early sowing date.

The implications of this research to plant improvement and crop management are discussed.

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