Grain legume research at Lincoln College

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Lincoln College on the Canterbury Plain is well situated to conduct research on grain legume crops.Traditionally peas *(Pisum sativum)* have been the major crop legume in Canterbury, but in recent years field beans *(Vicia faba),* lupins *(Lupinus albus, L. angustifolius, L. mutabilis)* and cold-tolerant soya beans *(Glycine max)* have been investigated.

A survey of farmers growing field beans showed that most farmers sowed at too low a plant population and too late to maximise yield. The survey also revealed the extensive presence of the seed borne pathogen *Aschochyta fabae* (1). European spring cultivars gave maximum yield when autumn sown (2). Irrigation increased seed yield in spring sowings from 1.8 t ha^{-1} to 2.7 t; however, irrigation of autumn sowings increased yield even further from 3.8 t to 5.3 t (3). A current study is aimed at determining optimum time of irrigation for the crop.

Among lupins highest yields have been obtained from *L. angustifolius* at 7.3 t ha^{-1} from an irrigated crop. Unirrigated plants showed little response to plant population and yielded 5.5 t ha^{-1} (4). Unirrigated *L. albus,* however, responded to plant population up to 36 plants m^{-2} and yielded 3.2 t of seed with a seed nitrogen content of 6.16% (5). Introductions of *L.* mutabilis had a high dry matter production per plant, but a low harvest index. Seed nitrogen concentration was high at 6.41 to 7.54%, as was oil at 15.75 - 22.03% (6).

Soya bean yields in Canterbury have generally been low because of low night temperatures. The Swedish cultivar Fiskeby V produces up to 17% oil (7) and yields 3.1 t ha^{-1} with a seed nitrogen of 6.9%.

Work on peas concentrated initially on optimum plant population and irrigation. For vining, irrigated plants grown at 10 x 7.5 cm yielded 7.9 t ha^{-1} compared with 5.3 t from unirrigated plants. A yield response to irrigation of 59%

was obtained when water was applied at flowering and at pod fill (8). For production of field peas optimum population varied with cultivar; yields of up to 4.1 t ha^{-1} were obtained from an unirrigated crop (9). Optimum populations of 90 and 120 plants m-2 were obtained under dryland and irrigated conditions respectively for non-branching cultivars of vining peas, but only 60 pl M-9 for branching cultivars of field peas.

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