

## Some basic breeding objectives for dryland chickpeas

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Chickpeas could become an important winter grain legume in areas where heavy alkaline soils predominate. Prospects are also good for their cultivation on some lighter-textured wheatbelt soils. The grain is suitable for human consumption, mainly in the form of dhal, or for a variety of animal feeding purposes. There is presently only one cultivar available for dryland production in Australia. This is Tyson, a short-statured, brown-seeded "desi" type. A number of simply-inherited characters could be incorporated into the basic type (for example Tyson) to make the crop higher-yielding and more adapted to mechanical harvesting. A further modification to seed type could make the grain more acceptable for stockfeed purposes.

the most striking alteration proposed is that to growth habit. The normal habit is semi-erect. Erect types, differing only by a single gene, have longer internodes and are from 25% to 50% taller. They also have a reduced number of basal primary branches and, conversely, an increase in apical primary and secondary branching. Most pods are therefore carried well above ground level, and harvesting difficulties associated with semi-erect types are avoided. Yields from erect and semi-erect lines with comparable maturity and genetic background do not indicate a yield reduction due to erect growth habit, despite the radical changes to height and branching pattern.

Flowers normally arise singly from leaf axils. A mutant recessive gene conditions the multiple-flowered character, where more than one (but usually only two) flowers originate from the one peduncle. The frequency of double-flowered axils and imperfections in the second flower is significantly affected by background genotype. Consequently, the effect on yield is variable. Selection for a high frequency of double-poddedness is therefore a simple means of substantially raising yield potential.

Grain quality is closely related to seed type. Desd (angular) seeds have approximately 17% fibre, three times that of kabuli (rounded) seeds. Kabuli seeds have a compensatory increase in carbohydrates, most of which is starch. Therefore, on the basis of lower fibre and higher energy, kabuli types would be preferred in monogastric (pig, poultry) diets. The kabuli type, however, does not meet with consumer acceptance for human consumption. The two seed types differ by at least two genes.

Under adverse soil conditions the establishment of white-seeded lines is generally low. A response in establishment of 14 to 27% has been observed for coloured-seeded isolines. This is due to the control of damping-off attributable to some component of coloured seed coats. Selection for coloured seeds will thus ensure a high frequency of lines with satisfactory resistance to damping-off.

In summary, early generation selection in dryland chickpeas should concentrate on erect plant type, double-poddedness and coloured seeds. The end use, whether for human consumption and/or stockfeed, will determine the seed type selected.