FABA BEAN

SECTION 10

PLANT GROWTH REGULATORS AND CANOPY MANAGEMENT

KEY POINTS | CANOPY MANAGEMENT IN FABA BEAN AND BROAD BEAN | PLANT GROWTH REGULATORS
Plant growth regulators and canopy management

Key points

- Canopy management of faba bean crops aims at managing biomass.
- Management is based on variety choice and crop agronomy at sowing.
- No plant growth regulators (PGRs) are registered for faba bean. Research is continuing but results do not support the use of PGRs in faba bean crops.
Canopy management is about producing the most appropriate amount of crop biomass for the growing season, to optimise grain yield and input use. It is also about canopy duration in a particular environment.1

10.1 Canopy management in faba bean and broad bean

Attempting to grow high-yielding irrigated (and high-rainfall) crops with high inputs can promote tall and bulky vegetative crops at increased risk of lodging.2 3 Lodging can reduce yields and cause harvest difficulties. Irrigated faba bean crops can grow to 2 metres and collapse close to harvest.

Large faba bean and broad bean crop canopies often lead to poor penetration of fungicides. This is particularly so in high-rainfall and irrigation areas, where crop canopies are large and disease incidence can be high because of high humidity within the canopy.4

Canopy management of faba bean involves reducing crop height to allow improved fungicide application and efficacy, and may reduce disease intensity and plant lodging, potentially increasing grain yield.5

Canopy management in faba bean is largely related to:

- variety selection (see Section 3.7 Southern faba bean varieties);
- time of sowing (see Section 4.1 Time of sowing);
- sowing rate (see Section 4.2 Sowing rates and plant density);
- row spacing (see Section 4.2 Sowing rates and plant density); and
- fertiliser use (see Section 6 Nutrition and Fertiliser).

While grazing is used for canopy management of other crops, it is not an agronomic practice commonly used in faba bean. Grazing is an alternative to chemical plant growth regulators (PGRs). Grazed plants are often shorter than non-grazed plants and are less prone to lodging.6

Growers can use PGRs to control crop height, although none are registered for faba bean.

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10.2 Plant growth regulators

While there are no plant growth regulators registered for use on faba bean, new research is underway in this area, see Section 10.2.2 Plant growth regulator trials in faba bean and broad bean.

A ‘plant growth regulator’ (PGR) is a term that describes many agricultural and horticultural chemicals that influence plant growth and development. This influence can be positive, such as larger fruit or more pasture growth, or negative, for example, shorter stems or smaller plant canopies.

PGRs tested in faba bean and broad bean are applied with the intention of:

• producing a smaller plant, resistant to lodging; or
• reducing excessive growth in irrigated or high-rainfall crops.

Crop responses to the use of PGRs can be inconsistent. In general, yield responses, if any, are produced by the reduction in lodging rather than as a direct effect of the PGRs.

PGRs must be applied at the correct crop growth stage according to product directions, which can be well before any lodging issues are apparent.

10.2.1 Survey of the use of PGRs in Australia

A survey funded by the GRDC on the use of PGRs in Australian grain-growing regions found that growers who use PGRs aim to produce a compact crop that is easy to harvest.

The survey found no consistent yield improvement in response to PGRs.

10.2.2 Plant growth regulator trials in faba bean and broad bean

Plant growth regulators used in trials in faba bean in Victoria and South Australia shown no effect on grain yield.

A recent trial in Hart, South Australia, found that PGRs were effective in reducing the height of early-sown faba bean, while one PGR reduced the level of crop lodging. Grain yield was unaffected. Further field testing is needed to better understand the best application timing and quantify the benefits of PGRs.

A 2013 trial at Glenroy, south-east South Australia, compared 17 canopy management treatments, including PGRs, herbicides, fungicides, grazing and delayed sowing for the broad bean variety PBA Kareema. All products are unregistered for broad bean but were used for experimental purposes in the trial. An earlier trial in the same project evaluated the use of several PGR hormones and two herbicides for their effect on plant growth, and found a number of these treatments regulated plant growth at Tarlee in South Australia’s Mid North.

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Two canopy management treatments (simulated grazing and a low rate of glyphosate) suppressed plant height with no significant effect on grain yield. All other treatments either caused a yield penalty or did not suppress plant height. Several herbicides showed promise as growth regulators, but require revision of application rates.14

In an irrigated trial at Kerang in north-west Victoria, a chemical PGR and fungicide (used as a PGR) were applied before flowering. PGRs had no effect on the yield, height or lodging of faba bean (Table 1).

### Table 1: Yield, height and lodging of faba bean with applied plant growth regulator in an irrigated trial at Kerang, Victoria.15

<table>
<thead>
<tr>
<th>PGR</th>
<th>Yield (t/ha)</th>
<th>Height (cm)</th>
<th>Lodge score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>6.24</td>
<td>137</td>
<td>4.3</td>
</tr>
<tr>
<td>Reward®</td>
<td>6.24</td>
<td>133</td>
<td>4.3</td>
</tr>
<tr>
<td>Prosaro®</td>
<td>6.34</td>
<td>127</td>
<td>3.7</td>
</tr>
<tr>
<td>P</td>
<td>0.795</td>
<td>0.373</td>
<td>0.694</td>
</tr>
<tr>
<td>L.S.D.</td>
<td>Not significantly different (NS)</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>CV%</td>
<td>3.3</td>
<td>6.2</td>
<td>20</td>
</tr>
</tbody>
</table>
