Regrowth Brassicas

In brief
‘Regrowth Brassicas’ are the forage crops of the *Brassica* species that can regrow after most of the aerial part of the plant has been grazed.

They include species such as forage rape (*Brassica napus*), kale (*Brassica oleracea*), hybrids such as pasja (*Brassica campestris x Brassica napus*) and leafy turnips.

Regrowth Brassicas are gaining popularity among dairy farmers in southern Australia, mainly as an alternative to turnips during summer but also more recently as an autumn forage option.

The 3030 Project evaluated different types of regrowth Brassicas in plot studies as well as on farmlets and partner farms. This Information Sheet summarises some of the key findings about practical management of regrowth Brassicas.

Key features
- Able to provide feed for longer than turnips due to their regrowth ability.
- High nutritive value (similar to turnips).
- Higher autumn growth potential than most perennial or annual pasture species and other forage crops.
- Grazing management is important to reach potential yields.
- Knowledge and recommendations on best management practices are still developing.
How do regrowth Brassicas compare to turnips?

Advantages

- **Window of time for utilisation**: Regrowth Brassicas and turnips are similar in their potential for summer growth and nutritive value (high metabolisable energy (ME) and low fibre). Unlike turnips, regrowth Brassicas can regrow after the first grazing. With suitable conditions, they can provide quality feed for longer than turnips (see Figure 1).

- **Autumn feed**: Turnips are not well adapted to autumn sowing in southern Victoria as they do not stand over well in wet soils. Most regrowth Brassicas have a higher autumn growth rate potential than turnips and a higher leaf:bulb ratio. If sown early, some regrowth Brassicas can be grazed in about 6–7 weeks, filling the autumn gap and/or the lack of feed caused by the slow establishment of most newly sown grass species. There is some anecdotal evidence that regrowth Brassicas sown in spring can struggle through summer and then provide significant yields through autumn and early winter once soil moisture improves and the insect burden decreases. Some of the later-maturing Brassicas such as kale are best adapted to late spring-summer sowing to be utilised in autumn–winter.

- **Ready to be grazed first**: In summer, the potential DM yield of regrowth Brassicas and turnips is similar, but there are differences in their growth patterns. Turnip growth peaks at the end of the plant cycle when carbohydrates are being stored in the bulb. Regrowth Brassicas have higher growth rates in the initial stages of the plant cycle and so may be ready to graze before turnips. Differences in maturity times must be taken into account, for instance some turnips can mature well ahead of rape in summer.

- **Pest management**: Defoliation by insects is one of the most common threats for summer Brassicas. When turnips are attacked in the crop's early stages, the only option is to spray; grazing too early would limit yields. Regrowth Brassicas offer more flexibility. They can be grazed early to break an insect attack and regrow without compromising total yield, if the conditions are favourable. During the later stages of turnip growth, once the bulbs are fully developed, insect damage to the aerial part of the plant becomes less important.

Disadvantages

- **Grazing management**: Turnips are fully utilised in one grazing, so the grazing management is mainly aimed at maximising utilisation efficiency (reduced wastage) and avoiding metabolic issues. With regrowth Brassicas, decisions must balance utilisation of the crop at the first grazing with the potential for regrowth. In this respect, the reliability of summer rainfall (or availability of irrigation) is an important consideration.

In summer-dry regions, such as south-west Victoria, the aim should be to utilise as much of the crop as possible at the first grazing. There is no benefit in under-utilising the crop because it will decay over time and there will only be regrowth if there is summer rainfall.

Under irrigation, where the supply of moisture for regrowth is assured, potential yields can only be achieved by maintaining a post-grazing residual that can support the regrowth. This requires higher accuracy in the daily allocation of feed.

- **Water use efficiency**: During a study in Tasmania (Eckard et al. 2001), turnips showed higher water use efficiency (WUE) [expressed as kg dry matter (DM) per mm of water received] than pasja, kale and rape. A study in south-western Victoria (Jacobs et al. 2002) confirmed this higher WUE of turnips, although the difference with forage rape was not large. The average WUE over two sites and two years of rape, pasja and turnips was 19, 16 and 20 kg DM/mm of irrigation water applied, respectively. Both turnips and regrowth Brassicas have a much higher potential WUE than perennial ryegrass, which normally ranges between 7 and 13 kg DM/mm.

- **Response to effluent**: In the 3030 Project trials in south-west Victoria, turnips showed a more reliable response to effluents than regrowth Brassicas in summer. The regrowth Brassicas had a higher response to effluent than turnips only in the early growth stages. Turnips were also able to respond to effluent applications when the soil was dry, whereas regrowth Brassicas did not respond in such conditions.

- **Standing over**: From farm experiences it is believed that turnips can stand over (for grazing at a later stage) better than most regrowth Brassicas. However, this varies with cultivars; late maturity turnips are better than other cultivars. Some regrowth Brassica species such as kale stand over very well (better than turnips); others such as pasja do not. Sowing density, stage of growth and DM accumulated also affect the crop’s capacity to stand over.

- **Body of knowledge**: The dairy industry has far more experience in the agronomy and grazing management required for turnips than for regrowth Brassicas. This applies to both research and commercial farm experiences. For example, the potential yields in most regions or different environments are known for turnips but not for regrowth Brassicas. There is also a lack of knowledge around grazing regrowth Brassicas for maximum yield and nutritive value and how these practices interact with factors such as soil moisture, time of the year, etc. Although a lot of new information has been produced in recent years, there are still many unknowns. This reduces farmers' willingness to try a new crop.

- **Species, hybrids and cultivars**: There is a broad range of options within the spectrum of what is called ‘regrowth Brassicas’ which include different species, cultivars or hybrids of different species. This breadth of options has led to some level of confusion about which seeds are different cultivars of the same species and which are different species altogether or hybrids/mixes of two or more species.
**Where do regrowth Brassicas fit into your feed plan?**

**Spread of quality summer feed**

Multiple grazings of regrowth Brassicas has the potential to provide feed for a more extended period than turnips. However, in dryland systems of southern Victoria, the crop might not be able to regrow after the first grazing if there is not sufficient moisture in the soil and/or rainfall. In general, Brassicas are not very tolerant to drought conditions.

Regrowth Brassica herbage has been shown to have consistently high nutritive characteristics (see feeding value section below). It has the potential to provide cows with a source of high-quality grazeable feed throughout most of the summer, typically at a time when both the quality and amount of pasture on offer is limiting dry matter intake. By planning a continuous inclusion of Brassica in the diet, there will be less loss of milk production as a result of the rumen adapting to a new feed or to changing proportions of different feeds.

**Filling autumn feed gap**

Feed produced and utilised during summer and autumn has a higher economic value than feed produced during spring, when environmental conditions are more favourable for pasture growth and rainfall is more reliable (Chapman and Kenny 2007). This concept fits well with the growth pattern of regrowth Brassicas.

At the 3030 Project partner farm in south-west Victoria, forage rape was used as an autumn crop to utilise the first rains more quickly and efficiently than with annual grasses. For that dairy farm system, the most critical aspect was to have all sowing completed before autumn calving began and just before the autumn break was likely. The farmer decided to dry sow the forage rape based on expected rainfall and temperatures. In southern parts of south-west Victoria, effective rainfall can be expected from late March onwards and it is unlikely to be hot (>35°C). To get the sowing done on time, a strict action plan was needed to organise contractors and staff.

Similarly, the north-east Victoria partner farm incorporated forage rape into its autumn oversowing program. As in the south-west, this provided relatively cheap early winter feed, reducing the need to feed purchased concentrates and/or conserved fodder.

These examples highlight the value provided by grazable forages when pasture supply is limited. Brassicas incorporated as part of an ongoing oversowing or resowing program provide high-quality feed during autumn and early winter. This is at little cost, essentially just buying the Brassica seed, and with minimal impact on the future productivity of the pasture sward.

**Use as a break crop in a renovation program**

Regrowth Brassicas, like turnips, can act as ‘break crops’ for the renovation of permanent pasture.

There are three main advantages:

- Some regrowth Brassicas have a particular root system structure that increases soil aeration and water movement for the subsequent crop. This contrasts with permanent pasture that has a shallower, denser and more-fibrous root system.
- Brassicas crops allow control of perennial (e.g. bent grass) or annual grass weeds (e.g. barley grass) that are common weeds in permanent pastures due for renovation. This can be done using selective herbicides and/or cultivation during the crop cycle or total herbicides before the crop is planted and/or after being grazed.
- Brassicas are efficient in capturing the soil N available from the mineralisation of organic matter that occurs after permanent pasture paddocks are cultivated.

Brassicas also have bio-fumigation properties. Their roots can produce a chemical (glucosinolate) that has been shown to control certain cereal diseases. How pasture species could benefit from this process is not well understood.

**Yields and growth of regrowth Brassicas**

Jacobs et al. (2006) compared two hybrid Brassicas (cv. Hunter and cv. Graza) in an experiment in western Victoria under different N and irrigation regimes (Table 1). Both crops responded positively to increasing irrigation and N application levels. The WUE (kg DM/mm) of the evaluated Brassica crops were higher at the higher irrigation levels. This highlights the low tolerance to water stress of Brassica crops.

Hybrid regrowth Brassicas such as Hunter can produce about 8 t DM/ha during summer over three grazings without irrigation (Table 1).

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Hunter (t DM/ha)</th>
<th>Graza (t DM/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 kg N/grazing</td>
<td>9.1</td>
<td>10.8</td>
</tr>
<tr>
<td>100 kg N/grazing</td>
<td>10.2</td>
<td>11.7</td>
</tr>
<tr>
<td>Irrigation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100% irrigation</td>
<td>12.3</td>
<td>14.3</td>
</tr>
<tr>
<td>50% irrigation</td>
<td>10.2</td>
<td>11.9</td>
</tr>
<tr>
<td>25% irrigation</td>
<td>8.28</td>
<td>10.3</td>
</tr>
<tr>
<td>Dryland</td>
<td>7.8</td>
<td>8.4</td>
</tr>
</tbody>
</table>

Table 1. Yields (t DM/ha) of regrowth hybrid Brassicas at harvest under different N and irrigation treatments (adapted from Jacobs et al. 2006).
In experiments by Jacobs et al. (2002) at two sites in western Victoria, pasja showed higher summer growth rates than forage rape or turnips, particularly at the early stages of the crop.

The average growth rate in the first eight weeks from sowing was 33, 18 and 16 kg DM/ha/day for pasja, rape and turnips, respectively. This advantage of pasja was consistent across cultivation techniques and sowing times. However, for the whole period from sowing to harvest (13 weeks), the average growth for pasja, rape and turnips was 36, 33 and 40 kg DM/ha/day, respectively. This is because most of the turnip growth is at the end of the cycle when the plant accumulates carbohydrates in the bulb.

Feeding value of regrowth Brassicas

A study by Moate et al. (1998) showed that the feeding value of grazed turnips is equivalent to feeding barley grain [low neutral detergent fibre (NDF) and high ME] and found similar responses in milk production for cows in mid-lactation. The similarity to barley grain may also apply to regrowth Brassicas. If grazed adequately, the feeding value of regrowth Brassicas has been reported to be similar to that of turnips in south-west Victoria (see Table 2).

In the Jacobs et al. (2002) study, turnips and forage rape reached higher leaf ME than pasja, but the average ME of total DM showed no differences between rape, pasja and turnips.

Grazing management of regrowth Brassicas

Grazing decisions must balance the utilisation of the regrowth Brassica at the first grazing with the potential for regrowth. The reliability of summer rainfall (or availability of irrigation) is an important consideration.

In summer-dry regions like south-west Victoria (with no irrigation) grazing management should aim for high utilisation of the available DM at the first grazing because there are no assurances of regrowth. Experiences of the 3030 Project at Terang have shown that a post-grazing residual of around 20% of the DM on offer at the first grazing results in the highest consumption over the growth period. The results of an experiment by Jacobs et al. (unpublished) showed that high utilisation at first grazing optimised total consumption (Table 3).

In dryland conditions regrowth will only occur if there is sufficient moisture and some growing points are left after the first grazing.

In irrigated conditions, the approach is to leave a greater post-grazing residual (about 40% of DM available at grazing) to achieve a quick and vigorous regrowth. This approach could also be adopted in dryland conditions for autumn sown regrowth Brassicas if soil moisture is expected to be adequate for the regrowth.

Cows should not consume more than 5–6 kg DM of Brassicas per grazing. It is not recommended to aim for higher intakes as it might lead to metabolic problems.

Due to the limited daily intake per cow, there is a limit to the total area to be sown to regrowth Brassicas. If a large area is sown, the crop will not stand over and will go to waste by the time the end of the paddock is reached. The nutritive value of the leaf portion of the plant begins to decline 13 weeks after sowing (Kaur et al., 2011).

Grazing management will also depend on the type of regrowth Brassica. From the experiences at the 3030 Project in western Victoria it was found that to maximise DM yield Winfred Brassica needs 12–14 weeks

### Table 2. Nutritive value of pasja, forage rape and turnips as average of two sites in south west Victoria and two consecutive years (adapted from Jacobs et al., 2002).

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pasja</td>
<td>13.2</td>
<td>14.1</td>
<td>25.6</td>
<td>14.7</td>
</tr>
<tr>
<td>Rape</td>
<td>13.1</td>
<td>16.7</td>
<td>25.3</td>
<td>16.4</td>
</tr>
<tr>
<td>Turnip</td>
<td>13.2</td>
<td>16.5</td>
<td>25.8</td>
<td>12.2</td>
</tr>
</tbody>
</table>

### Table 3. Effects of high, medium and low-intensity defoliation at the first grazing on the growth and consumption of regrowth Brassica at Terang over two years. Data shown is DM grown between grazing dates (t DM/ha), DM remaining after each grazing (t DM/ha), DM and percentage consumed at each grazing, and total DM consumed over two grazings (t DM/ha).

<table>
<thead>
<tr>
<th>Defoliation</th>
<th>Grazing 1</th>
<th>Grazing 2</th>
<th>Total consumed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>3.6</td>
<td>0.6</td>
<td>2.9</td>
</tr>
<tr>
<td>Med</td>
<td>3.6</td>
<td>1.9</td>
<td>1.7</td>
</tr>
<tr>
<td>Low</td>
<td>3.1</td>
<td>1.4</td>
<td>1.7</td>
</tr>
<tr>
<td>Year 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>13.1</td>
<td>2.3</td>
<td>10.8</td>
</tr>
<tr>
<td>Med</td>
<td>13.9</td>
<td>2.7</td>
<td>11.2</td>
</tr>
<tr>
<td>Low</td>
<td>13.3</td>
<td>3.3</td>
<td>10.0</td>
</tr>
</tbody>
</table>
(when it reaches maturity) whereas kale will need about 18 weeks to achieve full maturity (Figure 2).

See the ‘Turnips’ Information Sheet for more about the management of the adaptation period of cows starting to graze Brassicas and potential metabolic problems.

Figure 2. Kale plant at 3030 Project trials in Terang, August 2008.

Responses to N application in regrowth Brassicas

N fertiliser

A 3030 Project study compared the effect of applying N fertiliser to different summer-active species: regrowth Brassica cv. Hunter (hybrid), regrowth Brassica cv. Winfred, turnips cv. Barkant, chicory cv. Grouse (Chichorium intybus), plantain cv. Tonic (Plantago lanceolata), sorghum cv. Sweet Jumbo (Sorghum bicolor), millet (Echinochloa utilis) and a mixture of Winfred and millet (1:5). Nitrogen was applied at 0, 40, 80, 120, 160 and 200 kg N/ha, half after sowing and half after the first grazing (Jacobs et al., 2011).

Applying N fertiliser to summer forages only showed growth responses after rainfall and when there was enough available moisture. This clear outcome applied for all forages evaluated.

The crude protein content of all forages increased with increasing N application in both years, with the highest response being 0.14% per kg N applied, which was recorded in the sorghum crop. In contrast, the water-soluble carbohydrate content of forages decreased with N application.

It is important to note that the production responses observed in this trial were relatively low, even for the regrowth Brassicas, with Hunter and Winfred showing 4 and 2.5 kg DM/kg of N applied, respectively. However, the trial paddock had come out of perennial pasture and was cultivated. It is likely that there may have been subsequent mineralisation of soil organic N, which can mask N responses.

The main lesson from this trial is to only use N fertiliser for these summer forages when there is enough moisture in the soil and if the paddock has not been cultivated following a permanent pasture.

The situation can be completely different in the case of autumn-sown Brassicas. Mineralisation is limited during autumn and winter, and there is anecdotal evidence that regrowth Brassicas respond to the use of N fertiliser when sown in autumn, typically following a summer crop.

Effluent

Another study, by Jacobs et al. (2008), looked at the response of chicory cv. Grouse, Winfred Brassica, Hunter Brassica and Sweet Jumbo sorghum to the application of 0, 40, 80 and 100 mm of second pond effluent during summer.

Responses were relatively high in year 1 when 75 mm of rain fell immediately before effluent application (Table 4). Crude protein content of all crops increased in a linear manner at a rate of 0.07% per mm applied effluent. However, in year 2, the lower rainfall reduced the DM responses to 15 kg DM/mm across all species evaluated and also protein responses were not as consistent.

Table 4. Response of summer forage crops to second pond effluent application (adapted from Jacobs et al., 2008).

<table>
<thead>
<tr>
<th>Crop</th>
<th>Year 1 (kg DM/ha.mm)</th>
<th>Year 2 (kg DM/ha.mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grouse chicory</td>
<td>49</td>
<td>15</td>
</tr>
<tr>
<td>Hunter Brassica</td>
<td>52</td>
<td>15</td>
</tr>
<tr>
<td>Sweet Jumbo sorghum</td>
<td>29</td>
<td>15</td>
</tr>
<tr>
<td>Winfred Brassica</td>
<td>51</td>
<td>15</td>
</tr>
</tbody>
</table>

When using effluents to improve DM yields and crude protein content of regrowth crops, the general recommendation is to apply second pond effluent about four weeks before grazing and then immediately following grazing.

Since response rates to effluent have been shown to be linear up to 100 mm, application rates should be based on effluent available and DM yields required. If possible, matching the effluent application with significant rainfall will boost the growth response. The paddock should not be grazed within three weeks of application. Be aware that the N content of second pond effluent can be highly variable, so aim to apply the effluent at an agronomically sensible rate.

Regrowth brassicas mixtures

Regrowth brassicas + annual ryegrass

Because of their higher initial growth and higher nutritive value than most grass species sown in the autumn, regrowth Brassicas have shown good results when sown with annual ryegrass.

A 3030 Project experiment in south-western Victoria compared different sowing rates of a forage Brassica (cv. Winfred) sown with annual ryegrass (cv. Winterstar) at the end of March (Figure 3). Adding 1, 2 or 3 kg of Brassica to annual ryegrass sown at 25 or 35 kg/ha increased the total DM utilised by about 1 t DM/ha after three grazings.

Figure 3. Autumn-sown Winfred Brassica and annual ryegrass before the first grazing at Terang (sown 1 April 2010).
In this experiment, the addition of Brassica increased ME value at the first grazing from 13.4 to 14 MJ/kg DM. However, the proportion of Brassica in the total DM on offer decreased after the first grazing, as did its impact on the nutritive value of the consumed feed.

The general recommendation from the trial and other experiences is to sow Winfred Brassicas at 1–2 kg/ha with annual ryegrass at 20–25 kg/ha.

**Regrowth Brassicas + millet**

This mix has been used by several commercial dairy farms in the Gippsland region (Figure 4) and on trials at Terang (Figure 5). The objective was to increase the nutritive value of the millet crop which is normally high in fibre (see the ‘Millet and Sorghum’ Information Sheet).

However, the Brassica component of the crop on-farm has not seemed to contribute significantly to the final yield of the crop. This issue has become the subject of further research. It appears that the millet might be more aggressive in the initial competition of seedlings. More experimentation, including different sowing techniques and sowing densities, is needed to reach a more definite conclusion about the feasibility of this mix.

**Regrowth Brassicas + chicory or plantain**

There is only limited anecdotal experience on the use of this crop mix. It appears that sowing regrowth Brassicas with chicory/plantain in the spring still allows for a high yielding summer crop for the first 2-3 grazings (Figure 6). After this, the crop ‘seamlessly’ moves into a solid stand of chicory and/or plantain that could be managed as a pure crop or oversown with a perennial grass, short-lived ryegrass or a forage cereal.

Having chicory in the mix provides also some ‘insurance’ against a failed Brassica crop if there is a severe insect attack.

**Agronomy of regrowth Brassica crops**

**Establishment**

Most regrowth Brassica seeds are vigorous and will emerge from the ground in 7–10 days in either spring or autumn sowings. Because Brassica seeds are very small, it is important not to drill them more than 1.5 cm deep for a quick and successful emergence. When this is not possible, broadcasting the seed (by letting the seed hoses of the sowing machine hang free) followed by rolling has shown good results unless the soil is too wet for rolling (Fulkerson, 2008).

Direct drilling is a feasible option for sowing tap-rooted forage Brassicas such as rape and kale, although there is limited information reported about direct drilling other regrowth Brassica species.
The recommended sowing rates can vary substantially with the different types and cultivars of regrowth Brassicas. Table 5 gives the sowing rates used in the 3030 Project plot studies.

### Table 5. Sowing rates of regrowth Brassicas utilised in different studies of the 3030 Project at Terang.

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Sowing rate (kg/ha)</th>
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</thead>
<tbody>
<tr>
<td>Winfred</td>
<td>3</td>
</tr>
<tr>
<td>Pasja</td>
<td>4</td>
</tr>
<tr>
<td>Forage rape (Goliath)</td>
<td>4</td>
</tr>
<tr>
<td>Hunter</td>
<td>5</td>
</tr>
<tr>
<td>Kale</td>
<td>5</td>
</tr>
</tbody>
</table>

### Pests and weeds

Regrowth Brassica species are affected by the same pests and weeds as turnips (see the ‘Turnips’ Information sheet for details). However, except for pasja, roots or bulbs of regrowth Brassicas are not utilised by the grazing animal whereas they represent the main part of the DM yield in the case of turnips. Therefore, the impact of insects that cause defoliation such as the cabbage butterfly or the diamond back moth can be higher for regrowth Brassicas than for turnips.

The fact that the regrowth Brassicas, unlike turnips, can continue to grow after grazing provides some flexibility in the management of pests that cause defoliation.

Once the infestation is detected (Figure 7), if the crop is at an advanced stage (more than six leaves and firmly attached to the ground), an alternative to spraying is to graze the crop as quickly as possible to remove the biomass affected by the insect. By the time the crop develops new foliar biomass, a pest like the diamond back moth would have completed its cycle and turned into an adult.

This technique only works if there is either adequate soil moisture or rain immediately after grazing to allow for vigorous regrowth.

If the area planted to regrowth Brassicas and the DM available exceeds the herd’s capacity to graze it within 3–4 days, spraying is normally more effective in severe attacks, otherwise the insect would have consumed most of the crop before it is grazed. It is recommended to rotate chemical use to avoid resistance build-up.

Typically, broad-leaved weeds in Brassica crops are difficult to manage. To minimise competition during establishment, it is best to sow the Brassica into a clean paddock—either fully cultivated or sprayed. When Brassicas are sown in the spring, fat hen (*Chenopodium album*) can be very competitive during the germination phase. Consider using a herbicide such as trifluralin before sowing in paddocks where fat hen has been seen in previous years. Trifluralin offers pre-emergent control of certain annual grasses and broadleaf weeds and it needs to be incorporated into the soil within 4 hours of application.

### Soil and nutrient requirements

When sowing regrowth Brassicas, the normal practice has been to apply 20 kg of P/ha with the seed as either a P-based fertiliser such as single or triple superphosphate or an N-P fertiliser such a DAP or MAP.

Brassicas are sensitive to low molybdenum and boron, so where these trace elements are known to be deficient, either sow seed with these in the coating or apply them in the fertiliser application (e.g. Super-Moly).

For spring-sown Brassicas, N may not be required at sowing as high N mineralisation will occur with the cultivation of the seedbed. Nitrogen mineralisation is driven by temperature but will depend on paddock history and moisture availability through the summer. Normally, paddocks coming from pasture have high organic matter content and therefore summer mineralisation is significant. If the paddock has had previous crops and soil moisture is likely to be good, some N fertiliser applications may be beneficial. Side dressings of 40–50 kg N/ha may be warranted during the growth of the crop.

Where soil potassium (K) levels could be limiting, applying K as a top dressing (~100 kg potash/ha) has showed growth responses. Potash should not be applied with the seed at sowing.
References


See also

3030 Project Report from the Gippsland Partner Farm Field Day February 2010.


About 3030

PROJECT 3030 aims to help farmers achieve a 30% improvement in farm profit by consuming 30% more home-grown forage (pasture plus crop). It is aimed at dryland farmers in southern Australia who have mastered the challenge of growing and using ryegrass pasture for dairy-cow feeding.

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