Widens your application window for fruit thinning.

Product guide

Brevis provides Australian apple growers with an innovative and flexible option for fruit thinning.

**At a glance**

- Unique mode of action inhibits photosynthesis to induce fruit thinning
- Apply in daily temperatures of 10°C to 25°C
- Apply between 8 and 16 mm fruitlet diameter
- Apply as one or two treatments to a maximum of 2.2 kg/ha
- No impact on beneficial insects or IPM programs

**Flexible application**

Brevis can be applied across a wider growth window (8–16 mm fruitlets), a wider temperature range (10–25°C) and as one or two applications to a maximum of 2.2 kg/ha per season. By comparison, 6-benzyladenine (6-BA) requires rising temperatures of at least 15°C for two or three days after application. The flexible application window for Brevis enables growers to vary the level of thinning according to their local climate and management.

**Unique mode of action**

Brevis contains the unique active ingredient, metamitron, which inhibits photosynthesis to induce fruit thinning. Applied as a foliar spray, metamitron is absorbed primarily by leaves but does not translocate throughout the tree. The rate of photosynthesis starts to decline within one hour of application and reaches its lowest point within three to five days of application. Excess fruitlets stop growing and discolouration of the stems can be observed five days after application. The weakest fruitlets within a cluster (i.e. fruitlets with low growth rates or without seeds) will usually drop first. Fruit drop will continue for several weeks. Depending on application rate, timing and environmental conditions, the rate of photosynthesis will return to normal levels within two to three weeks.

**More options to manage crop load**

Brevis is a versatile new fruit thinner to help apple growers optimise fruit set, yield and quality and to reduce biennial bearing. Biennial bearing is the production of a heavy crop one year followed by a light crop, and is a major problem for apple growers with a reduction in cumulative yield and fruit quality. The main cause of biennial bearing is competition between the current season’s crop and production of next season’s flower buds. Biennial bearing can occur as a result of adverse climatic conditions, susceptible cultivars, poor pollination and crop management practices, including how crop load is managed.
Can be used on most cultivars
The efficacy and safety of Brevis has been assessed on Granny Smith, Rubens, Red Delicious, Royal Gala, Pink Lady, Fuji and Envy apples throughout Australia. Adama is evaluating the use of Brevis in other apple and pear cultivars.

Impact on hand thinning
Hand thinning after natural fruit fall is both time-consuming and expensive. Brevis can significantly reduce the amount of hand thinning after natural fruit fall. However, the use of Brevis will not replace the need for hand thinning, particularly to remove damaged or misshaped fruit and to further optimise the number of fruit per cluster or tree. In certain situations (e.g. heavy fruit set, use in hard-to-thin varieties and/or adverse crop and weather conditions), further hand thinning may be required to achieve the desired fruit size and crop load.

Proven efficacy
Extensive field testing and commercial use conducted throughout Australia and overseas confirm that Brevis provides similar or better fruit thinning compared with existing products. Trials have shown Brevis has a beneficial impact on fruit size and quality by reducing fruit load and competition for nutrients when applied in accordance with the label directions.

Easy to use
Brevis is a water-soluble granule formulation that can be applied using existing orchard spray equipment, provided adequate coverage is achieved throughout the canopy. Brevis is rainfast within two hours of application and workers can re-enter the orchard once the spray has dried. Brevis has no withholding period when used according to the label directions. Brevis has no impact on beneficial insects and is compatible with IPM programs.

Unique technology from Adama
Brevis was developed by Adama, one of the world’s leading crop protection companies. The fruit thinning properties of metamitron were first identified by researchers at the Fruit Research Station in Jork, Germany. Adama developed a formulation specifically for pome fruit thinning and continued development in collaboration with leading research institutes, advisors and growers throughout the world. Brevis – Latin for ‘short’, reflecting its short period of activity in apples – was launched in Europe in 2013. It is now registered for use in 23 countries throughout the world.
Australian efficacy data

Brevis has been extensively tested by independent researchers, consultants and customers throughout Australia. Applied in accordance with the label guidelines, Brevis provides similar or better fruit thinning when compared with standard fruit thinners (Figures 1 to 4).

In all trials, Brevis was applied at 1.1 kg/ha and 2.2 kg/ha at the 8 mm central fruitlet diameter stage; or as a split application of 1.1 kg/ha at the 8 mm stage followed by 1.1 kg/ha at the 14 mm stage. Hand thinning was conducted at the normal timing.

**Figure 1: Thinning effect of Brevis in apples, cv. Fuji (average 3 trials, 2014–15).**

*Application timing A: 3–5 mm, B: 8 mm king fruitlet, C: 14 mm king fruitlet, D: Commercial hand thinning timing.*

**Figure 2: Thinning effect of Brevis in apples, cv. Royal Gala (average 15 trials, 2014–18).**

*Application timing A: 3–5 mm, B: 8 mm king fruitlet, C: 14 mm king fruitlet, D: Commercial hand thinning timing.*
Figure 3: Thinning effect of Brevis in apples, cv. Red Delicious (average 4 trials, 2014–16).
Application timing A: 3–5 mm, B: 8 mm king fruitlet, C: 14 mm king fruitlet, D: Commercial hand thinning timing.

Figure 4: Thinning effect of Brevis in apples, cv. Pink Lady (average 5 trials, 2014–17).
Application timing A: 3–5 mm, B: 8 mm king fruitlet, C: 14 mm king fruitlet, D: Commercial hand thinning timing.
Fruit size and quality

Fruit thinning in apples is critical as fruit size at harvest is directly related to the timing and degree of thinning. Ineffective or delayed thinning can result in lower grade or fruit quality and increase the risk of biennial bearing.

Applying Brevis within the recommended application window improves fruit size and quality. The relationship between application timing, thinning, fruit size and quality is demonstrated in Figures 5 to 8.

Figure 5: Effect of Brevis on average fruit weight in apples, cv. Pink Lady (Shepparton, Vic, 2017).

Average fruit weights for each treatment with the same letter are not significantly different (LSD; P=0.05). Application timing A: 3–5 mm, B: 8 mm king fruitlet, C: 14 mm king fruitlet, D: Commercial hand thinning timing.

Figure 6: Effect of Brevis on average fruit weight in apples, cv. Royal Gala (Orange, NSW, 2017).

Application timing A: 3–5 mm, B: 8 mm king fruitlet, C: 14 mm king fruitlet, D: Commercial hand thinning timing.
Figure 7: Effect of Brevis on fruit size (diameter) in apples, cv. Pink Lady (Shepparton, Vic, 2017).

Average fruit weights for each treatment with the same letter are not significantly different (LSD; P=0.05).
Application timing A: 3–5 mm, B: 8 mm king fruitlet, C: 14 mm king fruitlet, D: Commercial hand thinning timing.

Figure 8: Effect of Brevis on fruit size (diameter) in apples, cv. Royal Gala (Orange, NSW 2017).

Average fruit weights for each treatment with the same letter are not significantly different (LSD; P=0.05).
Application timing A: 10–14 days after full bloom, B: 8 mm king fruitlet, C: 14 mm king fruitlet, D: Commercial hand thinning timing.
Application guidelines

Application rate
Brevis applied at 1.1 to 2.2 kg/ha as a single application or applied as a split application to a maximum of 2.2 kg/ha per growing season. DO NOT apply more than two applications per season.

Single spray program: Apply as a single application at 1.1 kg/ha to 2.2 kg/ha when the central fruitlets are 8–16 mm in diameter (Figures 9 & 10). Use the lower rate to remove fewer fruitlets, on trees with lighter fruit set and/or on easy-to-thin cultivars/blocks. Use the higher rate to remove more fruitlets, on trees with heavier fruit set, on normal-to-thin cultivars and/or when applying later in the application window.

Double spray program: In situations where the orchard/variety is likely to be easily thinned by the high rate of Brevis, apply two applications at 1.1 kg/ha. Apply the first application when the central fruitlets are 8 mm in diameter (Figures 9 & 10). Apply the second application at least five days later when the central fruitlets are up to 16 mm in diameter. Note that adverse weather conditions may prevent a second application, potentially reducing the number of fruitlets thinned.

Application timing
Brevis should be applied when the central (king) fruitlets are 8–16 mm in diameter. Australian research has confirmed the application of Brevis at the 8–10 mm diameter stage has a stronger effect on fruit thinning (Figure 11). If conditions are not suitable to apply Brevis at 8 mm, delaying application may improve the results. When applying Brevis as either a single timing or split application, DO NOT apply later than the 16 mm diameter stage.

Application conditions
The efficacy of Brevis is directly related to day/night temperatures before and after application. Apply when daily temperatures are between 10°C and 25°C. Cloudy weather (lower light intensity) and warmer night temperatures >10°C can increase the thinning effect of Brevis the week before and after application. Always check current and forecast weather conditions before application. Postpone application if temperatures are outside the recommended range or trees are under stress due to cloud cover, heat, frost, drought or hail damage. Consider reducing the application rate and/or the need for a second application. DO NOT apply within five days of a frost or if frost is expected.

Application volume
Apply in a spray volume to achieve good coverage. DO NOT apply past the point of run-off. Table 1 converts the recommended application rate (kg/ha) to an application rate per 100 L for a range of target spray volumes. DO NOT apply using concentrate spray volumes exceeding 220 g of Brevis per 100 L water.

Table 1: Application rate vs. spray volume.

<table>
<thead>
<tr>
<th>Application rate (kg/ha)</th>
<th>Water volume (L/ha)</th>
<th>Rate (g/100 L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>1000</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>1500</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>55</td>
</tr>
<tr>
<td>2.2</td>
<td>1500</td>
<td>220</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>147</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>110</td>
</tr>
</tbody>
</table>

Figure 9: 8–10 mm diameter fruitlet (cv. Gala).

Figure 10: 12–14 mm diameter fruitlet (cv. Gala).
Use with other products
Brevis should not be mixed with any other product, including wetting agents, surfactants and foliar fertilisers. The addition of a tank mix partner may have an unpredictable effect on thinning response and an increase in leaf phytotoxicity.

Use with other fruit thinners
The use of Brevis in conjunction/sequence with other primary or secondary thinners has not been thoroughly evaluated under local conditions. Application of other thinners in conjunction with Brevis may impact the efficacy and/or crop safety. Adama Australia does not recommend tank-mixing Brevis with other fruit thinners.

Application method
Apply using ground equipment. DO NOT apply by aircraft. DO NOT apply to wet foliage, e.g. early in the morning after a dew or after rain. DO NOT allow spray drift onto non-target crops, especially stone fruit.

Application checklist
- Apply to 8–16 mm diameter central fruitlets
- Apply when daily temperatures are 10°C to 25°C
- Apply as one or two treatments to a maximum of 2.2 kg/ha per growing season
- Apply in a spray volume to achieve good coverage
- DO NOT tank-mix with other crop protection products, wetting agents, surfactants or foliar fertilisers
- DO NOT apply past the point of run-off

Withholding periods
Harvest: Not required when used as directed.
Grazing: DO NOT allow livestock to graze interrows in treated orchards.

Figure 11: Average thinning effect of Brevis at two application timings (average of 9 trials and 6 cultivars, 2016).

Application timing B: 8–10mm, C: 12–16mm, D: Commercial hand thinning timing.
Crop load management

Determine the level of thinning

Desired fruit size, target yield, pruning levels and initial blossom density and strength are some of the key factors that determine the degree of thinning required. Calculating the desired crop load is the first step in determining the required level of thinning.

The level of thinning provided by Brevis can vary significantly according to the application rate and timing. Determining the optimum application rate and timing depends on the target crop load and a range of orchard parameters, including cultivar, tree age, training system, rootstock and tree vigour/stress.

Factors that increase thinning

The thinning effect of Brevis is influenced by a number of factors that determine the rate of photosynthesis in treated trees. These factors need to be considered when deciding the appropriate application rate, number of applications and application timing. Refer to Table 2.

<table>
<thead>
<tr>
<th>Cause</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil-based treatments: The application of oil-based products, such as summer oils, adjuvants and crop protection products that contain oils (e.g. penthiopyrad).</td>
<td>DO NOT apply oil-based products seven days before or after application of Brevis.</td>
</tr>
<tr>
<td>Application of other thinners: The application of other fruit thinners before, concurrently or after, the application of Brevis.</td>
<td>The application of other thinners in conjunction with Brevis may impact efficacy and/or crop safety. DO NOT tank-mix Brevis with other fruit thinners.</td>
</tr>
<tr>
<td>Stress: Warm night-time temperatures (&gt;10°C) the week before or after application. Reduction in sunlight/light intensity (e.g. cloud cover, hail nets).</td>
<td>DO NOT use on trees with poor vigour or which are under stress (e.g. frost, water or heat stress). Postpone application if trees are under stress due to cloud cover, heat, frost, drought or hail damage. Consider reducing the application rate and/or the need for a second application.</td>
</tr>
<tr>
<td>Cultivars: Different cultivars and clones respond differently to fruit thinning agents.</td>
<td>In general, cultivars can be grouped by their ease of thinning (see Table 3). Hard-to-thin cultivars may require a higher application rate or two applications of Brevis. Additional thinning practices may be required on hard-to-thin cultivars following the application of Brevis.</td>
</tr>
<tr>
<td>Orchard characteristics: Tree age, training systems, rootstock, tree vigour, cropping history and management practices.</td>
<td>DO NOT use on areas with a history of poor or variable fruit set or poor fruit retention. DO NOT apply higher rates to varieties or trees with a history of poor fruit retention or overthinning responses to other thinning products. DO NOT use Brevis on trees less than four years old. If the block history is unknown or if there is a history of variable responses to fruit thinners, evaluate the performance of Brevis on a small section of each block for one year before treating the entire block.</td>
</tr>
<tr>
<td>Vigorous tree growth</td>
<td>The activity of Brevis may be increased due to competition for photosynthates between the vegetation itself and the fruits.</td>
</tr>
</tbody>
</table>
Factors that decrease thinning

Conversely, a range of factors may decrease the thinning effect produced by Brevis:

- Low application rate and/or single application
- Low night temperatures
- Application to large fruitlets (>16 mm diameter)
- Use in hard-to-thin varieties (e.g. Fuji)
- Trees with low vigour

Cultivar differences

The thinning program needs to be adapted to the cultivar to avoid economic loss by over-thinning or under-thinning. Thinning classification of common cultivars may vary between apple growing regions.

Table 3: Thinning ease of common cultivars

<table>
<thead>
<tr>
<th>Easy-to-thin</th>
<th>Moderate</th>
<th>Hard-to-thin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golden Delicious</td>
<td>Red Delicious</td>
<td>Fuji</td>
</tr>
<tr>
<td>Granny Smith</td>
<td>(vigorous root stocks)</td>
<td>Red Delicious</td>
</tr>
<tr>
<td></td>
<td>Pink Lady</td>
<td>(spur types)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Royal Gala</td>
</tr>
</tbody>
</table>

Crop safety

Brevis can cause minor chlorotic/necrotic areas on leaves and minor leaf drop. These effects may become visible on treated foliage 10 to 14 days after application. These effects have no impact on crop development or fruit yield or quality. The incidence of leaf phytotoxicity is related to the application rate, weather conditions and variety. The efficacy and safety of Brevis has been assessed in Granny Smith, Rubens, Red Delicious, Royal Gala, Pink Lady, Fuji and Envy. Contact your local Adama representative for advice about using Brevis in other cultivars.
Brevis™

Widens your application window for fruit thinning.

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Scan here for all the latest information and resources for Brevis

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