



GRANUBOR

DANGER



S5 Poison

Causes serious eye irritation

May damage fertility or the unborn child

Classified as Hazardous according to Safe Work Australia criteria

ANALYSIS

Nutrient content

- Boron (B), as Disodium tetraborate pentahydrate ($\text{Na}_2\text{B}_4\text{O}_7 \cdot 5\text{H}_2\text{O}$) 14.3 % w/w

Heavy metal impurities

- Cadmium (Cd) 1 mg/kg Cd (max)
- Lead (Pb) 1 mg/kg Pb (max)
- Mercury (Hg) 0.2 mg/kg Hg (max)

USE

Granubor® is a granulated boron fertiliser, for dry application to the soil. It is not suitable for application in solution (dissolved in water).

BORON

Boron (B) is mobile in soils. It moves with soil moisture towards plant roots, and can be leached below the root zone, more so in sandy soils and high rainfall areas, and under irrigation. Boron's mobility in the soil means it can easily burn plant roots, if applied at too high a rate, or concentrated in a small volume of soil rather than being spread over a wider area.

It also often means boron needs to be applied annually in crops in which it is required, like nitrogen. Boron differs from trace elements that are immobile in the soil, for which a single application at high rates may remain effective for several years. Applying boron at too high a rate can result in toxicity.

All crops need an adequate supply of boron but vary significantly in how much is required. Low rates are required in strawberry, while Brassica crops, e.g., cabbage and cauliflower, have a high requirement. Crops vary in their sensitivity to boron deficiency, and tolerance of excess boron. There can be a thin line between deficiency, adequacy, and toxicity.

It is very easy to induce boron toxicity. Rates that are necessary in some crops to prevent deficiency may be toxic in others. Applying fertilisers such as Granubor to the soil uniformly and at low rates can be difficult. For this reason, Granubor is often added as a blend ingredient to NPK fertilisers. Alternatively, soluble boron fertiliser forms can be used, either as soil or foliar sprays, to provide more uniform coverage.

ANNUAL CROPS

Boron can be applied pre-plant. If the position of the intended crop row is known in advance (e.g., vegetable crops), boron can be applied and incorporated into the soil before planting, as a basal fertiliser, and when applied in a broad band along the intended position of the plant row.

Boron should not be applied in the planting fertiliser if it is applied in narrow bands adjacent to the seed, transplants, or setts during the planting operation. Applying the crop's complete boron requirement always, and in this way, is likely to result in root burn and toxicity.

If the crop is side dressed, apply boron fertiliser towards the inter-row space in as broad a band as possible, and early in the growing season, e.g., drop on the soil surface and water in. If applied into the soil, do not apply too close to the row to avoid root pruning and toxicity.

Seek local and industry advice on the need for boron, and appropriate boron application rates for the crops to be grown. In the absence of specific crop advice, the rates shown in Table 1 can be used as a guide to how much boron to apply where a deficiency is identified.

Lower application rates may be considered where there is less evidence that boron is required, e.g., as insurance against a minor deficiency in susceptible crops.

Suggested maximum broadcast application rates, which should not be exceeded on loam soil for various field crops, are shown in Table 2. Too high an application rate of boron may result in toxicity.

Consideration also needs to be given to the next crop to be grown in the rotation. If it is sensitive to (i.e., intolerant of) boron, it may be advisable to err on the low side when choosing the rate at which boron is to be applied, or only use foliar sprays. For example, French Bean, pea and cucumber are sensitive to boron toxicity.

Table 1: Suggested application rates for Granubor® in these specified crops.

Crop	Rate (kg/ha)
French bean, Strawberry	2
Maize	2 – 4
Cucurbits	3
Potato	4
Cotton, Sunflower, Tomato	4 – 8
Carrot, Celery, Lettuce, Onion	8
Canola, Lucerne, Cabbage, Cauliflower, Beetroot	8 – 12

Table 2: Maximum annual broadcast application rates for Granubor®.

Crop	Rate (kg/ha)
Cowpea, Cucumber, French Bean, Pea, Strawberry, Cereals	4
Celery, Citrus, Melon, Potato, Squash	15
Cabbage, Carrot, Chilli, Radish, Spinach, Sweet Potato	25
Cauliflower, Mustard, Tomato, Turnip, Beetroot	40

TREE, VINE, AND PLANTATION CROPS

Use annually at the start of the major growing season. Spread evenly over the root zone, i.e., under the whole canopy and just beyond the edge of the tree canopy, but no closer than 30 cm to the trunk. Be careful not to concentrate the fertiliser on too small an area around each tree.

In the absence of more specific local advice, the rates detailed in the following table can be used as a guide to boron application rates. Unless otherwise specified, these rates are for mature trees and vines. Young trees require lower application rates. Boron may not be required in the early years before the trees reach the reproductive (fruiting) stage.

Table 3: Suggested application rates for Granubor® in perennial horticultural crops.

Crop	Rate (NOTE: 1 g/m² = 10 kg/ha)
Bearing Pome and Stone fruit	<p>Apply Granubor at 8 – 25 g/tree in the late winter/spring. This equates to 5 - 15 kg/ha of Granubor at 6 x 3 metre row spacings (555 trees/ha).</p> <p>Higher rates may be required where severe deficiency occurs.</p> <p>Boron is not recommended on trees less than three years of age.</p>
Avocado	<p>Application rates, frequency and timing are variable depending on the soil type, degree of deficiency as measured by soil and leaf analysis, rootstock, and disease.</p> <p>Seek professional or Departmental advice before use.</p>
Banana	<p>Apply Granubor at 7 g/plant on two occasions each year. At 2,000 plants per hectare, this equates to 15 kg/ha of Granubor per application, and an annual rate 30 kg/ha of Granubor.</p>
Grape	<p>Apply Granubor at 8 g per mature vine in August. At 1,500 vines/ha, this equates to 12 kg/ha of Granubor.</p> <p>On very sandy soils, split this into two applications, at least four months apart.</p>
Lychee	<p>Apply Granubor at 3 g/m² of canopy cover.</p>
Macadamia	<p>Apply Granubor at 1.5 g/m² of canopy cover in April, and up to a maximum of 40 g/tree for large trees. At 250 trees/ha, this amounts to a maximum of 10 kg/ha of Granubor.</p>
Mango	<p>Apply Granubor at 35 g evenly under the canopy of trees with radius > 2.5 m after harvest and again at flowering. At densities of 100 – 200 trees/ha, this amounts to 7 – 15 kg/ha/annum of Granubor.</p> <p>For trees smaller than 2.5 m radius, apply evenly to the canopy area twice per year at 1.75 g/m² of canopy area. On very sandy soils, split this into four applications per year at 0.9 g/m²</p>
Papaw	<p>Apply Granubor at 20 kg/ha pre-plant.</p> <p>Once established, apply 2 g/m² of canopy cover in spring and again in autumn on red volcanic soils.</p> <p>On sandy soils, boron will need to be applied more regularly at lower rates. Apply a maximum of 1.5 g/m² of canopy cover/application four times per year.</p>
Passionfruit	<p>15 kg/ha of Granubor (or 1.5 g/m² of canopy cover) annually.</p>

FURTHER READING

An Agritopic on Boron is available if required and should be read in conjunction with these Use Directions.

SAFETY DIRECTIONS

Avoid ingestion and inhalation of dust. Avoid contact with eyes or skin. Wash hands after use.



FIRST AID

If exposed or concerned, seek medical advice/attention. If in eyes, hold eyelids apart and flush continuously with running water for several minutes. Remove contact lenses, if present and easy to do. If eye irritation persists, contact a doctor.

CARE OF EQUIPMENT

Fertilisers can be corrosive to metals. Clean equipment after use.

SAFETY DIRECTIONS

Refer to the Safety Data Sheet (SDS) for more detailed safety advice. Before use, read the Product Label and the SDS. Use safe work practices and avoid contact with the eyes and skin. Avoid ingestion and inhaling dust. Protective clothing, eyewear and dust masks should always be used when dealing with this product. Observe good personal hygiene, including washing hands after use. Avoid loss of fertiliser to waterways.

WARNING

This document contains information of a general nature. Before using fertiliser seek independent agronomic advice. Fertiliser programs may need to be varied depending on the plants being grown, climatic and soil conditions, application methods, irrigation, agricultural and livestock management practices, the soil's fertility, and cultural practices. ('Unforeseen Elements')

Fertiliser may burn and/or damage crop roots or foliage. Foliar burn to the leaves, fruit or other plant parts is most likely to occur when fertilisers are foliar applied at high concentrations and/or on a regular basis, different products are mixed and sprayed together at cumulatively high rates, the water is of poor quality, or the spray is applied under hot dry conditions, e.g. in the heat of the day.

Fertiliser and supplements may affect animal health. Seek independent advice before using any supplements in livestock rations.

DISCLAIMER

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