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Crop symptoms?

作物病徵

Apple bitter pit

蘋果缺鈣之苦腐病

Calcium deficiency on cucumber

胡瓜缺鈣症狀

Tomato blossom end rot

蕃茄缺鈣之尻腐病

Lettuce tip burn

萵苣缺鈣之葉燒症

Poor fruit set? 著果不良嗎?

- The effect of a combination trace element deficiency – calcium, boron and magnesium (and perhaps zinc)

  微量元素缺乏綜合症狀---缺鈣,硼及鎂(可能還缺鋅)

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Calcium deficiency?

鈣 缺乏症?

- Calcium applied but…

  雖然施用鈣,但-----

  - Calcium is immobile and may not reach the growing points where it is required

    鈣不能在作物中移動,可能無法送達需要的生長點
  - Growing points die

    生長點死亡
  - Lack of soil moisture or water logging

    土壤太乾或太溼
  - Calcium gets locked up in the soil

    鈣被土壤固定,無法吸收

Poor fruit quality? 水果品質不佳嗎?

Calcium levels are also important in controlling post harvest rots, as Calcium enhances shelf life and increases fruit quality

鈣之含量對採收後之腐爛影響很大因鈣可增加其櫥架保存期及提高水果之品質.

Why the need for Calcium?

為什麼需要補充鈣肥?

- Poor quality fruit = loss of income 水果品質不好=減少收入
- Calcium is required for quality fruit with good shelf life水果品質及櫥架保存期之提高皆需要補充鈣肥
- Calcium is immobile 鈣在作物體內不能移動
- Calcium is readily locked-up in the soil
  鈣容易被土壤固定

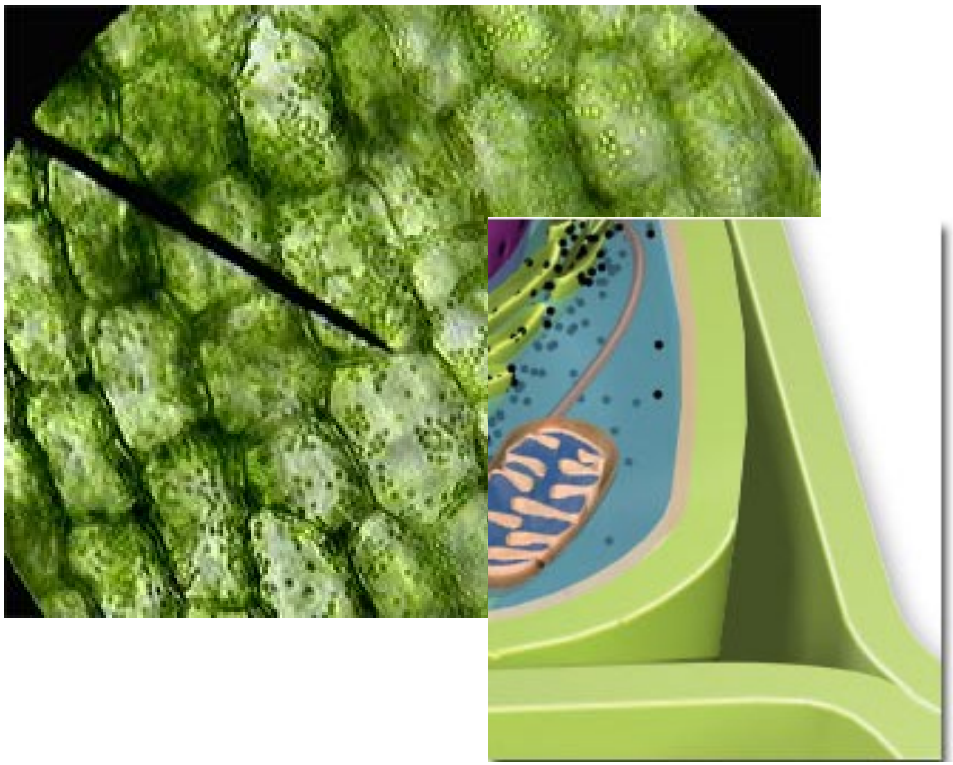
The solution – Grocal MGB

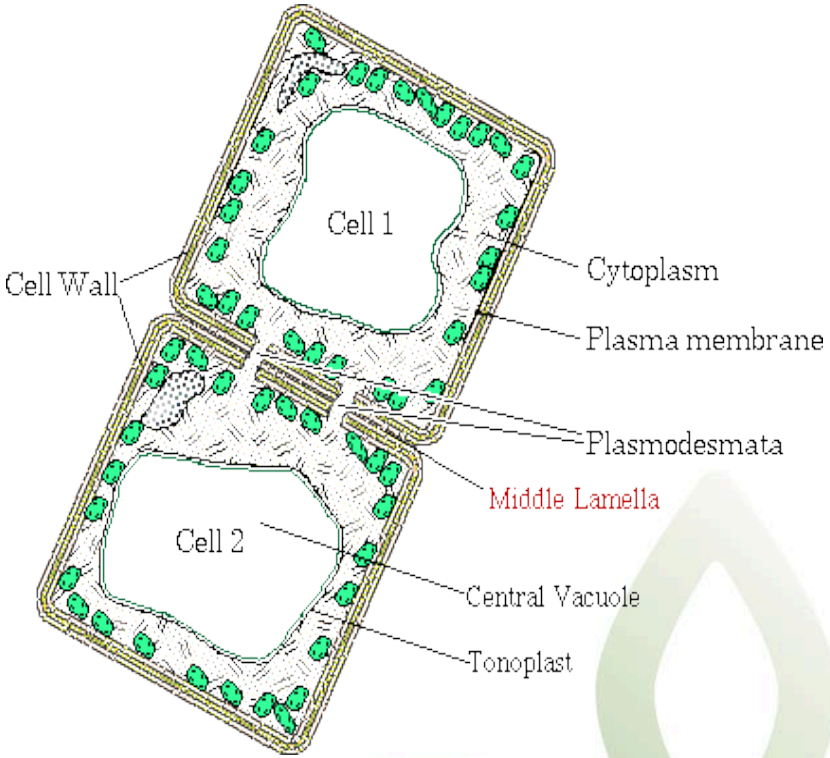
請施用補鈣鎂液體肥料來解決以上問題

- **Analysis:** 成分:
  - NPK 10-0-0 氮:10%
  - 17% Calcium 鈣:17%
  - 4% Magnesium 鎂:4%
  - 0.1% Boron 硼:0.1%
- **Formulation type** 製劑:綠色果膠狀懸浮液
  - Green gel-like suspension
- **Packsizes** 包裝:5公升,20公升,200公升,1000公升
  - 5 L, 20 L, 200 L, 1000L
- **Application** 用法:參閱標示內之推薦用量
  - See label for crop rates

Why do we need calcium?

為什麼我們需要鈣?

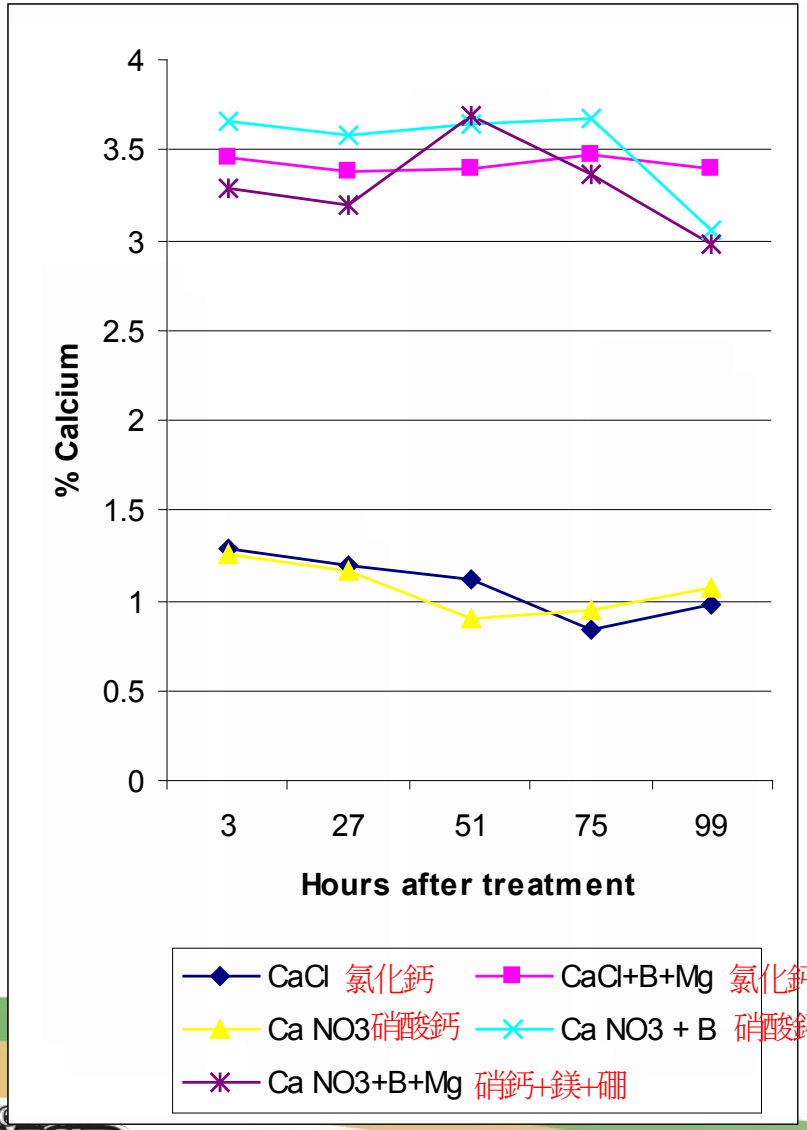




強化細肥壁:大部分的鈣聚集在細胞壁間隙之細胞薄層中

Strengthening cell walls: a high proportion of Calcium is located in the middle lamella of the cell walls

Grocal MGB Science 補鈣鎂之學證明



- Boron is required for Calcium uptake
  鈣的吸收需要硼的幫助
- Magnesium appears to affect uptake
  鎂可以促進鈣的吸收

Foliar-applied Calcium
葉面噴施鈣肥

Treatment 處理	Rate of Ca/acre Ca/acre lbs 鈣 磅/英畝	Ca concentration concentration ppm 鈣之濃度
8 foliar sprays 噴8次	22	45
5 foliar sprays 噴5次	12	25
2 foliars 噴2次	5	10
Gypsum applied to soil 土壤施用石膏	400	12

Source: umass.edu/fruitadvisor/factsheets/folcalcium)

- Comparison of foliar applications of Calcium on apples

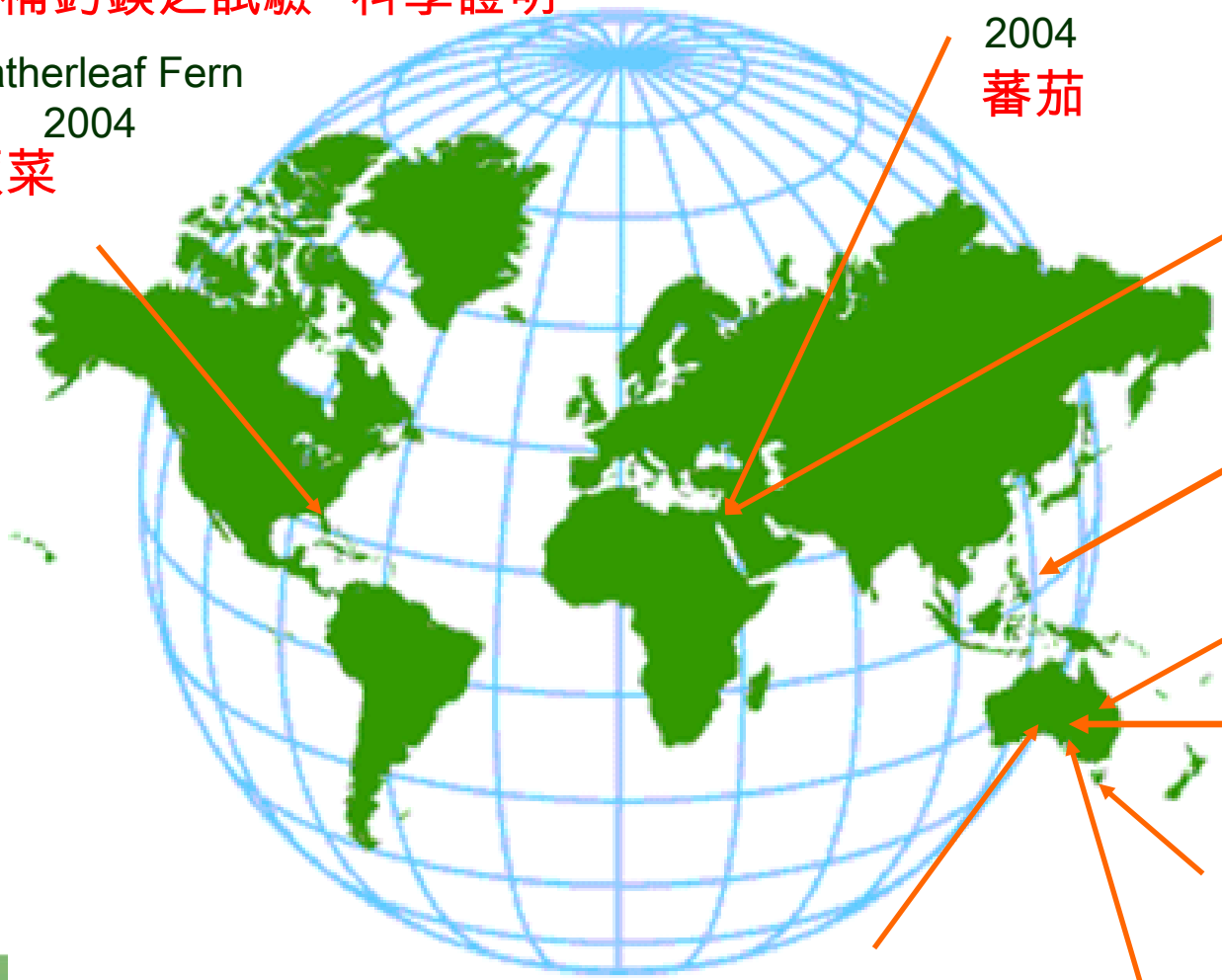
  蘋果葉面噴施鈣肥之比較

- Foliar sprays of Ca more effective than soil applied

  葉面噴施鈣肥比土壤施用鈣肥更有效

Grocal MGB Trials - Science

補鈣鎂之試驗--科學證明



Leatherleaf Fern
2004
厥菜

Tomatoes
2004
蕃茄

Bananas
2004
香蕉

Banana
2003
香蕉

Potato
1980's
馬鈴薯

Bananas
1999
香蕉

Green Beans
2003
綠豆

Faba Beans
2000 豆類

Wheat
1999 小麥

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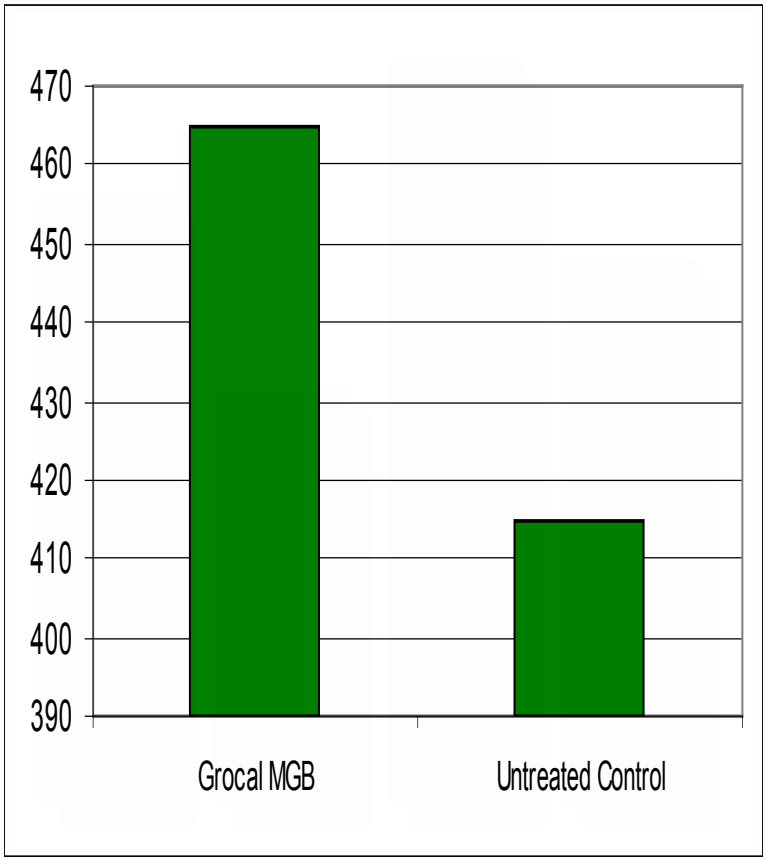
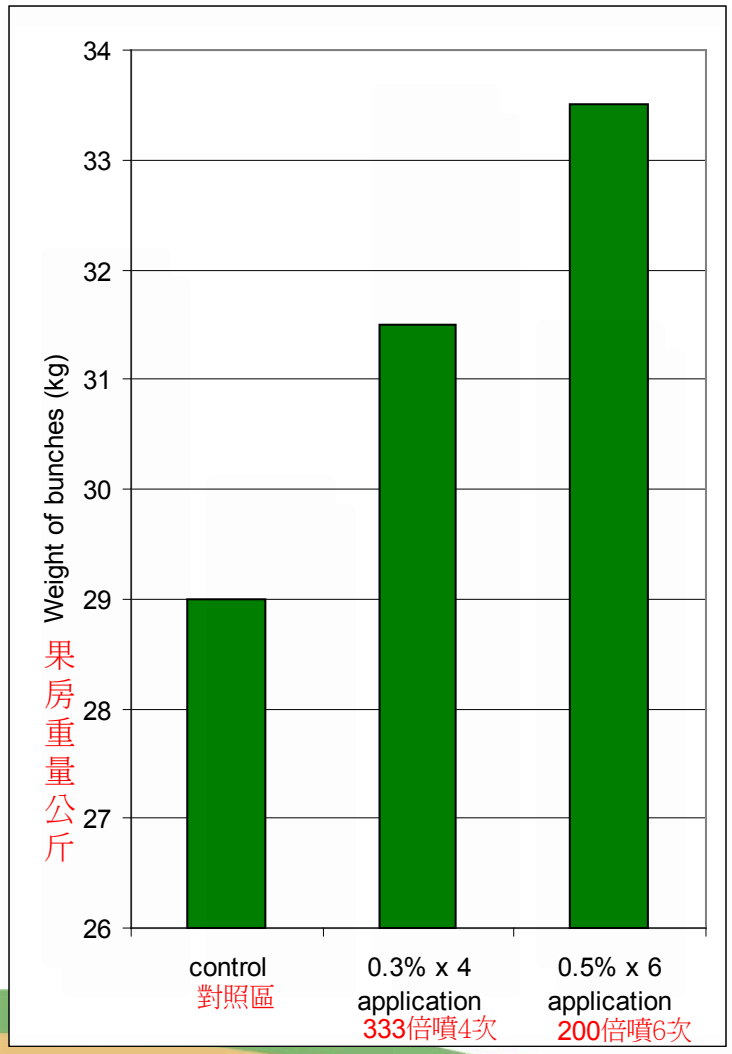
Grocal MGB on green beans

補鈣鎂施用於綠豆之成果



- Average no. of marketable Beans per Sample 每次取樣可銷售之綠豆之數量
- Location: Tasmania 地點:Tasmania
- Date: January 2003 日期:2003年1月
- No of Applications: 2 (at first flower and again 7 days later) 2次(第一次為開花時,7天後再噴1次
- Application rate: 4 L/ha in 400 L water/ha 4公升/公頃,溶於400公升水中/公頃
- Application method: Boom sprayer 施用方法:動力噴霧器
- Variety: Montano 品種:Montano

Banana’ s 1999 1999年香蕉試驗結果



- Location: Australia
  地點: 澳洲
- Date: 1999
  日期: 1999年
- Application method: foliar
  用法:葉面噴施
- Bunch weight increase by Grocal MGB
  施用補鈣鎂果房重量增加很多

Testimonial

- Business : Crop Tech
- Location : Bundaberg
- Person : Malcolm Fricke, chief agronomist
- Date : June 2006

- “I find that Grocal MGB is a very efficient form of Calcium to use. It keeps the calcium:magnesium ratio right in the plant and the hint of boron aids utilization. It is an ideal calcium application for flowering and fruiting crops”.

而少量的硼可促進其吸收利用,這是很適合會開花作物及果樹用的鈣肥

Summary 摘要

- Grocal MGB is a very effective form of Calcium 鈣鎂是一種很有效的肥
  - **Science:** 學理上:
    - The addition of Boron and Magnesium enhances plant uptake of Calcium 含有硼及鎂可促進鈣的吸收
  - **Utility:** 應用上:
    - Can be applied as foliar, getting Calcium where you need it 經由葉面噴施,到達作物需要它的各處
  - **Testimony:** 推薦書
    - Mal Fricke uses it to keep the Ca:Mg ratio in balance 馬可 費律克 施用它可以保持鈣,鎂平衡之比例
    - Agrichem trials show that it is a very effective form of calcium澳洲農化公司之各項試驗證明這是很高效率的鈣肥
    - Increases yield, fruit and vegetable quality, shelf life and therefore return 可以提高產量,蔬菜,水果之品質,櫥架保存期,因此收益提高

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