

# Calcium Chloride for Grape and Strawberry Crops

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Grapes



- All Grapes Acreage (wine, table, raisin):
  - 2010 Estimate:
    - ❑ Total: 842,000 Acres
      - 792,000 bearing
      - 50,000 non-bearing
  
- Wine Grapes
  - 2010 Estimate:
    - ❑ Total: 535,000 Acres
      - 497,000 bearing
      - 38,000 non-bearing

# Wine Making Grapes: Economics



- Average Farming Cost:
  - \$20K - \$25K/ Acre
  
- Average Profit:
  - \$3K - \$4K/Acre



# Ca as a Crop Nutrient



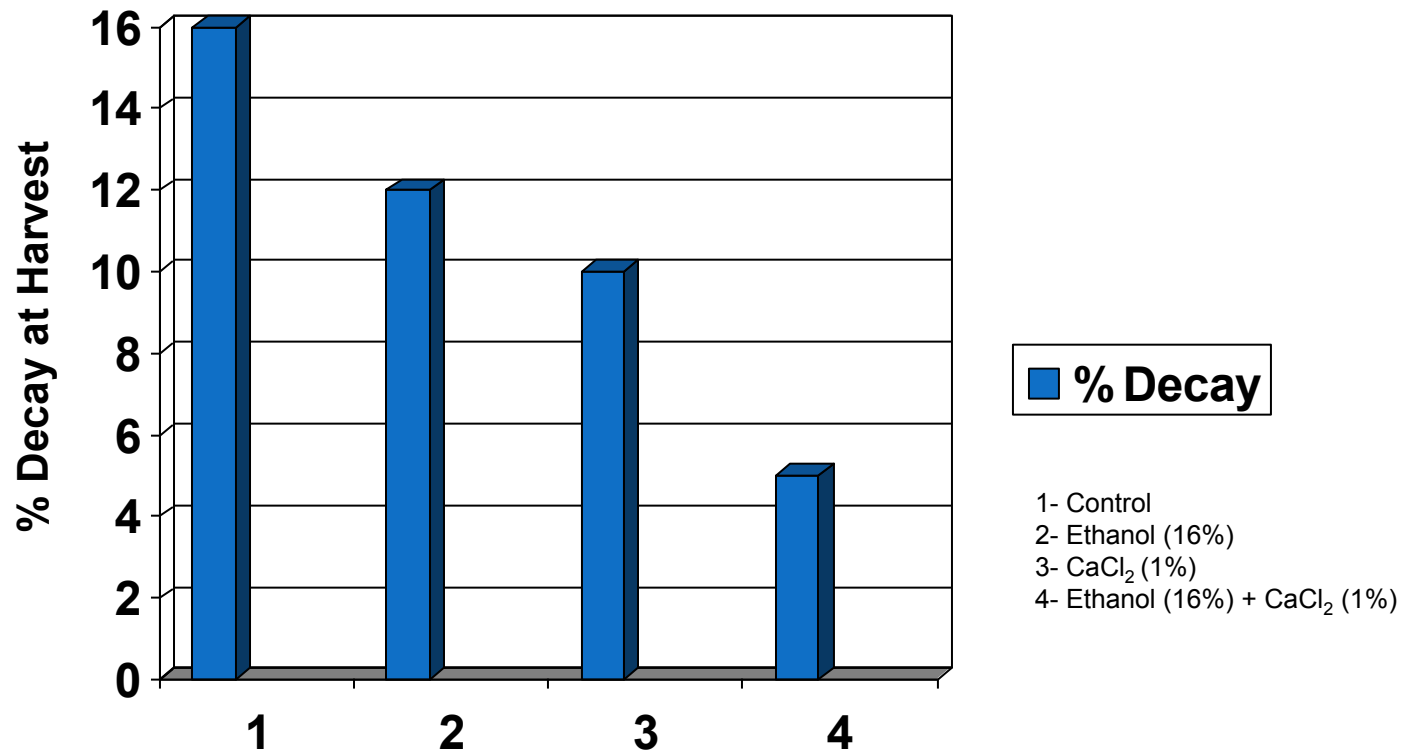
- Similar to other fruits and vegetables Ca is an essential nutrient for grapes
- Crop requires well draining soil - extensive use of drip irrigation
- Calcium Chloride in Soil Application:
  - Rates depends on the soil composition and its chemistry
  - Gypsum is widely used as Ca source
  - Lime application in low pH soil
- Calcium Chloride in Foliar Application:
  - Recommended rates
    - ❑ 1 – 2lb/ 100 gallon dilution of TETRA Flake
    - ❑ 3 – 4 sprays at 14 day intervals, 7-10 days after flowering
    - ❑ Followed by 2 sprays with 3 – 4lb/ 100 gallon at 4 and 2 weeks before harvesting
    - ❑ This is equivalent to 27 – 48lb  $\text{CaCl}_2$  (7.5 – 13.4 lb Ca)/ Acre

# CaCl<sub>2</sub> in Disease Control



- *Botrytis Bunch Rot* or *Gray Mold* is common in grapes
- All grape varieties are susceptible to Gray Mold
- Losses result from the rotting of grapes in the field or in storage
- Losses greater on tight-clustered varieties
- Several synthetic fungicides are on the market
- Move towards environmentally friendly products led to the use of ethanol
- Ethanol applied as foliar application is an effective method of reducing the damage
- Pre-harvest application of CaCl<sub>2</sub> (1% soln) has also shown to be very effective (*Nigro et al, 2006*)
- Synergistic effect when CaCl<sub>2</sub> is used with ethanol (*Chervin et al, 2009*)

# Effect of Foliar Treatment of Grapes (after Chervin et al., 2009)



# Advantages of Using $\text{CaCl}_2$



- Cost effective
- Non-toxic
- Readily miscible with ethanol
- OMRI approved product
- Move towards organic grapes for table consumption and wine making



Strawberries



# Strawberries in California



- More than 80% of US fresh market and processed strawberries
- About 50% of US Acreage – Estimated 2011 acreage 37,500
  - *Watsonville/Salina, Santa Maria and Oxnard* the dominant growing areas
- About 1,500 acres of Organic Crops
- About 20% of worlds production
- Exports 20% of its production
- CA produces about 50,000lb/Acre compared to about 12,000lb/Acre for other states – National average about 30,000lb/Acre
- Farming cost, including harvesting, about \$30,000/Acre
- Net profit up to \$3,500/Acre

# Scope of Calcium Chloride in Strawberry Crop



- Similar to other fruits and vegetables calcium plays critical role
- Being rapidly growing fruit its demand for calcium is also rapid, particularly during its peak growing period
- During this period the crop requires supplemental calcium
- Strawberries are prone to developing *Botrytis fruit rot (gray mold)* disease
- Calcium chloride is effective for controlling this disease, apart from it being a macronutrient for the development of the fruit
- Ca deficiency symptom
  - Tip burn of the rapidly growing new leaves
  - Leaves containing 0.9% Ca are considered deficient
  - Ca sufficiency in the area of about 1.5% Ca of the dry leaf

- Begin applying as soon as blossoms open
  
- Application through the irrigation system
  - 25-30 gallons/acre/crop
  - Application spread out with the periodical irrigation
  
- Application by Sprayer for foliar application
  - Concentration to be kept at about 1 gm calcium chloride per gallon of water – limit it to 2 gm/gallon
  - Strawberry being a delicate fruit, high concentration can have damaging effect

# Recommended Use of Calcium Chloride



- When N is applied to the crop, it should be followed by calcium chloride application within Two Days
- In the season when crop load is very heavy, stop foliar application of N but keep up the calcium chloride application
- In the season when fruit load is heavy, application of calcium chloride will hold the fruit a Few Extra Days
- As long as concentration is kept under control, you can apply calcium chloride as often as you like without causing damage to the crop