



Producing Quality Grapes



Barry Bull
Hydro Agri Specialities
September 2003

Balanced Nutrition gives:

- ◆ **Healthy Vine Growth**
- ◆ **Controlled Yield**
- ◆ **High Quality Wine**
- ◆ **Large, long storing table grapes**



Role of Nutrients in Grape Production

	N	P	K	Ca	Mg	B	Cu	Fe	Mn	Mo	Zn
Brix	-		+			+		+	+		+
Flavour	+		+								
Berry Size	+		+			+	+	+	+	+	+
Bunch weight	+		+			+	+	+	+	+	+
Fruit Set	+				+	+					+
Skin Strength	+		+								
Storage Quality				+							+
Disease Tolerance	-		+	+	+	+	+				
Yield	+	+	+			+	+	+	+	+	+

Grapes – Nutrient Removal.

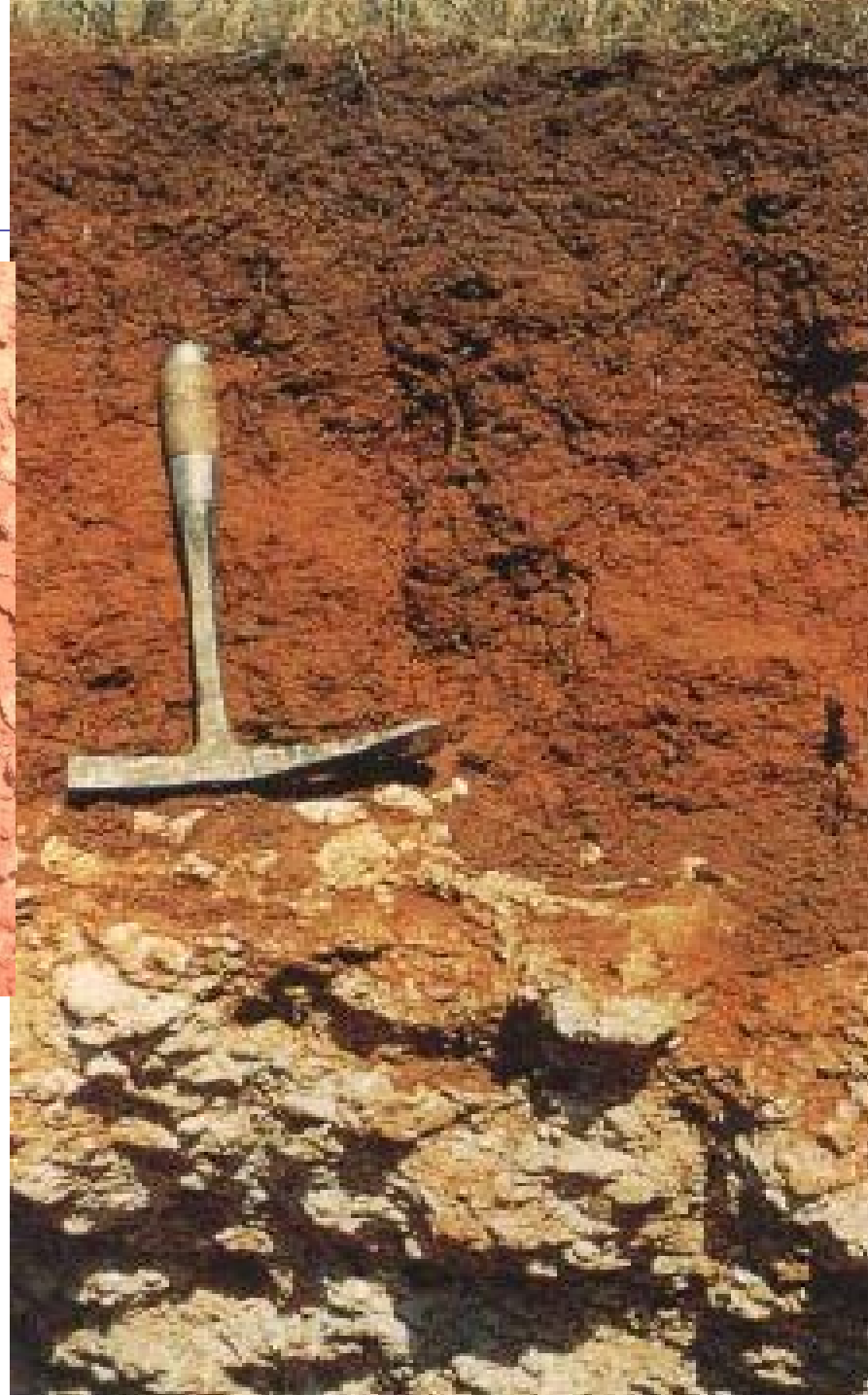
Fresh wt	Kg/t
Water	810
Nitrogen	1.33
Phosphorus	0.27
Potassium	2.28
Sulphur	0.11
Calcium	0.21
Magnesium	0.10



Know your soil type



**.... and its affect on
nutrition**



Understand soil water



Many nutritional problems come from poor water management

Cover crops

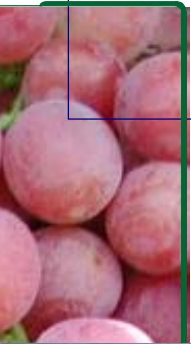
- ◆ build organic matter
- ◆ prevent erosion
- ◆ use excess soil water



Cover crops need to be fertilized



Understanding the nutritional effects



Early vigour from balanced nutrition

Nitrogen

◆ Promotes

- ◆ Vigour
- ◆ New shoot growth
- ◆ Yield

◆ Essential to young vines

◆ Must be controlled in mature vines



Nitrogen

◆ Excess

- ◆ more fungus problems
- ◆ excess vigour
- ◆ smaller, weaker bunches
- ◆ lower sugars
- ◆ reduced colour intensity
- ◆ cracked fruit
- ◆ poor storage life



Nitrogen

- ◆ must be balanced with other nutrients
- ◆ high rates, esp under fertigation can lead to toxicity.



**Ammonium
toxicity**

**Nitrate
toxicity**



Phosphorus

◆ Promotes

- ◆ vigour
- ◆ active root growth
- ◆ yield

◆ Essential to young vines

◆ Maintain in mature vines



Rarely seen



Potassium

◆ Promotes

◆ berry size

◆ berry skin colour

◆ cell strength

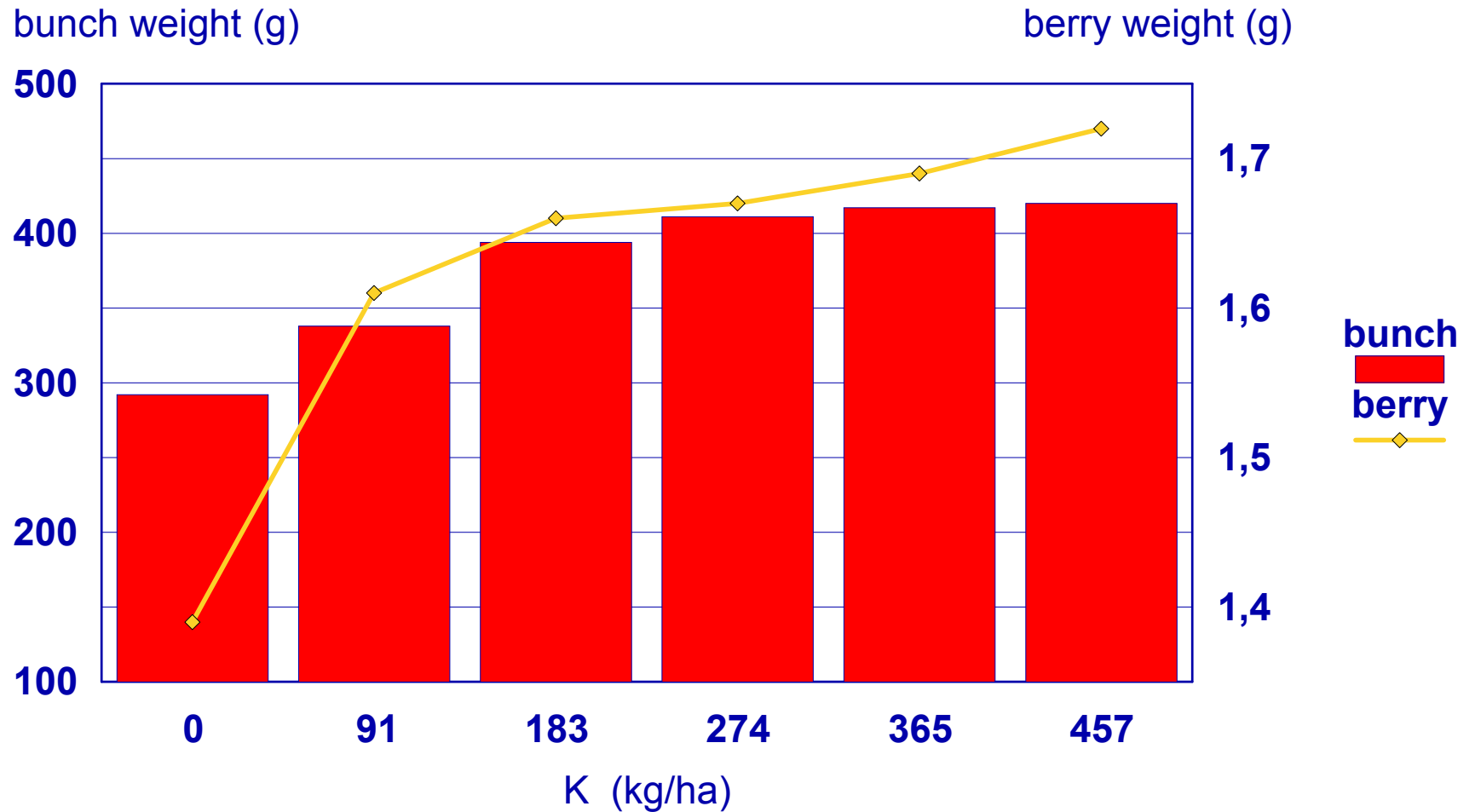
◆ tolerance to disease and stress

◆ Essential to vines

◆ Excess may upset wine pH

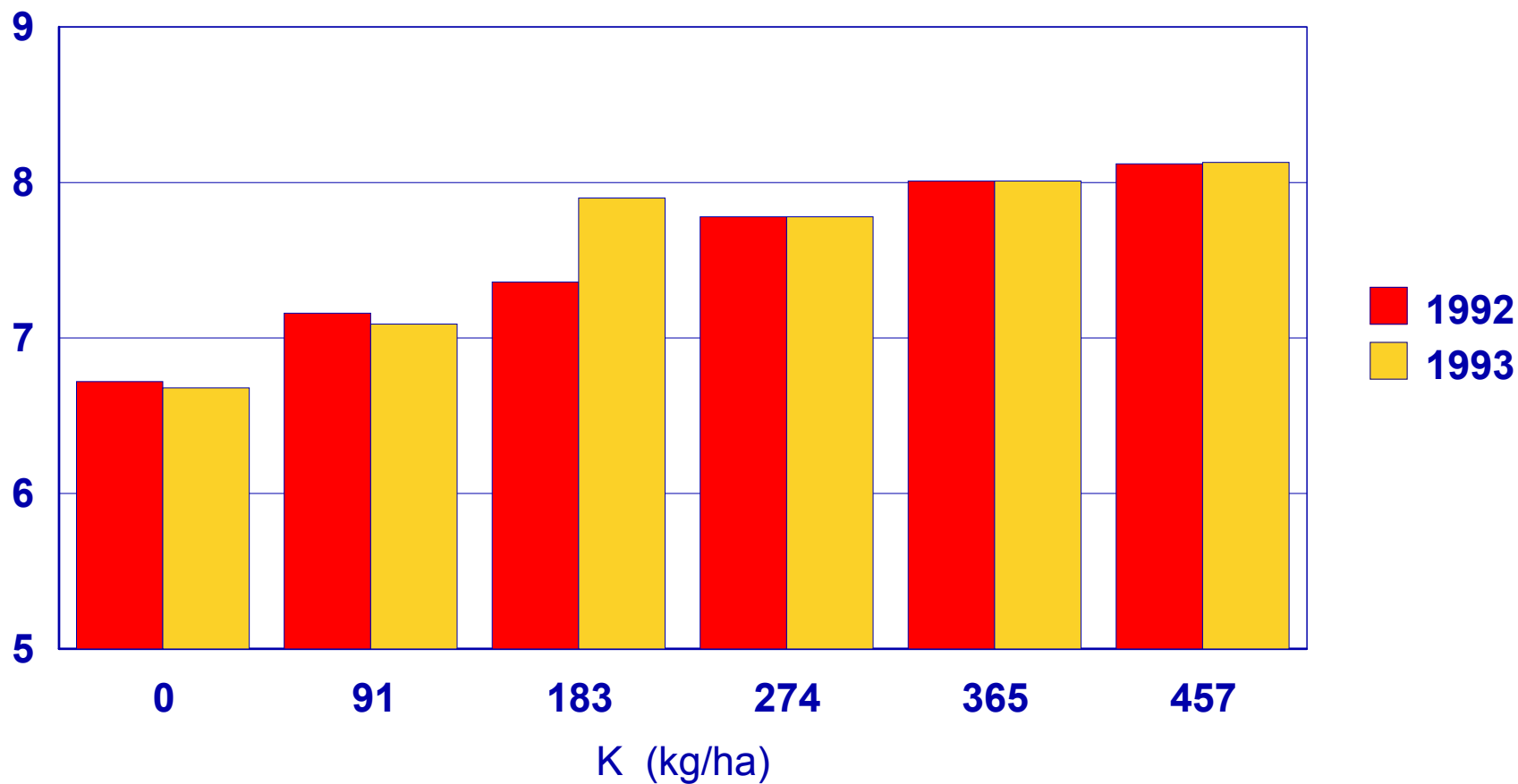


Effect of Potassium on bunch and berry weight



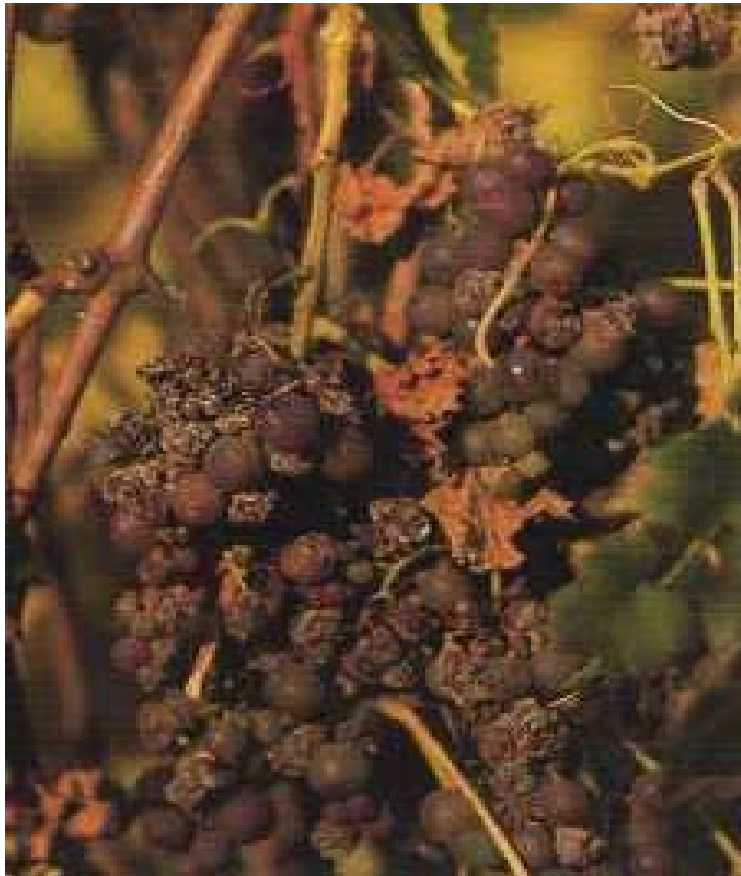
Effect of Potassium on flavour

organoleptic rating

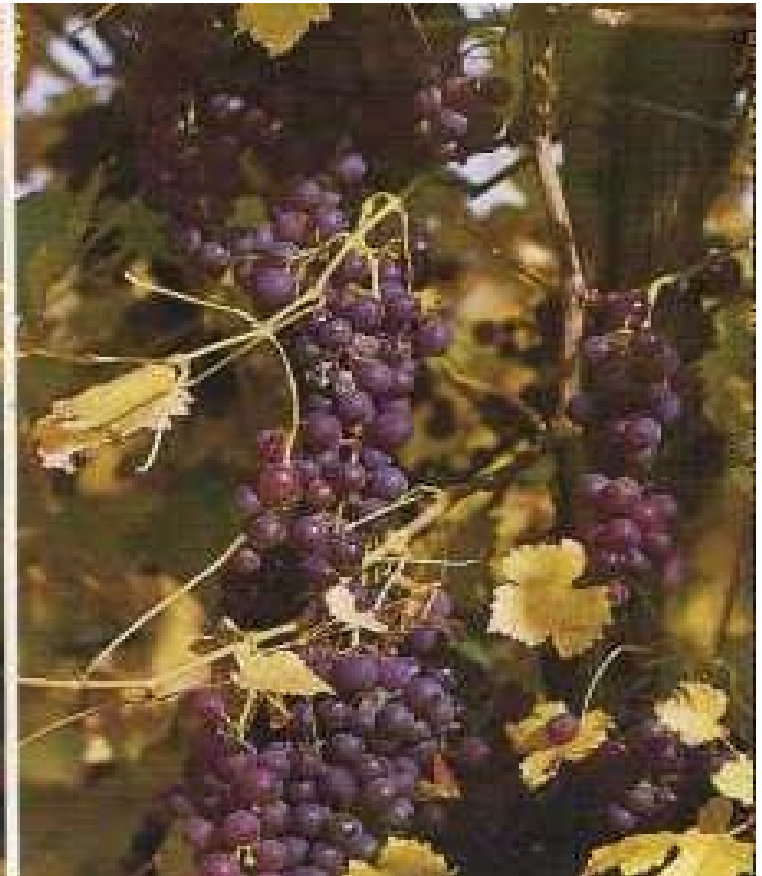


Potassium

Tolerance to diseases



Botrytis cinerea due to K deficiency
Leaf: 2.10% N and 0.80% K



After High K fertilisation
Leaf 1.40% N and 1.20% K



Calcium

◆ Promotes

- ◆ root and shoot growth
- ◆ berry strength
- ◆ storage quality
- ◆ tolerance to stress

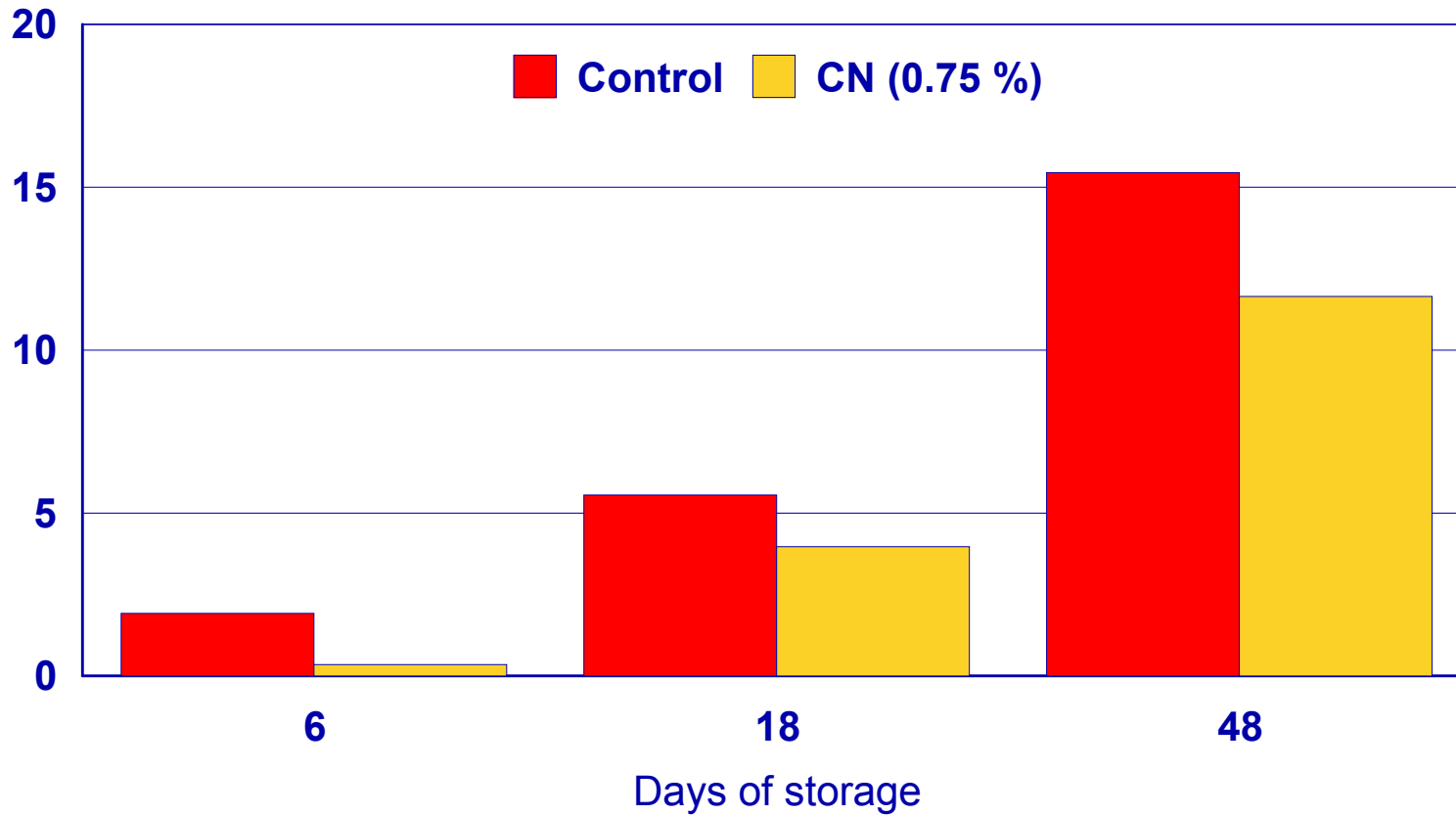
◆ Essential to table grapes



Calcium – weight loss



Loss in berry weight (%)

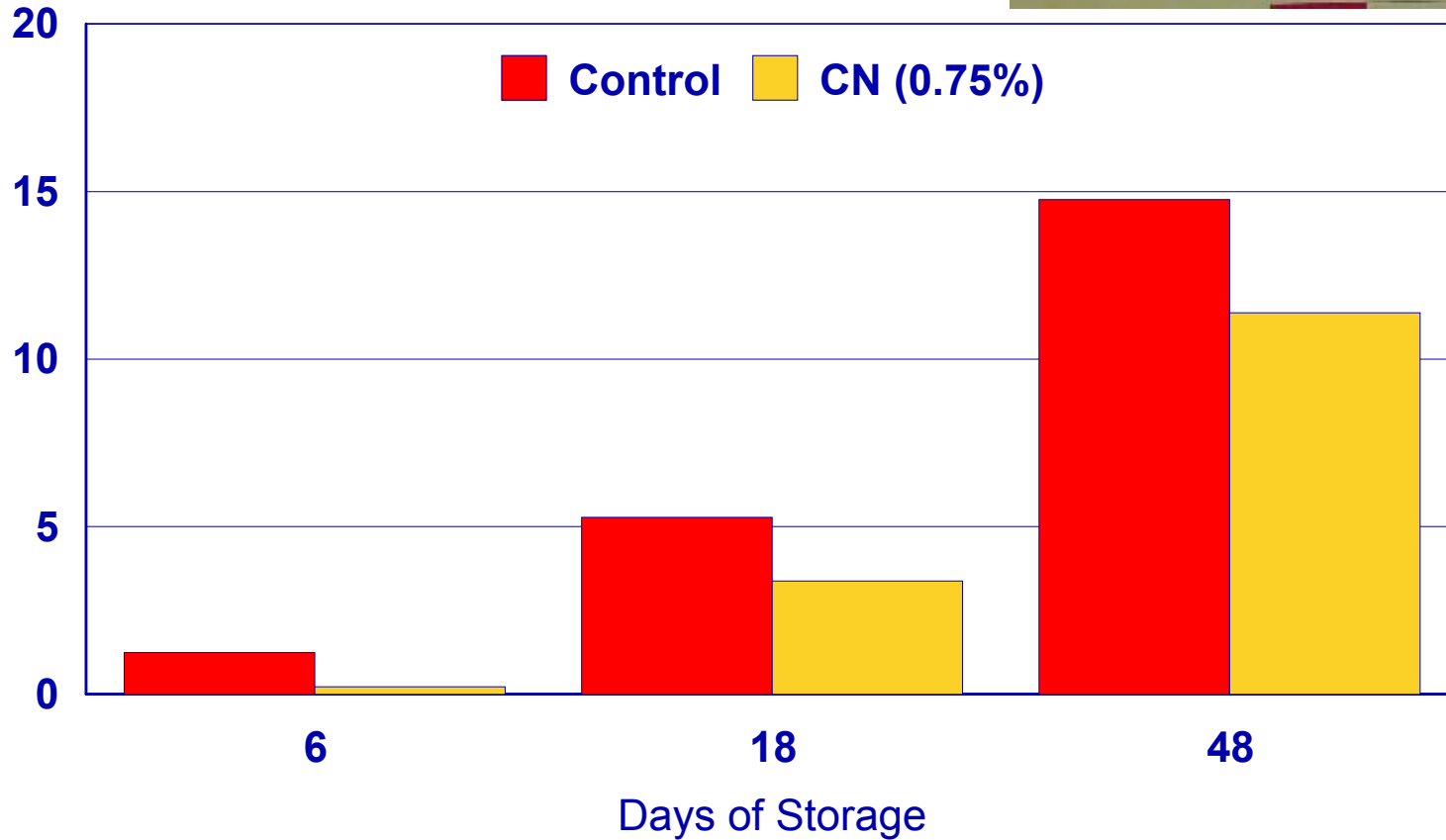


0.75% foliar of CN 10 days before harvest
Storage at 1C., 80% r.h.
Variety: Perlette

Calcium – berry drop



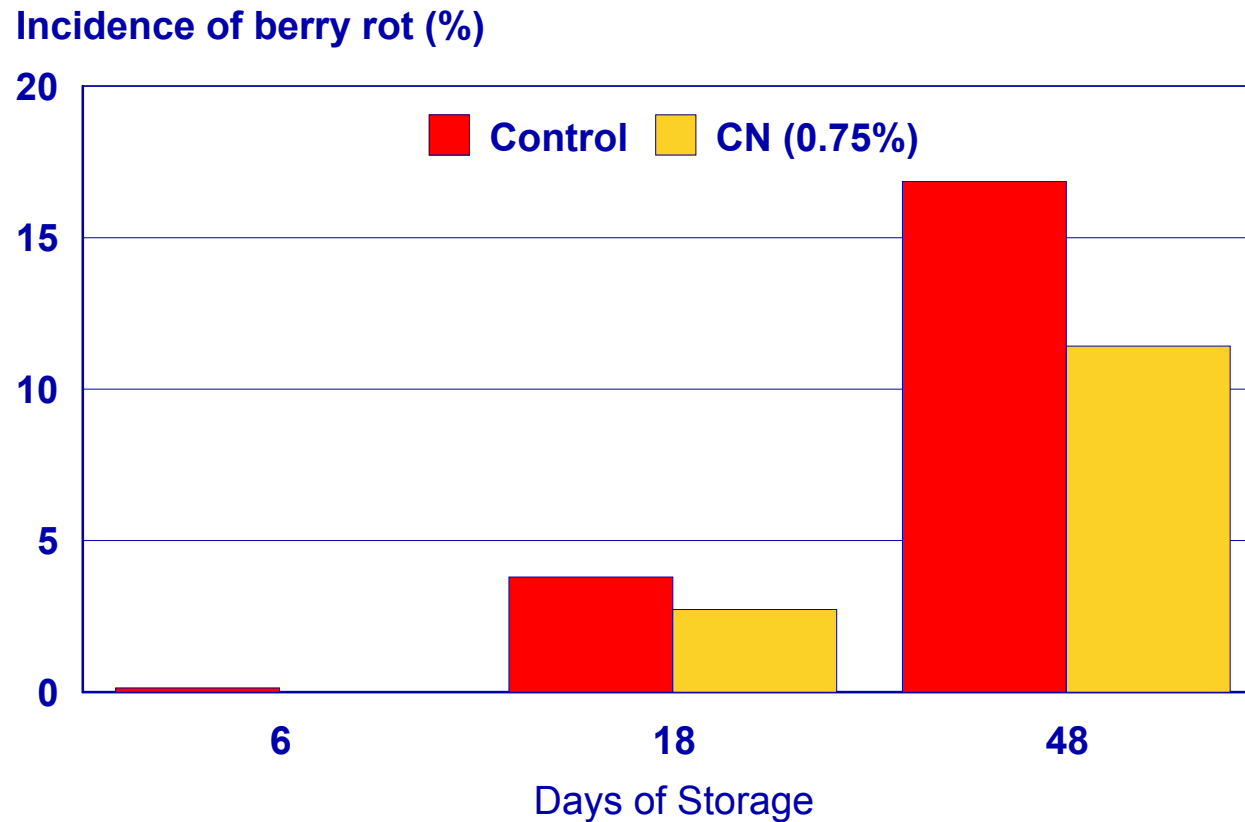
post harvest berry drop (%)



0.75% foliar of CN 10 days before harvest
Storage at 1C., 80% r.h.
Variety: Perlette



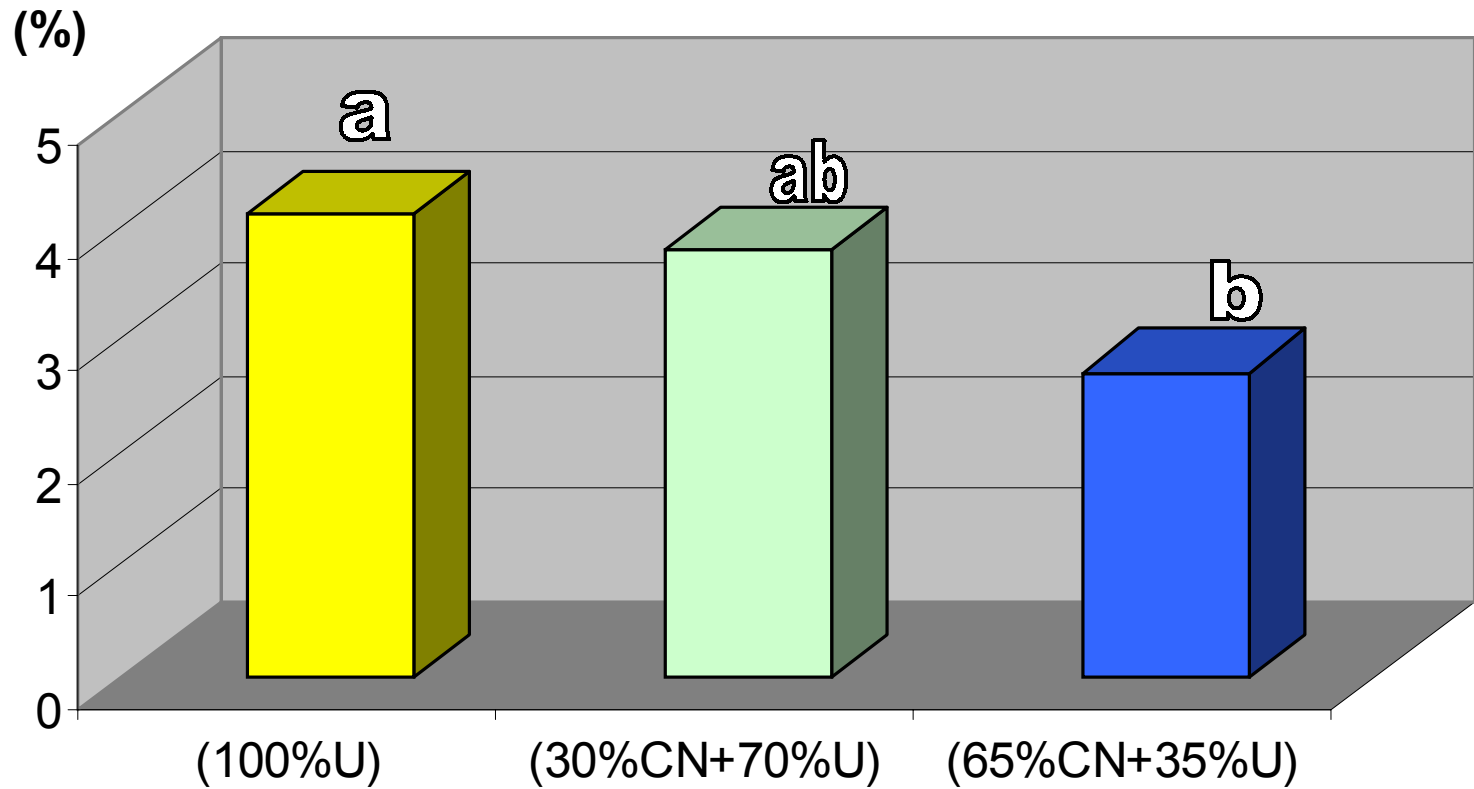
Calcium – berry rot



0.75% foliar of CN 10 days before harvest
Storage at 1C., 80% r.h.
Variety: Perlette

Calcium reduces post harvest breakdown

Average Values (%) of Pathological Deterioration of Grape cv. Italia vs. The Nitrogen Sources



Magnesium

- ◆ vital to chlorophyll
- ◆ improves P efficiency
- ◆ bunch stem necrosis is associated with Mg def.
- ◆ must be balanced with Ca and K
- ◆ vigorous rootstocks are showing Mg problems

Apply Mg early



Trace Elements

- ◆ **Activators of:**

- ◆ **Enzymes**

- ◆ **Sugars**

- ◆ **hormones**

- ◆ **Essential to flowering, berry set, maturity, yield & quality.**

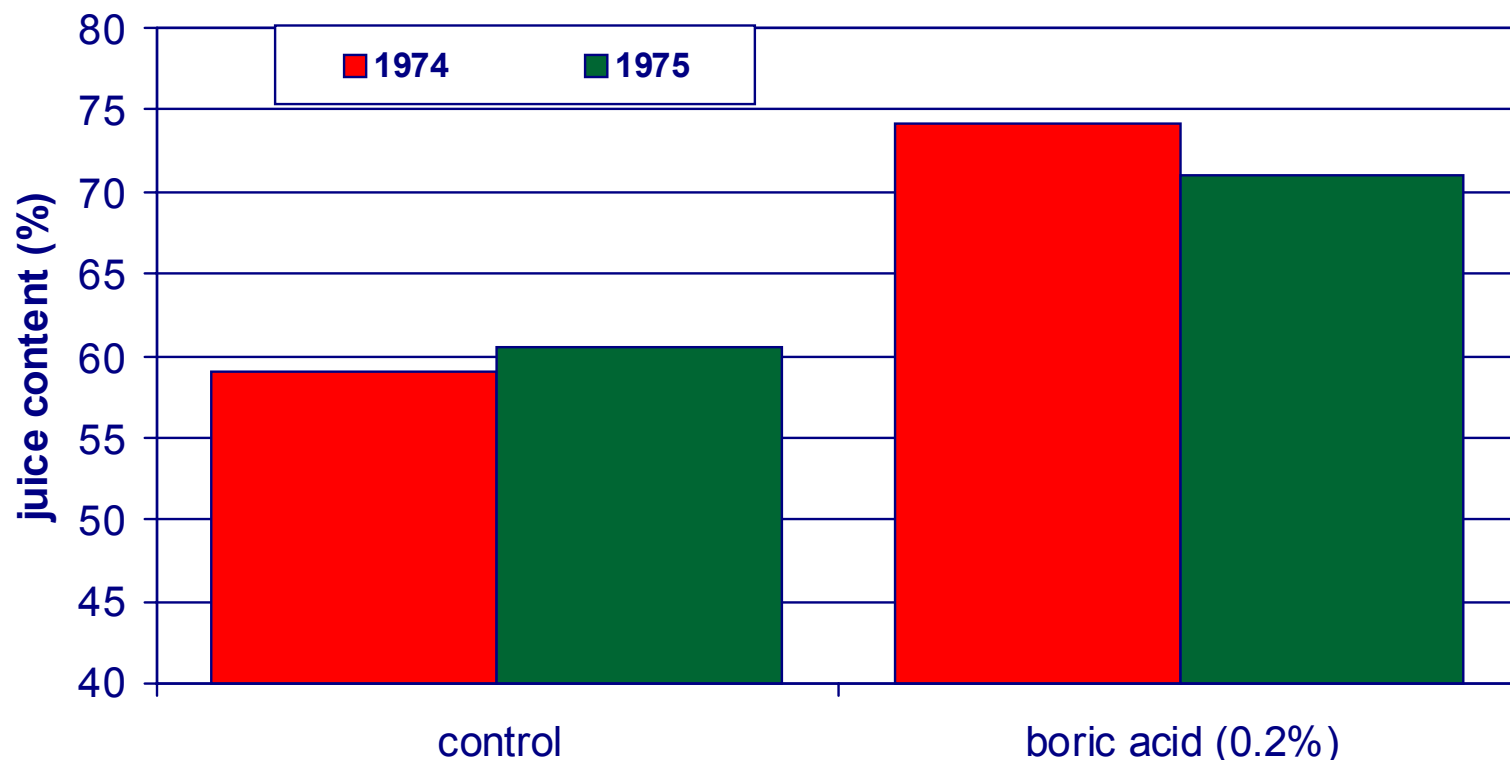


Boron

- ◆ vital to fruit formation
- ◆ improves juice content and solids



Boron increases juice content

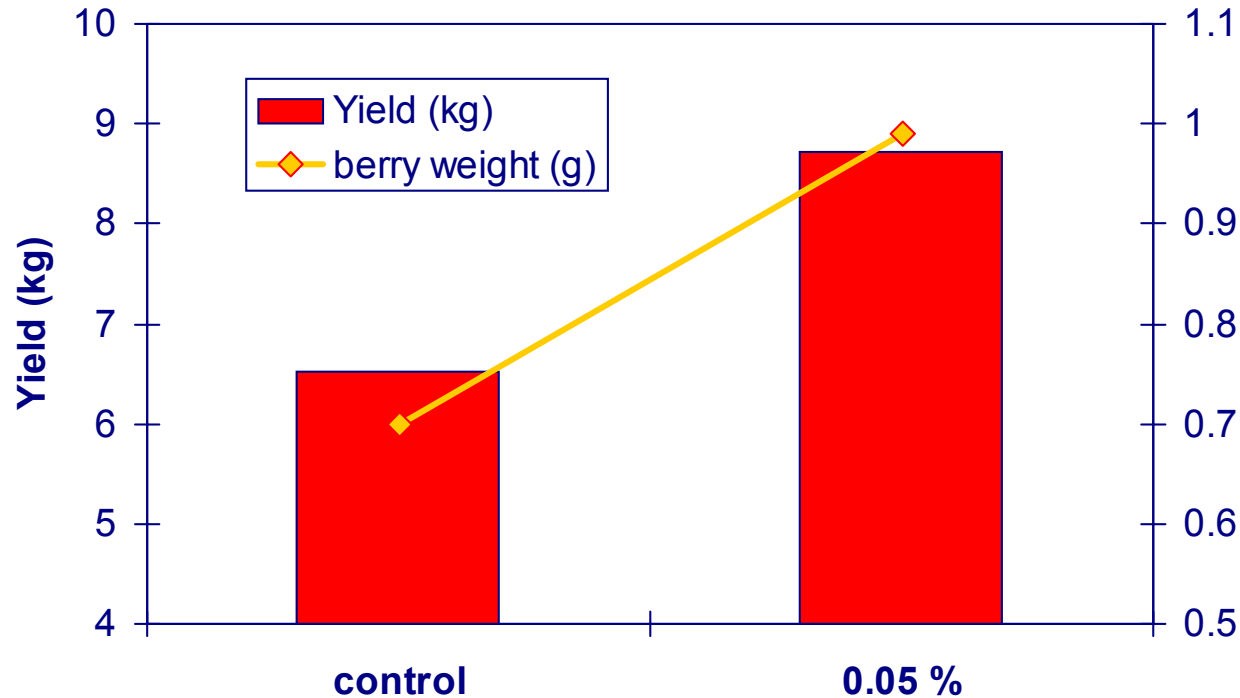


Field trials, soil low in organic matter (0.29); 6-year old vines, Cultivar: Thompson seedless

foliar application three times per year (before flowering; after fruit set; before maturity)

Source: Kumar & Bushan (1977)

Iron increases berry weight



* = significant to control

Field trial on saline-alkaline soil with high pH and therefore low in plant available Iron.

6-year old vineyard, Cultivar: Thompson Seedless

foliar application twice (pre bloom + after fruit set)

Applied amounts : foliar with 0.05 % Fe-sulfate

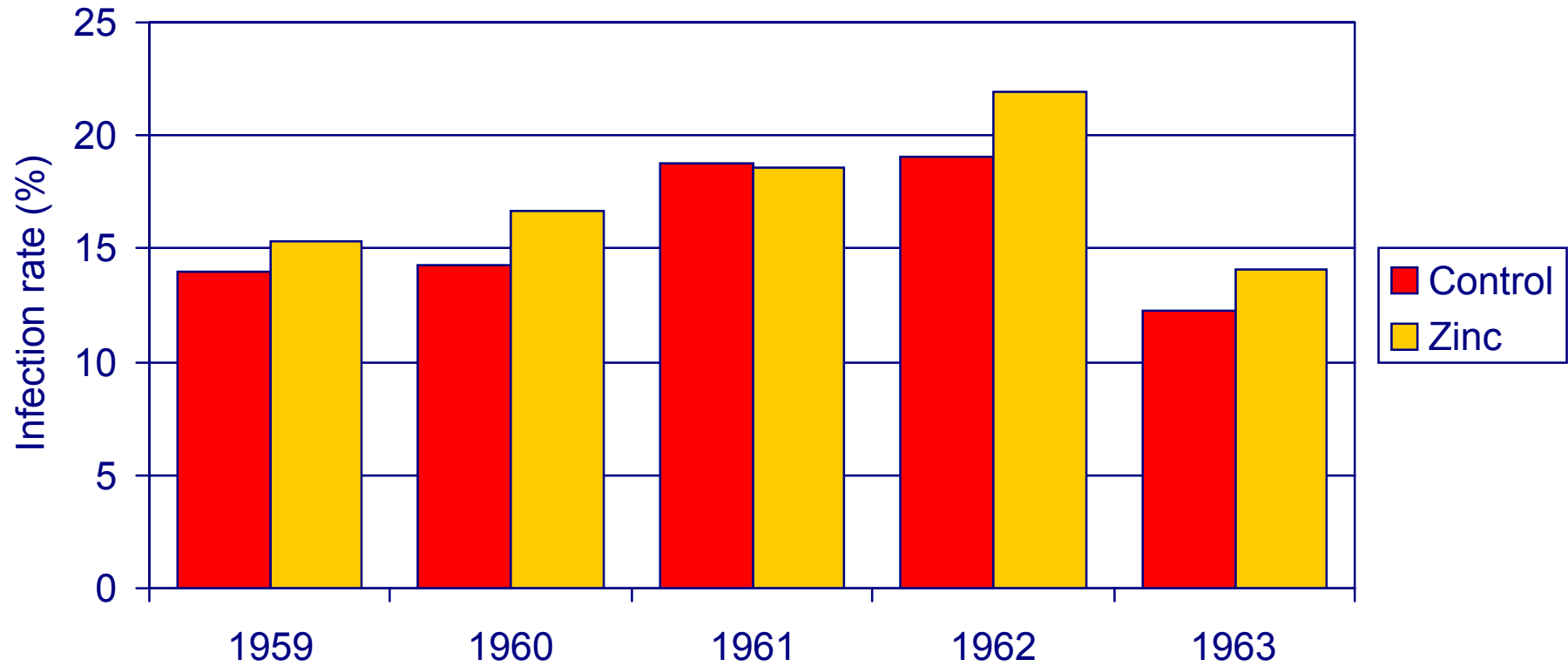
Zinc

- ◆ involved with auxins in plant
- ◆ improves fruit set
- ◆ sandy soils, high pH soils and high P soils may be def. in zinc

Apply Zinc as foliar



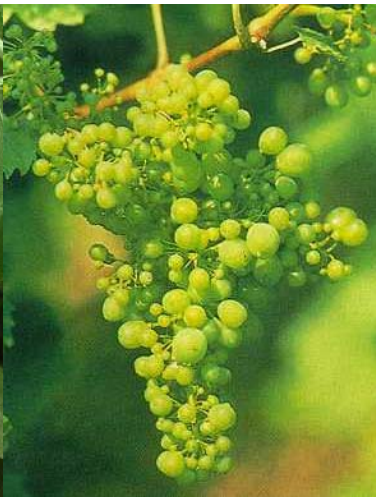
Zinc



**Vines showed no visual deficiency
Kg/ per 3 vine plot - sultana**

Source: Alexander & Woodham 1964

Fertilizer Timing



N
P
K
Mg

N
K
Mg
Ca

K
Ca
Foliar
TE

N
K

Tissue
Test

Soil
Test

Balanced nutrition

For yield and quality

