Healthy Soils for a Sustainable Viticulture

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Sustainable Viticulture

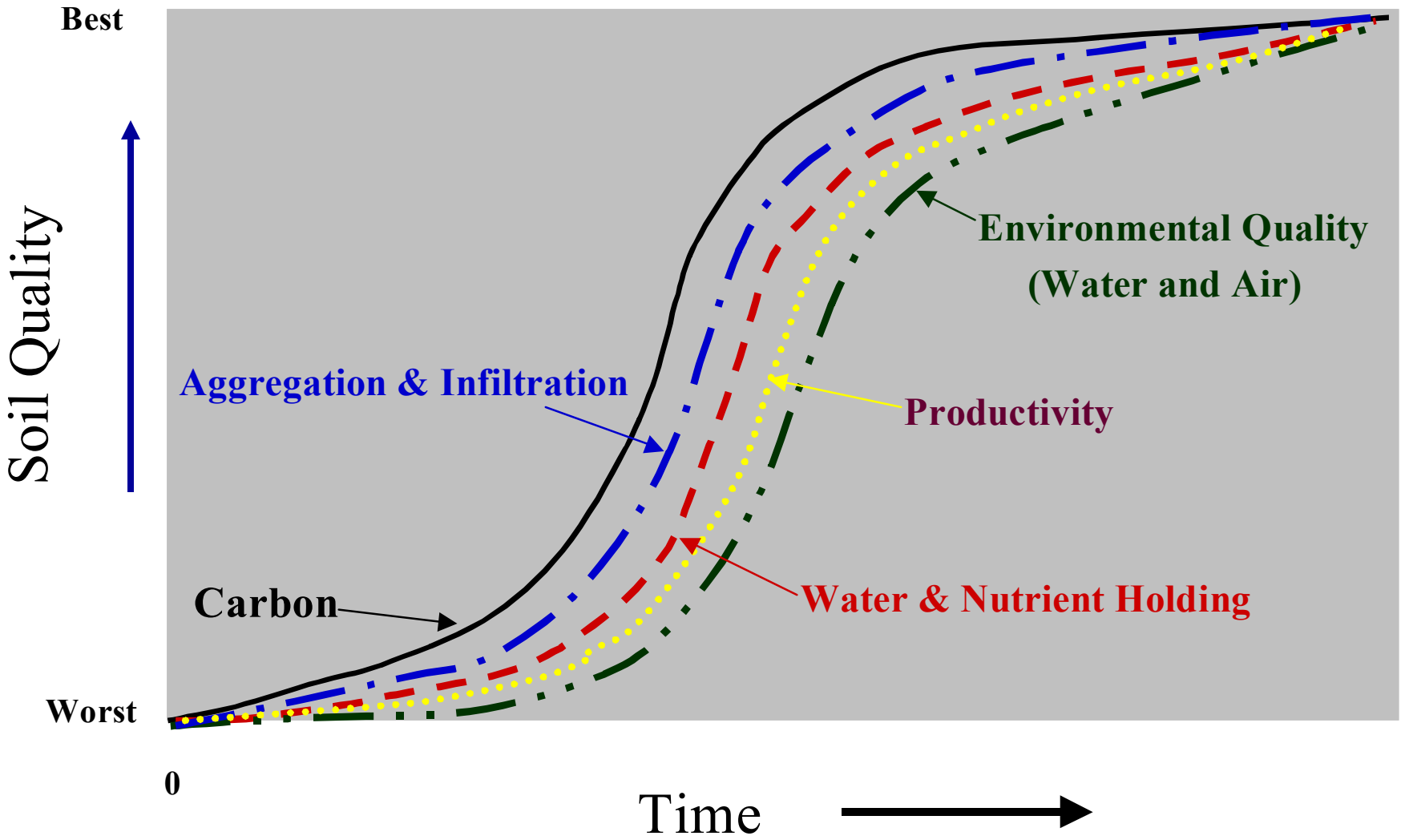
Economically viable
Environmentally sound
Socially responsible

QuickTime™ and a TIFF (Uncompressed) decompressor are needed to see this picture.

Major Indicators of a Sustainable Vineyard

- Soil Quality
- Crop Quality (and Yields)
- Financial Performance
- Environmental Impact
- Energy Efficiency
- Social Performance

Soil Carbon Benefits



The Soil Conditioning Index

- Provides a means to evaluate and design conservation systems that maintain or improve soil condition.
- Expresses the effects of the system on organic matter trends as a primary indicator of soil condition.
- Estimates the combined effect of three variables on trends in organic matter.

Soil Health and Viticulture

"The French term 'terroir' is used to describe the ambiance created by the soil and its immediate environment. Topographical, geographical, morphological, and agro-pedological factors, it is maintained, influence quality and can define boundaries of appellations recognized as producing superior wines."

(Jackson and Lombard, Am. J. Enol. Vitic., 1993; based on G. Sequin, Experientia, 1986)

Soil Health and Viticulture

"All grapes have an affection for gravel, flint, slate, or stony soils, and the best acres are so infertile and stony that a corn farmer wouldn't take them as a gift." (Jeff Cox, From Vines to Wines, 1999)

"The crop will, of course, be larger on very fertile soils, but the fruit will be of coarse texture, with composition poorly balanced and its general character will be less pleasing. The less-fertile soils are especially adapted for fine table grapes and premium quality dry table wine varieties." (Winkler et al., General Viticulture, 1974)

Soil Health and Viticulture

"The ideal soil for best vine growth and production, especially for table grapes, is a deep, light, silty or slightly sandy loam.

"Classic wine vineyard soils are often the reverse: thin, rather poor soils that make the vines 'struggle' so that they develop more character and more intense flavors.

"However, grapes can adapt to a wide range of soil types, from sandy soil to heavy clay , depending on the variety of the grape, the climate, and how the soil is managed."

(Lon Rombough, The Grape Grower, 2002)

Soil Health and Viticulture

“The importance of soil type to vinegrowing is well recognized. On the other hand its relationship to wine quality, or qualities, remains controversial.”

“Most modern scientific writers have minimized the influence of soil type on wine qualities, other than as exerted through vine vigour and moisture relations.”

(John Gladstones, Viticulture and Environment, 1994)

Soil Health and Viticulture

"**. . . soil mineral characteristics can still influence the subtler qualities of wines very significantly, particularly at the higher quality levels.**" (John Gladstones, Viticulture and Environment, 1994)

"**Favorable soil conditions [high O.M., balance nutrient and water availability, good structure and earthworm populations] encourage healthy roots and hence healthy vines.**" (McCarthy et al., In: Viticulture, Vol. 2, Practices, 1988)

Soil Health and Viticulture

“ Lack of hard data does not negate the beliefs, but it is more likely to indicate the difficulty of disentangling the several contributions of soils and their permutations and combinations.”

“That the soil may affect grape composition is generally believed”.

(Jackson and Lombard, Am. J. Enol. Vitic., 1993)

American Journal of Enology and Viticulture

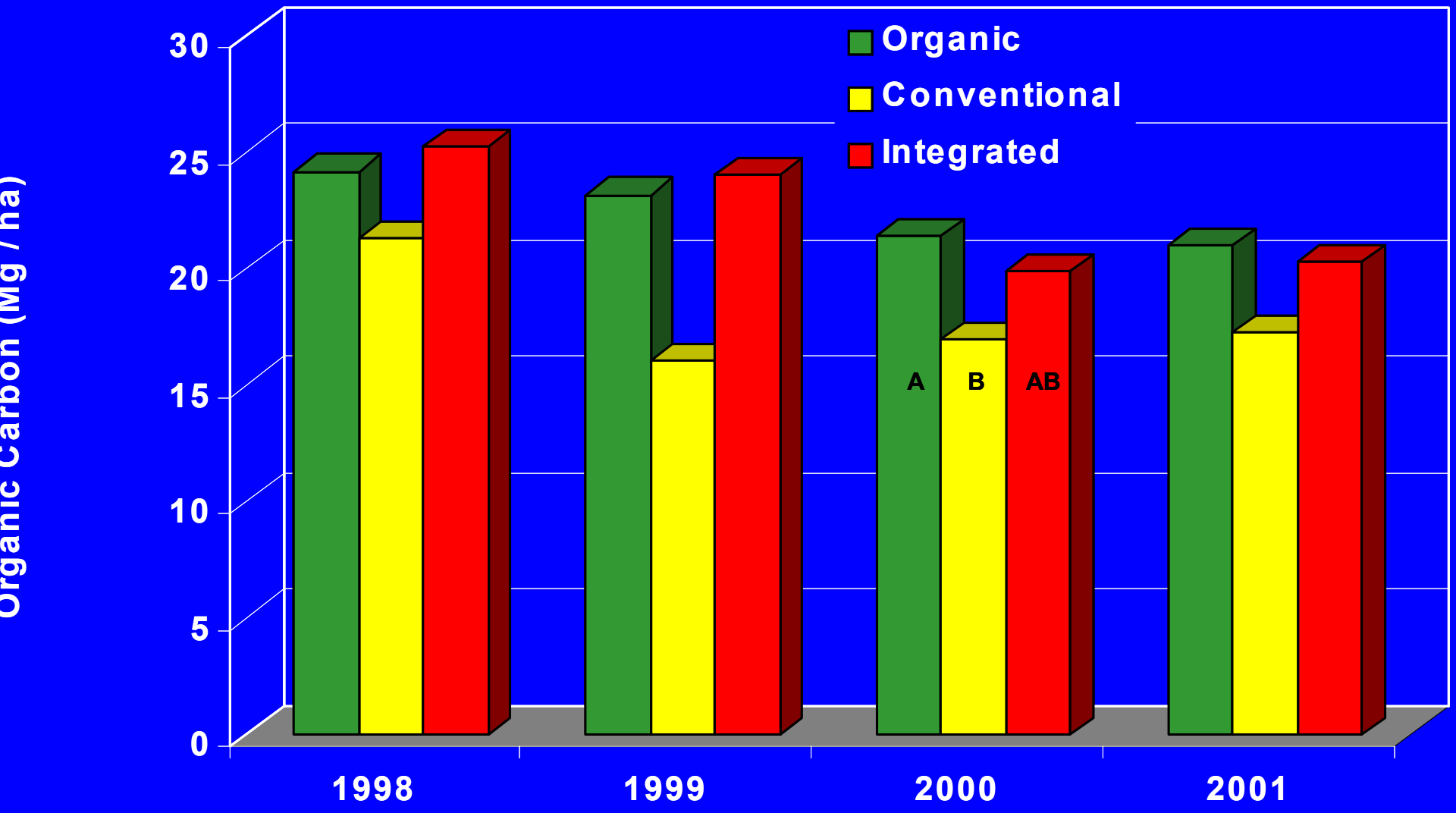
"Soil" in Subject Index

- 1988-1992 3 articles
- 1993-1997 3 articles
- 1998-2002 3 articles
- 2003 1 article

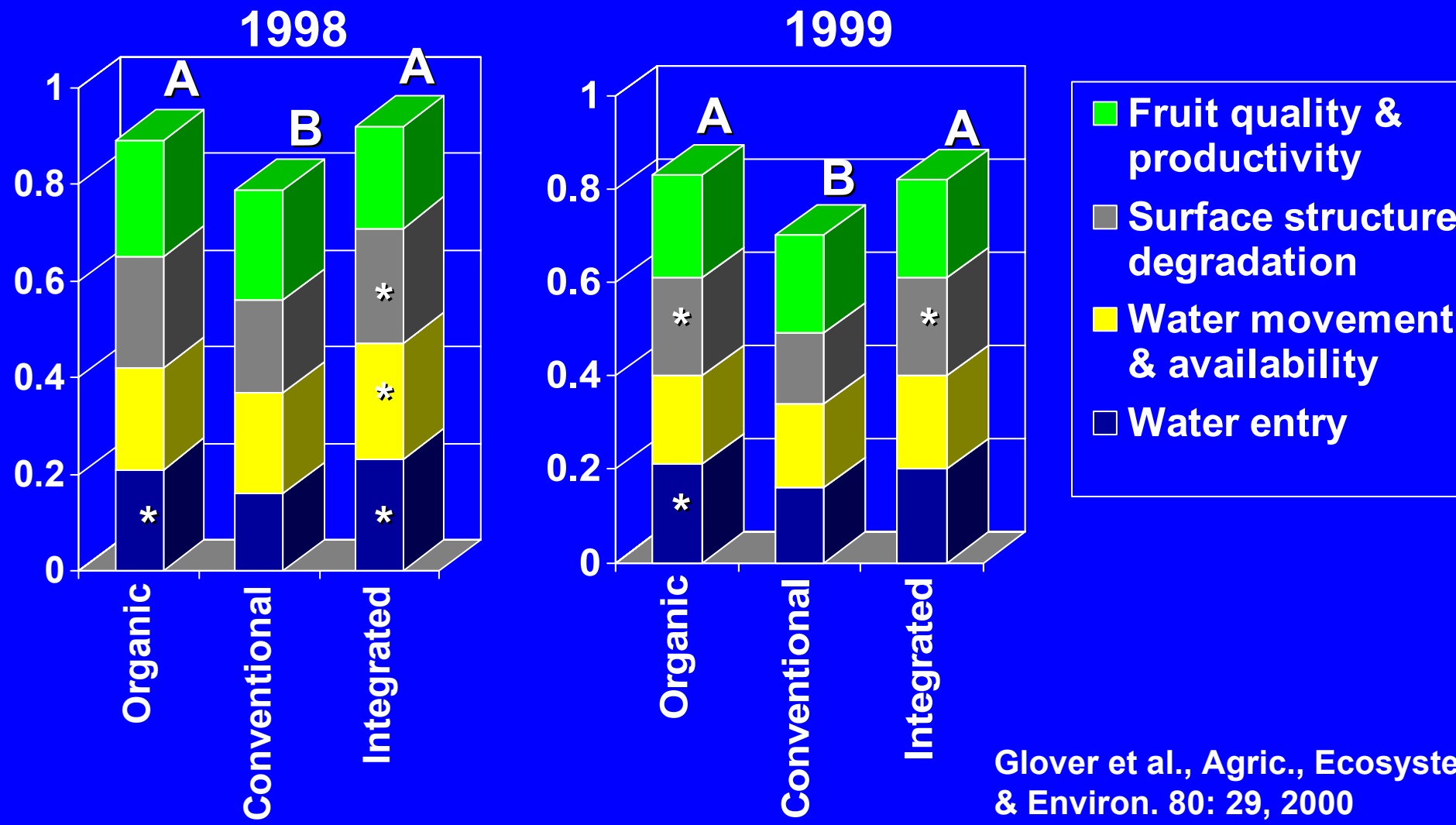
Sustainability of Three Apple Production Systems: Organic, Conventional, and Integrated

John Marshall Photography

SOIL QUALITY (0 – 15 cm)

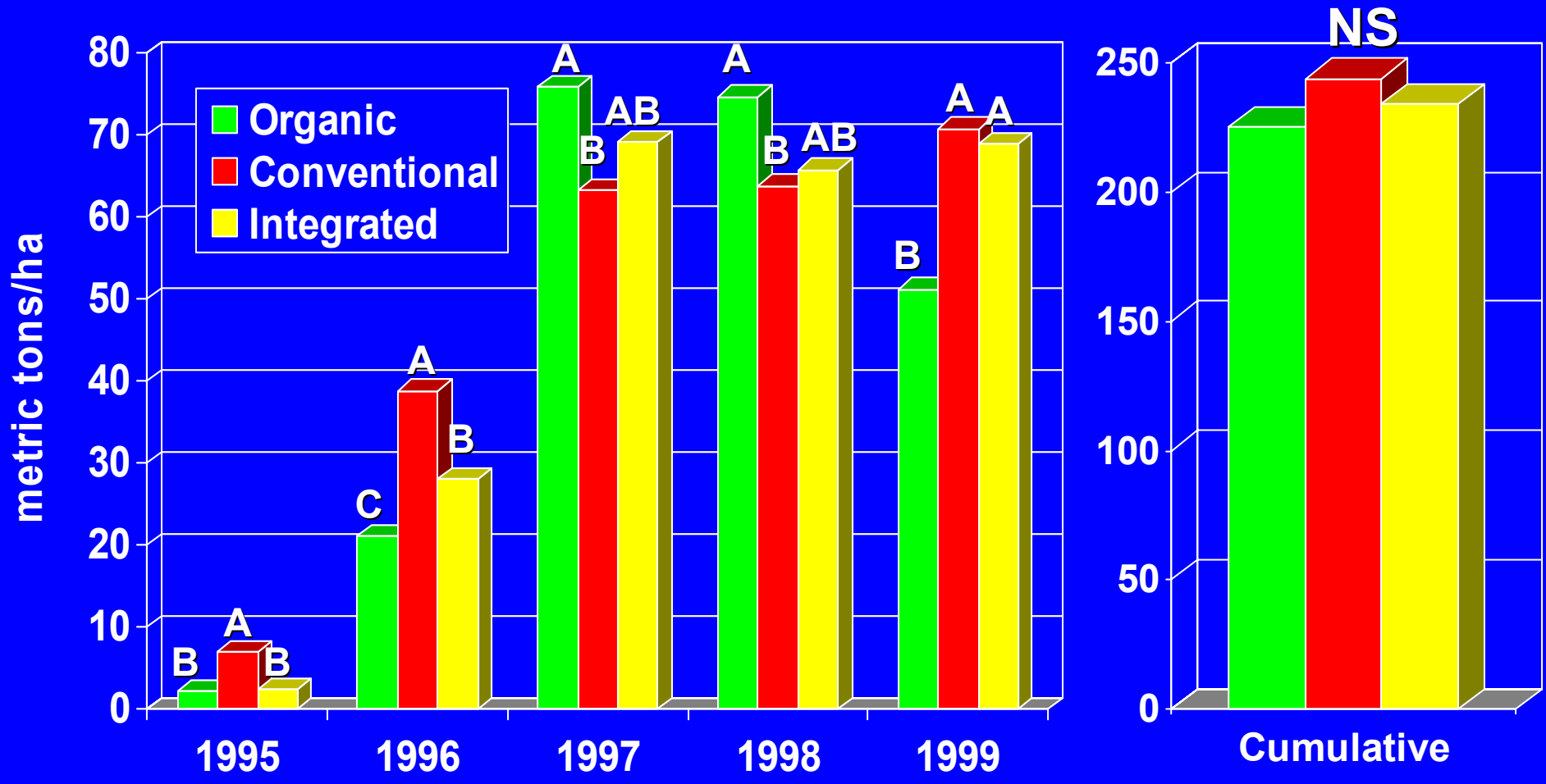


SOIL QUALITY INDEX



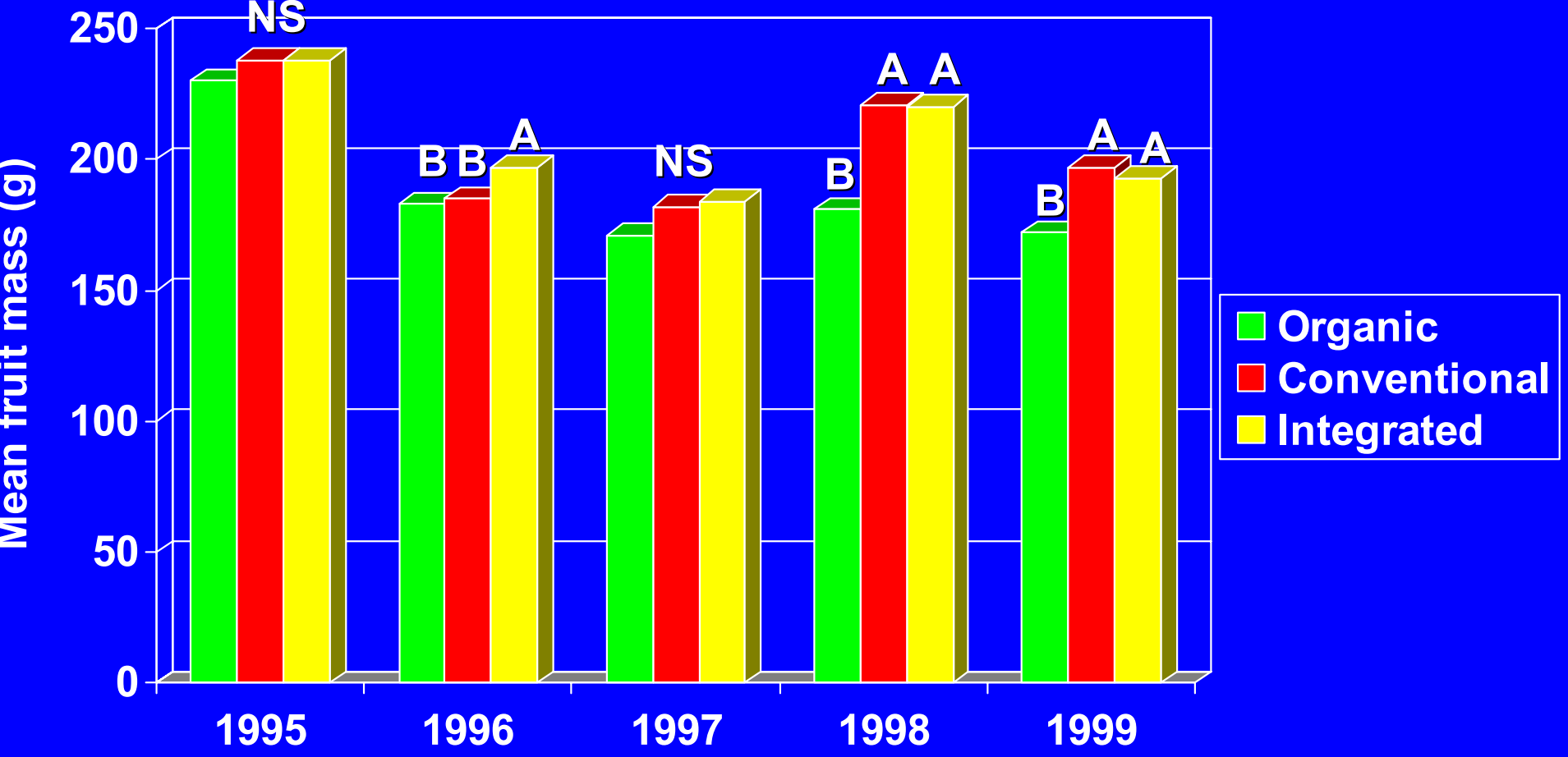
Glover et al., Agric., Ecosyste
& Environ. 80: 29, 2000

YIELDS

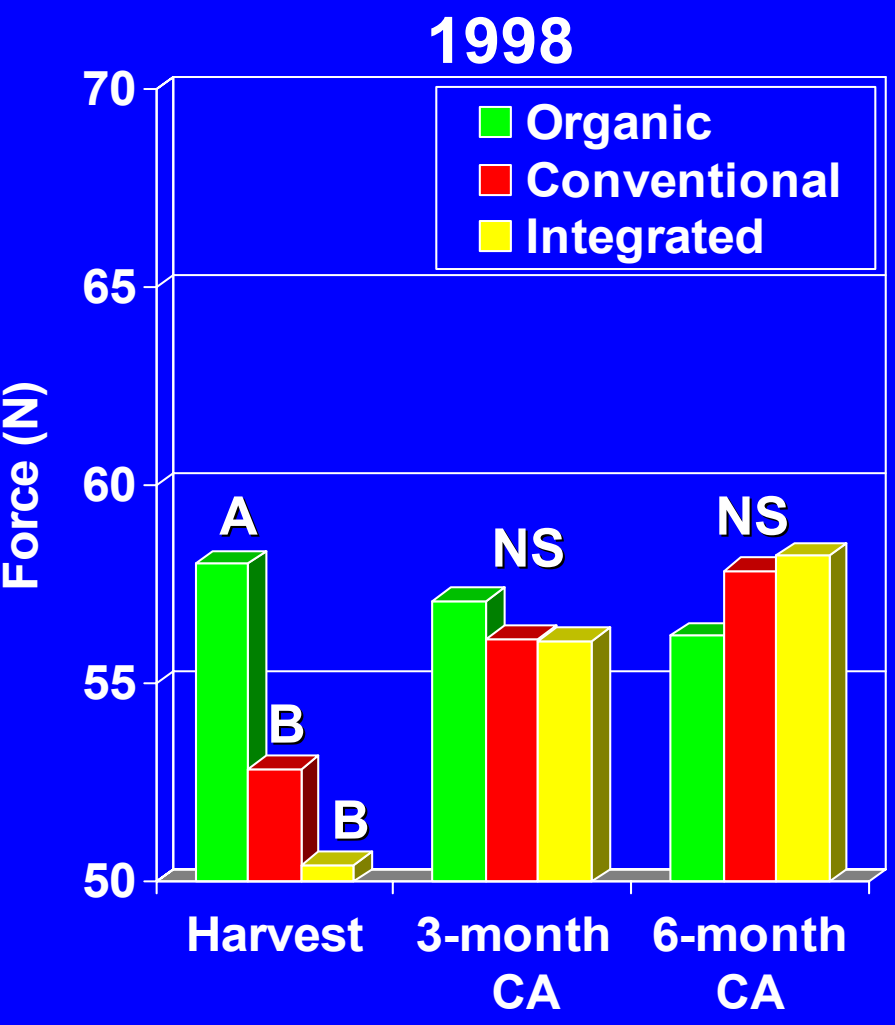

metric tons/ha
80
70
60
50
40
30
20
10
0
Organic
Conventional
Integrated
B
A
B
C
A
B
A
B
AB
A
B
AB
B
A
A
1995
1996
1997
1998
1999
250
200
150
100
50
0
NS
Cumulative

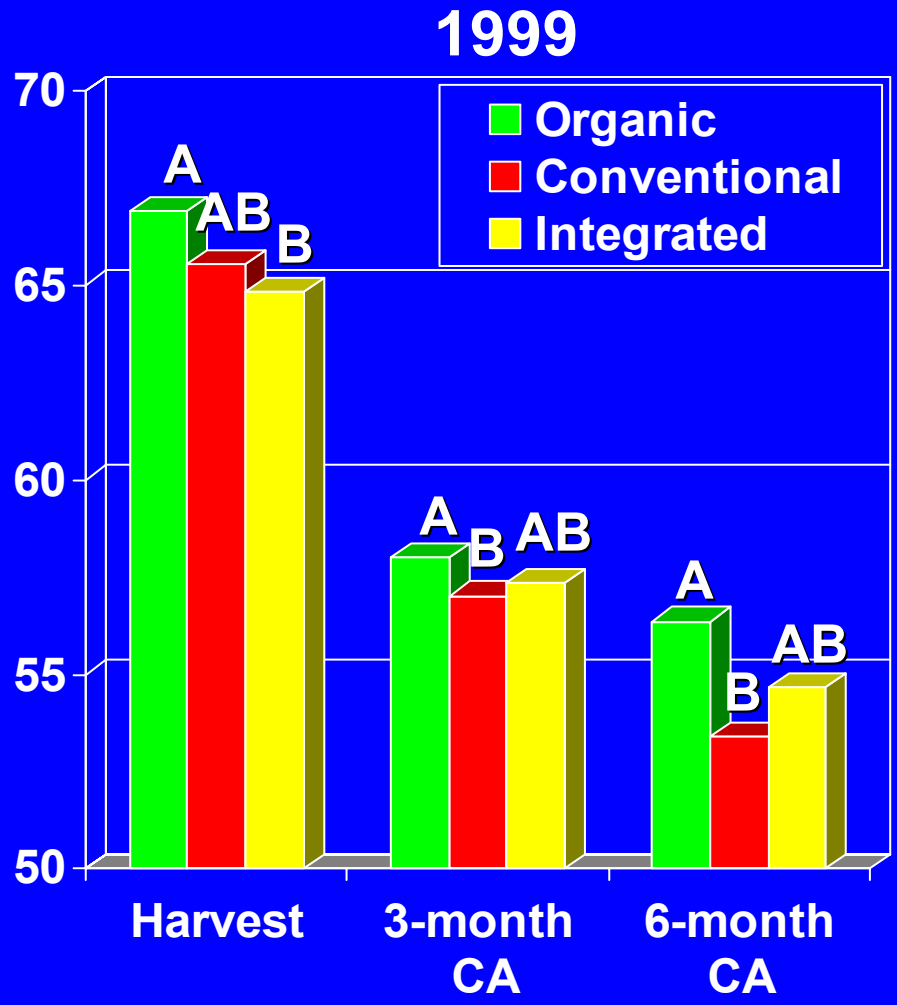

9 19 89

FRUIT WEIGHT

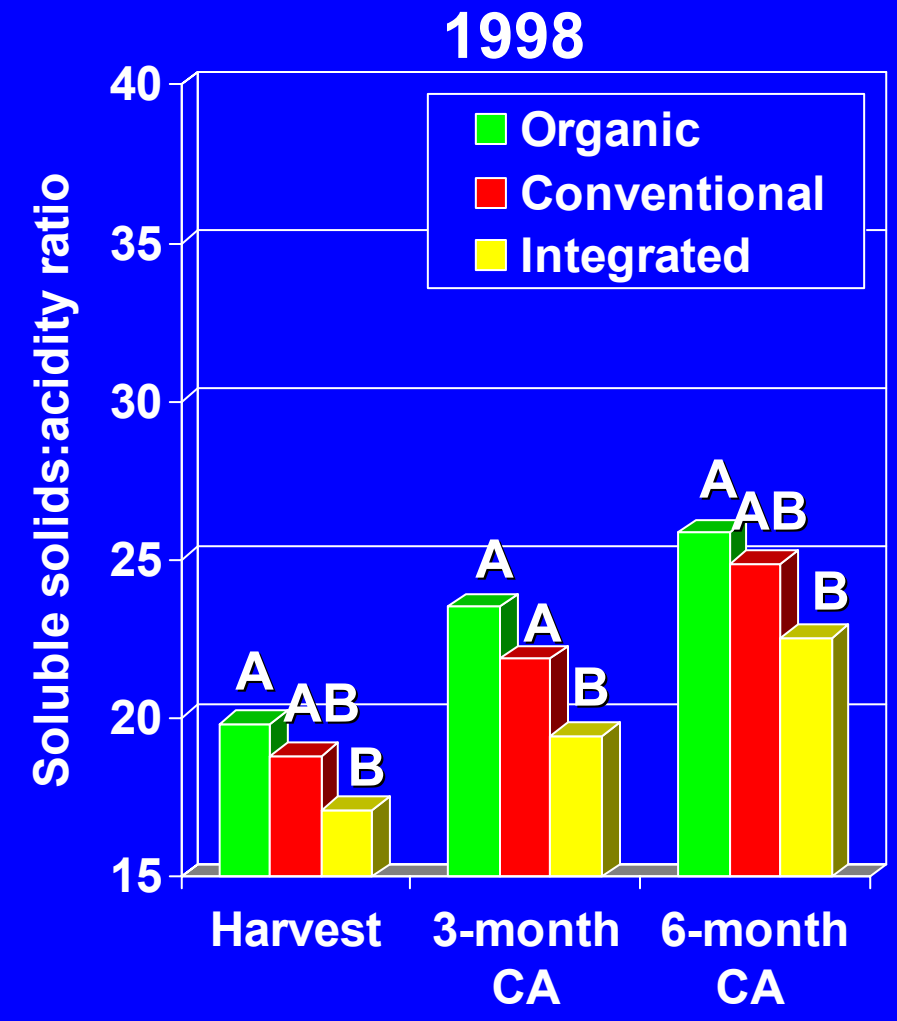


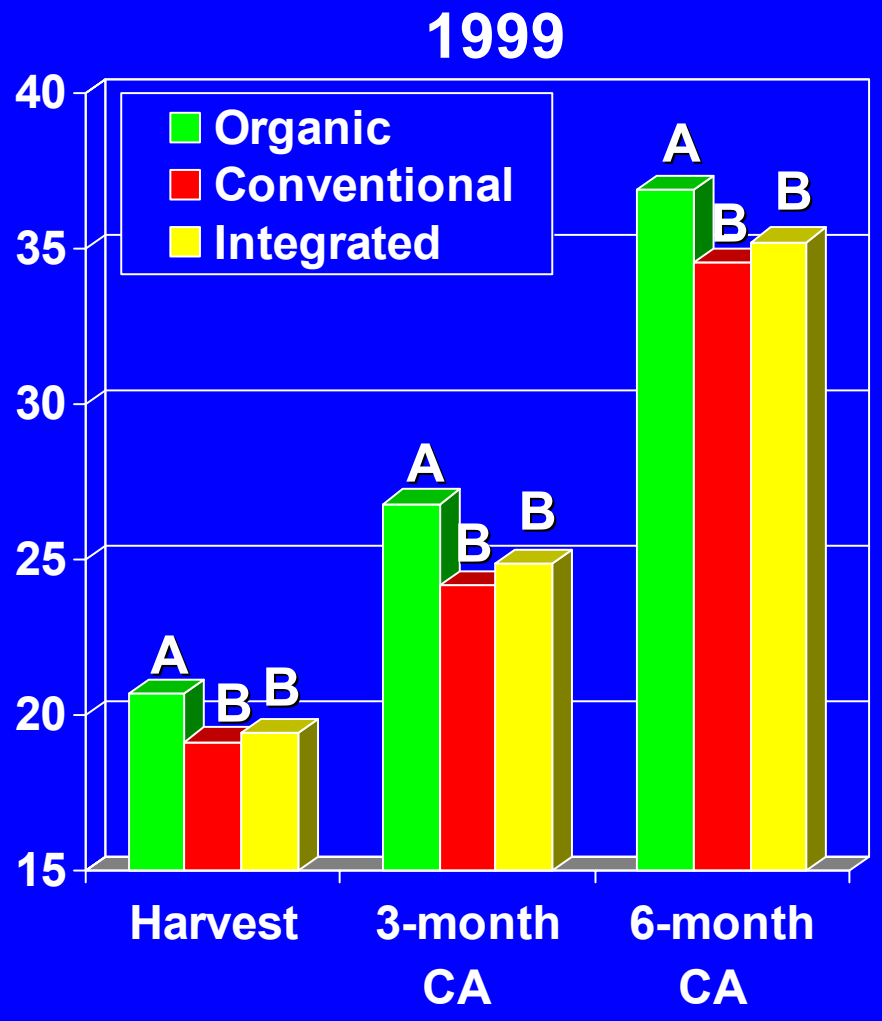
FRUIT FIRMNESS



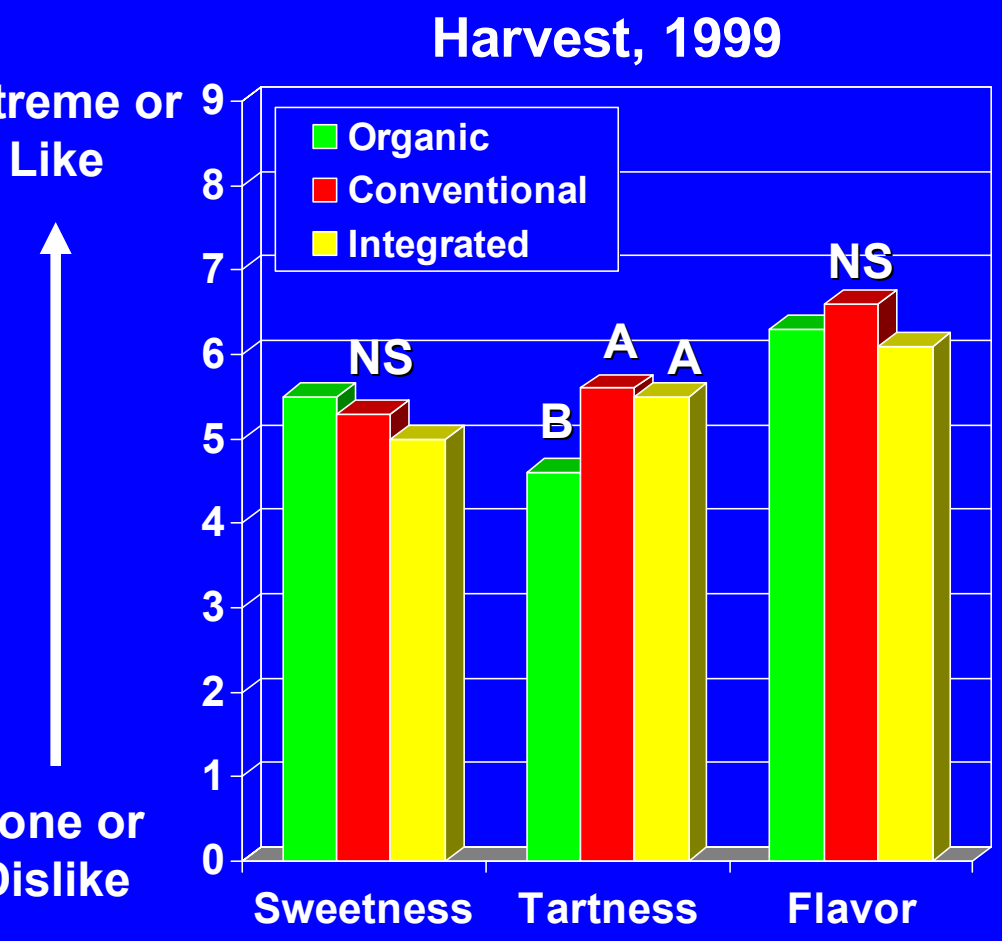


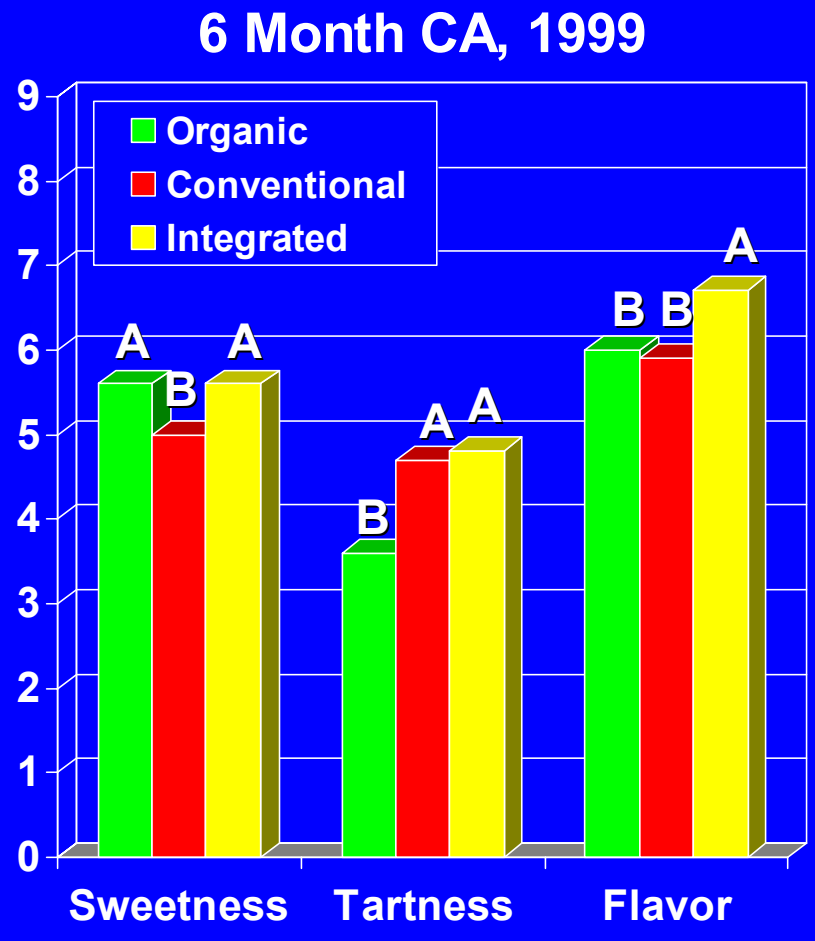
SOLUBLE SOLIDS:ACIDITY





TASTE PREFERENCE





Good Bets for Soil Health

- Reduce tillage, maintain soil structure
- Keep the soil covered, stop erosion
- Maintain adequate C and N inputs
- Promote diversity
- Monitor soil moisture to avoid excess


Know Your Soil

Know Your Soil

A soil survey is essential for making the correct decisions about the following matters:

What to plant;

How soils can be improved;

Which irrigation system to install and how it should be designed;

How much irrigation is necessary;

What soil problems are there (e.g., drainage).

(Tom Crossen, Venture into Viticulture, 1997)