Quality of Organically and Conventionally Grown Apples and Strawberries

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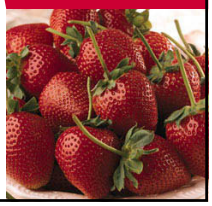

Fruit quality

- Depends on stakeholder
  - fruit growers
  - graders/processors
  - marketers
  - consumers
- Scientists - specific quantifiable measures
  - priorities of consumers, growers, grading and processing enterprises, wholesale & retail marketers

Definition of fruit quality

- Composite of attributes
  - productivity
  - ripeness (maturity)
  - storage capacity, including "shelf-life"
  - sensory
  - nutritive value
  - health benefits
- The standards of excellence of a product that distinguishes it as superior

Food quality issues

- Farm-worker rights
- Land ownership
- Farm profitability
- Resource utilization
- Environmental quality
- Globalization
- Pesticide risks
- Affordability
- Food attitudes

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Sustainability of three apple production systems
JP Reganold, JD Glover, PK Andrews & HR Hinman
Nature 410: 926, 2001

Crop quality
Soil quality
Farm profitability
Environmental risks of agrochemicals
Energy efficiency

Recent publications:

GM Peck, PK Andrews, JP Reganold & JK Fellman. 2006. Apple orchard productivity and fruit quality under organic, conventional, and integrated management. *HortScience* 41:99

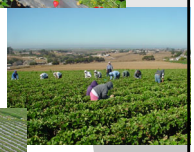
SB Kramer, JP Reganold, JD Glover, BJM Bohannan & HA Mooney. 2006. Reduced nitrate leaching and enhanced denitrifier activity and efficiency in organically fertilized soils. *PNAS USA*. In Press

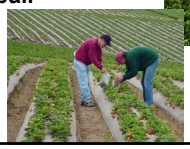
Apple field study

- Yakima County, Washington
- Replicated, on-farm
  - ORG & CON
- Soil & topography identical
- Cultivars
  - 'Golden Delicious'
  - 'Gala'
- Grower/scientist managed

Strawberry field study

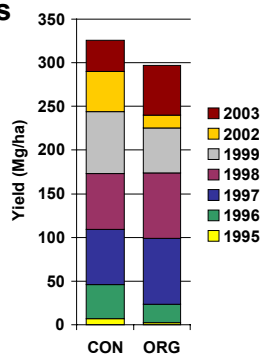
- Monterey & Santa Cruz Counties, California
- Paired ORG/CON farms
  - 5 pairs in 2004
  - 8 pairs in 2005
- Soils & topographies matched for each pair
- Cultivars
  - 'Diamante'
  - 'San Juan'
  - 'Lanai'





Crop yields

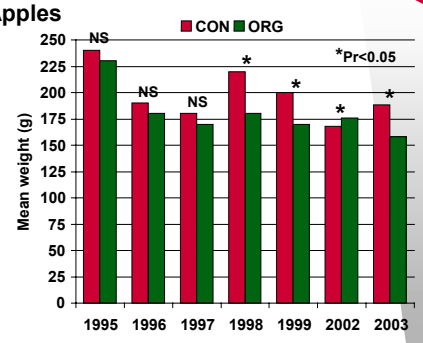
Apples



Nature (2001) & HortScience (2006)

Fruit size

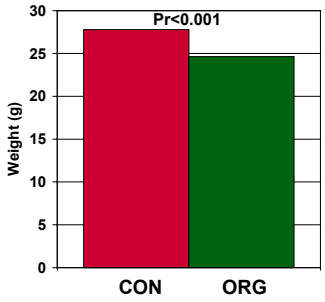
Apples



Nature (2001) & HortScience (2006)

Fruit size

Strawberries



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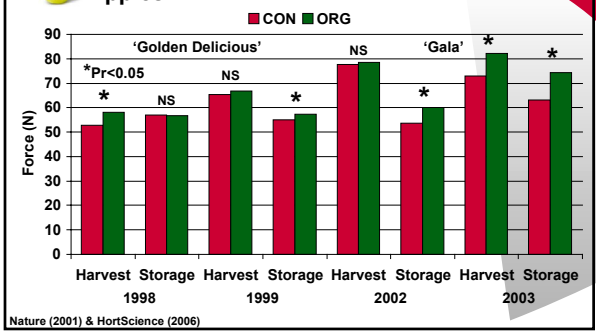
Fruit firmness

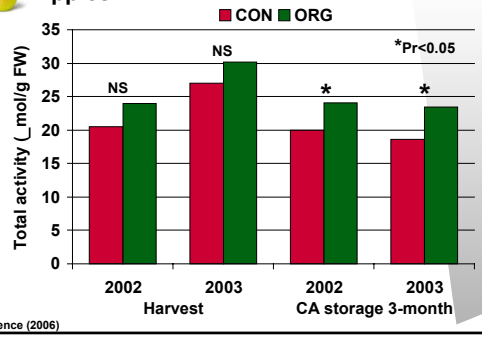
Apples



Nature (2001) & HortScience (2006)

Antioxidant Activity

Apples



HortScience (2006)

Phytochemicals

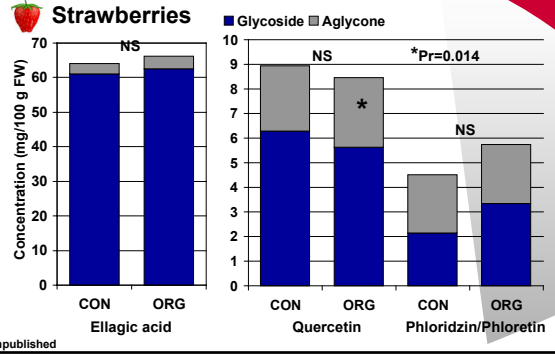
Strawberries

(units per g FW)	CON	ORG	Method
Polyphenols (mg gallic acid)	1.22 B	1.37 A	Folin-Ciocalteu
Flavonoids (Abs 325 nm)	14.0 B	15.6 A	HCl-methanol
Anthocyanins (µmol)	319 B	350 A	HCl-methanol Pelargonidyn-3-glucoside

Unpublished

Polyphenols

Strawberries



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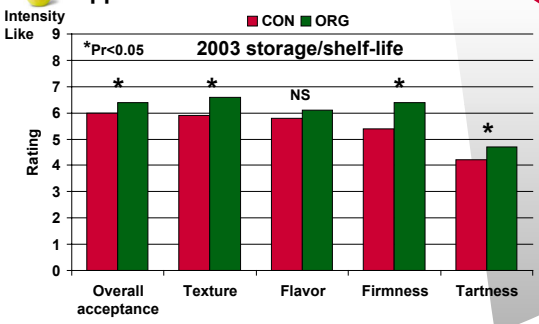
Consumer taste panel

Apples



HortScience (2006)

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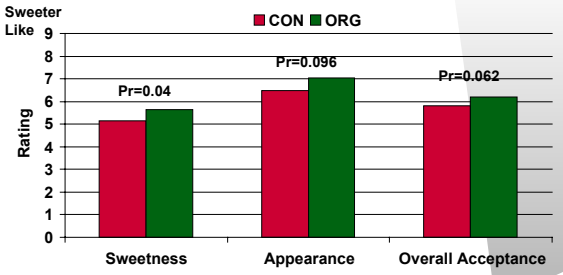

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Conclusions & Future

- ORG apple yields were often lower and fruit size was smaller
- ORG apples were as firm or firmer and ORG strawberries were sweeter
- ORG apples had higher antioxidant activity and ORG strawberries had higher polyphenol content
- ORG apples stored better
- ORG fruit were generally preferred by consumers

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