WINDBREAKS IN ARGENTINA

MANAGEMENT STRATEGIES FOR CITRUS CANKER

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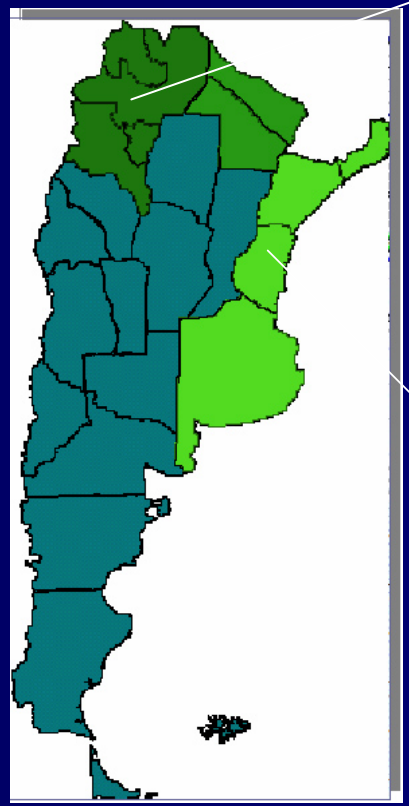
MAIN ARGENTINEAN CITRUS REGIONS



- **NWA:**

Area = 64.088 ha

Production = 2.008.000 tn

- **NEA:**

Area = 83.378 ha

Production = 1.092.000 tn

ARGENTINEAN CITRUS PRODUCTION STRUCTURE AND ECONOMICAL VALUE

	#	Production Tn	Value U$S
Growers	5.300	3.100.000	500.000.000
Packing / Exportation	79	21 %	43 %
Packing / Internal Market	450	32 %	33 %
Industries	16	47 %	24 %
Total direct labor	120.000 (1 x 1,3 ha)		

MARKETS REQUIREMENTS

FRUIT HEALTHY AND QUALITY

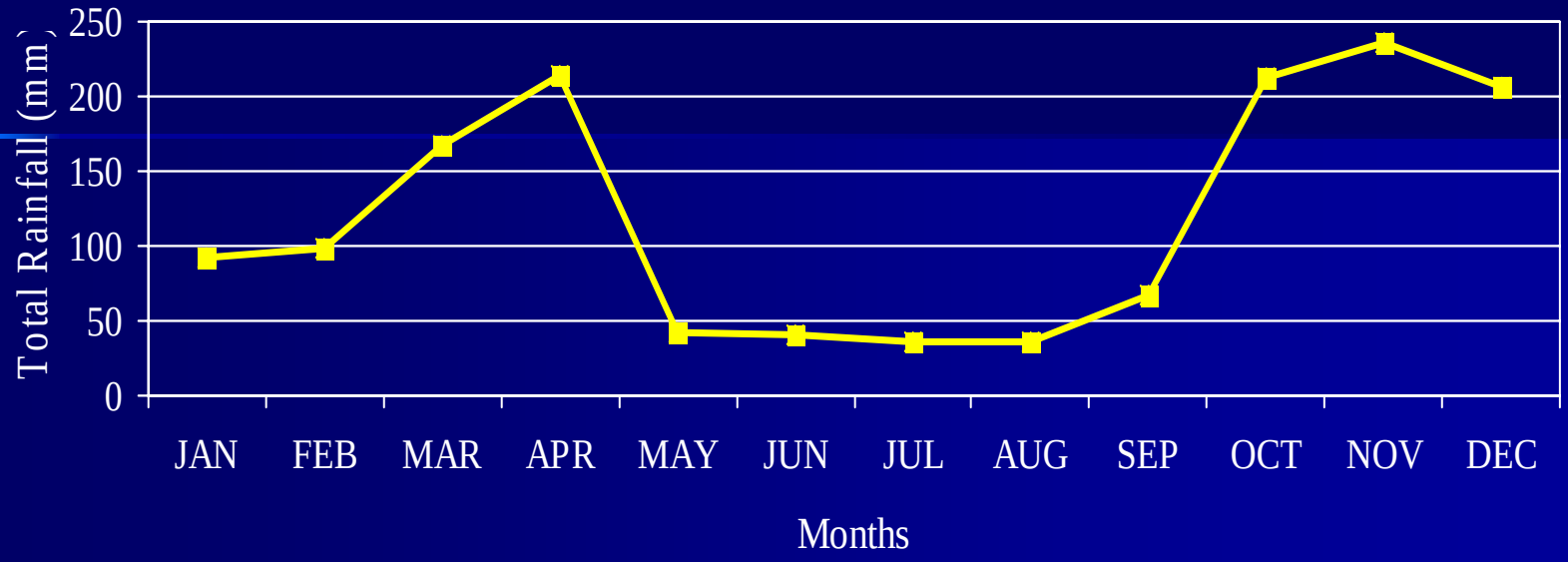
- Citrus canker affect production & quality

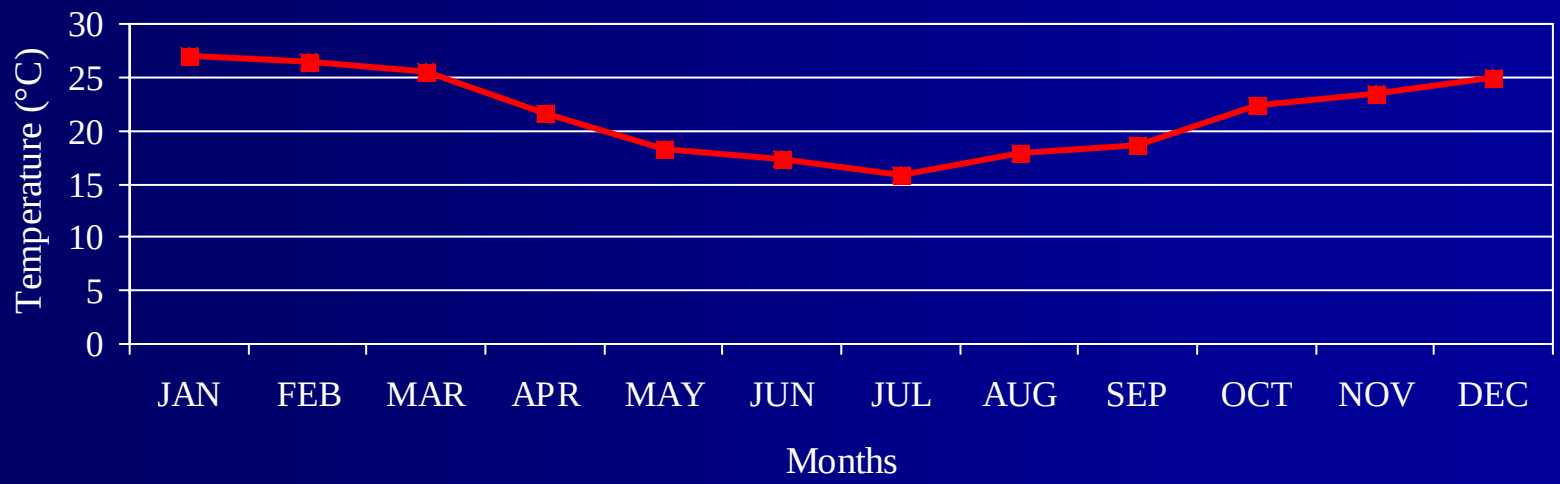
Therefore:

Healthy is an strategic problem for national citrus production

CITRUS CANKER SYMPTOMS

Rainfall (mm) and temperature (°C) per month. Average 2001 to 2005





FAVORABLE CONDITIONS FOR CITRUS CANKER INFECTION

- **Rain with strong winds and high temperatures**
- **Aggressive strains**
- **Use of susceptible varieties**

CITRUS CANKER

Integrated Management :

involves biological, physical and operatives factors that affects disease viability

PREVENTIVE MEASURES and ORCHARD DISEASE MANAGEMENT

- **Windbreaks**

  - Every 3-4 ha: External double line and Internal one line

- **Resistant Varieties**
- **Desinfection & Monitoring**
- **Remove diseased organs:**
  - Leaf and fruit pruning, defoliation with Diquat
- **Chemical Control:**
  - Products, doses, timing and application methods
- **Cultural Practices:**
  - Irrigation, fertilization, weed control

WINDBREAKS

WINDBREAKS : MAIN SPECIES OF TREES USED IN ARGENTINA

- *Eucalyptus grandis;*
- *Eucalyptus torelliana;*
- *Pinus elliottis;*
- *Pinus taeda*
- *Grevillea robusta;*
- *Casuarina cunningamia*


30 3 2006


30 3 2006


31 3 2006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5 4 2006


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Competition between windbreaks and citrus plants

Eucalyptus

Pinus


Pinus
Eucalyptus
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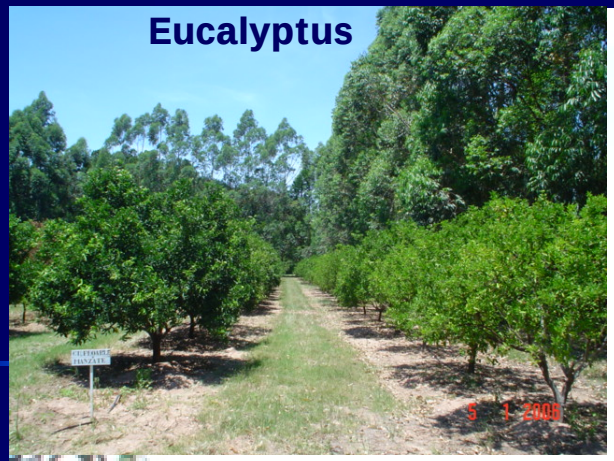
Eucalyptus
Pinus
4 1 2006



Casuarina


4 4 2006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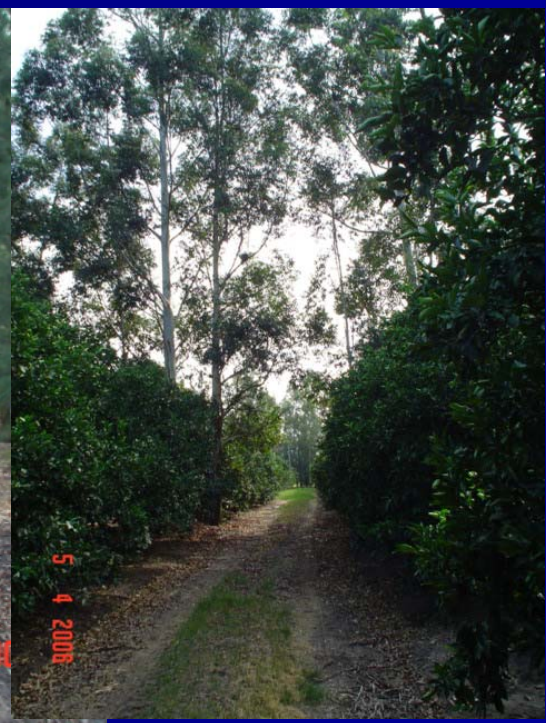
Bamboo


5 4 2006


5 4 2006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Shade

Distance


5 4 2006


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5 4 2006


5 4 2006


5 4 2006


5 4 2006


5 4 2006


5 4 2006

Sugarcane

MAIN WINDBREAK ADVENTAGE ON CITRUS FRUIT PRODUCTION

- **Reduction of canker infection (30 %)**
- **Minimizing damages in fruit by leaves and branches rubbing (Blemish)**
- **Improvement of the pulverizations on windy days**
- **Improvement externally fruit quality**


FLUSHING


FLUSHES DEVELOPMENT
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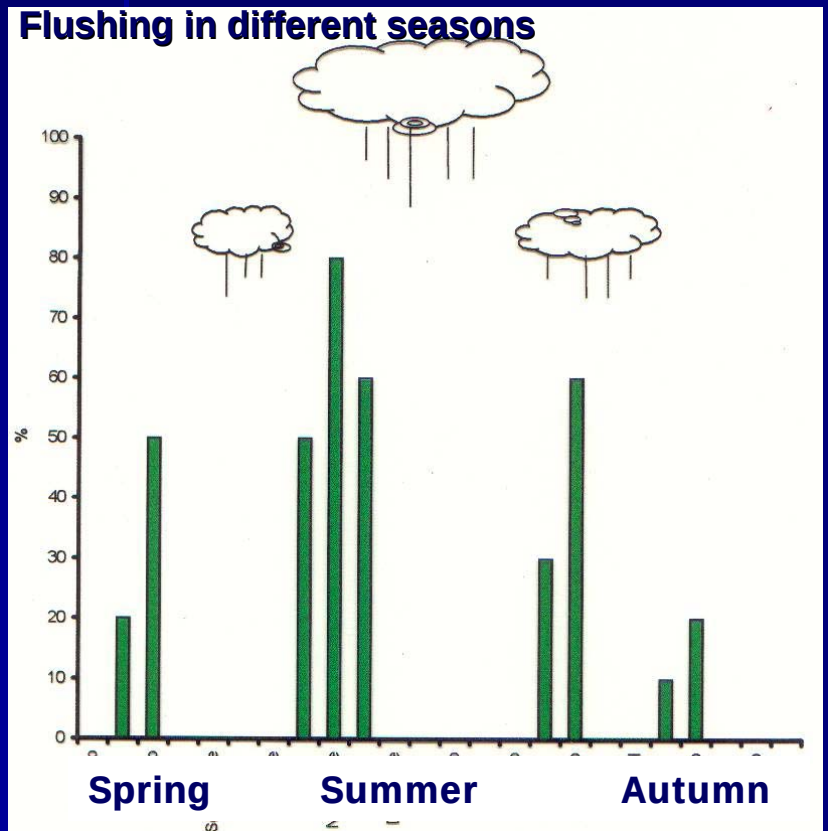
Flushing in different seasons
100
90
80
70
60
50
40
30
20
10
0
%
Spring
Summer
Autumn


LEAF DEVELOPMENT
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4 1 2006


30 3 2006


30 3 2006

DISEASE MANAGEMENT

- **Chemical control in orchards:**

Spray on each flushing (4 per year)

Products: Copper oxychloride, Copper hydroxide, Copper oxyde, Tribasic copper sulfate (micronizados)

Doses: 1,5 kg metallic copper / 1000 lt water

Resistant Bacteria to Cu: add Mancozeb 2 kg

Leaf miner:

Flushes of 3,5 to 5 cm
Vertimex 200cc + 5 lt oil / 1000 lt
15 days old flushes
Vertimex 200cc + 5 lt oil + Copper / 1000 lt

Spray quality: Moment, Volume, drops size and quantity, penetration and hole contact surface , etc.


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PRUNE OF BRANCHES AND FRUITS WITH CITRUS CANKER

Prevention

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