



Sampling and diagnostic of leprosis in Brazil

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Ministério da
Agricultura, Pecuária
e Abastecimento



Diagnostics of leprosy

- Traditionally
 - Symptoms
 - TEM
 - Biological assays
- More recently
 - RT-PCR
 - ELISA



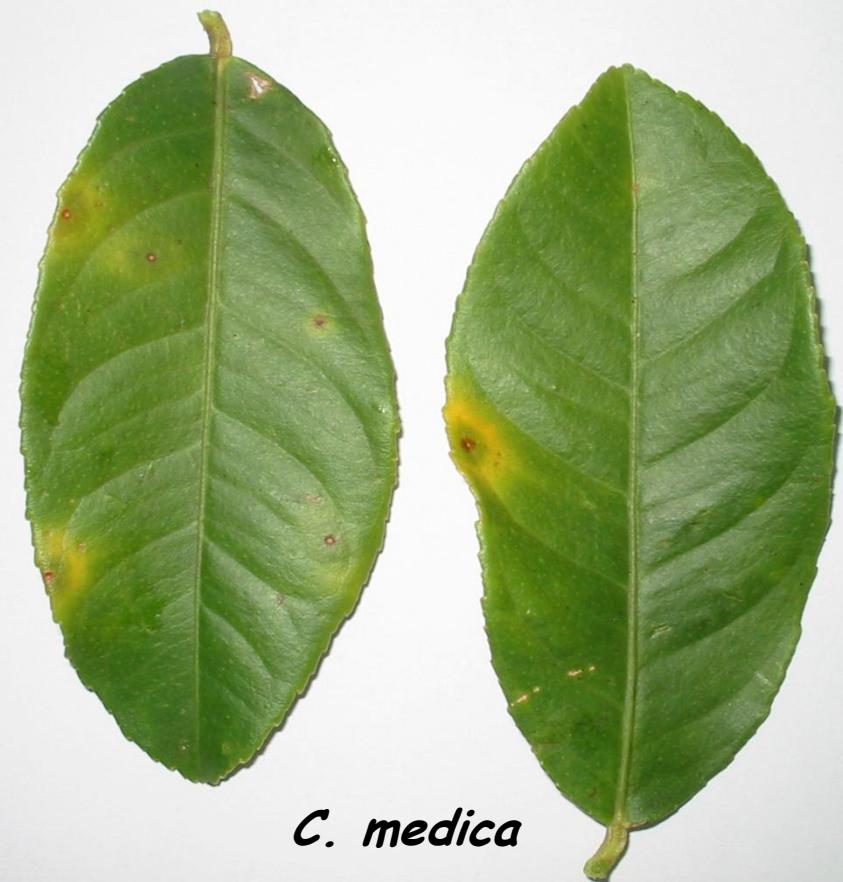
Diagnostic tool: symptoms

- Localized chlorotic or necrotic lesions, often with ringspot patterns



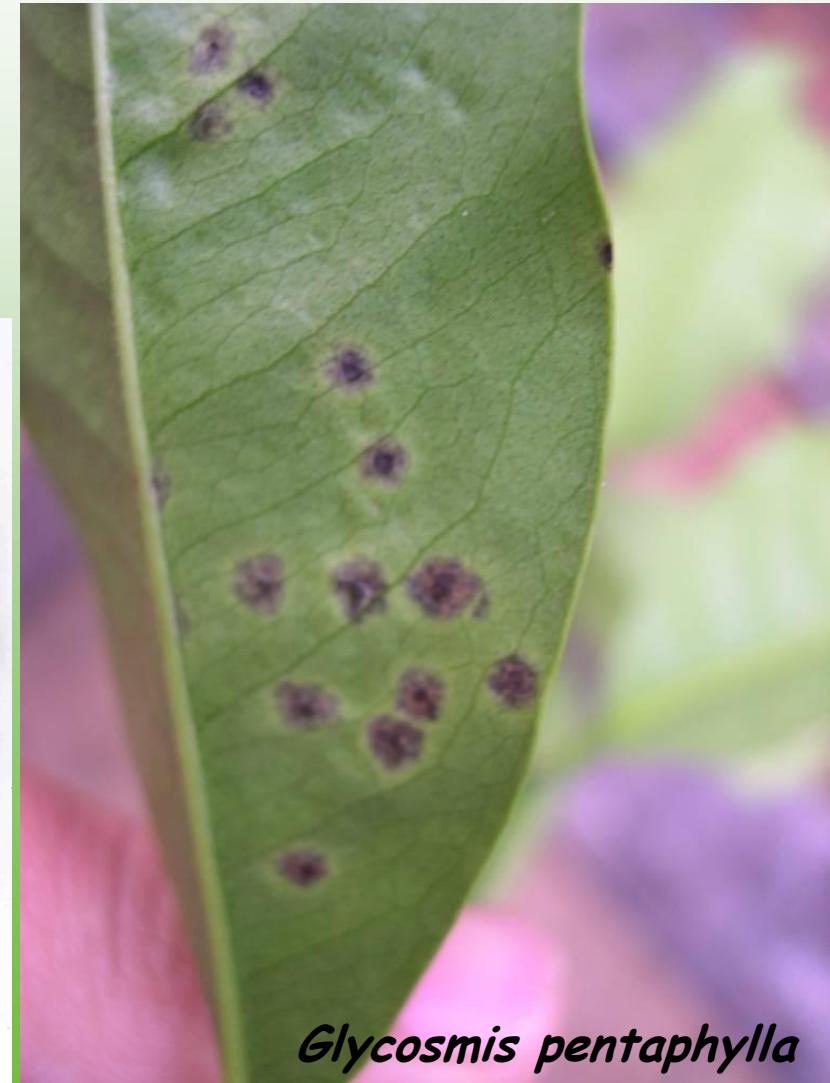
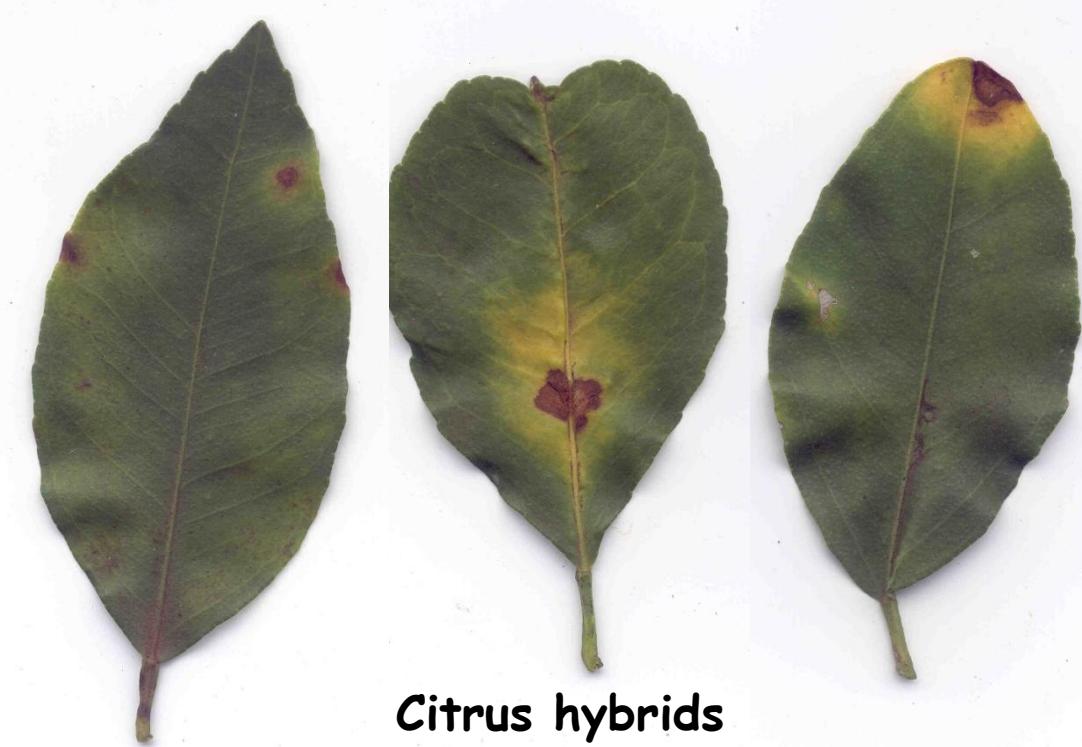
Symptoms

Sometimes symptoms are not so typical...



C. medica

Symptoms

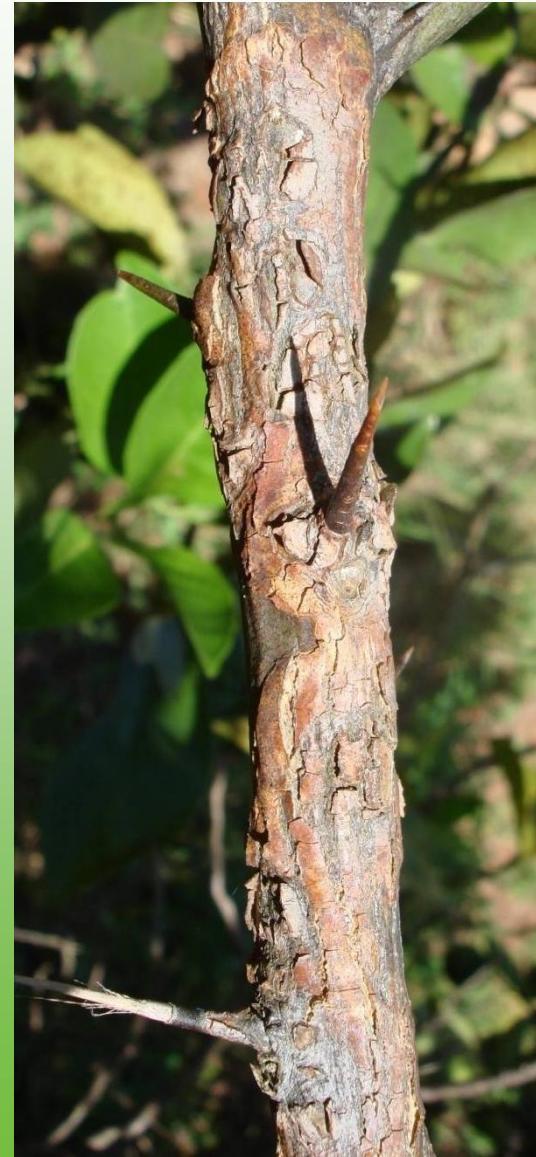


Symptoms

Symptoms can be confusing...



psorosis



Symptoms



canker



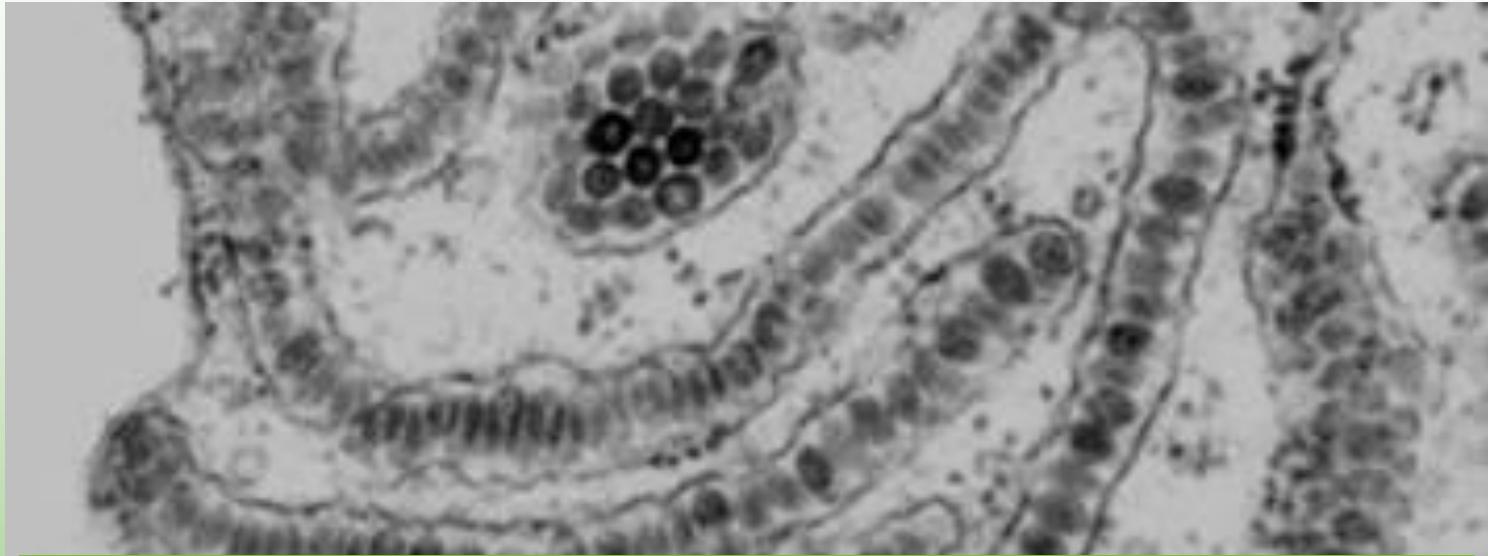
Symptoms



<http://aggie-horticulture.tamu.edu/citrus/l2309.htm>

Damage caused by *Brevipalpus* in grapefruit in Texas

Diagnostic tool: TEM



Direct evidence of the presence of the virus

Need for aTEM

Need for specialized personnel

High cost

Time consuming method

Limited number of samples

Diagnostic tool: biological assays



Using mites:
Reproducibility
Mite-rearing system
Time consuming method
Need for greenhouse space
Quality of the source of inoculum

Diagnostic tool: biological assays

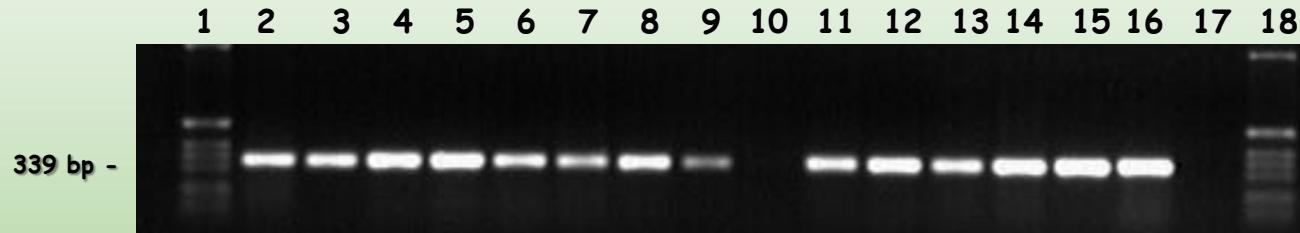
Using sap inoculation

Host	Symptoms (dai)
<i>Chenopodium quinoa</i>	5-7
<i>C. amaranticolor</i>	5-7
<i>Gomphrena globosa</i>	14-16
<i>Citrus sinensis</i> (var. Caipira)	20-24
<i>Phaseolus vulgaris</i>	5-7

Diagnostic tool: RT-PCR

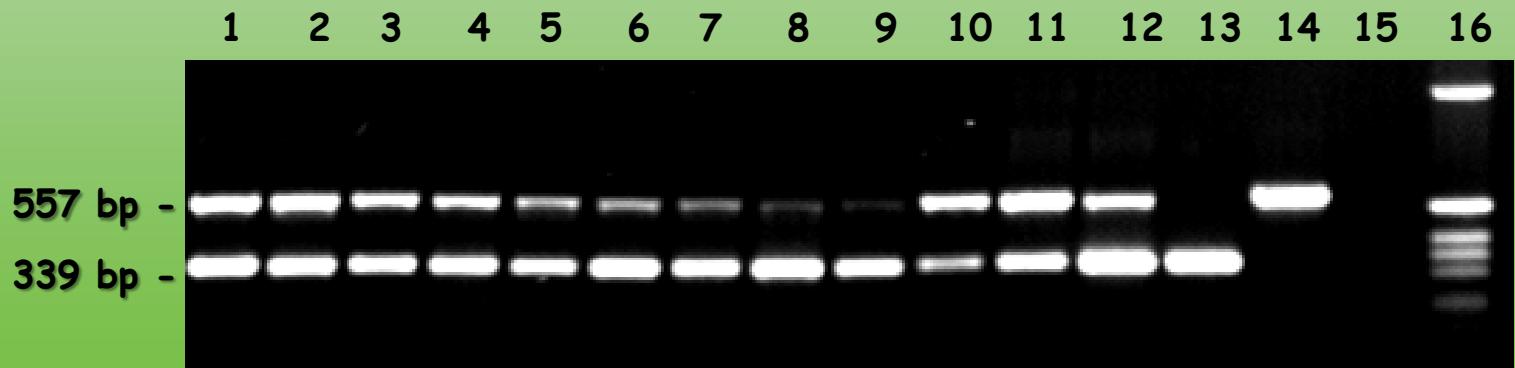
Sensitive, specific, fast, reliable

Leprosis



Locali et al. (2003)

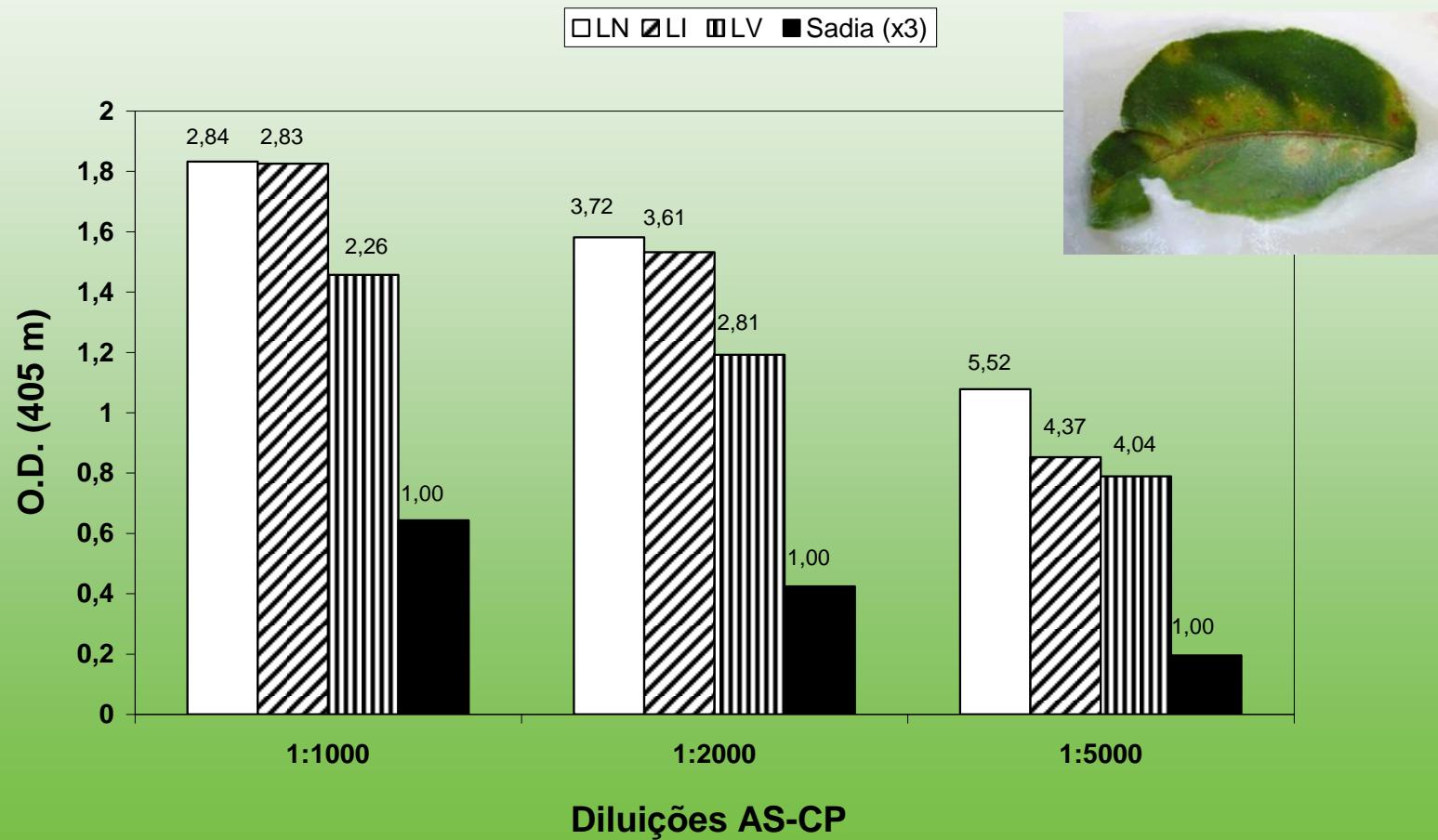
Leprosis + tristeza



Freitas-Astúa et al. (2005)

Diagnostic tool: ELISA

Sensitive, specific, cheap, reliable



Management of leprosis: sampling

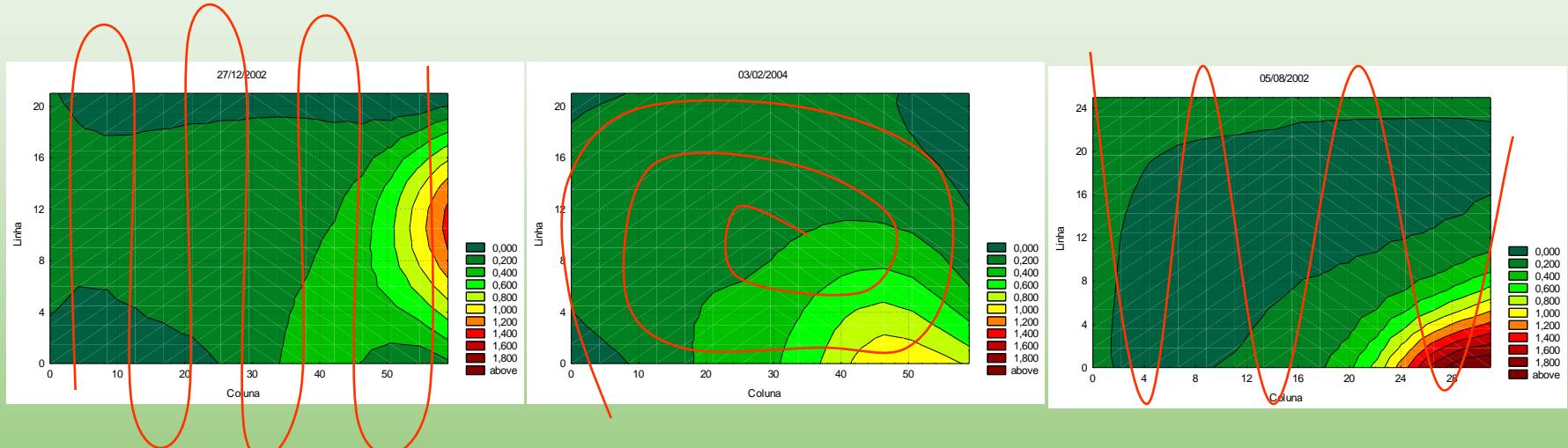
Blocks of < 2,000 plants



Sampling 1-2% of the plants



Sampling blocks



What to sample

- Mite's preference: fruits (75-90%) > branches > leaves
- Sample 2-3 internal fruits, if possible with scab, leafminer galleries or other lesions
- Assess the whole fruit
- Repeat inspections every 7-15 days



Picture: Renato Bassanezi



Spray with acaricides when the threshold is reached
Often 5-10% of fruits or branches with mites



The threshold is empiric and may vary according to the history of the disease in the area

INVENTÁRIO DE PRAGAS

PRAGAS	PLANTAS AMOSTRADAS																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
FERRUGEM	1																			
	2																			
LEPROSE	1																			
	2																			
OBSERVAÇÕES																				
TALHÃO:																				
DATA:																				
Nº DE PLANTAS:																				
INSPETOR:																				
AMOSTRAGEM CONVENCIONAL																				

Does it work?

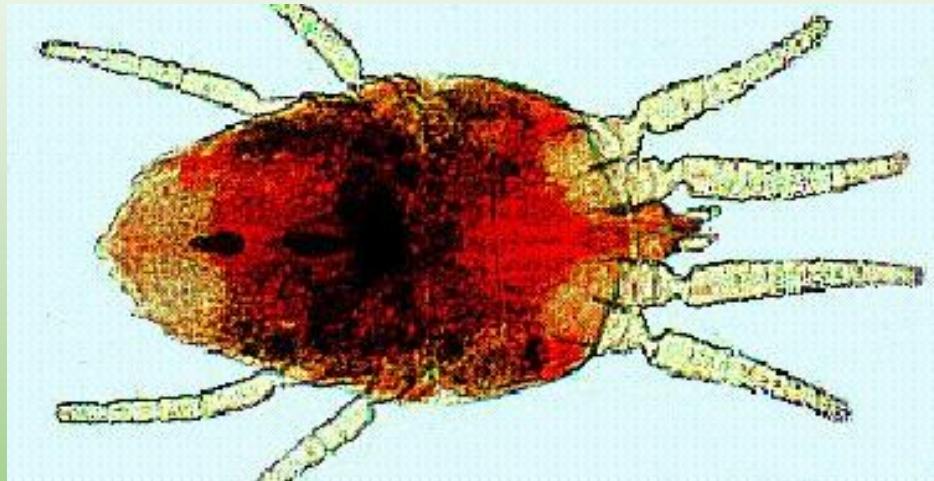
It helps, but...



- The error for the estimated mean for the % of fruits with mites in a 1% sampling and 3 fruits/ plant ranges from 63-67%
- The minimal sample size for an average error of 25% should be 165 plants

Why?

- *Brevipalpus* mites have low population density
- They tend to hide in the plant



So why do it?

It is still the most feasible way to assess the presence
of the mite in citrus orchards ➔ management of the disease



Thank you!

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