2024 Citrus Australia
AUSTRALIAN CITRUS CONGRESS
SUNSHINE COAST, QUEENSLAND
5 March | AGM & Welcome Event
6 & 7 March | Congress

Current Huanglongbing status and management in China

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1

Background

2

Management

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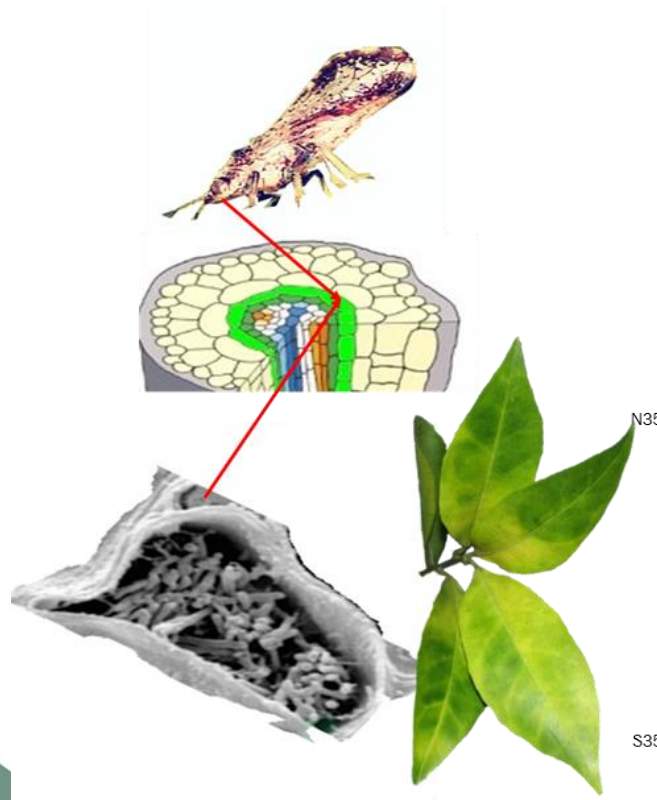
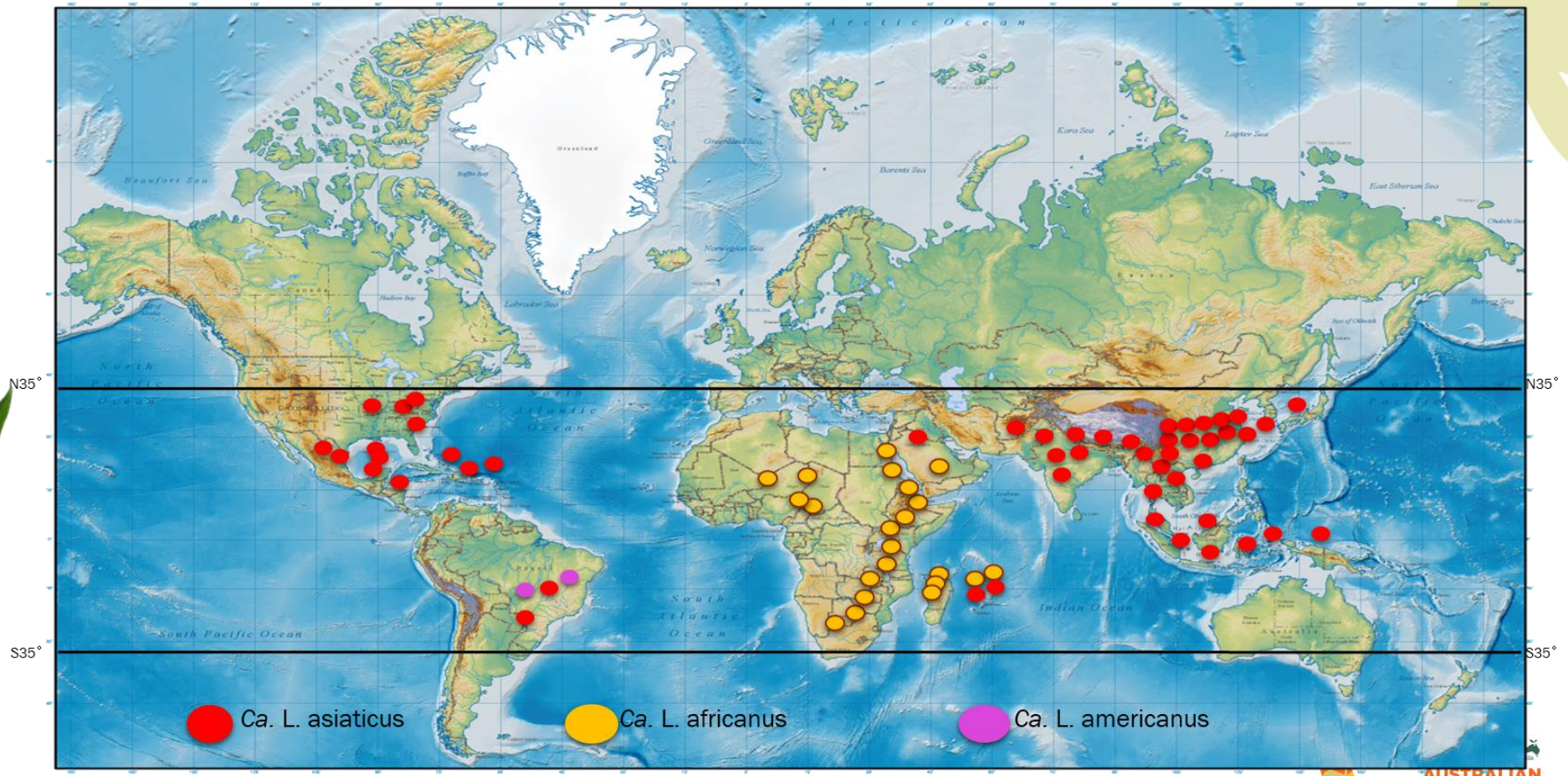
Phloem limited, global distribution





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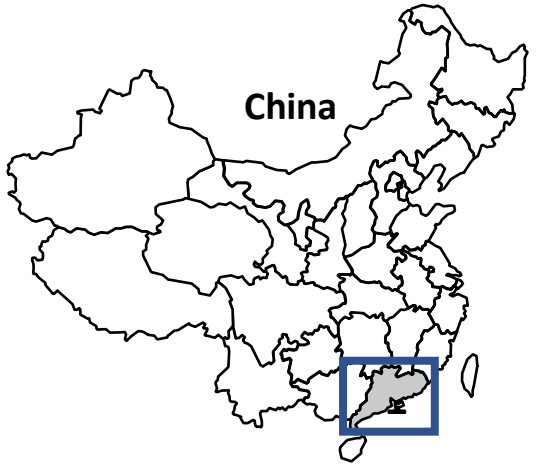
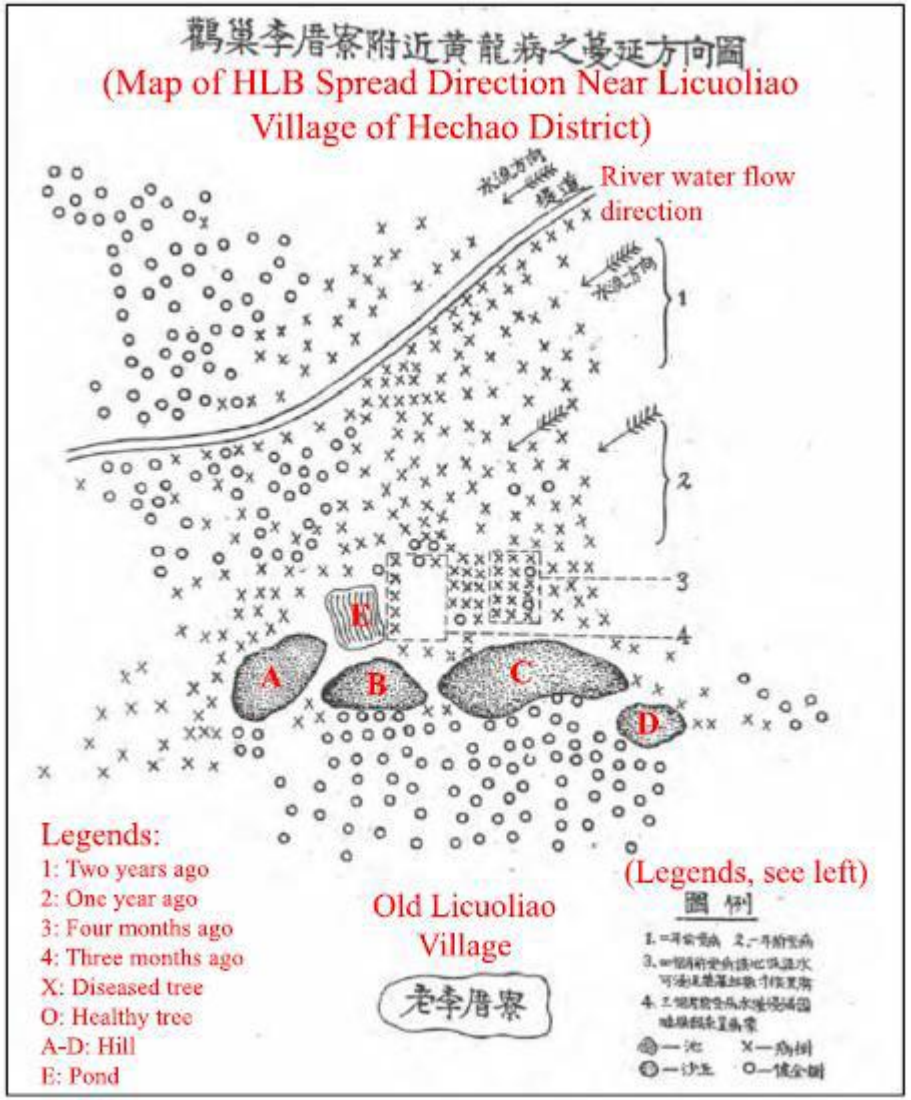
First report in China

- HLB was observed in Guangdong Province in 1880s, mainly in Chaoshan and Pearl River Delta area.



Epidemiological evidence



From 1938 to 1941, Chen (1943) performed a survey in six counties in the Chaoshan area.

X: infected tree
O: healthy tree

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HLB name- in memory of Prof. Lin

Prof. Kongxiang Lin
(1910-1985, SCAU)

In honor of Prof. Lin's pilot work on citrus greening disease, which has been scientifically named with Chinese spelling "**Huanglongbing**" since 1995

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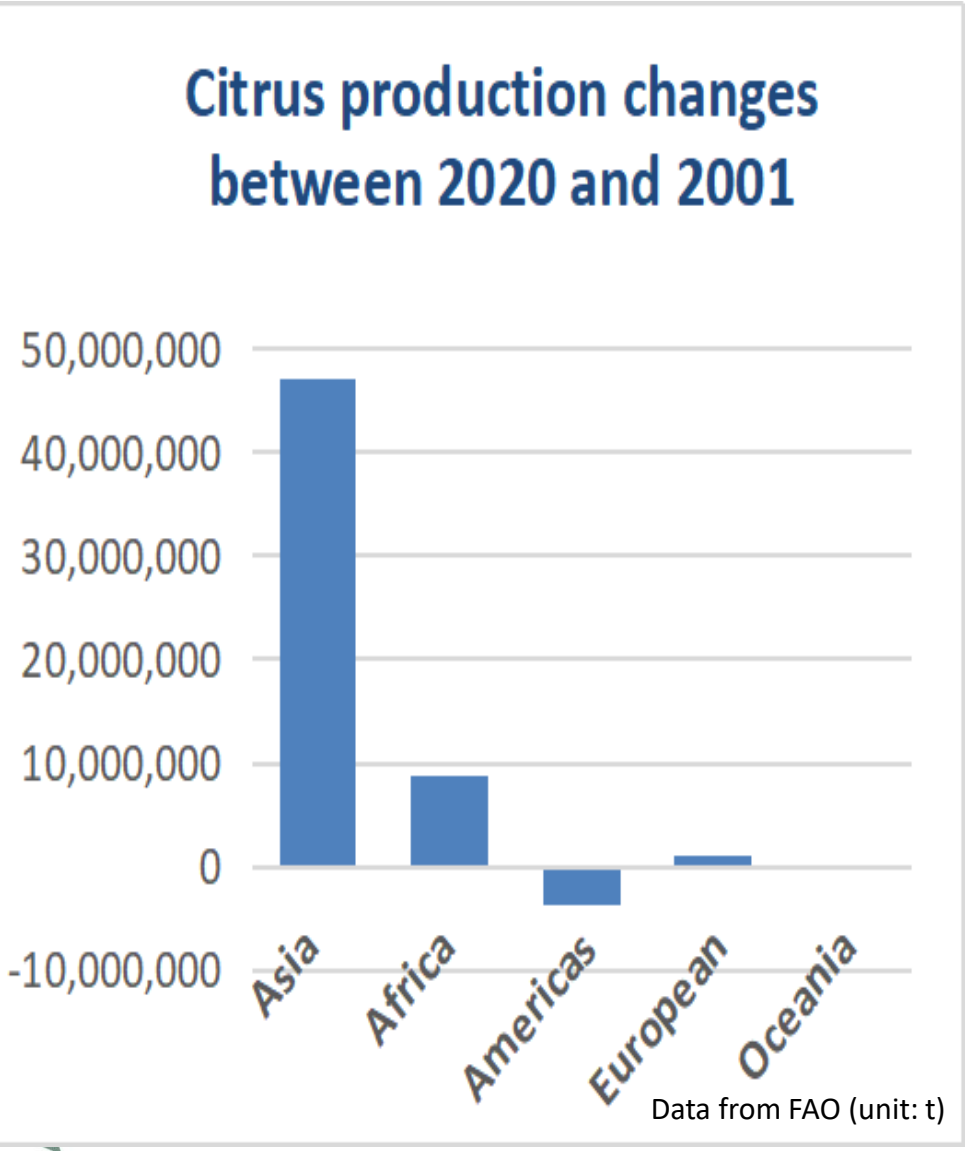
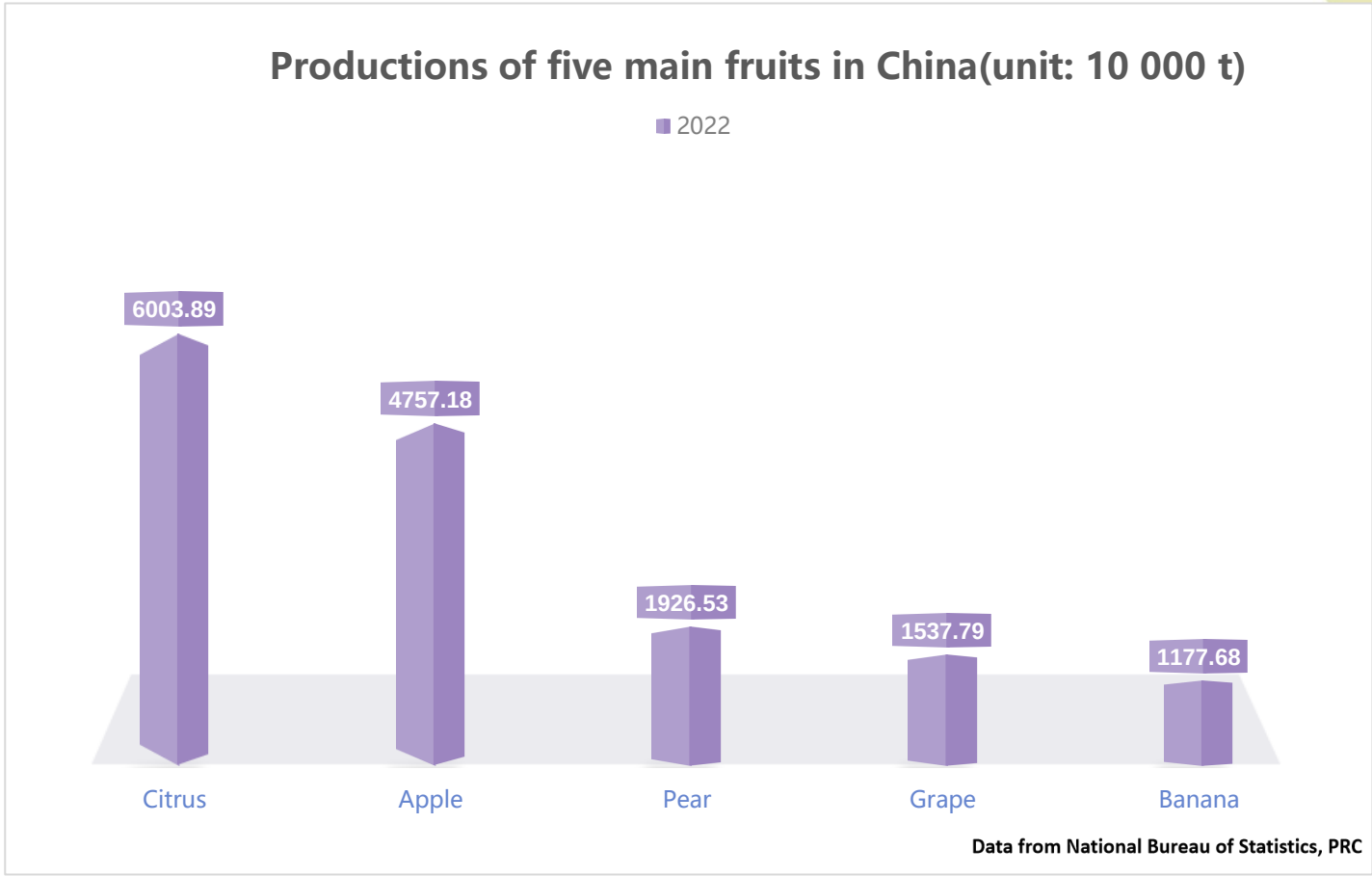
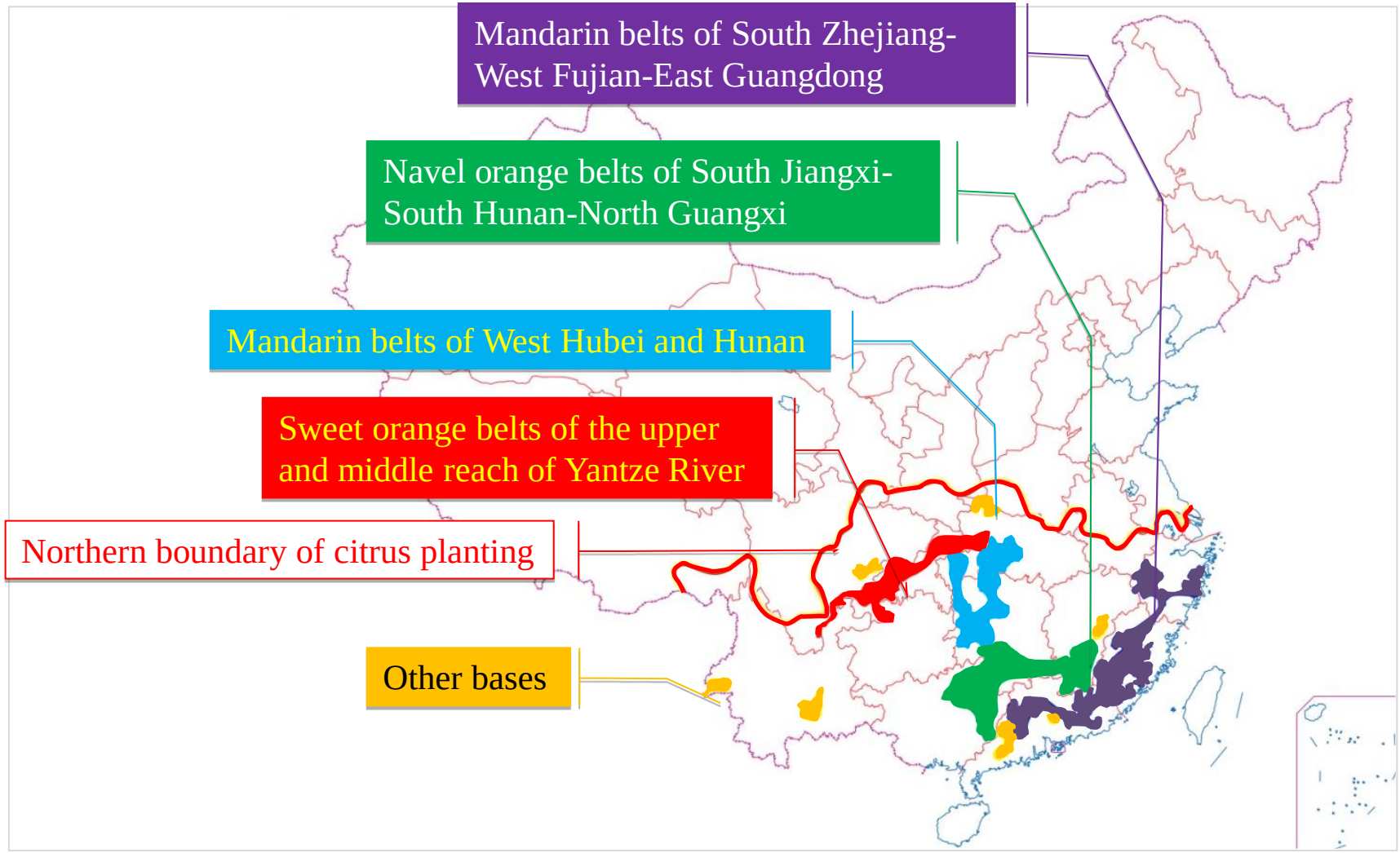
Citrus is the largest fruit industry in China



China's contribution to the increase in citrus production from 2001 to 2020： 69% of Asia, 61% of World



Superior citrus belts in China



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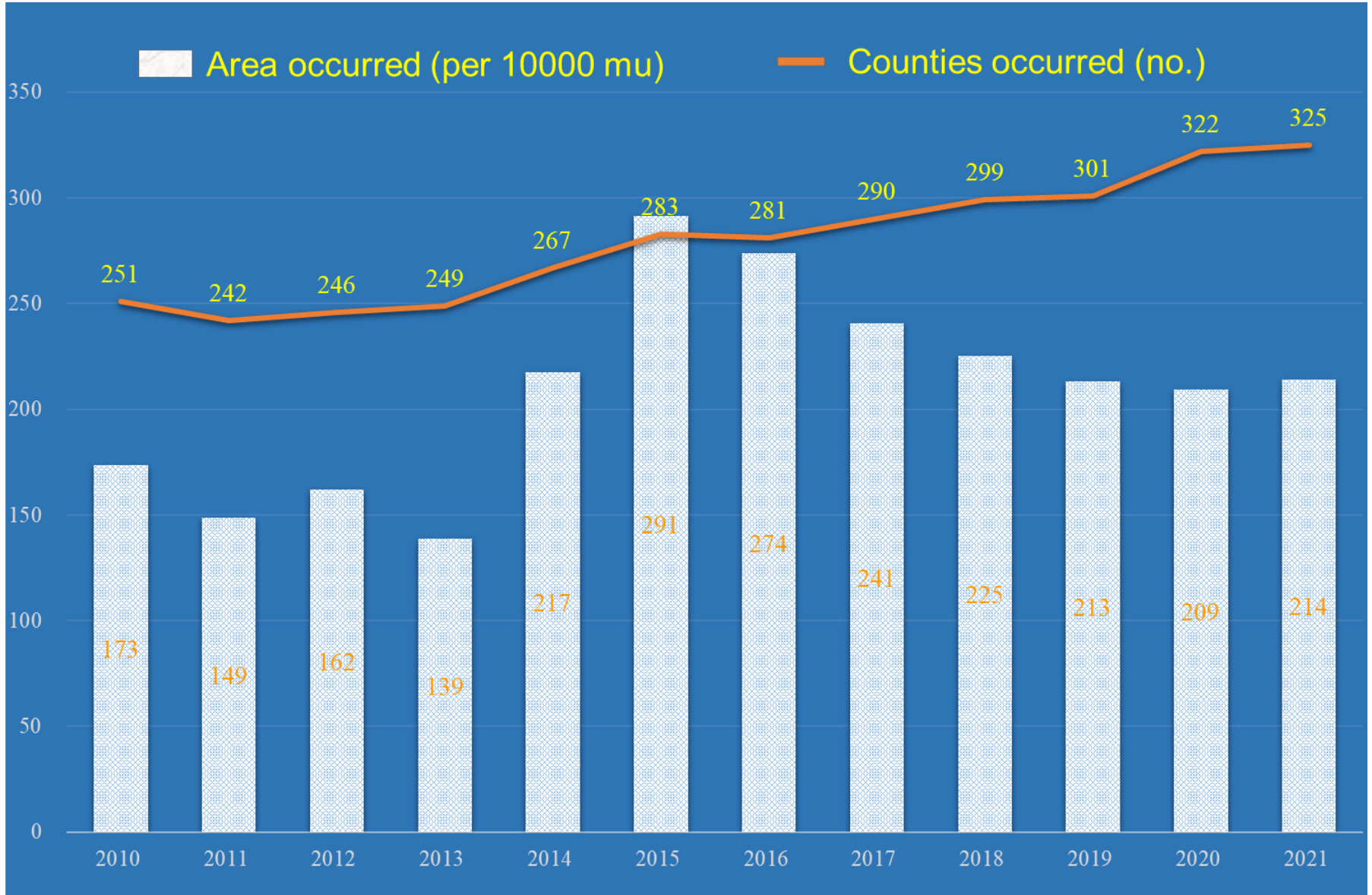
Increasing of HLB pressure but under control



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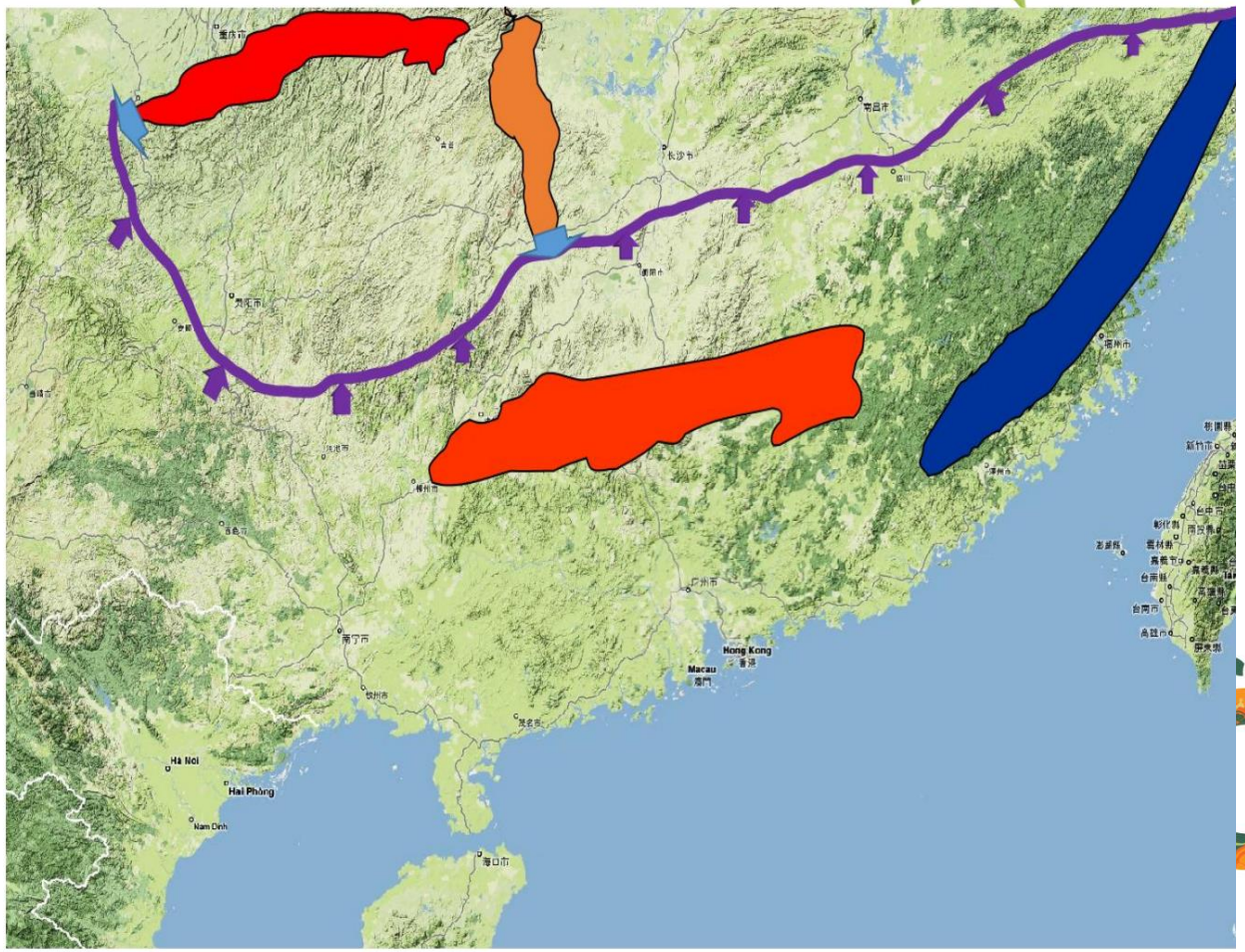
Pressure- Northward moving of ACP/HLB



A sketch map to show the trend of ACP/HLB movement **from** two belts with ACP/HLB **to** two HLB-free belts

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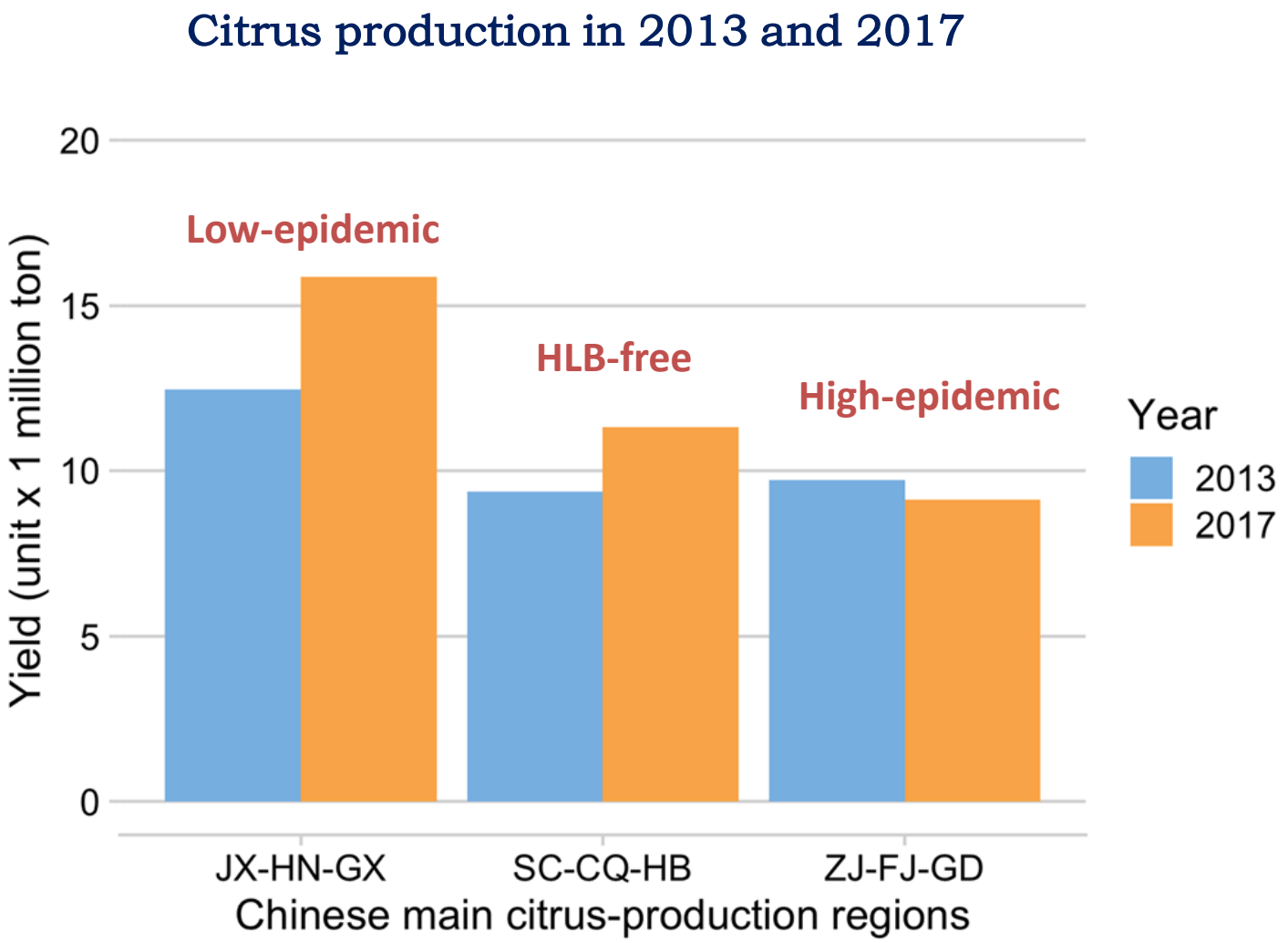
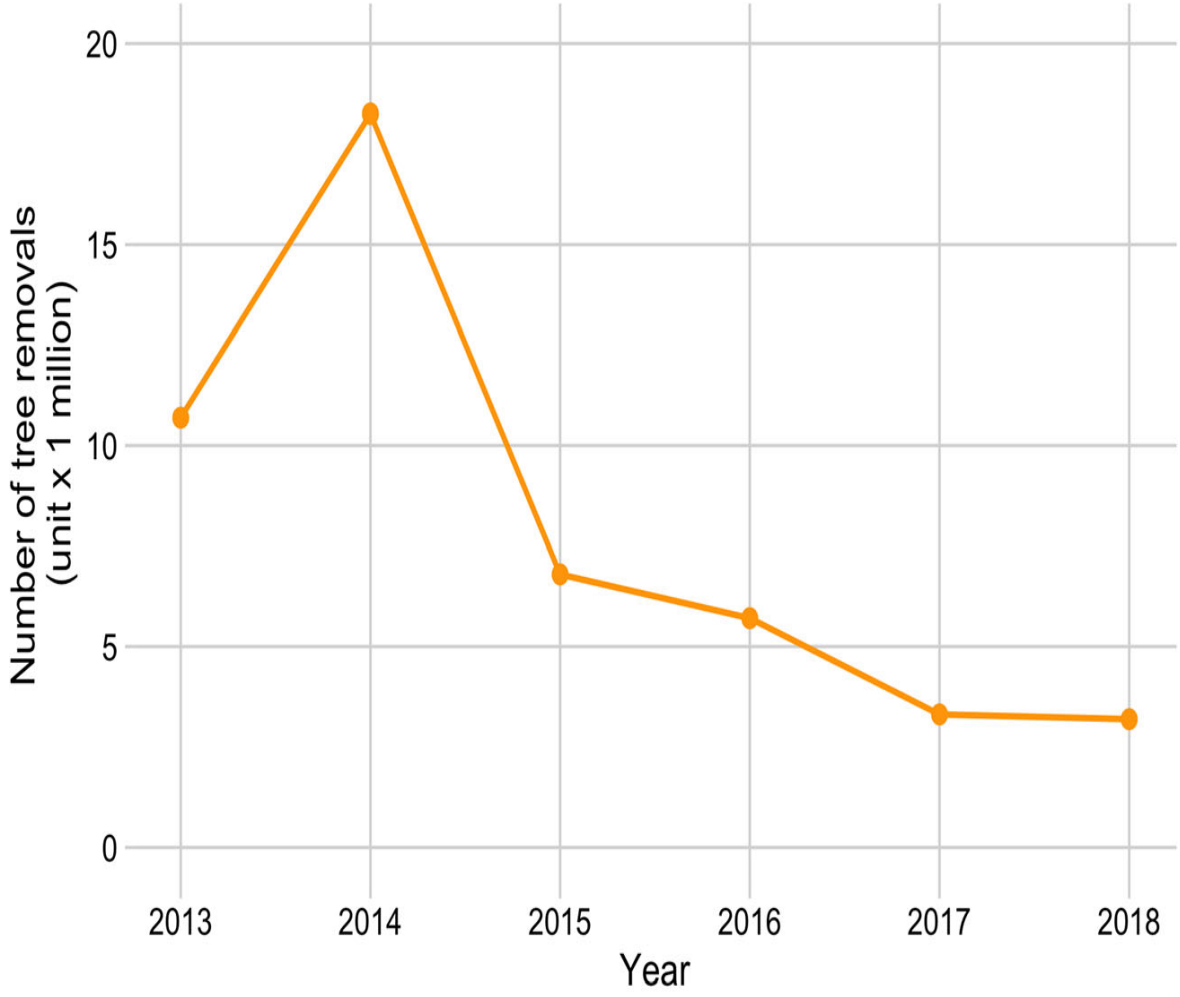
Citrus yields of three Chinese dominant regions



Zhou, 2020

A case in Ganzhou, Jiangxi

Over 50 million trees destroyed by HLB since 2013



Source: Chief technician Cixiang Chen of Ganzhou Fruit Industry Bureau, Jiangxi province

Zhou, 2020

1

Background

2

Management

HLB management

Three basic measures

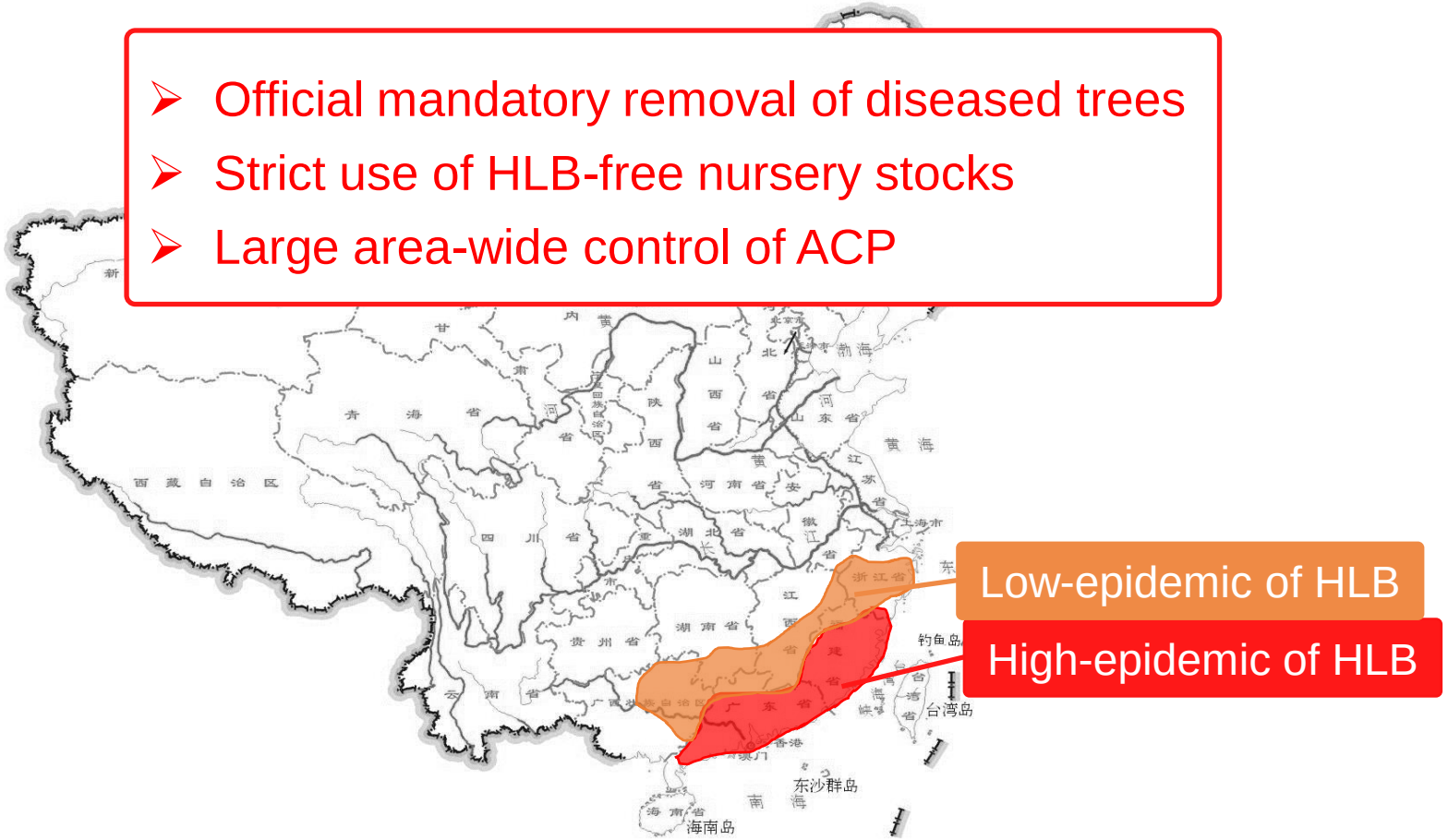
1. Use of clean nursery stock
2. Removal of diseased trees
3. Control of insect vector

auxiliary measures

- Windbreaks
- Killing the summer shoots
- Village rules …….

HLB endemic area

- Official mandatory removal of diseased trees
- Strict use of HLB-free nursery stocks
- Large area-wide control of ACP



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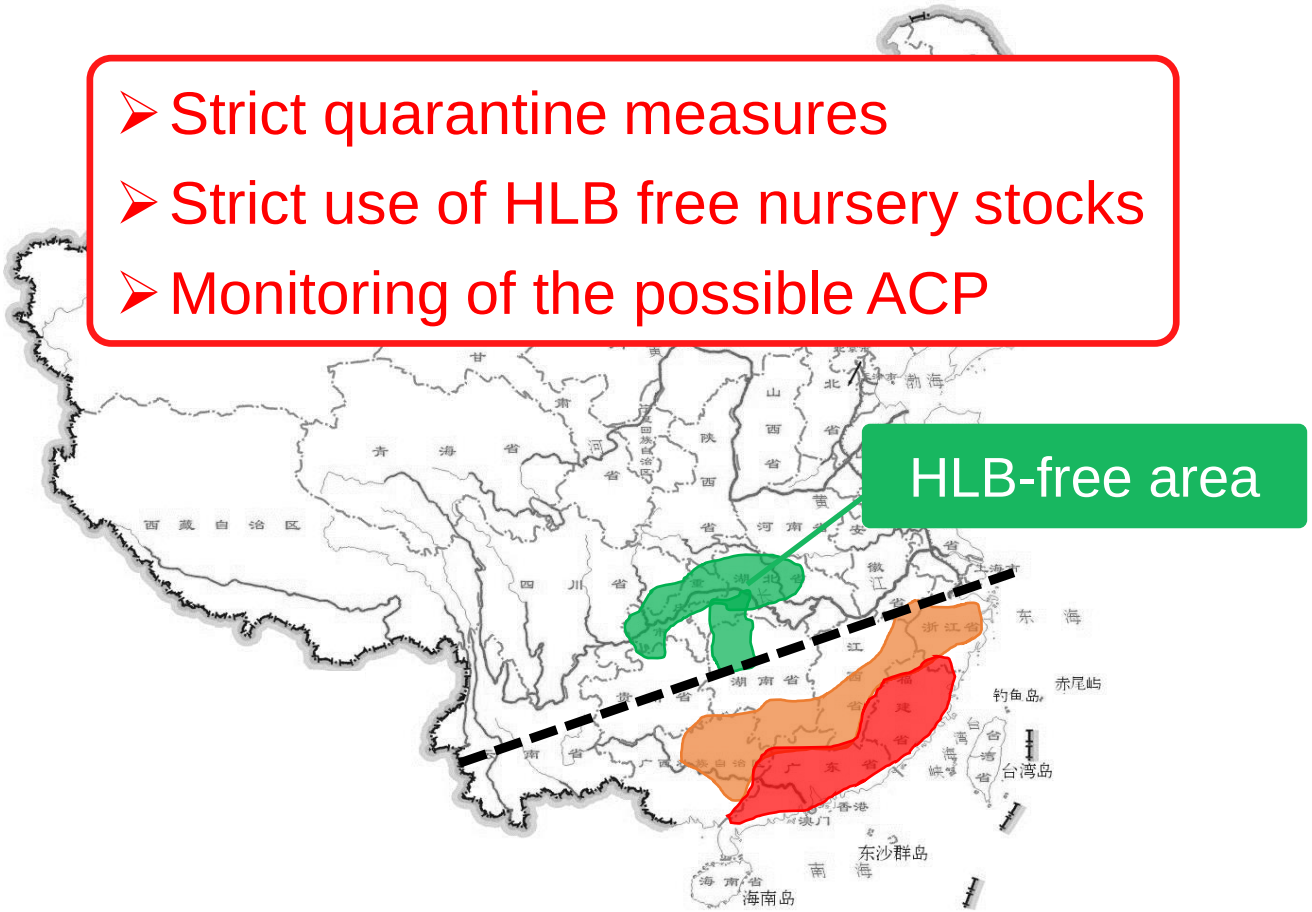
HLB-free area

- Strict quarantine measures
- Strict use of HLB free nursery stocks
- Monitoring of the possible ACP



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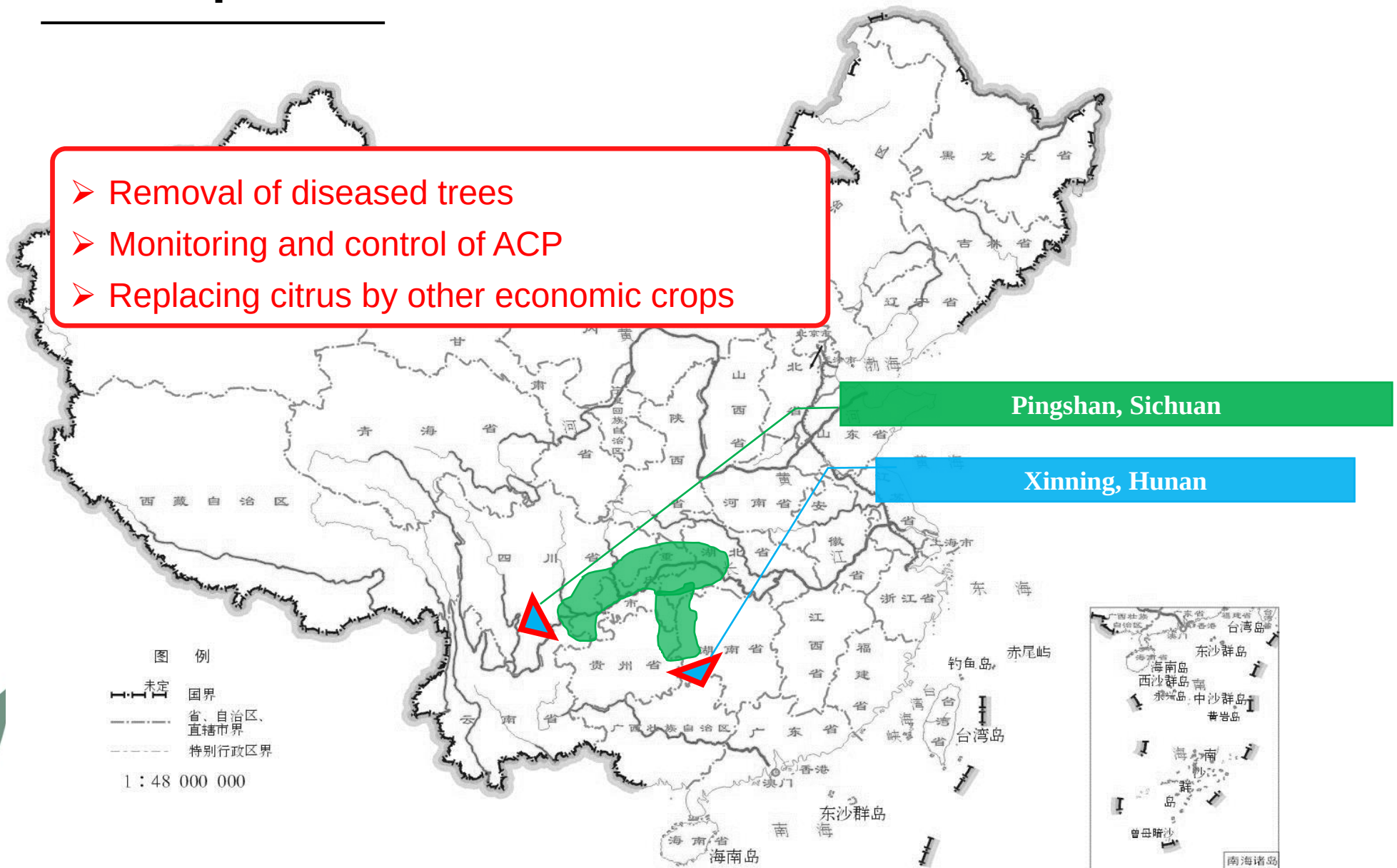
Interception zones

- Removal of diseased trees
- Monitoring and control of ACP
- Replacing citrus by other economic crops



Case 1- Outbreak in Ganzhou is under control

Ganzhou, Jiangxi province, produced 1.5 million tonnes of navel orange in 2013, when started an outbreak of HLB, with average incidence of ca 20% in 2014, and reduced to ca 2% in 2021 with 1.5 million tonnes yield back!

Key point 1: pre-planting of trees for 1-2 yrs in screenhouse before transplantation to groves

Key point 2: set up 'head of household system' for joint control of ACP/HLB

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Case 2- Legislate against HLB in Guangxi

Guangxi province produced over 10 million tonnes of citrus, fast development driven by poverty alleviation policy and good returns. Although still under control so far, there still exists potential risk.

Key point 1: organized via 'village rules and people's covenants'.

Key point 2: released a provincial Act for effective regulations on prevention and control of HLB since Nov. 2019.

Problems- what are the growers common response?

- Unwilling to remove the HLB-infected tree on time
- Willing to use so-called curable measures
- Waiting for resistant/tolerant cultivars/new tech

Problem driven basic and applied research

- CLas-ACP-Citrus interactions
- In-site detection of CLas and real-time monitoring of ACP
- Green and high efficiency control of ACP
- Screening of cures/creating resistant materials

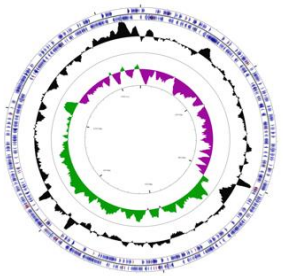
Interaction mechanism - looking for targets

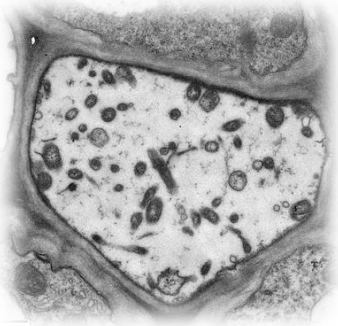
Xu *et al*., 2023, ***Horticultural Research***

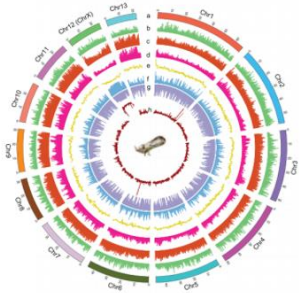
Li *et al*., 2023, ***Horticultural Research***

Zou *et al*., 2021, ***Plant Journal***

Peng *et al*., 2017, ***Plant Biotechnology Journal***







Shi *et al*., 2023, ***Autophagy***

Cheng *et al*., 2023, ***Plant Journal***

Shi *et al*., 2023, ***Journal of Experimental Botany***

Pan *et al*., 2023, ***Scientific Data***

Lei *et al*., 2023, ***Insect Science***

Jiang *et al*., 2023, ***Microbiology Spectrum***

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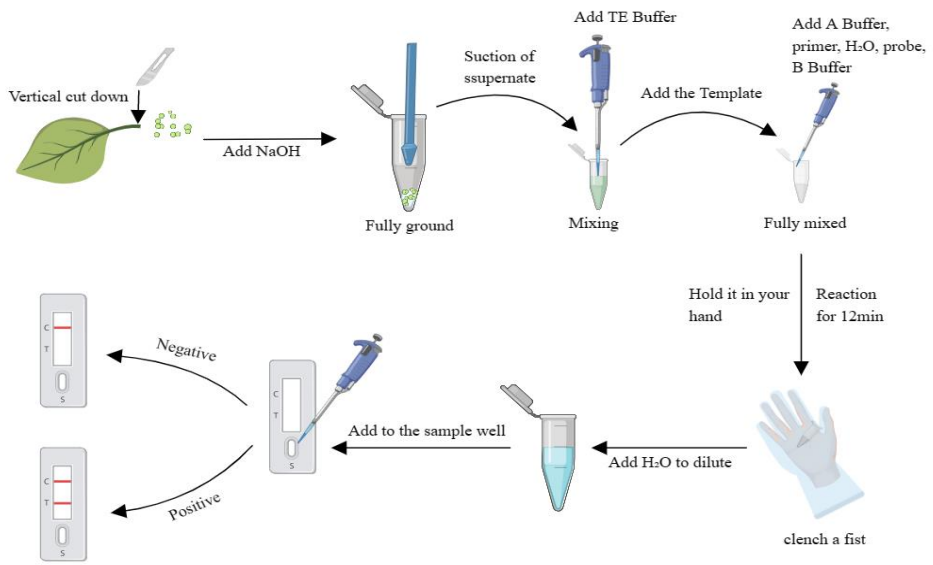
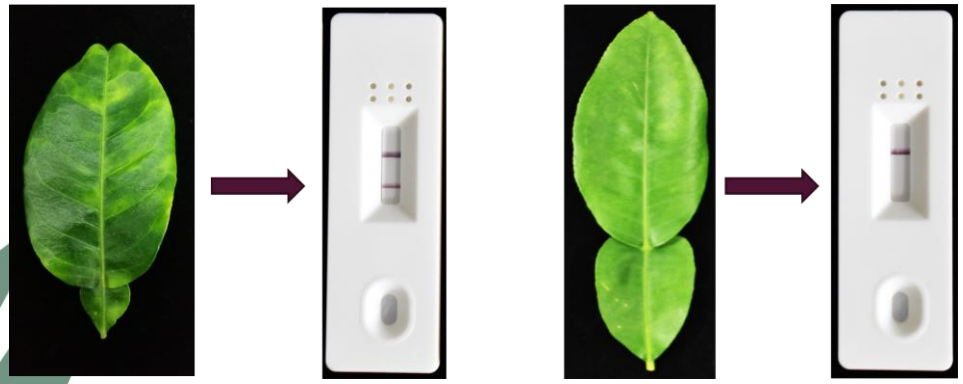
Quick detection and smart monitoring





MIRA-LFD-based in-site CLas detection

ACP real-time smart monitoring

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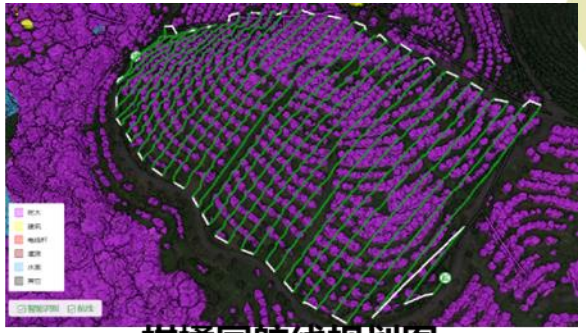
Practical and high efficiency control of ACP

Screen wall (4m)

大疆精灵4RTK



柑橘园航线规划图

极目EA-30X植保无人飞机

大疆T40植保无人飞机

Unmanned aerial vehicle for ACP control

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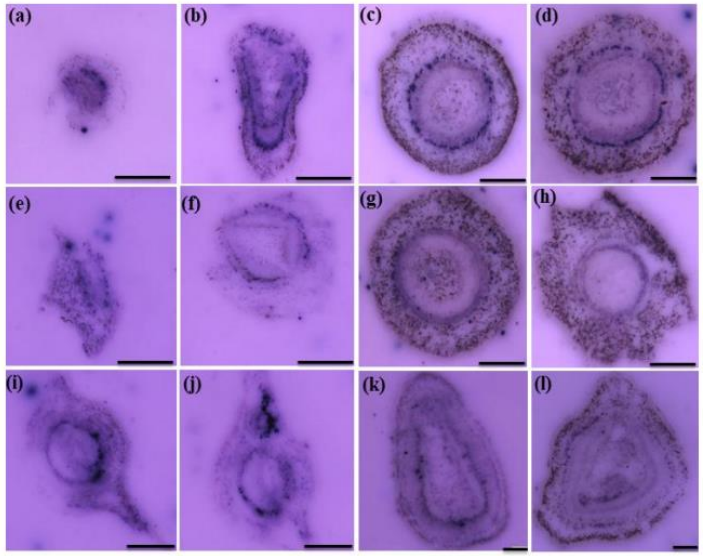
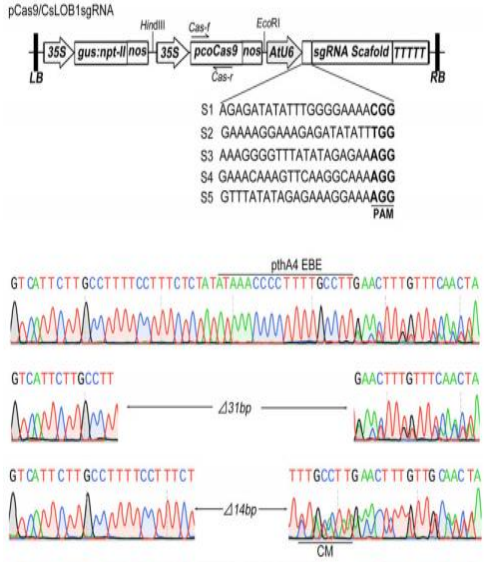
Screening of cures/creating resistant materials



Semi in vitro cultivation for the screening of sulfone compounds, nanomicelles ……



WT

mPP2B15-5

Genome editing based resistant germplasma

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Suggestions

- Antibiotics, uric acid, rutin, brassinosteroids, peptide(MaSAMP) etc. can or may somehow alleviate HLB symptoms, which should be cautiously used in practice.

- Put state-level cooperation in a priority, not only for research but also for PREVETION & CONTROL.

- Put prevention first, treasure the window period, don't be misled by ‘easily curing of HLB’ saying, at least not for now!

Acknowledges

- National Key Research and Development Program of China (2021YFD1400800)

- National Natural Sciences Foundation of China (U23A0196)

- Profs. Changyong Zhou, Binhai Lou and Zheng Zheng for contributing slides.









Thank you for your attention!