

Fundecitrus and Citrus Sustainability

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SCIENCE AND SUSTAINABILITY
IN CITRICULTURE

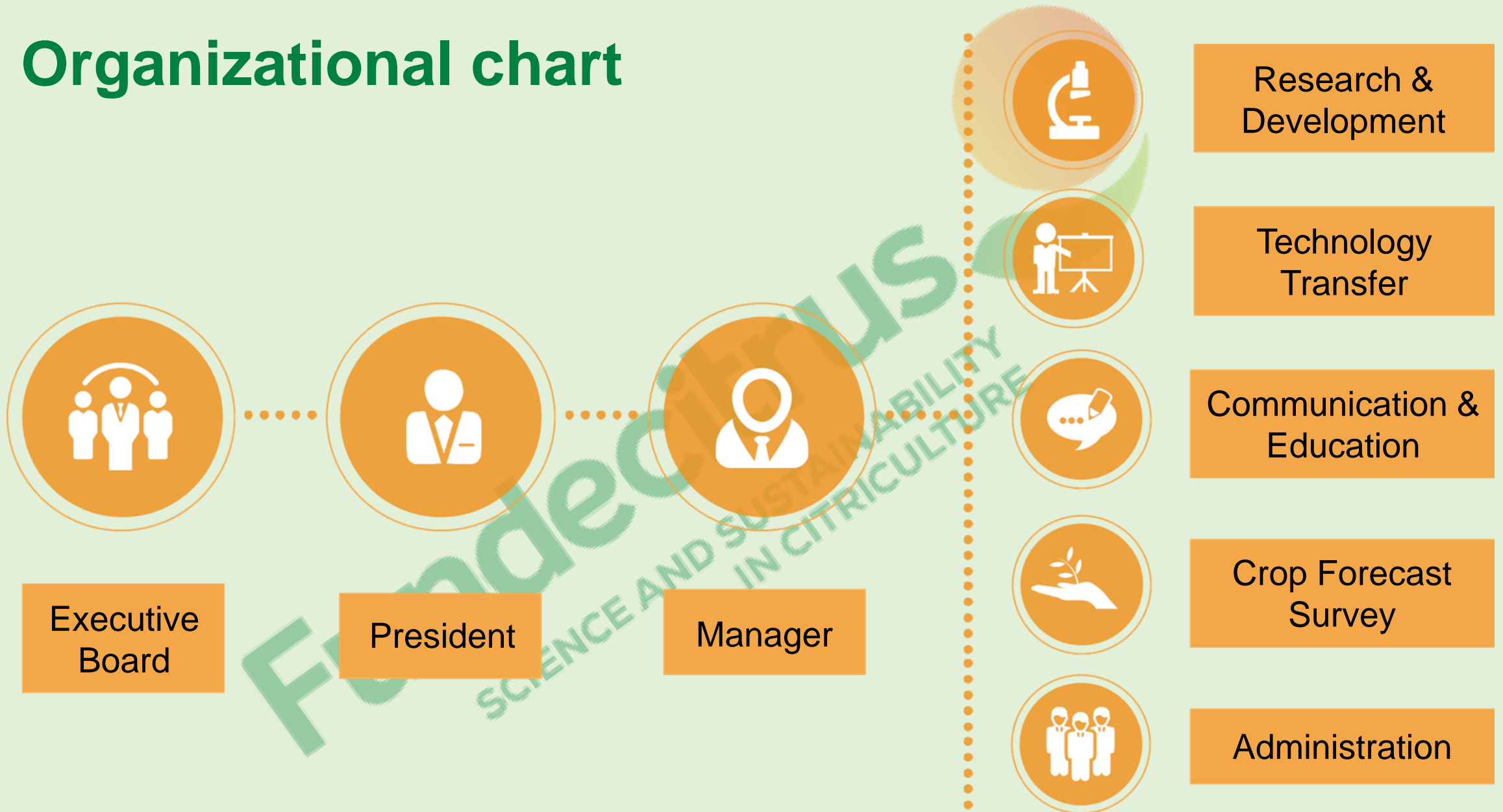
Supported by citrus growers and orange juice companies

Pursuing effective and sustainable solutions to challenges in citrus plant health



43 years in 2020
26 years of research
140 professionals
1,300 m² laboratories
70 experimental fields
80 research projects
40 partners worldwide

Organizational chart



Working areas



**RESEARCH AND
INNOVATION**



**CROP FORECAST
SURVEY**



**TRAINING OF
PROFESSIONALS**



**EXTENSION
ACTIVITIES**

Main sanitary risks in SP citrus belt

Huanglongbing – HLB/Greening



Postbloom fruit drop



Citrus black spot



Citrus canker



Citrus leprosis

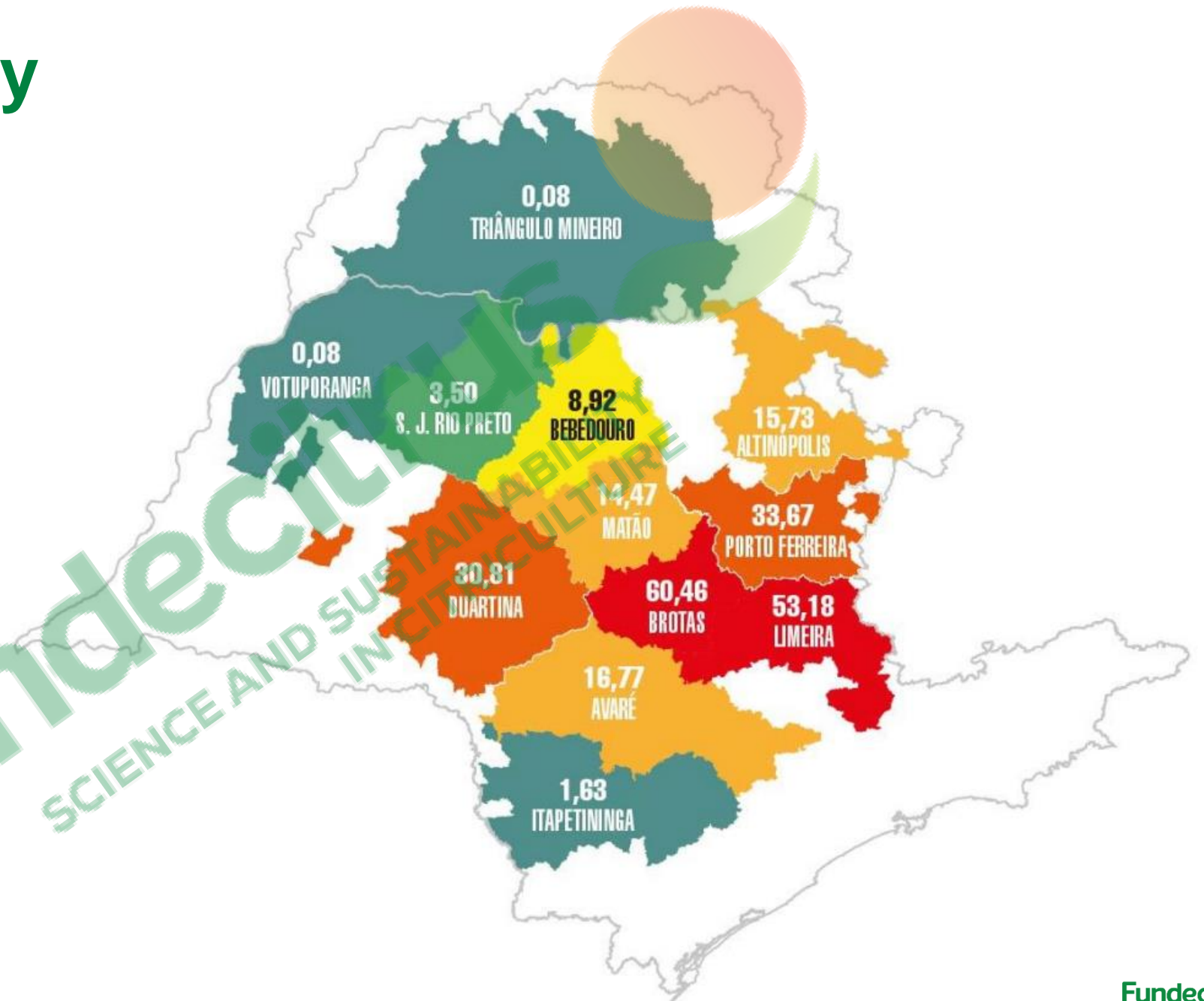


Fruit borer

Disease survey

HLB incidence
by regions of
SP citrus belt

Survey includes
Citrus canker
CVC



Research and development



Focus on sustainability

Applied and basic research

Diagnostic methods

Plant/Pathogen/Vector interaction

Insect bioecology

Epidemiology and damages

Integrated management (biological, cultural, genetic, and chemical control)

Spray technology

Biotechnology

Laboratory of research and diagnostic

Two main lines of work: services and research

Free diagnostic of HLB and CVC

Since 2004

more than 100,000 HLB tests
performed for citrus growers

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Laboratory of Biological control

Capacity for rearing 100,000
Tamarixia radiata wasps per month

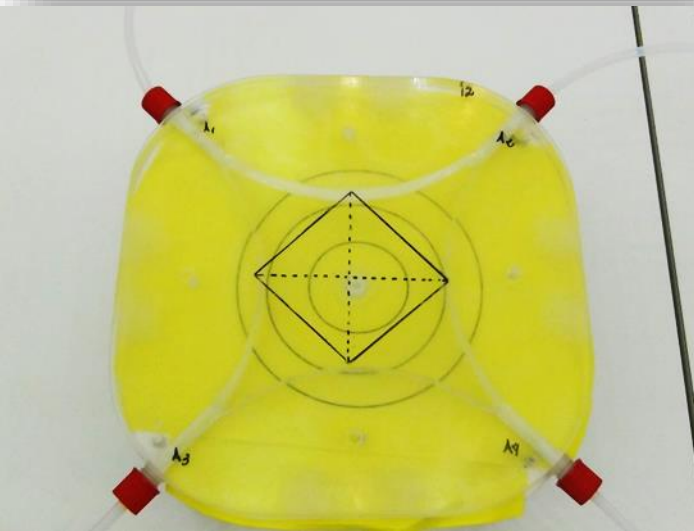


Wasps are released in the citrus
belt based on the information
from the Psyllid Alert System

Laboratory of chemical ecology and insect behavior



Studies of compounds used in insect communication (attractant and repellents)



Studies of insect behavior



Biotechnology laboratory

Development of
resistant or repellent
citrus plants



PES – Crop forecast survey

Information on
citrus production
that supports
decision making
by actors of citrus industry

PES – Crop forecast survey

Mapping citrus orchards



Every three crops

Orange tree inventory



In all crops

Orange crop forecast



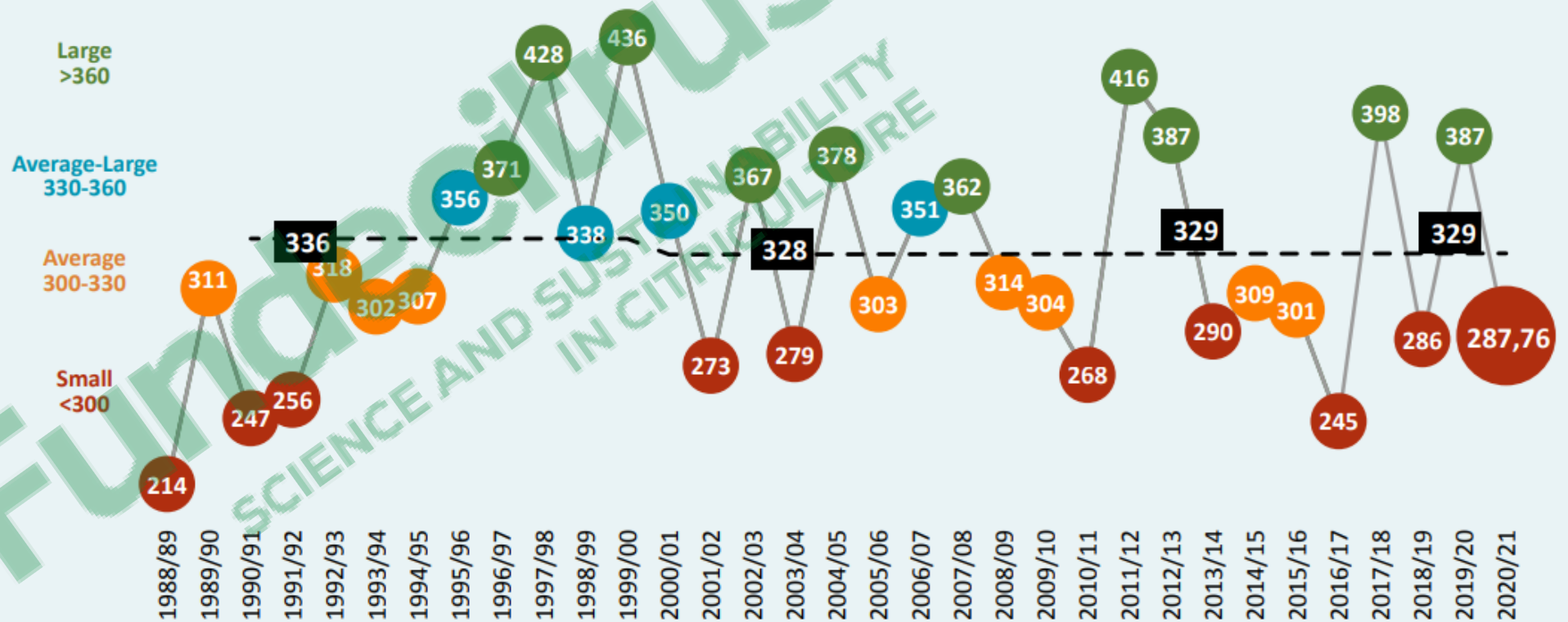
Orange crop forecast updating








Orange production and productivity in SP



ORANGE PRODUCTION AND 2020-2021 CROP FORECAST (IN MILLION BOXES)



Losses (fruit drop) caused by disease and pest

		2016/17 (13.73%)	2017/18 (17.31%)	2018/19 (16.70%)	2019/20 (17.63%)	Losses in millions of boxes (4 seasons)	Total 220 millions of boxes
	Fruit borer Fruit fly	2.34%	2.70%	5.70%	4.29%	49.39	
	HLB/Greening	1.37%	4.06%	2.70%	4.39%	44.24	
	Black spot	3.75%	2.16%	2.02%	2.12%	31.78	
	Leprosis	0.25%	0.62%	0.82%	1.30%	10.46	
	Citrus canker	0.03%	0.31%	0.30%	0.38%	3.64	
Natural/others		5.99%	7.45%	5.16%	5.15%	79.05	
Production (million boxes)		245.31	398.35	285.98	386.79		

MasterCitrus



**Professional
Master's Degree
in Citrus Disease
and Pest Control**

**10
professors**

**Score 4
from
Ministry of
Education**

**2-year
duration**

**Since 2009,
more than
70 masters
have been
graduated**

Extension activities

Courses, lectures and trainings

Inspection and management of pests and diseases

Psyllid identification on yellow sticky traps

Sprayer adjustment and calibration

Sustainable HLB management meetings

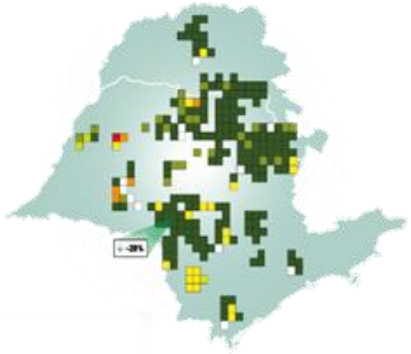
Since 2014,
More than 26,000
professionals
have been trained



Professionals are in
the field to support
growers with visits,
consulting and training



Technologies for citrus sustainability in SP



**Psyllid
alert**

2013



SPIF
Fundecitrus integrated
spray system

2016



PFD system
Decision support system
for postbloom fruit drop

2016



SICEG
System for external
control of HLB

2018



**System for
Phytosanitary
management**

2019

Communication

Website, Facebook, WhatsApp, Twitter

E-mail and newsletter

“Citricultor” magazine

Technical materials, manuals and books

Scientific articles

Videos

Press office

Events



Communication



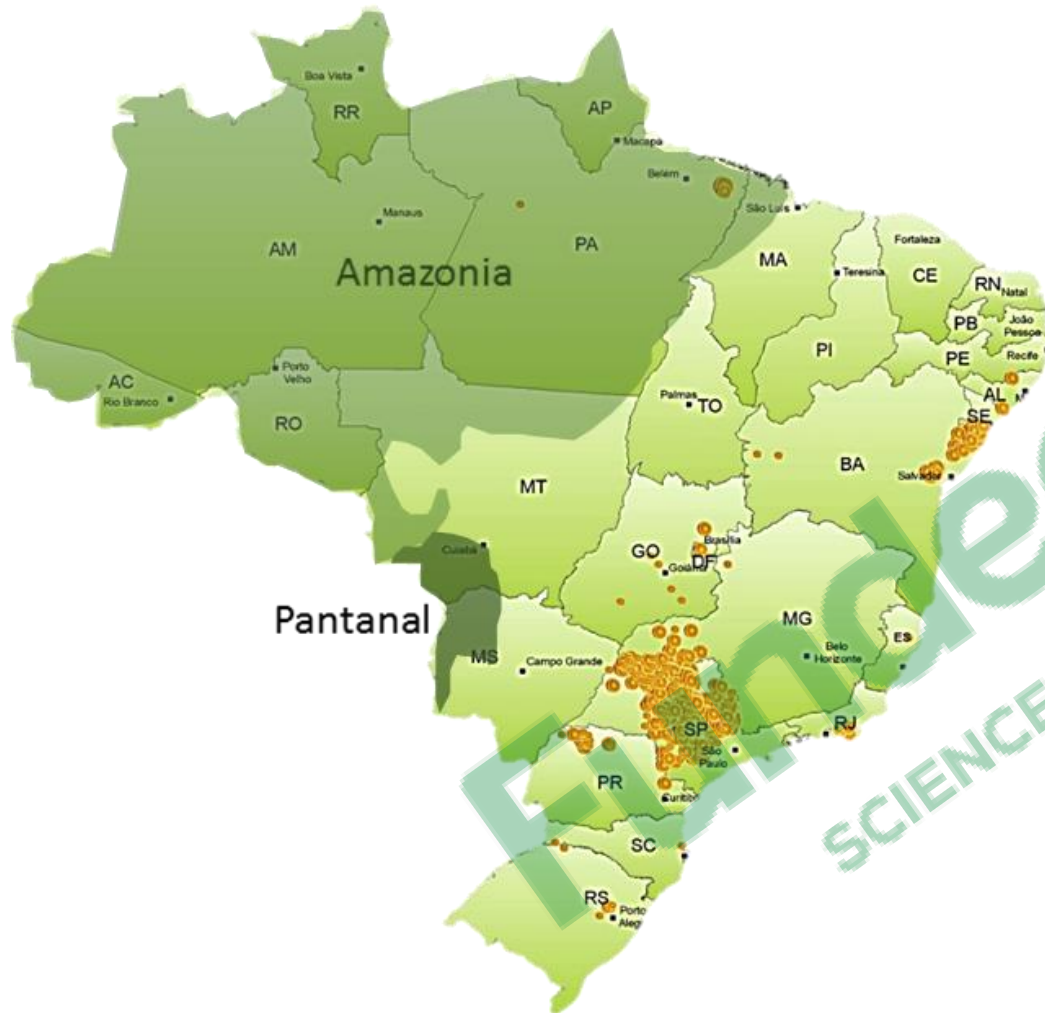
Competitive and Sustainable Citriculture

Brazil: the largest orange producer in the world

37% of global orange production

64% of global orange juice production

79% of the international trade in orange juice



Orange juice in Brazilian agribusiness

Position in the ranking of agribusiness exports

7^o of Brazil

3^o of SP

Export of orange juice

70%



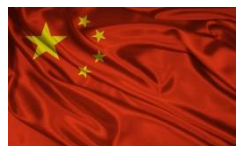
16%



5%



4%



Citrus belt of SP and MG states

70-80% of Brazilian production

250 - 400 million boxes

630 - 1000 boxes per ha

~ 400,000 ha of orange

~ 10,000 farms

~ 200,000 jobs

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89%

8%

3%

The modern SP citriculture

SP citrus belt	1980-1990	2010-2020	
Orange production	8.73 million of tons	15.78 million of tons	+ 80%
Orange area (adult orchards)	635 thousand hectares	376 thousand hectares	- 41%
Planting density	322 trees per hectare	643 trees per hectare	
Yield	13.75 tons per hectare	42.64 tons per hectare	+ 210%

Competitive and Sustainable Citriculture



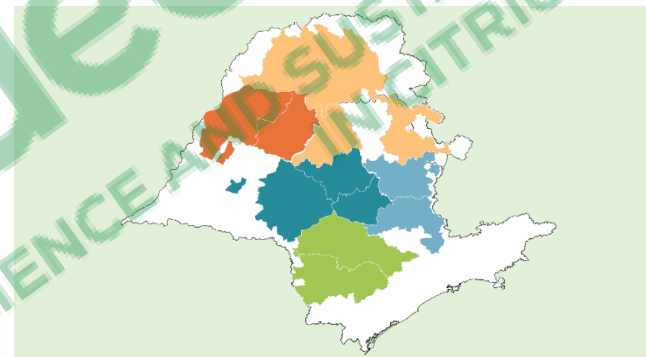
Protected nurseries



Nutrition and irrigation



**Planting density, rootstock
and orange variety**



Citrus growing region



**Pest and disease
management**

Sustainability Committee



ProteCitrus

Produtos para Proteção
da Citricultura

Products for citrus protection

Voluntary citrus protection program
Analyses of pesticide trends and regulations in international markets
Website: fundecitrus.com.br/protecitrus

São Paulo Citrus Belt

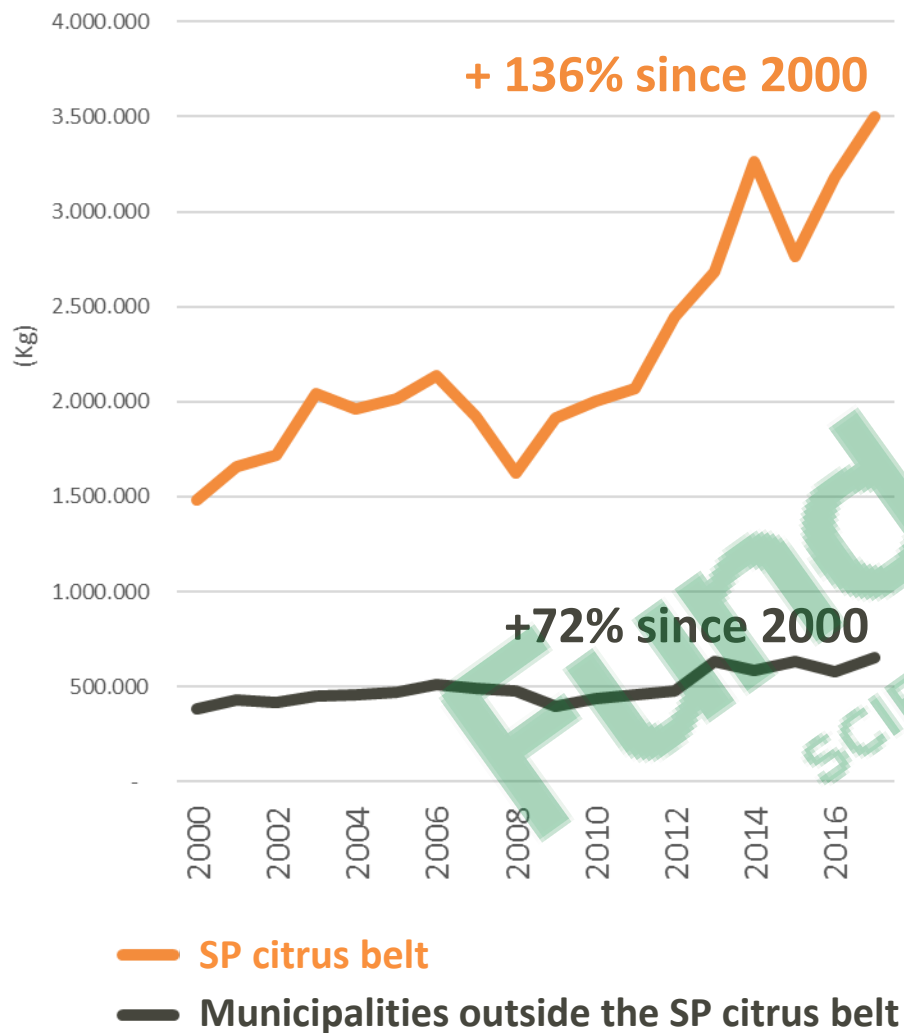
Citrus

459.058
hectares

Native forest

181.750
hectares

Honey production in SP



84%
of honey from SP
is produced inside
the SP citrus belt



Citrus sustainability in SP



Biological
control



Alternative
control



Pheromone and
insect repellence



Integrated disease
management



Spray
technology



Extension activities
Cooperation partnerships



Coexistence
Citriculture and apiculture



Worker safety
and proper use of PPE



ProteCitrus

Citrus sustainability in SP

TOWARDS AN EVER MORE SUSTAINABLE CITRICULTURE

Fundecitrus's concern about reducing the impact of citriculture and contributing to environmental preservation is present in several projects and research studies with many results already obtained:



Reduction of 70% in water and chemicals to control psyllids in the last ten years



Biological control of greening (huanglongbing/HLB) with the use of *Tamarixia radiata* as a complementary management measure



Reduction of up to 80% of copper application and amount used yearly to control citrus canker



External actions for greening management have already donated more than 60 thousand nursery plants to be planted in the citrus belt



Up to 75% less spraying with the use of the prediction system for blossom blight



Sustainability and disease/pest management

Reduced use
of pesticides

New molecules

Spray technology

Lower use of water and
non-renewable resources

Integrated management



Loss and damage reduction

Productivity increase

Cost reduction

Increase in
demand for fruit

Maintenance of growers and
jobs in the citrus industry

Access to information and
technology

Cooperation partnerships

External actions against HLB

Community awareness and replacement of citrus plants

More than 1.5 million ha covered

920 thousand citrus trees and jasmine replaced

> 93% efficacy

66,000 fruit trees and ornamental plants donated



Strategies in progress and challenges



Thank you!

www.fundecitrus.com.br



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