



Policies enabling biocontrol in Brazil



19-20 October 2021

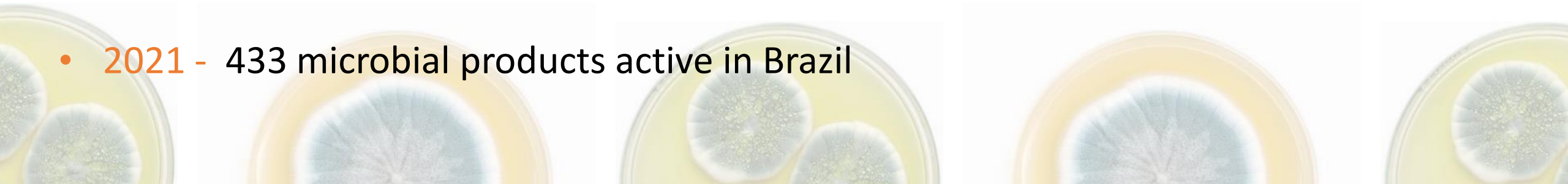
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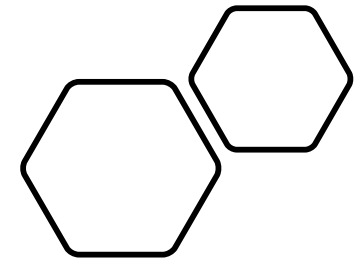


Brief history of the biological control in Brazil



- **1970s** - Massive use of *M. anisopliae* against sugarcane spittlebugs and Baculovirus against soybean caterpillar started: government support was fundamental for initial research, Unsophisticated, using labor-intensive mass-production techniques, suitable for countries with relatively cheap labor
- **1980s** - A considerable number of small Brazilian companies disappeared: there was distrust of mycoinsecticides by farmers due to low quality of most products, poor dosage recommendations, unreliable field performance
- **1997 a 1999** - Registration of 9 Bt-based products
- **2021** - 433 microbial products active in Brazil





Regulatory framework

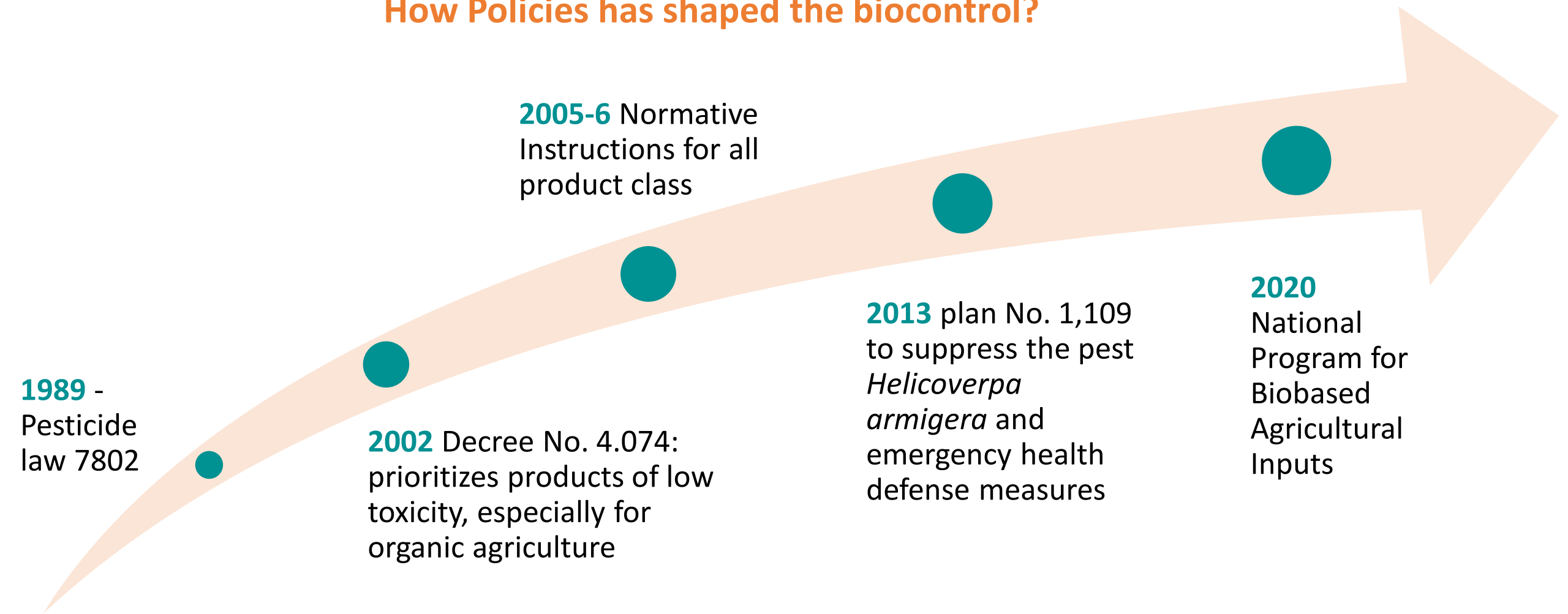




Main changes of the regulatory framework in Brazil

Photo: The New York Times

How Policies has shaped the biocontrol?





Registration in Brazil

- The first step is applying for temporary special registration (RET) providing general information on taxonomy and preliminary non-target safety.
 - The issuance of the RET enables companies to perform field trials required to obtain definitive registration
- Three government agencies control registration of biopesticides: the National Health Surveillance Agency (ANVISA) (toxicological risk), the Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA) (environmental risk), and the Ministry of Agriculture, Livestock and Supply (MAPA) (Agronomic efficacy).
 - requires the submission of toxicological data and field-trial results

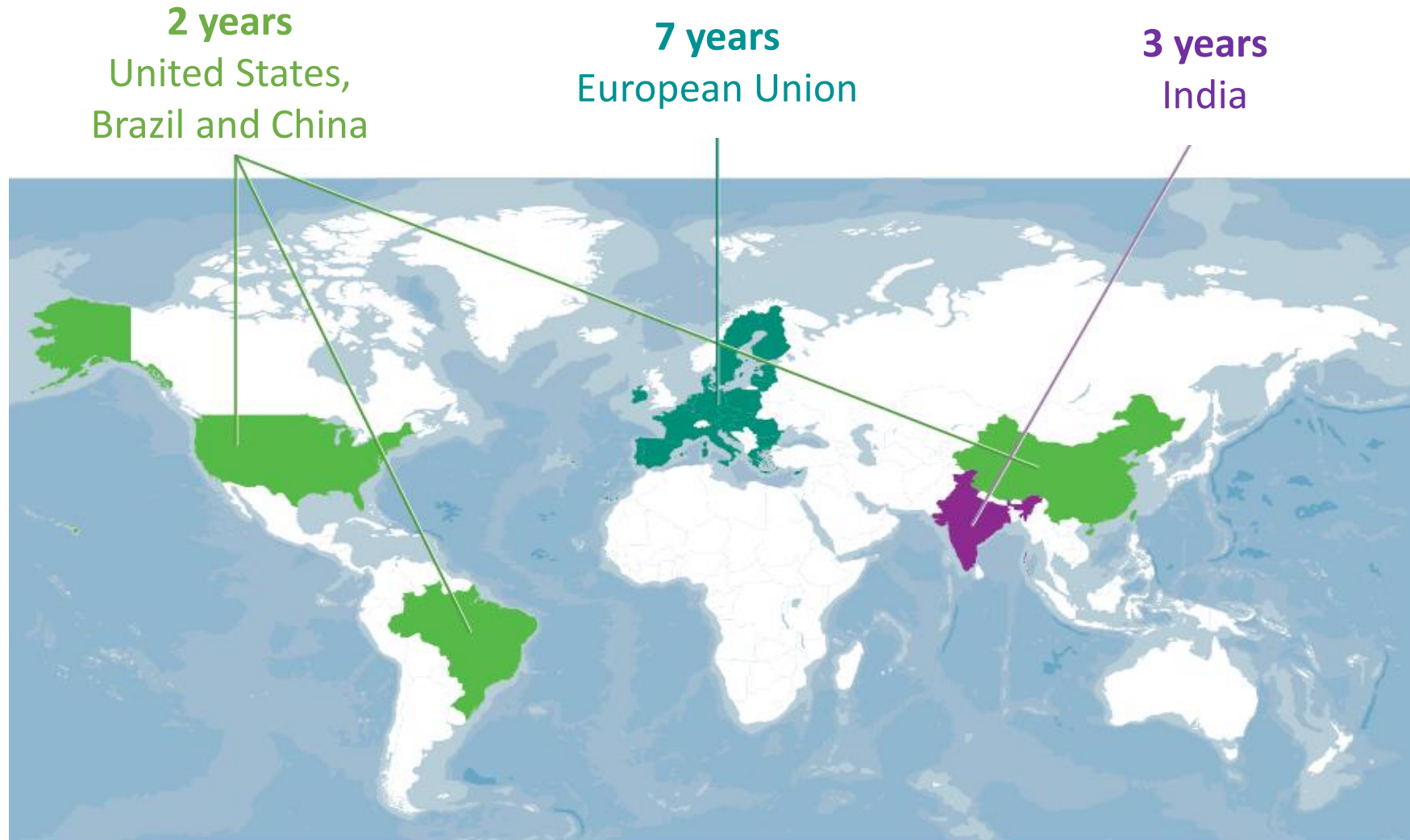


The background of the slide features several petri dishes containing microbial cultures. In the top left, there are two dishes: one with several small, circular, white colonies on a yellow agar, and another with a single, larger, circular, white colony. In the top right, there is a teal-colored banner with white text. In the bottom right, there are two more dishes: one with several small, circular, white colonies on a yellow agar, and another with a single, larger, circular, white colony. The overall theme is microbiology and biopesticides.

Registration in Brazil: New policies

- The increased number of applications for registration of biopesticides is forcing regulatory authorities to adapt procedures and legislation to meet the unique requirements of products
- The federal government published on Oct 8, 2021, Decree No. 10,833, which changes the rules on production, research, registration, use, import, and export of pesticides. The main objectives are to reformulate analyzing records and facilitate research on pesticides to enable technological innovations
- It also provides permission to use different brands for the same registration number, which will reduce the number of requests for the registration of products with the exact specifications by the same applicant
- The new rules facilitate research and experimentation activities with active ingredients already registered

Time for registration of biological products



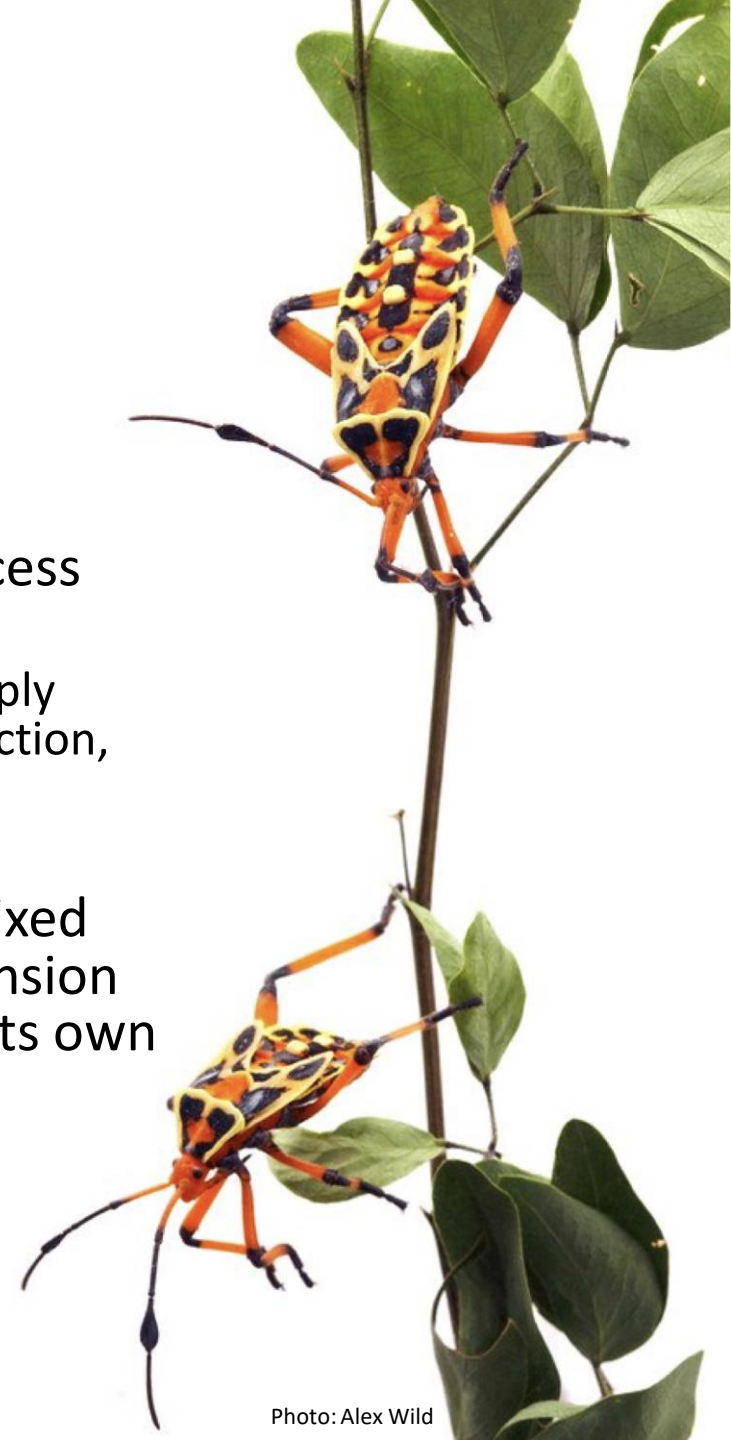
New Policies

National Program for Biobased Agricultural Inputs

- The objective of this program is to structure the development and regularization of products of biological origin, and expand the offer, access and encourage the adoption and correct use of these products.
 - The program is coordinated by the Ministry of Agriculture, Livestock, and Supply (MAPA). The program results from the 2012 National Policy on Organic Production, which brought more significant commitment from regulatory bodies with the registration process for products of biological origin.

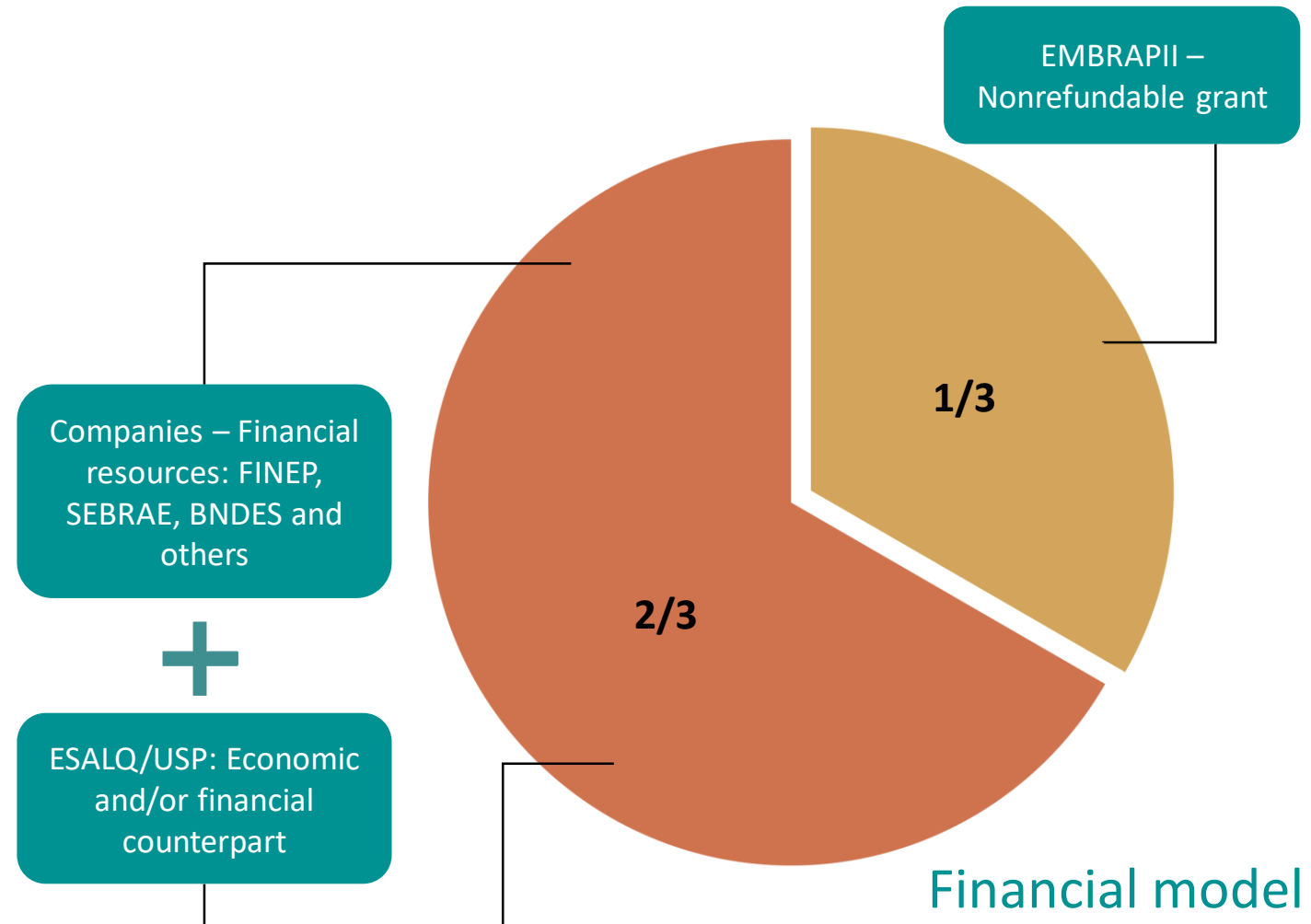
National Program for Strengthening Family Farming (PRONAF) - Prefixed interest rate of up to 3%/y for operations, including construction or expansion of bio-input and bio-fertilizer production units on the rural property, for its own use.

National Plan for Low Carbon Emission in Agriculture (ABC) = take Biological Nitrogen Fixation to over 5.5 million hectares



Brazilian Company of Industrial Research and Innovation (EMBRAPII) on Biocontrol and biotechnological processes on sustainable management of agricultural pests

- Public-Private partnership to accelerate the innovation in the companies
- The company negotiates and contracts the project directly with the EMBRAPII unit
- The resources are already available at EMBRAPII unit
- At any moment the company can carry out projects without waiting for a call for proposals



São Paulo Advanced Research Center in Biological control

Prof. Dr. Italo Delalibera Jr.

Principal Investigator - Microbiologicals

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SPARC BIO
São Paulo Advanced Research Center for Biological Control

Partnership



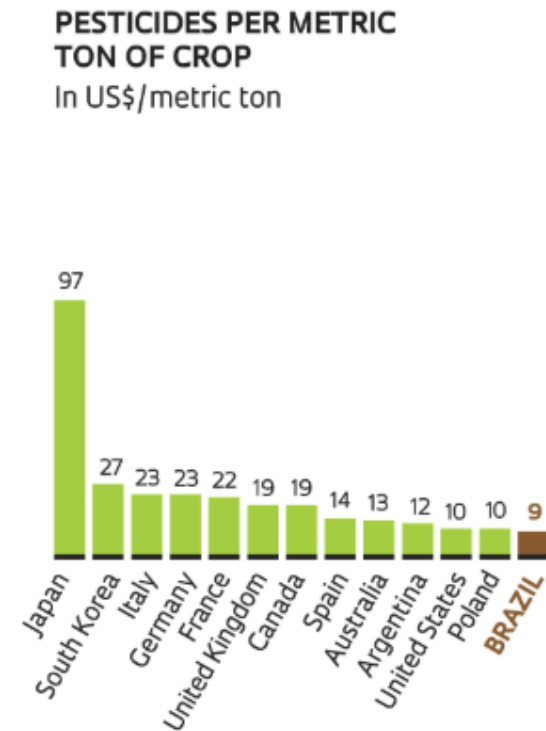
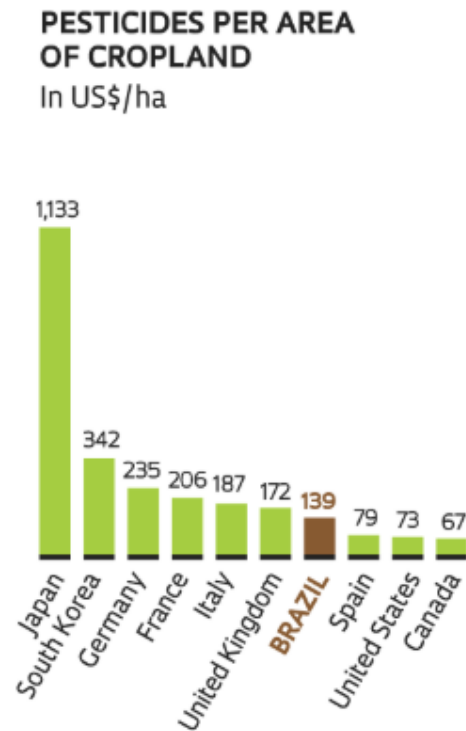
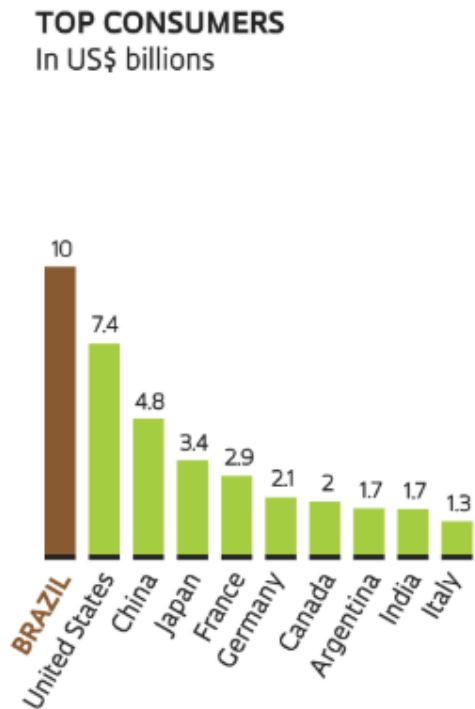


Market growth and drivers

Pesticide Market in Brazil



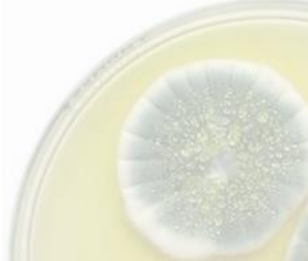
The pesticide Market in 2020 was US\$ 12 billion > 823,000 tons of pesticides – 1st in the world
>50% of pesticides are imported (SINDAG)

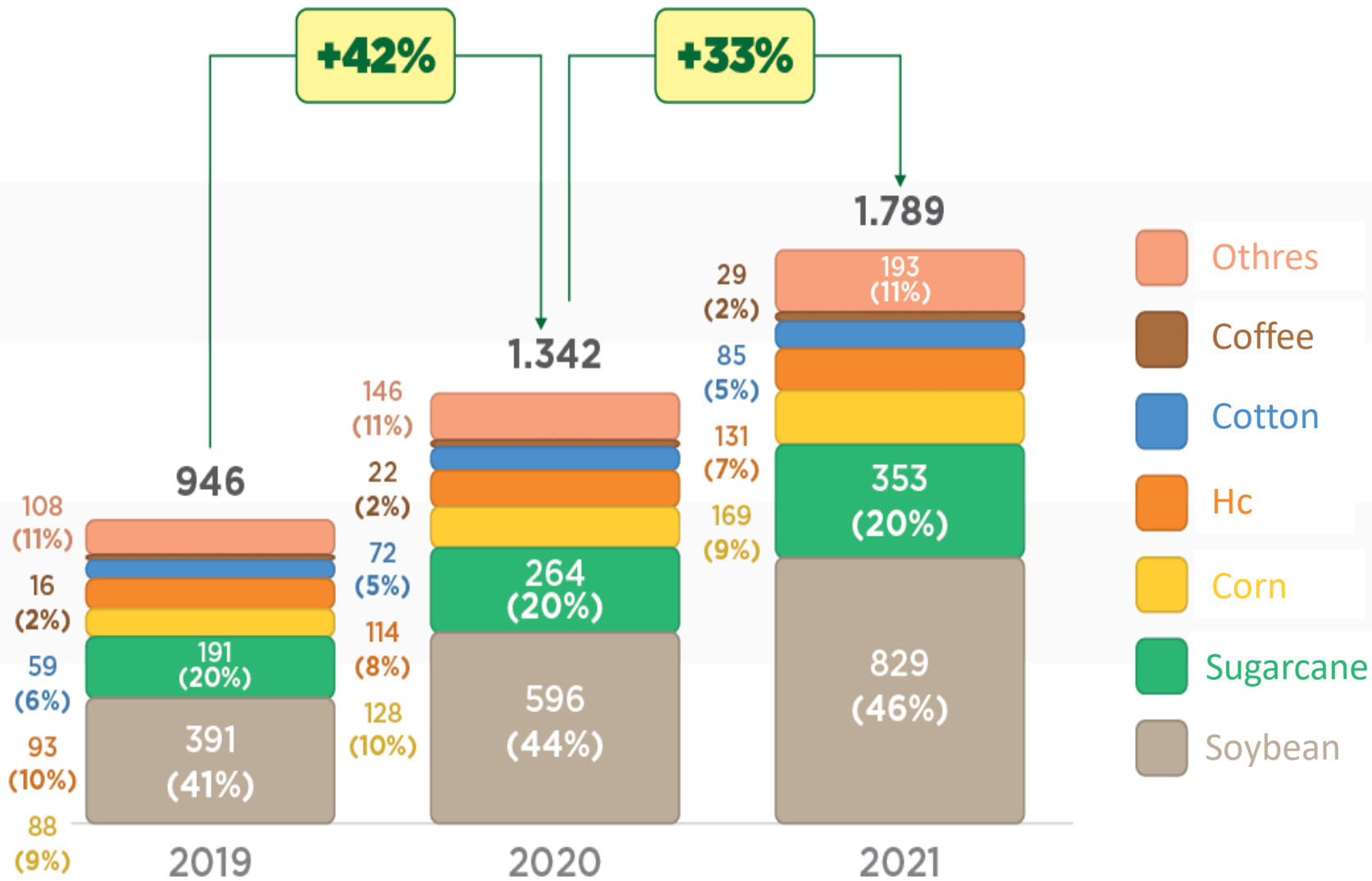


Biocontrol Market in Brazil



- ❖ Between 2015 and 2019, more than 40 new companies registered their 1st product. There are currently > 80 companies with registrations.
 - ❖ Global biocontrol companies strengthens position in Brazilian crop protection market
- ❖ LatAm is by far projected to have the highest CAGR from 2020-2025. This is mainly to the expected entrance of biocontrol into row crops and cereals in Brazil (Duham Trimmer 2019)
- ❖ Currently, soybean, sugarcane, fruit and vegetable, coffee, and cotton hold 86% of the biological market in Brazil.
- ❖ Biological products are used in about 10 million hectares (ABCBio 2019)/ 23 million ha (MAPA 2021) in Brazil. The total planted area in the country is 77.4 million ha





Biopesticide Market
by crop (million R\$)



Registered
biologicals in Brazil
by year

2013– 107
2021 - 433

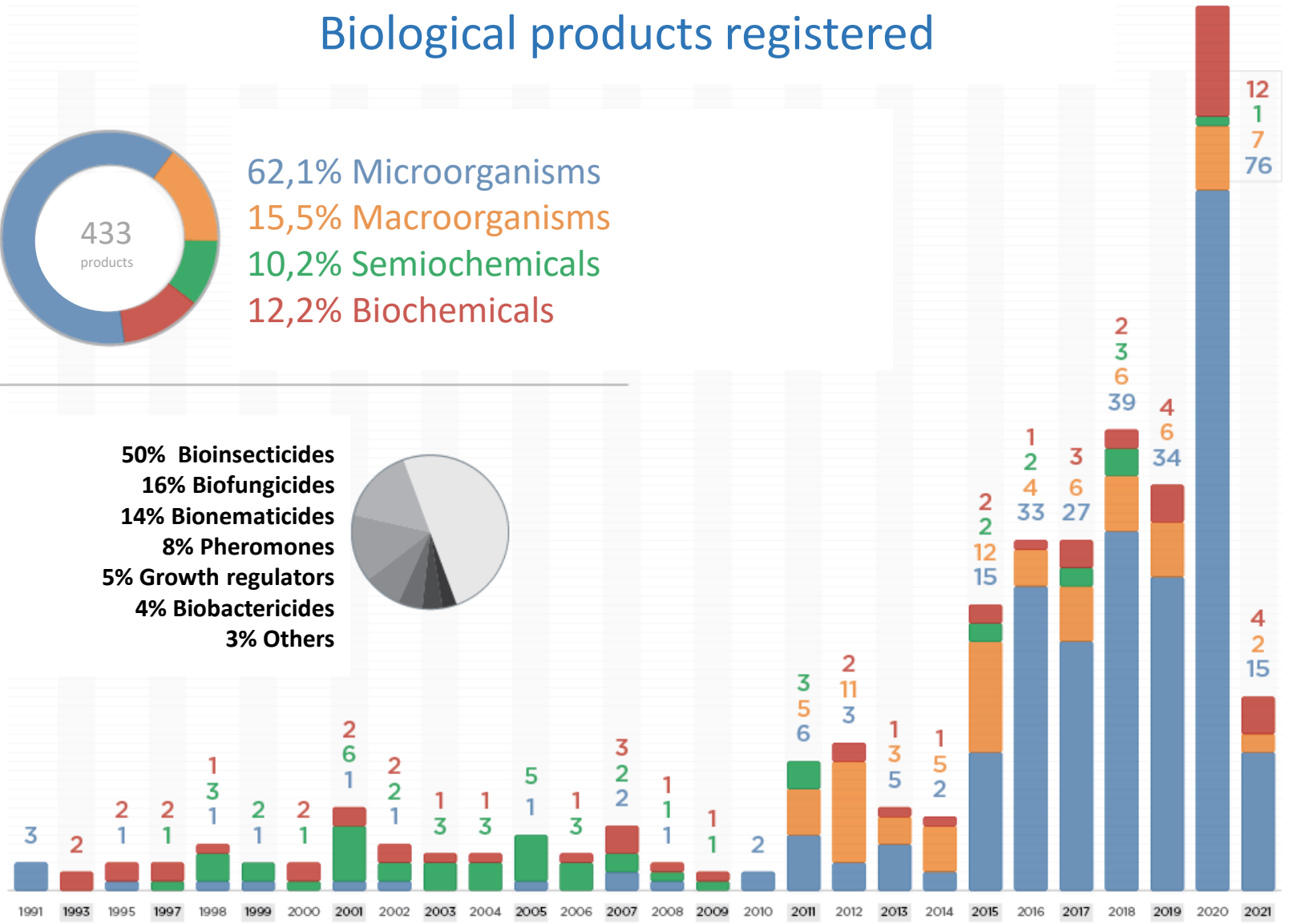
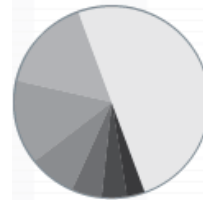


Biological products registered



62,1% Microorganisms
15,5% Macroorganisms
10,2% Semiochemicals
12,2% Biochemicals

50% Bioinsecticides
16% Biofungicides
14% Bionematicides
8% Pheromones
5% Growth regulators
4% Biobactericides
3% Others



Registered biological products: Segment growth in Brazil (million R\$)

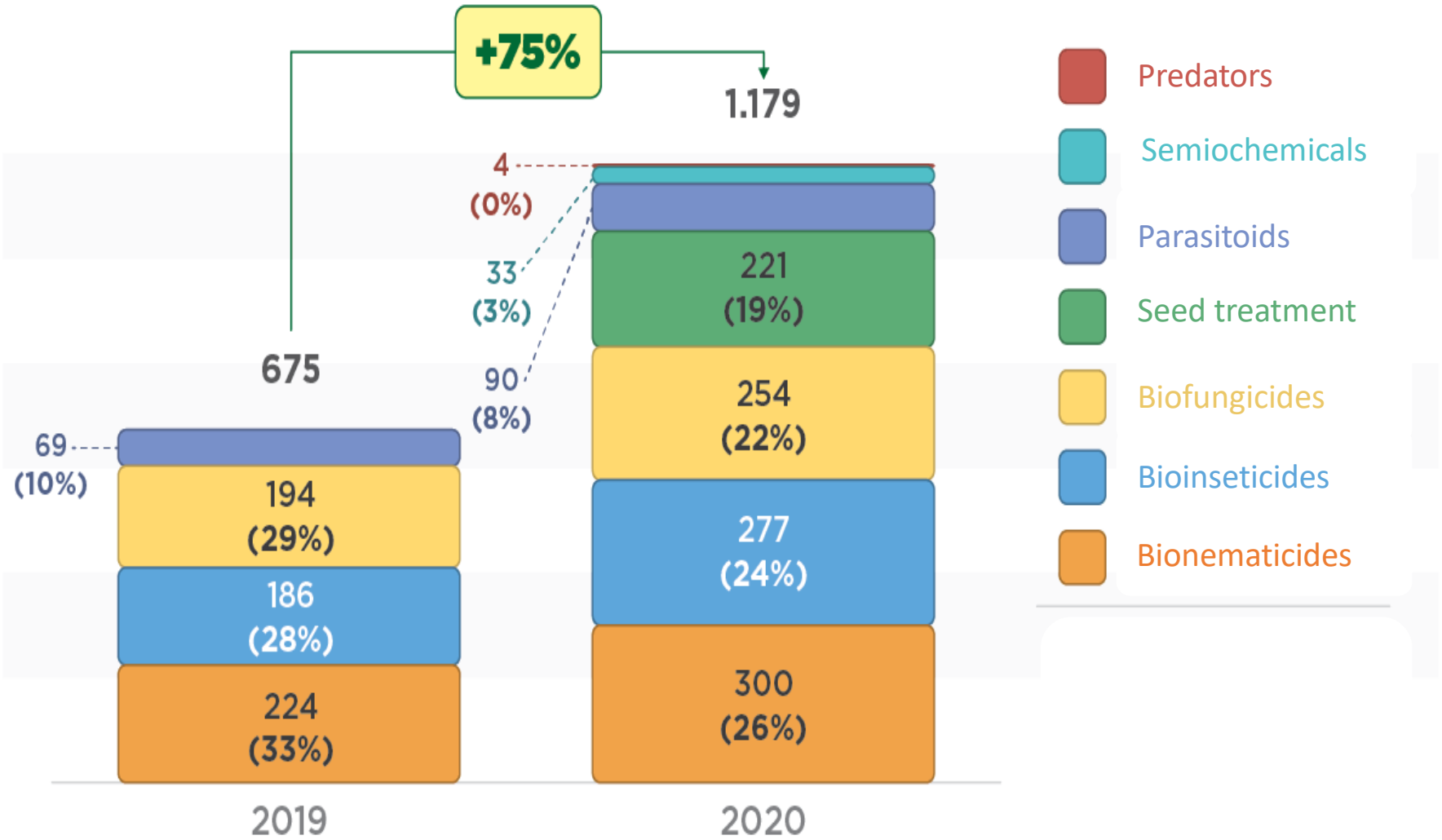






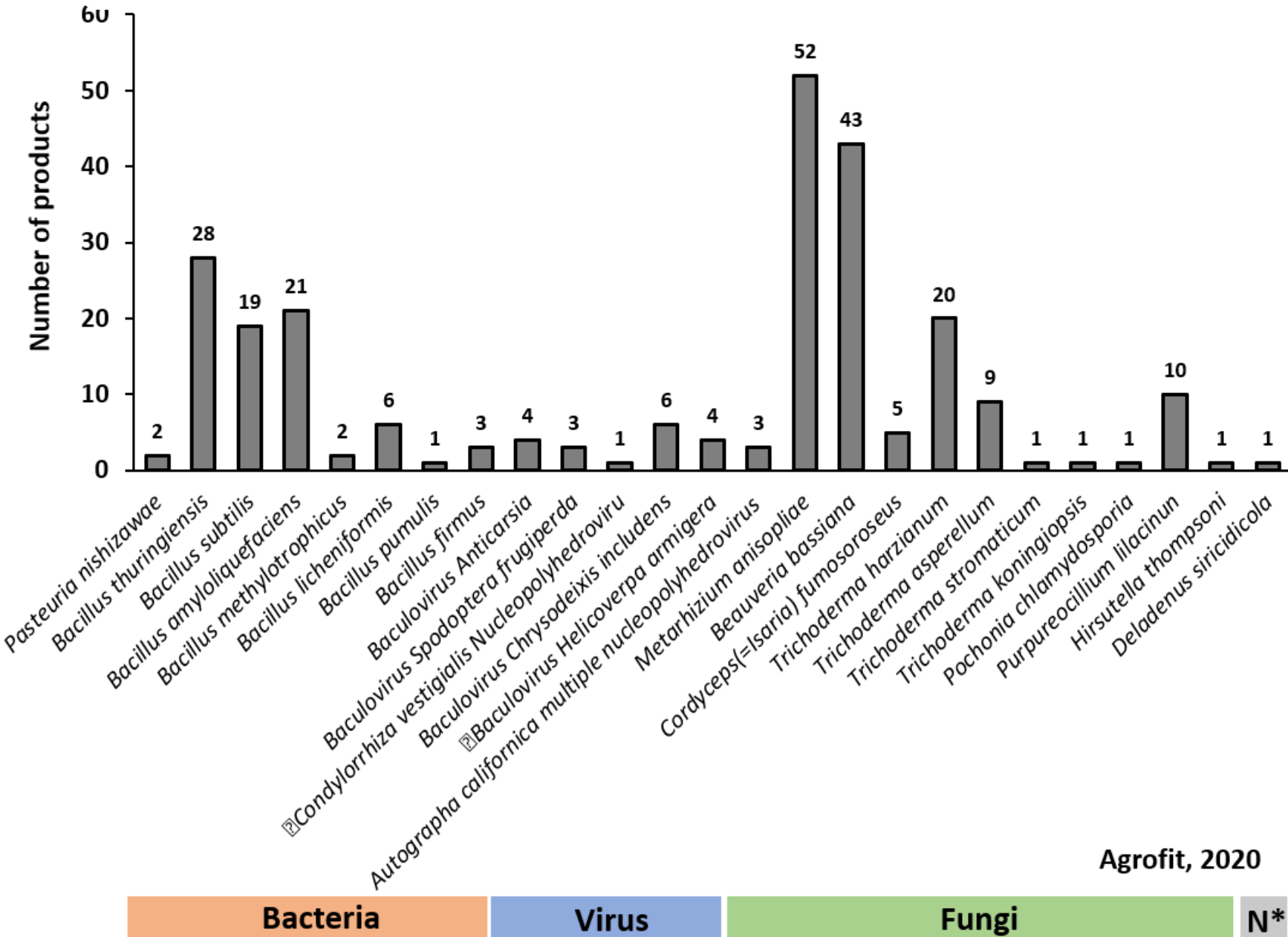


Photo: iStock

Increased adoption of biologicals by fruit growers in Brazil

	Crop	2019	2021	Increase
	Orange	16%	35%	19%
	Banana	31%	50%	19%
	Apple	23%	32%	9%
	Grape	21%	29%	8%
	Papaya	50%	57%	7%
	Watermelon	20%	26%	6%

Comercial Microbial Pesticides Registered by species



- 19 species registered against 86 targets in a universe of 1137 targets (8%).

Source: MAPA/ABCBio (2018)

- >250 Natural enemies available in the world (van Lenteren 2012)

- 5 Predatory mites

- 7 Parasitoids and predators

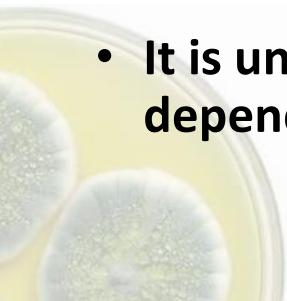
Agrofit, 2020



Biocontrol Market in Brazil: on farm



- **On-farm production on the 2019/20 harvest represented around 22% of the total market and the area treated was 3.1 million hectares (IHS Markit). 2/3 allocated to microbiological products, especially bacteria**
- **It has been greatly encouraged by companies that offer kits with biological assets and substrates for fermentation, in addition to equipment for installing biofactories on the properties**
- **The main reasons for producers who adopt on-farm production are the search for cost reduction and the perception that multiplication by fermentation is easy and risk-free**
- **There is strong pressure for the regulation of on-farm production, which should only serve those producers with the capacity to establish well-equipped biofactories, with infrastructure and qualified personnel to meet control and quality standards**
- **It is unlikely to meet the demand for biological control and on-farm producers will remain dependent on the industry for new, more effective products and higher technology**



Challenges of biological control in Brazil



Challenges of biological control in Brazil

- Scheduled chemical application culture: many do not even know the degree of infestation in the crop
- Few agronomic consultancies are familiar with biologicals.
- Little knowledge of producers about how, when, and how much to use

Recent changes of biologicals in Brazil

- Product portfolio expansion: bionematicides, biofungicides, inoculants, plant growth promoters, phosphorus solubilizers.
 - Increase the availability of biological products for a greater number of pests and diseases
- The same product with diversified action mechanisms, which include plant defense system inducers, disease and pest antagonists, antibiosis, mycoparasitism and competition
 - Market trend: products with a mixture of microorganisms and multiple functions.
- Some strains increase plant resistance to abiotic stresses such as water deficit, salinity, and temperature.

Final considerations

Biological control was once considered inefficient. This perception has completely changed in recent decades. After all, companies started to invest in formulation and application technology, longer shelf life, and a diversified portfolio of options, thus obtaining increasingly effective control products

Effective control and the aspects related to the greater safety of using biological products were the factors indicated by the majority of the producers as key elements for decision-making

High level of satisfaction: 98% of the farmers who used biological products in the 2017/18 crop year said that they would use the same products again

Source: Market Research 2018 ABCBio/Agribusiness intelligence



Photo: Alex Wild

Is the market for biologicals expected to be larger than that for chemicals in the future?