
birdview
DroneBioControl

NEXT GENERATION
PEST CONTROL

BIOLOGICAL CONTROL

CONTROLLING PESTS
WITHOUT CHEMICALS,
PROTECTING NATURE



BENEFITS



SOCIAL



UN SDG

Technology meets 8 of the UN's Sustainable Development Goals

COSTS



↓ **300** R\$/ha
215 R\$/ha

Cost reduction and value addition in produced food

CLIMATE



↓ **2.8**
tCO₂-eq/ha

SOURCE: UN IPCC, FAO

Lower carbon footprint from biological production to application

WATER



↓ **150**
Litres/ha

Less water usage in chemical dilution

CHEMICALS



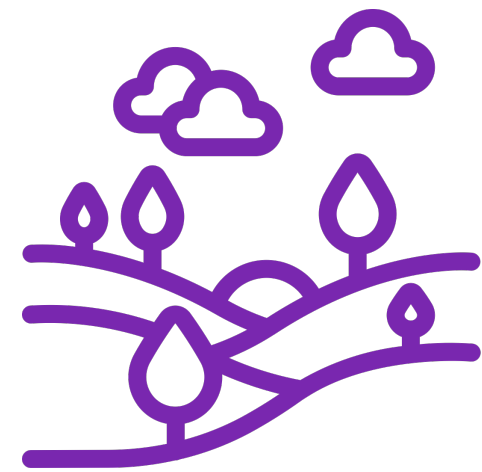
↓ **0.5**
kg/ha

Lower chemical use – avoids toxicity and molecule resistance

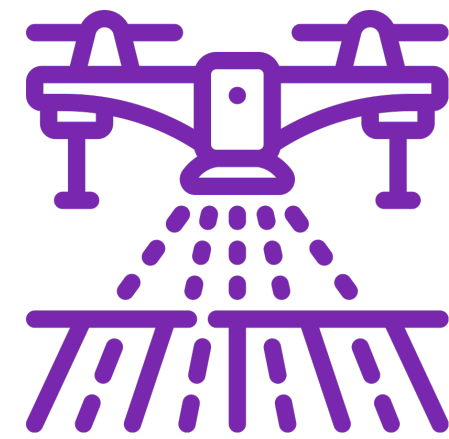
COMPANY



Pioneer in unmanned aerial application of **beneficial insects** for **biological pest control**, began activities in 2015, in the city of São Manuel, São Paulo.



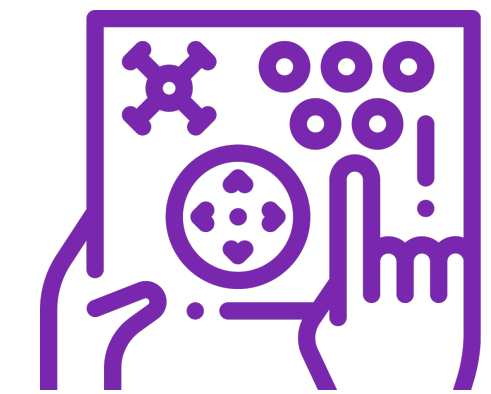
> **1 M** acres
applied



60.829 km
flown



1.696 hours
flown



11.738
flights

PROPRIETARY TECHNOLOGIES



Solid powder / insect egg dispenser



PCT/BR2020/050238

Adult insect / formulation dispenser



PCT/BR2020/050237
BR1020190147539

'Refill' cartridge for beneficial insects



PCT/BR2021/050211
BR1020210086122

DIFFERENTIALS



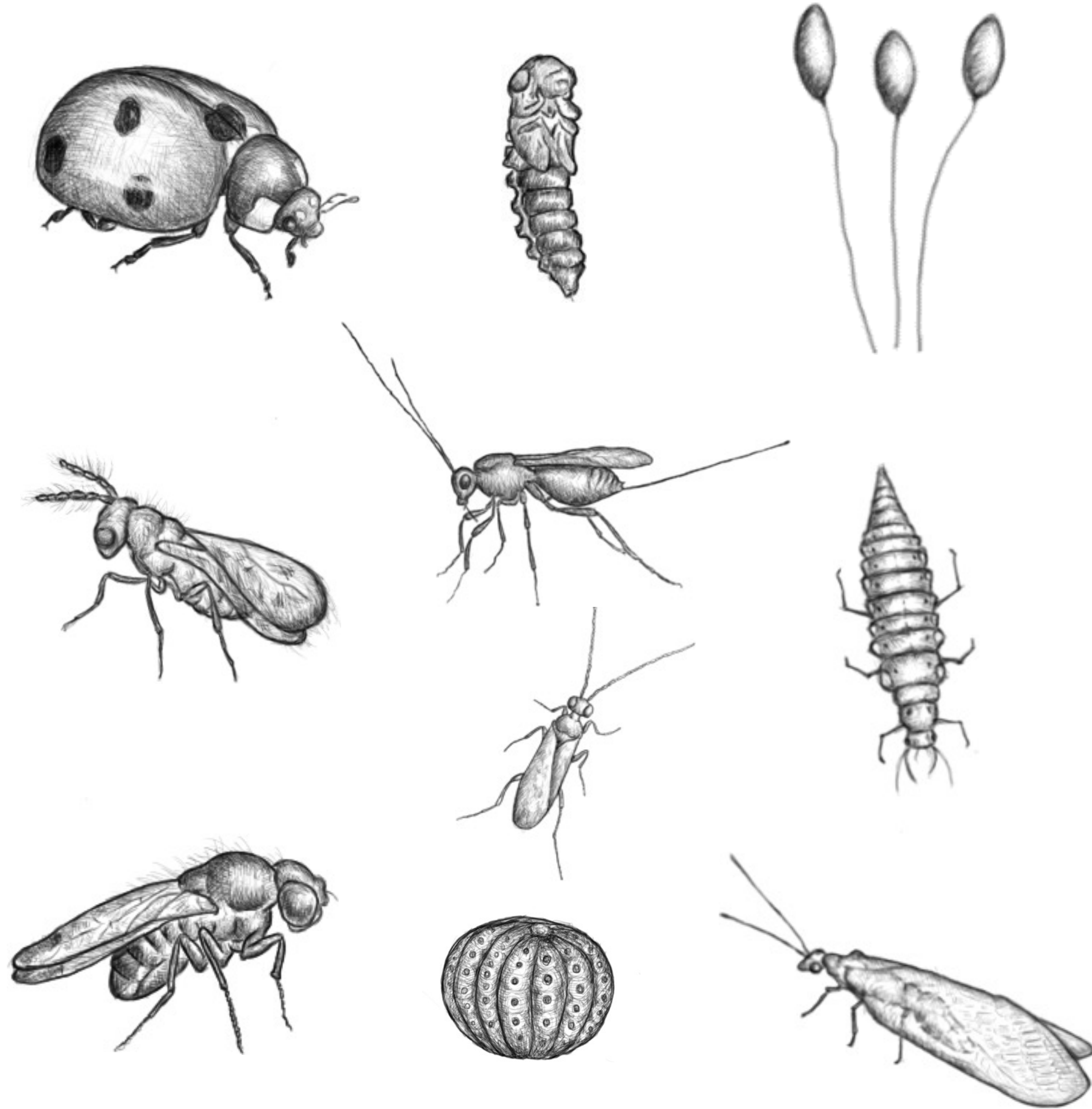
Implement

- Light weight
- Low CAPEX / OPEX
- Easy to use, transport
- Robust, reliable, eco-friendly
- Quick to scale

Cassette

- Low induced stress
- High survivability
- High competitiveness
- Works for many insects
- Higher shelf-life





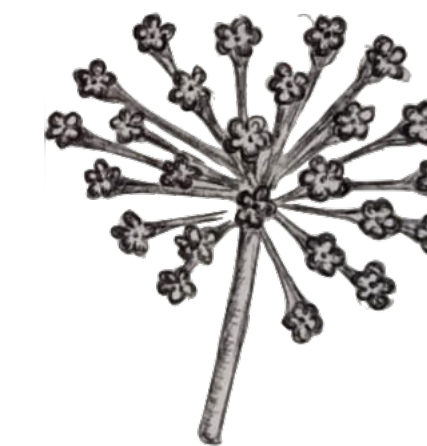
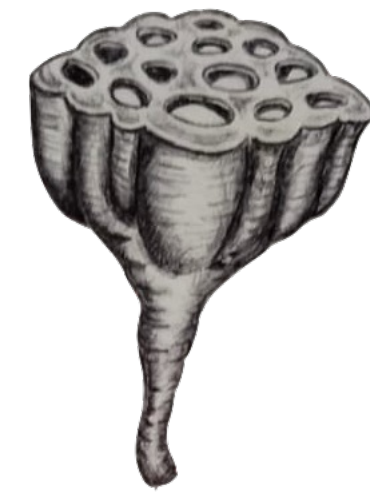
AGRICULTURAL PESTS



FARMING IN
HARMONY WITH
BIODIVERSITY

DEGRADED LAND RECOVERY

SCALABLE ASSISTED NATURAL REGENERATION

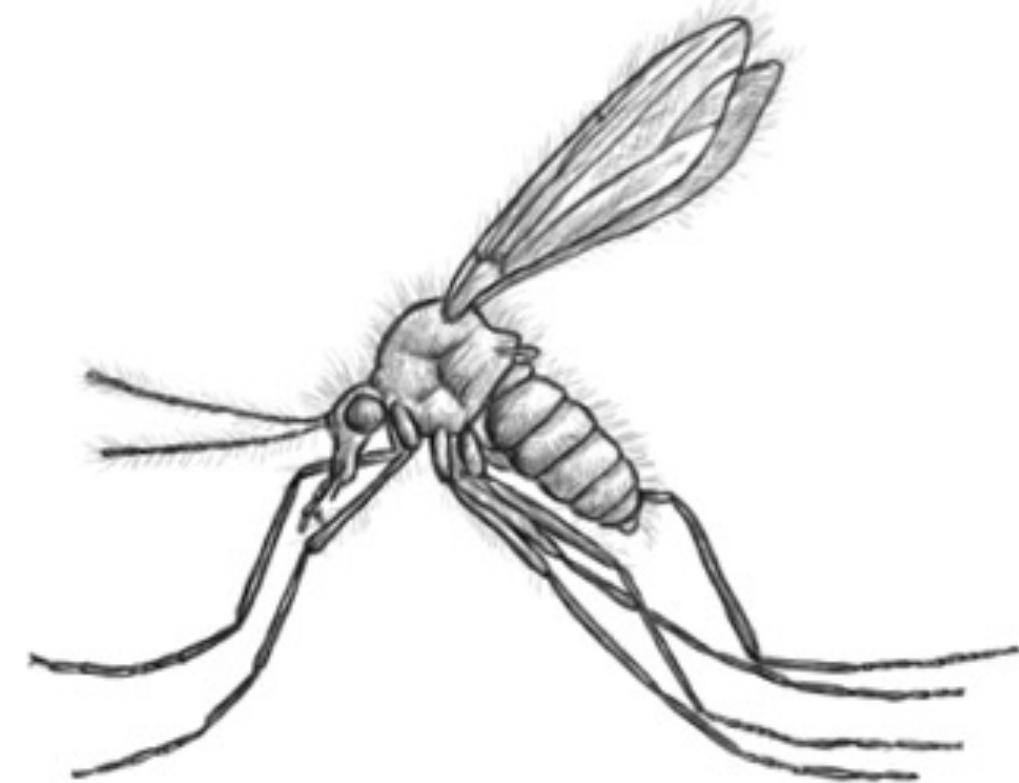
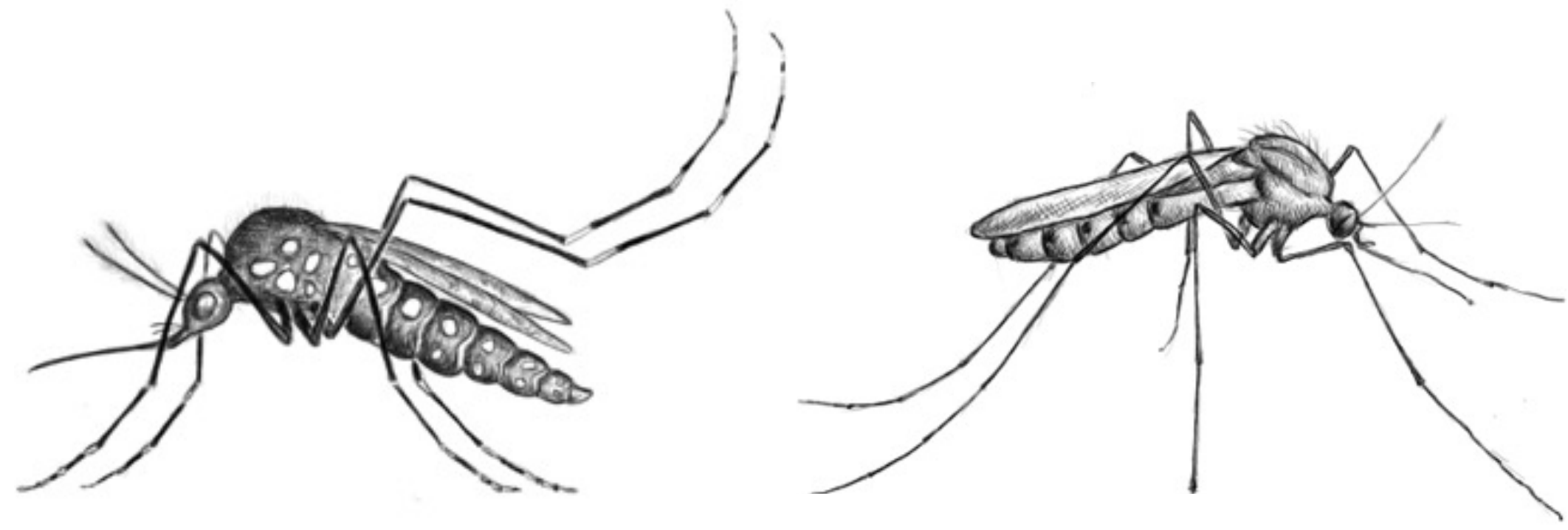




URBAN PESTS

—

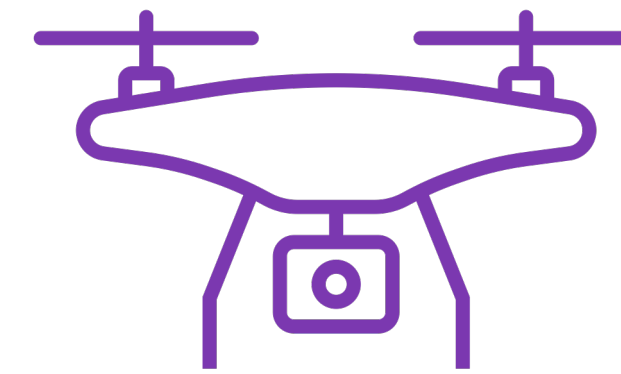
ERRADICATION OF DISEASE TRANSMITTING MOSQUITOES



CONVERGENCE – WHY NOW?



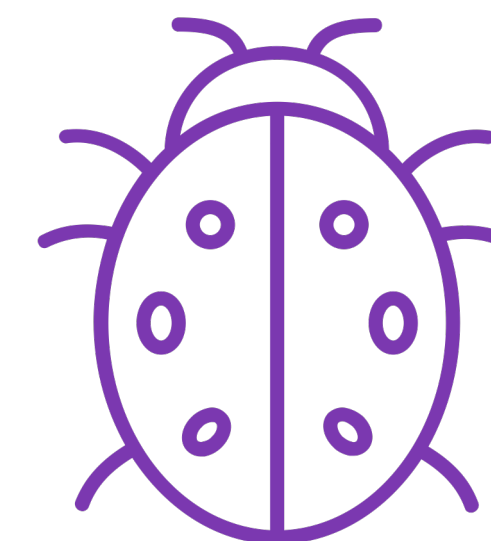
- Health conscious
- Climate conscious
- Food quality



- Drone technology
- Release technology
- Packaging technology



- Water consumption
- Toxicity & Degradation
- Molecule resistance



- Insectaries
- Predators & Parasitoids
- Sterile Insect Technique

FOUNDERS



**RICARDO
MACHADO**

CEO, ricardo@birdview.com.br

Brought up on a farm, studied Environmental Engineering at the University of Edinburgh. Invested his early career in environmental conservation in onshore and offshore drilling platforms.

Passionate about biodiversity, founded www.plantyourtree.com just out of university to provide a sustainable means to create biodiversity corridors, attempting to replicate a similar project in the family's agricultural property in Brazil.

Currently helps manage the family's agricultural activities, focused on reducing chemical insecticide usage and helping restore biodiversity, especially within arable lands.

Leads BirdView's efforts at the intersection of entomology and agricultural productivity, constantly seeking to improve the farmer's bottom line and quality of life.



**NICHOLAS
MATIAS**

CTO, nicholas@birdview.com.br

A roboticist through and through, studied 3D Model Making and Design at the University of Bournemouth.

His early career was developing animatronics for TV and film, having worked in several studios including the BBC London. Was responsible for the automation (software and hardware) of the Christmas decorations at Avenida Paulista (São Paulo) for several years running.

Works magic with 3D printing and additive manufacturing, co-founded BirdView and develops and builds scalable implements to release beneficial insects with minimum impact on their wellbeing, maximizing their efficacy- while never losing sight of costs!

PARTNERS - CLIENTS



Instrumentação



São Manoel



nosso melhor é para o mundo

birdview.com.br

Nota 1) Acordo de Cooperação Técnico-Financeiro nº 23700.20/0091-0 <https://www.in.gov.br/web/dou/-/extrato-de-acordo-281335750>



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DroneBioControl



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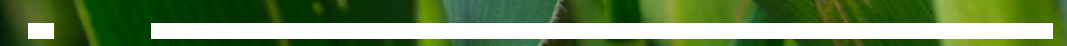
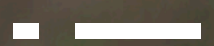
Rua Cel. Amando Simões 829

São Manuel, SP, 18650-00

Brazil

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DIÁRIO de PERNAMBUCO

SEXTA-FEIRA Recife, 16 de julho de 2021 nº 194 RUMO AOS 200 ANOS diariodepernambuco.com.br

CIÊNCIA E SAÚDE

Mosquito estéril pode erradicar as arboviroses

Vida Urbana 10



Coroa do Avião ganha projeto de revitalização

Vida Urbana 12



Tecnologia é aliada dos agricultores para combater a mosca das frutas

REDAÇÃO ESPECIAL

Trabalho com controle biológico da praga Ceratitis capitata...



"Colhemos frutos perfeitos agora, praticamente sem furros (livres da infestação)"

Trabalho com controle biológico da mosca das frutas...

Trabalho com controle biológico da mosca das frutas...

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Videos:

<https://mobile.twitter.com/prefrecife/status/1415782544839151618>

<https://youtu.be/HAYhDLHdSTU>

https://globoplay.globo.com/v/9691099/?utm_source=whatsapp&utm_medium=share-bar

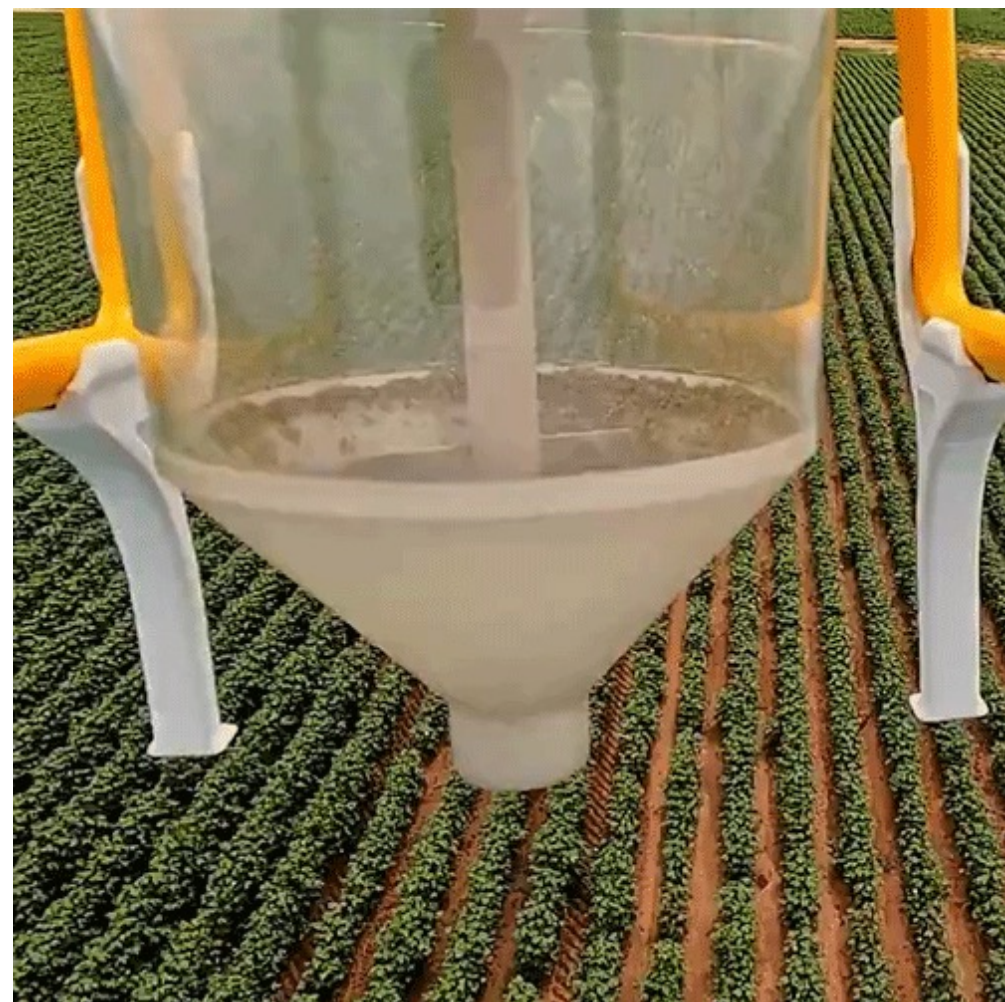
Globo Rural (minuto 8:00 - 10:00) <https://g1.globo.com/economia/agronegocios/globo-rural/noticia/2021/12/05/desertificacao-avanca-na-caatinga-por-cao-de-mudancas-climaticas.ghtml>

Bahia Rural (minuto 2:00 – 6:00) <https://youtu.be/5DctA7J3yS4>

ALTERNATIVES - BIOLOGICALS



Contact between applicator mechanism and product.



Induces stress and reduces insect viability.



ALTERNATIVES - MOSQUITOES



<https://www.youtube.com/watch?app=desktop&v=gtN1jm9UO98>



https://globoplay.globo.com/v/9691099/?utm_source=whatsapp&utm_medium=share-bar



<https://www.youtube.com/watch?v=XfisAqtc4oM>



<https://youtu.be/HAYhDLHdSTU>

VERSATILITY



Beyond Biologicals:

- Pheromone microcapsules;
- Fish feed;
- Control of invasive mussels in dams;
- Seeds for reforestation;
- Earthworms for soil aeration;
- Coagulants for sanitation;
- Polymers for oil spillage;

Beyond Drones:

- Scalable implement;
- Attachable to tractors;
- Boats;
- Motorcycles;

TEAM



**RICARDO
MACHADO**

Environmental engineer at the University of Edinburgh and MBA from USP/ESALQ. Professional experience in environmental damage mitigation.



**NICHOLAS
MATIAS**

Graduated in 3D Modeling and Design of the Bournemouth Institute of Arts. Professional experience in the design and manufacture of mechatronic elements at BBC London and other companies.



**MURILO
JULIANI**

Aeromodelist and technician in mechanics, operates production missions, solving problems in the field avoiding downtime. 6 years of unmanned aerial application experience.



**MARIO
MARTINS**

Economist with a master's degree in environmental sciences from Yale University. Has experience in entrepreneurship and corporate finance.

EMBRAPA TEAM



The project in progress with Embrapa Instrumentation went through several iterations of the hiring process, ending up with an experienced team, highly prepared for the challenges in the project.



Bruno Siqueira da Silva

Graduated in Mathematics and Information Systems, Master in Computer and Computer Engineering and Master in Scientific and Technological Teaching.
He is a PhD student in Computing at UFPEL, linked to the Research Group of Engineering and Cyberphysical Systems.
He is a professor at the Federal Institute Farroupilha Campus São Borja of the Programming area.



Tauã Milech Cabreira

Professor at the Federal Institute of Education, Science and Technology South-Rio Grande do Sul (IFSul - Campus Pelotas). He holds a PhD in Computer Science from UFPEL and a Master's degree in Computational Modeling from FURG.
Participated in the Sandwich Doctorate Program Abroad at The Real-Time Systems Lab, Scuola Superiore SantAnna.
He is a member of the Research Group on Cyber-Physical Systems Engineering (Cyphy Lab).



Bruno Olivieri

D.Sc. in Flight Coordination Approaches of UAV Squads for WSN Data Collection with a strong background in IT.

BENEFITS - SOCIAL

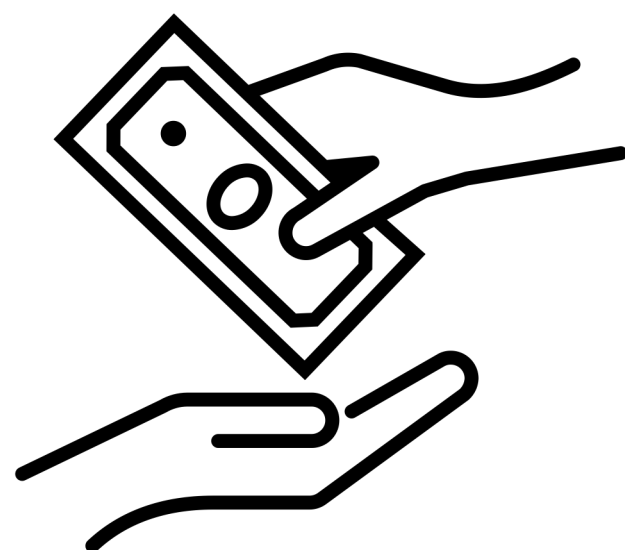


**8 UN
SDGs**

<https://brasil.un.org/pt-br/sdgs>

Technology meets 8 of the UN's Sustainable Development Goals, helping reduce climatic effects of pest control, reducing water usage, chemical runoff and contamination as well as creating high quality employment opportunities

BENEFITS - COSTS



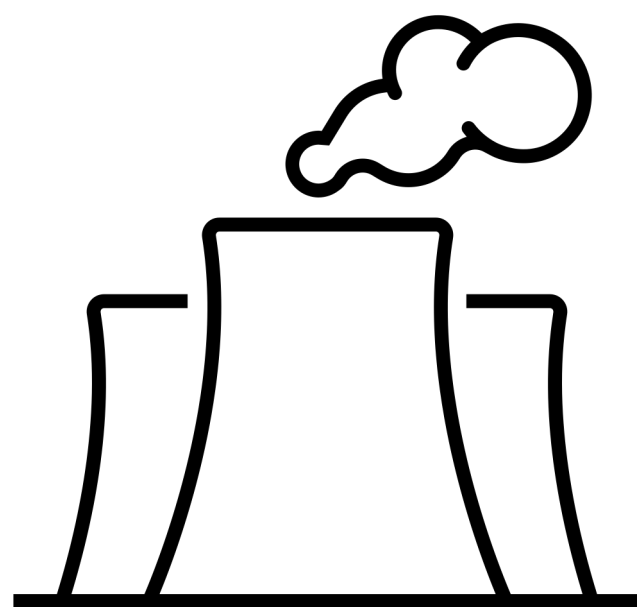
↓ **300R\$/ha**
215R\$/ha

Cost reduction when compared to the use of chemical insecticides

Lower exposure to exchange rate variation and oil price

Increased added value of agricultural production (sustainable, organic cultivation)

BENEFITS - CLIMATE



↓
2.8
tCO₂-eq/ha

Direct reduction of GHG emissions in production and logistics of the crop input

Direct reduction of GHG emissions in the application process

<https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg3-chapter8-1.pdf>

BENEFITS - WATER



↓ **150**
Liters/ha

Indirect reduction of water use during production of the biological input

Direct reduction of water use in the dilution of chemicals

BENEFITS - CHEMICALS



0.5
kg/ha

<https://www.epa.gov/safepestcontrol>

Direct reduction of chemical insecticides

Reduction of waterway pollution

Reduction of residues in food

Reduction of the evolution of molecules resistance in target pests



SUSTAINABLE DEVELOPMENT GOALS



1 NO POVERTY

2 ZERO HUNGER

3 GOOD HEALTH AND WELL-BEING

6 CLEAN WATER AND SANITATION

8 DECENT WORK AND ECONOMIC GROWTH

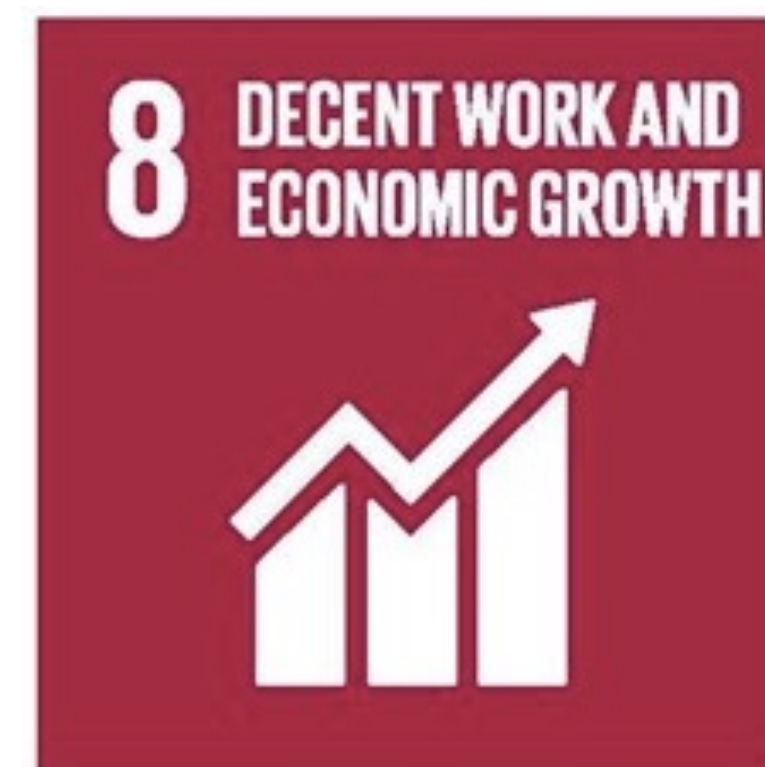
12 RESPONSIBLE CONSUMPTION AND PRODUCTION

13 CLIMATE ACTION

15 LIFE ON LAND



Our business model considers the production of low cost implements mounted on small off the shelf drones, with software solutions to help remove technical barriers to entry. Our primary aim is to include small scale farmers as users of chemical-free biological pest control. To do that, we must have localized operation partners.



We envisage our technology will enable the creation of new jobs and stimulate local entrepreneurs, as releasing biologicals needs to be done at a small scale, stimulating local economies and the establishment of on-farm or near-farm insectaries.



Our technology helps decrease crop damage, resulting in immediate effects of food waste reduction. It also helps reduce the evolution of molecule resistance in pests, which means the evolution of 'super bugs' will be slower, helping further reduce crop damage over time.



Our technology helps avoid the exposure of farmers to harmful chemicals and reduces chemical residues in food at the markets. This improves the food grower's well-being, helping avoid chemical induced illnesses, similarly with consumers to chemical residues.

Another aspect of our company that furthers this is the technology to cost-effectively scale mosquito borne disease eradication programs. This can help save thousands of lives by removing the insect and avoiding the diseases from being transmitted in the first place.



Our company helps the clean water front by reducing the amount of chemical insecticides in the environment, and hence in water run-off that are serious contaminants of streams and rivers. It also helps directly reduce water usage in agriculture since biological defensives do not need to be diluted in water prior to application.



Our technology helps farmers grow food with less chemicals and considerably less carbon emissions. With the new trend of 'biological revolution', beneficial insects will be produced locally, either on-farm or near-farm, improving the production processes further.



Our technology helps reduce green house gas emissions directly through fuel substitution (diesel from tractors to electricity in drones), and through substitution of chemical insecticides that are primarily petroleum based. The biological economy, which incentivizes the establishment of local insectaries for on-farm or near-farm production of these biological defensives will also help by reducing emissions in transport from factory to farm.



Our company aims at helping scale biological pest control strategies. These strategies are inherently biodiversity driven, using the pest's natural enemies to help fight them. Therefore we directly promote biodiversity by enabling the reintroduction of beneficial insects, helping avoid biodiversity degradation by removing chemical insecticides (that indiscriminately kill both good and bad bugs).

MARKET VERTICALS



Agriculture:

Biological control can avoid billions of Dollars of losses annually.

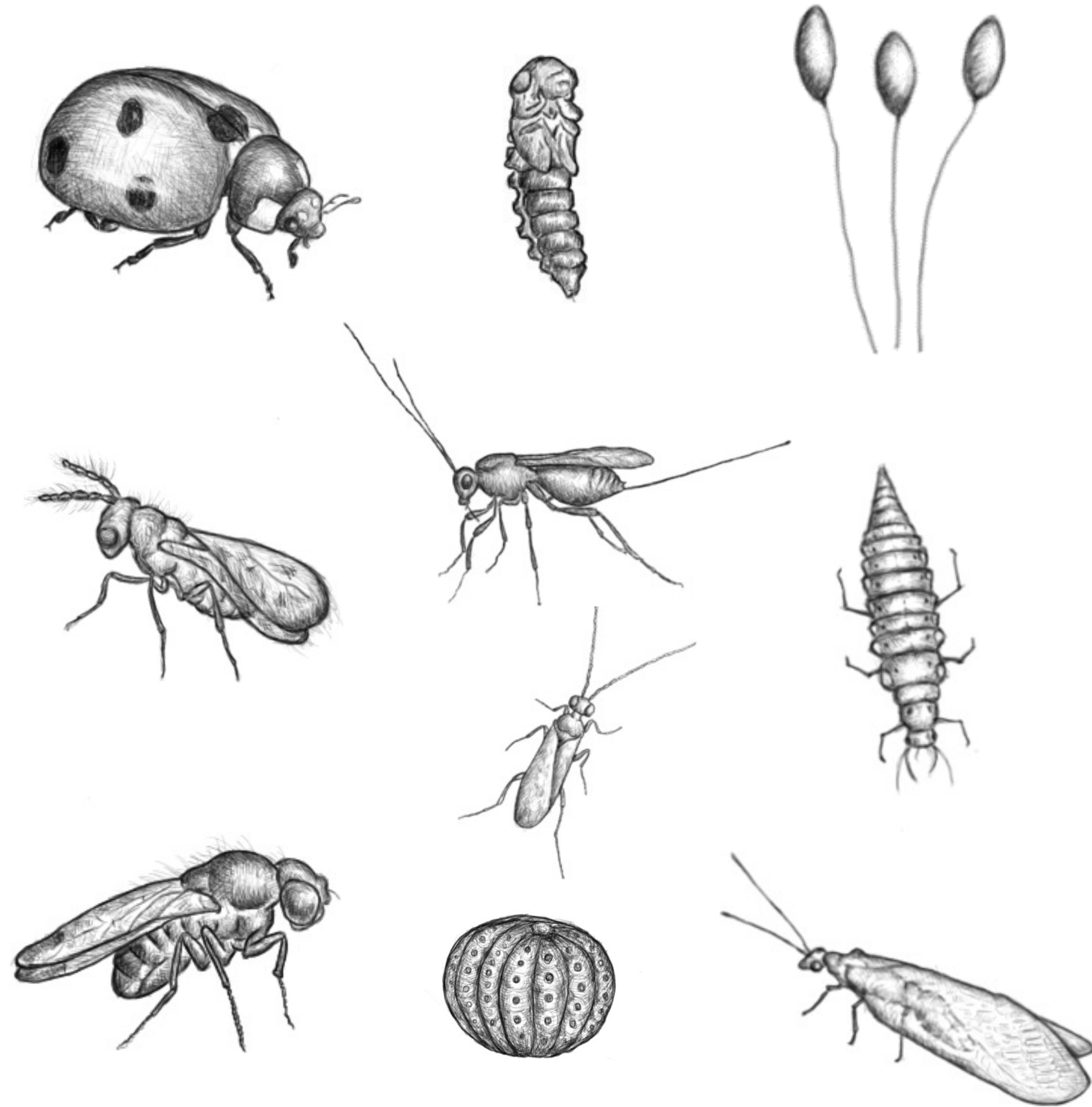
Currently, millions of acres are treated with biologicals around the world.

Public Health:

Mosquitoes cause hundreds of thousands of deaths yearly.¹

There are many mosquito borne disease eradication projects underway across the world. Our technology can cost effectively scale these projects, helping eliminate diseases like Dengue and Zika.

¹ WHO 2021: <https://www.who.int/news-room/fact-sheets/detail/malaria>



AGRICULTURE

Global biological control is estimated at 85.5 million km² (Embrapa)

The biological pest control market is projected to register a CAGR of 14.7% in the period (2021 - 2026) (<https://www.mordorintelligence.com/>)

Increased growth trend with democratization and inclusion of small holder farming

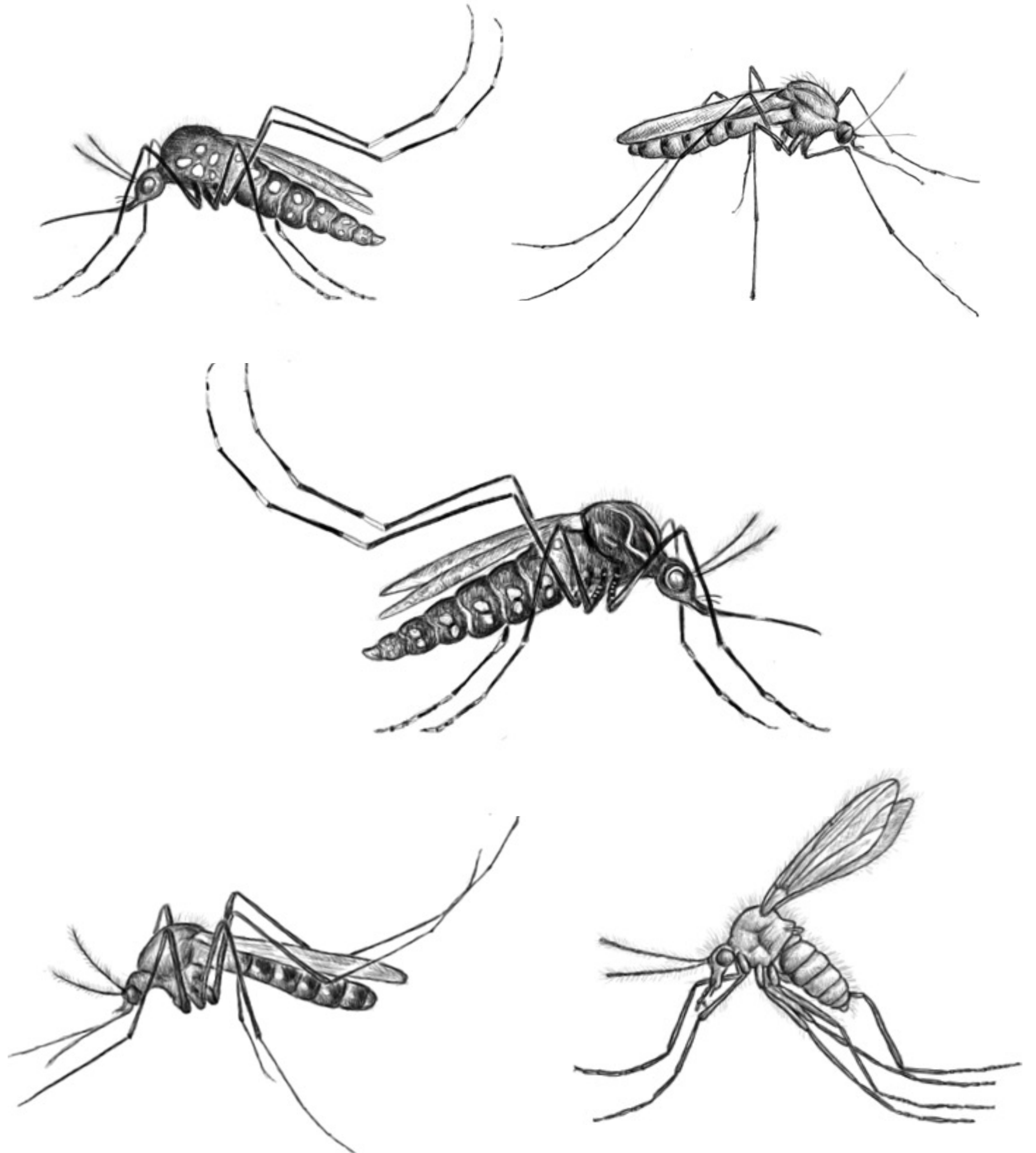


PUBLIC HEALTH

Biological control for disease transmitting vectors is a new market with immense potential

Currently employed in several locations, coordinated by the UN, WHO and World Mosquito Program, its use is growing rapidly

By including resorts, hotels, golf courses, etc., as users, the market potential increases exponentially



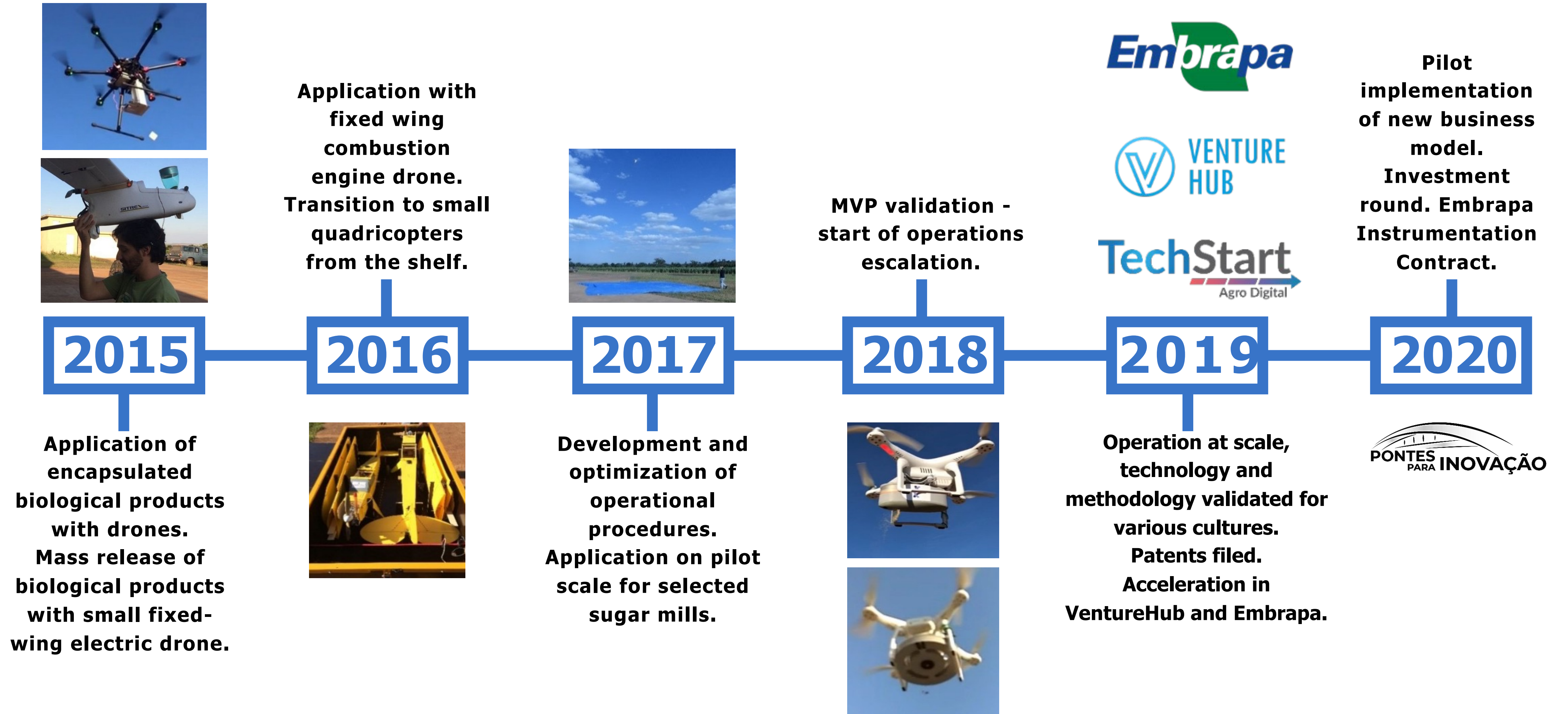


REFORESTATION

There are many different strategies for recovering degraded land. All have different trade-offs between cost and success rate.

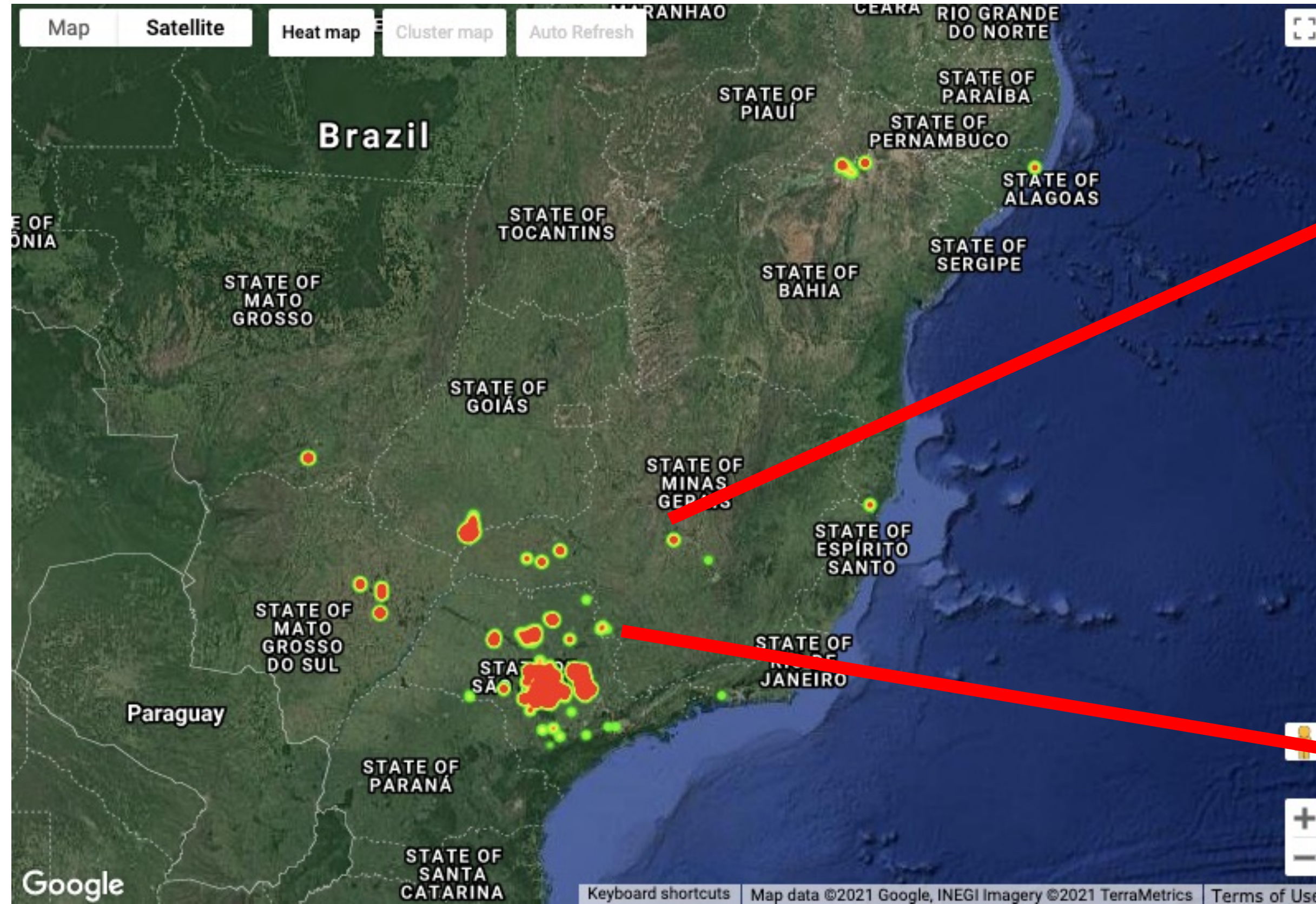
Blending different native seeds from specific biomes and releasing them regularly over a specific area is a cost effective way to scale assisted natural regeneration projects, enabling large areas to be reforested at a fraction of the cost of traditional methods.

TIME LINE



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EXPERIENCE



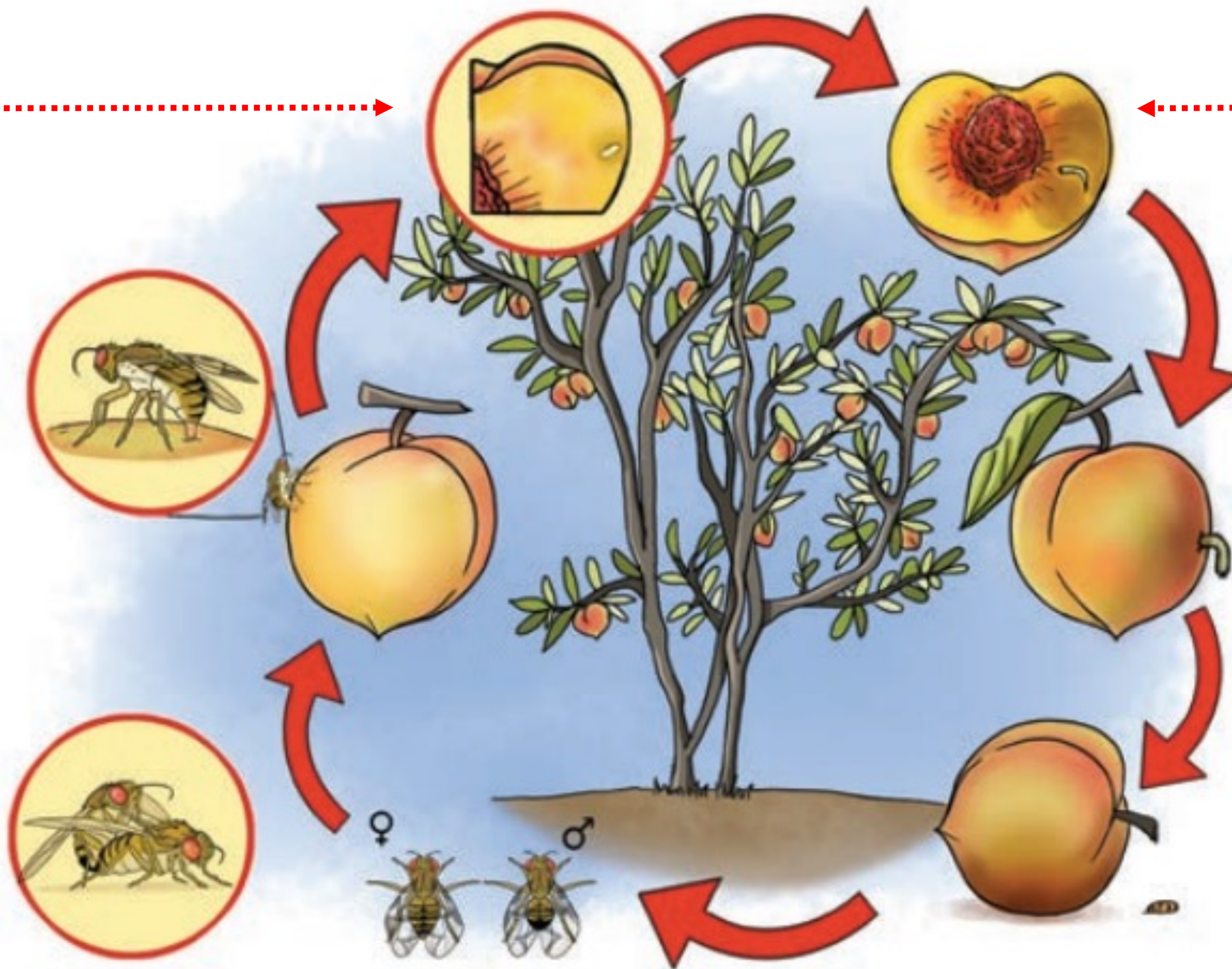
CONTROL – MED FLY



Fopius



Diachamismorpha



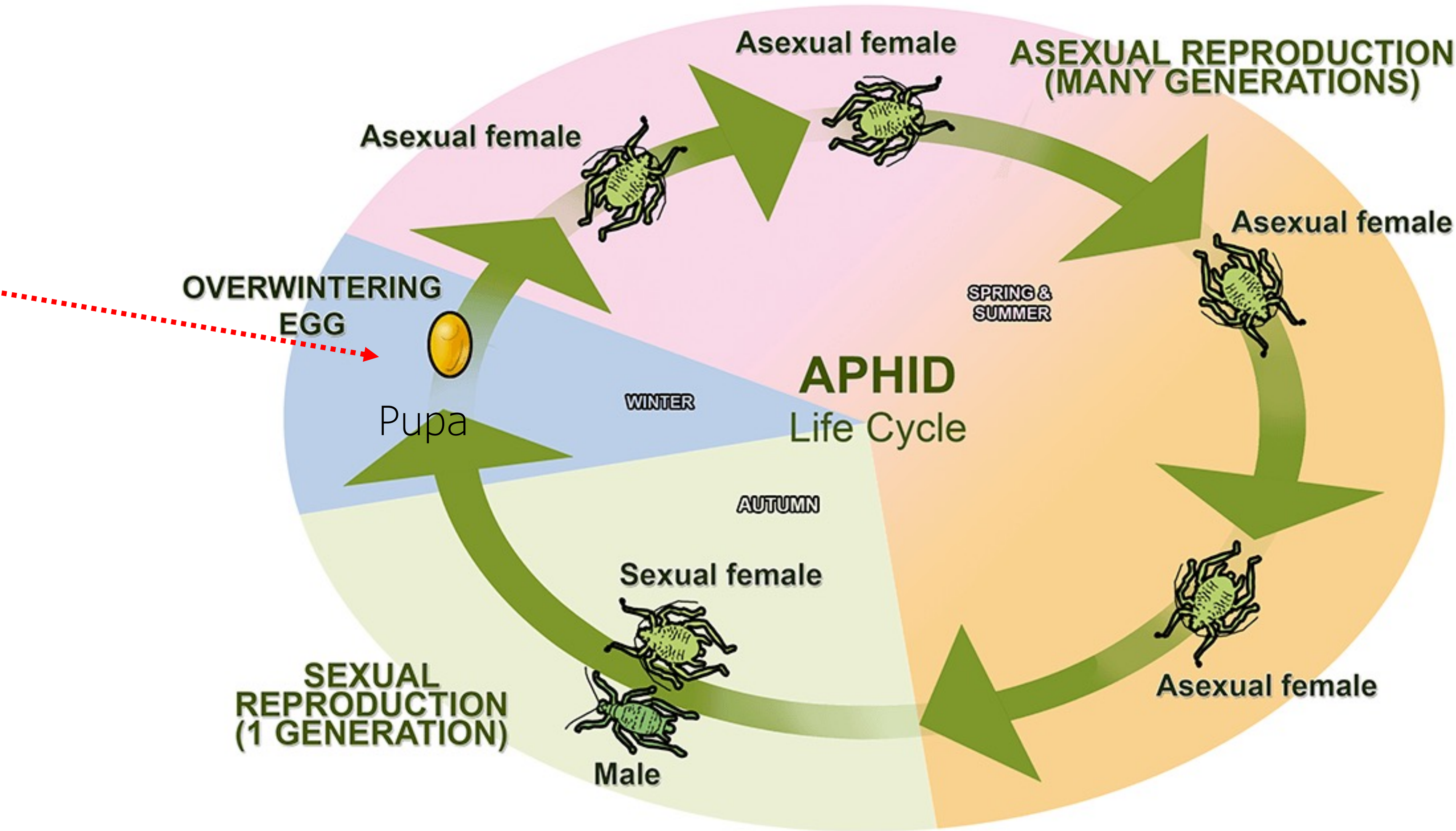
Ceratitidis / Anastrepha

© 2016, SERVIÇO NACIONAL DE APRENDIZAGEM RURAL – SENAR

CONTROL – APHIDS



Chrysoperla externa



CONTROL – BORERS



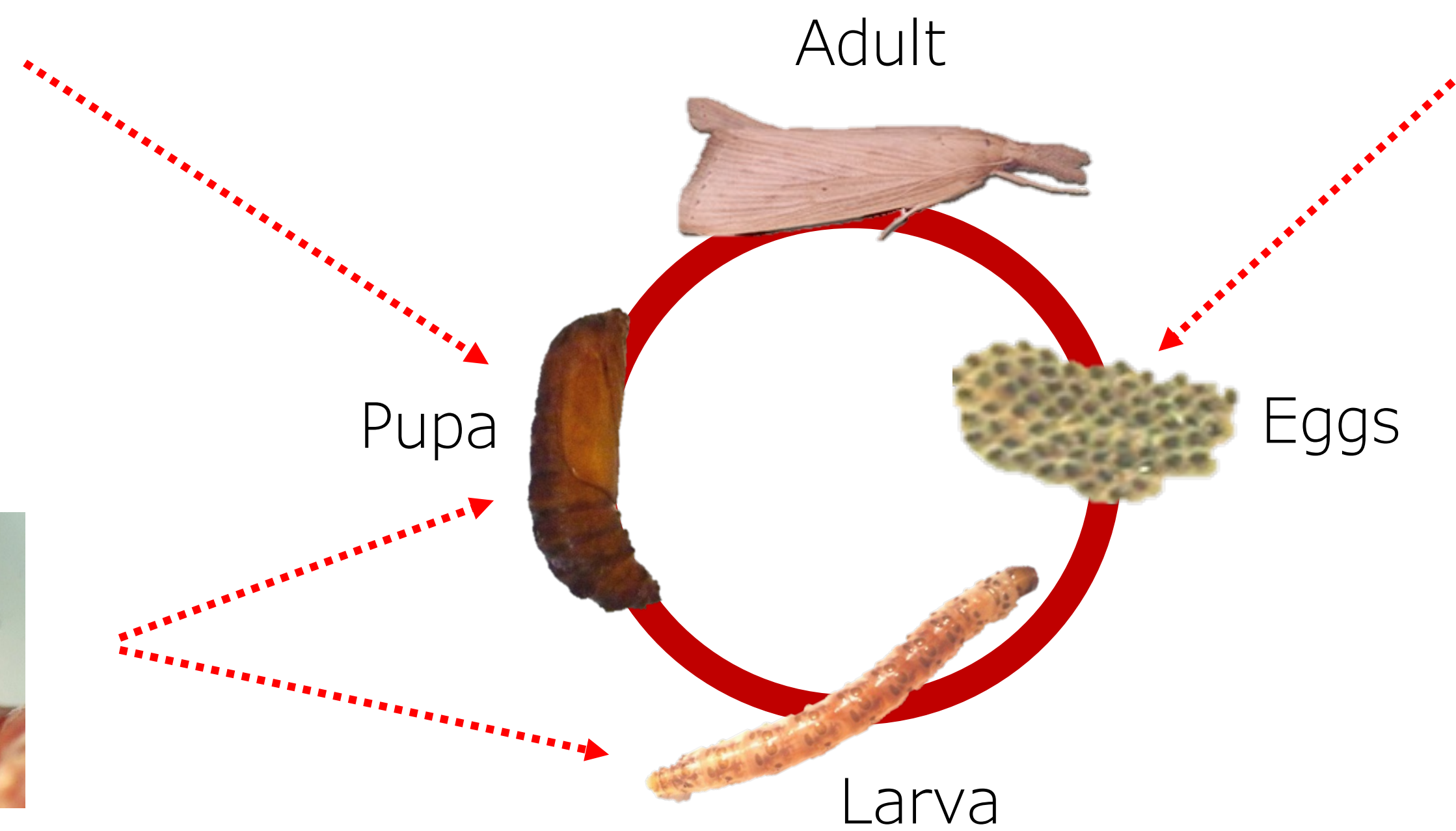
Palmistichus elaiseis



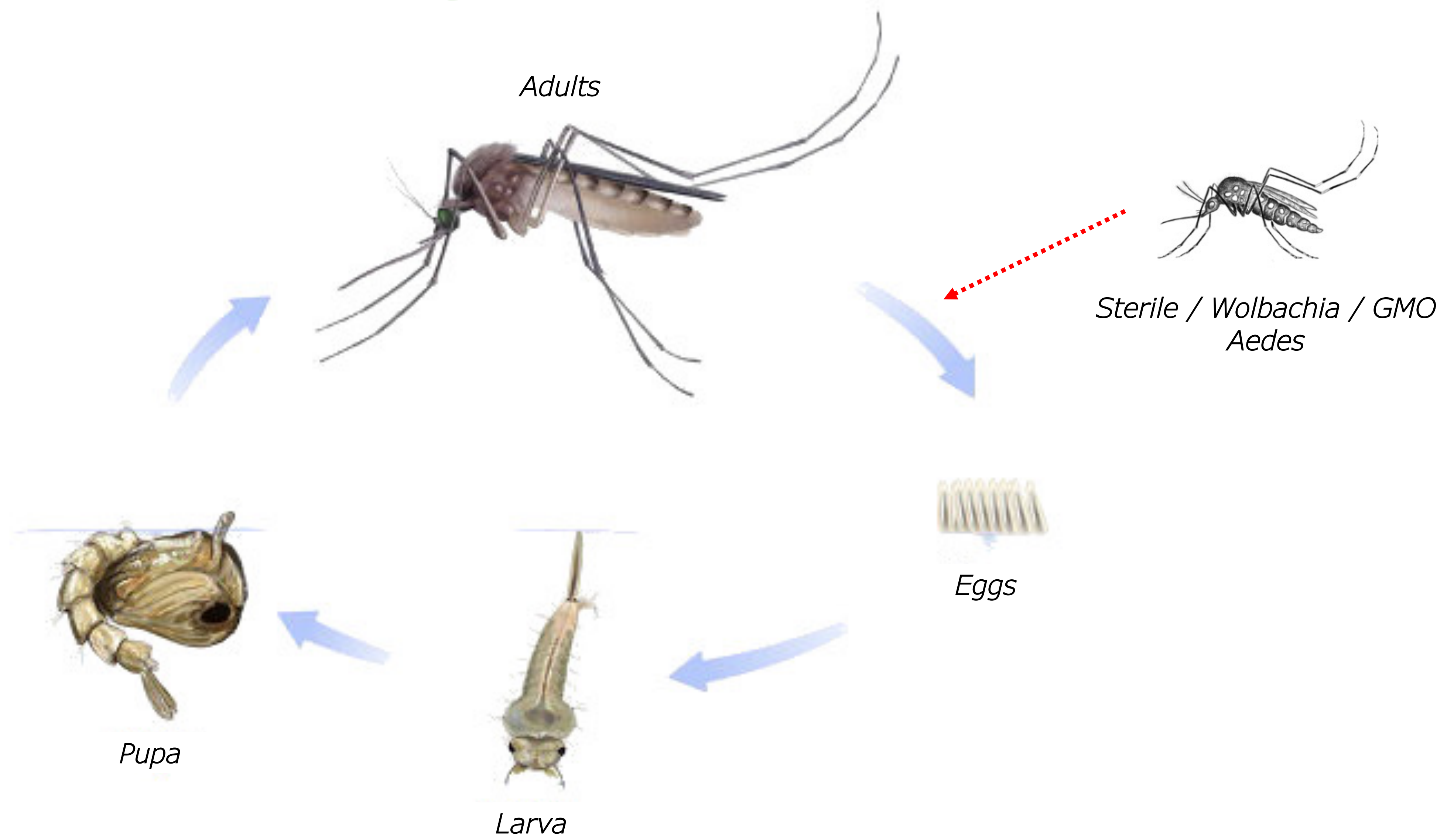
Trichogramma pretiosum



Tetrastichus howardi



CONTROL – MOSQUITOES



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SANTOS, Vanessa Sardinha dos. "Ciclo de vida do *Aedes aegypti*"; *Brasil Escola*. Disponível em: <https://brasilecola.uol.com.br/animais/ciclo-vida-aedes-aegypti.htm>. Acesso em 29 de junho de 2021.