

GENOROBOTICS

ENGINEERING TOOLS TO COUNTER THE
BIODIVERSITY EXTINCTION

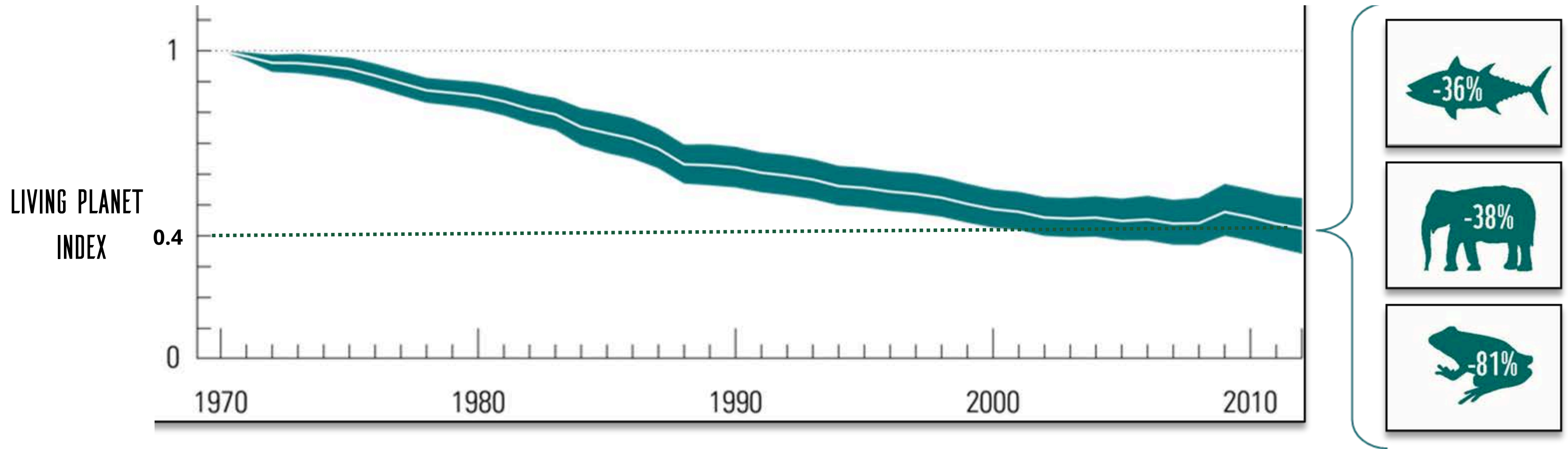


SYMPOSIUM RESEARCH & SUSTAINABILITY

EPFL

MAY 16TH 2024

BIODIVERSITY CRISIS



Source : WWF Living planet Index



THE BIG UNKNOWN

ESTIMATED 8.7 MILLION SPECIES

17 % ARE KNOWN

ONLY 18'000 DISCOVERED EACH YEAR



BOTANIST'S CUNNUNDRUM

Sampling

Samples exportation

DNA extraction & DNA sequencing



Lab turnaround time:
10 days up to 1 month



Sending time:
Several weeks/months
Legal and administrative issues

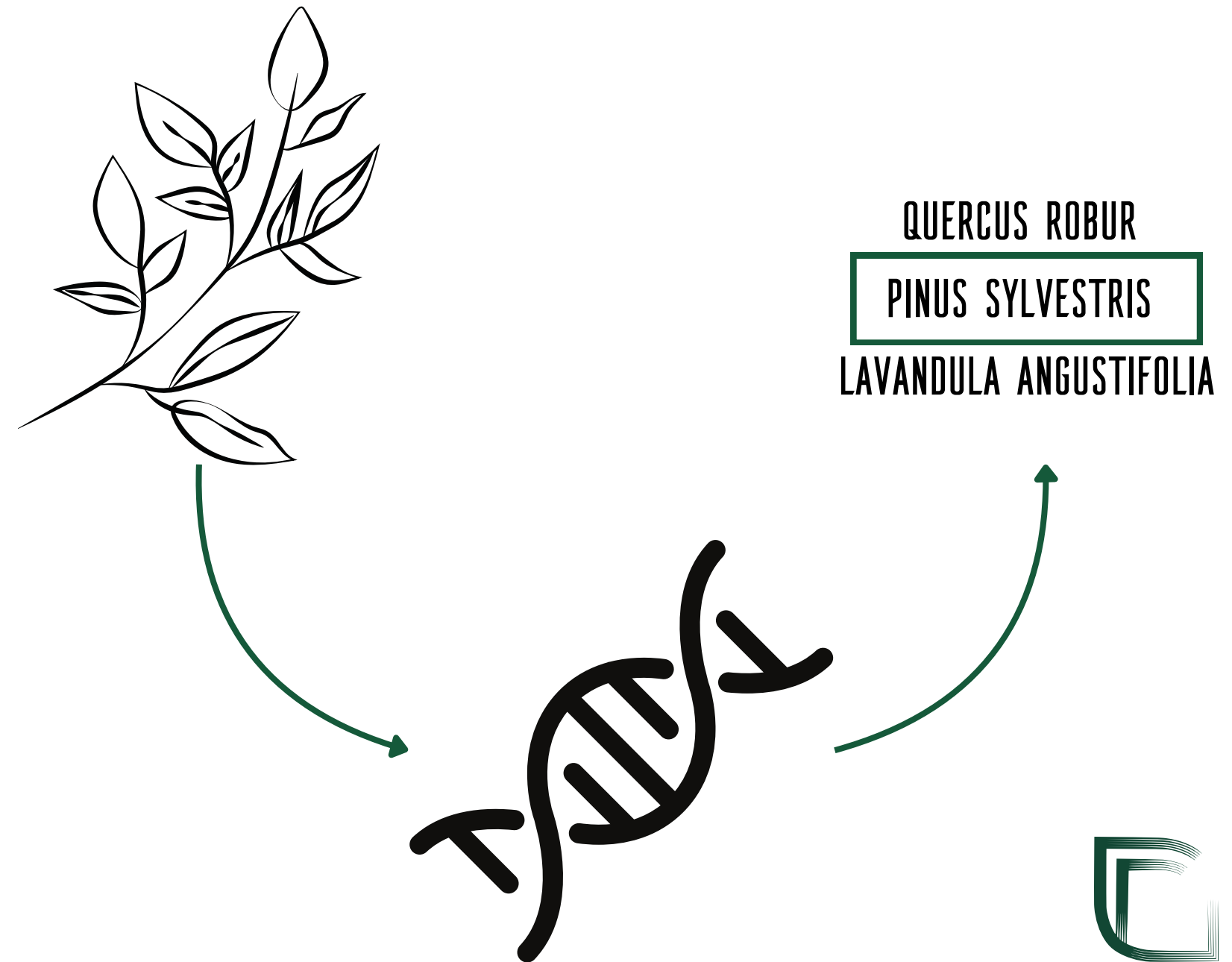
Expedition costs & time
Harsh environment
High skill level



PORTABLE DNA ANALYSIS AS A SOLUTION

**Replacing Morphology-based methods by
DNA based methods**

**Adding portability allows to increase
usability**



GENOROBOTICS



● AROSE FROM AN EXPEDITION TO MADAGASCAR

Made it clear that new methods and tools had to be found

● GOAL

Develop breakthrough innovations to accelerate the identification of plants on the field

● METHOD

On site DNA extraction, sequencing & analysis

● STUDENT DRIVEN

40+ students working and driving the project
Supervision ensured by coordinator and professors



A SIMPLE 4 STEP STRATEGY TO IDENTIFICATION

DNA EXTRACTION



DNA AMPLIFICATION

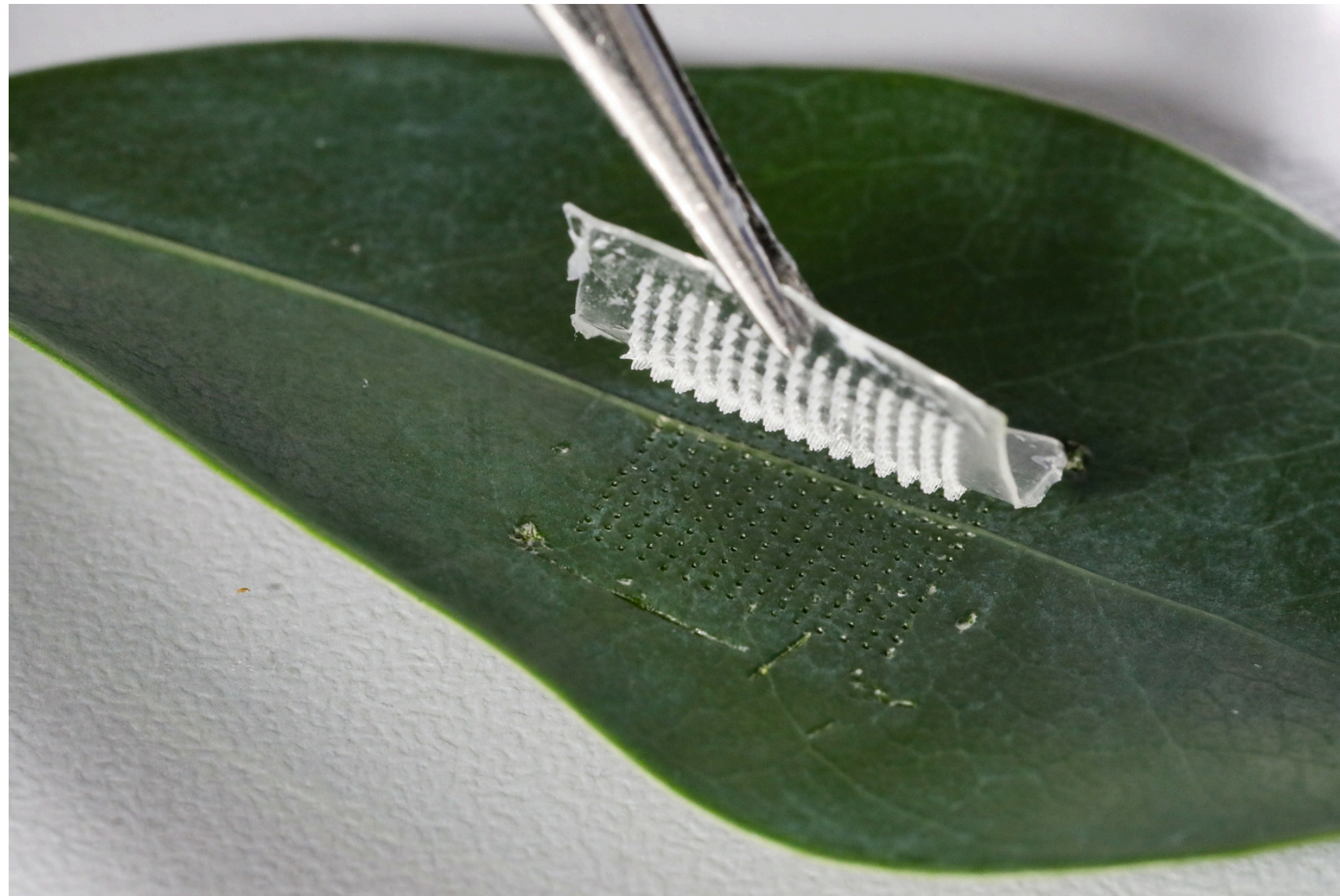
DNA SEQUENCING



IDENTIFICATION



A CASE STUDY : DNA EXTRACTIONS



THE PLANT DNA CONTAINS ALL THE REQUIRED INFORMATION

HOMEMADE MICRONEEDLE PATCHES ALLOWS TO EXTRACT IT

- Cost-effective
- Adaptable to any plant
- Do not require any harsh chemicals – Only water



NEXT STEPS



FIELD TESTING IN BOTANICAL GARDENS

Collaboration with botanical gardens to test our pipeline

Returning to Madagascar

DIFFERENT ECOSYSTEMS

Developing tools to tackle the biodiversity crisis in aquatic ecosystems

KEEP INNOVATING

Using our extensive engineering and biological knowledge to perfect our pipeline , on the bio and software side

AND MUCH MORE

Maybe you will be part of the adventure as well

