



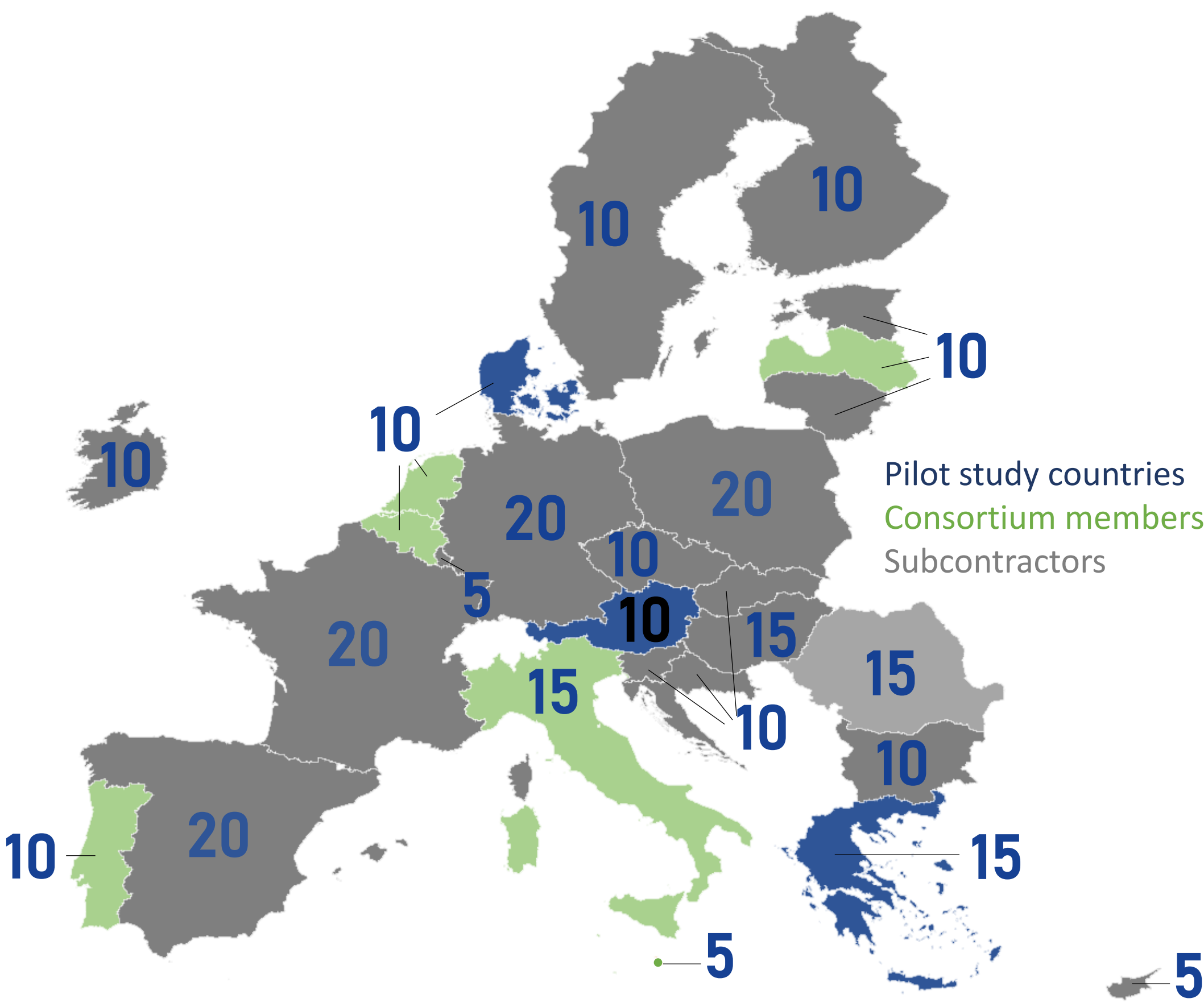
INSIGNIA-EU: Monitoring of environmental pollution with honey bees and citizen scientist beekeepers

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www.insignia-bee.eu/team

Project Objectives:

Honey bees collect forage and pollutants when in contact with the environment. INSIGNIA-EU is the first biomonitoring project that measures environmental pollution across Europe with honey bee colonies and a broad network of citizen scientist beekeepers. Between 5 to 20 apiaries per EU country (see map) were involved. Investigated parameters are: pesticides, microplastics, heavy metals, the air pollutants polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs) and pollen diversity available to honey bees. Supported by research organizations using advanced analytical and modeling techniques, this citizen science approach contributes to the understanding of pollution, identifies varying pollution levels, and supports environmental improvement efforts.



Study overview:

Matrices used 2022 (pilot study)*

*were dropped for the full study after citizen scientists' feedback and laboratory results

Air pump

ApiStrip outside hive

Bees

Beekeeper citizen scientist sampling microplastic from a beehive

Matrices used 2023

APIStrip

ApiTrap

Honey

Pollen

Propolis grids

Silicone bands

Citizen Scientists:

315 beekeepers from all 27 EU member states.

Level of engagement:

Contributory research

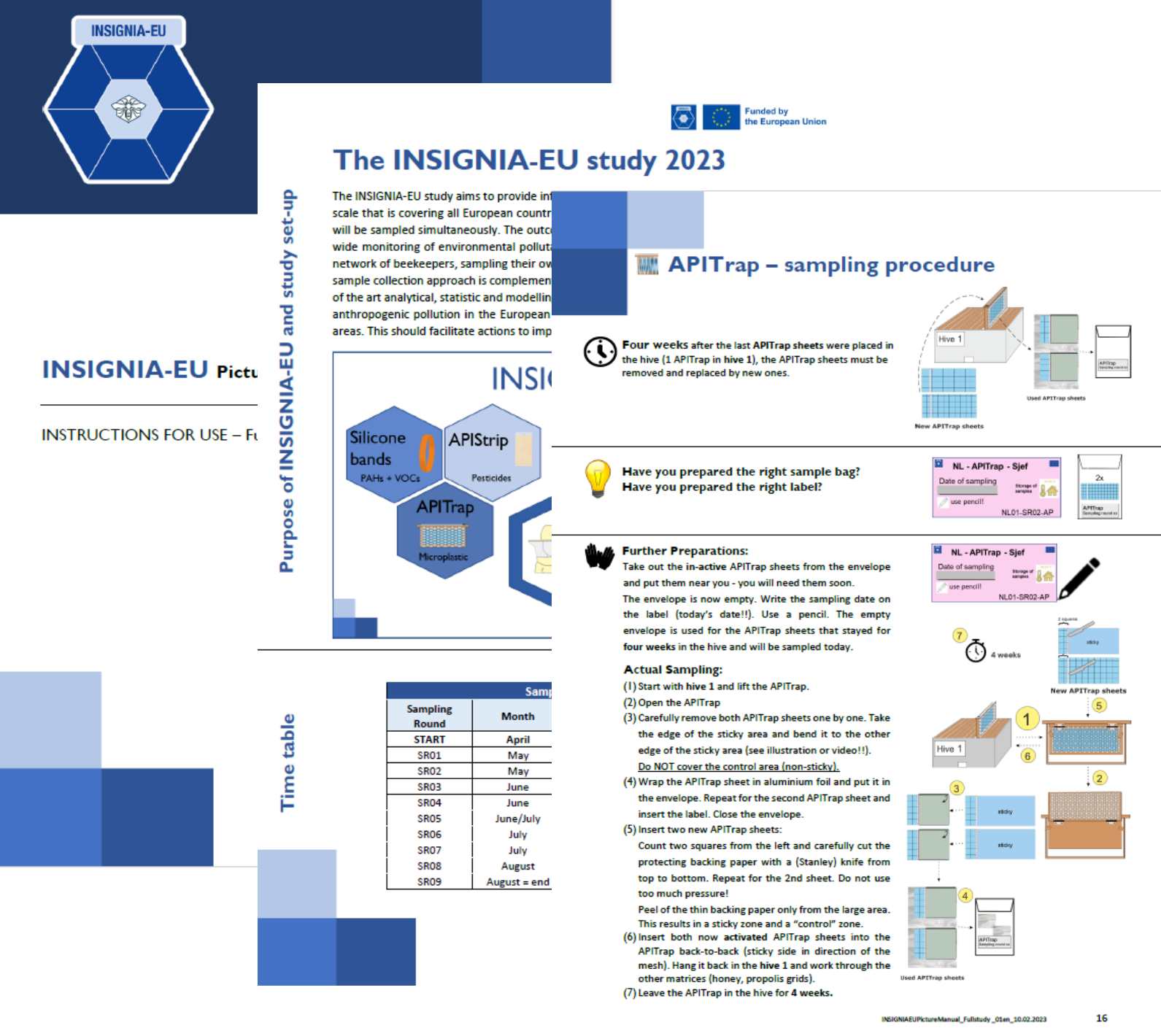
Methodology:

Non-invasive sampling (APIStrip, honey, silicone bands, APITrap, pollen propolis) from April to August.

Impact:

Promoting citizen science participation, leverage of beekeepers' expertise for extensive environmental data across diverse landscapes.

Instruction material:



Österreichische Citizen Science Konferenz 2024 & ECSA 2024

Sampling success:

Matrix	Target substance	No. of samples per apiary	Samplings per season	Maximum number of possible samples	Received samples (% of possible)
ApiStrip	Pesticides	2	9	5985 (315x2x9x2+315)	97,50
ApiTrap	Microplastics	1	4	2520 (315x1x4x2)	98,80
Honey	Pesticides (high polar)	2	4	1260 (315x1x4)	93,20
Silicone bands	PAHs & VOCs	2	4	2520 (315x2x4)	96,50
Propolis	Heavy metals	2	4	1260 (315x1x4)	98,33
Pollen	Pollen	2	9	2835 (315x2x9)	89,10

Conclusion:

Beekeepers are capable citizen scientists that provided 15700 samples in the INSIGNIA-EU study. Their participation enables large-scale studies on the environment. Sample analysis is currently ongoing.

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