



DETECTIVE

DETECTIVE: DETECTION OF NGT PRODUCTS TO PROMOTE INNOVATION IN THE EUROPEAN UNION

ANNUAL
GENERAL
MEETING

2024



**EVERY VOICE
EVERY DNA**

A STRATEGIC EXCHANGE
LINKING **SCIENCE** AND **POLICY**
TO BUILD THE **FUTURE** OF A
DIVERSIFIED LANDSCAPE
OF ANIMAL BREEDING



Funded by
the European Union

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Content of the presentation



- **The DETECTIVE project**

Aim – WP structure – Development of analytical methods – Databases

- **The GenEdit database**

Overview



DETECTIVE, a four-year EU-funded research project (2024-2027)



It aims to **develop and validate innovative detection methods for plants and animals** obtained with new genomic techniques (NGTs), as well as in their derivative products.

20 partners



(Coordinator: Dennis Eriksson)



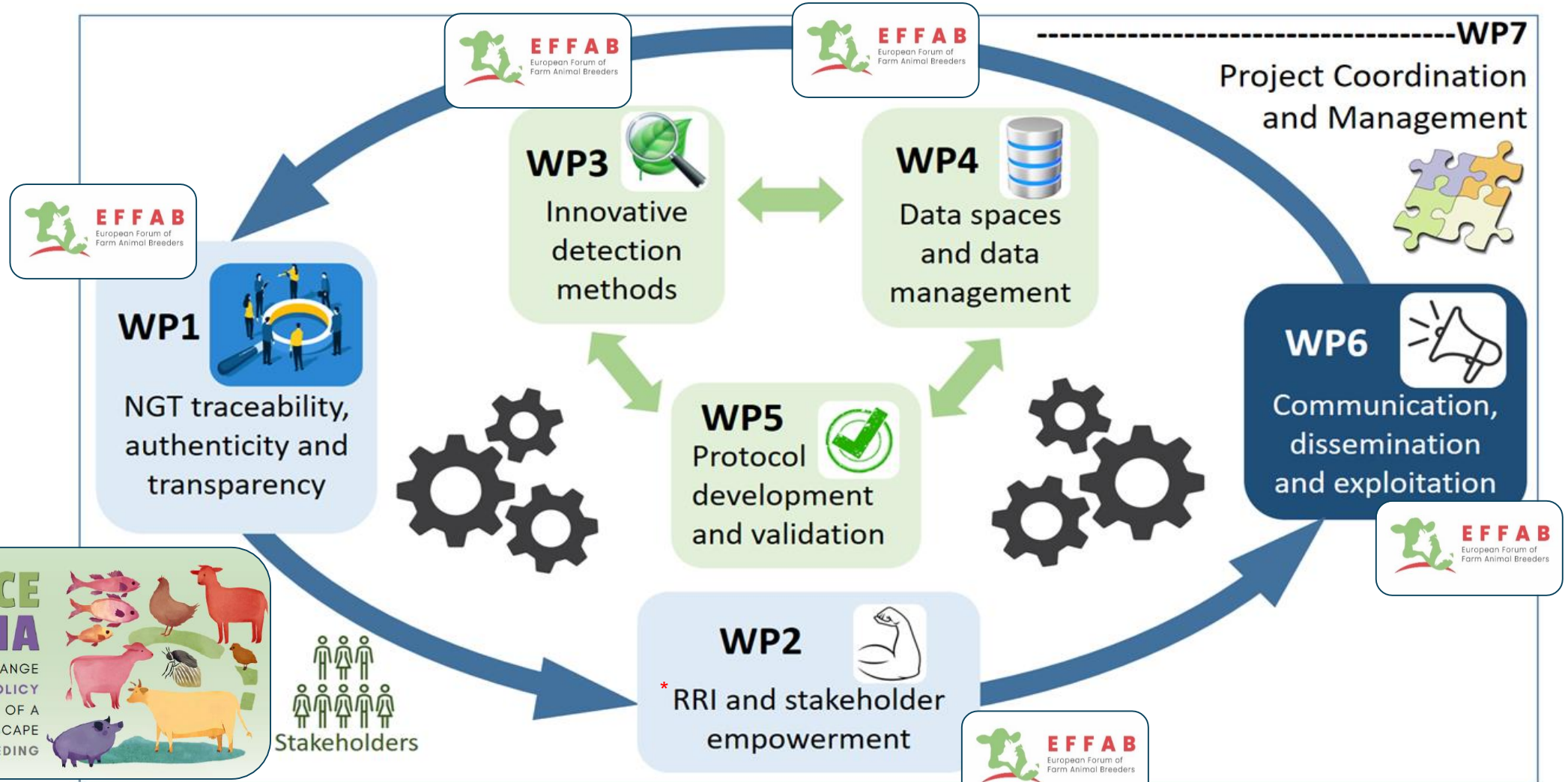
DETECTIVE – Expected results and impacts



- 1** Develop reliable detection methods to address the sustainable farming and food systems challenges
- 2** Validate detection methods for enforcement authorities as well as for developers and agro-food operators
- 3** Empower enforcement authorities, developers and agri-food operators for the authenticity and traceability of products obtained through NGTs
- 4** Enable informed consumer choices by enhancing transparency and traceability across the food chains
- 5** Foster innovation in the food chain systems linked to NGTs



WP structure and interdependencies



EVERY VOICE EVERY DNA

A STRATEGIC EXCHANGE LINKING SCIENCE AND POLICY TO BUILD THE FUTURE OF A DIVERSIFIED LANDSCAPE OF ANIMAL BREEDING



WP3. Development of detection methods



WP leader :  Wallonie
recherche
CRA-W

Task 3.1. Collection of samples

- **Types of mutations:** deletions, substitutions, of one or more than one nucleotide, etc.
- **Organisms:** it is essential to consider various categories of commercially important plants but also animals (such as beef, pork, poultry, and fish).
- **Gene/trait categories**
- **Complexity of the genome**
- **Status:** commercialisation, pre-commercialisation, research
- **Developers:** ability to bring products from development to commercialisation stage
- **Processing:** applicability to processed food
- **Origin:** countries
- **NGT category:** NGT1 and NGT2

→ **Important to have a collaboration with animal breeders**



WP3. Development of detection methods

Task 3.2. Targeted approaches

- Methods that are present in control laboratories (qPCR, dPCR,...)
- Methods used in the medical field (adapted for food and feed?)
- Additional methods (sequencing,...)

Task 3.3. Multi-targets approaches

Methods able to detect several modifications in one single experiment.

Task 3.4. Untargeted approaches

Methods looking at different sequences (high-throughput sequencing approaches, machine learning, detection of mutations, off-target detection)

- Evaluation of the approaches
- Link with databases (WP4)
- Methods will be selected for validation (WP5)
- Methods used by the developers of the material can be evaluated under different performance criteria

WP4. Data spaces and data management

WP leader :  ILVO

Task 4.1: Building a federated data space structure

Task 4.2: The GenEdit database

- Current situation
- Trends
- Define strategies

DATABASE 1 GenEdit database

- Species
- Countries
- Traits
- Genes involved
- Links to publications

Task 4.3: Building additional databases



1157 entries
840 plants
314 animals

The screenshot displays the GenEdit database interface. On the left, there are filter panels for 'Please select a kingdom' (Plants, Animals, Fungi), 'Please select a variable' (Species, Trait Category, Status, Transformation Methods), and 'Please select a variable' (Species, Kingdom, Trait Category, Method, Year). The main area features a 'Plot' tab with a bar chart showing the 'Numbers of modified organisms' by species. A pie chart on the right shows the distribution of 'Trait Category'. A 'Status' filter is set to 'Commercialized', 'R&D', and 'Unknown'. At the bottom, a table lists 15 entries with columns for Kingdom, Species, Country, Trait_Category, Trait, gene, Technique_details, Modif_Type, Year, Status, and References. Buttons for 'Copy', 'CSV', and 'Print' are visible at the bottom of the table.

The GenEdit database



 Exclusively based on published information

Please select a kindgom

- Plants
- Animals
- Fungi

Please select a variable

Species

Trait Category

All data

Status

Commercialized

R&D Unknown

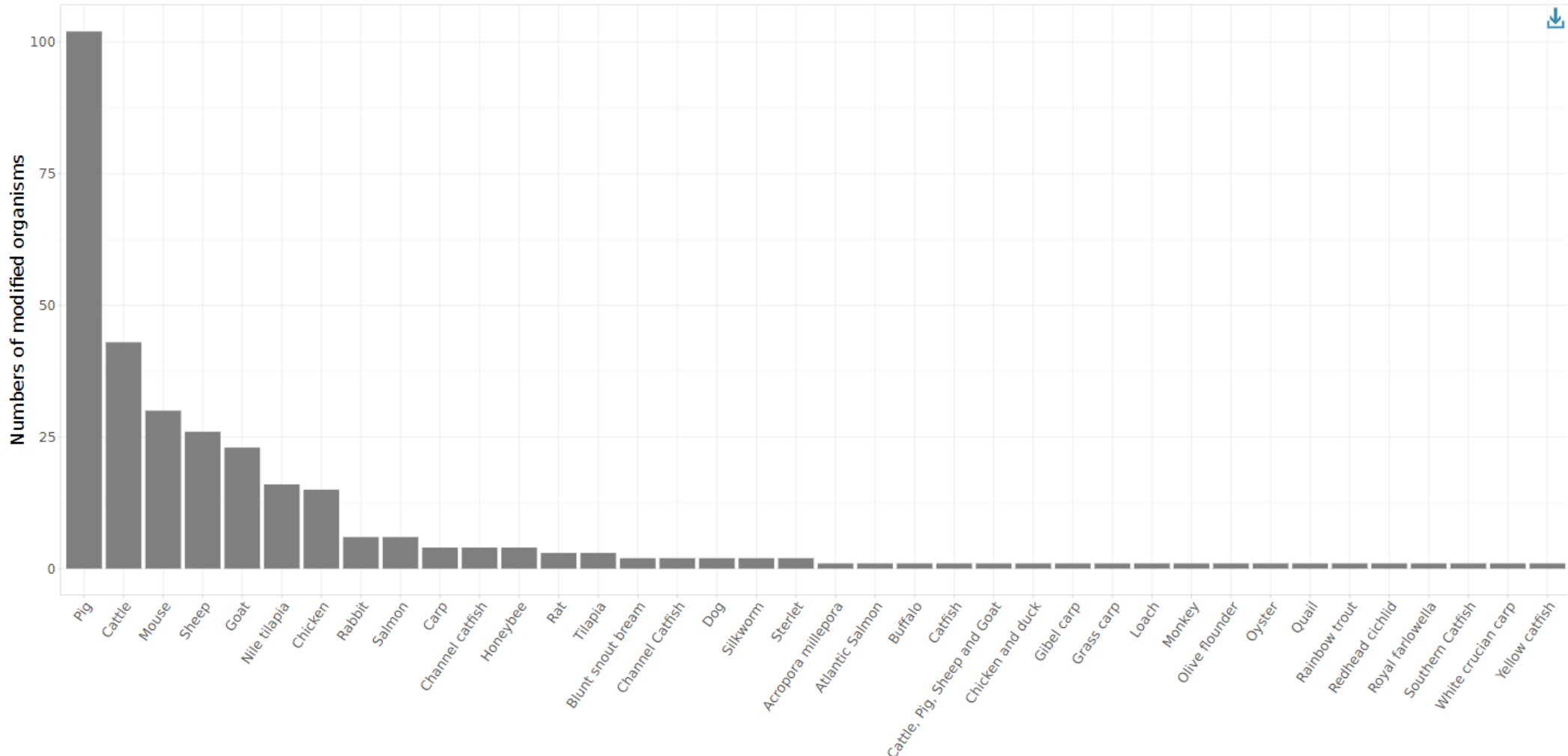
Transformation Methods

- BE (base editors)
- CRISPR
- Meganuclease (MN)
- ODM (Oligo-Directed Mutagenesis)
- TALEN
- ZFN

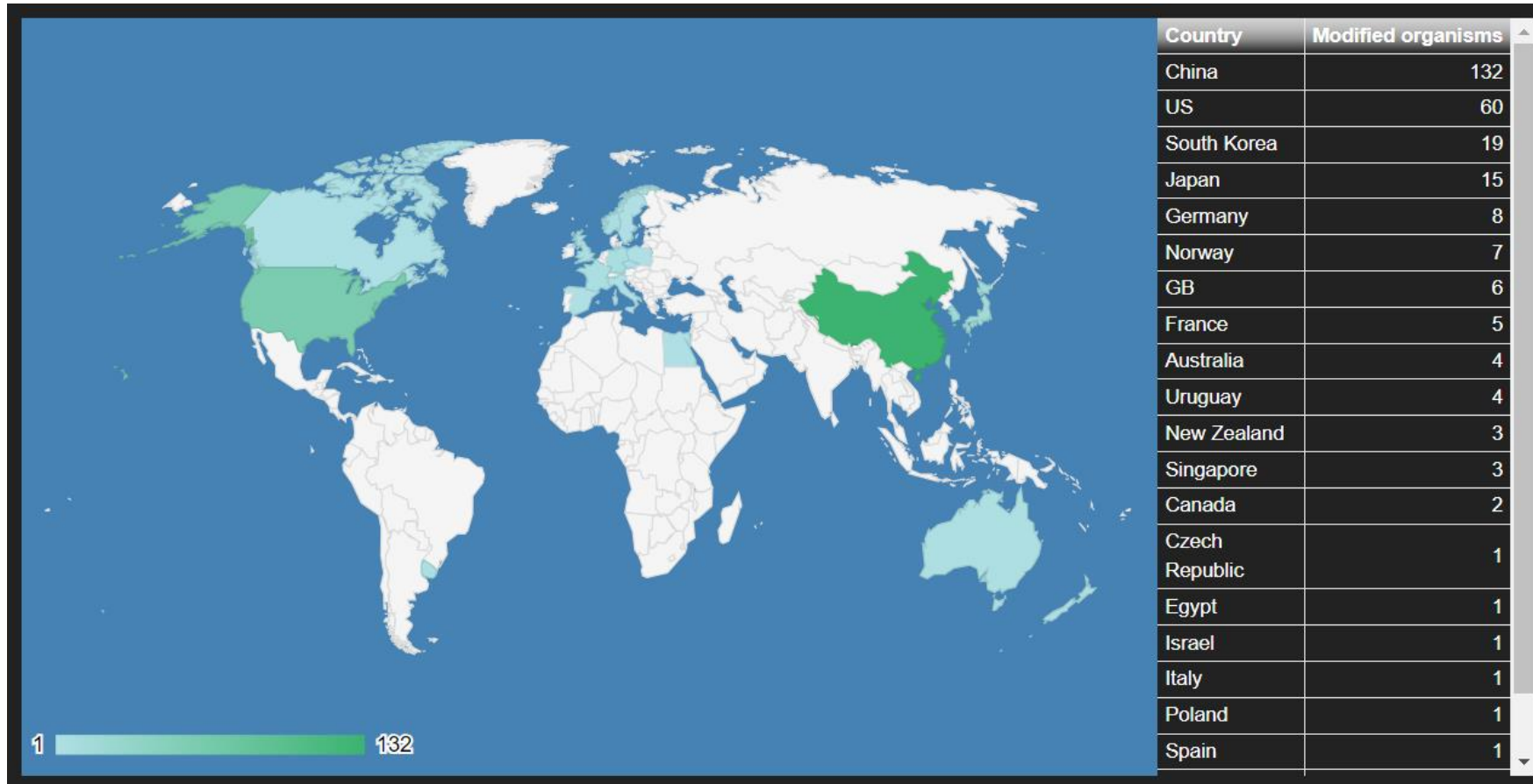
Showing 1 to 100 of 314 entries

kingdom	Species	Country	Trait.Category	Trait.	gene	Technique.details	Modif.type	Year	Status
Animals	Goat	China	Meat production, Flesh quality	Meat and cashmere production	MSTN, FGF5			2015	Unknown
Animals	Cattle		Modified composition	Prevision :reduce b-lactoglobulin	BLG		Knock out	2011	Unknown
Animals	Goat	China	Modified composition	decreased BLG levels in milk	BLG		Knock out	2015	Unknown
Animals	Cattle	US	Animal welfare	Horn-free cattle	POLLED			2016	Unknown
Animals	Sheep	Uruguay,France	Meat production	improves meat production	MSTN		Knock out	2015	Unknown

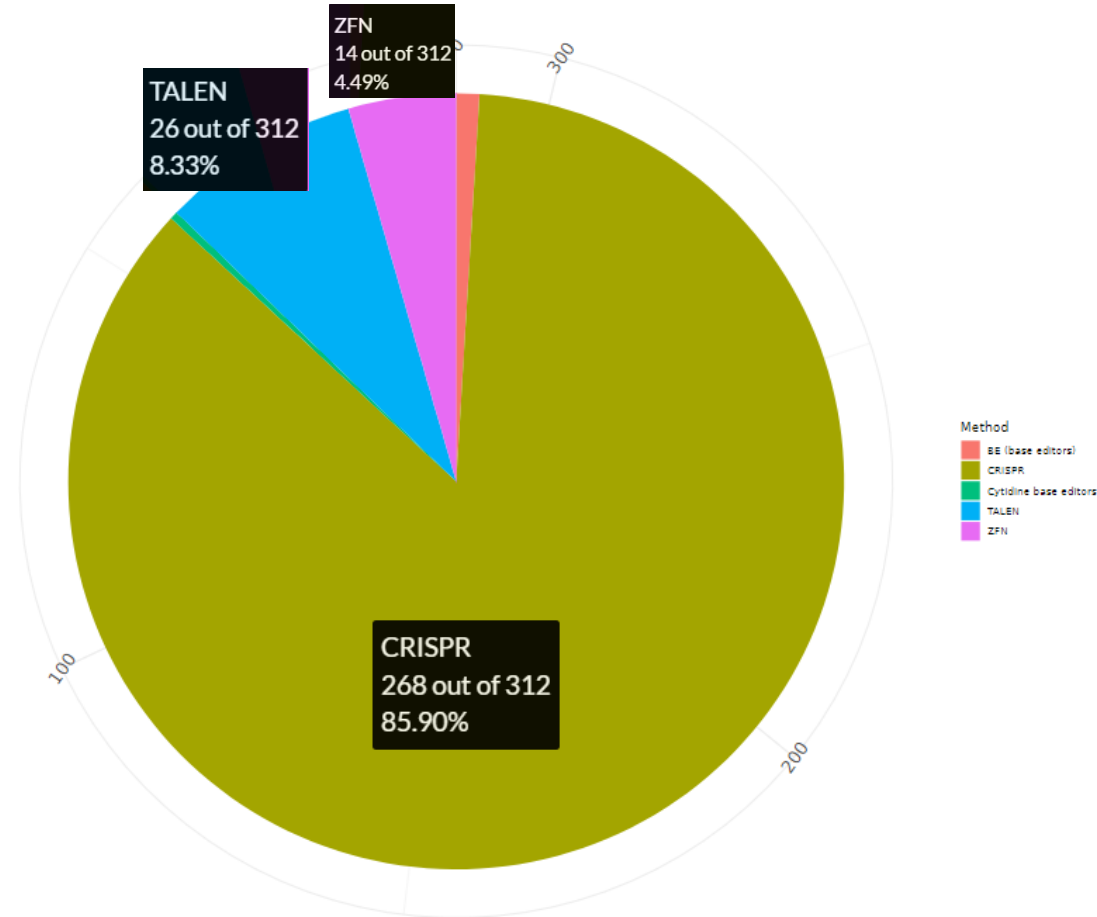
GE animals – Current situation



WP4: GE animals – countries (research papers)

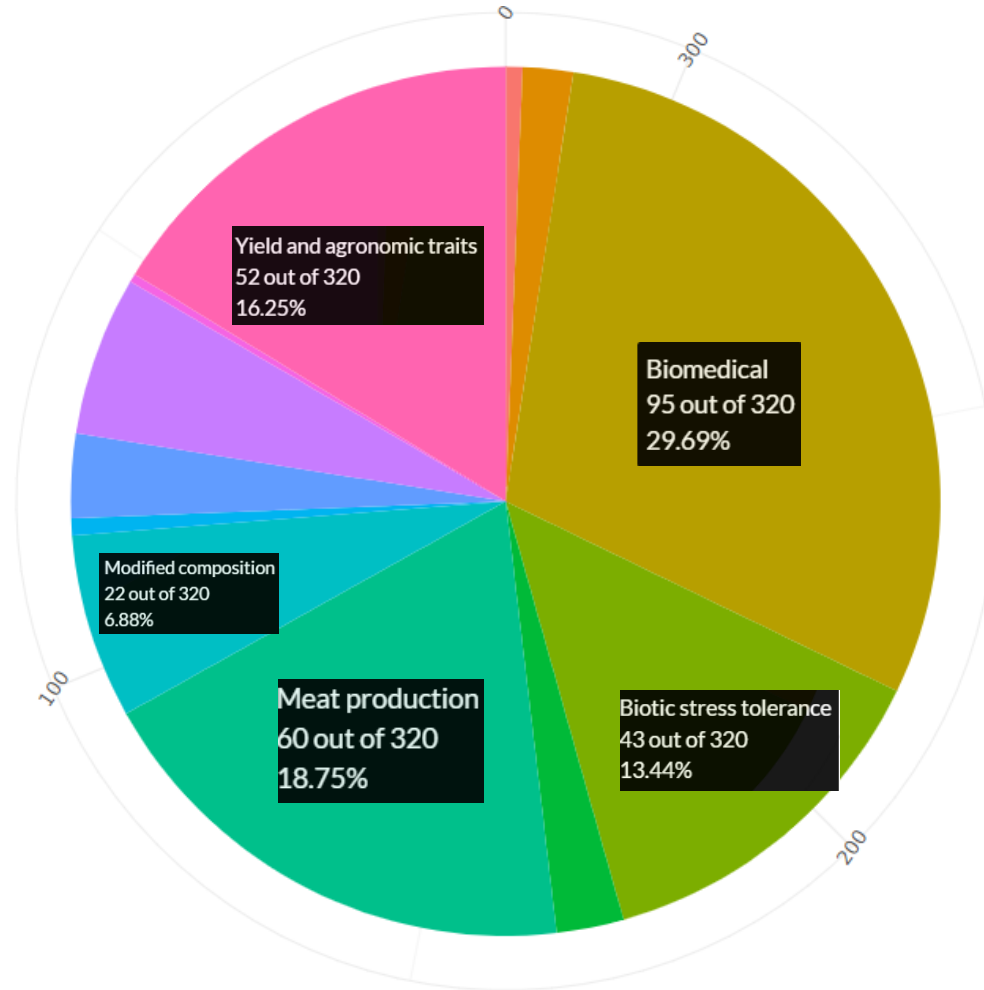


GE animals – Methods used for modifications



Numbers of modified organisms

GE animals – Main trait categories



Numbers of modified organisms

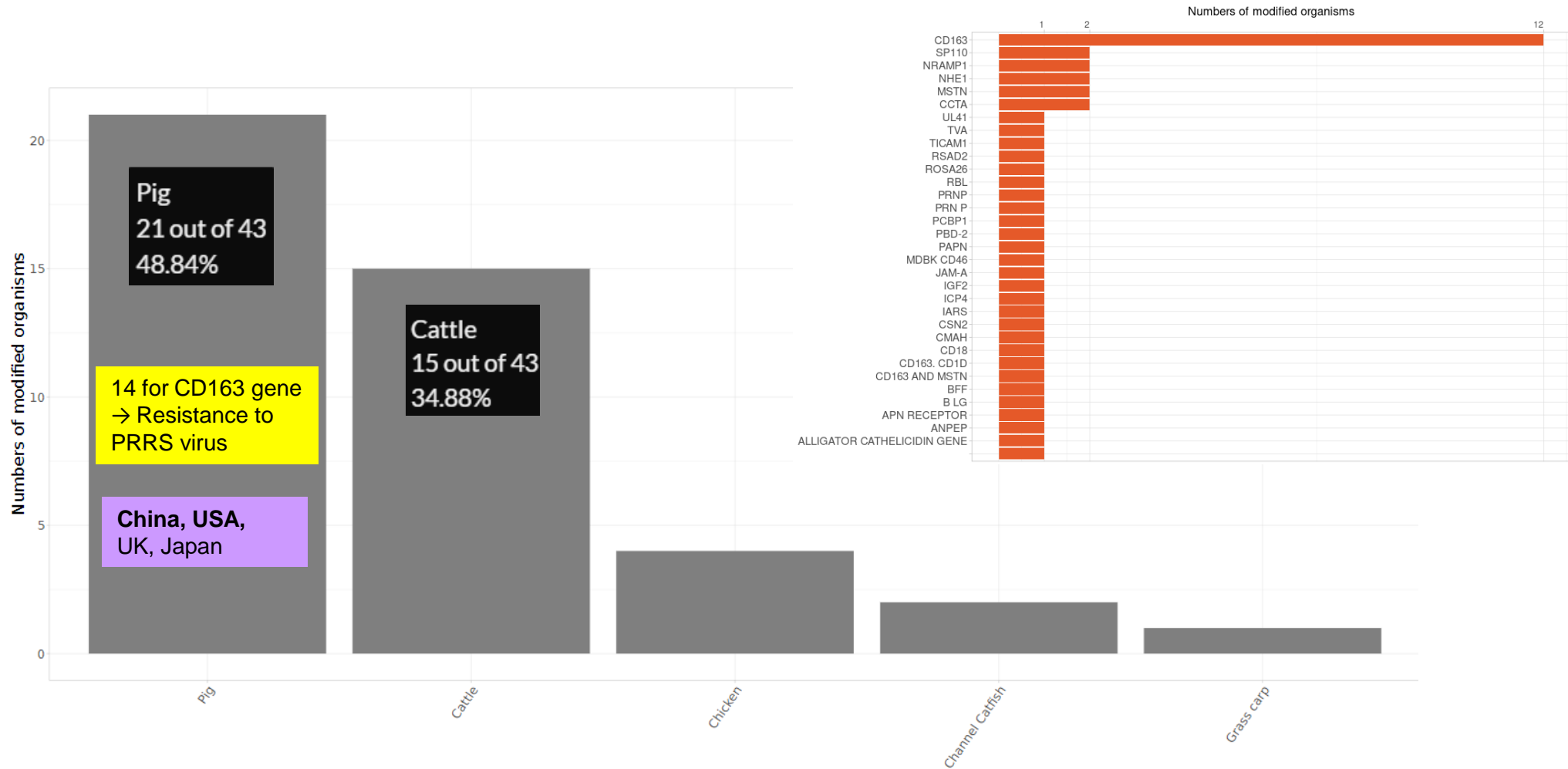
EFFAB & FABRE TP ANNUAL MEETING - 12 June 2024



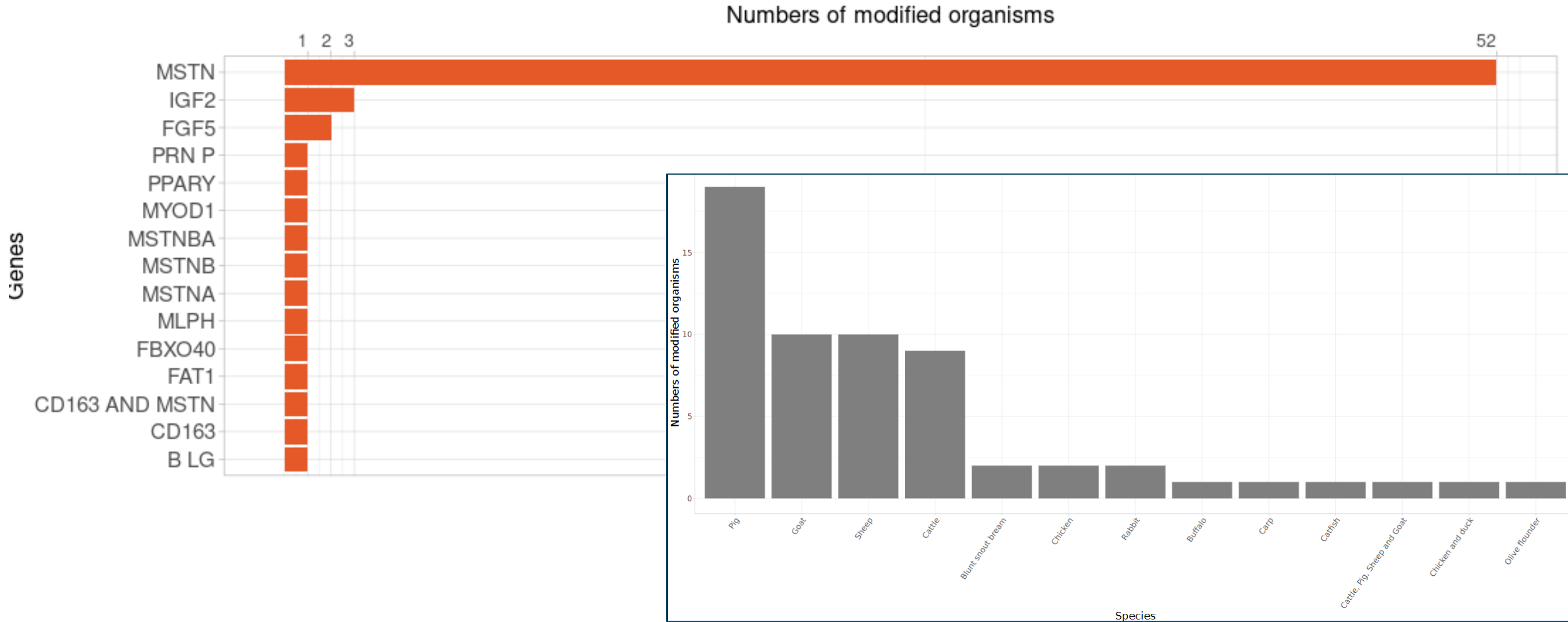
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GE animals – Biotic stress tolerance



GE animals – Meat production





www.detective-ngt.eu



Thank you for your attention !

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