



Horizon Europe

FARM2FORK Project

Enhanced and cost-effective
biosecurity in livestock
production



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Quantitative assessment of biosecurity in livestock farms: filling critical knowledge gaps

E. Biebaut, N. Caekebeke, L. Svennesen, A. Reilent, L. Ózsvári, M. Máté, K. Bárdos, C. Correia-Gomes, N. Meunier, E. Garcia Manzanilla, S. Bărăităreanu, T. Imperial, M. Meester, Y. Bakhshi, F. Velkers, L.R. Nielsen, J. Dewulf

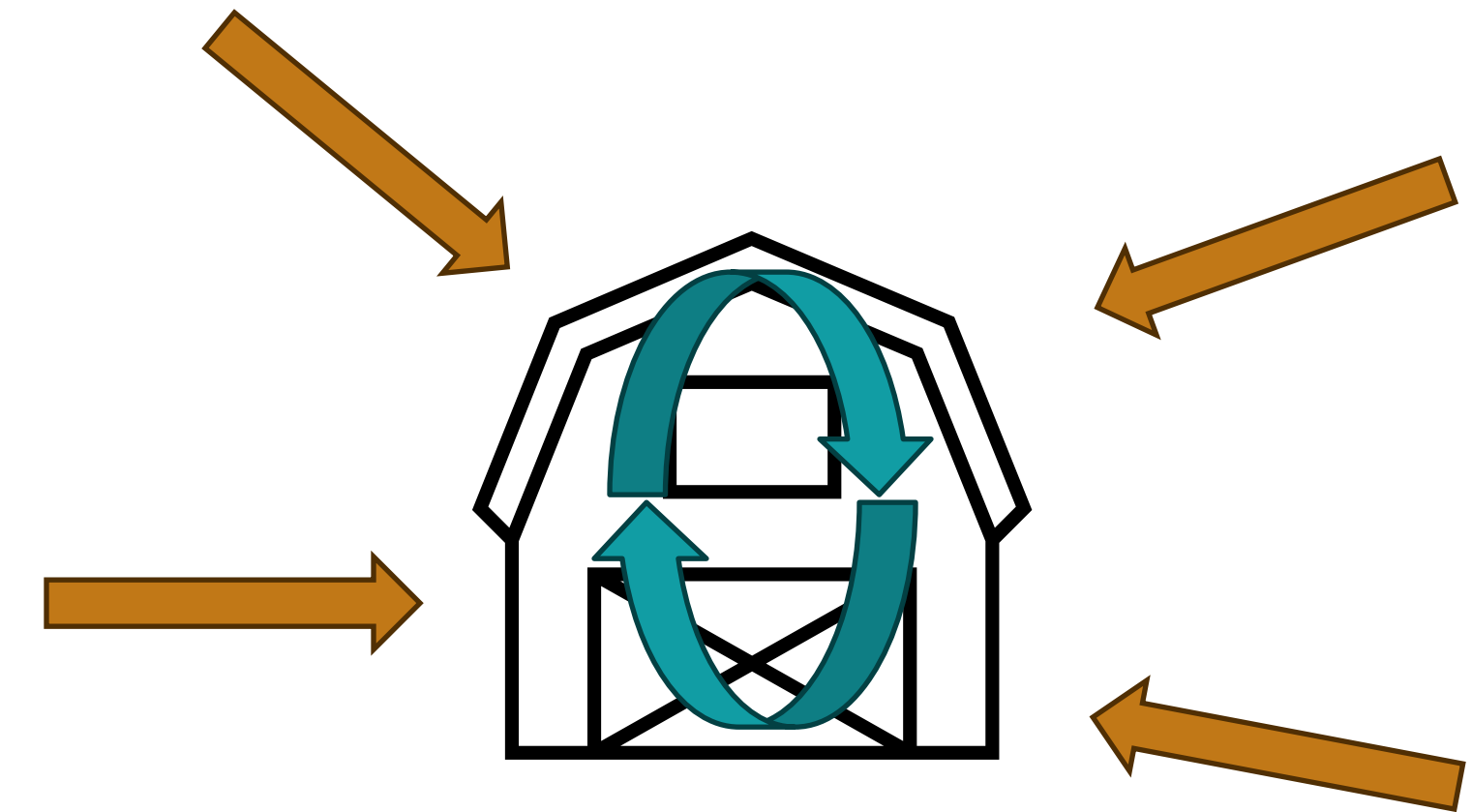


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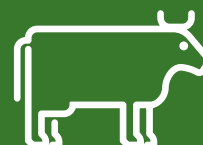

Biosecurity

- Defined by the WOAHA as...
- **External** vs. **Internal** biosecurity
- Increased biosecurity
 - ↗ Animal health – welfare – production
 - ↘ Diseased animals – antimicrobial usage
- Implementation levels on farm
 - Intensive farms: data present ✓
 - Outdoor, semi-intensive systems: data gap?



Filling data gaps


- Gaps identified via Biocheck.UGent database
- 396 farms visited between October 2023 – May 2024

										 	
	Indoor	Outdoor	Broiler	Broiler free-range	Layer	Layer free-range	Backyard	Beef	Dairy	Meat	Dairy
Denmark		9							13	18	
Estonia								20	25		
Hungary	33								22		10
Ireland	23				22			20	20		
Romania	11		16				36		10		6
Spain		21									20
Netherlands		11		15		15					

Assessing biosecurity



- Species – production type specific
- Survey
- Risk-based scoring system
- Biosecurity scores on 100 (total and subcategories)
- Freely available online



Pig

[→ Pigs indoor](#) Preferred

[→ Pigs indoor](#) Old version

[→ Pigs outdoor](#)

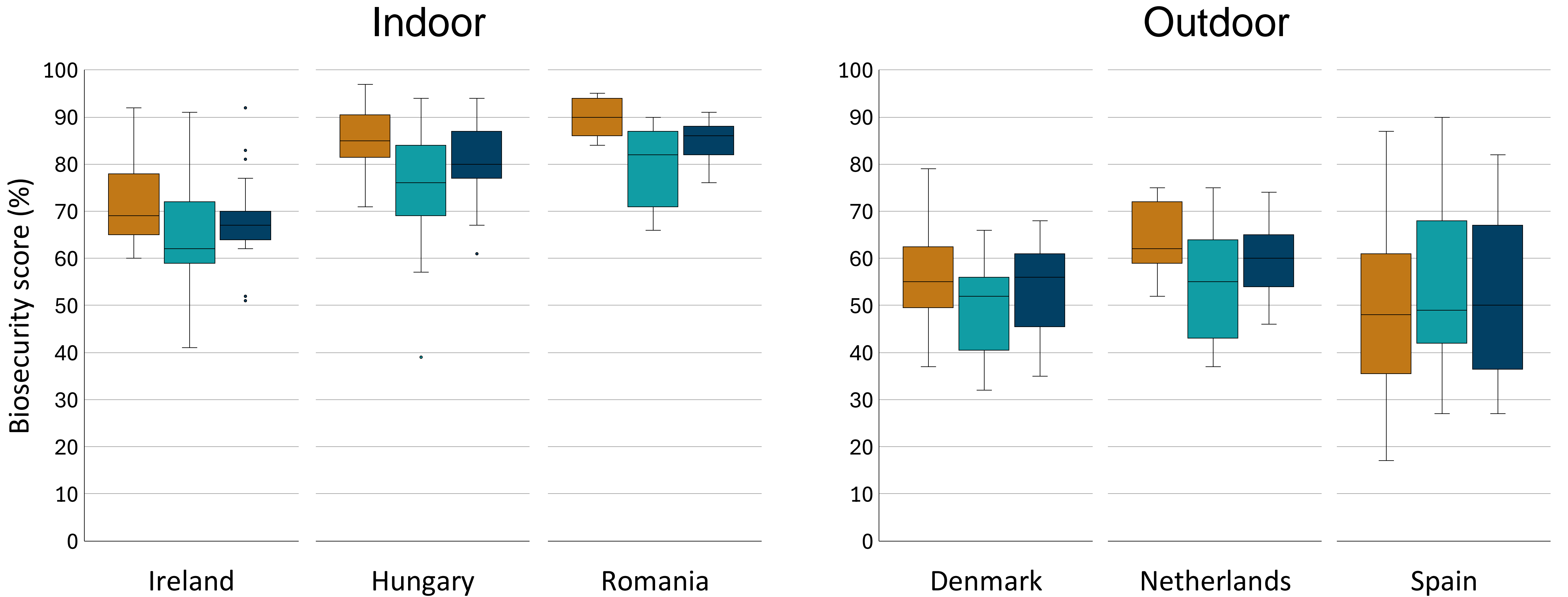
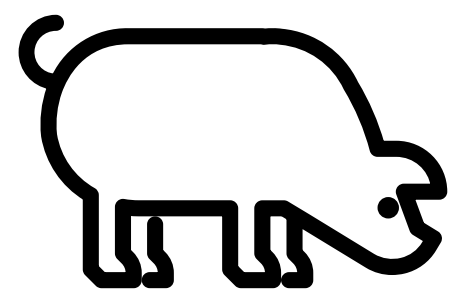
[→ Pig backyard/small-scale](#)


Cattle

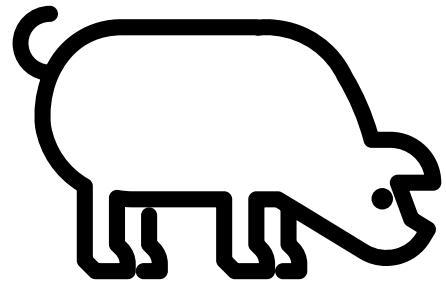
[→ Dairy](#)

Subcategory	Your score	Country average	World average
External biosecurity			
A. Infrastructure, location and housing	59 %	61 %	59 %
B. Organization of the farm and supply of materials	71 %	62 %	62 %
C. Visitors and personnel	82 %	68 %	67 %
D. Purchase of one-day-old chicks	N/A	79 %	73 %
E. Purchase of laying hens	0 %	72 %	75 %
F. Depopulation of laying hens	46 %	77 %	78 %
G. Transport of eggs	27 %	52 %	49 %
H. Feed and water supply	51 %	78 %	79 %
I. Manure and carcass removal	52 %	75 %	73 %
Subtotal External biosecurity	51 %	68 %	67 %

Pig production



Pig production



➤ Indoor

Country	External biosecurity category	Average score (± std) (%)
Ireland	Purchase of breeding pigs, piglets and semen	94.79 (±7.59)
Hungary Romania	Visitors and farm workers	97.09 (±5.24) 97.68 (±4.82)
Ireland	Visitors and farm workers	38.17 (±22.43)
Hungary Romania	Vermin and bird control	67.43 (±18.26) 71.39 (±18.41)

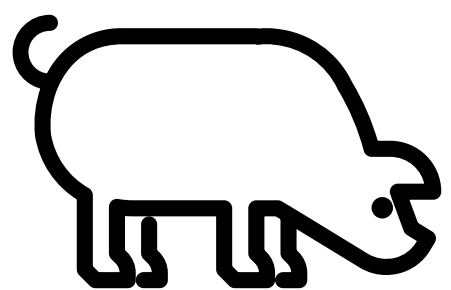
Country	Internal biosecurity category	Average score (± std) (%)
Ireland Hungary Romania	Disease management	87.83 (±19.33) 88.57 (±21.0) 90.0 (±19.31)
Ireland	Cleaning and disinfection	57.83 (±24.44)
Hungary Romania	Measures during farrowing and suckling period	55.82 (±16.31) 56.0 (±16.98)

➤ Outdoor

Country	External biosecurity category	Average score (± std) (%)
Netherlands	Purchase of breeding pigs, weaned piglets and semen	81.05 (±20.82)
Denmark Netherlands Spain	Vermin and bird control	33.36 (±27.86) 45.0 (±23.40) 33.31 (±30.60)

Country	Internal biosecurity category	Average score (± std) (%)
Denmark Netherlands Spain	Disease management	71.67 (±21.94) 76.48 (±20.19) 70.78 (±22.76)
Denmark Netherlands Spain	Measures between compartments, working lines, and use of equipment	30.36 (±23.27) 37.29 (±19.64) 31.09 (±23.75)

Pig production



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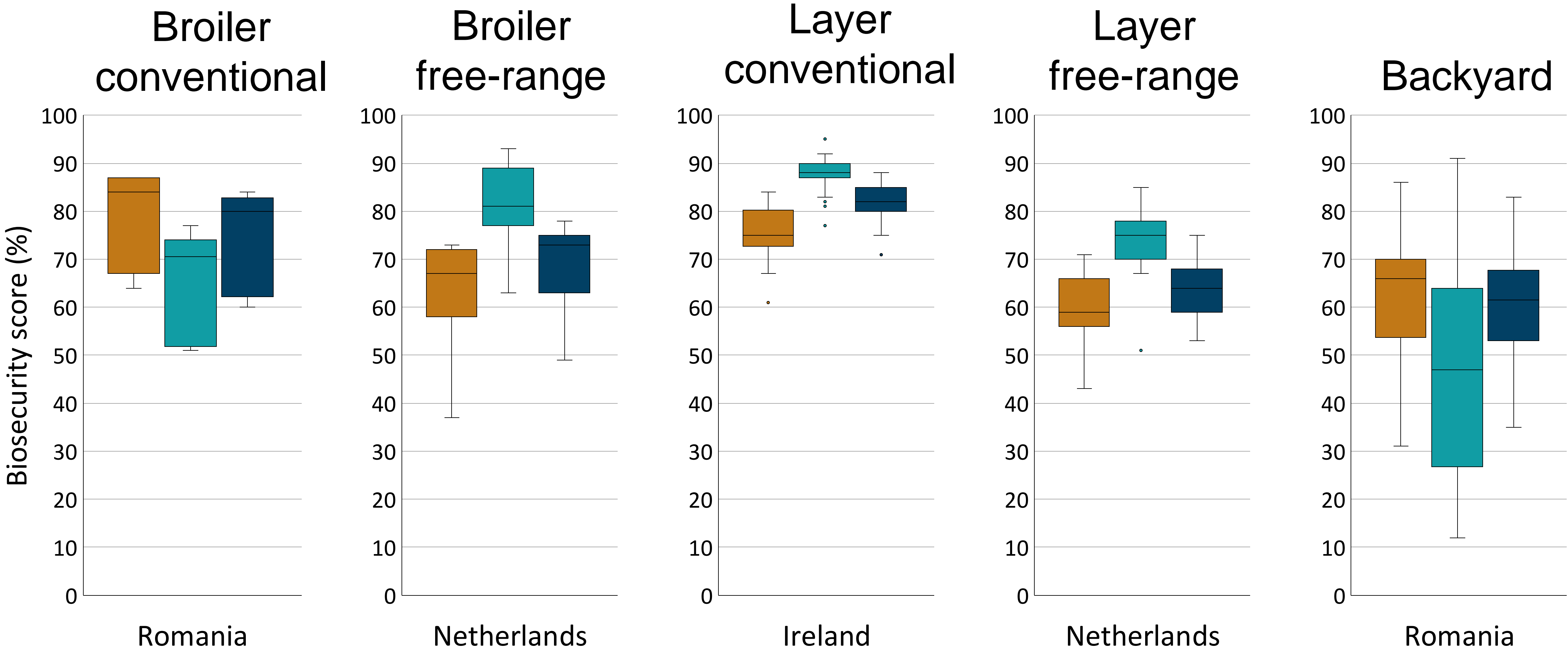
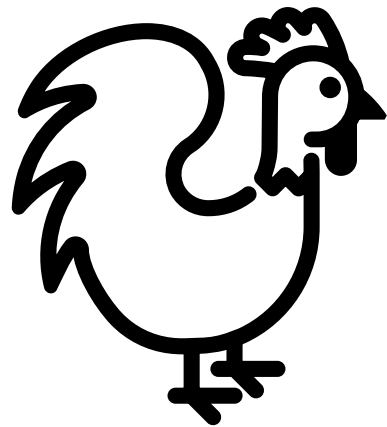
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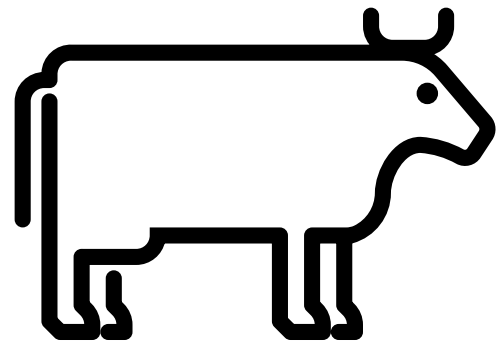
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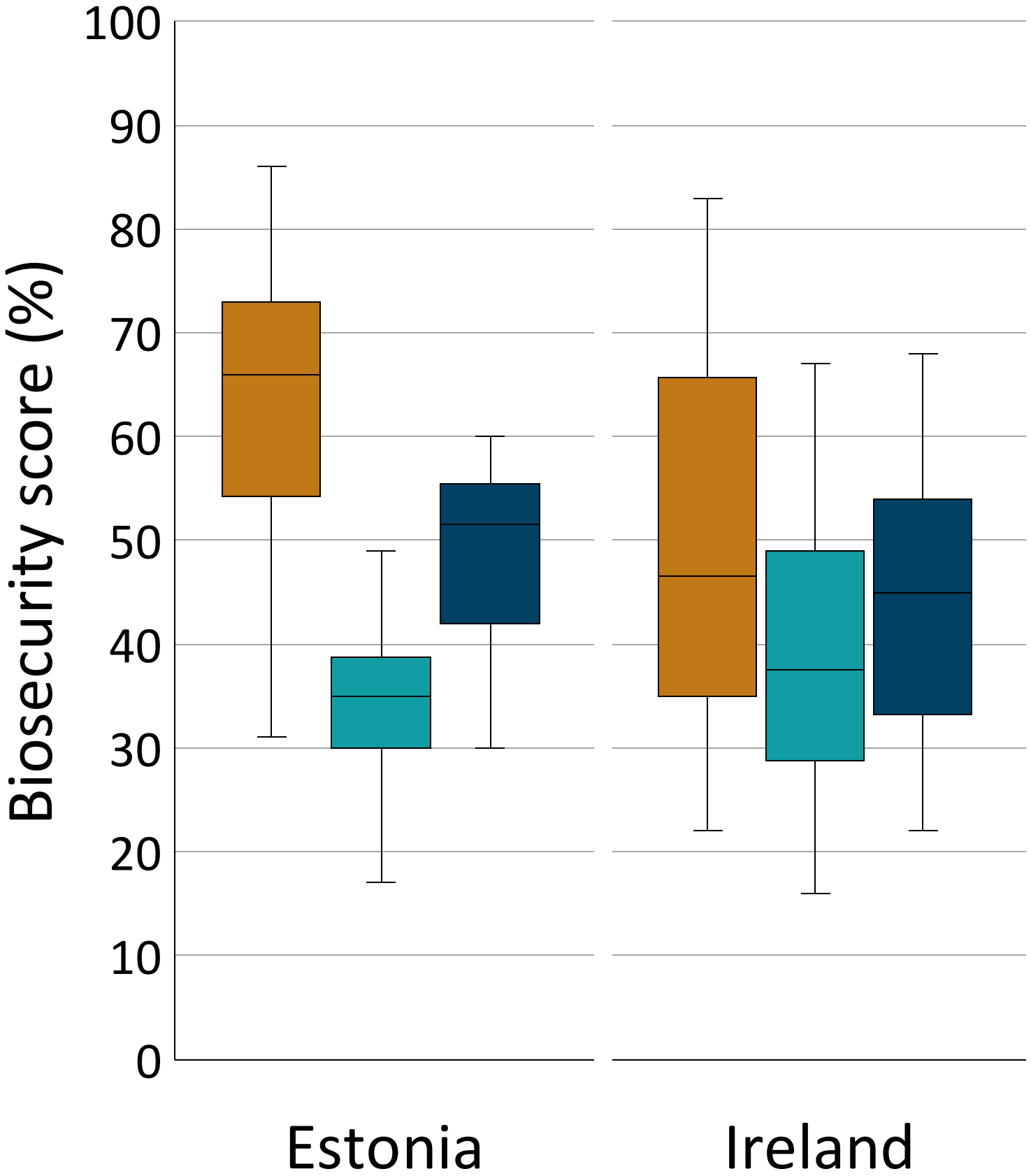
Poultry production



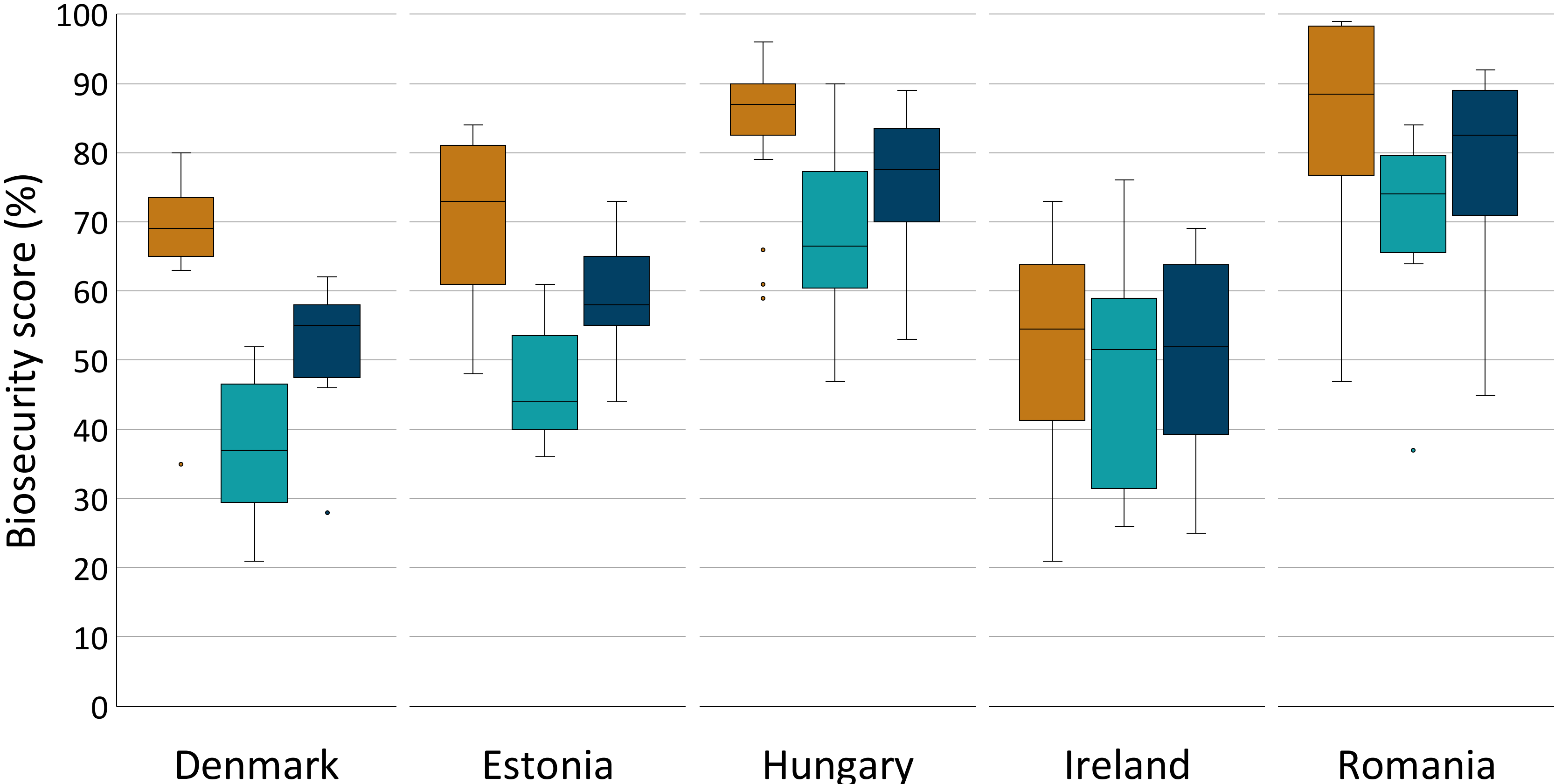
Cattle production



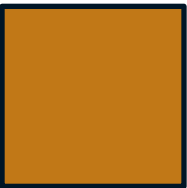
Beef



Dairy



Biosecurity score:



External

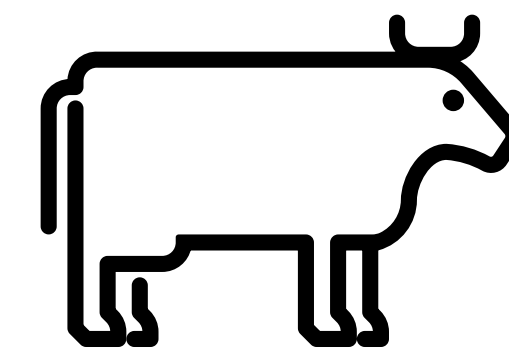


Internal



Total

Cattle production



➤ Beef

Country	External biosecurity category	Average score (± std) (%)
Estonia	Feed and water	56.63 (±18.54)
Estonia Ireland	Purchase and reproduction	53.0 (±27.44) 47.31 (±29.74)
Ireland	Vermin control and other animals	53.94 (±16.91)

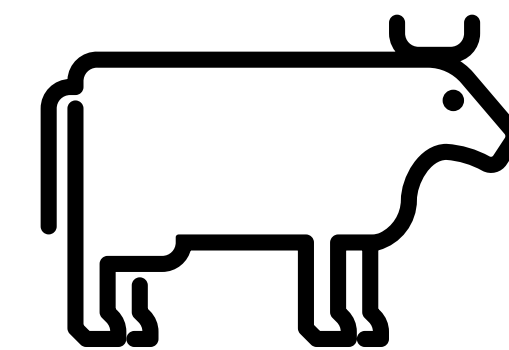
Country	Internal biosecurity category	Average score (± std) (%)
Estonia Ireland	Calf management	32.34 (±13.93) 35.69 (±16.56)
Estonia Ireland	Adult cattle management	28.91 (±29.91) 35.31 (±34.25)

➤ Dairy

Country	External biosecurity category	Average score (± std) (%)
Denmark Estonia Hungary	Purchase and reproduction	91.31 (±17.35) 83.24 (±25.77) 95.14 (±10.85)
Romania	Transport and carcass removal	89.20 (±10.41)
Ireland	Purchase and reproduction	47.10 (±27.67)
Denmark Estonia	Transport and carcass removal	38.15 (±13.48) 46.80 (±12.40)

Country	Internal biosecurity category	Average score (± std) (%)
Romania	Health management	84.30 (±13.80)
Hungary	Calf management	75.23 (±10.65)
Denmark Estonia	Calving management	22.77 (±8.67) 36.48 (±11.81)
Denmark Ireland	Adult cattle management	25.54 (±12.99) 39.10 (±24.23)
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Cattle production



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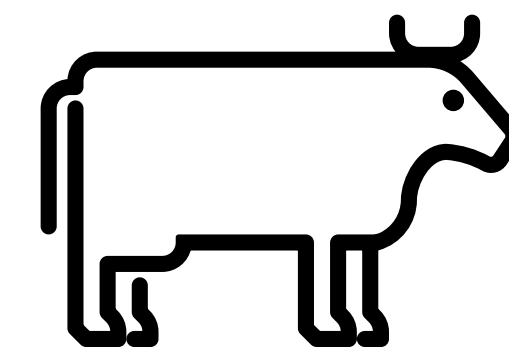
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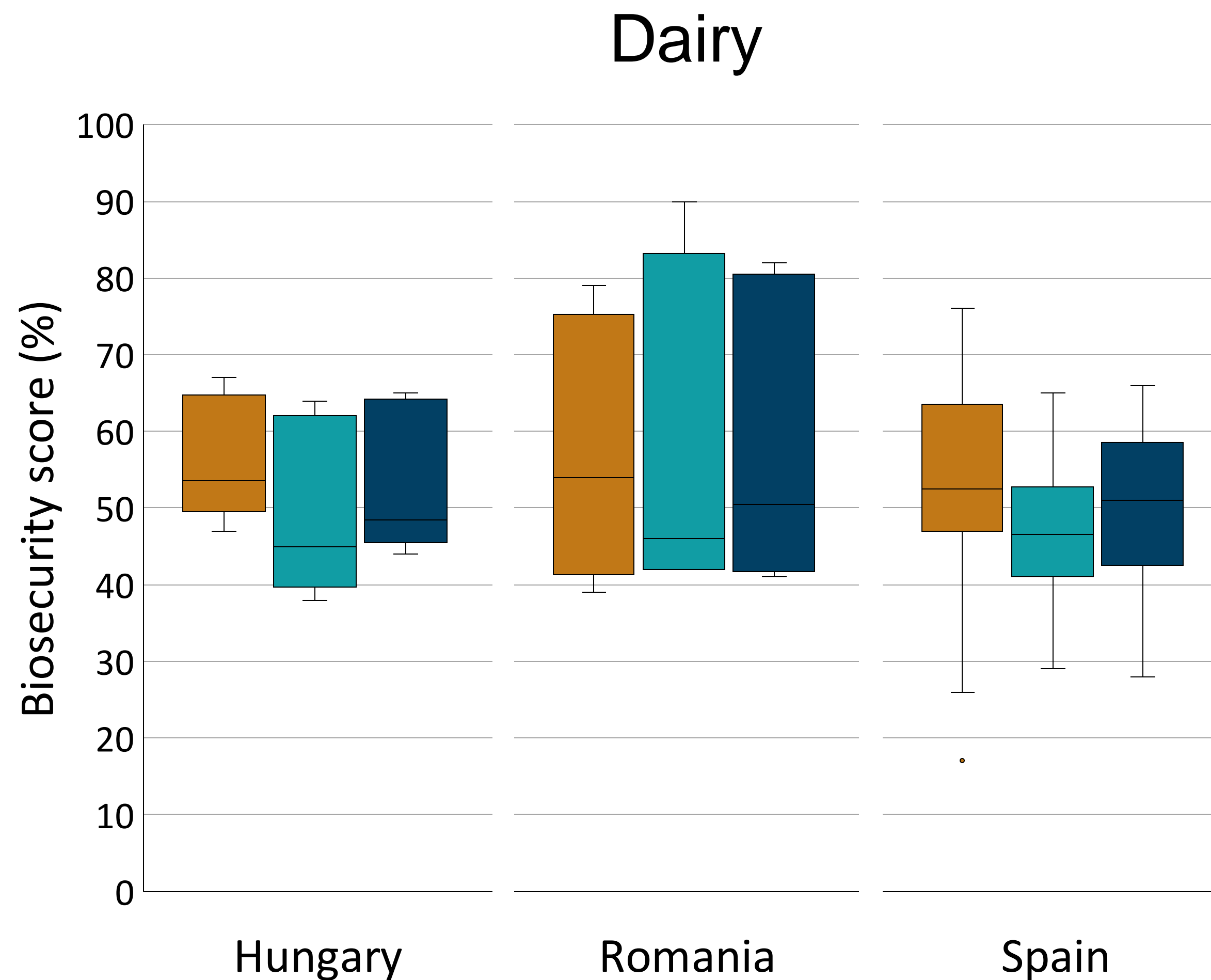
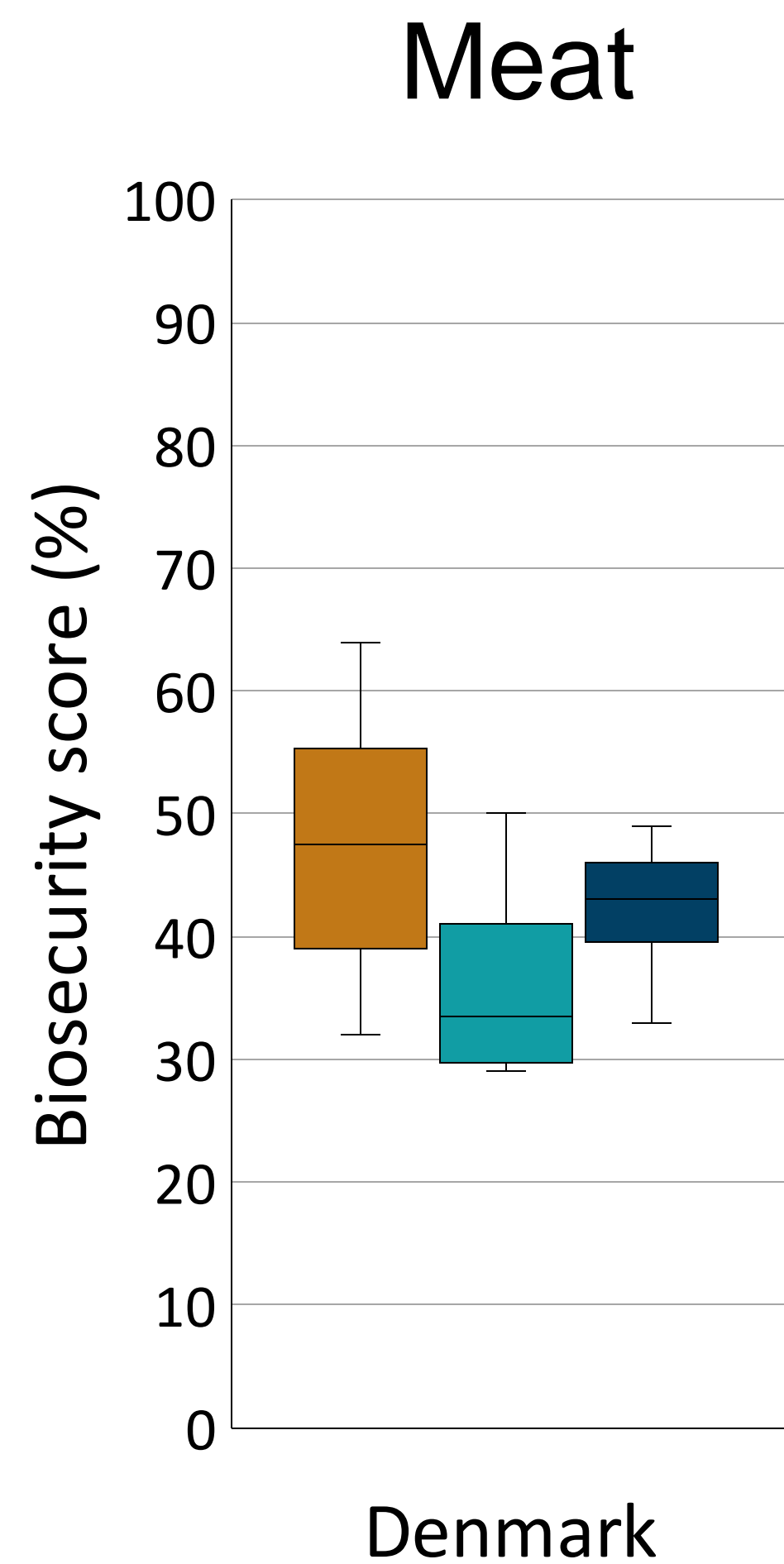
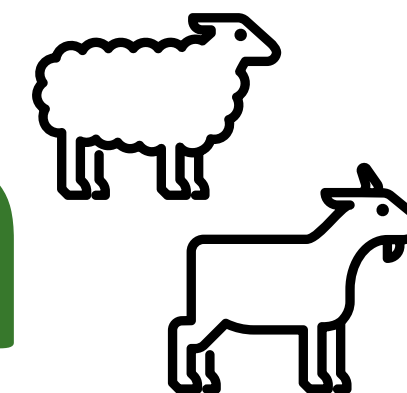
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Small ruminant production



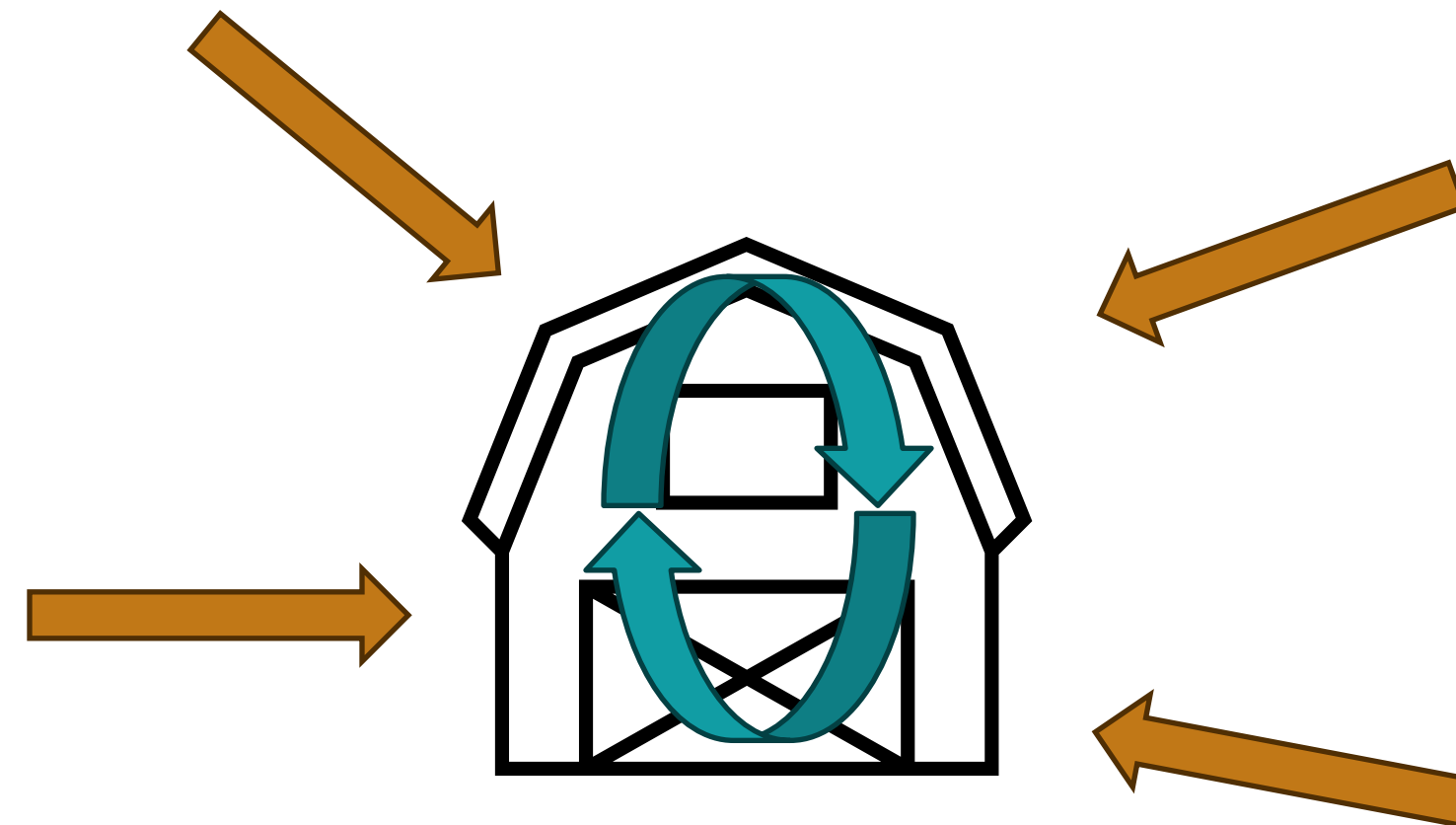
Discussion

➤ In general

- Farming types with outdoor access lower biosecurity compared to indoor systems



- **External** biosecurity scores higher than **internal** biosecurity



Discussion

➤ In general

- Farming types with outdoor access lower biosecurity compared to indoor systems
- External biosecurity scores higher than internal biosecurity

➤ 396 farms but

- Limited number species/production type/country combinations
- Some bias possible but in accordance with Biocheck.UGent database


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Here you can find the worldwide biosecurity averages based on all surveys representing a real herd.
These statistics are provided per country and species or production type.

Select an animal species



Pig



Cattle



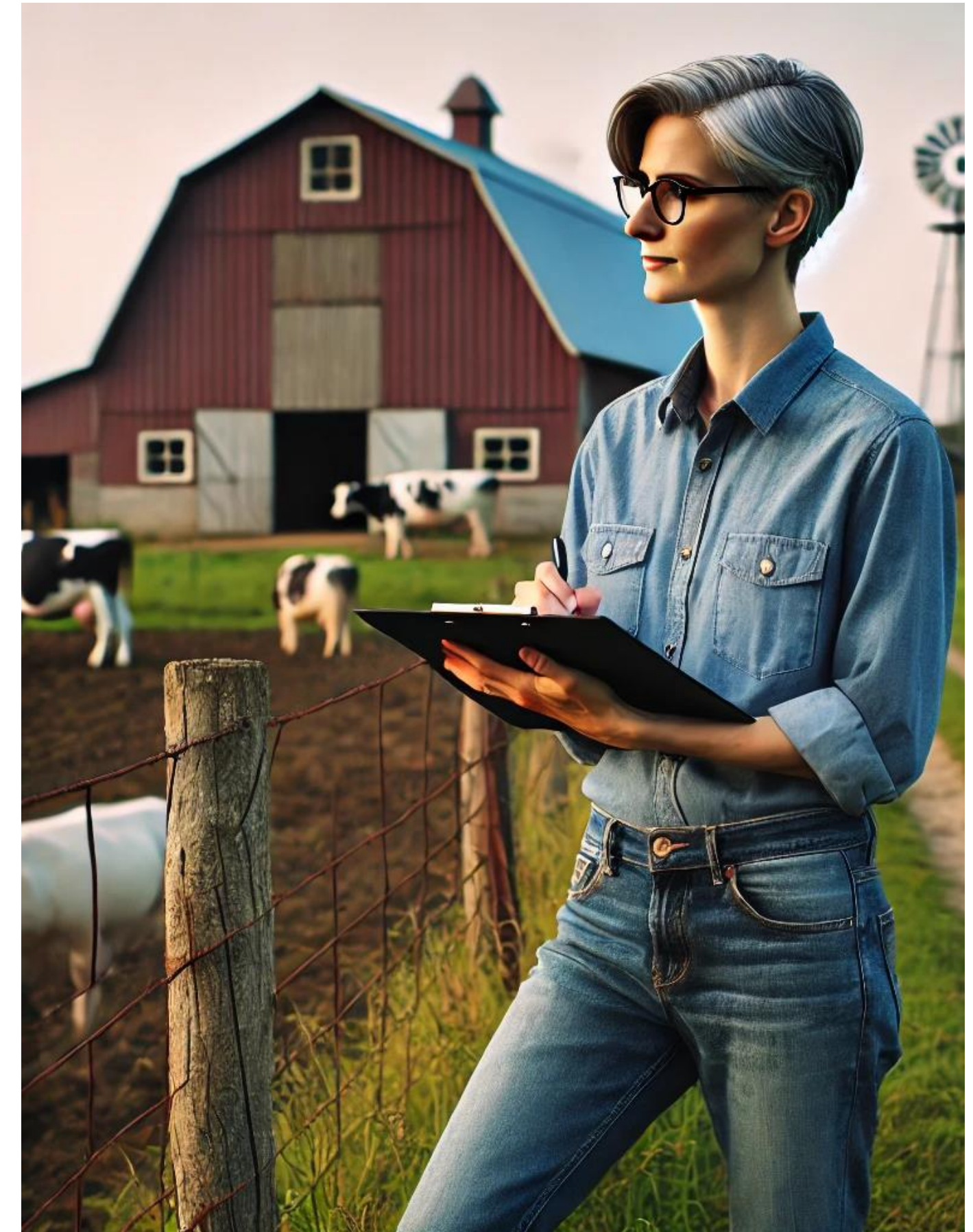
Small ruminants



Poultry

Recommendation

- Do not blindly extrapolate
- Assess the on-farm biosecurity
- Use the results as a starting point to talk to the farmer



To measure is to know!



More information



<https://biosecure.eu/>



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Dr. Jeroen Dewulf
Veterinarian,
Professor,
Founder

Episode 5

The link between
biosecurity and
sustainability



Liza Rosenbaum Nielsen

Professor,
Department of Veterinary and Animal Sciences,
University of Copenhagen



PODCAST



Dr. Jeroen Dewulf
Veterinarian,
Professor,
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Episode 3

Exploring technical
tools to ensure
biosecurity



Carlos Piñeiro
Animal Data Analytics



PODCAST



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Thank you!

Any questions?

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Ghent University
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