



# WOAH AMU Data Collection - Aquaculture

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Regional ANIMUSE Training for WOAH Focal Points for Veterinary Products - Europe  
07-09<sup>th</sup> September 2023



- Subcategorization of aquatic animals in the ANIMUSE questionnaire
- Highlights of the global survey on AMU/AMR in aquaculture – Europe

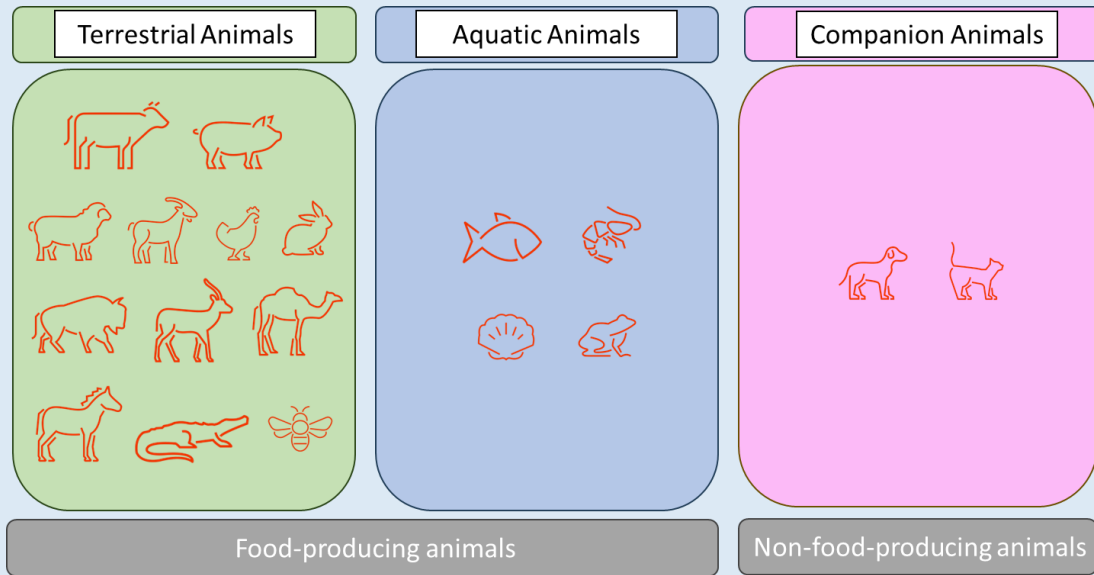




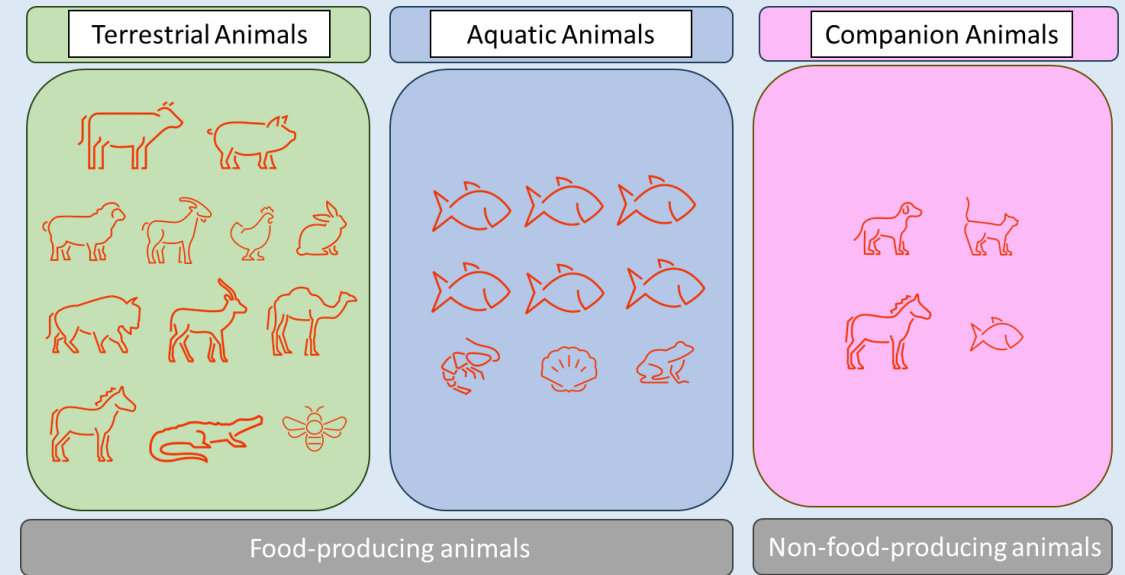
- **Subcategorization of aquatic animals in the ANIMUSE questionnaire**
- Highlights of the global survey on AMU/AMR in aquaculture – Europe



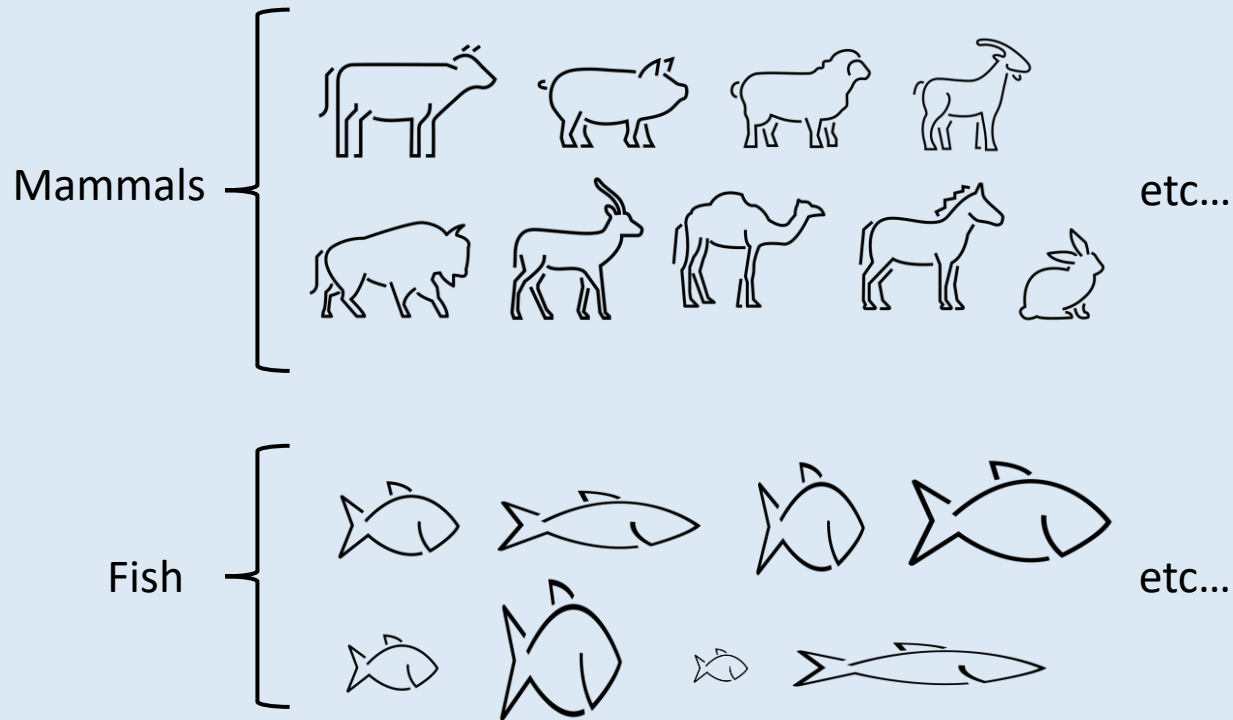
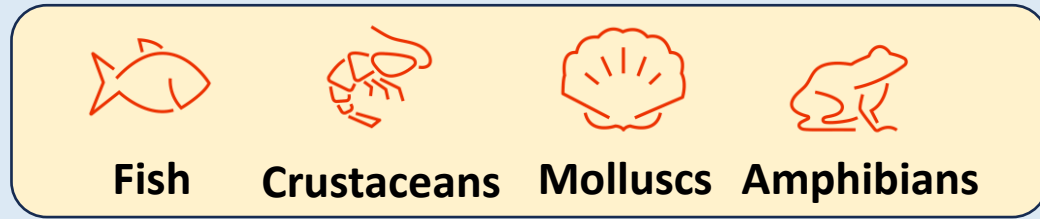
## Until 6<sup>th</sup> Round



## From 7<sup>th</sup> Round



## Categorization of Aquatic Animals until the 6<sup>th</sup> Round



### Aquaculture diversity

- **24 main fish species** (out of **313** cultured species)
- **8 main crustacean species** (out of **49** cultured species)





# World production of major aquaculture fish and crustacean species

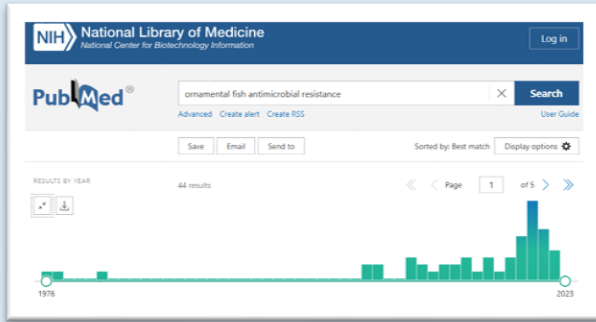
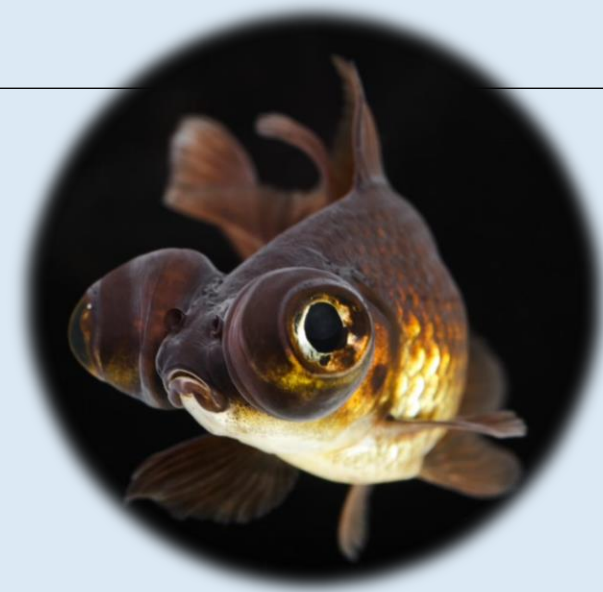
## FISH

Cichlids	Cyprinids	Salmonids	Siluriformes	Marine	Other
Nile tilapia: 4.5	Grass carp: 5.8	Atlantic salmon*: 2.7	Striped catfish: 2.5	Mulletts nei: 0.3	Milkfish*: 1.2
Tilapias nei: 1.1	Silver carp: 4.9	Rainbow trout: 1.0	Clarias catfishes: 1.2	Gilthead seabream: 0.3	Largemouth black bass: 0.6
	Common carp: 4.2	Coho salmon: 0.2		Large yellow croaker: 2.5	Barramundi*: 0.1
	Catla: 3.5			European seabass: 2.4	
	Bighead carp: 3.2			Groupers nei: 0.2	
	<i>Carassius</i> spp.: 2.7			Japanese seabass: 0.2	
	Roho labeo: 2.5			Pompano: 0.2	
	Wuchang bream: 0.8			Japanese amberjack: 0.1	
	Black carp: 0.7				
<b>5.6</b>	<b>28.3</b>	<b>3.9</b>	<b>3.7</b>	<b>6.2</b>	<b>1.9</b>

## CRUSTACEANS

Penaeids	Other
Whiteleg shrimp: 5.8	Red swamp crawfish: 2.5
Giant tiger prawn: 0.7	Chinese mitten crab: 0.8
	Giant river prawn: 0.3
	Indo-Pacific swamp crab: 0.2
	Oriental river prawn: 0.2
	Green mud crab: 0.2
<b>6.5</b>	<b>4.2</b>

Values in million tonnes (FAO 2020); nei: not elsewhere included; \*: euryhaline species



**Veterinary Microbiology**  
Volume 171, Issues 3-4, 16 July 2014, Pages 413-421

**Ornamental fish as a source of plasmid-mediated quinolone resistance genes and antibiotic resistance plasmids**  
Hana Dobiasova<sup>1</sup>\*, Jaa Kutilova<sup>2</sup>, Veronika Plackova<sup>2</sup>, Tomas Vesely<sup>2</sup>, Alois Cizek<sup>1</sup>\*, Monika Duleta<sup>1</sup>

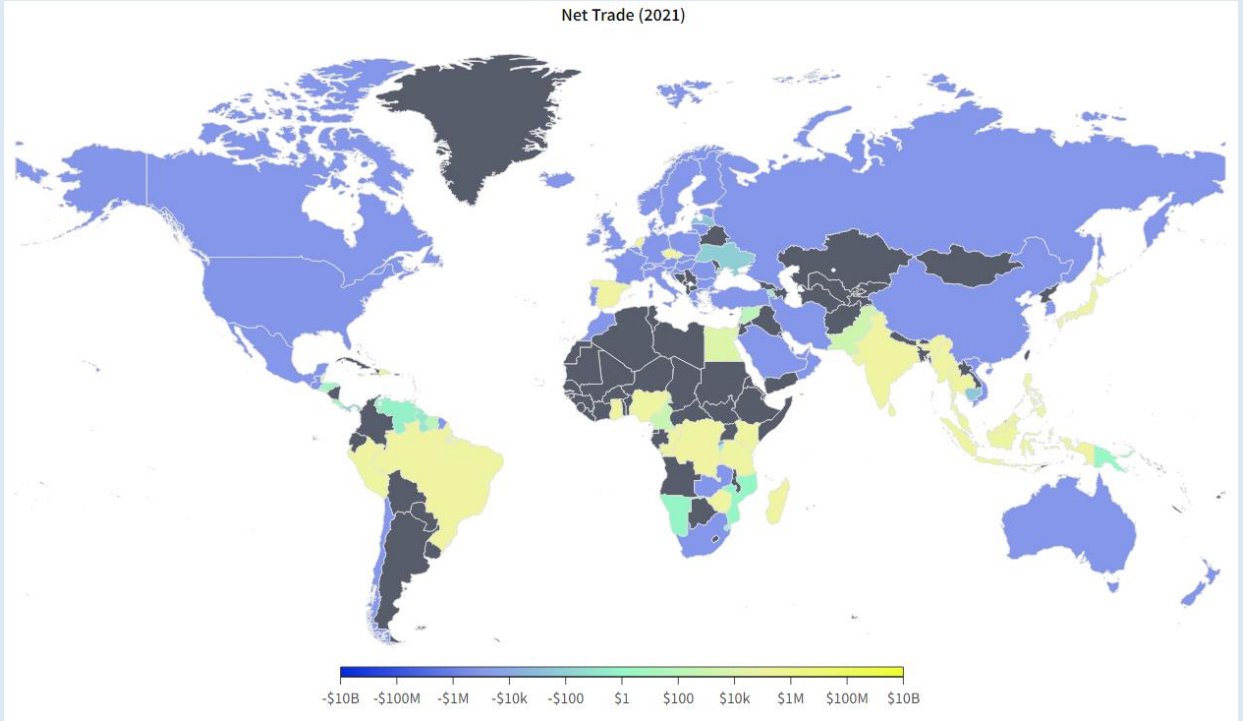
**Letters in Applied Microbiology**  
Special Issue Article  
**Diversity of antimicrobial-resistant pathogens from a freshwater ornamental fish farm**  
P.G. Preene<sup>1</sup>, D. Arathi<sup>1</sup>, N. Sundar Raj<sup>1</sup>, T.V. Arun Kumar<sup>1</sup>, S. Arun Raja<sup>1</sup>, R.N. Breshma<sup>1</sup>, T. Raja Swaminathan  
First published: 10 October 2019 | <https://doi.org/10.1111/lam.13231> | Citations: 27

**Journal Article** EDITOR'S CHOICE  
**Ornamental fish: a potential source of pathogenic and multidrug-resistant motile *Aeromonas* spp.**  
S. Hossain, G.-J. Heo

**Abstract**  
*Aeromonas* spp. are ubiquitous bacteria that cause diseases in fish and other aquatic animals. They are the natural inhabitants of different aquatic environments, such as freshwater, brackishwater and marine water. Extrinsic stressors, such as crowding, unhygienic handling, poor water quality, polluted feeding and inadequate nutrition, can predispose fish to *Aeromonas* infection. In ornamental fish, motile *Aeromonas* spp. are known as aetiological agents of motile aeromonad infections, which cause significant mortality in fish and economic loss in the ornamental fish industry. The existence of different virulence factors leads to the virulence potential of motile *Aeromonas* spp. There are several antimicrobials used to treat bacterial infections in ornamental fish. However, the extensive use of antimicrobials in the ornamental fish industry causes multidrug resistance. This article reviewed a multitude of virulence factors that are related to the ornamental fish-borne *Aeromonas* pathogenicity and the antimicrobial resistance determinants related to the multidrug

**Imported ornamental fish are colonized with antibiotic-resistant bacteria**  
S. Rose<sup>1</sup>, R. Hill, L. E. Bermudez, T. Miller-Morgan  
Affiliations + expand  
PMID: 23294440

**Abstract**  
There has been growing concern about the possible effects of antibiotic resistance genes in these fish. The aim of this study was to determine the prevalence of antibiotic resistance genes in imported ornamental fish. A total of 100 fish from 10 different countries were sampled. The results showed that 100% of the fish were colonized with antibiotic-resistant bacteria. The most common resistance genes were *bla*<sub>TEM</sub>, *bla*<sub>SHV</sub>, *bla*<sub>CTX-M</sub>, *bla*<sub>OXA</sub>, *catA*, *catB*, *catC*, *catD*, *catE*, *catF*, *catG*, *catH*, *catI*, *catJ*, *catK*, *catL*, *catM*, *catN*, *catO*, *catP*, *catQ*, *catR*, *catS*, *catT*, *catU*, *catV*, *catW*, *catX*, *catY*, *catZ*, *catAA*, *catAB*, *catAC*, *catAD*, *catAE*, *catAF*, *catAG*, *catAH*, *catAI*, *catAJ*, *catAK*, *catAL*, *catAM*, *catAN*, *catAO*, *catAP*, *catAQ*, *catAR*, *catAS*, *catAT*, *catAU*, *catAV*, *catAW*, *catAX*, *catAY*, *catAZ*, *catBA*, *catBB*, *catBC*, *catBD*, *catBE*, *catBF*, *catBG*, *catBH*, *catBI*, *catBJ*, *catBK*, *catBL*, *catBM*, *catBN*, *catBO*, *catBP*, *catBQ*, *catBR*, *catBS*, *catBT*, *catBU*, *catBV*, *catBW*, *catBX*, *catBY*, *catBZ*, *catCA*, *catCB*, *catCC*, *catCD*, *catCE*, *catCF*, *catCG*, *catCH*, *catCI*, *catCJ*, *catCK*, *catCL*, *catCM*, *catCN*, *catCO*, *catCP*, *catCQ*, *catCR*, *catCS*, *catCT*, *catCU*, *catCV*, 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Source: The Observatory Economic Complexity

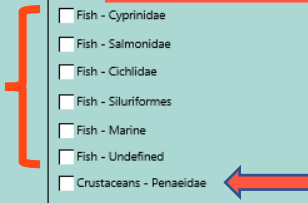


# Modifications on fish and crustacean species in AMU global data collection Template

Since Sep 2021 (7<sup>th</sup> round)



<p>25 <b>Food-producing animal species covered by the information on antimicrobial quantities</b></p>	<p><b>Terrestrial food-producing animals</b></p> <p><input type="checkbox"/> Cattle  <input type="checkbox"/> Pigs - commercial  <input type="checkbox"/> Pigs - backyard  <input type="checkbox"/> Sheep  <input type="checkbox"/> Goats  <input type="checkbox"/> Sheep and goats (mixed flocks)  <input type="checkbox"/> Layers - commercial production for eggs  <input type="checkbox"/> Broilers - commercial production for meat  <input type="checkbox"/> Other commercial poultry  <input type="checkbox"/> Poultry - backyard  <input type="checkbox"/> Buffaloes (excluding Syncerus caffer)  <input type="checkbox"/> Cervidae (farmed)  <input type="checkbox"/> Camelidae  <input type="checkbox"/> Equidae  <input type="checkbox"/> Rabbits  <input type="checkbox"/> Bees - honey  <input type="checkbox"/> Reptiles (e.g. crocodiles)</p> <p><b>Other terrestrial food-producing animals</b>  <input type="checkbox"/> Other</p> <p><b>All terrestrial food-producing animals</b>  <input type="checkbox"/> All - terrestrial food-producing animals</p> <p><b>Aquatic food-producing animals (aquaculture)</b></p> <p><input type="checkbox"/> Fish - Cyprinidae  <input type="checkbox"/> Fish - Salmonidae  <input type="checkbox"/> Fish - Cichlidae  <input type="checkbox"/> Fish - Siluriformes  <input type="checkbox"/> Fish - Marine  <input type="checkbox"/> Fish - Undefined  <input type="checkbox"/> Crustaceans - Penaeidae  <input type="checkbox"/> Molluscs  <input type="checkbox"/> Amphibians</p> <p><b>Other aquatic food-producing animals (aquaculture)</b>  <input type="checkbox"/> Other</p> <p><b>All aquatic food-producing animals (aquaculture)</b>  <input type="checkbox"/> All - aquatic food-producing animals (aquaculture)</p>	<p>Please indicate which food-producing animals are covered by the data. Multiple selections are possible.</p> <p>For the purpose of this database, the following terms are defined:</p> <p><b>1. Terrestrial food-producing animals</b>  <b>Pigs – commercial:</b> pigs including piglets, fattening pigs and breeding pigs.  <b>Sheep/goats (mixed flocks):</b> use this option only if there are mixed flocks and you cannot differentiate between sheep and goats in your country.  <b>Other commercial poultry:</b> it includes turkey, duck, geese, quail, guinea fowl, pheasant, pigeon, ostrich, etc. in commercial production.  <b>Poultry – backyard:</b> poultry including chickens and hens in backyard or village flocks.  <b>Equidae:</b> horses, donkeys and their crosses.  <b>All – terrestrial food-producing animals:</b> use this option only if all terrestrial food-producing animals listed in question 25 (e.g. cattle, pig-commercial, pigs - backyard, etc.) were included in the information on antimicrobial quantities.</p> <p><b>2. Aquatic food-producing animals (aquaculture)</b>  <b>Fish – Cyprinidae:</b> carp, etc.  <b>Fish – Salmonidae:</b> salmon, trout, etc.  <b>Fish – Cichlidae:</b> tilapia, etc.  <b>Fish – Siluriformes:</b> catfish, etc.  <b>Crustaceans – Penaeidae:</b> marine shrimp/prawn.  <b>All – aquatic food-producing animals (aquaculture):</b> use this option only if all aquatic food-producing animals listed in question 25 (e.g. Fish - Cyprinidae, Fish - Salmonidae, Crustaceans - Penaeidae, Molluscs, etc.) were included in the information on antimicrobial quantities.</p>
<p>27 <b>Non food-producing animal species covered by antimicrobial quantities, if any</b></p>	<p><input type="checkbox"/> Canines  <input type="checkbox"/> Felines  <input type="checkbox"/> Equidae  <input type="checkbox"/> Ornamental Fish  <input type="checkbox"/> Other</p>	<p>Please indicate which non food-producing animals are covered by the data. Multiple selections are possible.</p>
<p>28 <i>Clarification of other species considered to be non food-producing animals, if your response to Question 27 is 'Other'</i></p>	<p>&lt;free text field&gt;</p>	







# Modifications on fish and crustacean species in ANIMUSE questionnaire

Since Sep 2022 (8<sup>th</sup> round)

## 11 Animal species covered by the information on antimicrobial quantities.



### Terrestrial food-producing animals

- Cattle
- Pigs - commercial
- Pigs - backyard
- Sheep
- Goats
- Sheep and goats (mixed flocks)
- Layers - commercial production for eggs
- Broilers - commercial production for meat
- Poultry - backyard
- Other commercial poultry
- Buffaloes (excluding *Syncerus caffer*)
- Cervidae (farmed)
- Camelidae
- Equidae
- Rabbit/Hares
- Bees
- Reptiles (e.g. crocodiles)
- Other
- All

### Aquatic food-producing animals

- Fish - Cyprinidae
- Fish - Salmonidae
- Fish - Cichlidae
- Fish - Siluriformes
- Fish - Marine
- Fish - Undefined
- Crustaceans - Penaeidae
- Molluscs
- Amphibians
- Other
- All

### Non-food-producing animals

- Canines
- Felines
- Equidae
- Ornamental Fish
- Other



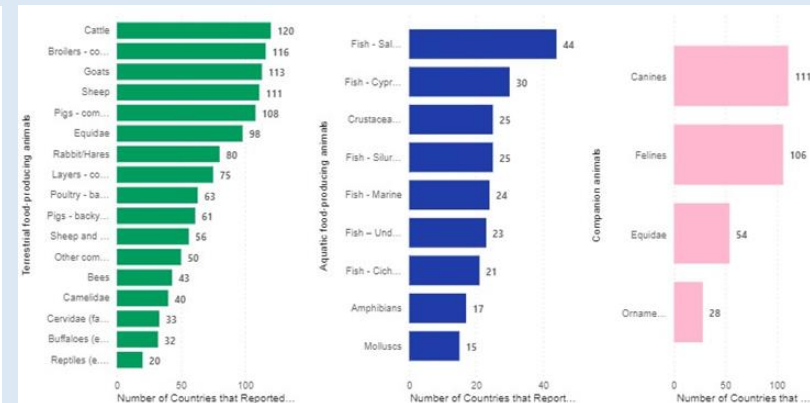
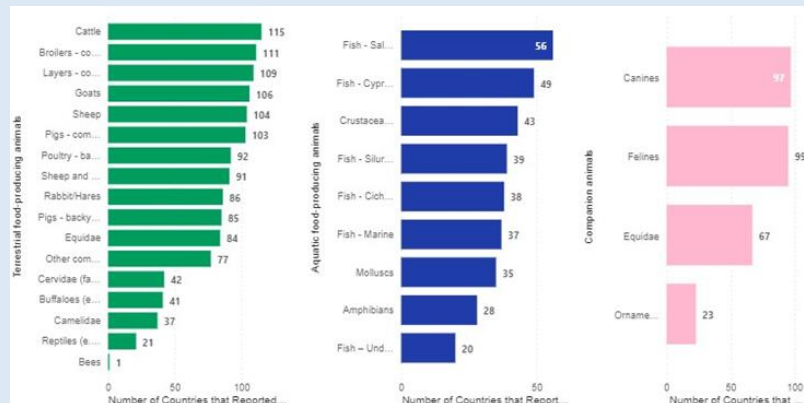
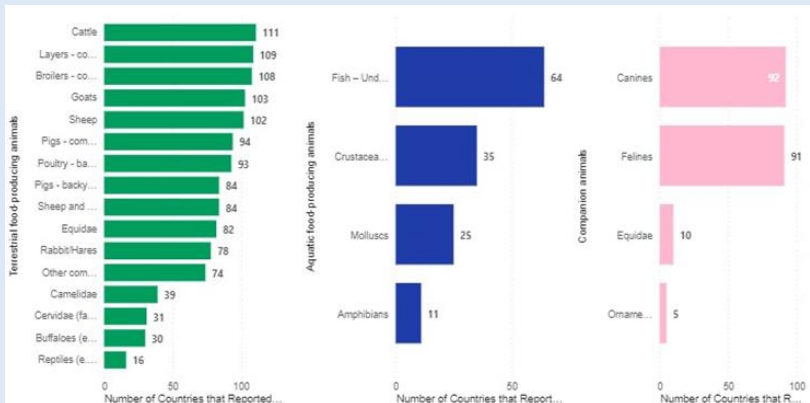
# Number of countries including aquatic animals in total AMU quantities

### 6th round

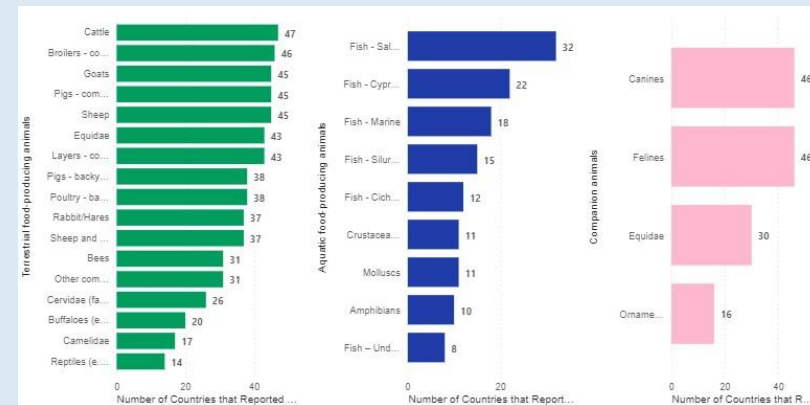
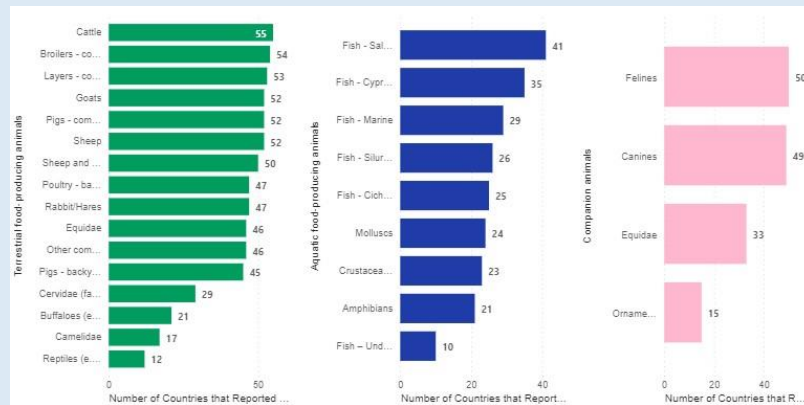
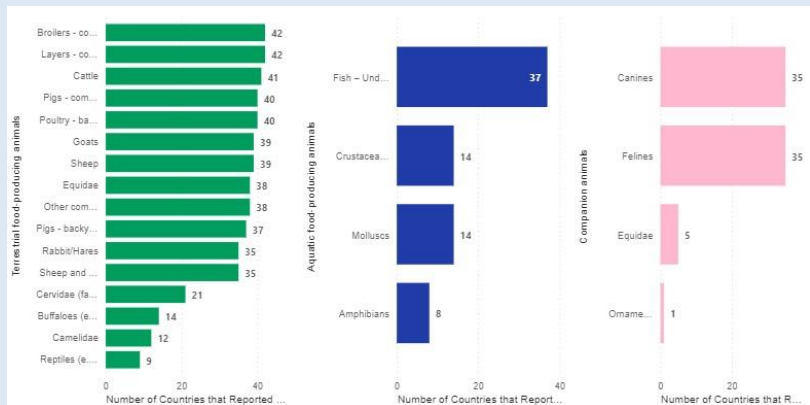
### 7th round

### 8th round

## GLOBAL



## EUROPE





- Subcategorization of aquatic animals in the ANIMUSE questionnaire
- Highlights of the global survey on AMU/AMR in aquaculture – Europe



## Focal Points for

- Aquatic Animals
- Veterinary Products

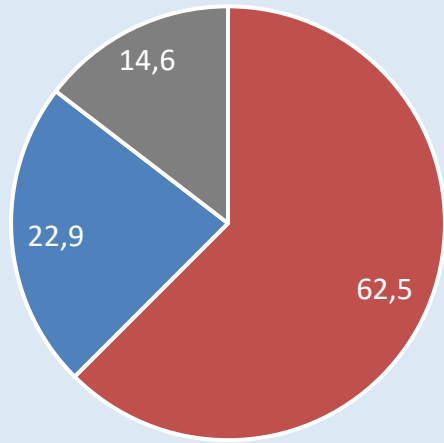
Support development of Formation Plan for FP on AMR in Aquaculture (needs/gaps and strengths in each Region)



- A) General aquaculture profile
- B) Antimicrobial use and antimicrobial resistance in aquaculture profile
- C) Awareness and compliance to WOAHA standards and tools related to AMU/AMR in aquatic animals
- D) Training needs on AMU/AMR in aquatic animals

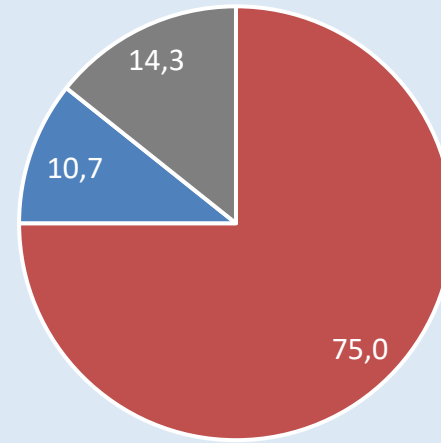
Region	FP-AA	FP-VP	Total FP	Total countries
Africa	25	17	42	31
Americas	22	14	36	24
Asia	15	7	22	19
Europe	30	15	45	33
Middle East	8	4	12	10
			<b>157</b>	<b>117</b>

Antibiotic use in aquaculture - Global



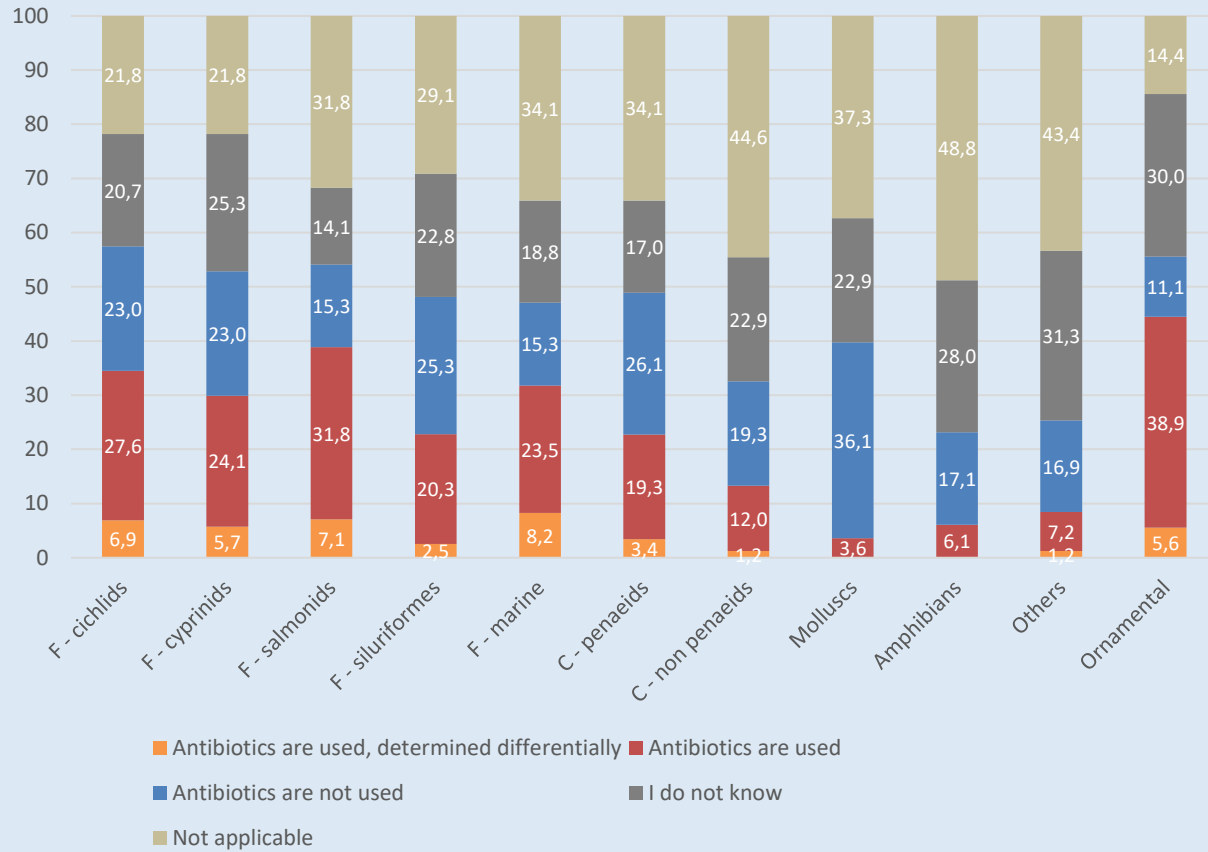
■ Yes, we use them ■ No, we don't use them ■ I do not know

Antibiotic use in aquaculture - Europe

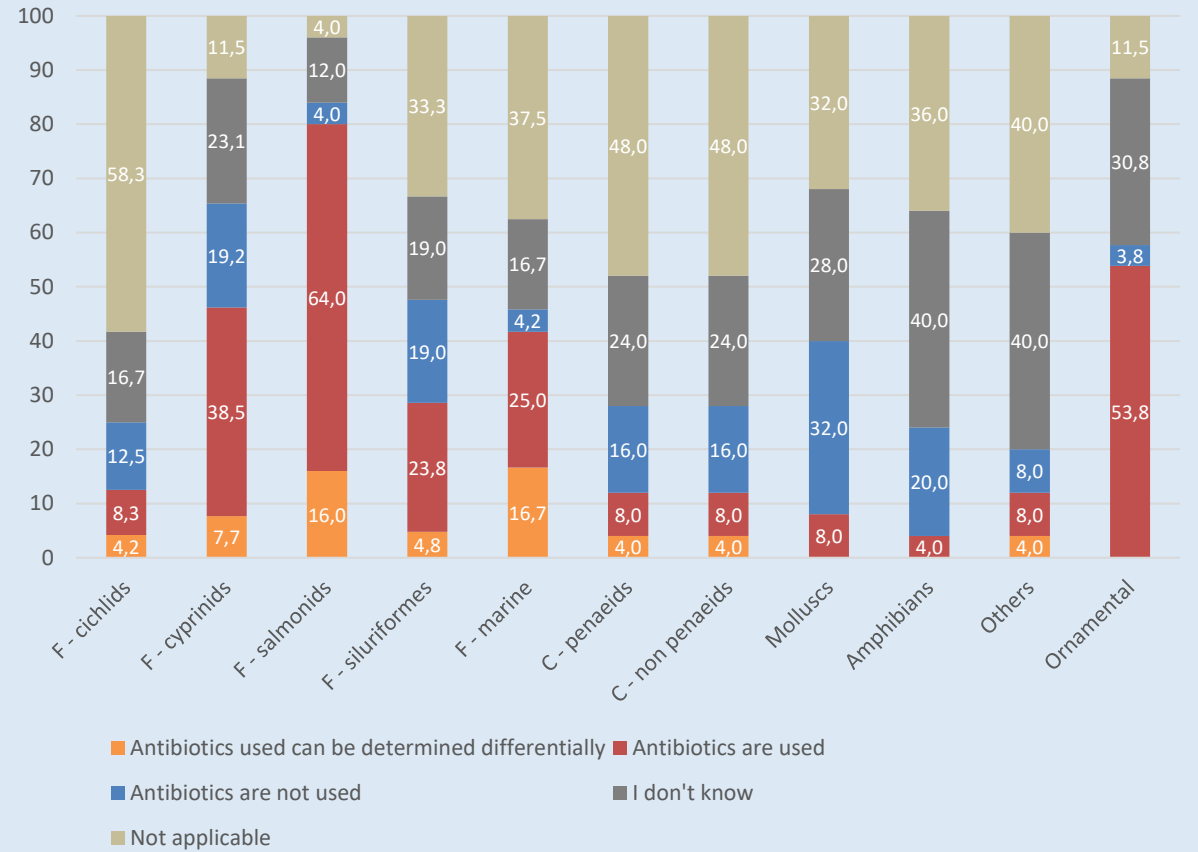


■ Yes, we use them ■ No, we don't use them ■ I do not know

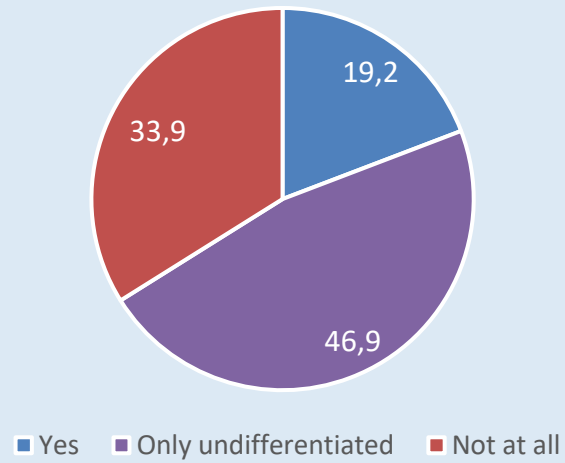
### Antibiotic use in aquaculture sub-sectors - Global



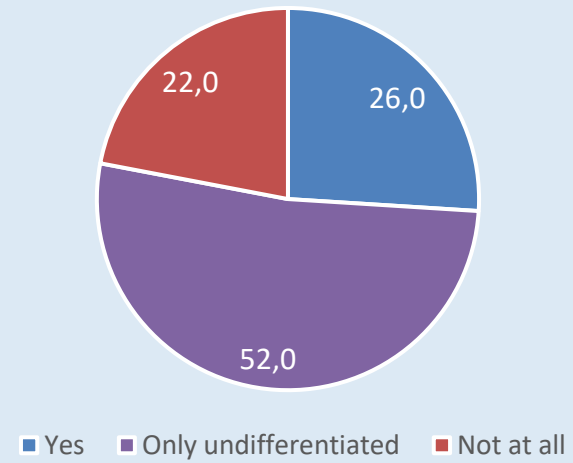
### Antibiotic use in aquaculture sub-sectors - Europe



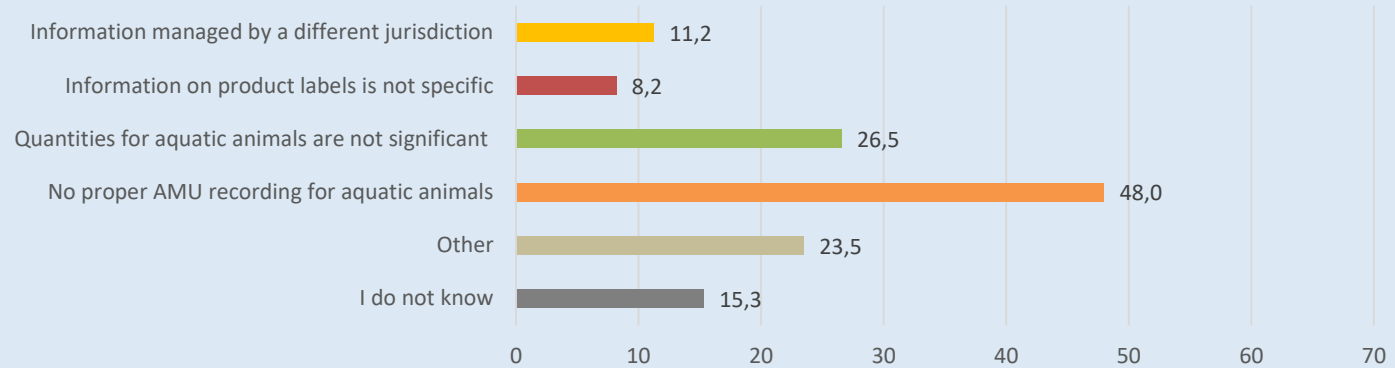
Report differentiated AMU quantities in aquatic animals to ANIMUSE- Global



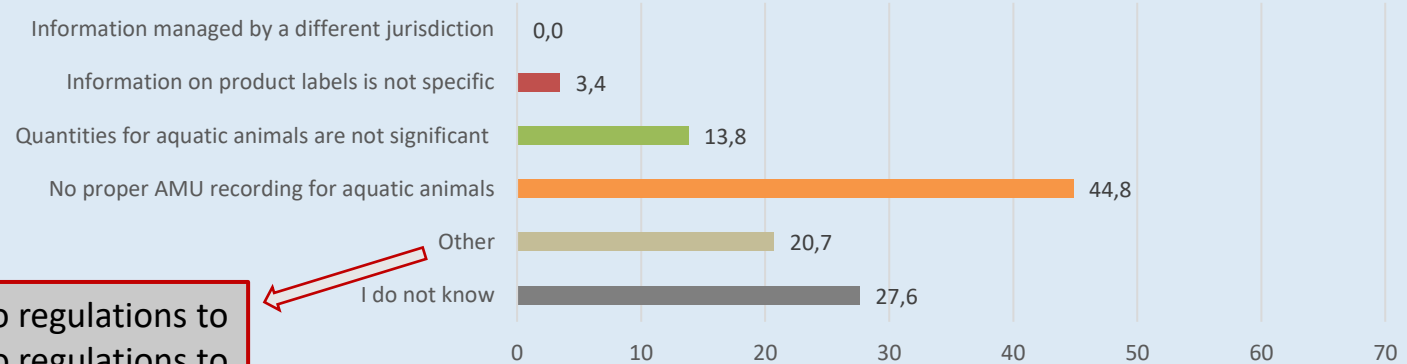
Report differentiated AMU quantities in aquatic animals to ANIMUSE- Europe



### Main difficulties to report AMU quantities in aquatic animals - Global



### Main difficulties to report AMU quantities in aquatic animals - Europe



No data at field level, no regulations to collect these data, no regulations to disclose these data







# Thank you

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