

Environmental risk assessment of veterinary pharmaceuticals – lessons learned from terrestrial effect data

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Background

Since the guidelines on the environmental impact assessment for veterinary medicinal products (CVMP/VICH/592/1998 & 790/2003) came into force, the German Environment Agency (UBA) is tasked with the environmental risk assessment of veterinary pharmaceuticals.

Over the last decade, this regulatory work resulted in a comprehensive data base containing effect data on active pharmaceutical ingredients (APIs) – which was evaluated with the following aims:

- Assessment of the current **data situation**
- Overview on predicted no-effect concentrations (**PNECs**) for **soil and dung organisms**
- Identification of **risks, shortcomings** or **knowledge gaps**

[1] Data situation

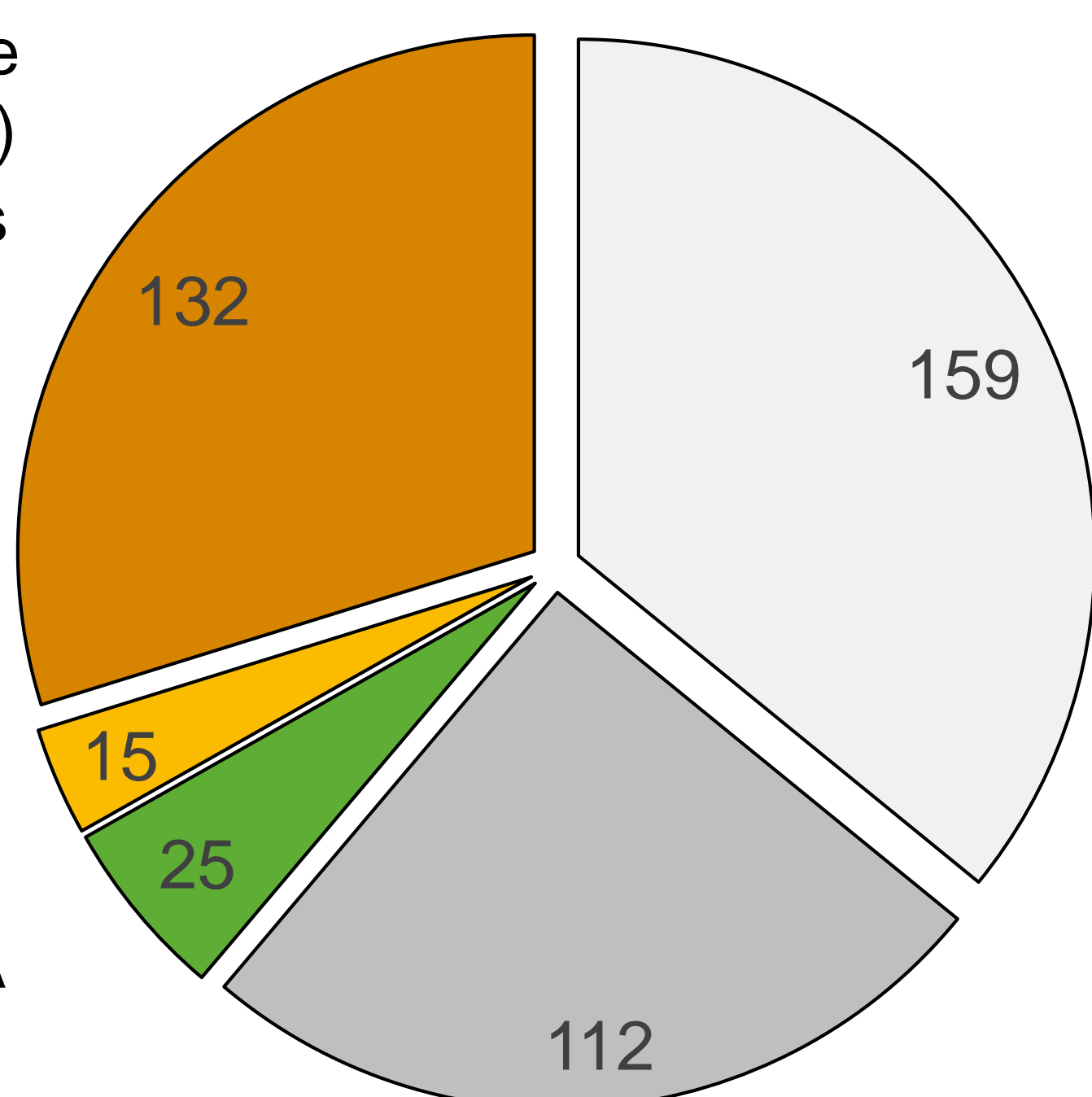
443 veterinary APIs on German market

□ 159 without environmental relevance (e.g. naturally occurring compounds)

□ 112 exclusively for non-food animals

→ 172 relevant for terrestrial assessment:

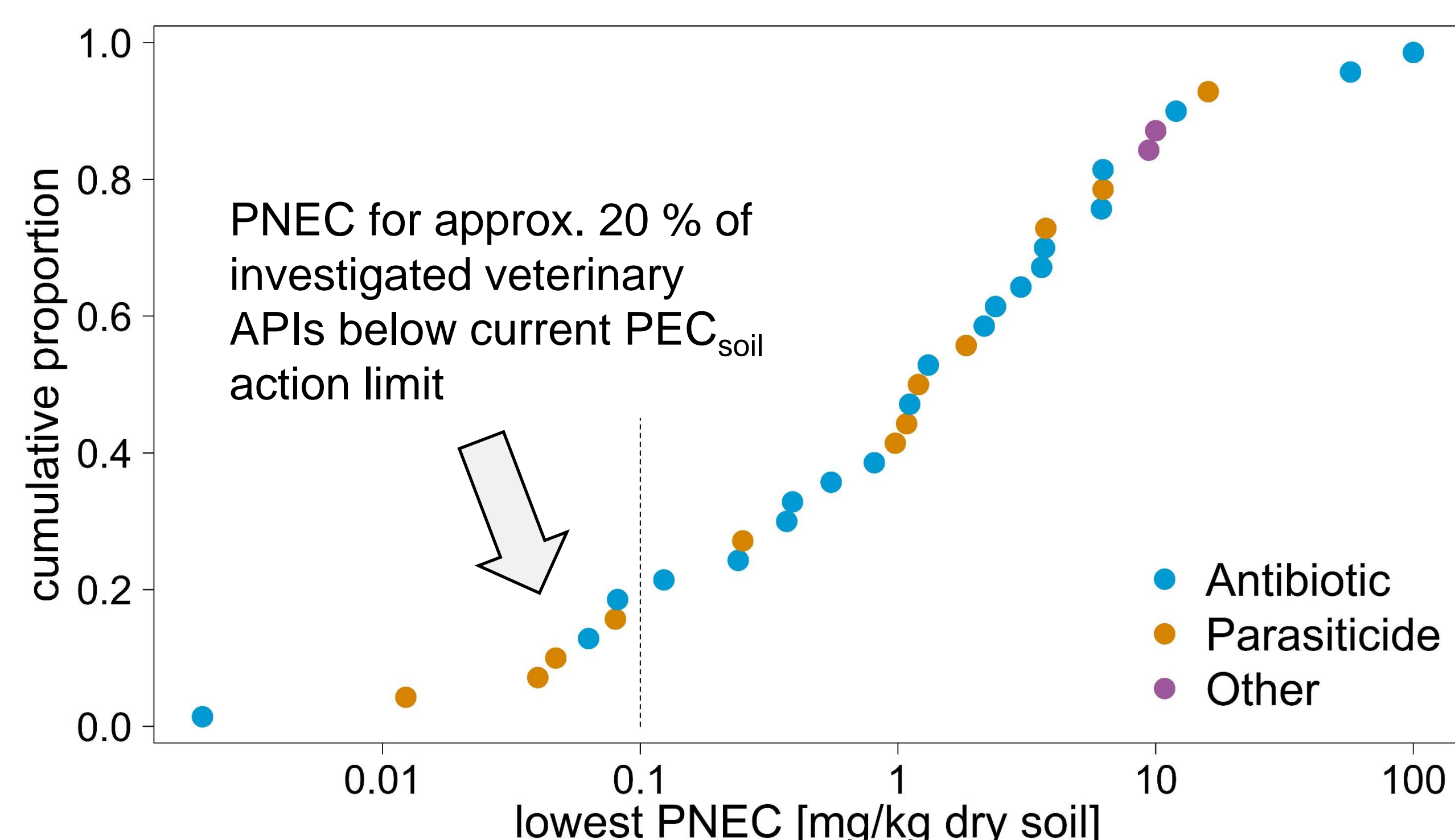
- 25 with **adequate** terrestrial effect data set
- 15 with **incomplete** terrestrial effect data set
- 132 **without** terrestrial effect data (e.g. no adequate data submitted, approval before ERA guidelines came into force, or stop of ERA in Phase I)



Conclusions

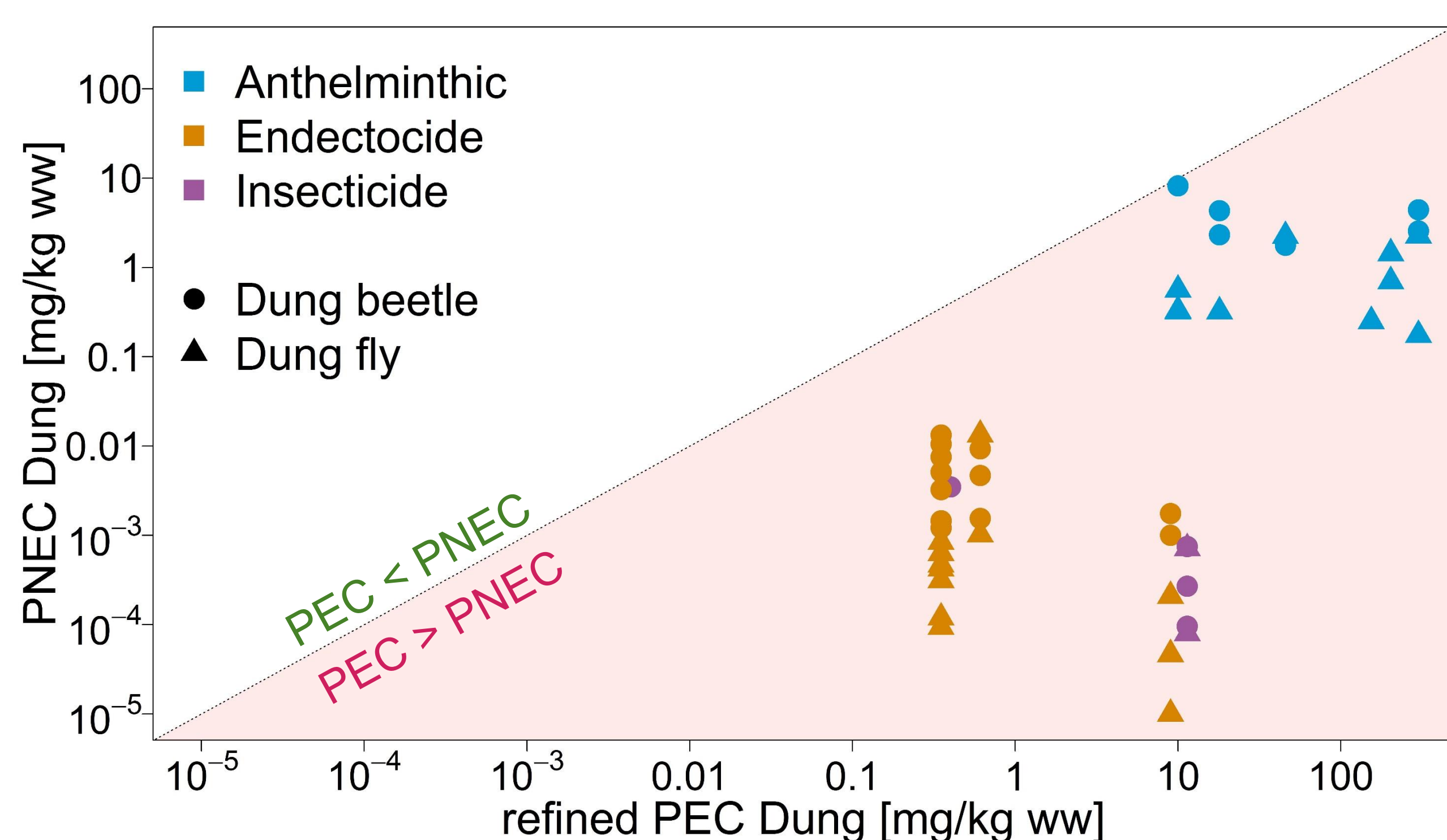
- Terrestrial effect data available only for a small part of veterinary APIs [1]
→ **Effect data** on more veterinary APIs **needed**
- A considerable fraction of terrestrial PNECs are below the current soil PEC action limit of 100 µg/kg [2]
→ The soil **PEC action limit** should be **revised**
- **Parasiticides** pose **high risks** (PEC/PNEC ≥ 1) to dung insects [3,4]
→ Potential impact on invertebrate biodiversity
→ These substances should be used with care and, if possible, appropriate risk mitigation measures should be applied
→ We endorse further research in this area, e.g. population monitoring of dung organisms as “higher tier” studies

[2] PNECs for soil organisms



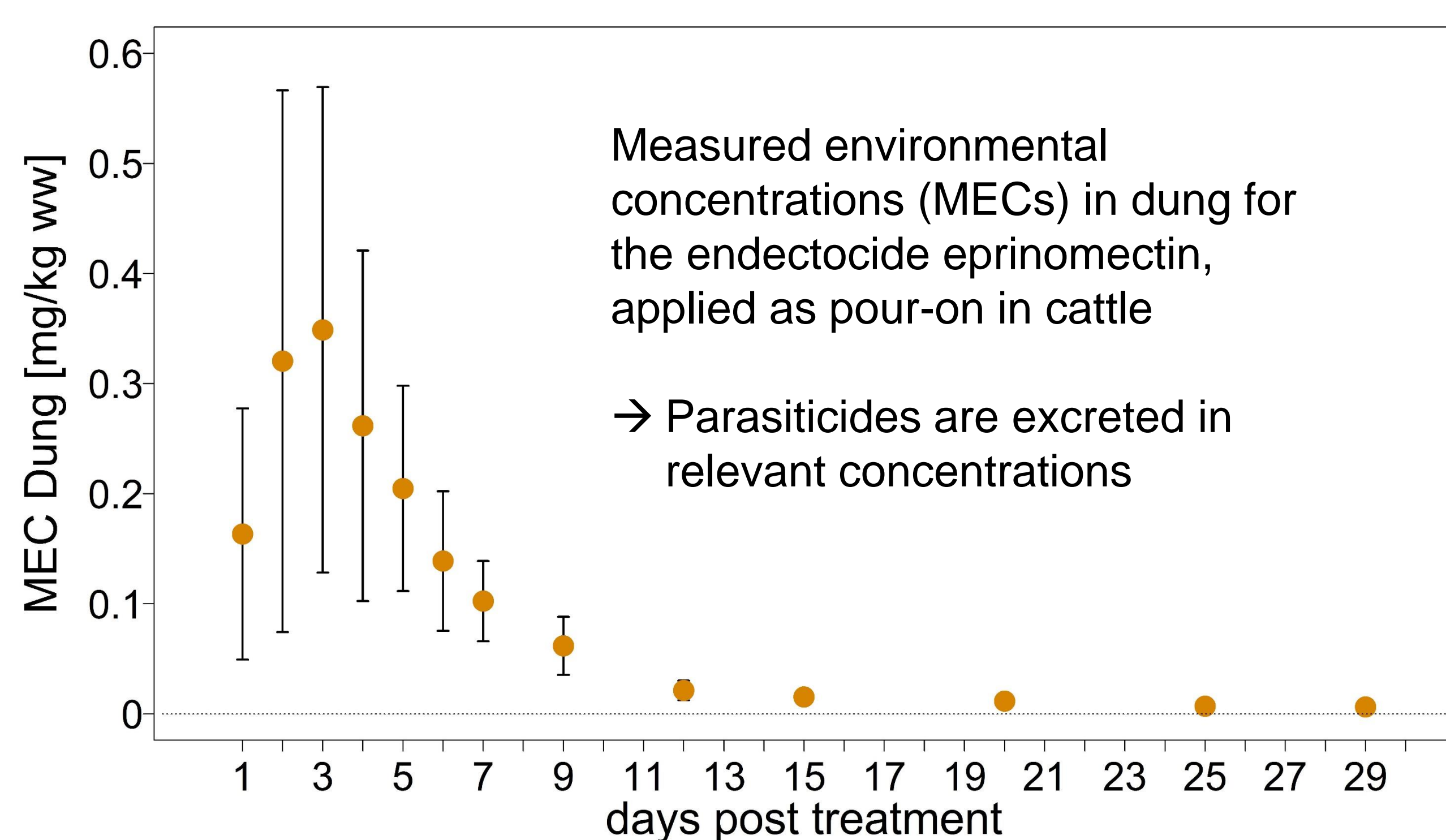
Dataset based on 40 APIs, for which soil effect data on terrestrial plant growth and/or earthworm reproduction were available. Depicted PNECs base on the most sensitive taxon.

[3] Parasiticides – risk to dung insects



Dataset based on 22 dung beetle and 23 dung fly studies for 11 different APIs

[4] Parasiticide excretion profile - example



Points depict mean MECs, whiskers standard deviations. Example data taken from Lumaret JP, Errouissi F, Galtier P, Alvinerie M (2005) *Environmental Toxicology and Chemistry*, 24/4 - <https://doi.org/10.1897/03-583.1>

Environmental Risk Assessment

Applicants seeking approval of medicinal products follow the Phase I guideline on environmental impact assessment of veterinary medicinal products (CVMP/VICH/592/1998). In several cases no further risk assessment is required, e.g. for natural substances, the use of which will not alter the environmental concentration, and products used only in non-food animals. For relevant substances, the Phase I assessment includes calculating predicted environmental concentrations (PEC). In case the PEC exceeds 100 µg/kg in soil, or if the substance is a parasiticide used on pasture animals, fate and effect data have to be provided in the more detailed Phase II assessment (CVMP/VICH/790/03-FINAL).

The standard terrestrial effect assessment includes testing of terrestrial plant growth (OECD 208) and investigation of earthworm reproduction (OECD 222). For parasiticides used on pasture animals, the environmental risk assessment also includes tests of developmental toxicity to dung flies (OECD 228) and toxicity to dung beetles (OECD GD 122). Only studies considered as reliable are included in our evaluation.

For more information on antibiotics, please visit posters **MO236**, **WE021**, **WE022** and platform presentation **413**.

PNECs and PECs

PNECs depicted for plants and earthworms [2] are based on the lowest available NOEC or EC₁₀, divided by an assessment factor of 10.

PNECs for dung insects [3] are based on the EC₅₀, divided by an assessment factor of 100. Predicted environmental concentrations (PECs) for dung [3] were calculated based on the maximum dose, and refined with the best available data on absorption, metabolism and/or excretion in the treated livestock.

If the PEC exceeds the PNEC, this indicates a high risk to the environment. For confidentiality reasons, the API names are not shown.

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