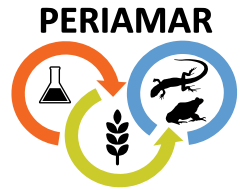


COST Action

# PERIAMAR:

PEsticide RIsk AssessMent  
for Amphibians and  
Reptiles



The structure of the **PERIAMAR** Action (<https://periamar.com/>) consists of four working groups (WG) that are interconnected.

**WG1** » Organism-level assessment: toxicity and exposure characterisation

**WG2** » Ecosystem-level assessment

**WG3** » Reduction and replacement

**WG4** » Implementation of risk assessment procedures

The ultimate task of the action is the task of WG4 and is based on the tasks implemented by WGs 1, 2 and 3. WG4 aims to **generate a proposal for a detailed environmental risk assessment (ERA) scheme that could be the basis for a guidance document for amphibian and reptilian pesticide risk assessment within the EU.**

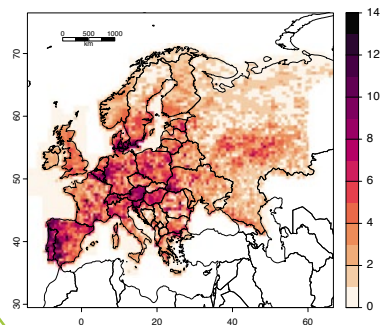
# Amphibians and reptiles in the agricultural landscape in Europe



As part of the COST Action **PERIAMAR**, Bancila and colleagues (2023) conducted a study that showed that the presence and richness of amphibians and reptiles in agricultural landscapes across Europe is affected by the extent of arable land and type of crop. Species richness is generally negatively correlated with the extent of arable land. Therefore, the integration of biodiversity conservation measures in agricultural landscapes is a priority.

Maps of species richness of amphibians and reptiles and maps of agricultural landscapes across Europe for different low spatial resolutions (50 and 10 km<sup>2</sup>) give us an overview of the extent of overlap between them. Such maps provide valuable information to develop a risk assessment scheme for amphibians and reptiles.

On the right is a map for 14 European amphibian species distribution at 50 km<sup>2</sup> resolution. Light red colours represent low species richness while dark green colours represent high species richness.



# The European pond turtle

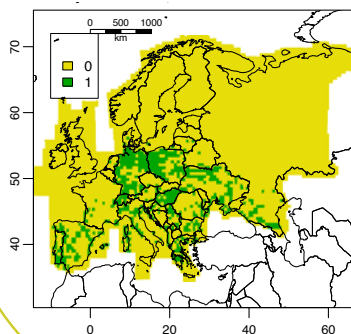


The European pond turtle (*Emys orbicularis*) is a long-lived freshwater turtle found in southern, central, and eastern Europe. It forages in the water and basks on exposed surfaces. Females lay their eggs and bury them in the soil, usually near a water source. Exposure to pesticides for turtles is less pronounced through the skin due to their thick shell, but more likely through eggs exposed in the soil, and for adults through food ingestion.

The European pond turtle is one of the eight most abundant reptile species in agricultural landscapes across Europe based on 50 km<sup>2</sup> resolution maps. They occur most frequently in the water bodies such as ponds or ditches inside crop fields and forest.

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The map on the right shows the presence (green) or absence (yellow) of the species in the agricultural landscape.



# The sand lizard

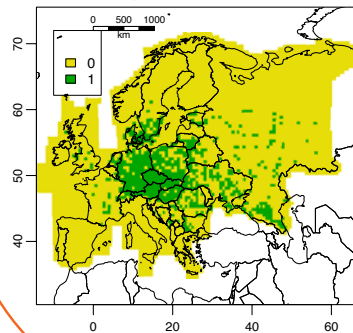


The sand lizard (*Lacerta agilis*) is distributed throughout Central and Eastern Europe. Sand lizards prefer to live in grasslands, but colonise a variety of habitats. As for snakes, lizards have permeable skin and are likely exposed to pesticides through their skin as well as through ingestion of contaminated food and via their eggs. Exposure to pesticides is particularly relevant for species such as sand lizards that spend a lot of time in crops at application of pesticides.

The sand lizard is an abundant reptile species in agricultural landscapes across large parts of Europe, as shown by Körner with colleagues (2012) and Bancila with colleagues (2023) at 50 km<sup>2</sup> resolution. The most frequently overlapped crop type with the distribution of the sand lizard at this resolution was pasture.

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The map on the right shows the presence (green) or absence (yellow) of the species in the agricultural landscape.



# The common toad

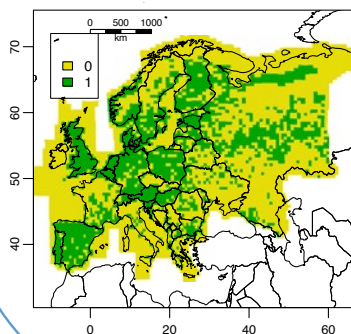


The common toad (*Bufo bufo*) is a very common amphibian species found throughout Europe. Its most common habitats are forested areas, open landscapes, non-cropped and cropped fields and urban areas like parks and gardens. Like most other amphibians, it requires freshwater for the larval phase of its life cycle and these stages may be exposed to pesticides that can enter adjacent water bodies. Adults have a highly permeable skin, which increases their exposure to pesticides as they move through cropped fields.

The common toad is one of the eight most abundant amphibian species in agricultural landscapes across Europe based on 50 km<sup>2</sup> resolution maps. Agricultural forests have been identified as the most common crop type overlapped with the distribution of common toad.

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The map on the right shows the presence (green) or absence (yellow) of the species in the agricultural landscape.





# What is the COST Action **PERIAMAR**



In 2013, the European Union published the first two regulations specifically mentioning amphibians and reptiles in the data requirement for the environmental risk assessment (ERA) of pesticides. Following this legal requirement, the European Food Safety Authority published a scientific opinion in February 2018 reviewing the state of the science on pesticide risk assessment for amphibians and reptiles (EFSA 2018). The scientific opinion highlighted the lack of knowledge and identified aspects that should be addressed prior to the development of a guidance document that is aiming for protection of amphibians and reptiles while minimising vertebrate testing.

Launched in 2019, the COST Action **PERIAMAR** is a multidisciplinary network of scientists from research institutions, regulatory authorities, consulting agencies, chemical industry, environment-focused NGOs, and the private sector who meet with the main goal of analysing available information and drafting an ERA protocol for amphibians and reptiles that could be the basis for a future guidance document.



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The photo shows the participants of the third General Meeting of **PERIAMAR**, held in Florence, Italy, October 5-6, 2023.



## Sources used:

### For **MAPS** and **TEXTS**:

Bancila, R., Lattuada, M., & Sillero, N. (2023). Distribution of amphibians and reptiles in agricultural landscapes across Europe. *Landscape Ecology*, 38(3), 861-874.

### For **TEXTS**:

EFSA 2018. Scientific Opinion on the state of the science on pesticide risk assessment for amphibians and reptiles. *EFSA Journal* 16: 5125, 301 pp.

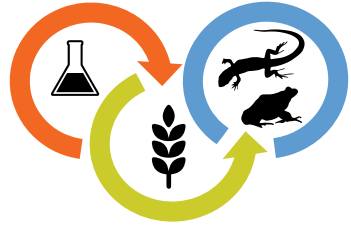
Körner, O., Lutzmann, N., Vogel, G., Dietzen, C. & Ludwigs, J.-D. (2012). Relevant Lizard Species for the Risk Assessment of Plant Protection Products in Northern and Central Europe. SETAC Poster presentation, SETAC World conference, May 2012, Berlin.

Sillero, N., et al. (2014). Updated distribution and biogeography of amphibians and reptiles of Europe. *Amphibia-Reptilia* 35(1), 1-31.

### **Authors of photos** used:

**Jelka Crnobrnja-Isailović** (title page up left), **Miha Krofel** (title page down right, page 3, page 4), **Miro Slavchev** (title page down left, page 6 up, page 7 up left, down right and left), **Rifcon** (title page up right, page 2, page 3), **Savvaz Zotos** (page 7 up right).

# PERIAMAR



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