

# Ecology of Amphibians: the fire-bellied toad (*Bombina orientalis*) and the crested newt (*Triturus cristatus*)



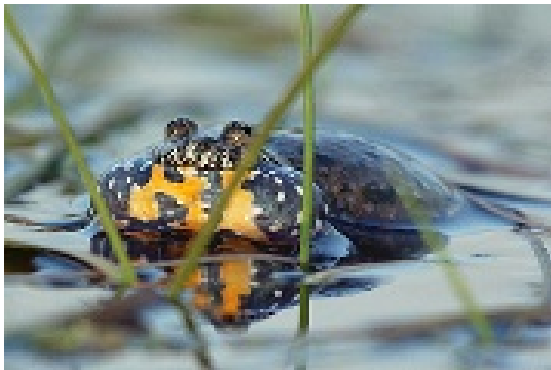
*“Protection of European pond turtle and amphibians in the North European lowlands“ The final seminar*

2009 Olsztyn

Dalia Bastytė

# Outline

- *Bombina bombina* and *Triturus cristatus*
  - Distribution and habitat
  - Vagility and population ecology
  - Predation and feeding ecology

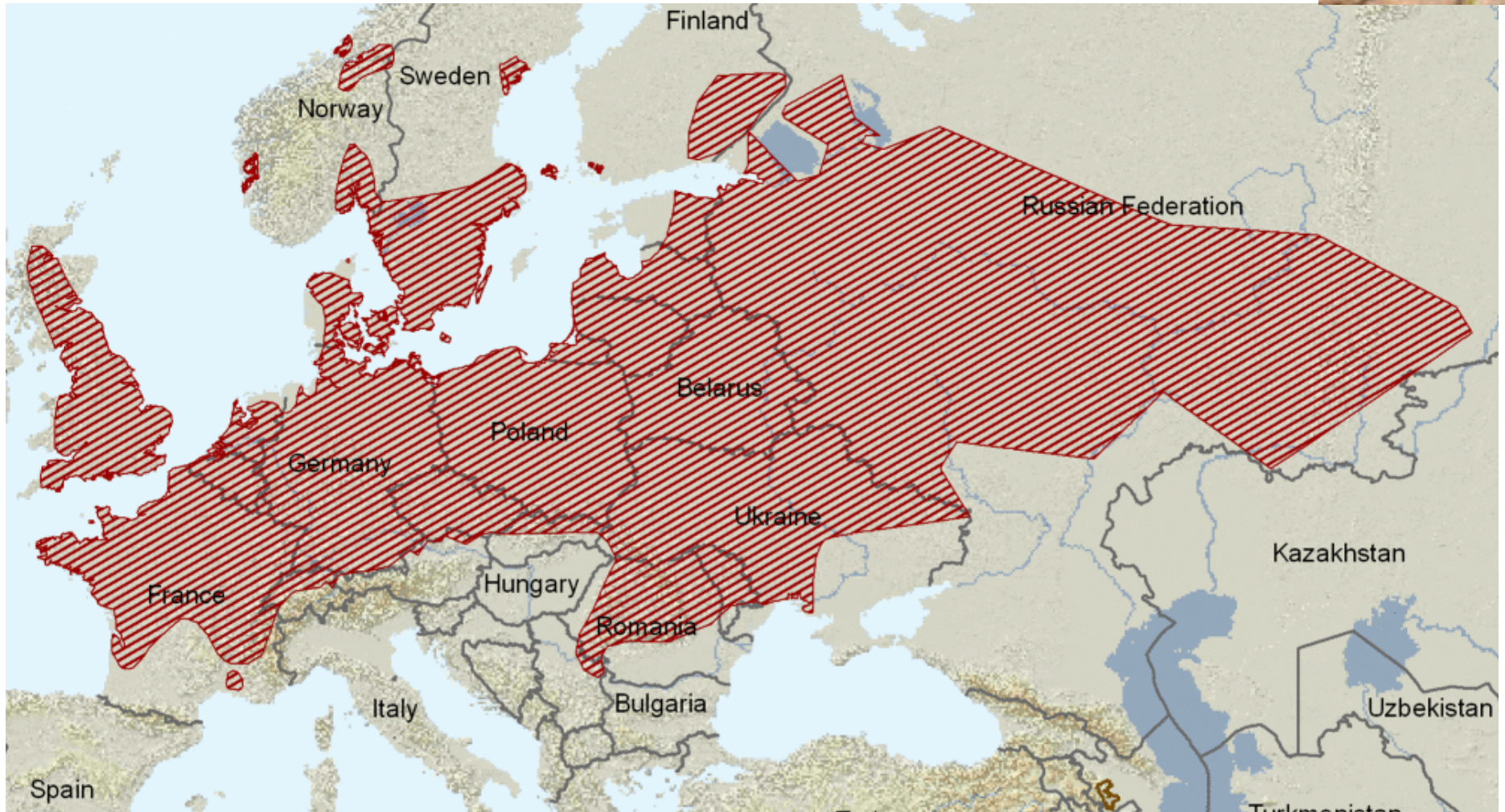


# *Bombina bombina* distribution range



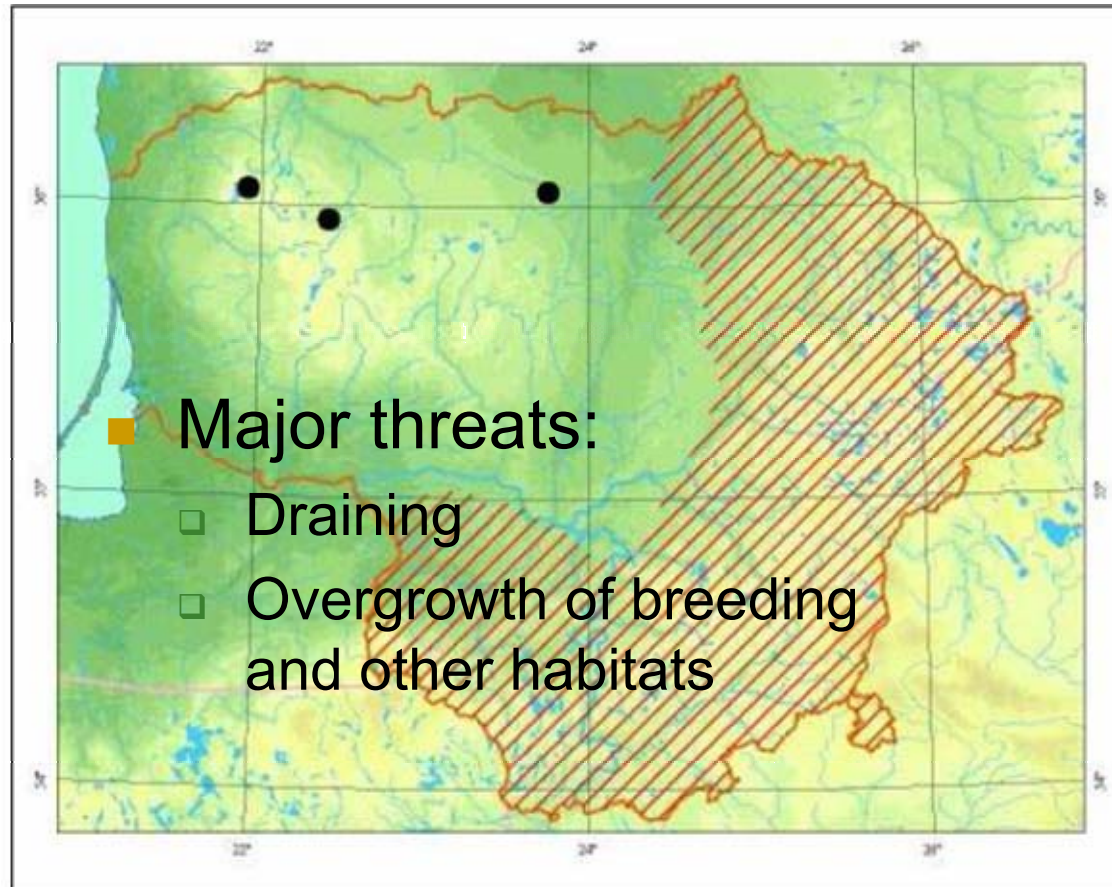
IUCN, 2009

# *Triturus cristatus* distribution range



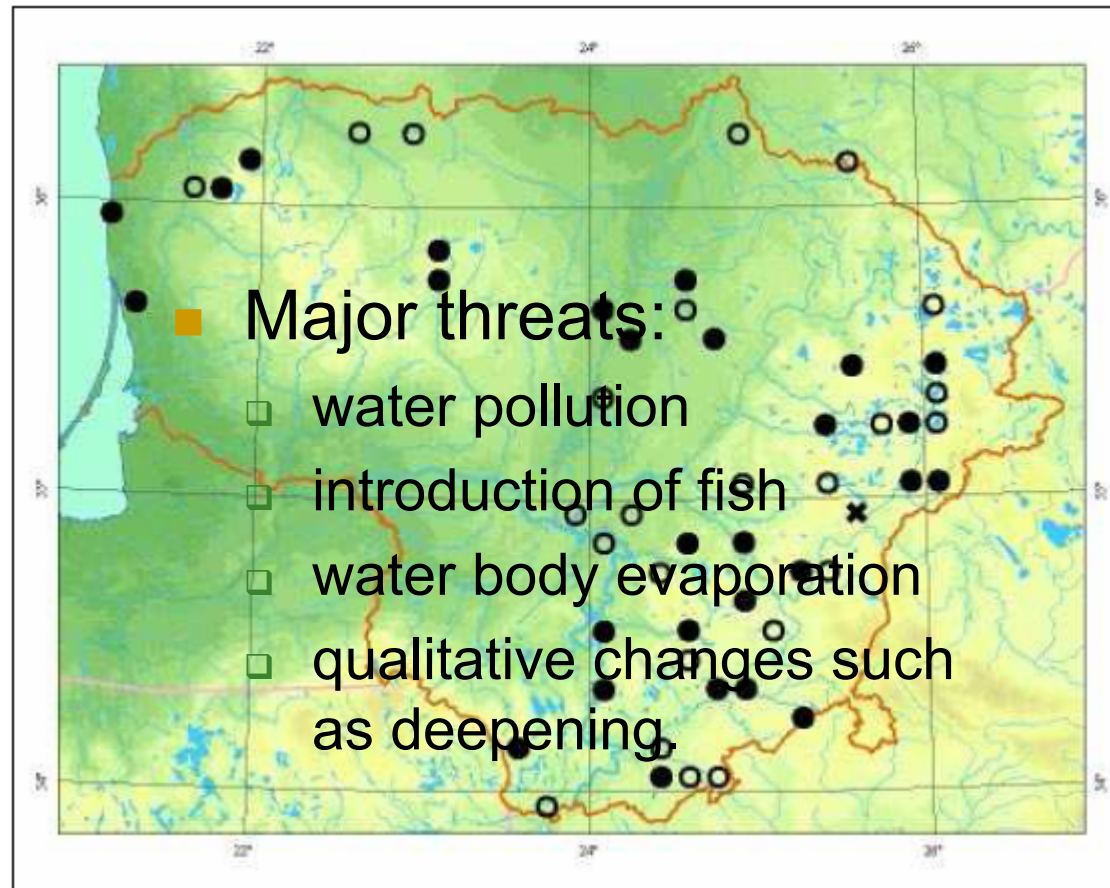
IUCN, 2009

## *Bombina bombina* distribution in Lithuania



- Since 1989, category 5 (Rs)

# *Triturus cristatus* distribution in Lithuania



- Since 1991, category 4 (I)

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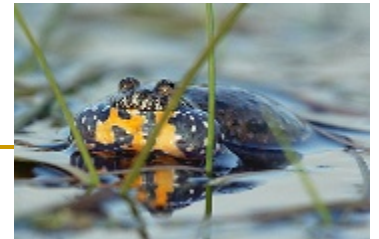
# Habitats

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# Habitat demands of *Bombina bombina*

- Perfect habitat complex is comprised of:
  - extensively grazed meadows
  - numerous more or less permanent ponds
  - forest

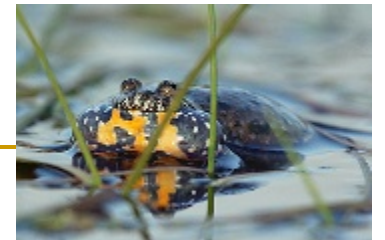




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# Aquatic habitat – early spring

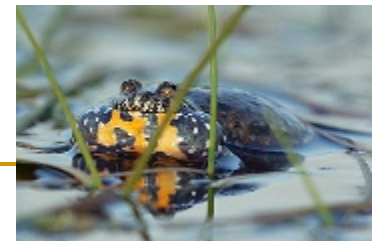
- Sunny
- Shallow
- Abundant with prey
- Close to the hibernation place.



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# Breeding ponds

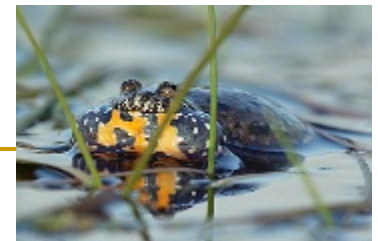
- Shallow (30 – 60cm)
- Temporary
- With vertical vegetation for attaching the eggs
- Vegetated areas to hide from the predators
- Open areas
- Fully exposed to the sun
- Sheltered from the wind

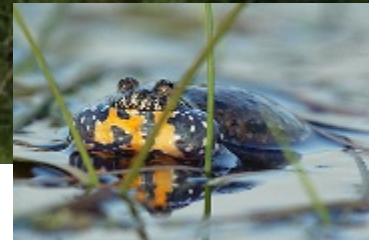


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## In Lithuania...

- 50-5000 m<sup>2</sup> ponds with submerged and floating plant cover:
  - Submerged meadows
  - Village ponds
  - Fishponds
- Inclined slopes (<10°)
- Sediment is mud
- Extensively grazed
- Not shaded
- Forest up to 50 m
- Other ponds in 100 – 200 m distance.

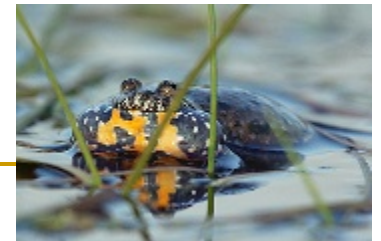




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# Foraging ponds

- Eutrophic
  - Partly overgrown
  - Sometimes partly shadowed.
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- Ponds with different vegetation zones and dead tree trunks are the most suitable for foraging.





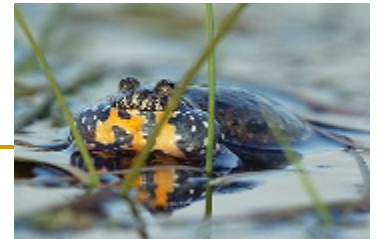
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# Terrestrial habitat before hibernation

- Moist fen and meadow
- Sun exposed

## Habitat for hibernation

- Forest with fallen trees
- Stone fences
- Hedgerows
- Cellars



# Habitat demands of *Triturus cristatus*





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# Aquatic habitat

- Clear water (courtship displays and predation)
- Bottom areas without vegetation (courtship displays)
- Shallow zones with soft leaved vegetation for:
  - Wrapping eggs
  - As a habitat of prey organisms
- Shallow zones without vegetation or with floating vegetation for development of larvae
- Deeper zones for adults to hide during a day
- No fish!
- Prefer ponds which dry out at least once per decade

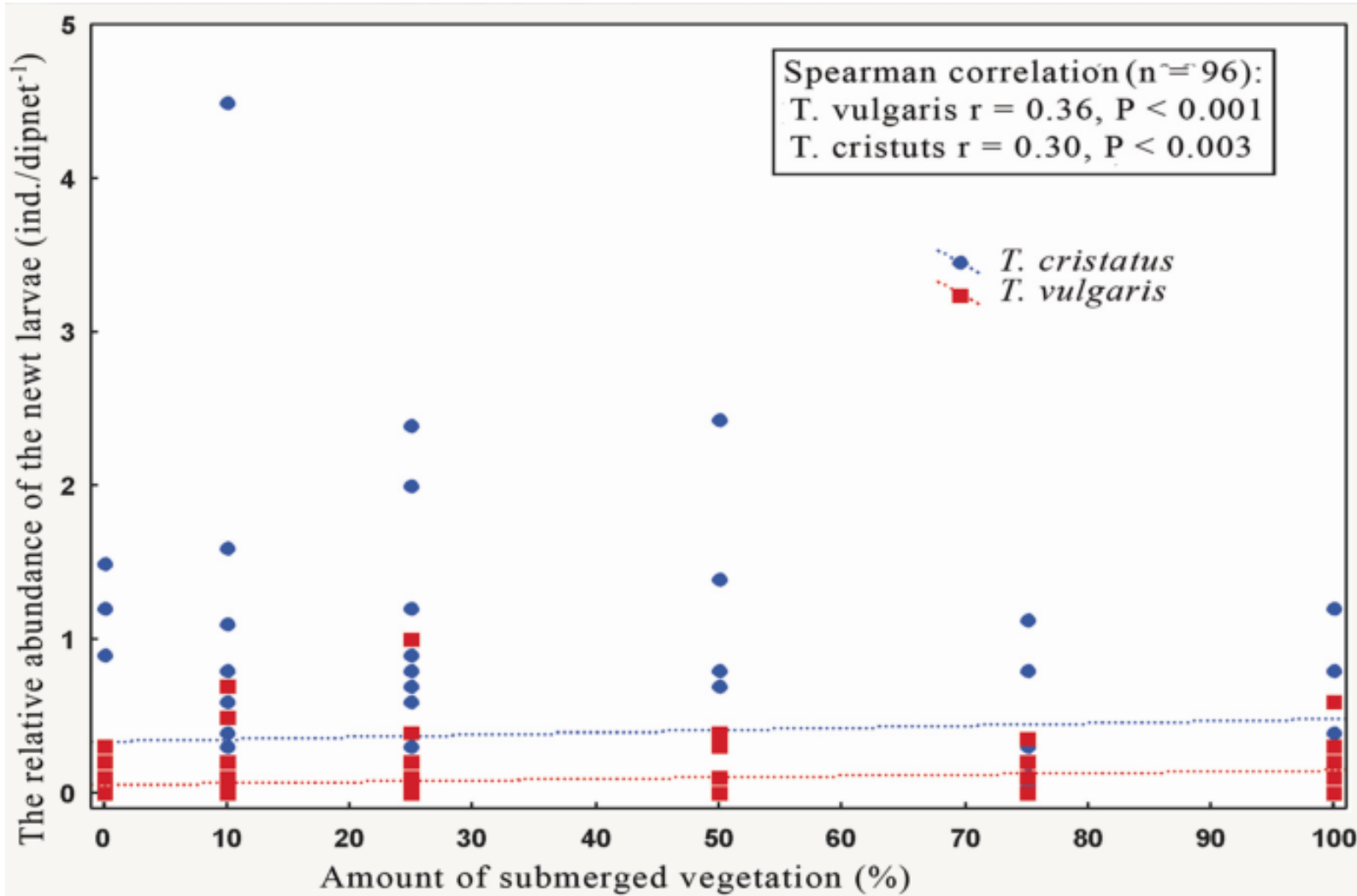


## In Lithuania...

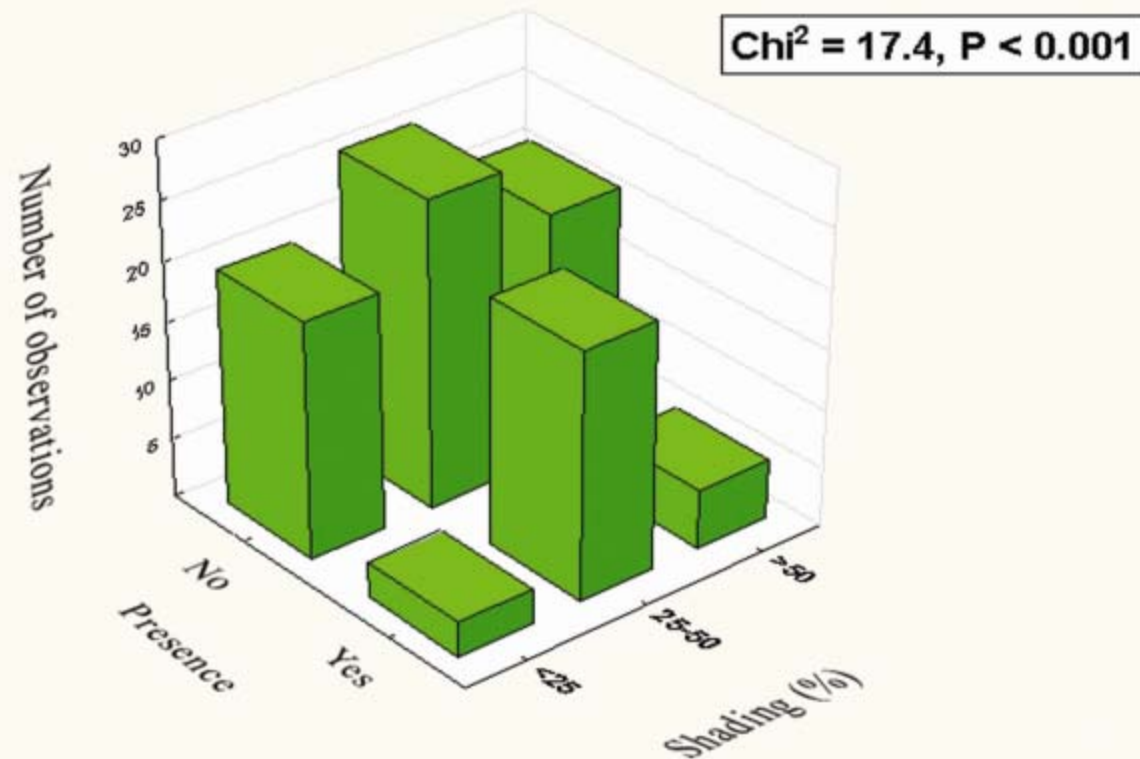
- Breeding success recorded in 15 - 1500 m<sup>2</sup> size ponds
  
- Trends:
  - Most favoured were 80 – 500 m<sup>2</sup> and 0.5 – 1 m depth ponds
- Statistically significantly *T. cristatus* larvae abundance depended on:
  - Submerged vegetation
  - Percentage of the shade
  - Distance to either deciduous or coniferous forest
  
- Statistically significantly *T. cristatus* larvae occurrence depended on:
  - Presence of fish
  - Presence of deciduous forest



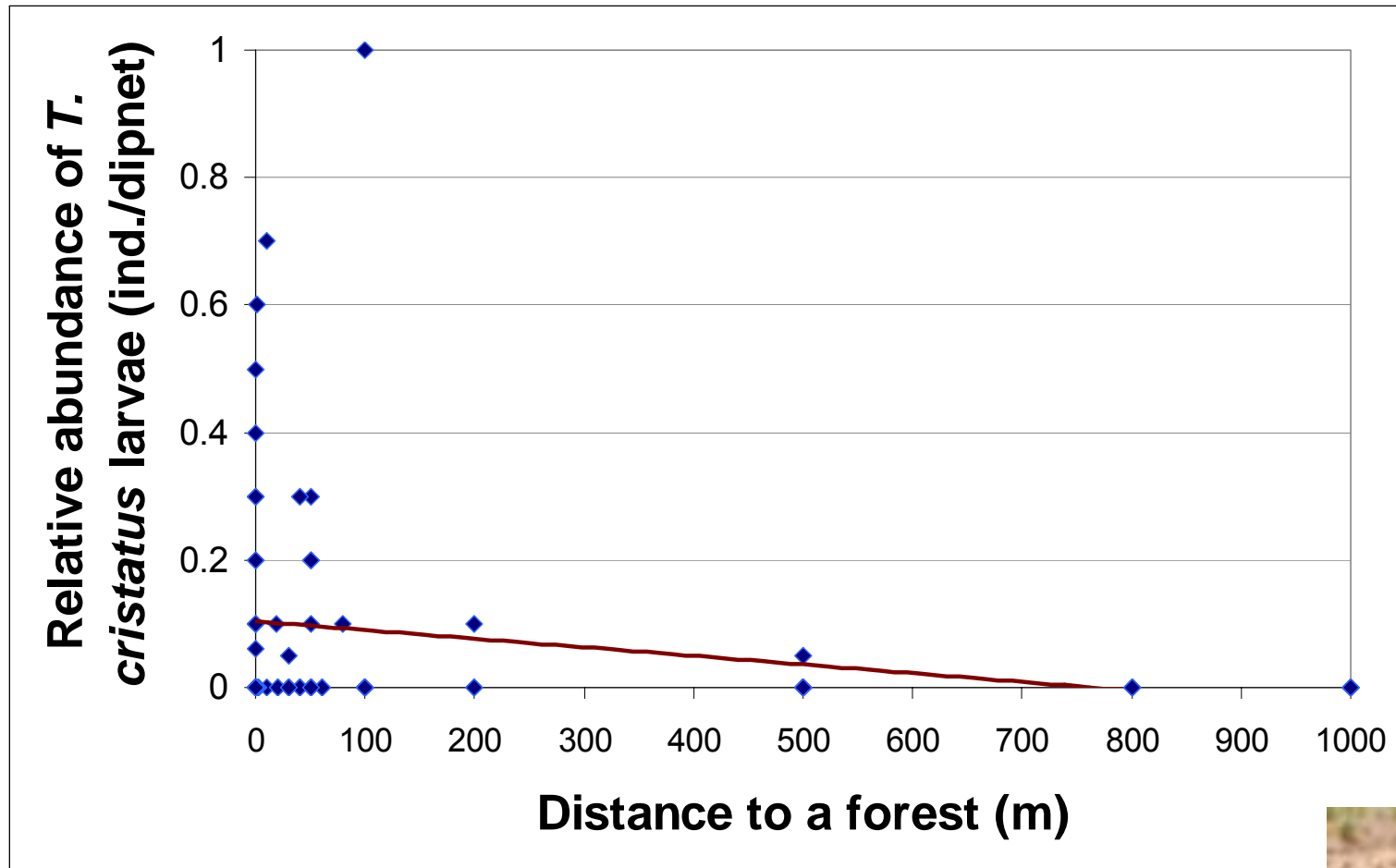
The more submerged vegetation, the higher abundance of *T. cristatus* larvae in a pond



The most desirable amount of shade on a surface of a breeding pond was 25 – 50 %



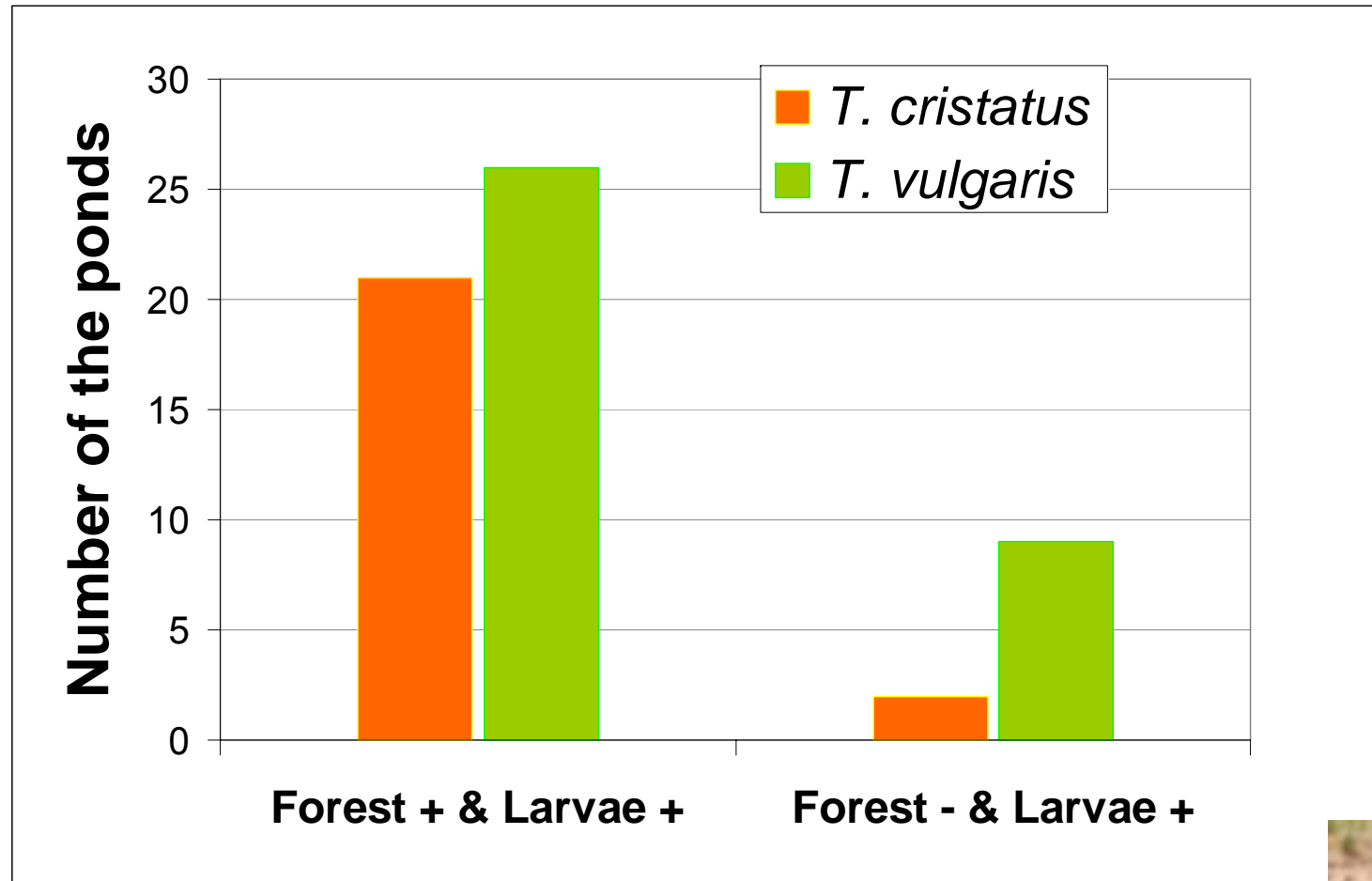
The closer to the breeding habitat was the forest the more *T. cristatus* larvae were found in the pond



Kendall Tau = -2.44; Z = -3.1; p = 0.0019



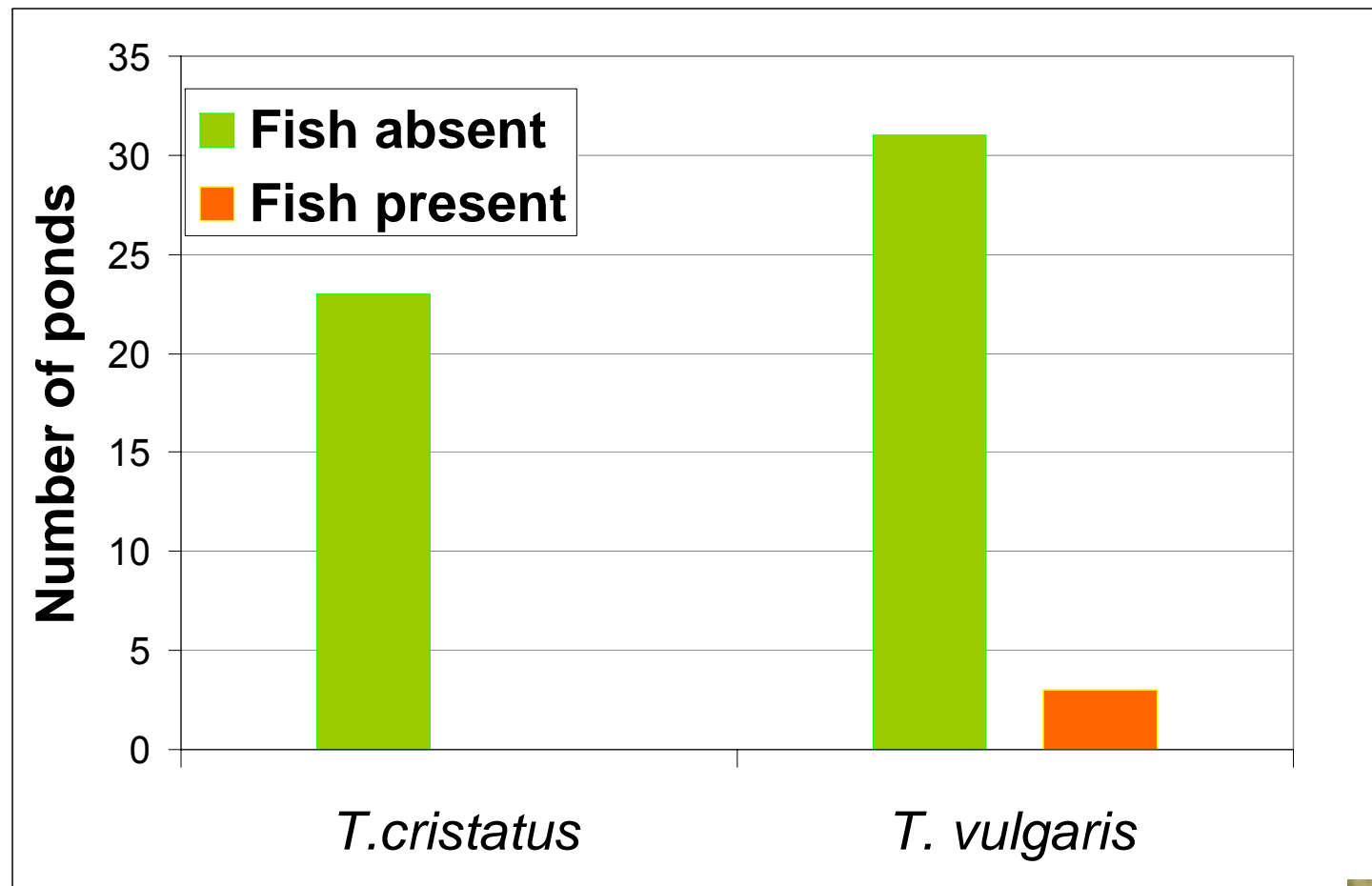
# Presence of larvae within 500 m from deciduous forest (Forest+) and beyond (Forest-)



Pearson's chi-square: 12.54; df = 1; p = 0.003



## No *T. cristatus* larvae in the ponds with fish



Pearson's chi-square: 10.9379; df = 1; p = 0.000943



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# Terrestrial habitat

- Complex...
- Necessary:
  - Buffer zone around a breeding pond
  - Forest
- Also:
  - Hedgerows
  - Stone fences
  - Cellars
- Frost free during the hibernation and never flooded during the early spring



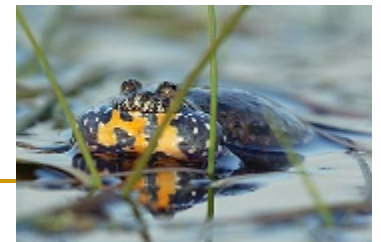


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# Vagility and population ecology

## *Bombina bombina*

- 5 – 6 migrations from early spring to late fall
- 100- 500 m, sometimes up to 2km
- Rare long distance dispersers may move up to 11km
- Particularly susceptible to habitat fragmentation



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# Vagility and population ecology

## *Triturus cristatus*

- Do not go far away from a breeding pond if places to hide are nearby (15 – 50 m )
- In more open landscape migrate 230 - 1,290 m
- Metamorphosed young migrate further
- High tenacity for its breeding pond
- High susceptibility to habitat fragmentation
- Threshold for the pond density is 0.7/ km<sup>2</sup>



# Predation and feeding ecology

- Glandular secretion for defence
- Larvae predated by:
  - *Dytiscidae*
  - *Odonata*
  - *Hirudinea*
  - Fish
- *Bombina bombina* tadpoles feed on:
  - Microbial films covering submerged surfaces
  - Decaying plants or animals
- *Bombina bombina* adults feed on insects, crustaceans, oligochaetae
- *Triturus cristatus* both larvae and adult are predatory
- Generalist feeders





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Thank you for your attention