Ecology of the European pond turtle *Emys orbicularis* (Linnaeus, 1758)

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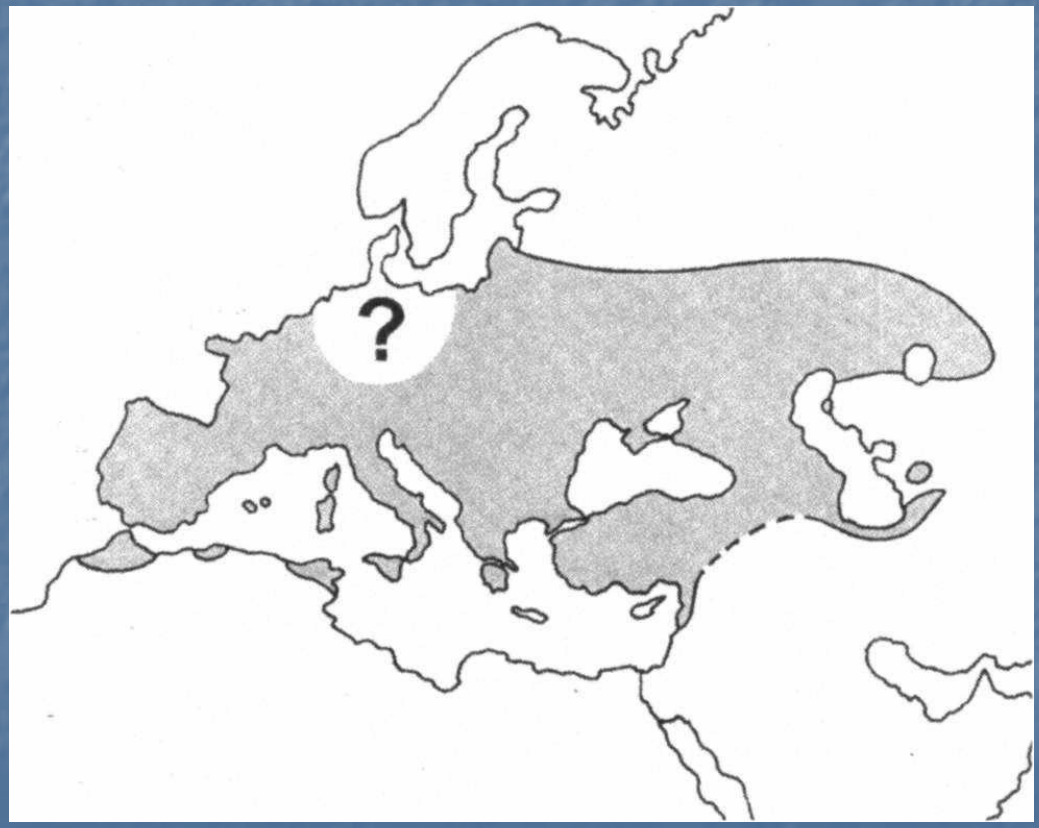
Biology

- only freshwater species in North-Europe
- Distribution: North-Afrika, Iberian Peninsula, West-, Central- and East-Europe up to the Aral sea (FRITZ 1995, 1996, FRITZ & GÜNTHER 1996) ⇒ northernmost populations in Lithuania, (Latvia), Poland and East-Germany



Biology

- Age: more than 50 up to 100 years
- Size: medium size turtle with size variation across its distribution (from 12 to 20 cm length)
- Coloration: brown shell and skin with yellow spots
- distinct sexual dimorphism

Biology

Nutrition:

• molluscs, insects, larvae of insects and amphibians, carrion as well as plants

⇒ species can only feed in water, so it is completely dependent on water bodies.

Basking:

• species is poikilothermic

• suitable basking sites e.g. tree trunks, deadwood, sunny shores or vegetation e.g. *Typha* spp. where a fast escape is possible

⇒ occurrence of suitable basking sites can be even a limiting factor in the northern species range

Biology

Hibernation:

- Hibernation period: September/ October until March/ April, beginning, duration and end of hibernation depend on weather conditions
- Hibernation behaviour: turtles hibernate mostly concentrated in specific sites, turtles show strong fidelity to such sites
- Hibernation sites: in deeper permanent ponds, can be near subterranean springs or current flows with better oxygen supply and smaller risk of frost
- Long-term freezing can have mortal consequences for turtles.

Biology

Reproduction:

- Mating period: after hibernation March/April (May)
- Nesting period: 4 up to 8 weeks between end of May and middle of June, lasts 2-3 weeks, start and duration of nesting depend on weather conditions
- Reproduction rate: up to 70 % of the total females in a population reproduce per season; usually, females reproduce once a year; average egg number: 12-13
- Incubation period: about 3 months in northern regions; duration of incubation depends on weather conditions, in cold summers with low temperatures development of embryos is prolonged or they even die off

Biology

Reproduction:

• Hatching period: end of August or in September, most of the hatchlings remain in the nest hole during winter

• Reproduction success: high predation on nests, hatchlings freeze to death in cold winters without enough snow cover ⇒ reproduction success needs adequate temperature sum in summer and suitable conditions in winter ⇒ reproduction success strongly depends on temperature conditions, impossible yearly.

⇒ availability of suitable nesting sites is a critical factor for species survival

Ecology

Species require two different habitat types (aquatic and terrestrial habitat).

Aquatic habitats for turtles:

- smaller and bigger water bodies with average sizes of 50-5000 m2,
- stagnant or slow running water,
- muddy ground,
- highly structured e.g. with abundant submerged and floating plant cover e.g. *Potamogeton* spp., *Nymphea alba*, *Spirodela polyrrhiza*, *Typha latifolia* and/ or *Acorus calamus*,
- e.g. meadow and forest ponds, swamps, higher bogs, fens, shores of inland lakes, back water of rivers and fens,

Ecology

Aquatic habitats for turtles:

• e.g. ditches, channels and seasonally partly flooded wetlands for short-term stays and migration routes,

• different functions e.g. as summer-, breeding-, hibernation-, short-term-stay- or all-year-round pond,

• artificially created ponds, such as farm, village and fish ponds, too,

• other structures e.g. bushes, trees at the shore (extending into the water) and deadwood as hiding sites,

• small temporary ponds close to nesting sites are very useful for resting, hiding of migrating females and for hatched juveniles.

Ecology

Suitable aquatic habitats for juveniles:

- smaller temporary ponds,
- water depth of 40-50 cm,
- abundant vegetation
- higher water temperatures,

suitable prey, less competition and hiding sites to avoid predation

⇒ such factors allow good growing possibilities and to develop swimming abilities

Ecology

Terrestrial habitats for turtle nests:

- open sunny areas,
- southern, south-eastern and or south-western exposition,
- sandy or sandy-loamy ground,
- flat, slight or strongly inclined ground
- lower vegetation cover

Ecology

Terrestrial habitats for turtle nests:

- often close to edges of forests
- e.g. sandy dry grasslands and clearings
- can be agricultural fields, field and forest paths, pastures, marginal stripes of roads
- favourable microclimate in such places can decide on successful reproduction in areas with unfavourable climate.

⇒ availability of suitable nesting sites is a critical factor for species survival in the northern distribution range of the species.

Population structure

Distribution of populations:

• if ponds are not suitable for a local population all the year round, animals change to different ponds in summertime. Hence, pond systems with various pond types are very appropriate for local populations of *Emys orbicularis*.

• Normally, during hibernation period turtles stay in small places e.g. in permanent hibernation ponds close together, while the individuals spread upon different parts of bigger ponds as well as upon different ponds within a pond system in late spring and summer.

Population structure

Individual density:
low (less than 1 animal/ha)
⇒ typical for populations of the northern species distribution range

Age structure:
populations are often slightly overaged
⇒ longevity cause “overaged”-situation

Sex ratio:
1 : 3

Juvenile share:
up to 20 %

Population structure

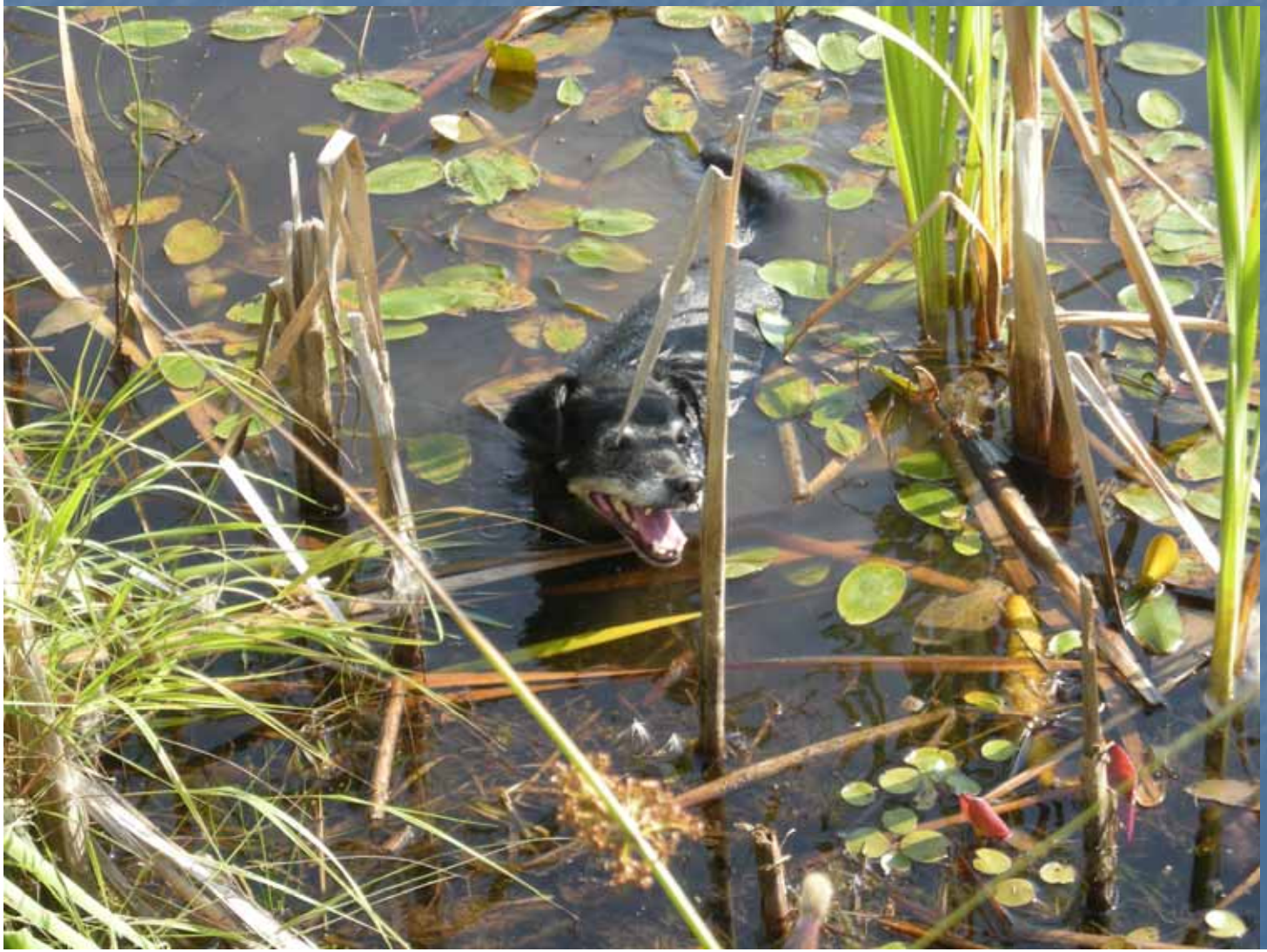
Predation rate:

- on adults: low e.g. 3-5 %
- on juveniles (younger than 3 years): high
- on nests: high (more than 70% of the clutches)
- nest predators: foxes (*Vulpes vulpes*), racoon dogs (*Nyctereutes procyonoides*), wild boars (*Sus scrofa*), badgers (*Meles meles*), martens (*Martes martes, M. foina*), polecats (*Mustela putorius*), hedgehogs? (*Erinaceus europaeus*)
- depends on density and composition of predators

⇒ a high predation rate on nests and juveniles can be very harmful or even crucial for small and isolated populations.

Northern species strategy:

⇒ long reproduction phase and a long life in order to compensate the low reproduction rate and the delayed sexual maturity (males > 10 year, females 12-20 years)



Thank you very much for your attention!