

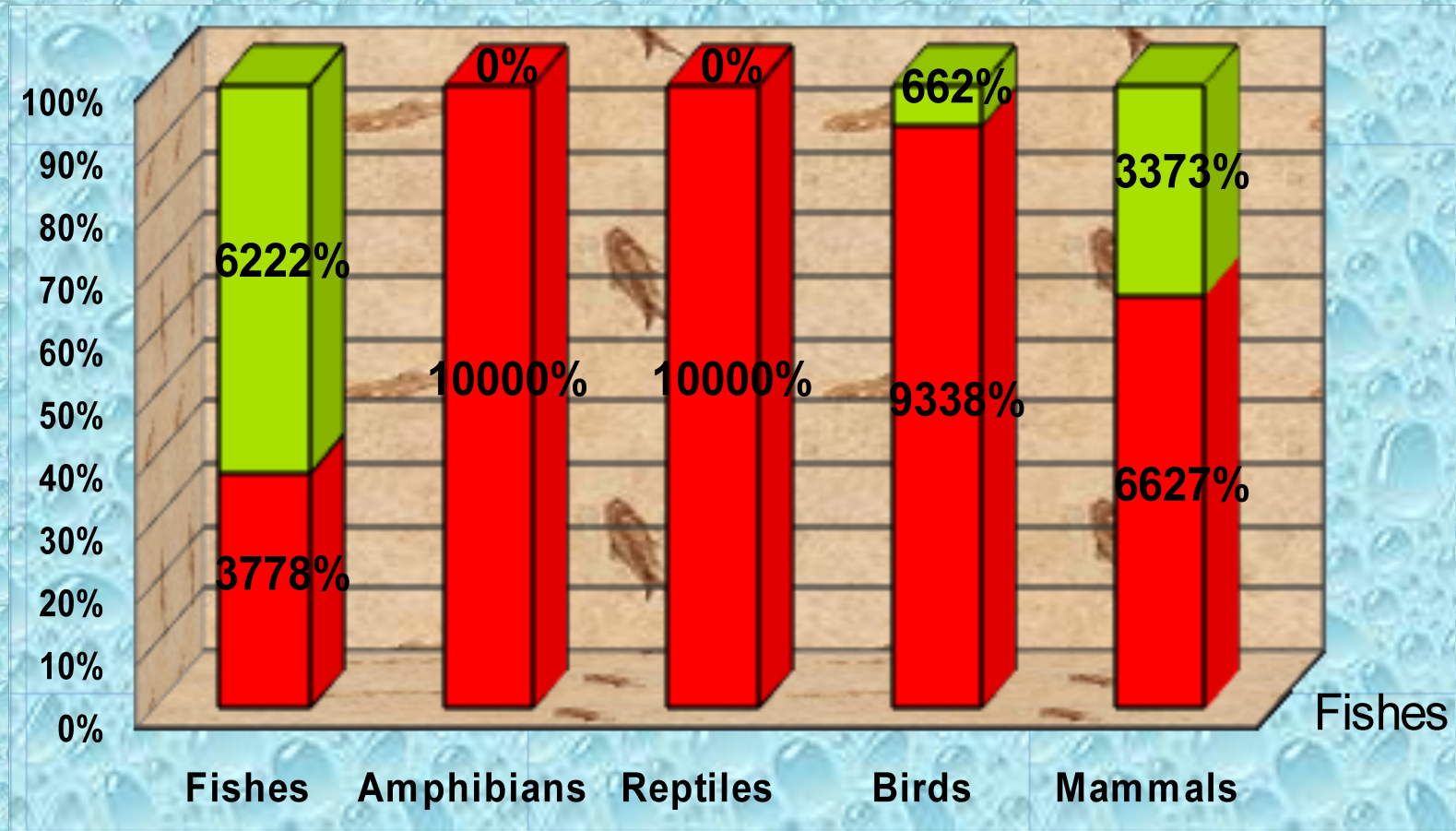


The current status of invasive fish
species in Hungary - recommendations,
case studies

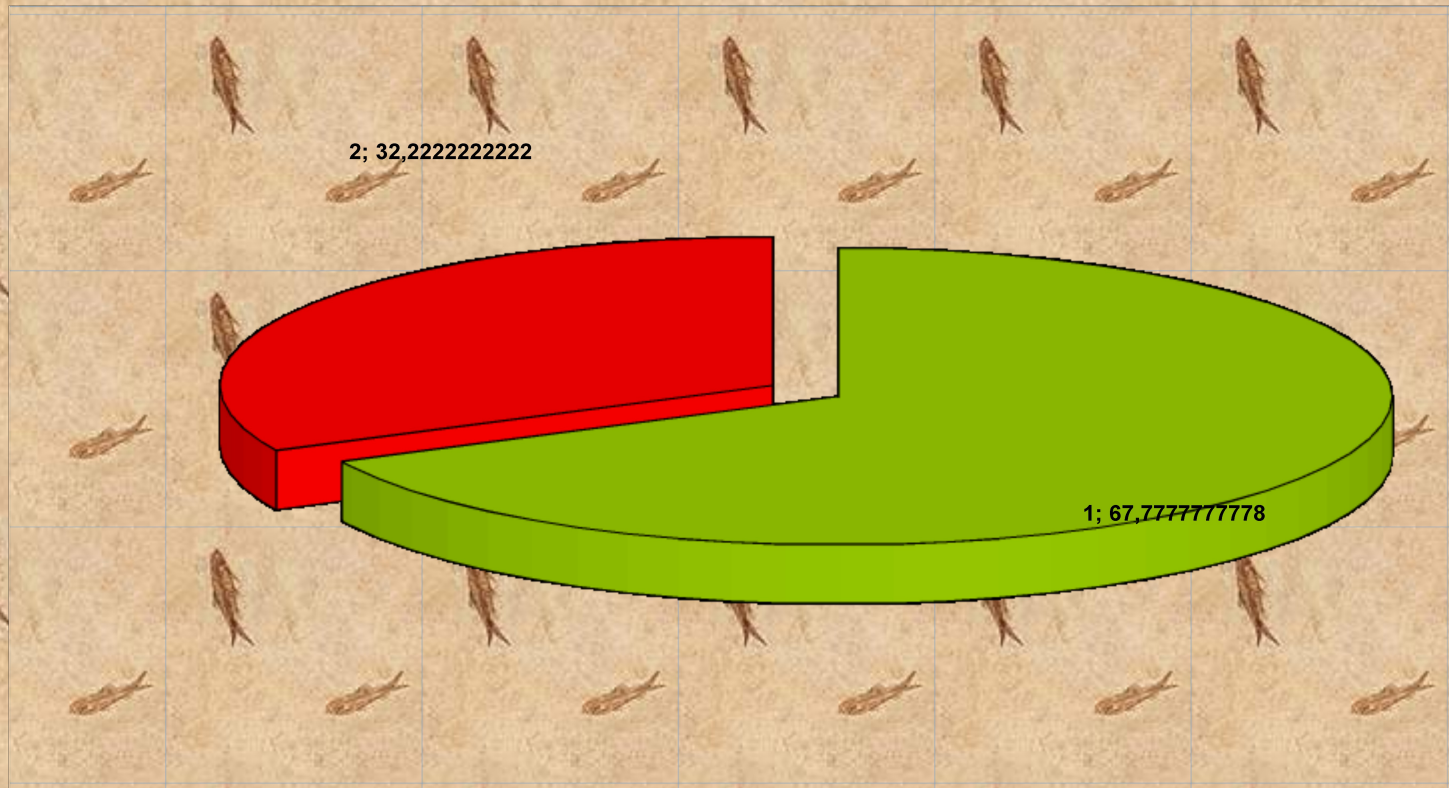
Sallai Zoltán & Bereczki Csaba

Hortobágy National Park Directorate, Hungary

Protected vertebrate species in Hungary



Hungarian fish fauna by its origin



Prussian carp - *Carassius gibelio*



- from South-east Asia
- introduced in 1954 from Bulgaria, though it was probably known formerly

Bloch's Atlas, 1782-84

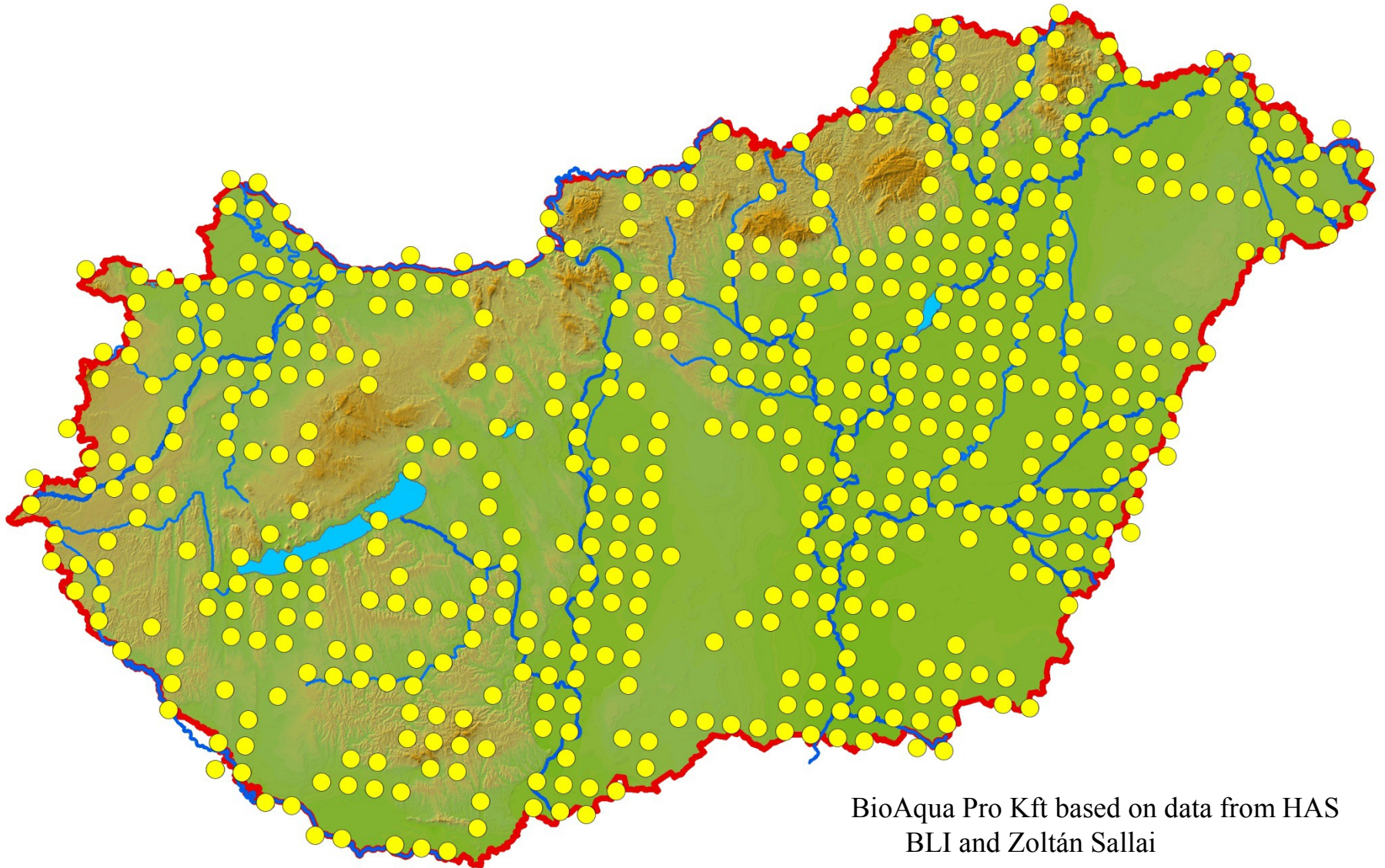


Prussian carp - *Carassius gibelio*

- special reproduction strategy: gynogenesis and spawning-parasitism
- omnivorous, food-competitor
- most threatened is the crussian carp (*Carassius carassius*):
gradation→decrease
- BĂNĂRESCU (1993, 1994): crussian carp is the second most threatened fish species in Romania (might be in Hungary)



Range of Prussian carp (*Carassius gibelio*) in Hungary

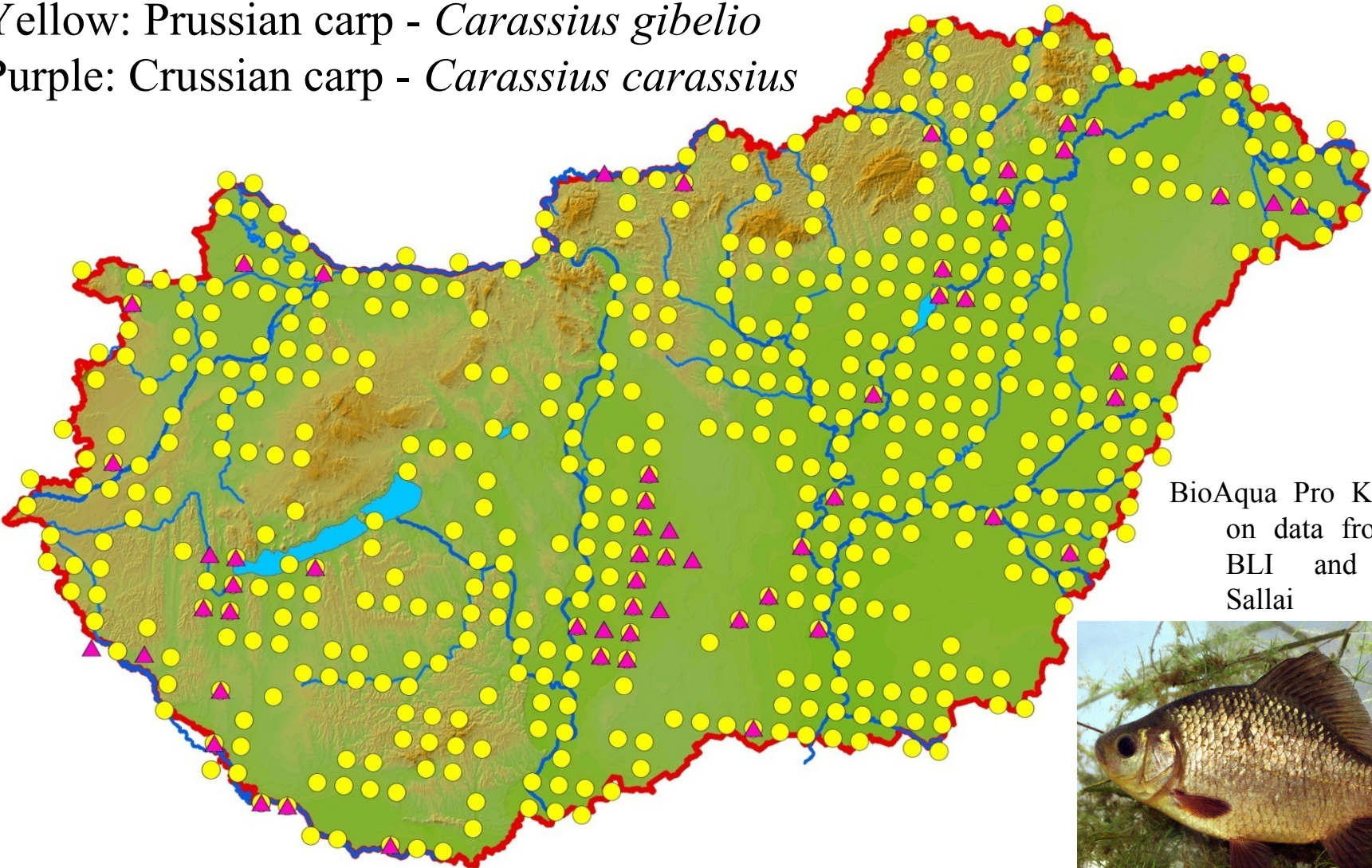


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Range of Prussian carp and Crussian carp in Hungary

Yellow: Prussian carp - *Carassius gibelio*

Purple: Crussian carp - *Carassius carassius*



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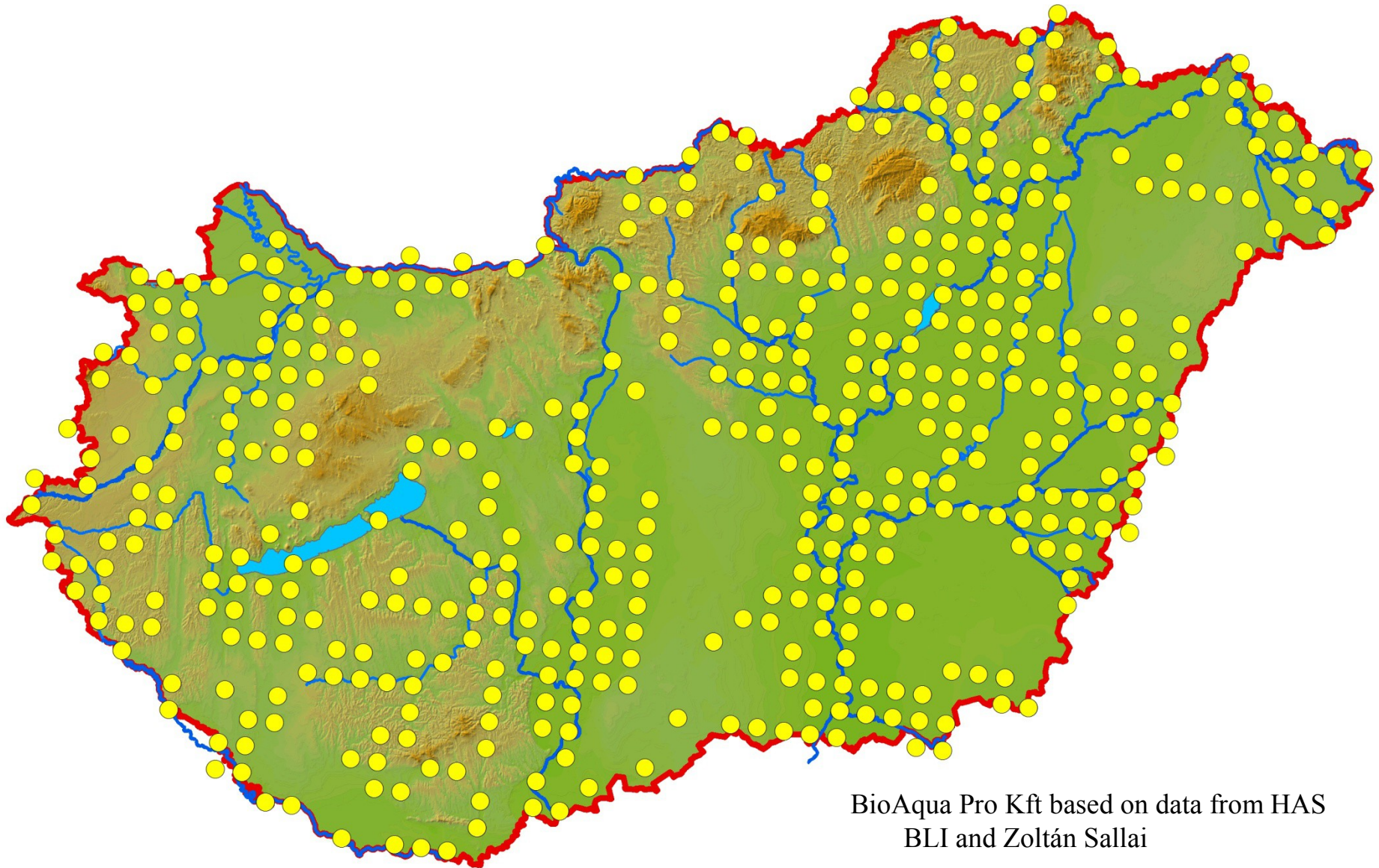
Crucian carp - *Carassius carassius*

Stone moroko - *Pseudorasbora parva*



- from Amur-river till South-China, Korea, Japan, Thailand
- accidentally introduced (first detection in Europe in 1961) and distributed
- first Hungarian detection in 1963 (Paks – middle section of Duna)
- today even in closed oxbows or marshes
- Romania: hermaphrodite individuals
- omnivorous: food-competitor
- economical damage in fish-ponds

Range of Stone moroko (*Pseudorasbora parva*)



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Mass of stone moroko at a fish-pond



Grass carp - *Ctenopharyngodon idella*

- imported from East-Asia in the 1960's
- from 1997 the introduction is prohibited (legislation)
- „sport angler-fish” (illegal introductions)



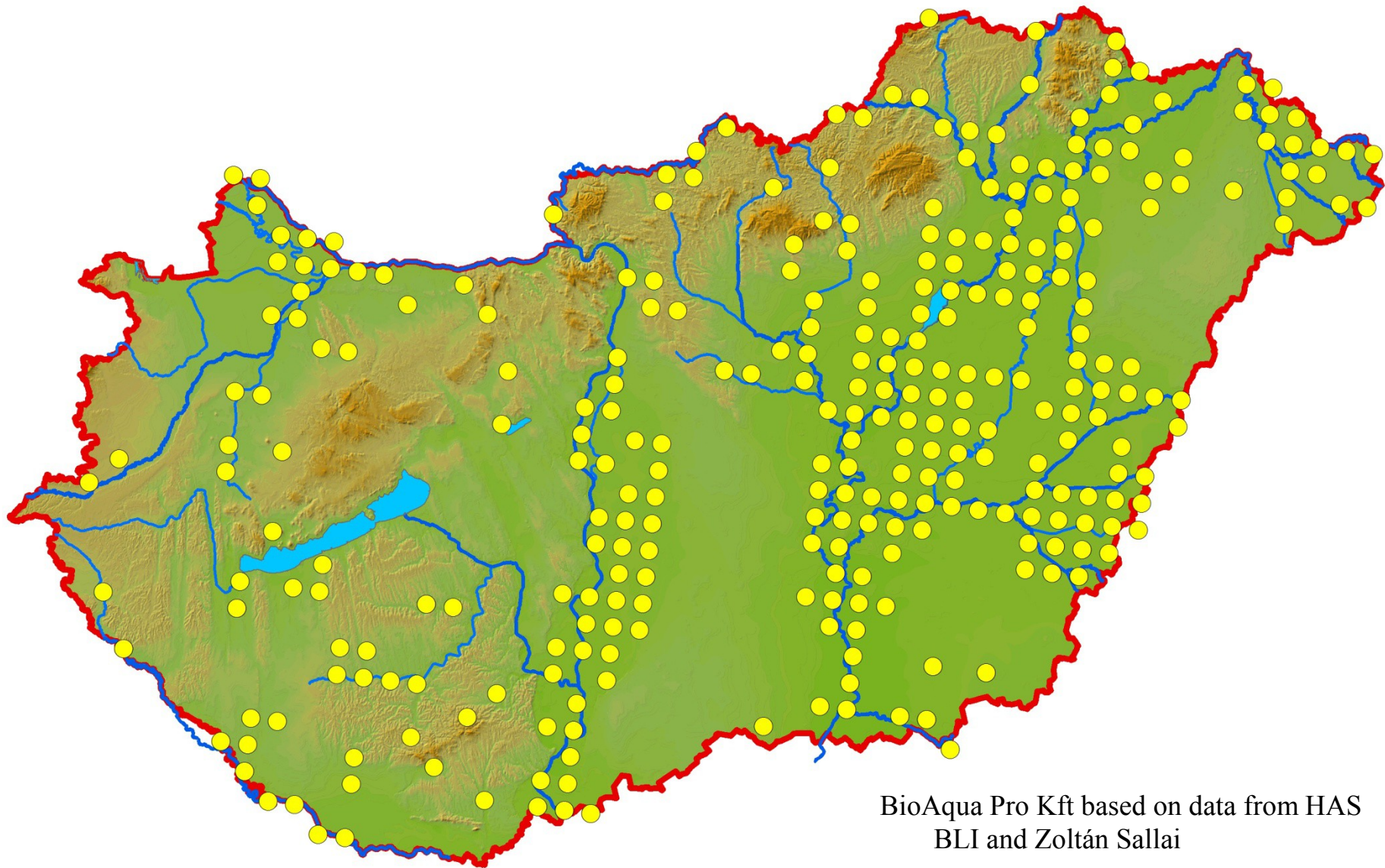
- herbivorous (aquatic macrophyte): habitat destruction and eutrophication

Black bullhead - *Ameiurus melas*

- introduced from North-America with the brown bullhead, distributed and introduced from Western-Europe
- Hungary: introduced in 1980 from Italy
- omnivorous (eggs and spawns)
- reproduction strategy: parents protect the nest, eggs and spawns



Range of Black bullhead (*Ameiurus melas*)



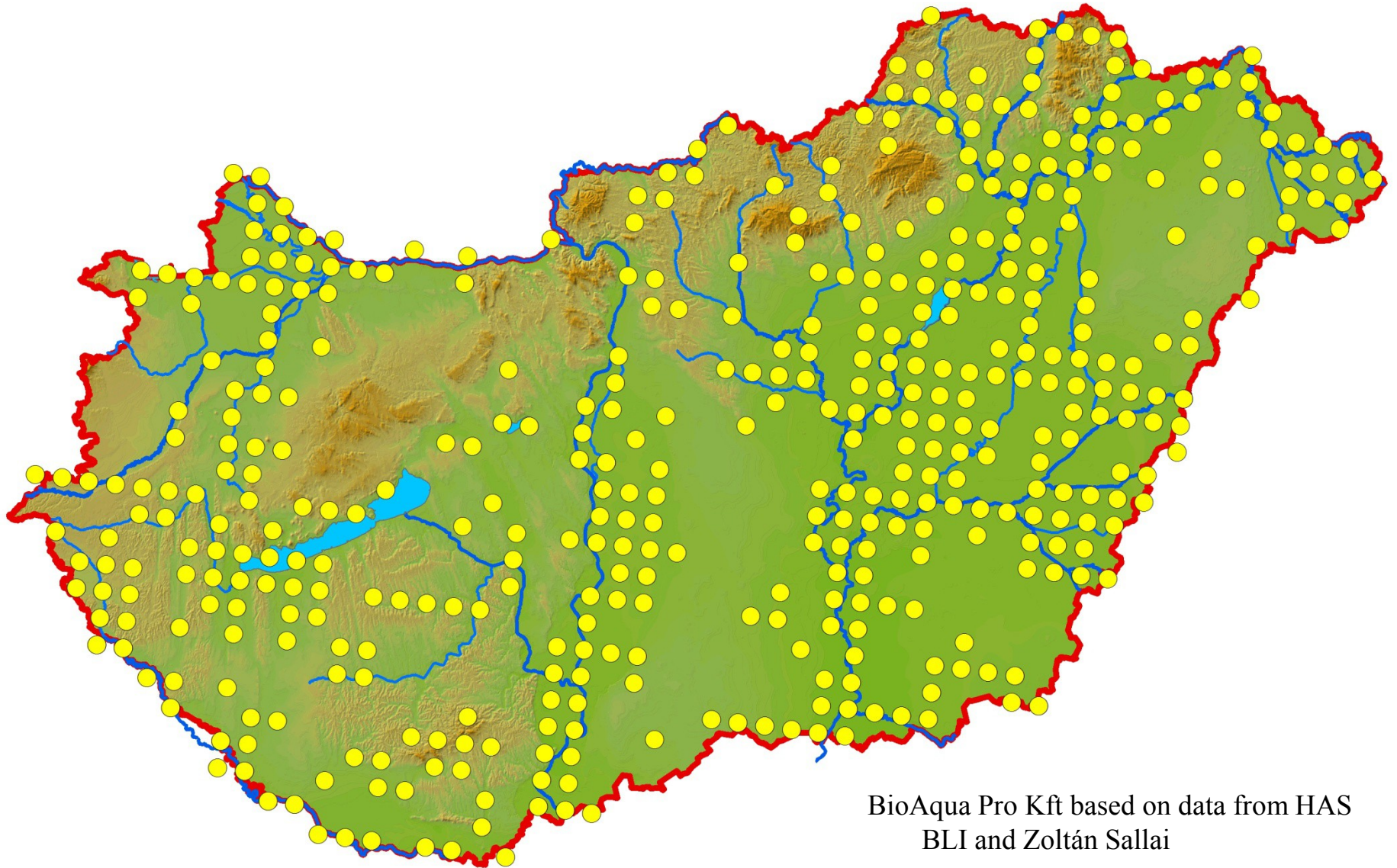
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Pumpkinseed - *Lepomis gibbosus*

- introduced from North-America, as aquarium fish about 1900
- quickly spreaded, even closed oxbow and marshes
- omnivorous, particularly aquatic invertebrates, (eggs, spawns)
- reproduction strategy: the male protects the nest and the eggs



Range of Pumpkinseed (*Lepomis gibbosus*)



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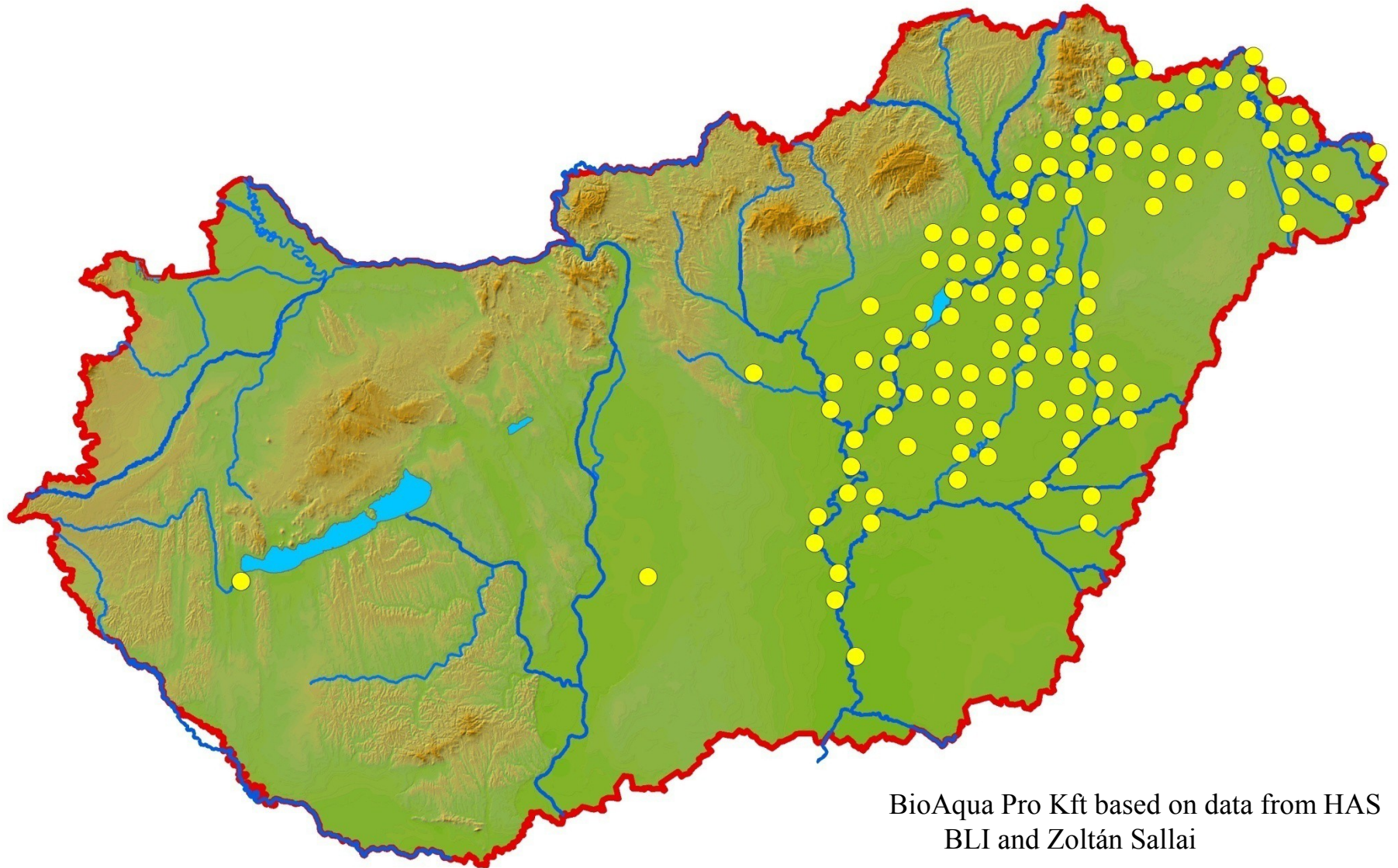
Chinese sleeper - *Perccottus glenii*

- native at the middle and lower section of Amur-river's cathment and at the seasoire of Yellow-sea
- distribution: 1912 - Saint Petersburg (aquarium fish) → Black-sea cathment → Don-river catchement → Dnieper River catchment → Eastern-Carpathians
- first detection in Hungary: 1997, Lake-Tisza

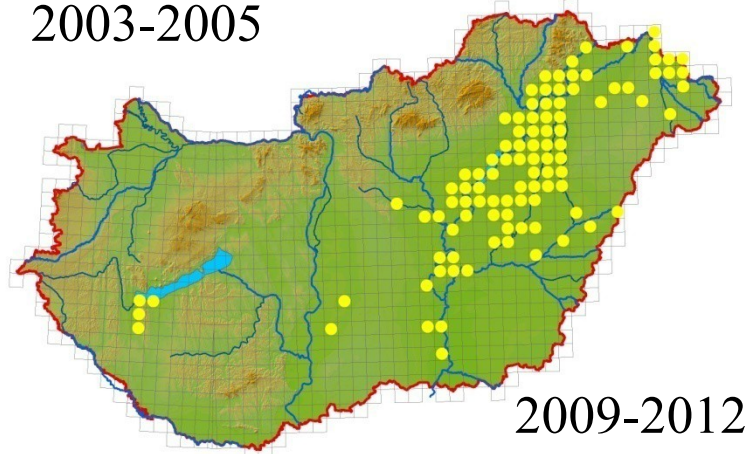
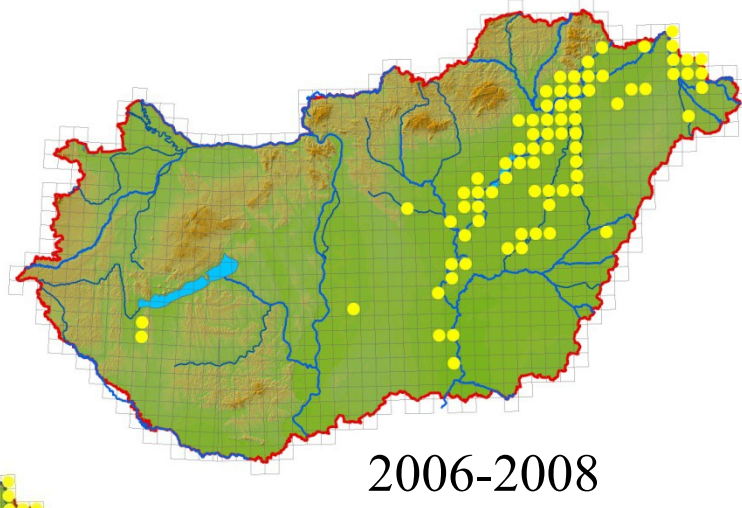
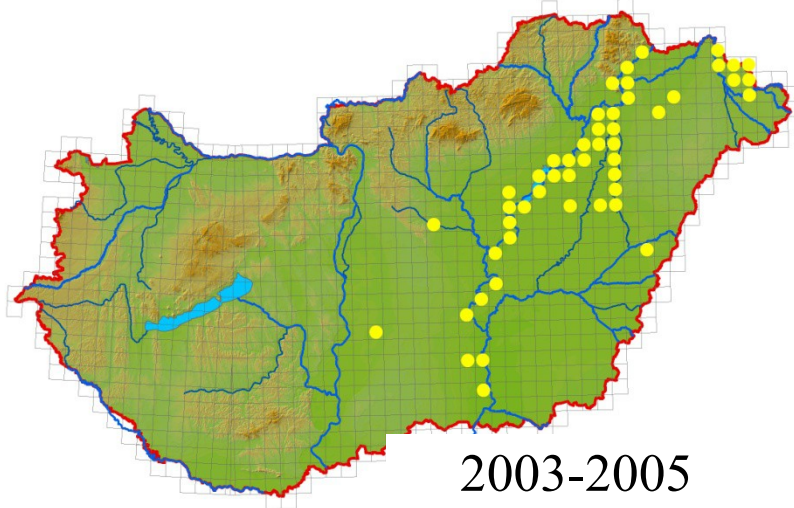
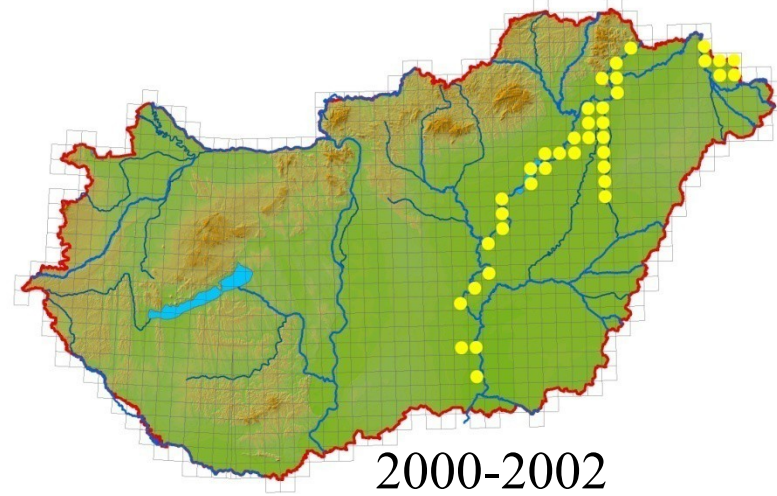
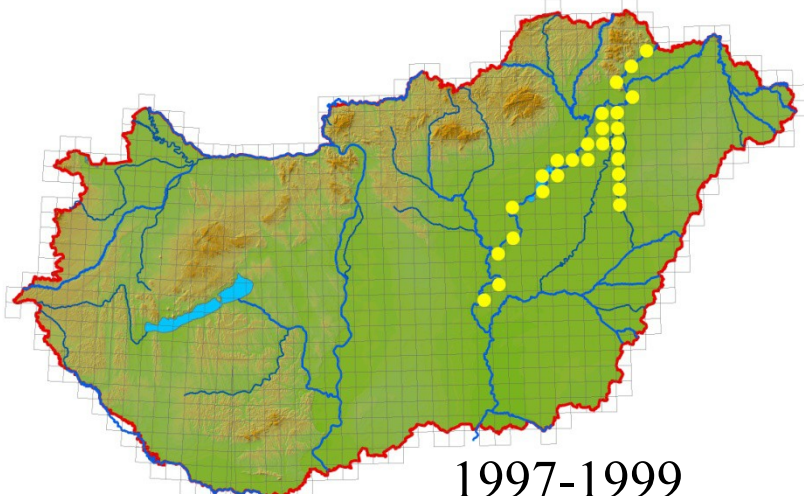


- reproduction strategy: maturation in the second year, the male protects the eggs on underwater objects
- threatens the vulnerable European mudminnow (*Umbra krameri*) at fens and marshes

Range of Chinese sleeper (*Perccottus glenii*)



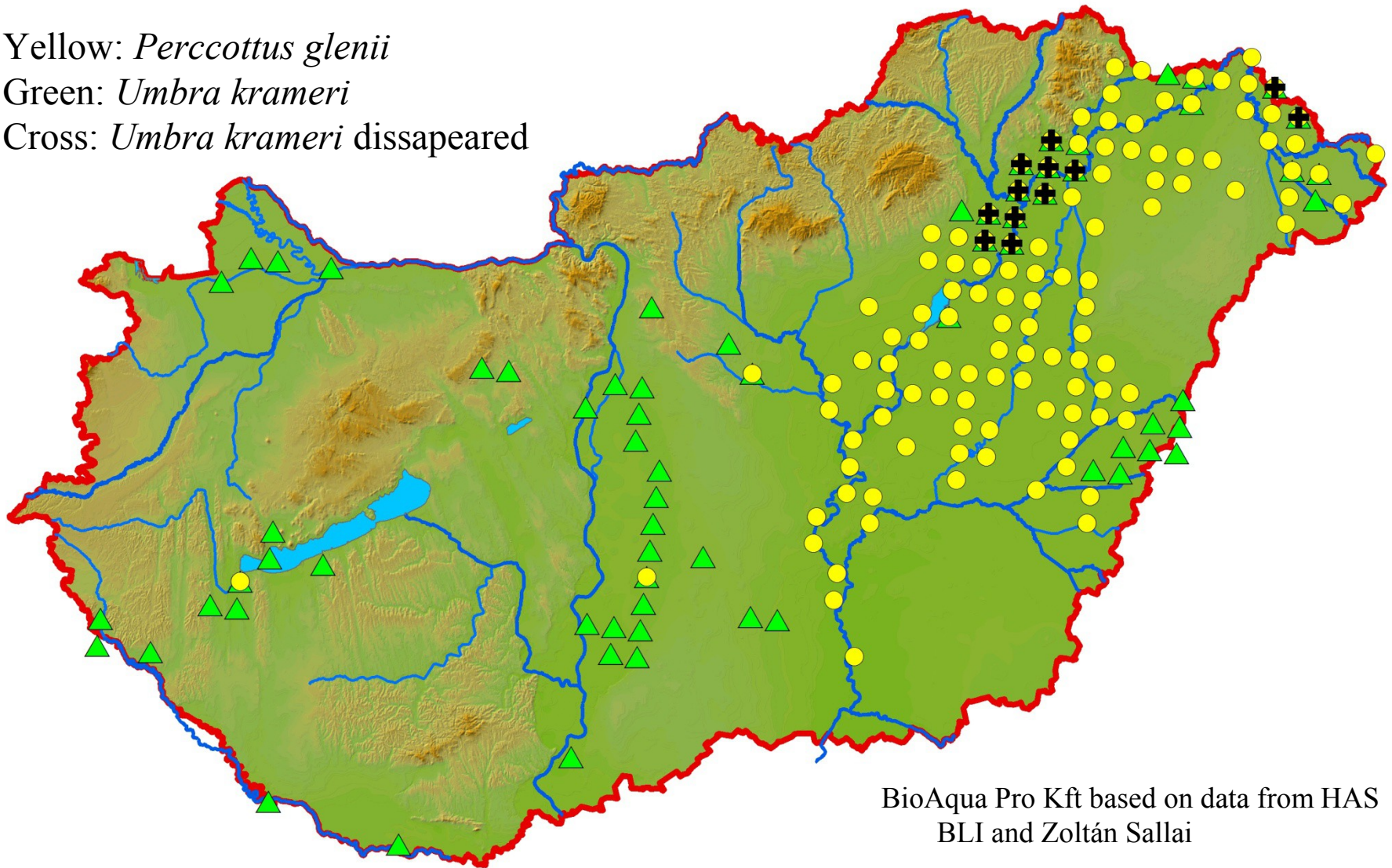
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Range of Chinese sleeper (*Perccottus glenii*) and Mudminnow (*Umbra krameri*)

Yellow: *Perccottus glenii*
Green: *Umbra krameri*
Cross: *Umbra krameri* disappeared



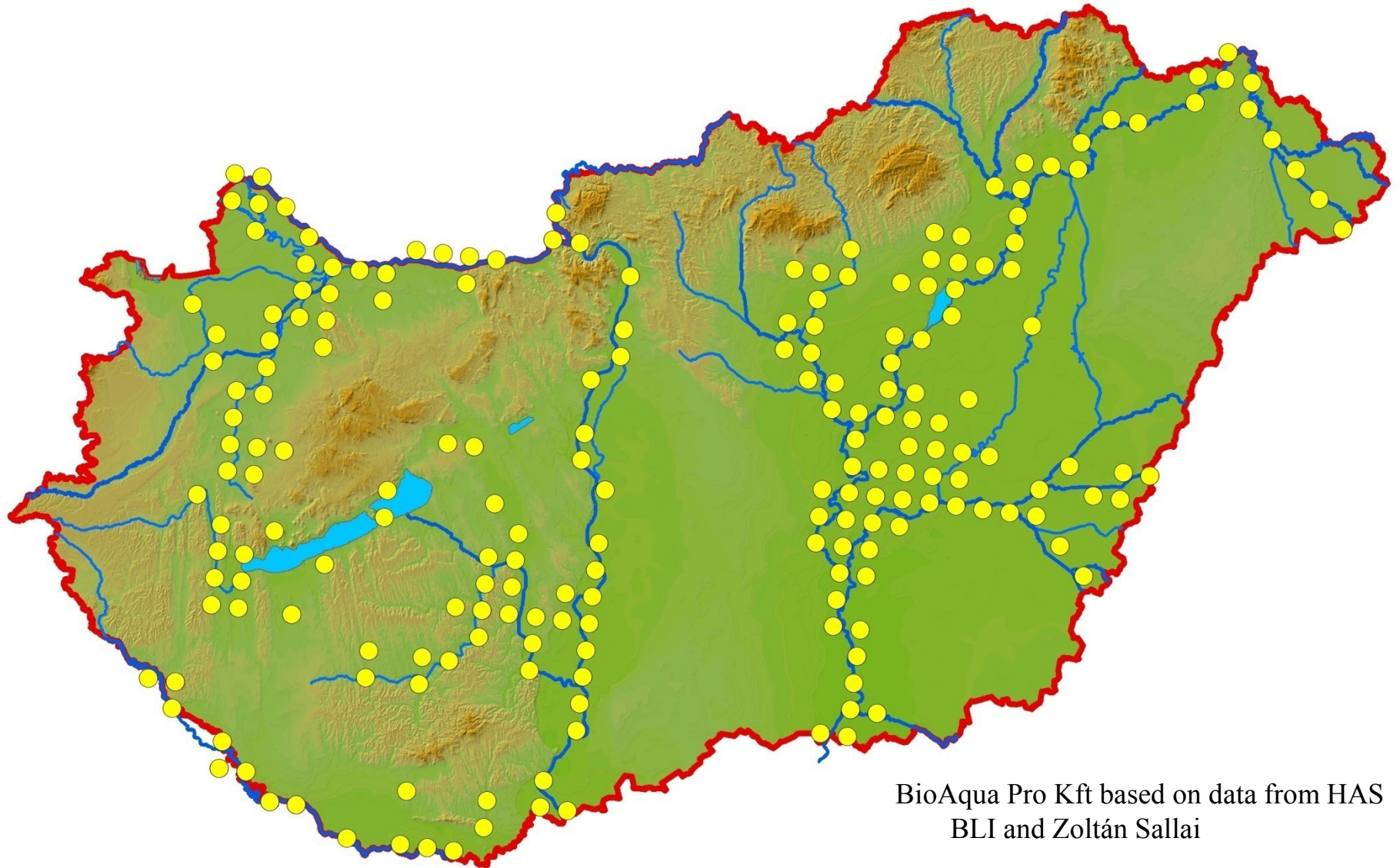
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Monkey goby - *Neogobius fluviatilis*

- Black-sea, seashore of Caspian-sea, and rivers of those (brackish water)
- first detection in Hungary: 1970, Balaton
- maturation: second year
- destruction (eating) of native fish eggs and spawn
- mass extinction of European eel in 1991: *Anguillicoda crassus* (parasite *Nematoda*) – monkey goby might be one of the most important intermediate host



Range of Monkey goby (*Neogobius fluviatilis*)



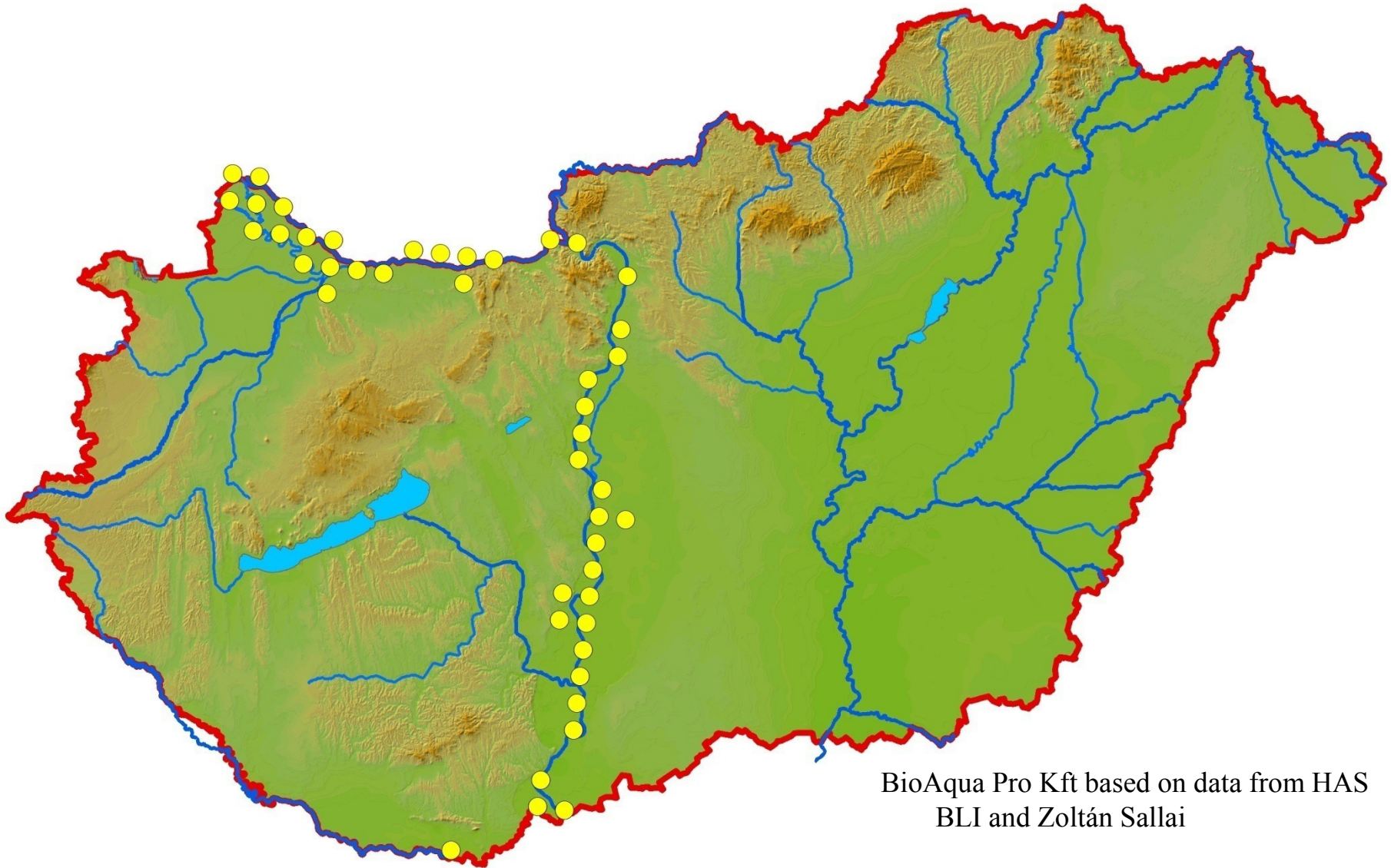
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Bighead goby - *Ponticola kessleri*

- Black-sea, seashore of Caspian-sea, and rivers of those (brackish water)
- formerly lower section of Danube; 1994-Wien; 1996-Hungary
- maturation: second year
- feeding: invertebrates, predation on spawn (Danube)
- main factor of the decrease of European bullhead (*Cottus gobio*) population at Szigetköz



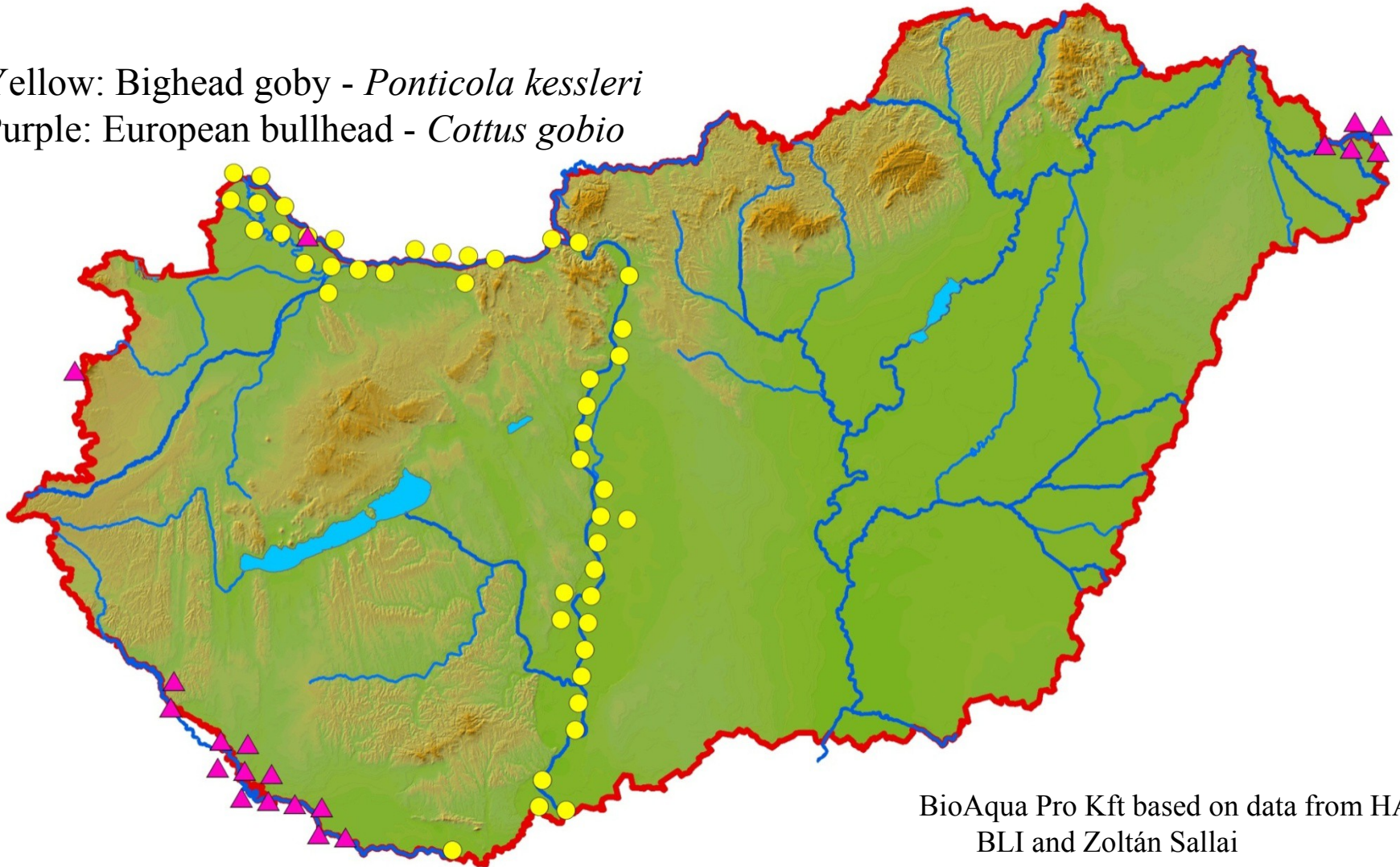
Range of Bighead goby (*Ponticola kessleri*)



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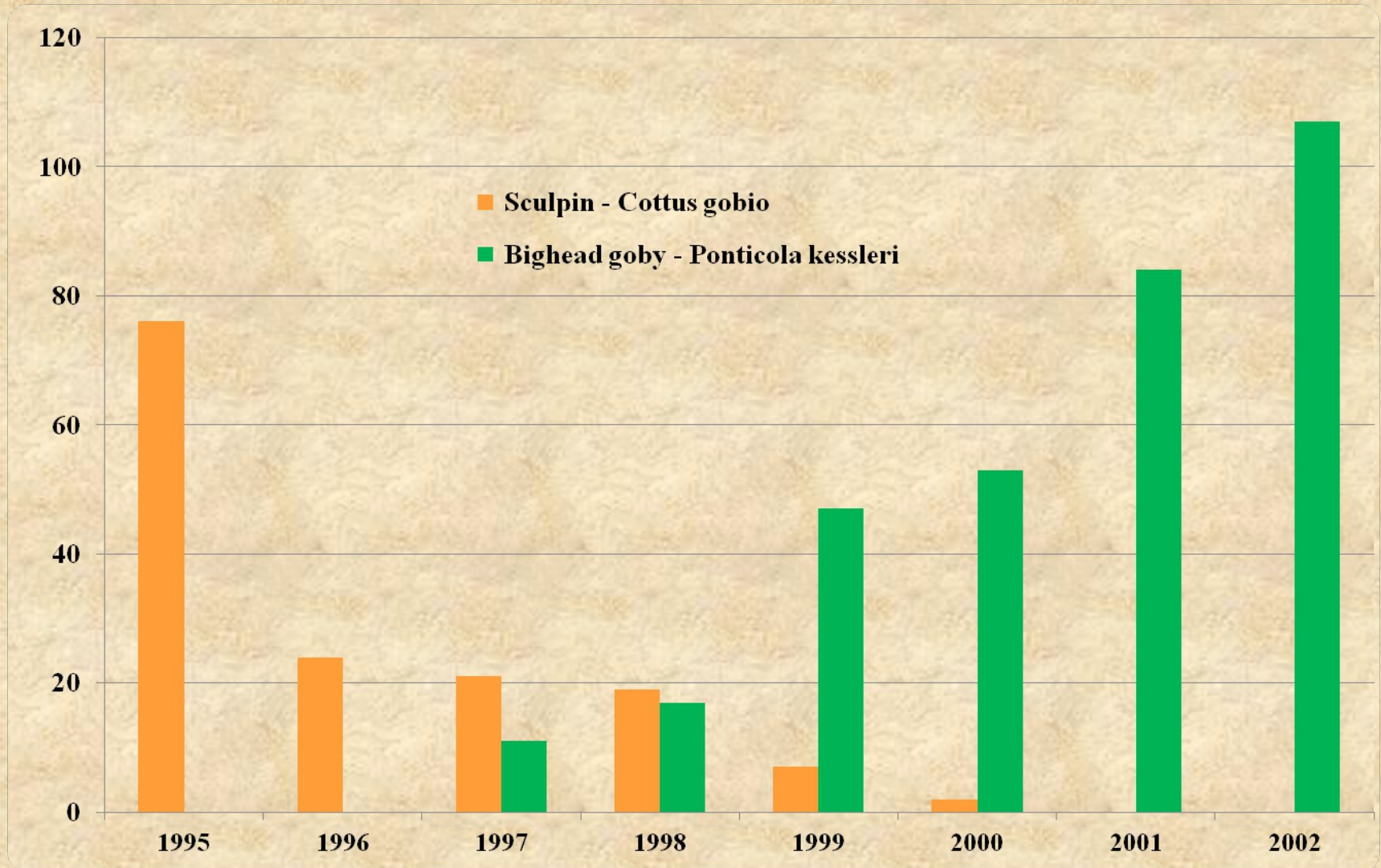
Range of Bighead goby (*Ponticola kessleri*) and European bullhead (*Cottus gobio*)

Yellow: Bighead goby - *Ponticola kessleri*
Purple: European bullhead - *Cottus gobio*



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Abundance changes of European bullhead (*Cottus gobio*) and Bighead goby (*Ponticola kessleri*) at one sample section of Danube

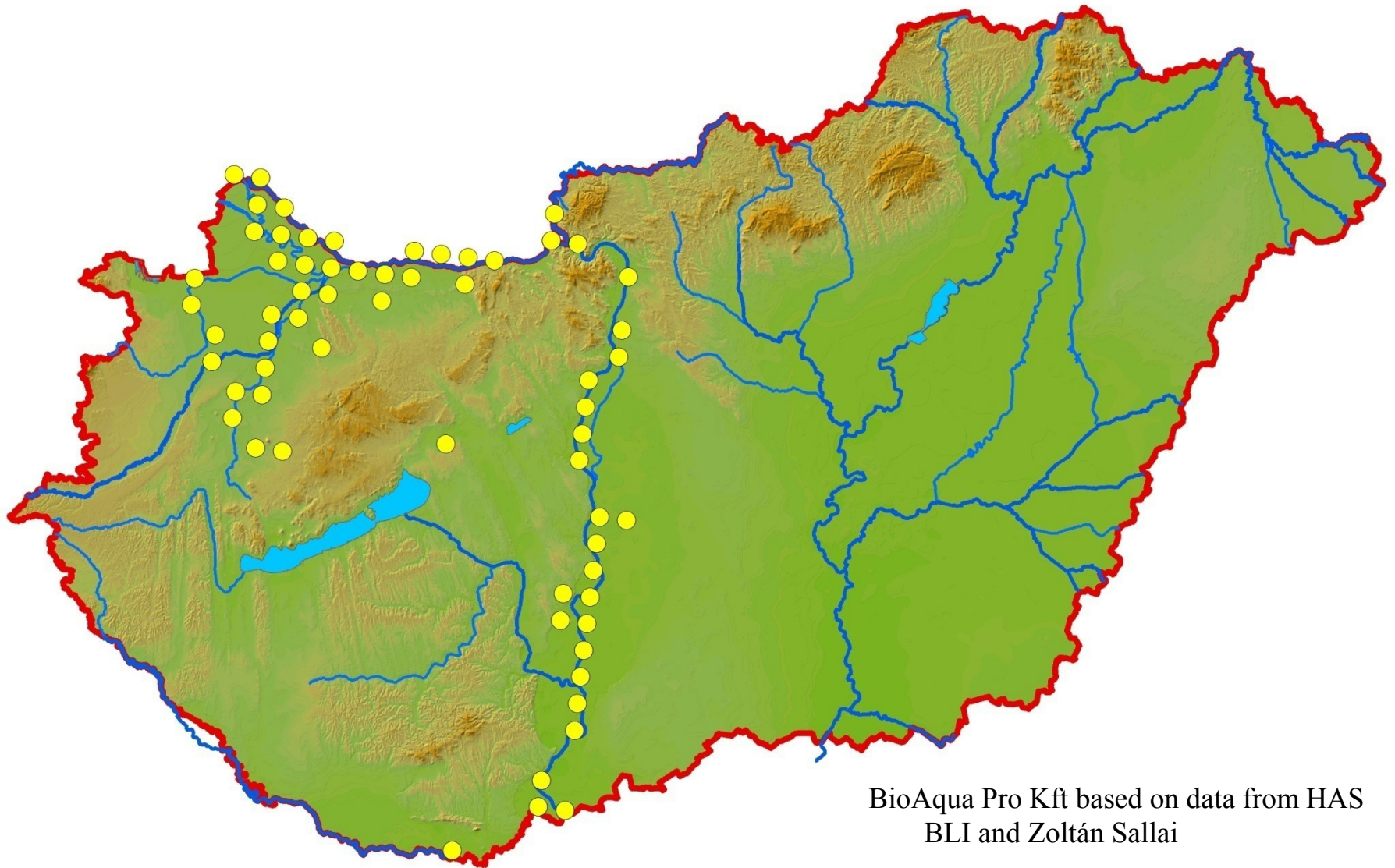


Round goby - *Neogobius melanostomus*

- seas and brackish zones of Black-, Caspian-sea and Sea of Azov
- first detection in Hungary: 2001, Danube
- maturation first or second year
- benthic aquatic insects and eggs, spawns



Range of Round goby (*Neogobius melanostomus*)



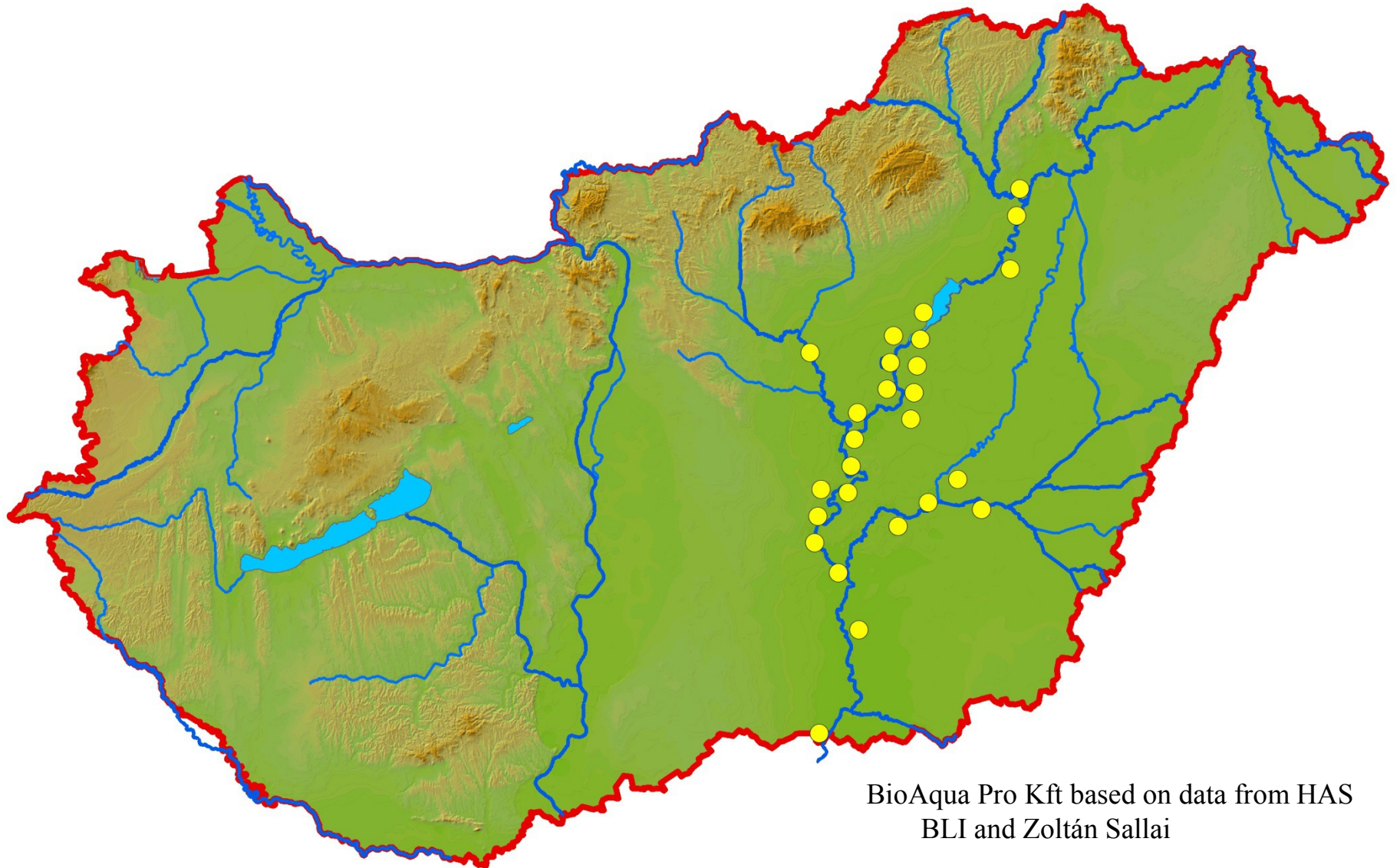
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Caucasian dwarf goby - *Knipowitschia caucasica*

- seasores of Black-, Caspian-, Aegean-sea and Sea of Azov
- first detection in Hungary: 2011-Szamos; 2012 - Tisza-lake
- benthic and planktonic aquatic invertebrates
- life-cycle: 2 years; maturation: first year
- food-competitor for native species



Range of Caucasian dwarf goby (*Knipowitschia caucasica*)



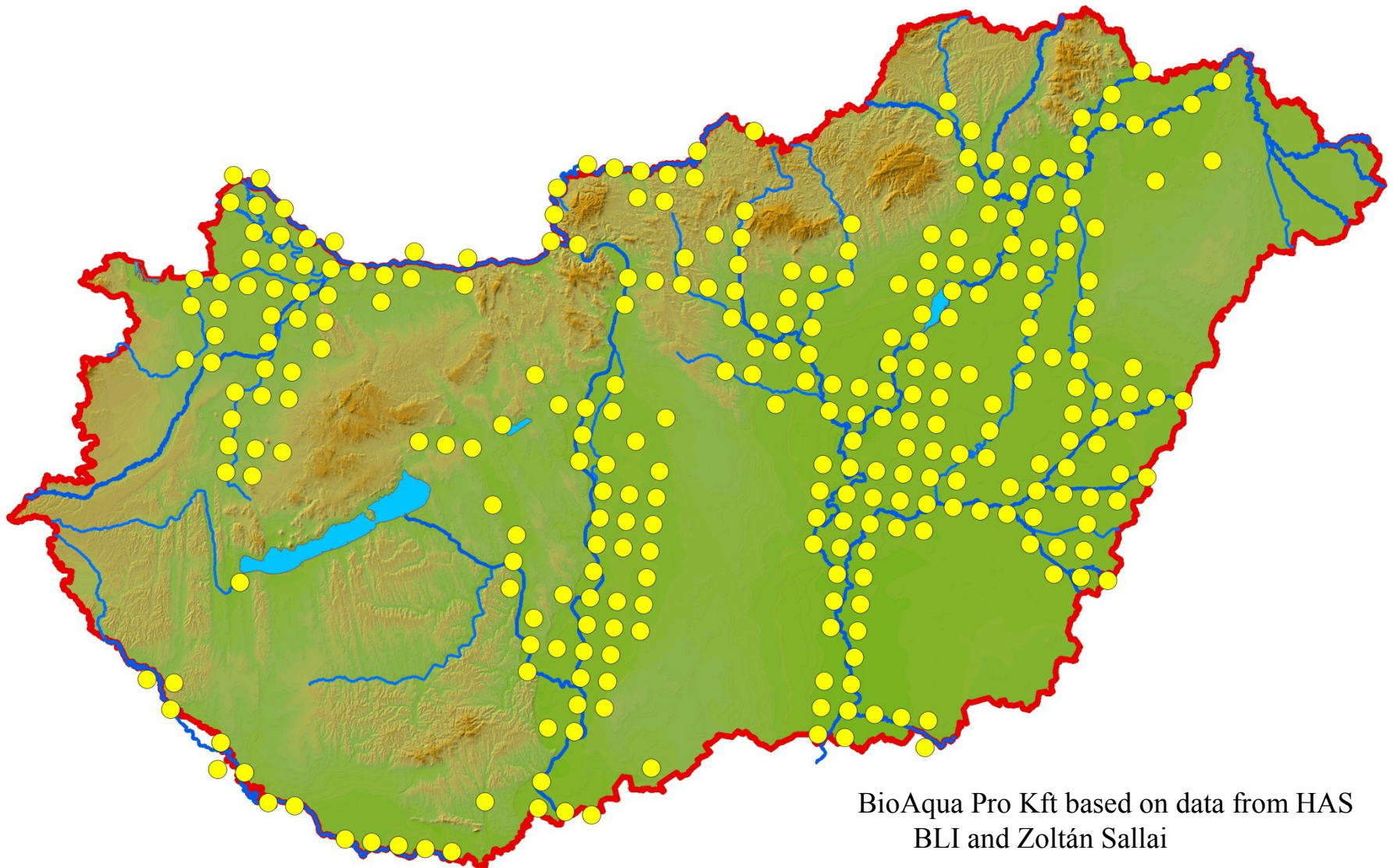
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Western tubenose goby - *Proterorhinus semilunaris*

- seasoers, brackish zones and catchment of Black- and Caspian-sea
- first Hungarian detection: 1872, hot water well in Budapest
- maturation: second year
- feeding: small benthic aquatic invertebrates, larvae, egg, spawns



Range of Western tubenose goby (*Proterorhinus semilunaris*)



BioAqua Pro Kft based on data from HAS
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Problems

- high tolerance (oxygen, freeze)
- omnivorous
- food-competitor
- absence of limiting factors (parasites, diseases, predators)
- habitat competitors, disturbance
- challenging selective eliminations (chinese sleeper, stone moroko, pumpkinseed)
- significant consumption of eggs, spawns and larvae (chinese sleeper, bullheads, pumpkinseed)
- succesful reproductive strategies (protecting eggs, spawns; gynogenesis)
- pressure of anglers (introduction and spread of grass carp)

Recommendations

- mandatory (legislations!) and continuous control of invasive alien species (silver and bighead carp, grass carp, bullheads)
- more effective practice to avoid escaping invasive species from fish ponds (prussian carp, stone moroko, pumkinseed)
- more carnivorous species at fish ponds
- preventing illegal introductions and distributions (grass carp, silver and bighead carp)
- high penalties or fees (illegal introductions)
- monitoring!!!
- strict regulation of aquarium species
- specific bio-regulations???
- promotion and public awareness of invasive species (bullheads, grass carp, silver and bighead carp, bigger gobies)
- distinguish invasive, non-native and native species in regulations (animal protection)

Thank you for your attention!

