Suppression of invasive topmouth gudgeon Pseudorasbora parva by native pike Esox lucius in ponds

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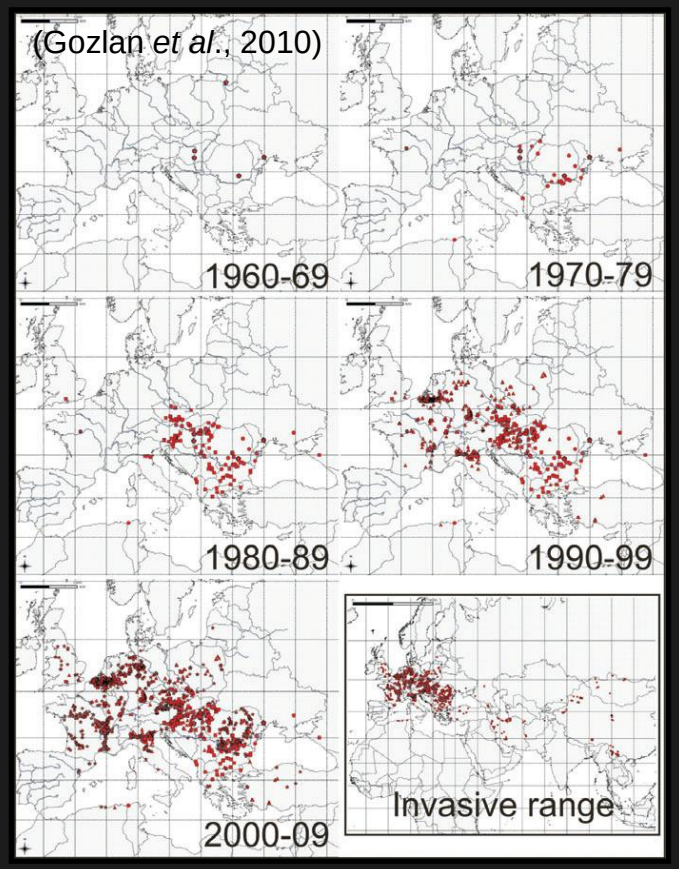
PSEUDORASBORA PARVA

- highly invasive cyprinid fish species (>32 countries)
  - opportunistic, flexible life history characteristics
  - ability to deal with degraded environmental conditions

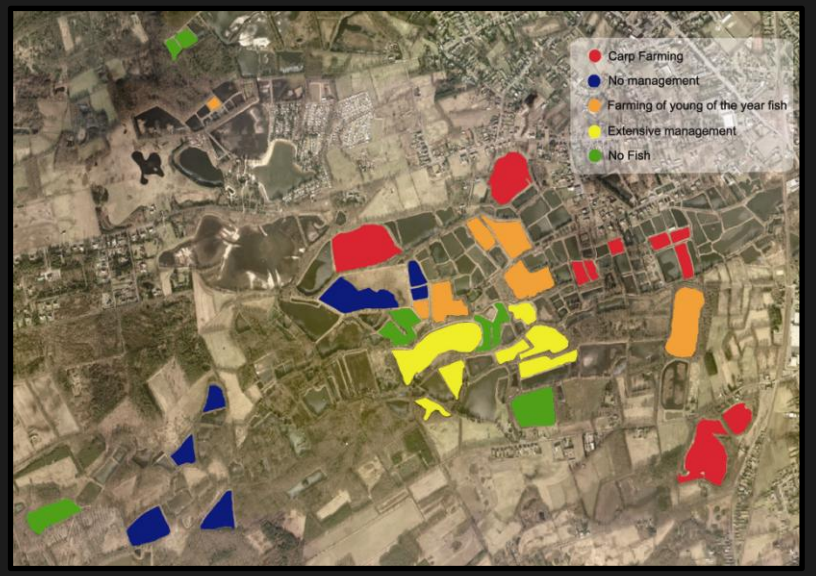


- risk to native communities
  - interspecific exploitative competition
  - alter trophic interactions
  - change ecosystem functioning
  - disease transmission and facultative parasitism

RESEARCH

FIELD SURVEY (39 ponds)

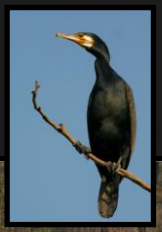
- Association between management and nature values and aquatic biodiversity

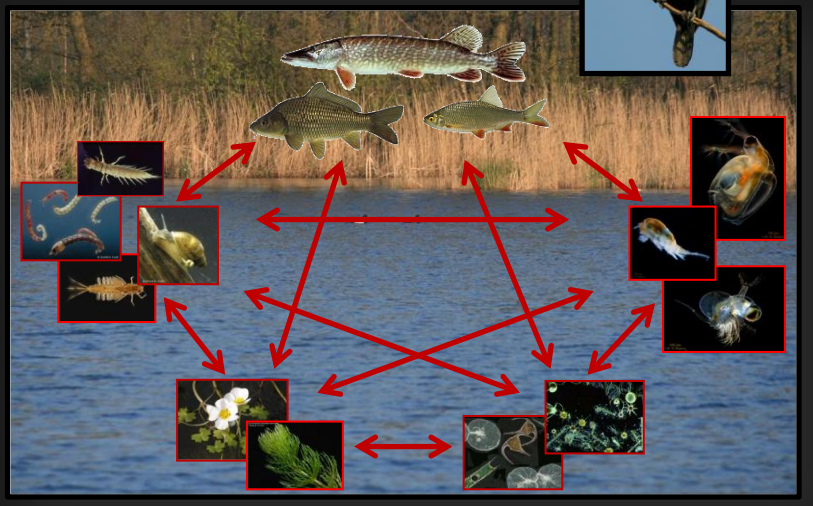


WHOLE LAKE EXPERIMENT (24 ponds)

- The role of the functional composition of fish communities on
  - biodiversity
  - food web structure
  - food web functioning

- The direct and indirect impact of predation by cormorants on aquatic ecosystems







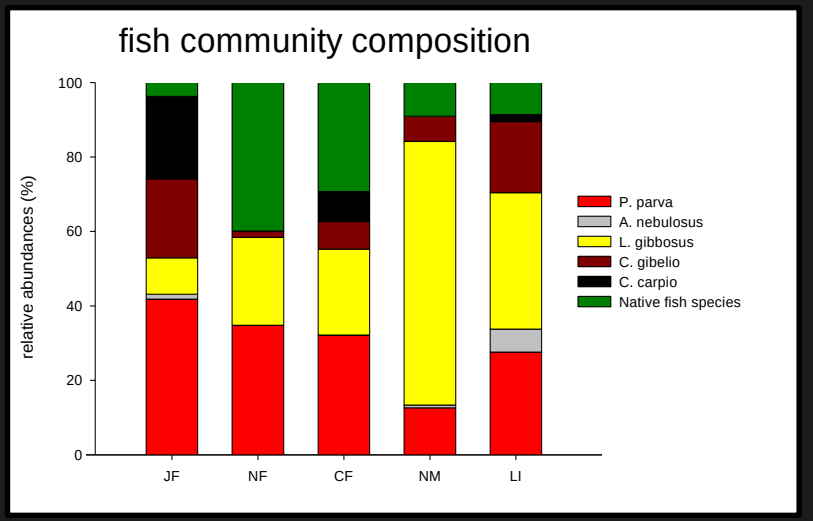


POND COMPLEX OF MIDDEN-LIMBURG

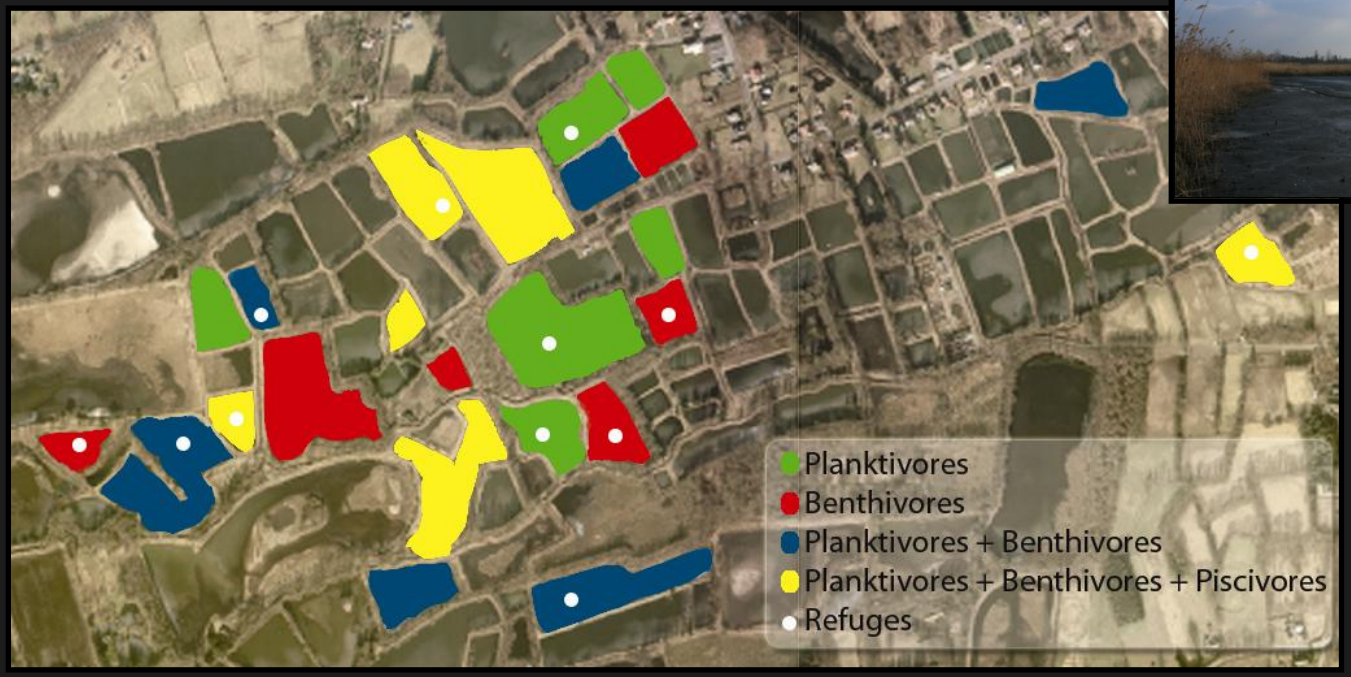
- “The Lake area of Belgium” (Hermy, 1993) (>1000 ponds)

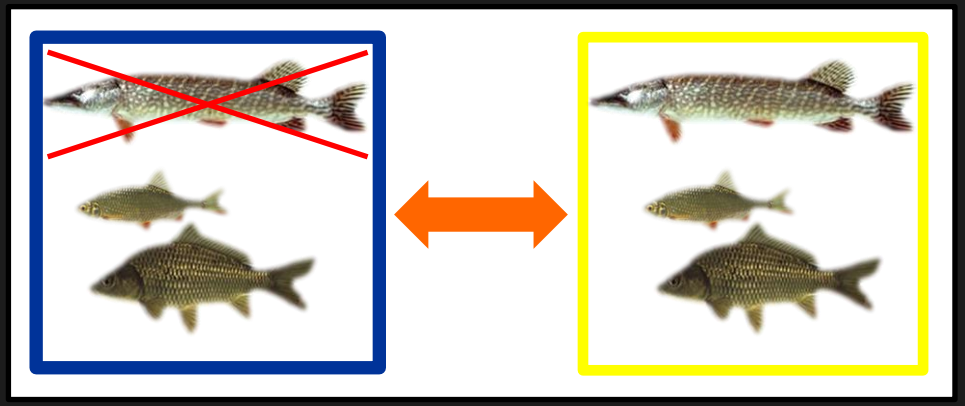
- Manmade ponds:
  - peat digging (15-19th century)
  - fish farming (20th century)

- ‘hotspot’ of biodiversity
  - unique aquatic flora
  - amphibians
  - birds

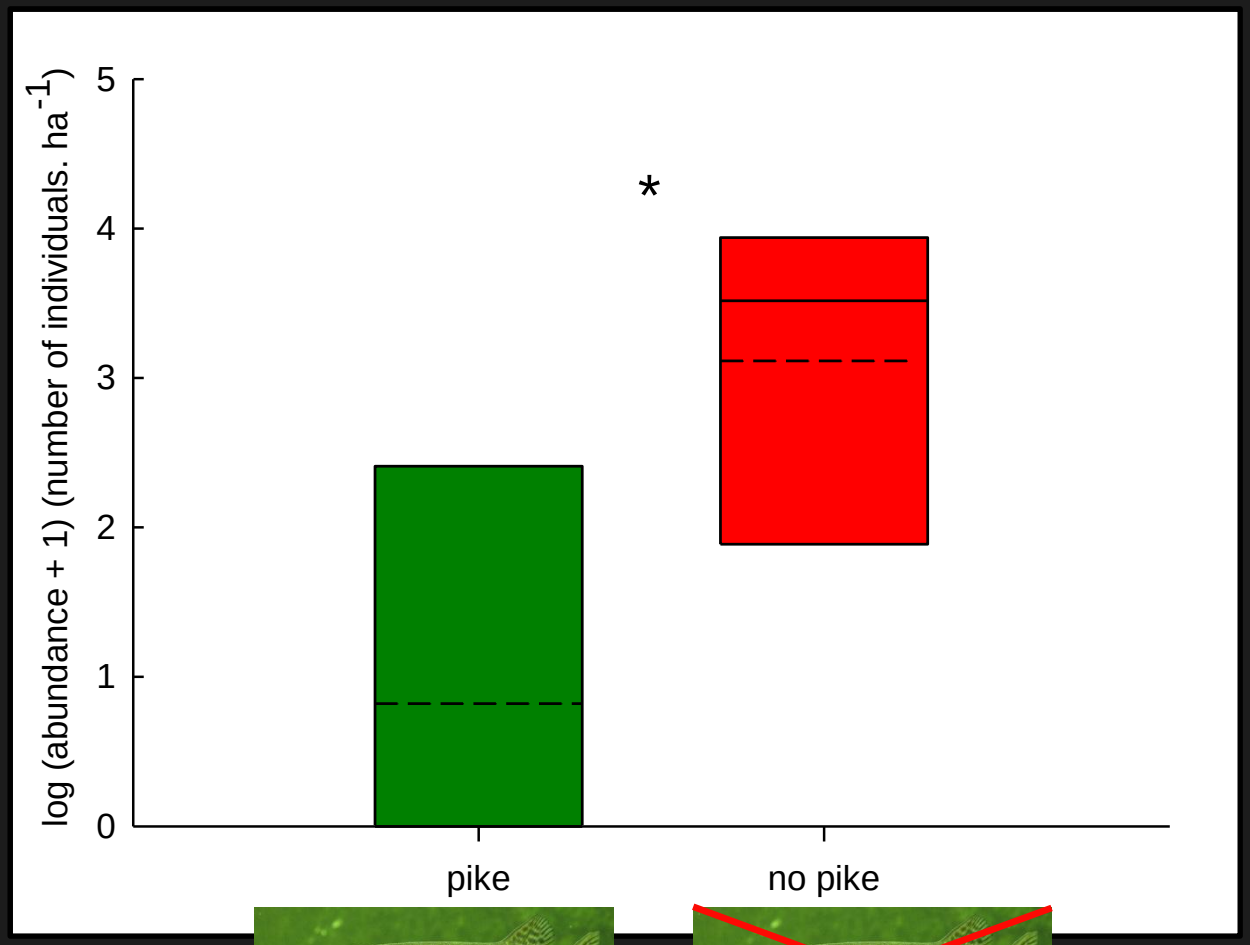


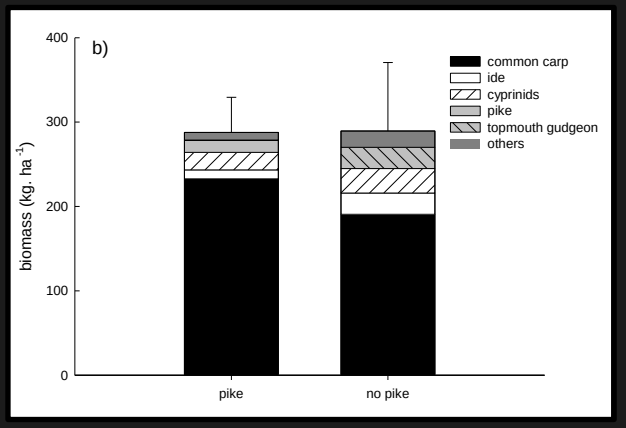
WHOLE LAKE EXPERIMENT





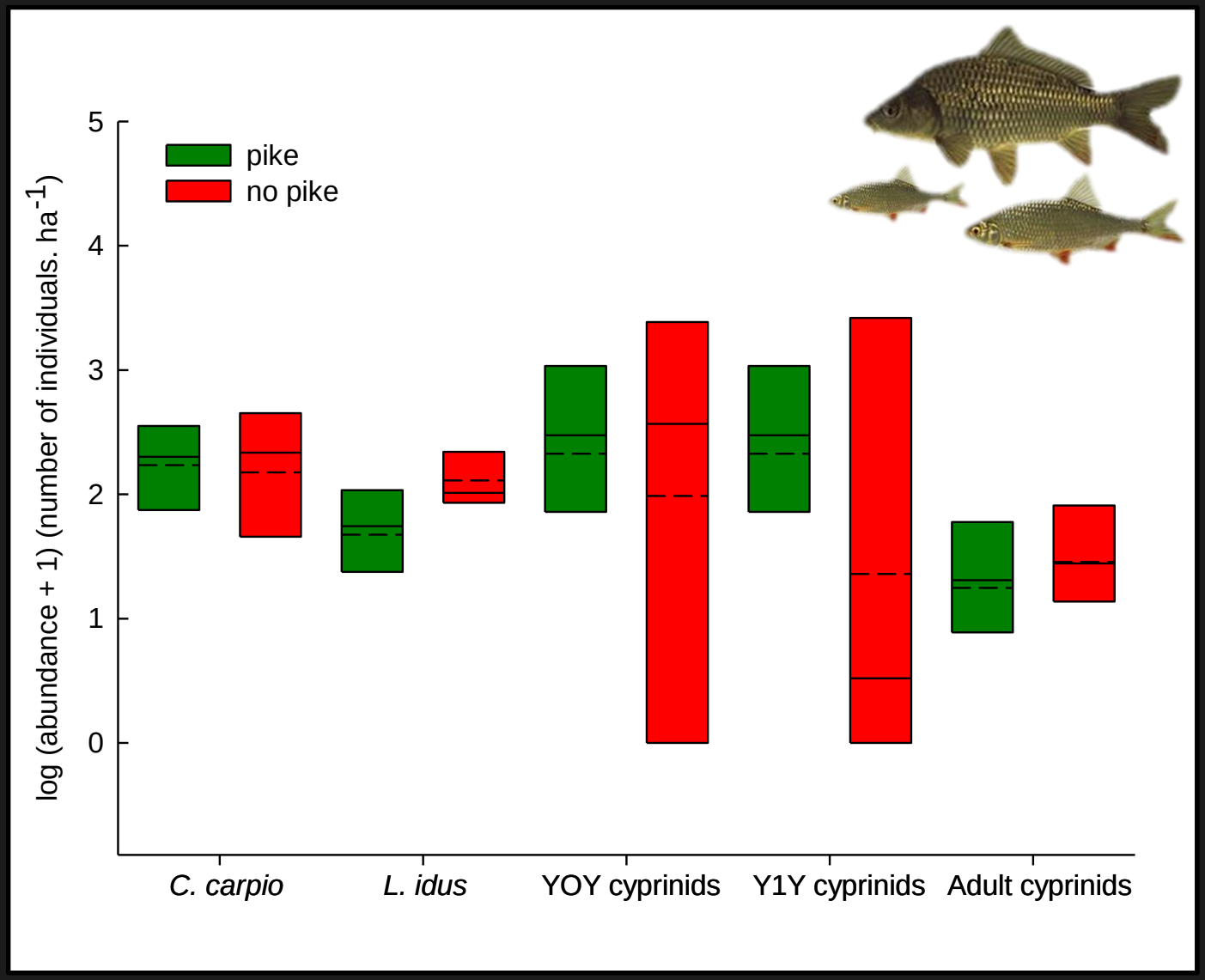
TOPMOUTH GUDGEON



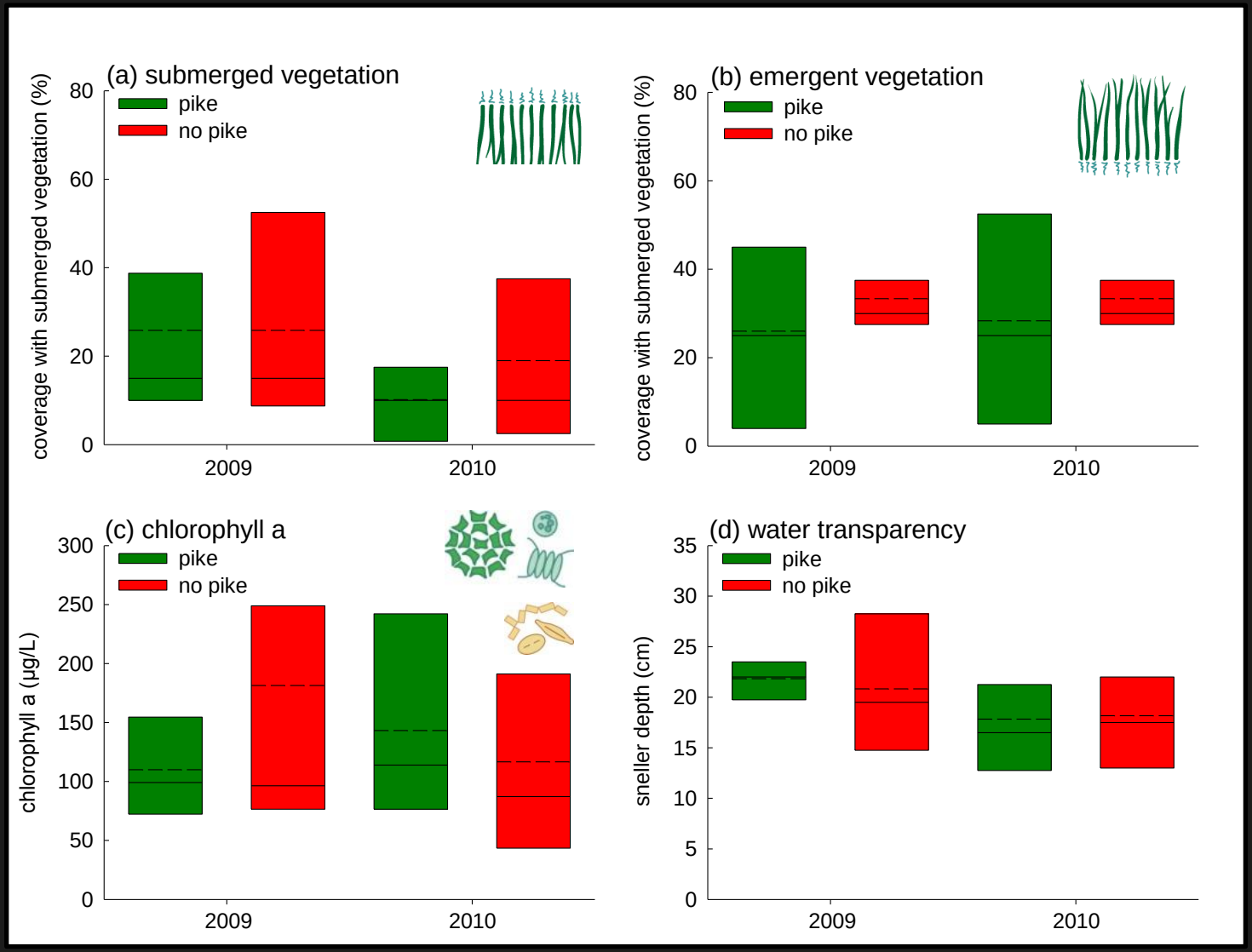


* Mann-Whitney U-test, $p < 0.05$

FISH COMMUNITY



LOCAL ENVIRONMENTAL POND VARIABLES



(RDA: 2009, R^2= 4.3%, F = 0.445, p = 0.859; 2010, R^2 = 3.7%, F = 0.388, p = 0.814)

CONCLUSION

- periodic drainage of ponds does not suppress TG populations in interconnected pond systems

- presence of native pike can prevent the establishment and proliferation of TG in shallow ponds

- predation pressure of pike was stronger on TG than on other fish species

RECOMMENDATIONS FOR MANAGEMENT

- fish community characteristics determine the biotic resistance against invasion by topmouth gudgeon

- management strategies that reinforce the presence and abundance of indigenous pike

- enhancement of pike populations by
  - stocking (scientifically based!)
  - improvement of habitat features

With cordial thanks to:

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