

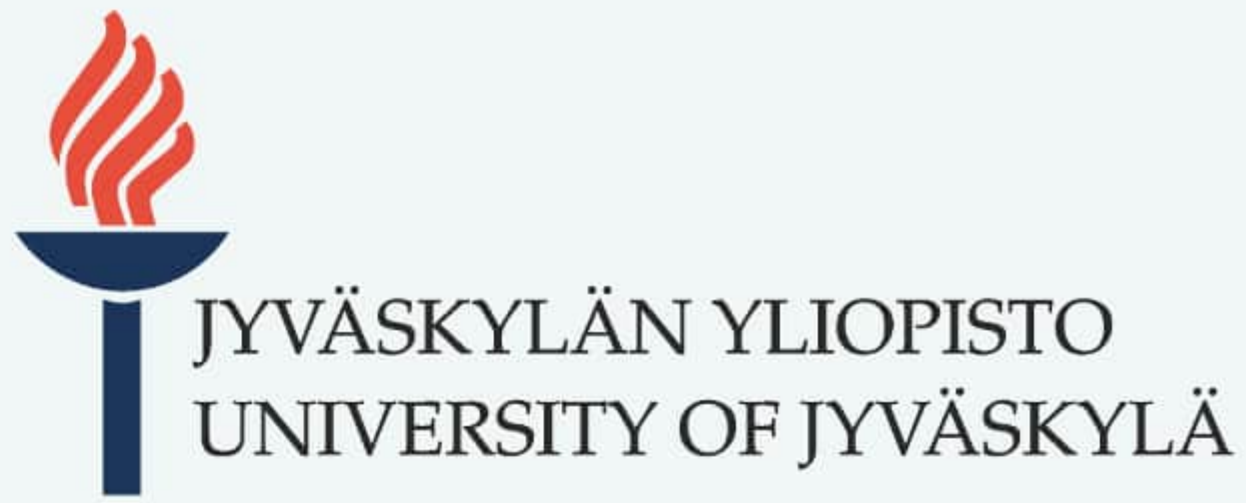
Land use drives terrestrial support of boreal lake food webs

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Objective:

To elucidate how environmental drivers influence terrestrial organic matter (t-OM) support of consumers (allochthony) in different habitats and trophic levels in boreal lakes

Hypotheses:

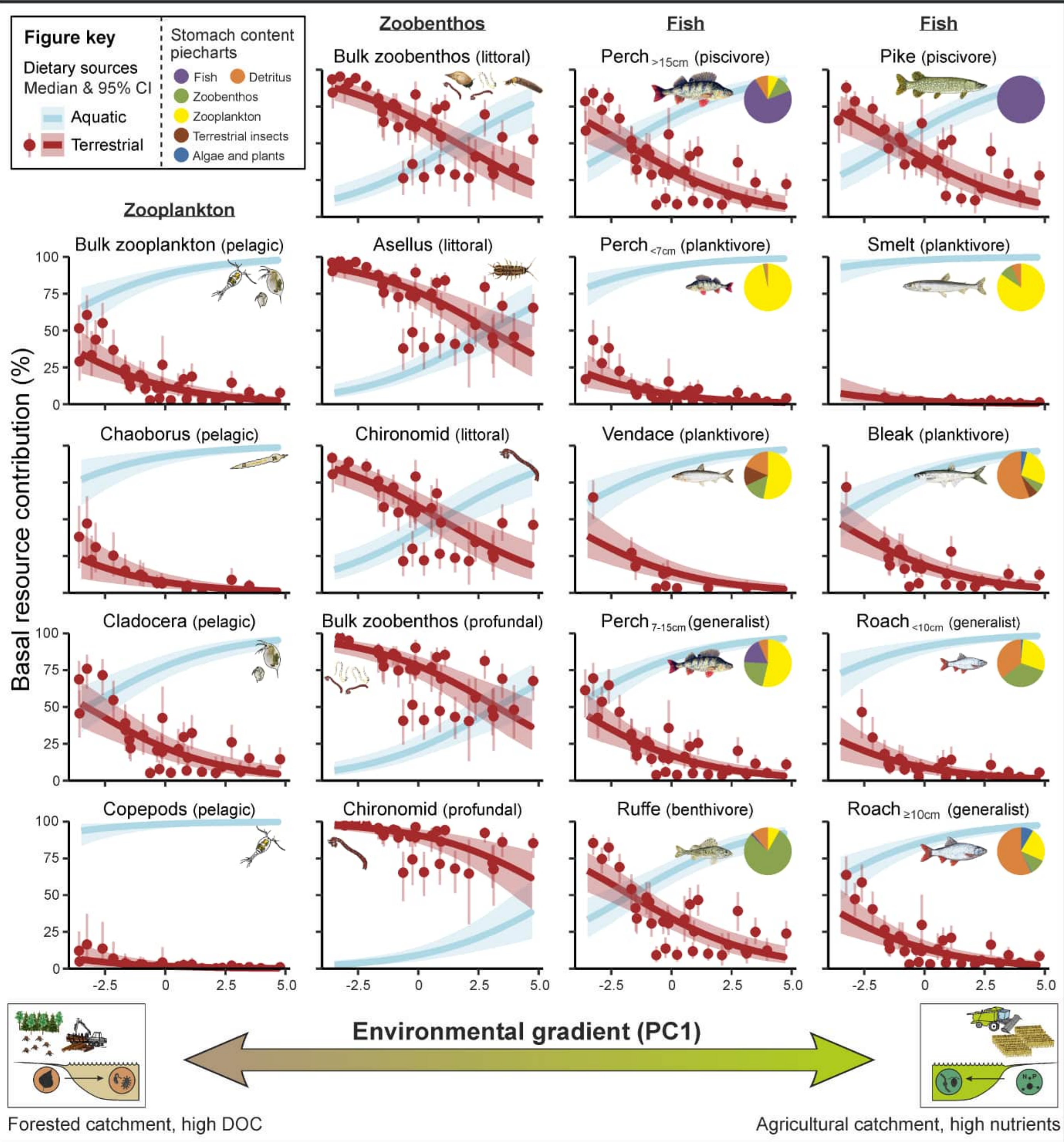
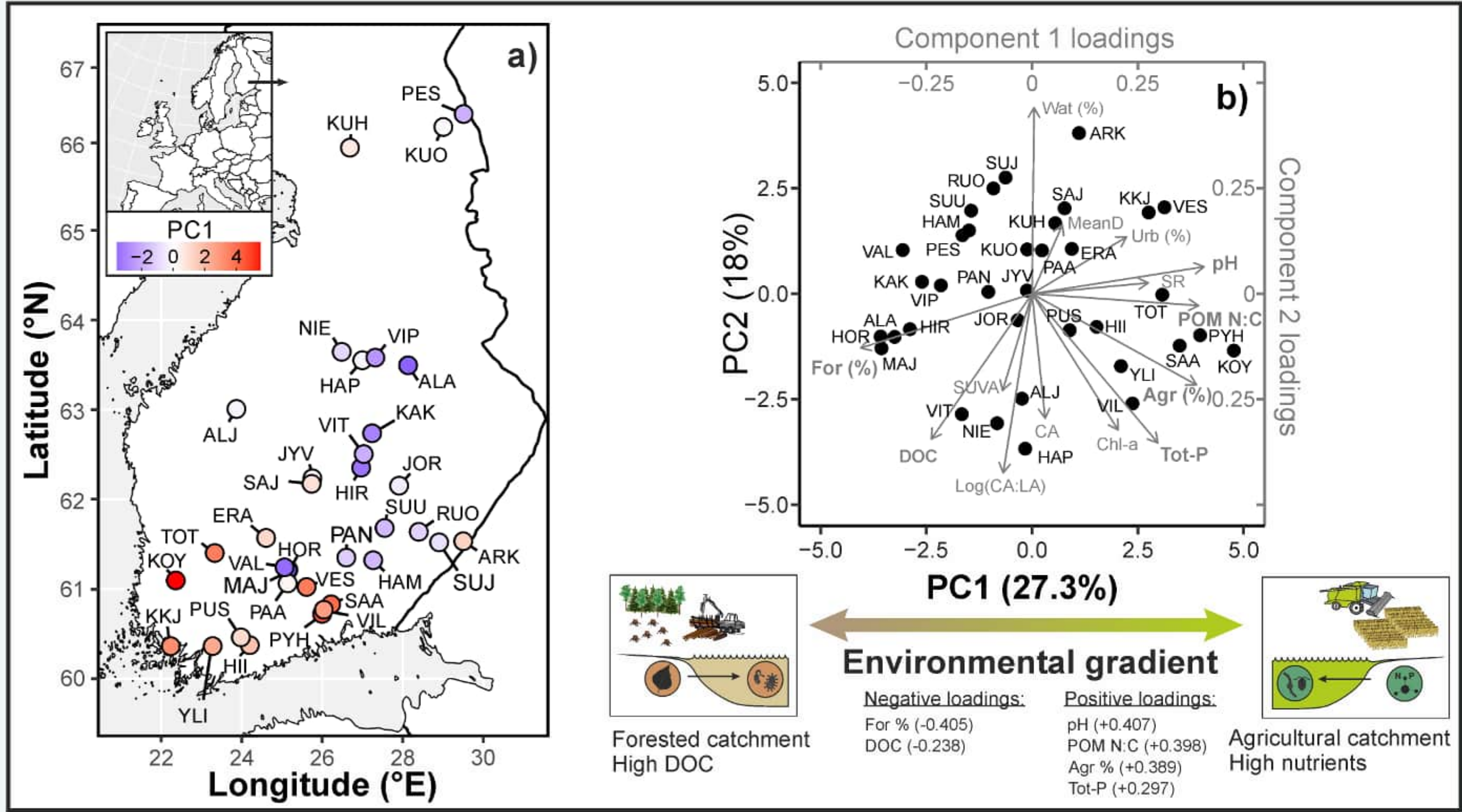
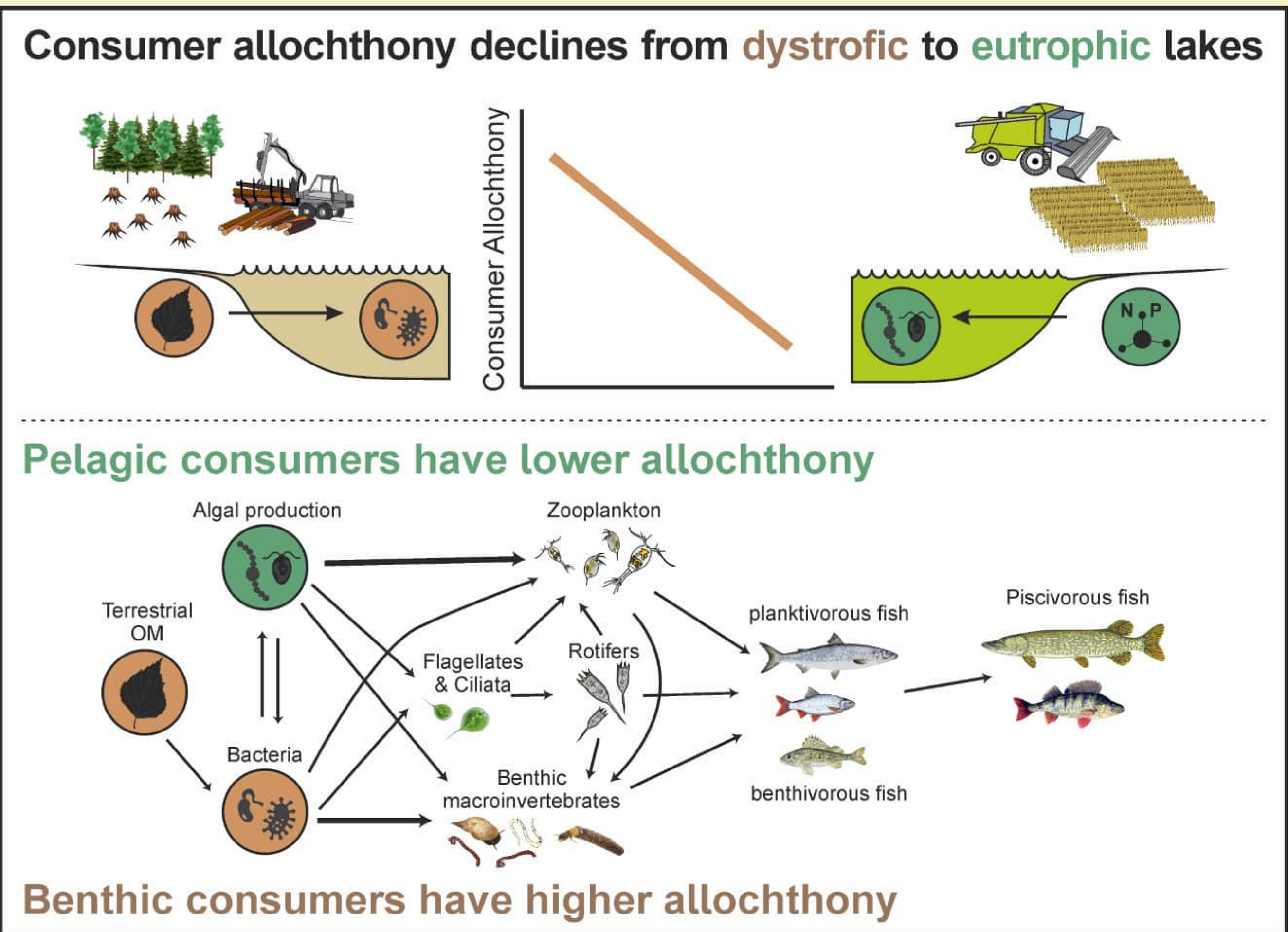


Figure 2. Terrestrial support of different aquatic consumers in 35 boreal lakes.

Results:

All consumers showed decreasing allochthony from brown to green lakes

Zooplankton had lower allochthony than benthos

Planktivorous fish had lower allochthony than other fish

Methods:

35 boreal Finnish lakes sampled in August 2016–2018
DOC (5–25 mg/L), Tot-P (5–120 µg/L),
Forest (50–90%), Agriculture cover (0–35%)

Samples:

Lake water: from center of lake

Aquatic producers: Seston, Benthic algae & Modelled pelagic algae

Terrestrial (allochthonous) OM: Inlet DOM

19 consumer groups including pelagic and benthic taxa
Zooplankton, benthos and fish samples (n = 1737)

Consumer allochthony was modelled with Bayesian dietary models (MixSIAR) based on trophic level and environmental water corrected consumer $\delta^2\text{H}$ values

- Environmental H assimilation (ω) 23% at each trophic level
- One-source trophic level estimation (Cladoceran $\delta^{15}\text{N}$ as base)
- Combined environmental variable (PC1) as a covariate

Take-home messages:

Catchment area land-use influences t-OM and nutrient runoff to boreal lakes, with high t-OM input in forested catchments

Consumer allochthony is driven by lake OM pool composition and microbial link

Ongoing lake **browning** potentially makes consumers more dependent on t-OM

