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## **Are freshwater species really bucking the trend of global insect decline?**

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In their recent meta-analysis, van Klink et al. (1) reported a worldwide increase in the abundance and biomass of freshwater insect communities, based on long-term monitoring surveys (mostly from Europe and North America). Such positive trend contrasts with the negative one found in terrestrial insects, and with the global decline of insect biodiversity reported elsewhere (2, 3). The authors found a positive association between freshwater insect abundance and crop cover, which they attribute to agricultural practices having become less detrimental to water quality, leading to overall improvement of freshwater habitats.

Based on reviews and databases of freshwater insects referring to the past decades (2–4), we argue that the observed increase in total biomass and abundance could be actually associated with negative changes in habitat conditions and community structure. In fact, alteration of chemical and physical ecosystem conditions has been associated with increase in abundance and biomass of widespread, pollution-tolerant, and euryoecious freshwater species (4, 5). These generalist species thrive after severe alteration has occurred in freshwater systems, and they remain favoured even under increased nutrients and decreased concentration of toxic pollutants. Meanwhile there has been a decline of abundance and distribution range of many species sensitive to waterbed and watershed alterations, water pollution and dredging, invasive species, and increasing global temperature and aridity (2–5). In Europe, most of these species represent rare and ancient freshwater lineages endemic to restricted areas (4).

We warn that only looking at total insect abundance (or biomass) does not necessarily reflect change in community diversity, ecosystem function, or species' conservation status and might result in misleading conservation messages (6). To avoid unwarranted generalizations, we recommend that multiple indicators, not only total abundance/biomass, be considered to evaluate trends in freshwater insect biodiversity, including species richness and evenness at the community level.

## References

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**Competing Interests:** None declared.