Microplastics impair amphibian survival, body condition and function

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Microplastics (MPs) are contaminants of increasing concern; they are abundant, ubiquitous and persistent over time, representing potential risks for organisms and ecosystems. However, such risks are still virtually unknown for amphibians, despite the particular attention that these organisms often receive because of their global decline. We examined the effects of MPs (fluorescent, 10-?m polystyrene microspheres) at different concentrations (from 0 to 103 particles mL?1) on tadpoles of the common midwife toad, Alytes obstetricans, using a microcosm experiment. We assessed MP effects on tadpole feeding, growth and body condition, as well as their ingestion and egestion of MPs (estimated through fluorescence). Additionally, we explored whether MPs became attached to periphyton (the main food source for these tadpoles, thus potentially representing a major way of MP ingestion), and the effect of MPs on periphyton growth (which may translate into altered freshwater ecosystem functioning). Our results showed significant effects on all the examined variables, and caused tadpole mortality at the highest concentration; also, fluorescence indicated the presence of MPs in tadpoles, tadpole faeces and periphyton. This suggests that MPs can be an important source of stress for amphibians in addition to other pollutants, climate change, habitat loss or chytrid infections, and that amphibians can be a major transfer path for MPs from freshwater to terrestrial ecosystems.

Alytes obstetricans

Emerging contaminants

Freshwater ecosystems

Periphyton

Tadpoles

Climate change

Fluorescence

Microplastic

Polystyrenes

Water

Alytes obstetricans

Emerging contaminant

Freshwater ecosystem

Periphytons

Tadpoles

Ecosystems

microplastic

microsphere

plastic

polystyrene

unclassified drug

fresh water

amphibian

body condition

concentration (composition)

ecosystem function

freshwater ecosystem

periphyton

plastic

survival

Alytes obstetricans

animal experiment

Article

body constitution

controlled study

feces analysis

feeding

freshwater environment

growth rate

microcosm

nonhuman

periphyton

survival

tadpole

analysis

animal

Anura

chemistry

drug effect

ecosystem

growth, development and aging

larva

physiology

toxicity

water pollutant

Alytes obstetricans

Amphibia

Animals

Anura

Ecosystem

Fresh Water

Larva

Microplastics

Periphyton

Water Pollutants, Chemical