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ABSTRACT BOOK

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from equilibrium. Consequently, the physiology of sea turtles and the chemical properties of pollutants need to be accounted for. These results improve the synthesis of patterns in pollution levels needed for assessment and management of sea turtle populations facing legacy and emerging organic pollution.

Impact of Chemical Pollutants in Food Webs within and across Ecosystem Boundaries

2.06.01

Seabird-Mediated Transport of Organohalogen Compounds to Remote Sites

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here is evidence that birds may act as carriers of pollutants over long distances. In the present study, the role of seabirds for the transport of organochlorine compounds to very remote sites, e.g. western Greenland, is evaluated. Three lakes were selected for this purpose, one, NOW5, with a little auk (*Alle alle*) bird colony and the other two, NOW14 and Q5, devoid of these seabirds. NOW14 has a historic albeit inconsistent human presence record, and Q5 is away from either bird or human presence. Samples were collected from the freshwater lakes on the coast of NOW polynya in the summers of 2015, NOW5D and NOW14, and 2016, Q5. Lake coring was carried out using an HTH gravity corer. The cores were sliced and stored frozen until analysis. The waters of NOW5 had a strong acidic pH, 3.4, whereas the pH values of NOW14 and Q5 were close to 8. This difference can be attributed to the influence of *A. ale* guano depositions. In Spitzbergen, guano depositions of these birds also resulted in acidic lake water. Other differences between the waters of NOW5D lake and the others were related to the fertilizing guano effects. Thus, NOW5D showed high chlorophyll concentrations (74 µg/L vs. 1.6-3.4 µg/L, respectively), higher content of total phosphorous (0.34 mg/L vs. 0.007-0.01 mg/L, respectively) and total nitrogen (3.75 mg/L vs. 0.21-0.75 mg/L, respectively). These differences reflected that the waters of NOW5D received more nutrients than in the other two lakes. The concentrations of all organohalogen compounds found above the limit of detecion were much higher in the lake under the influence of *A. ale* than in the other lakes showing the strong influence of these seabirds in the transport and deposition of these hydrophobic compounds to remote sites. However, not all compounds showed the same relative increases. The most volatile, hexachlorobenzene and the hexachlorocyclohexanes, were about 20 time higher in NOW5 whereas the enrichment of the chlordanes, PBDEs and PCBs was between 4 and 6 times and DDTs three times. These differences evidence a selective effect in the seabird accumulation and transport of organohalogen to remote sites.Seabirds play a significant role in the tranport of oranohalogen compounds to remote sites but their effect is selective depending on the chemical composition of these pollutants.

2.06.02

Diet Related Effects of the Pesticides Terbuthylazine and Tebuconazole on Scraper and Shredder Freshwater Invertebrates

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Leaf litter or algae are the most important basal resources for invertebrate primary consumers in freshwater ecosystems.This first level in the food chain is essential for nutrient and energy transfer to the entire food web. These basal source-consumer links can be influenced by chemical pollutants such as pesticides widely used in agriculture activities. Herbicides can affect algae growth in stream biofilms and fungicides in turn, may alter leaf-associated fungal community; both finally affecting food quantity and quality for invertebrate consumers. In this study we focus on the effects of the herbicide terbuthylazine and the fungicide tebuconazole, both frequently detected in streams and rivers. Our aim is to evaluate the diet-related effects of these two pesticides on the consumption and growth rates of the snail *Physella acuta* (scraper) and the crustacean *Echinogammarus* sp (shredder). We conducted a 14-day experiment using artificial channels where biofilm, leaf-litter and invertebrates were exposed to control conditions and to both pesticides, separately and in mixture (12 treaments with 3 replicates each one). The herbicide had a negative effect on chlorophyll concentration resulting in a lower growth rate of snails regarding to the control. Fungicide also reduced, but less, the chlorophyll in the biofilm, and the snail growth rate in this treatment was significantly higher than the growth rate in the herbicide treatment. We also observed lower effects on chlorophyll and growth rate in the mixture treatment comparing with the herbicide treatment. The observed changes in the biofilm and ultimately in the snail growth may be driven by a competitive advantage of algae in front of fungi in the fungicide treatments (alone and in the mixture). We did not observe significant effects of the pesticides on leaf litter quality (CN ratios), however the relative growth rate of the gammarid was slightly lower when was exposed to the herbicide. The present study shows that the effects of both pesticides via the dietary pathway seem to affect the growth rate of the consumers. The reduction of fungi in biofilm favours algae biomass and the growth rate of the snail. The mechanisms of the herbicide affecting gammarid growth rate are still unclear. These preliminary results point to the need of a better understanding of the effects of pesticides on microbial community to assess the indirect effects on food chains.

2.06.03

Trophic Interactions in Marine Zooplankton Communities Exposed to Closed Loop Scrubber Water

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Stricter global limits regarding sulphur content in marine fuels apply since January 2020, with the purpose of decreasing sulphur oxide emissions from shipping. To comply with these new regulations an increasing number of ships are installing an exhaust gas cleaning system, also known as a scrubber. A closed loop scrubber recirculates the washwater used to remove the sulphur oxides, yet most systems have a bleed off of between 1.8-10.8 m^3 washwater per hour for a medium sized ship (operating at 15 MW). Water from closed loop scrubbers contain high concentrations of metals and organic pollutants and has been shown toxic to zooplankton. Mortality in mesozooplankton (>200 µm), such as copepods, will likely lead to changes in community structure as species can have different tolerances. Such structural changes has the potential to trigger trophic cascades, which could ultimately lead to effects on microzooplankton (< 200 µm) or even primary producers. In order to test the effects of closed loop scrubber emissions on trophic interactions within the zooplankton community, we exposed a field-sampled mesozooplankton community to two concentrations of closed loop scrubber water or a control (1.5%, 3%, Control, *n=5*). We further tested how this affected their reproduction, and their predation on a natural microzooplankton community. The mesozooplankton were exposed for 72 h, and then transferred to bottles with microzooplankton for another 20 h, and copepod eggs were collected at 72 h and at 96 h. The results show that copepod reproduction is affected moderately at 1.5 %, and severely at 3 %. The results from the mesozooplankton and microzooplankton community structures are still under analysis, but will be assembled by the end of 2020. However, the results of the reproductive endpoints can already tell that zooplankton in heavily trafficked areas could be affected by these discharges, but more studies are needed in order to characterise environmental concentrations of contaminants related to scrubber use.

2.06.06

Effects of Metal Contaminated Sediments: Delayed Metamorphosis and Sex-Specific Accumulation in Aquatic Insects

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Aquatic ecosystems have generally been regarded as sinks for contaminants, receiving for example metals from the terrestrial ecosystem through runoff, direct discharge or deposition into the aquatic environment. However more recently, the interest in the opposite feedback-loop, from water to land, have increased, where aquatic insects may serve as biovectors of contaminants when they emerge as adults and become part of the terrestrial food web. Metals may also hamper sensitive life-stages such as metamorphosis, hence reducing prey availability for riparian consumers. In the present study we aimed to evaluate the impact of metal contamination on aquatic insect emergence and to assess the transfer of metals from aquatic to terrestrial ecosystems. We exposed chironomid larvae for a gradient of Pb/Zn contaminated sediment and assessed the timing and success of adult insect emergence. We were also interested in potential sex-differences in survival, emergence and transport of metals. Fewer adults emerged from treatments with high metal exposure and the emergence was also delayed for both males and females. However, metal contamination primarily affected the survival of insect larvae, and had limited effect on metamorphosis. A reduction and delay in emergence may result in reduced food availability and ecological mismatch for terrestrial consumers relying on aquatic subsidies. Male chironomids accumulated slightly higher concentrations of Pb than females, but due to their smaller sizes the individual contribution of Pb, but also Zn, was still higher from females. Thus, terrestrial insectivores will be subjected to different pollution regimes depending on preference for smaller (males) or larger (females) prey items.

2.06.11

Cross-Ecosystem Links in Polluted Areas: Effects on Breeding Success and Nestling Health in Pied Flycatchers (Ficedula hypoleuca) Under Lead Exposure

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