Increased tolerance to oil exposure by the cosmopolitan marine copepod Acartia tonsa -
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Oil contamination is an environmental hazard to marine ecosystems, but marine organism tolerance to oil after many
generations of exposure remains poorly known. We studied the effects of transgenerational oil exposure on fitness-related
traits in a cosmopolitan neritic copepod, Acartia tonsa. Copepods were exposed to an oil compound, the PAH pyrene, at
concentrations of 1, 10, 100 and 100+ (the saturated pyrene concentration in seawater) nM over two generations and
measured survival, sex ratio, size at maturity, grazing rate and reproductive success. Exposure to the pyrene concentration
of 100+ nM resulted in 100% mortality before adulthood in the first generation. At the pyrene concentration of 100 nM,
pyrene reduced grazing rate, increased mortality, reduced the size of females and caused lower egg production and
hatching success. Importantly, we found strong evidence for increased tolerance to pyrene exposure in the second
generation: the reduction in size at maturity of females was less pronounced in the second generation and survival, egg production and hatching success were
recovered to control levels in the second generation. The increased tolerance of copepods to oil contamination may
dampen the direct ecological consequences of a coastal oil spill, but it raises the concern whether a larger fraction of oil
components accumulated in survived copepods, may be transferred up the food web.

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