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How do mangrove-living ants survive inundation?

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Ants are one of the animal groups that inhabit extreme habitats, and one is the mangrove forests. Mangroves are both marine and terrestrial as determined by the fluctuating tide. Information on mangrove living ants is sparse even though ants are one of the most important terrestrial groups in this ecosystem. In the Australian mangrove in Darwin Harbor, the amplitude of the tide is up to 8 meters, which provides a unique opportunity to studying how the mangrove ants have adapted to these extreme conditions. The most 'marine' ant is *Polyrhachis sokolova*, which have nests in the mud. During high tide, the nests can be inundated for more than three hours, by up to 3.5 meters of seawater over the nest entrance. The ants and brood avoid drowning by residing in small air pockets in complex gallery system. The CO₂ concentration can reach 12 % in the galleries, but during receding tide, the water sinks in the nests and fresh atmospheric air replaces the water. *Camponotus anderseni*, nests in cavities in small twigs of the mangrove tree *Sonneratia alba*, together with scale insects. During high tide a soldier ant 'blocks' the entrance with its head and prevents seawater from intruding. The volume of ants, brood and scales can reach 50 % of the cavity volume, and if 'normal' respiratory rates were maintained, all O₂ would be used after 20-30 minutes. We showed that the ants can reduce their O₂ metabolism down to 1% when the CO₂ concentration reached 30%. We also showed, for the first time, that ants can change from aerobic to anaerobic respiration.