

Manganese Contamination Exacerbates Reproductive Stress in a Suicidally-Breeding Marsupial

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Abstract : For suicidal breeders, the physiological stresses and energetic costs of breeding are fatal. Environmental stressors such as pollution should compound these costs, yet suicidal breeding is so rare among mammals that this is unknown. Here, we explored the consequences of metal contamination to the health, aging and performance of endangered, suicidally-breeding northern quolls (*Dasyurus hallucatus*) living near an active manganese mine on Groote Eylandt, Northern Territory, Australia. We found respirable manganese dust at levels exceeding international recommendations even 20km from mining sites and substantial accumulation of manganese within quolls' hair, testes, and in two brain regions—the neocortex and cerebellum, responsible for sensory perception and motor function, respectively. Though quolls did not differ in sprint speeds, motor skill, or manoeuvrability, those with higher accumulation of manganese crashed at lower speeds during manoeuvrability tests, indicating a potential effect on sight or cognition. Immune function and telomere length declined over the breeding season, as expected with ageing, but manganese contamination exacerbated immune declines and suppressed cortisol. Unexpectedly, male quolls with higher levels of manganese had longer telomeres, supporting evidence of unusual telomere dynamics among Dasyurids—though whether this affects their lifespan is unknown. We posit that sublethal contamination via pollution, mining, or urbanisation imposes physiological costs on wildlife that may diminish reproductive success or survival.

Keywords : ecotoxicology, heavy metal, manganese, telomere length, cortisol, locomotor

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