

Effect of Heavy Metals on the Life History Trait of *Heterocephalobellus* sp. and *Cephalobus* sp. (Nematode: Cephalobidae) Collected from a Small-Scale Mining Site, Davao de Oro, Philippines

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Abstract : Mining is associated with increased heavy metals in the environment, and heavy metal contamination disrupts the activities of soil fauna, such as nematodes, causing changes in the function of the soil ecosystem. Previous studies found that nematode community composition and diversity indices were strongly affected by heavy metals (e.g., Pb, Cu, and Zn). In this study, the influence of heavy metals on nematode survivability and reproduction were investigated. Life history analysis of the free-living nematodes, *Heterocephalobellus* sp. and *Cephalobus* sp. (Rhabditida: Cephalobidae) were assessed using the hanging drop technique, a technique often used in life history trait experiments. The nematodes were exposed to different temperatures, i.e., 20°C, 25°C, and 30°C, in different groups (control and heavy metal exposed) and fed with the same bacterial density of 1×10^9 *Escherichia coli* cells ml⁻¹ for 30 days. Results showed that increasing temperature and exposure to heavy metals had a significant influence on the survivability and egg production of both species. *Heterocephalobellus* sp. and *Cephalobus* sp., when exposed to 20°C survived longer and produced few numbers of eggs but without subsequent hatching. Life history parameters of *Heterocephalobellus* sp. showed that the value of parameters was higher in the control group under net production rate (R0), fecundity (mx) which is also the same value for the total fertility rate (TFR), generation times (G0, G1, and Gh) and Population doubling time (PDT). However, a lower rate of natural increase (rm) was observed since generation times were higher. Meanwhile, the life history parameters of *Cephalobus* sp. showed that the value of net production rate (R0) was higher in the exposed group. Fecundity (mx) which is also the same value for the TFR, G0, G1, Gh, and PDT, were higher in the control group. However, a lower rate of natural increase (rm) was observed since generation times were higher. In conclusion, temperature and exposure to heavy metals had a negative influence on the life history of the nematodes, however, further experiments should be considered.

Keywords : artisanal and small-scale gold mining (ASGM), hanging drop method, heavy metals, life history trait.

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