

Living on the Edge: The Influence of Edge Effects on Ohio Plethodontid Salamanders

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Background

Amphibians are experiencing significant biodiversity loss due to changes in environmental conditions and habitat composition. Investigating how edge effects influence amphibians could provide insight on amphibian populations in habitat fragments and improve conservation methods.

EDGE EFFECTS: Significant differences in environmental conditions between the edge and interior of a fragmented habitat.

Methods

This study aimed to determine if edge effects were present within Wooster Memorial Park, Ohio and if edge effects were negatively affecting plethodontid salamanders. Data collection occurred from September 2024-November 2024. The environmental conditions of the forest interior and edge and salamander abundance were collected in 16 plots (8 pairs) that were at $\geq 50\text{m}$ apart.

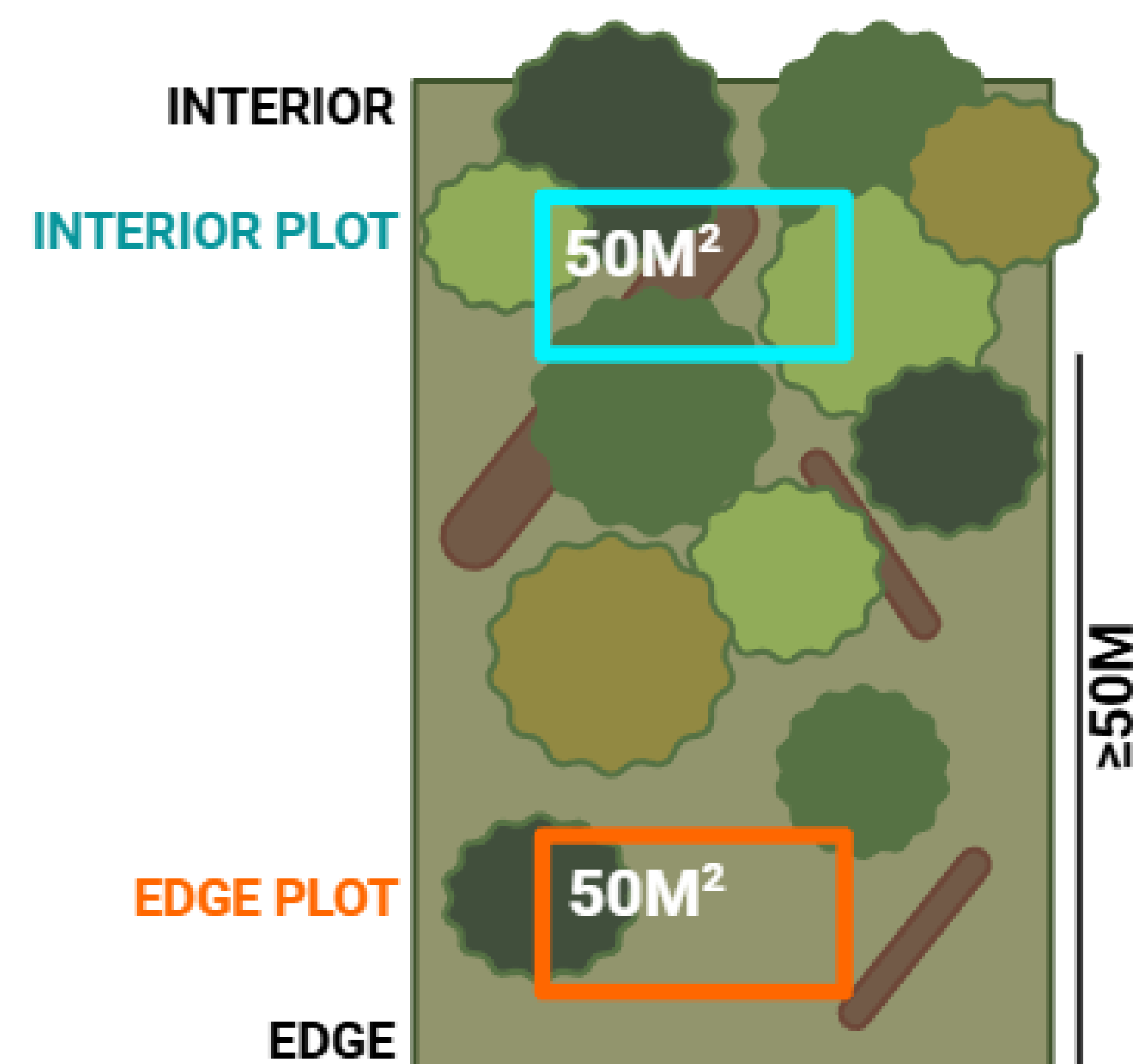
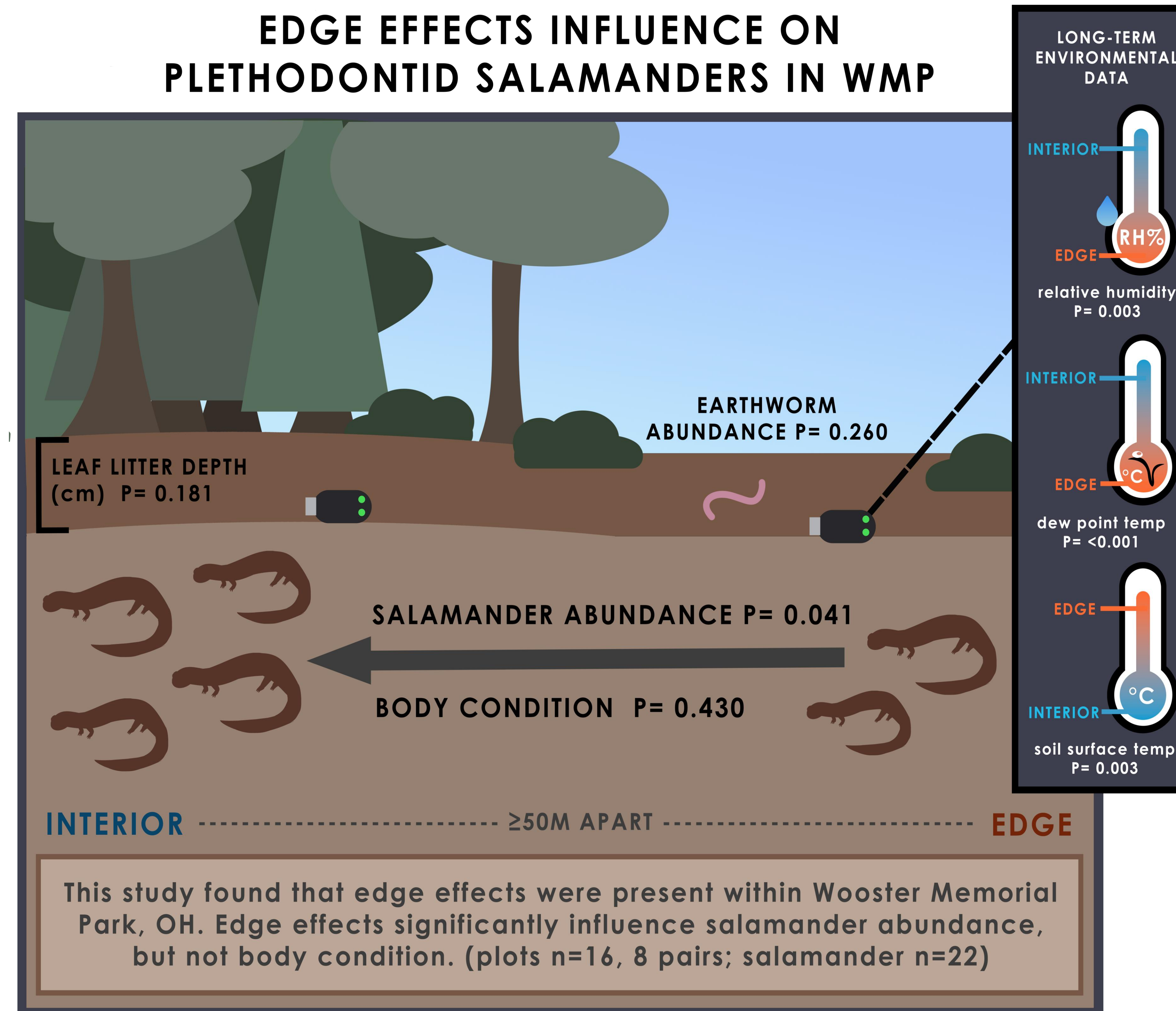


Figure 1. Graphic of Paired Plot Arrangement. (8 pairs, n=16 plots). All plots 50m² (5 x 10m).



Results and Discussion

The long-term environmental data indicated that edges were significantly drier and warmer than the interior (dew-point temperature (°C) $p = <0.001$, relative humidity (%) $p = 0.003$, soil surface temperature (°C) $p = 0.003$). Results indicate that edge effects significantly influence salamander abundance (total salamander $p = 0.041$). It was concluded that significant edge effects are present within Wooster Memorial Park, Ohio, USA and that these edge effects have a significant negative influence on plethodontid salamander populations.

Acknowledgements

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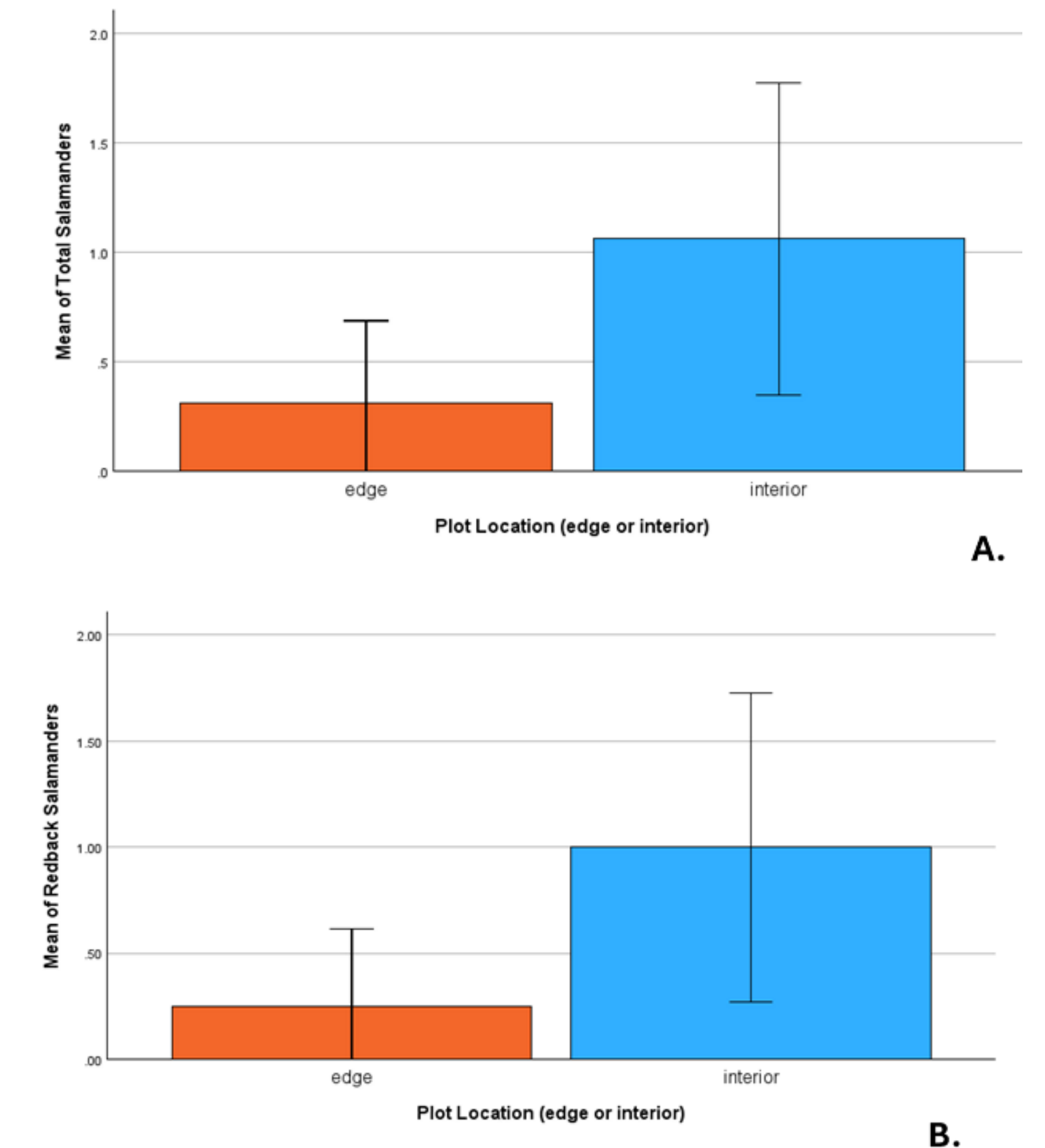


Figure 2. Means of Salamander Abundance Grouped By Plot Location (edge or interior). 95% C.I.
A. Mean Total Salamander Abundance ($p = 0.041$, $n = 22$).
B. Mean Redback Salamander (*P. cinereus*) Abundance ($p = 0.034$, $n = 20$).

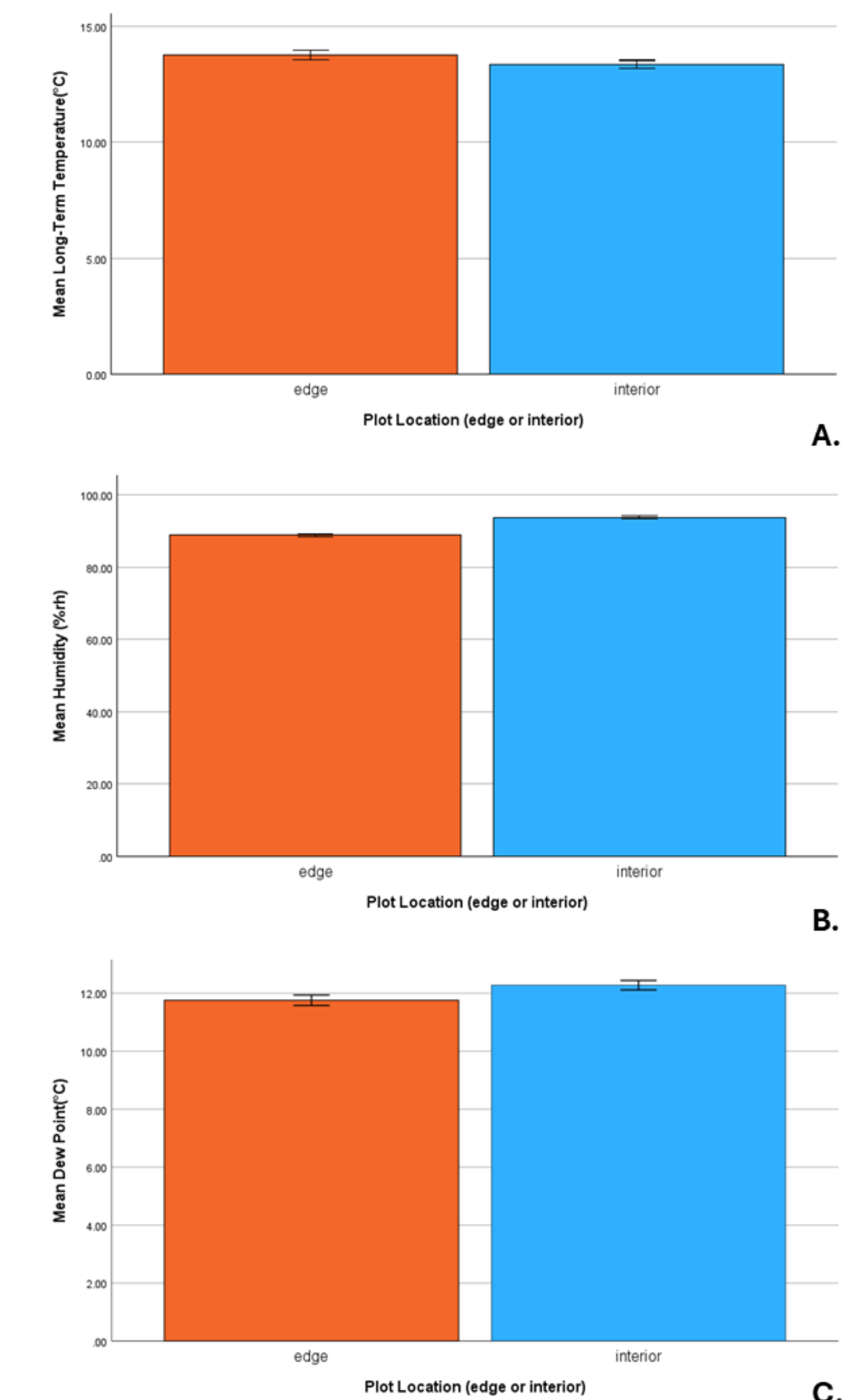


Figure 3. Long-Term Environmental Data Grouped by Plot Location (edge or interior). Plots n = 16. 95% C.I. error bars.
A. Mean soil surface dew point temperature (°C; $p = <0.001$).
B. Mean long-term soil surface temperature (°C; $p = 0.003$).
C. Mean soil surface humidity (rh%; $p = 0.003$).