Here today, gone tomorrow? Results and outcomes of 3-yearly pest control in the Tararua Ranges

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LANDCARE RESEARCH
MANAAKI WHENUA

Rationale for pest control

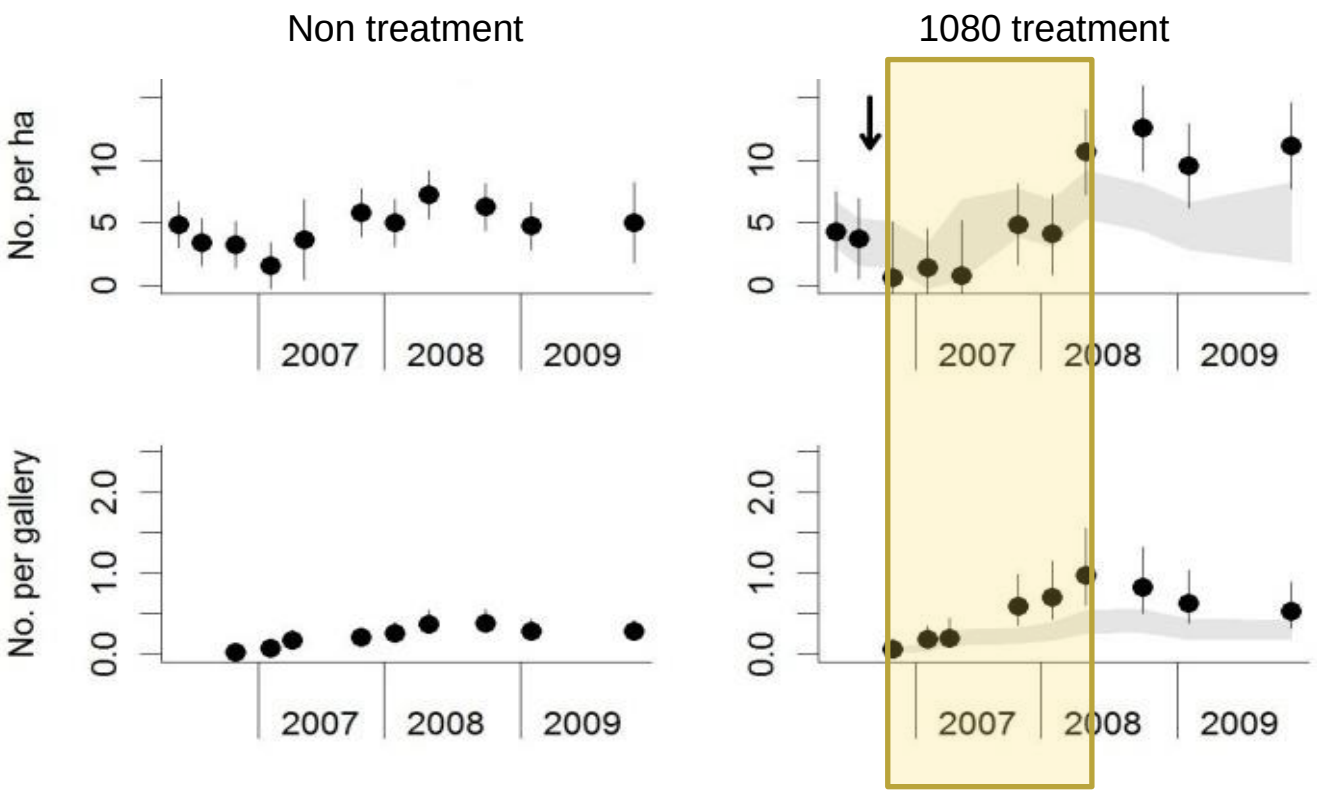
- Desired outcome = improved state of indigenous biodiversity
- On-going effort required due to pest population recovery (time)
- Spatial extent of pest control and its benefits (space)

Pest population recovery

- Re-invasion,
- *In situ* breeding,
- or both?

- How quickly?

Benefits of pest control over time



Rats

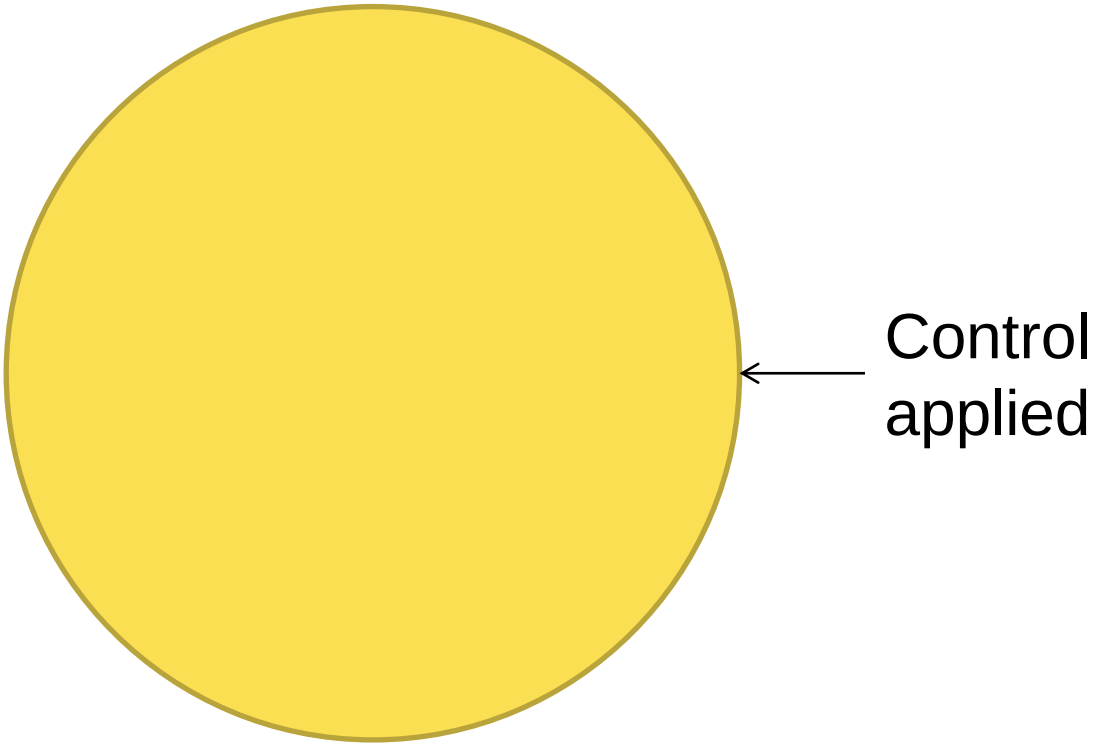
Tree weta

- Higher numbers of tree weta in the mid-term <3 years.
- ‘Window of relief from predation’

**** *No negative impact within 3 years* ***

Ruscoe et al 2012. Conserv. Biol.

Spatial extent of pest control



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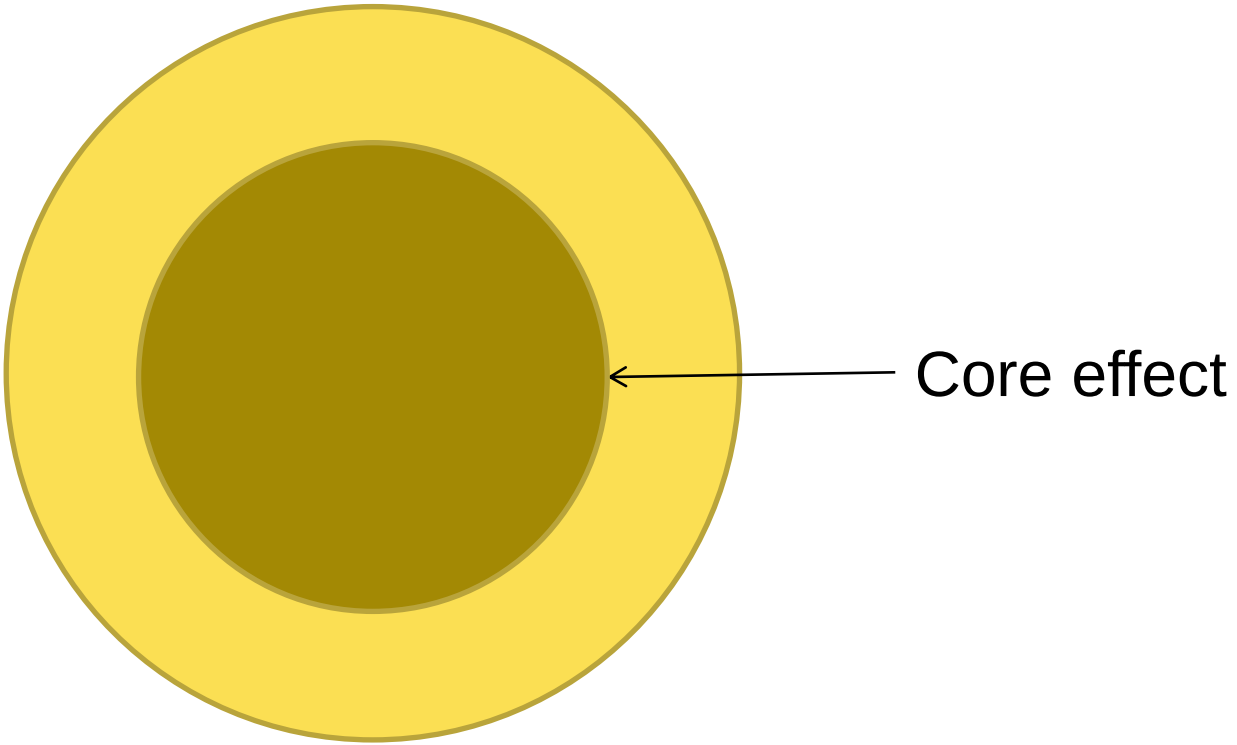

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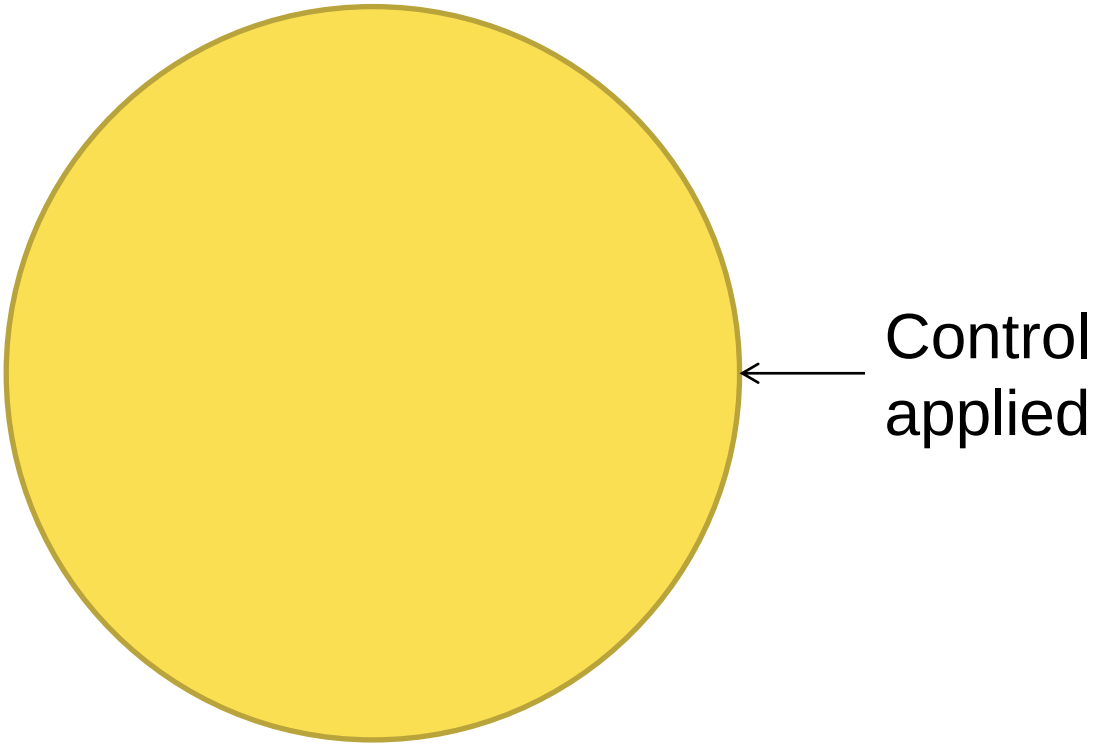

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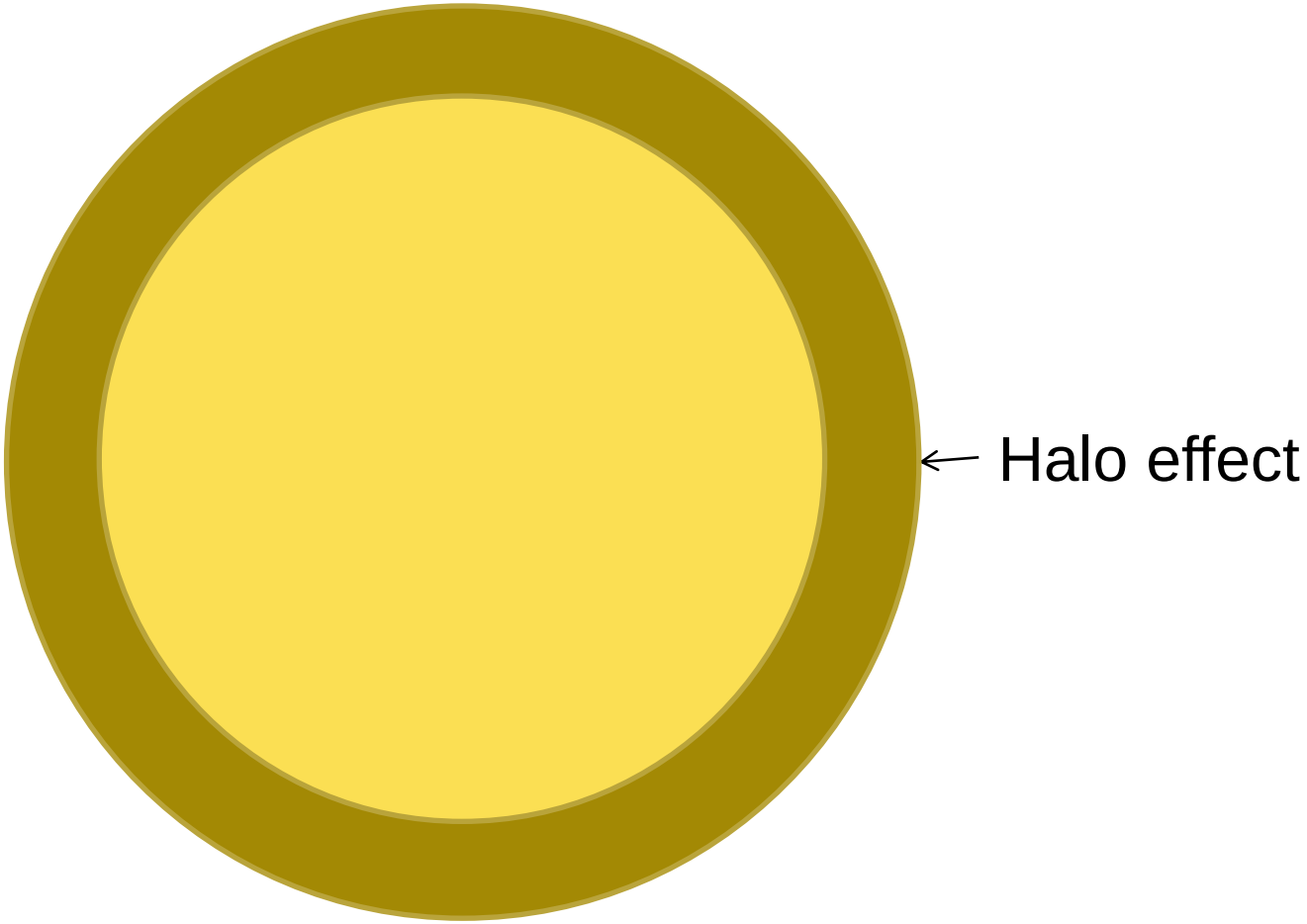


Project Kaka

- DOC initiative
- Large scale control – 22000 ha Tararua Forest Park
- 3-yearly aerial 1080
- Controls done:
  Nov 2010
  Nov 2013

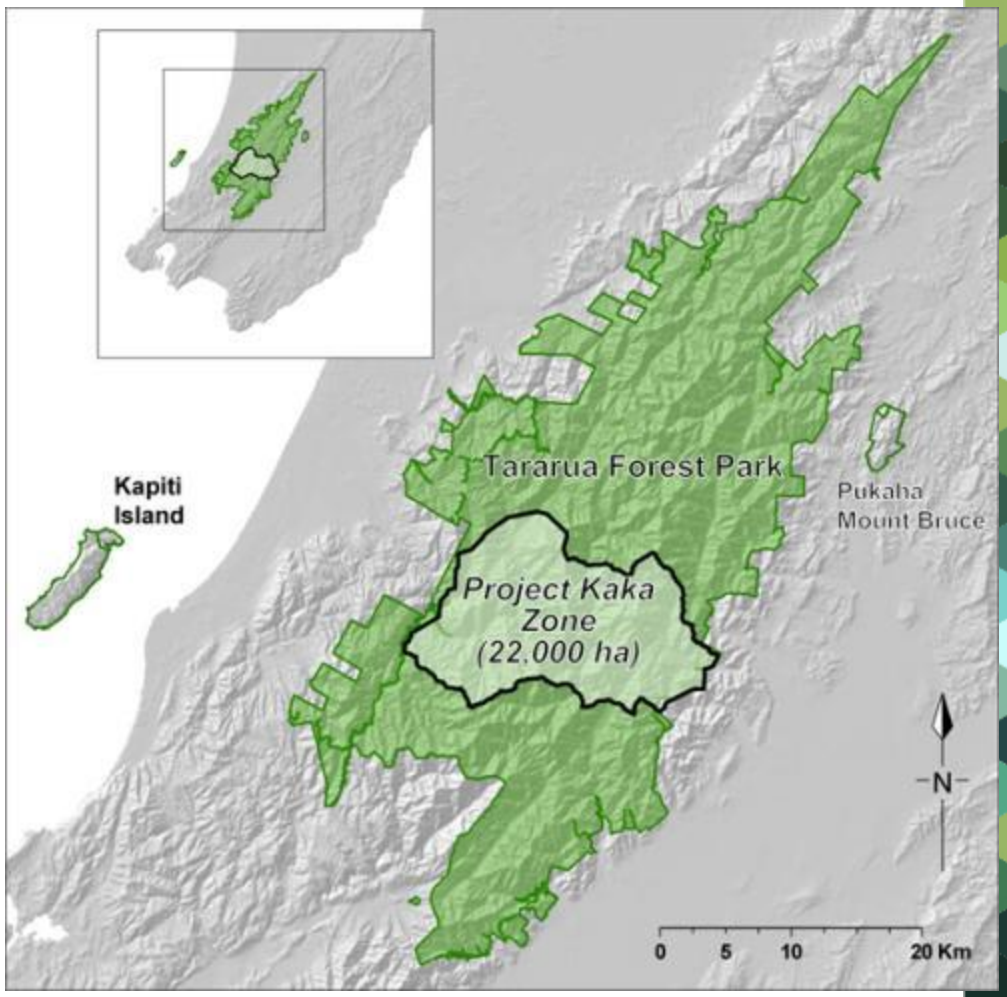
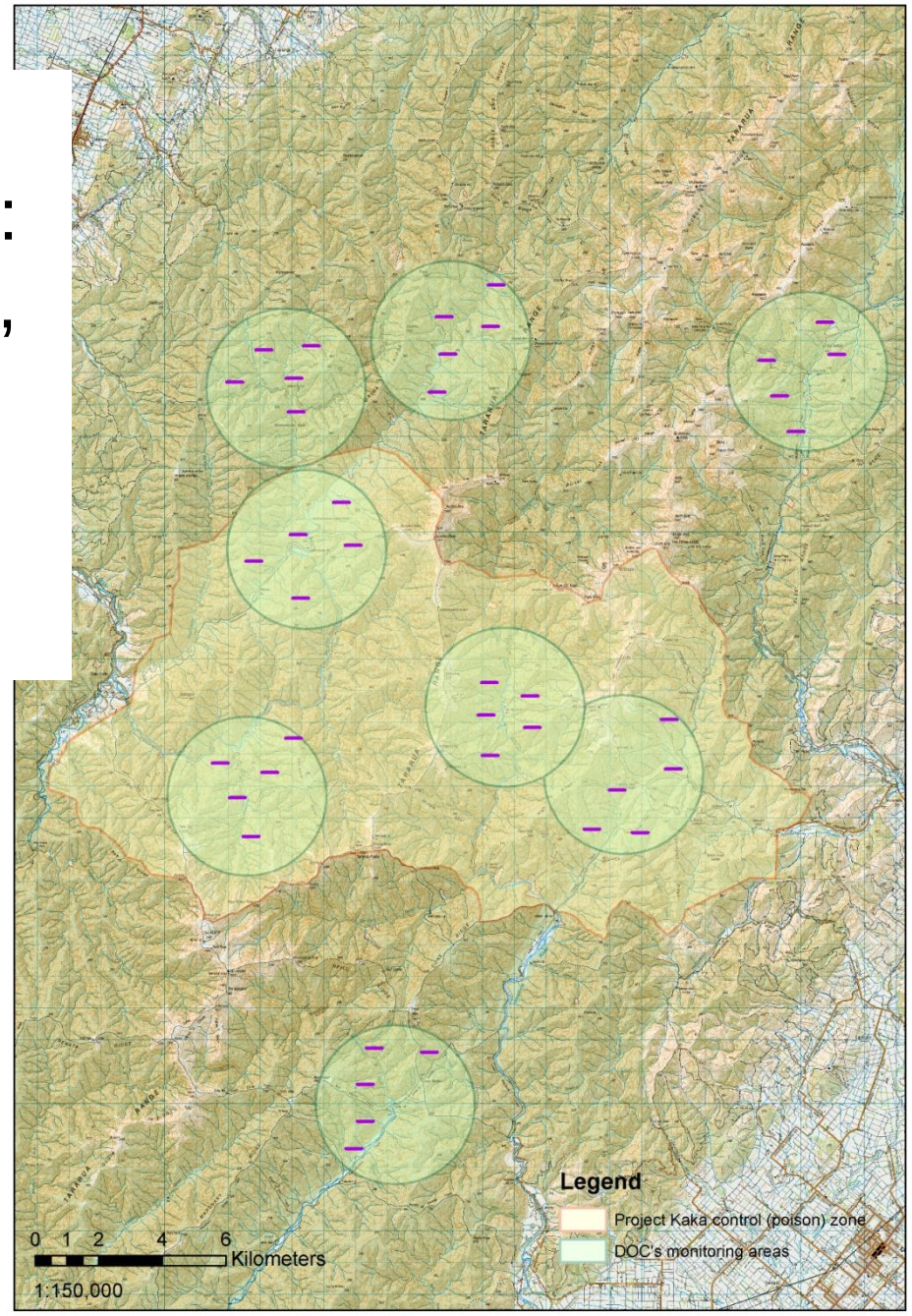


Image: www.doc.govt.nz

Department of Conservation monitoring:

- Possums, rats, stoats, birds & vegetation
- Tmt/non-tmt
- *In situ* pest response

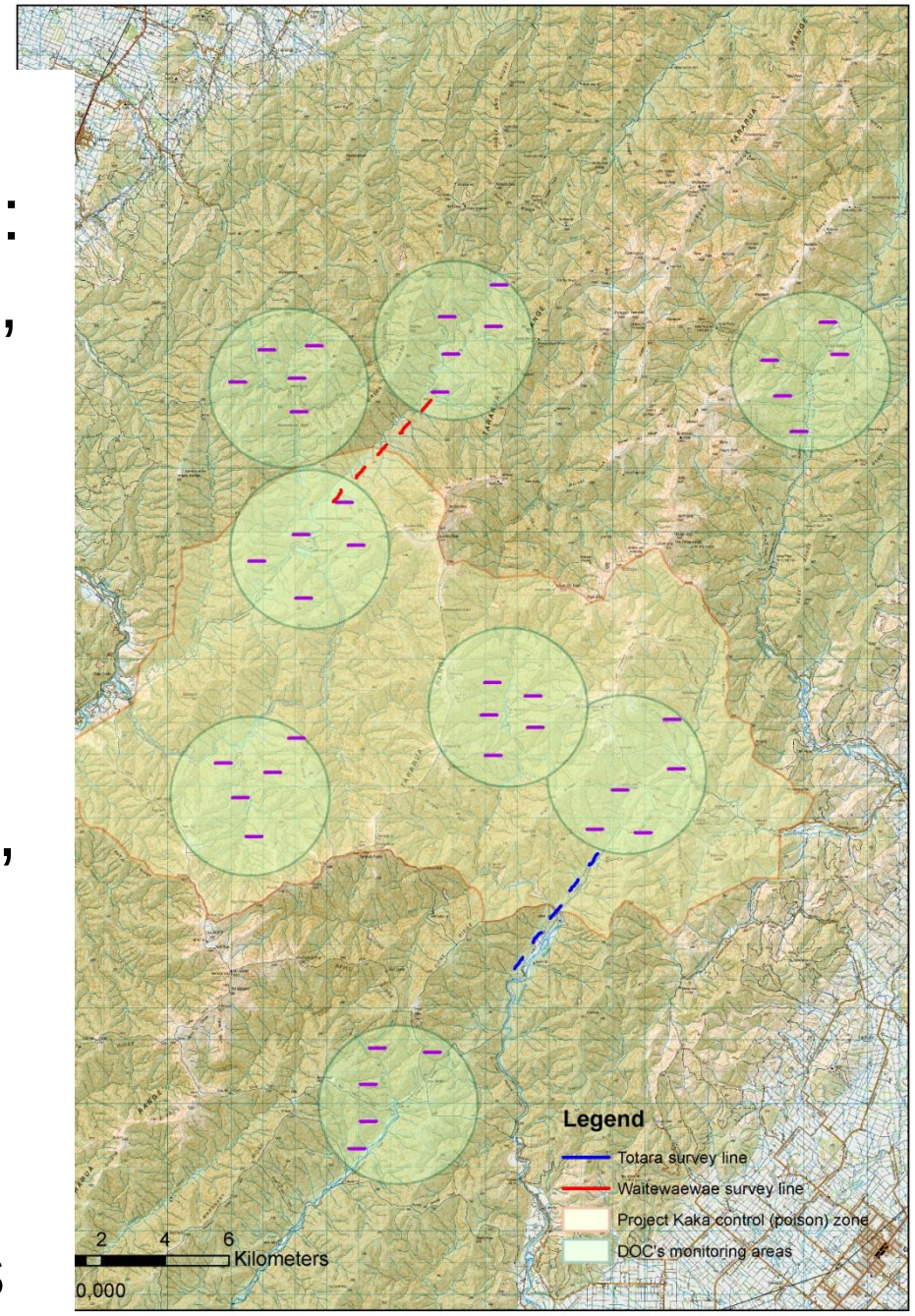


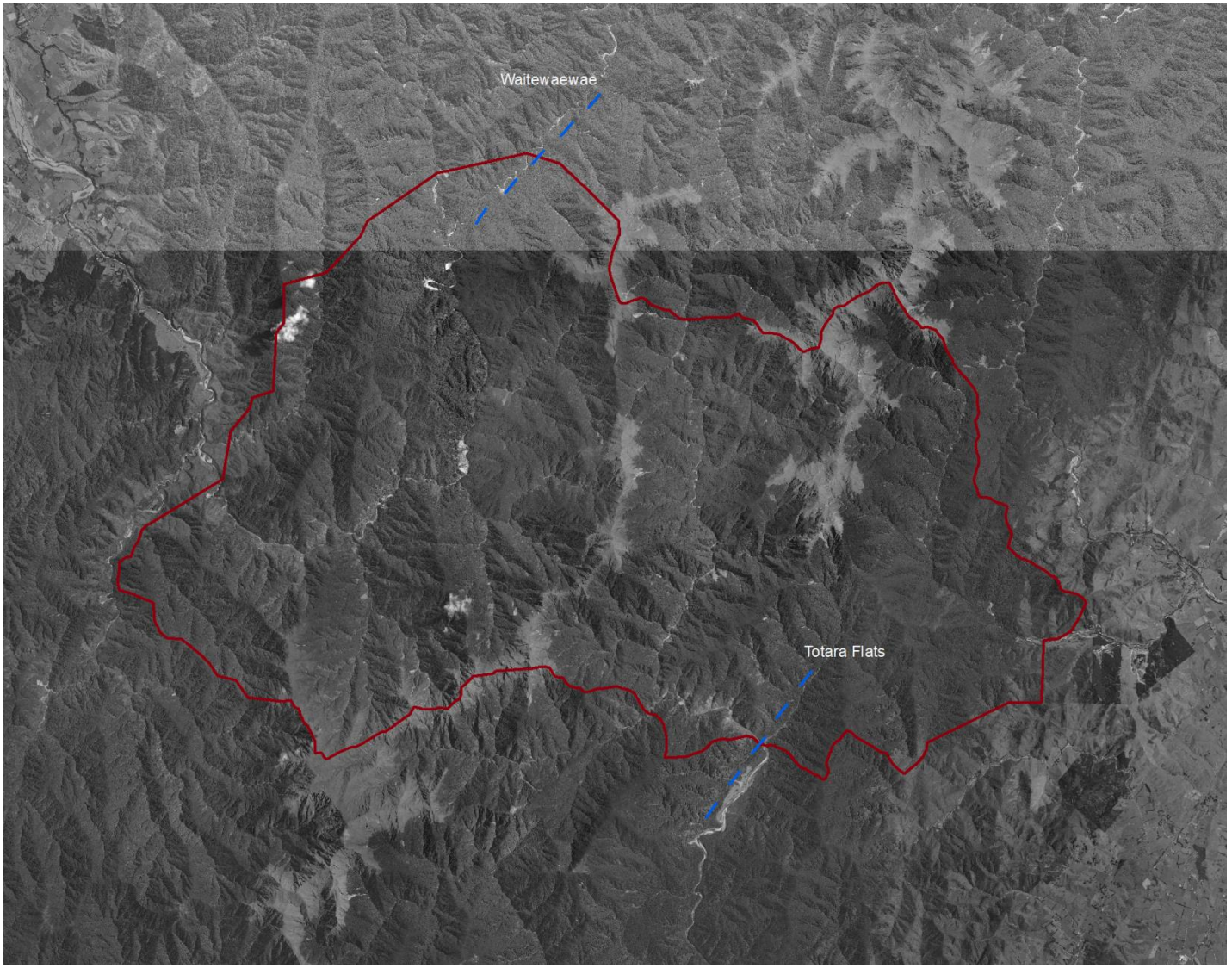
Department of Conservation monitoring:

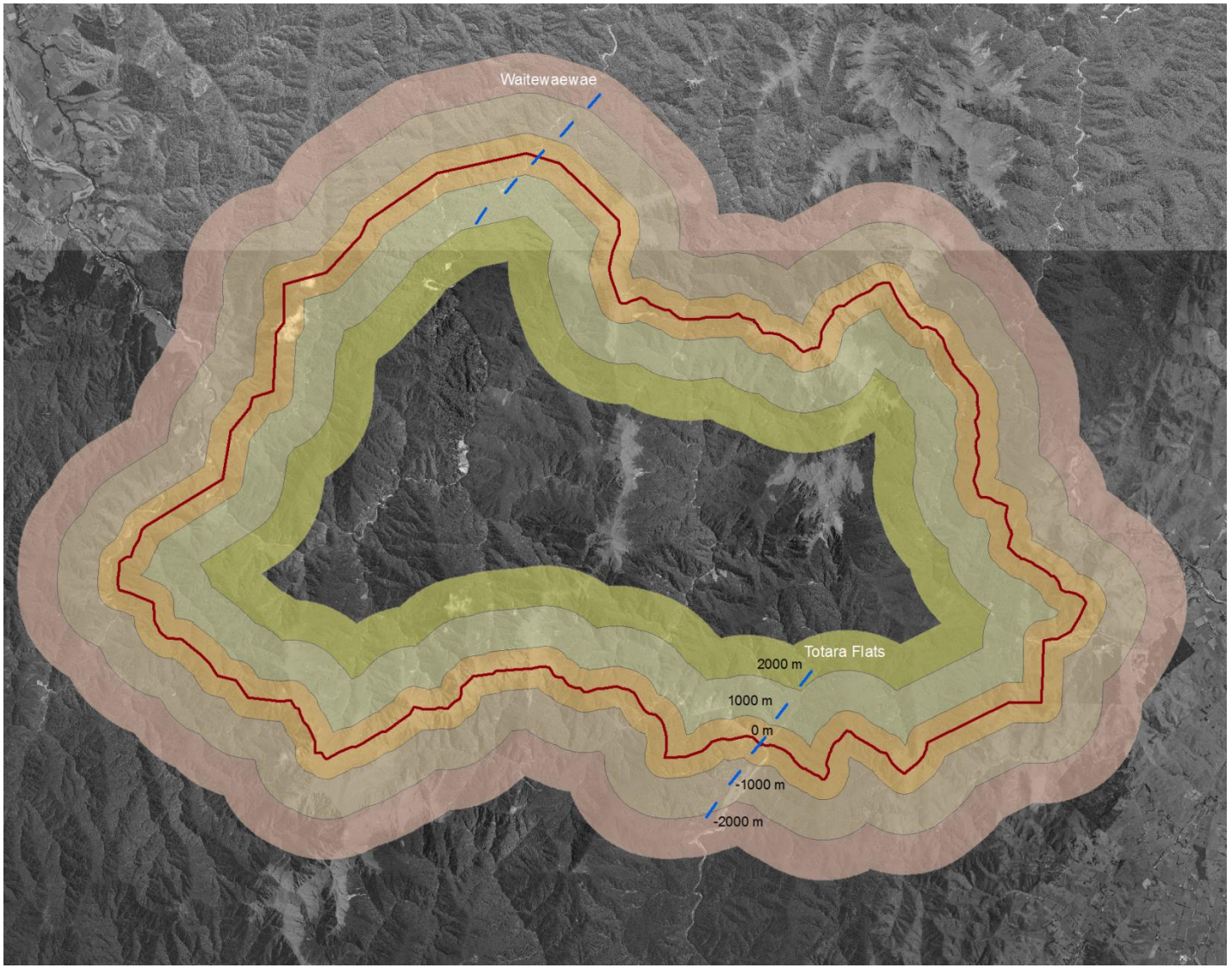
- Possums, rats, stoats, birds & vegetation
- Tmt/non-tmt
- *In situ* pest response

LCR monitoring:

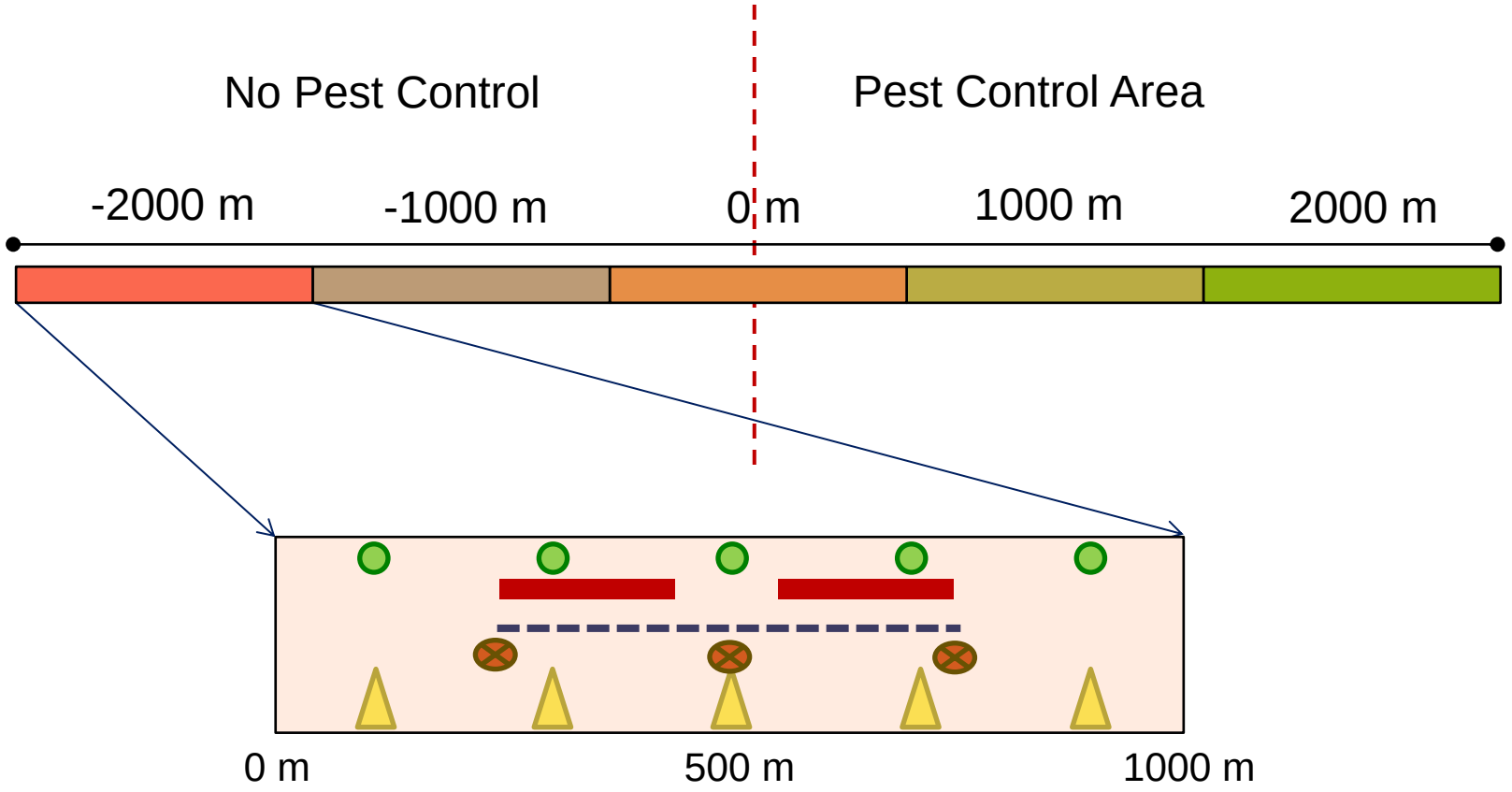
- Same as DOC, -birds, +inverts.
- Across boundary → spatial extent of pest control outputs and biodiversity outcomes




Waitewaewae
Totara Flats


Waitewaewae
Totara Flats
2000 m
1000 m
0 m
-1000 m
-2000 m

Monitoring lines



Wax tag line (200 m)

Tracking tunnel line (500 m)

5 Pitfall traps

Weta hotel

Kamahi, toro and rimu trees

Wax tags: possums, rats

Photo: Caroline Thomson, LCR

Photo: Nga Manu Images

Tracking tunnels: stoats, rats, weta

Photo: Caroline Thomson, LCR

Photo: Andrea Byrom, LCR

Photo: Nga Manu Images

Weta hotels

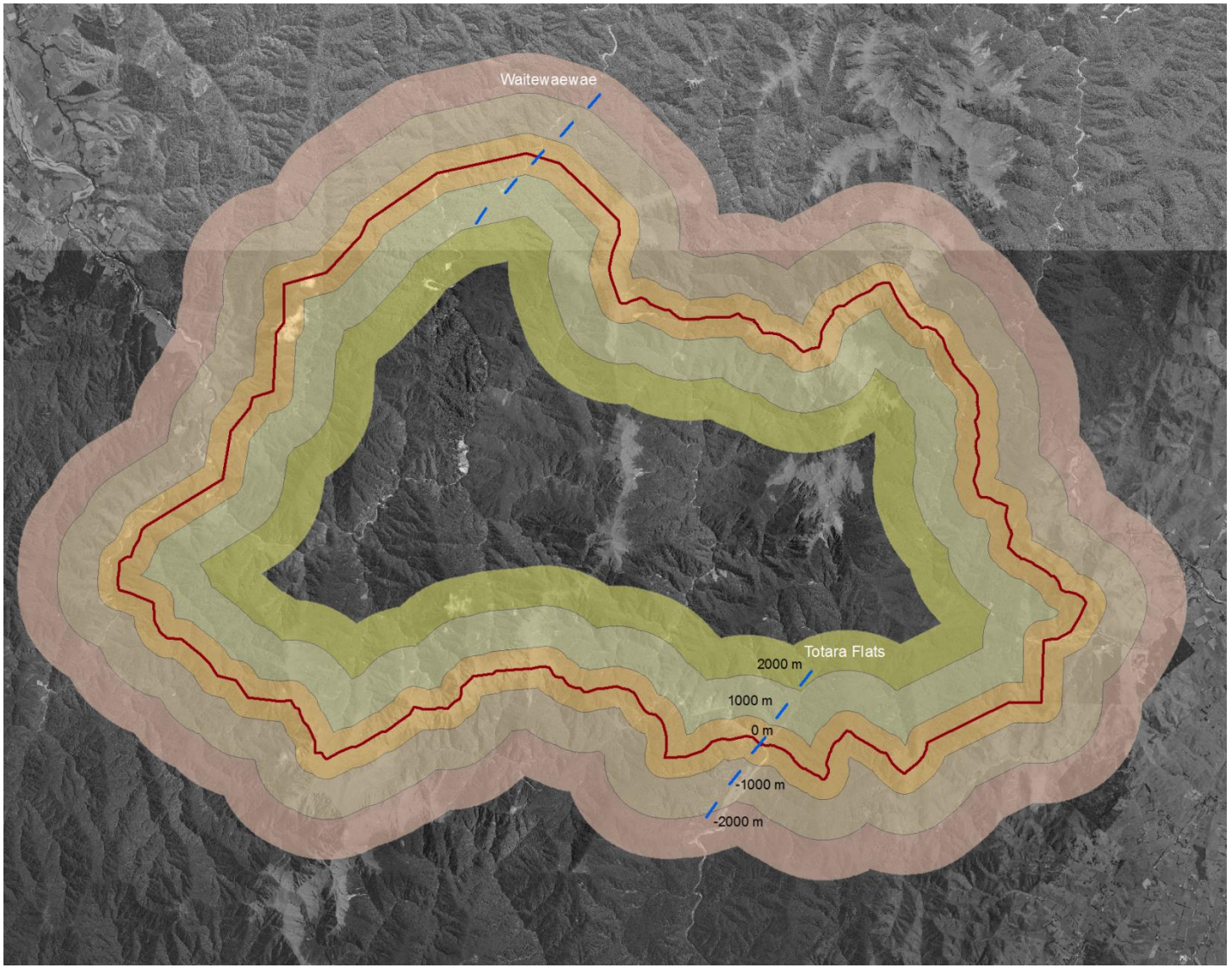
Photos: Caroline Thomson, LCR

Pitfalls: invertebrates

Photos: Caroline Thomson, LCR

Litterfall traps: leaves, fruit, weta and stick insect frass

FBI: tree canopy condition and browse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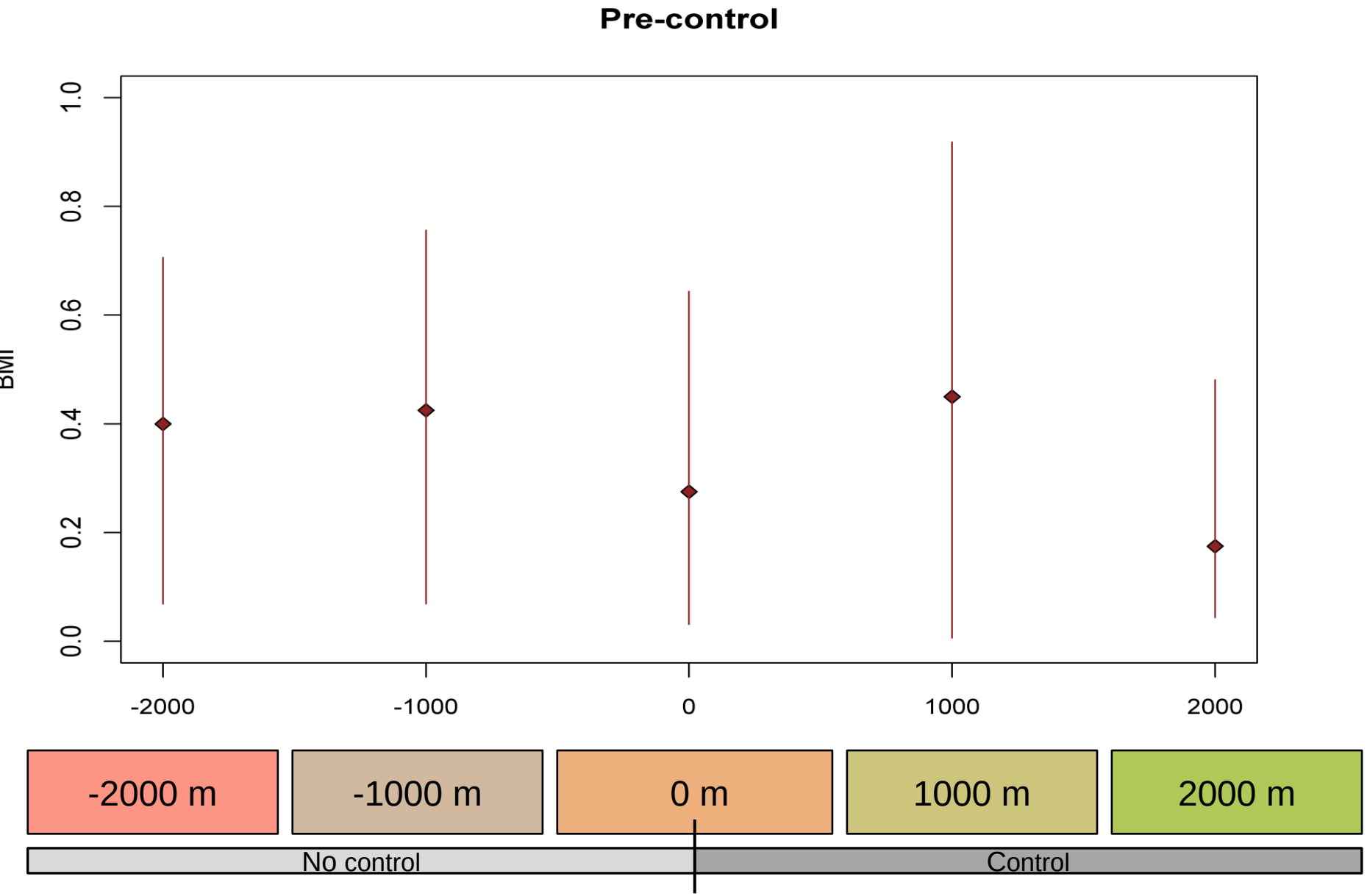
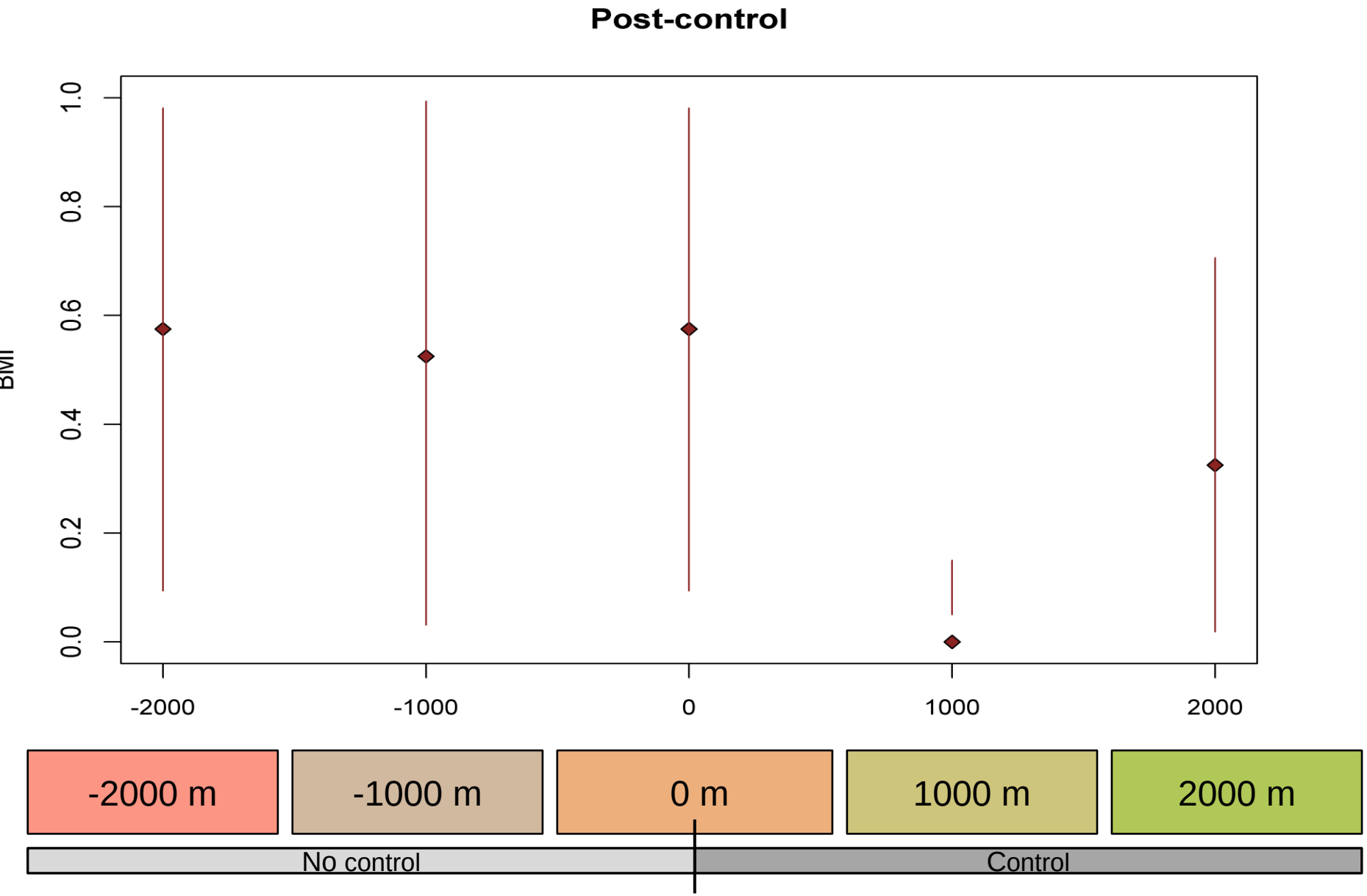
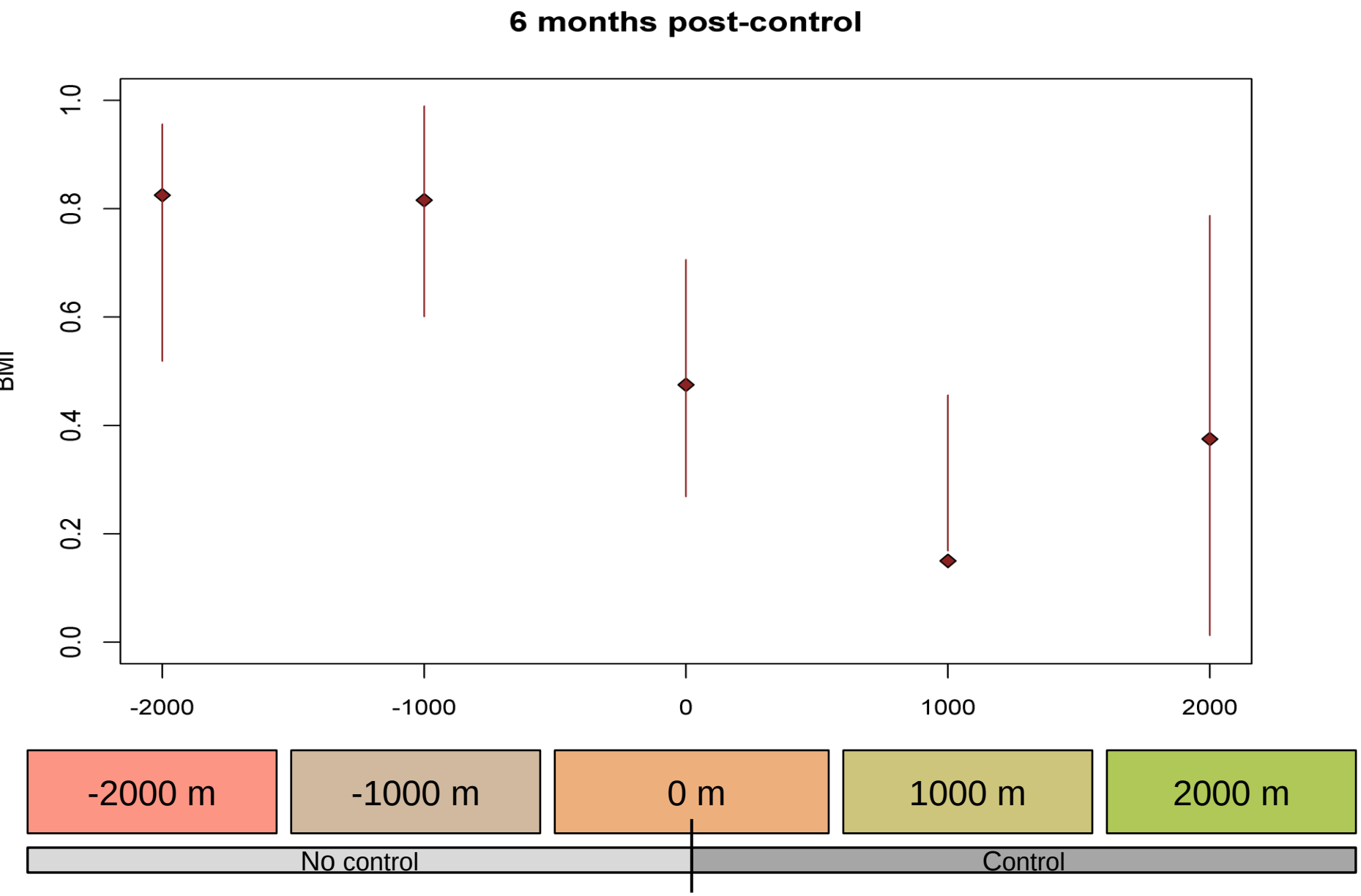
Possums – waxtag Bite Mark Index



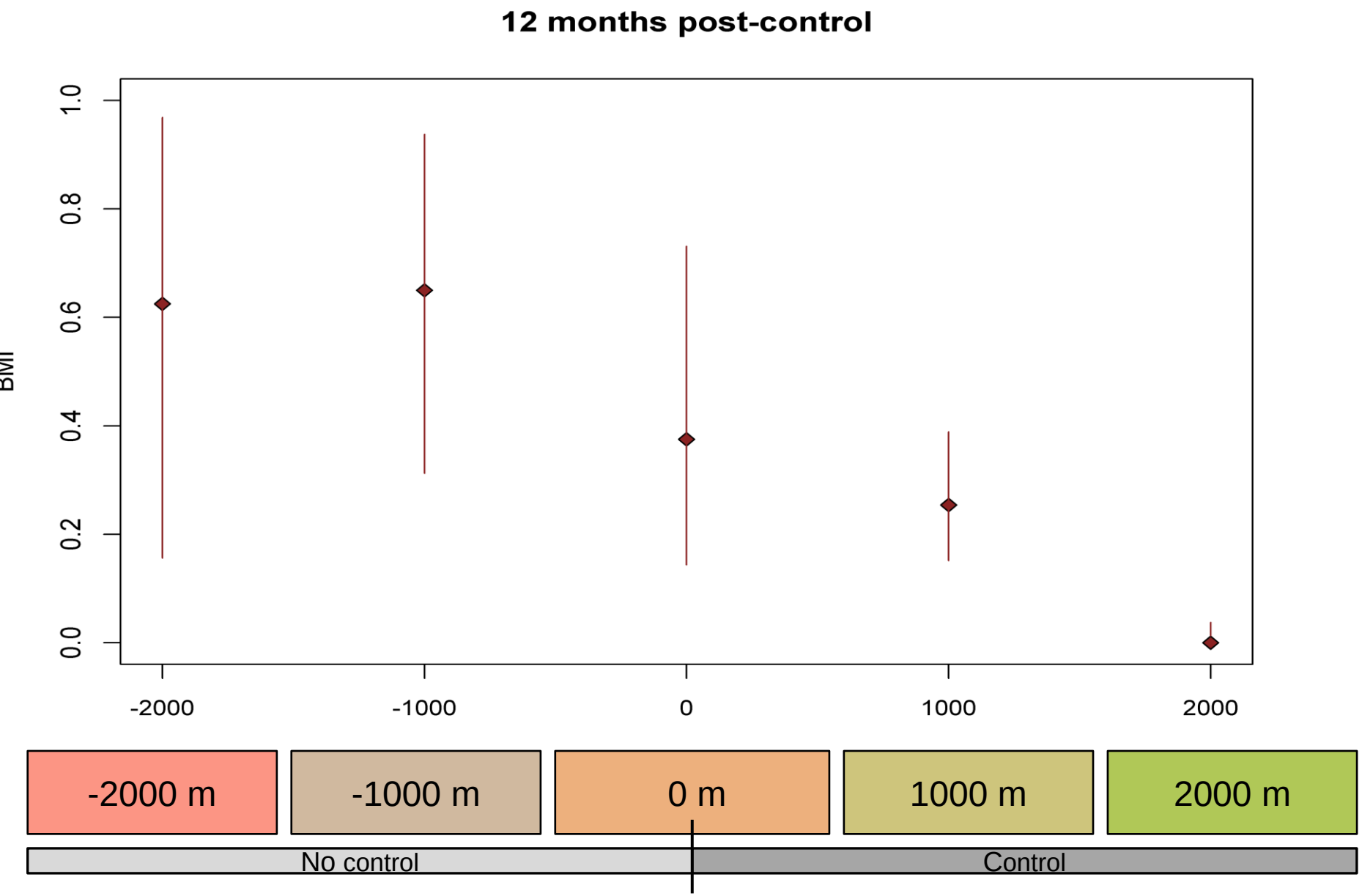
Possums – waxtag Bite Mark Index



Possums – waxtag Bite Mark Index



Possums – waxtag Bite Mark Index



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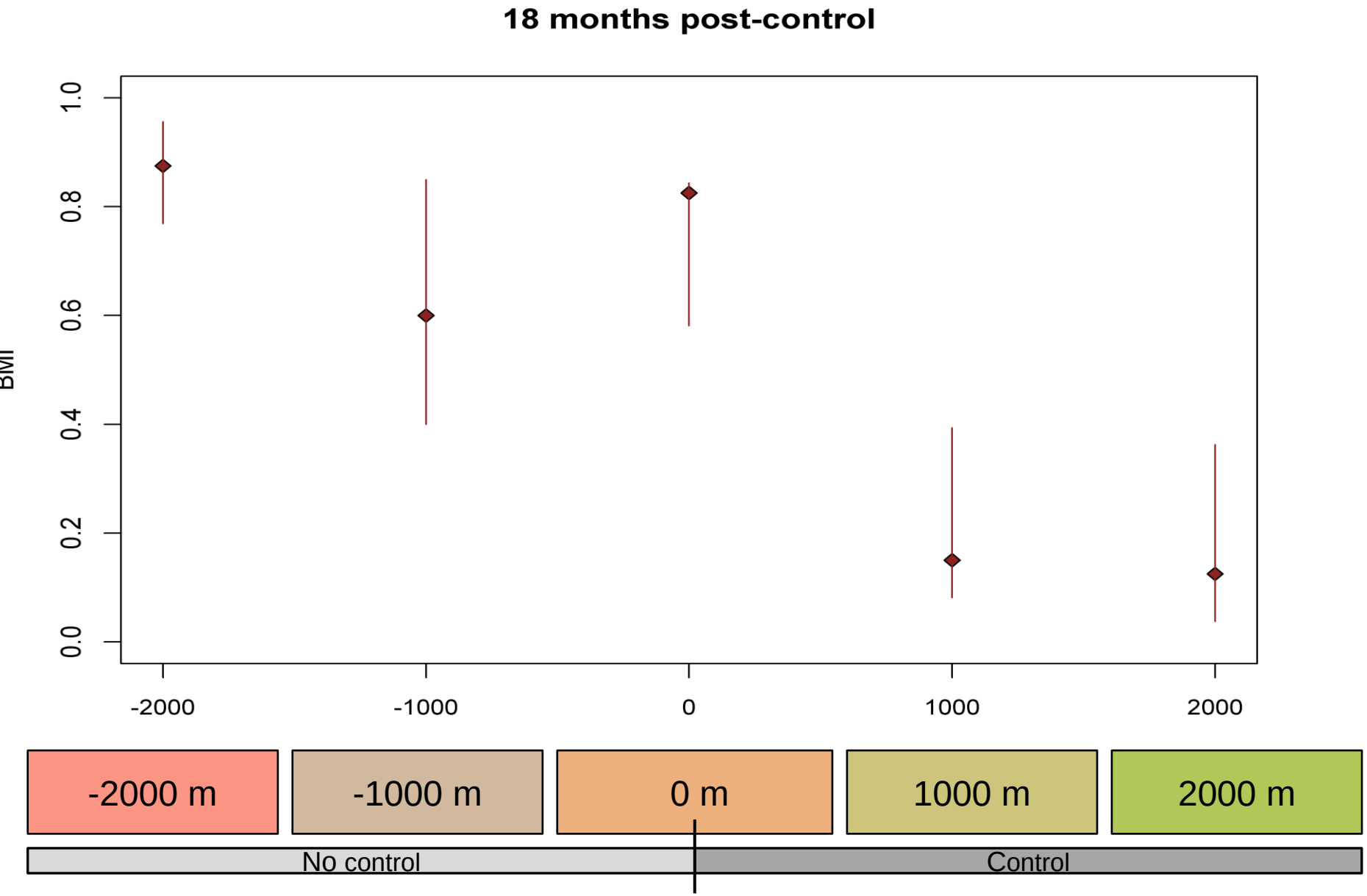
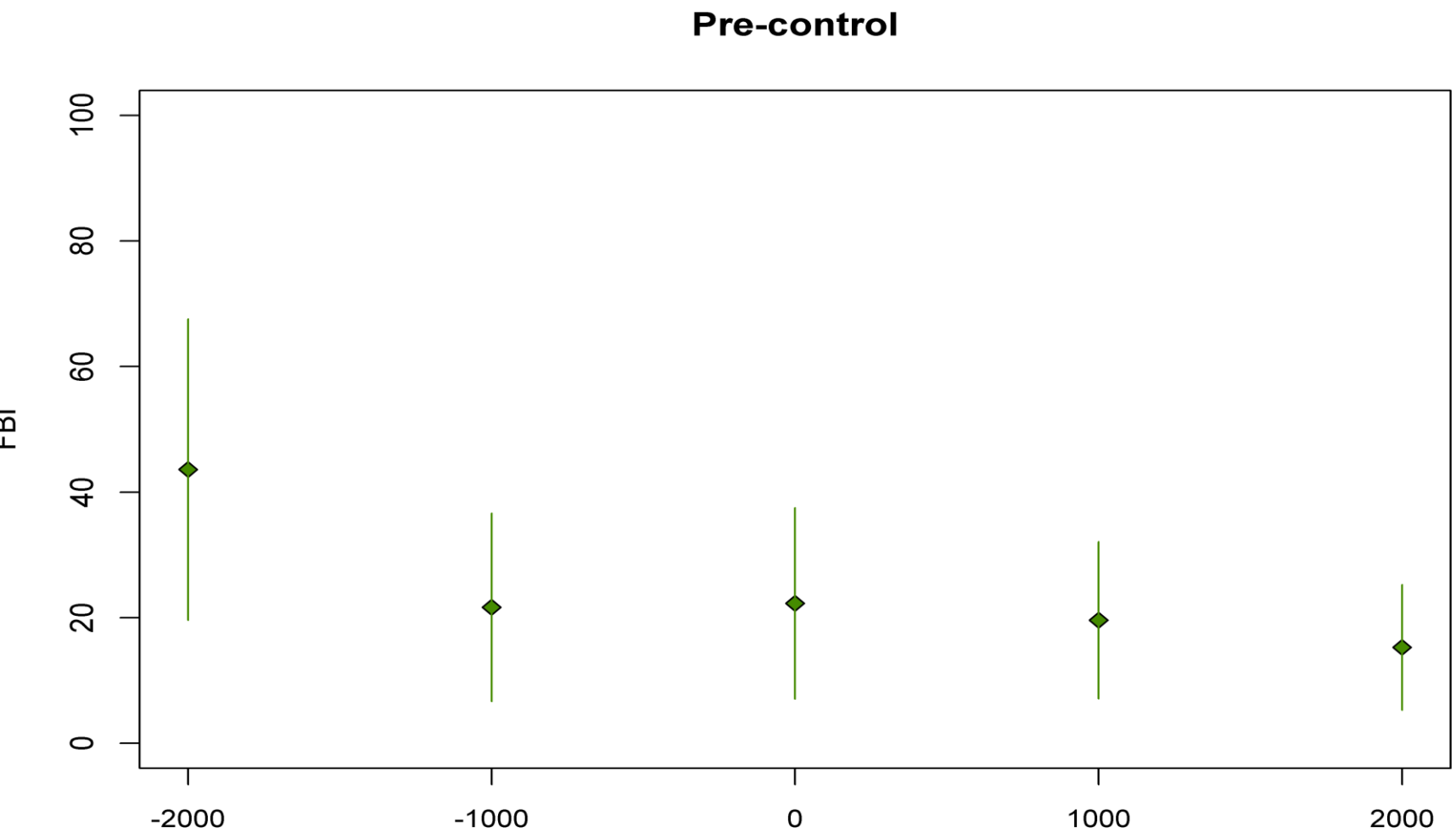


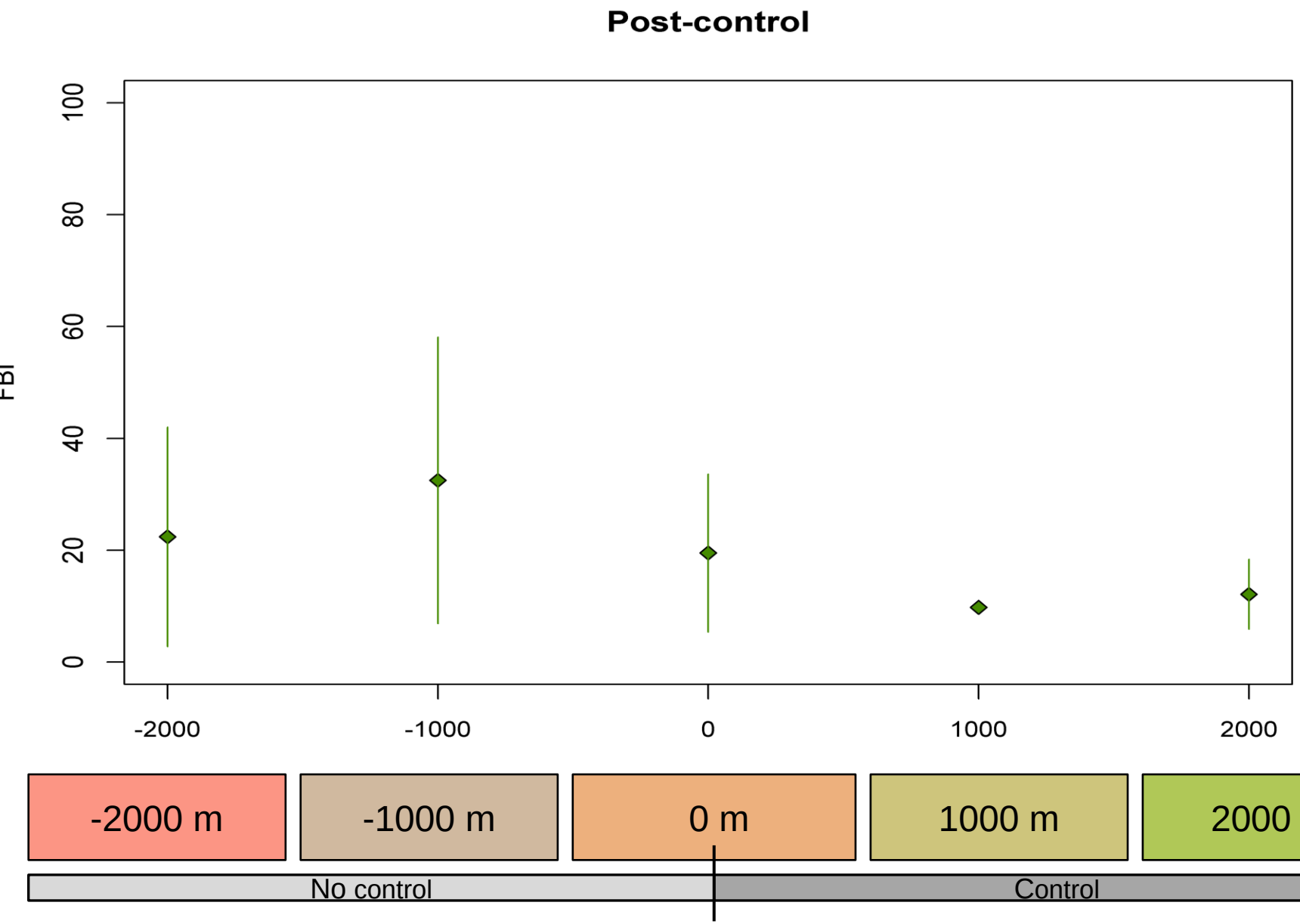
Kamahi trees – Possum Browse Index



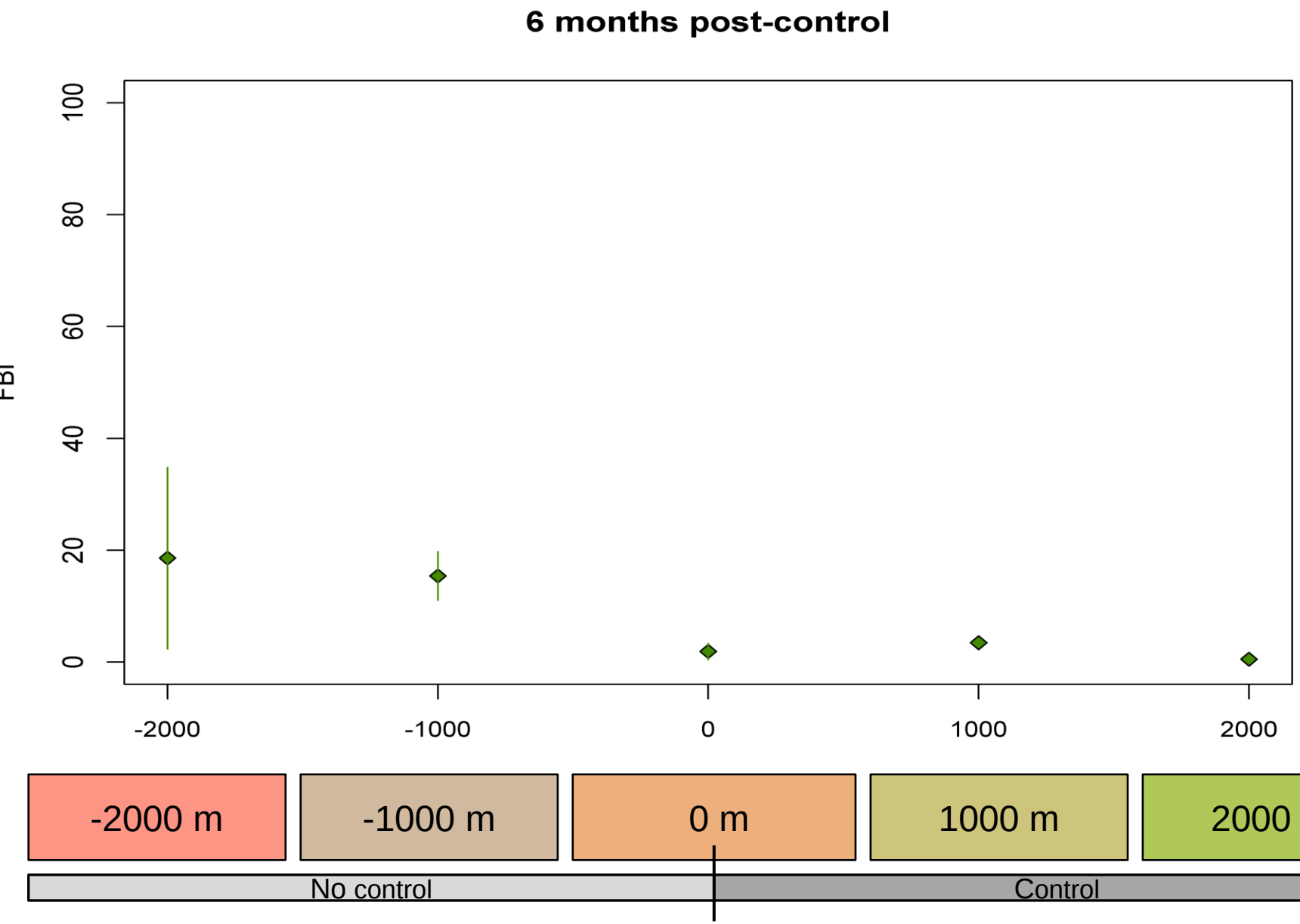
-2000 m | -1000 m | 0 m | 1000 m | 2000 m

No control | Control

Kamahi trees – Possum Browse Index



Kamahi trees – Possum Browse Index



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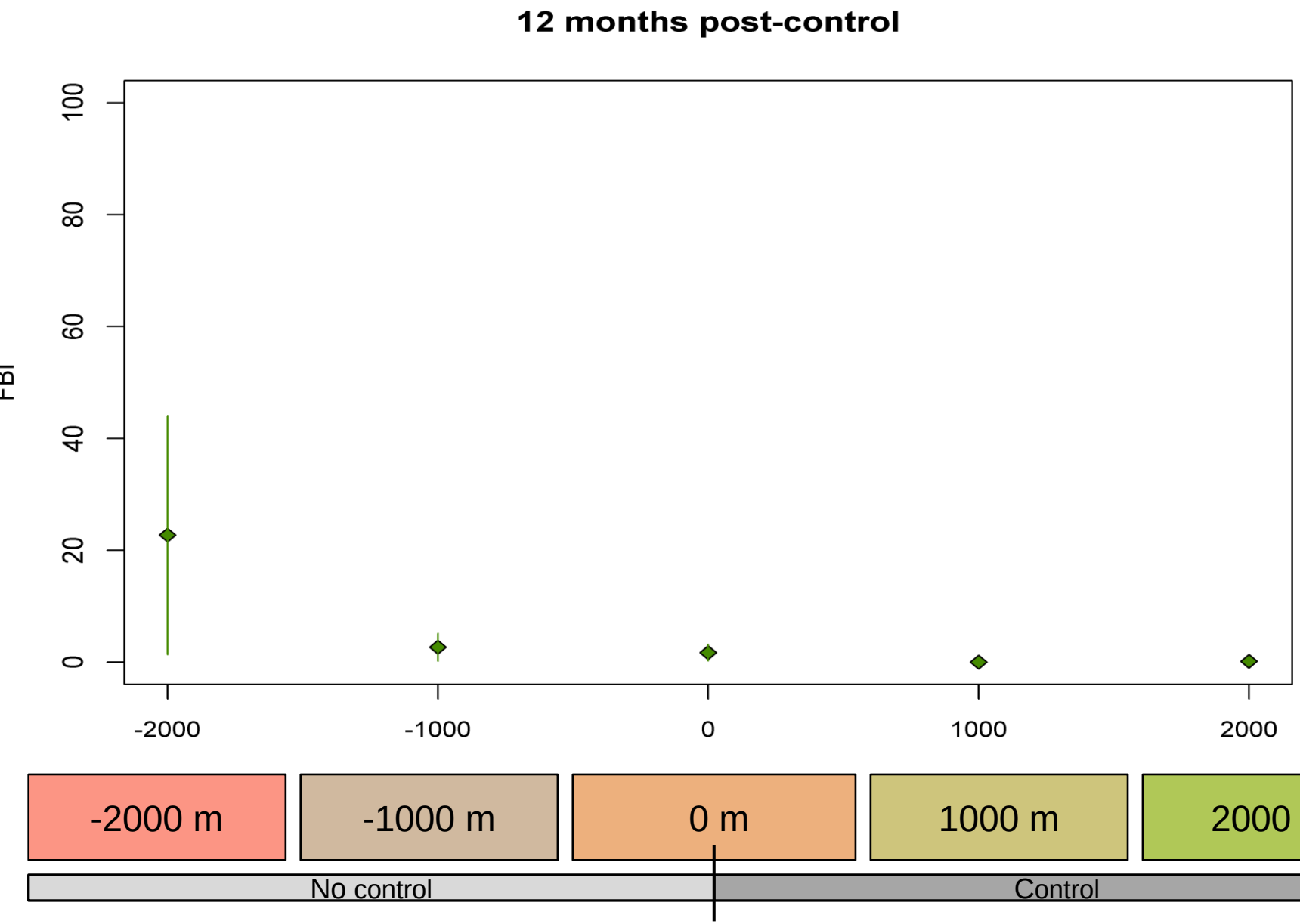

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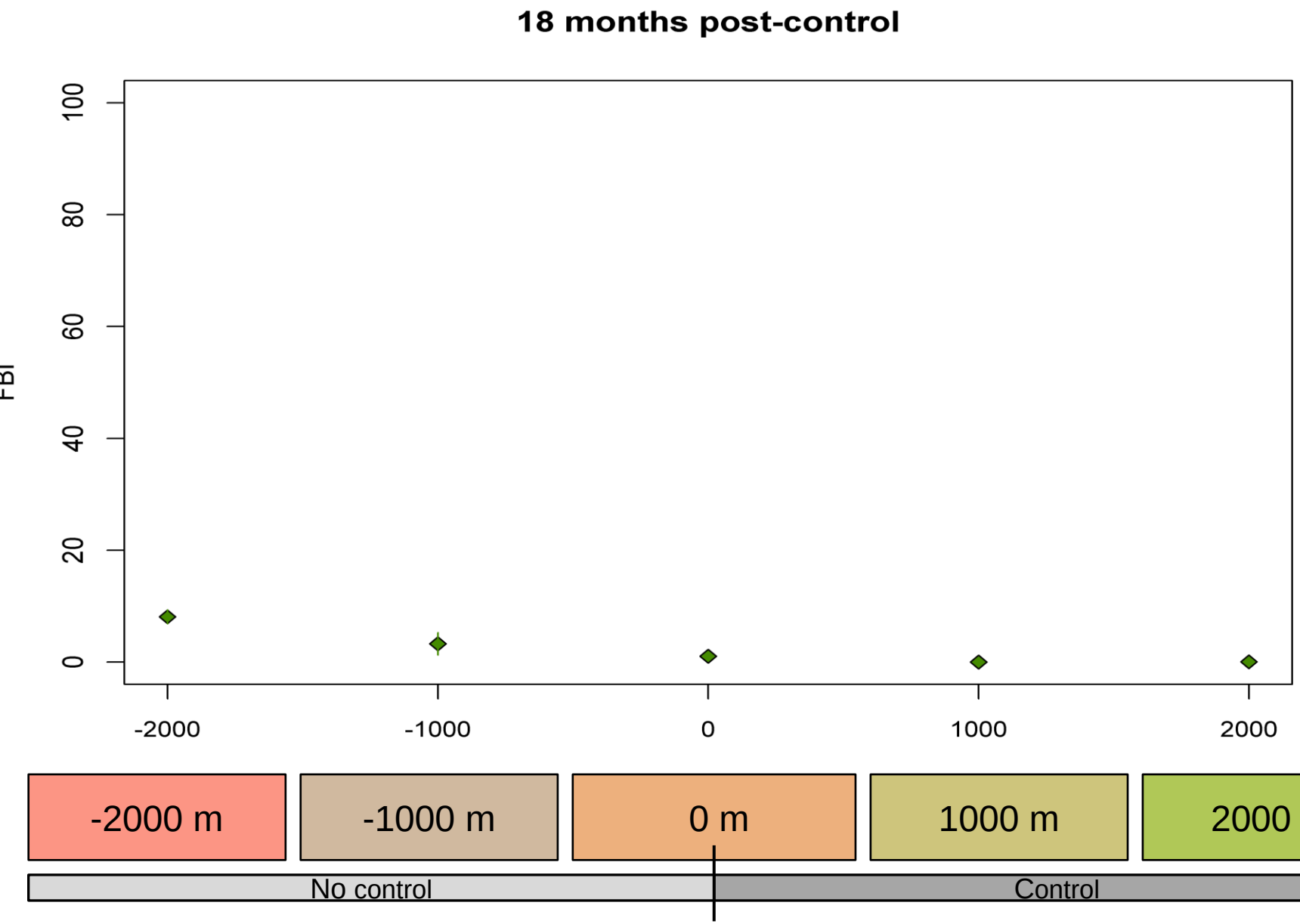
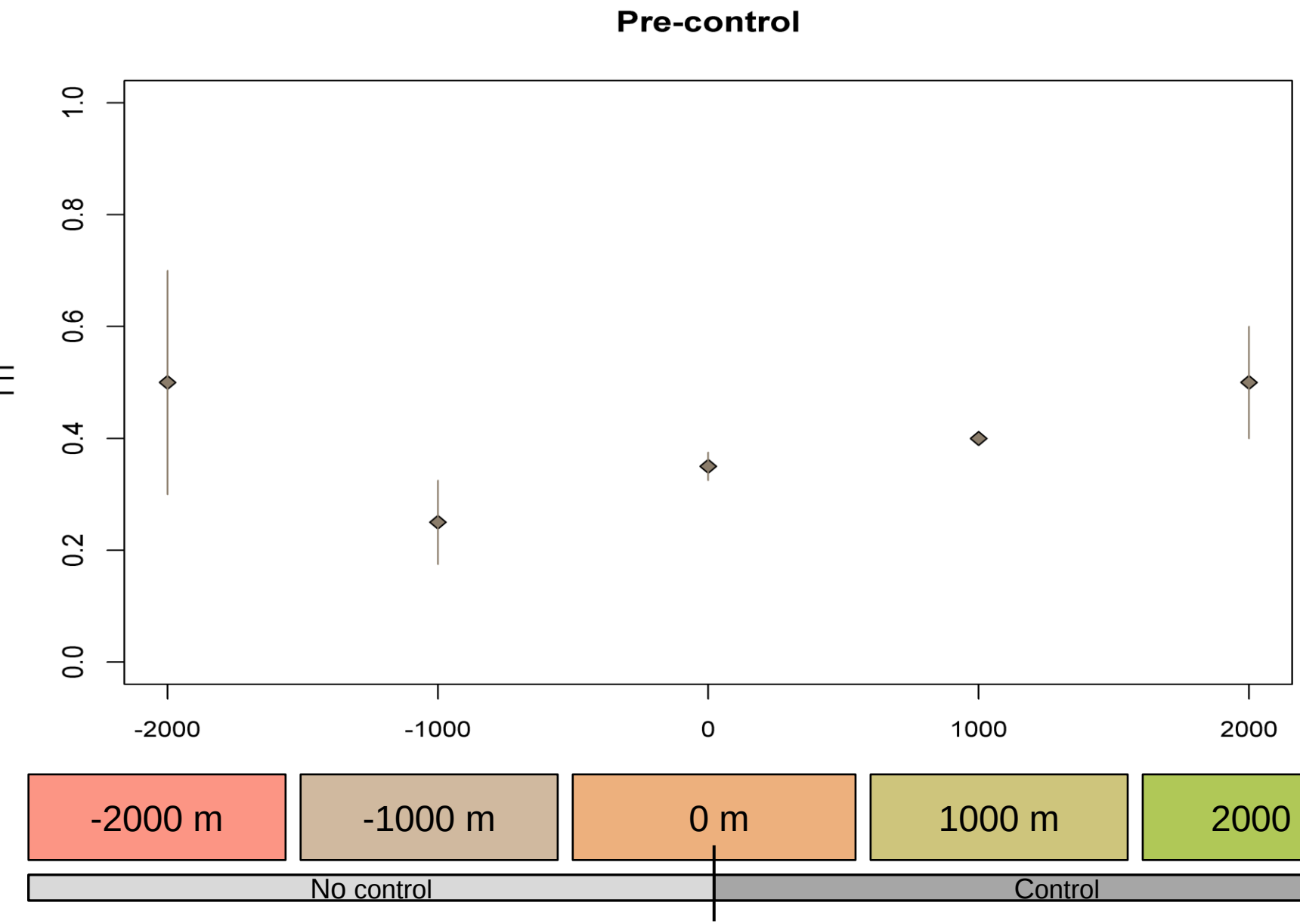


Ship rats – Tracking tunnel Index



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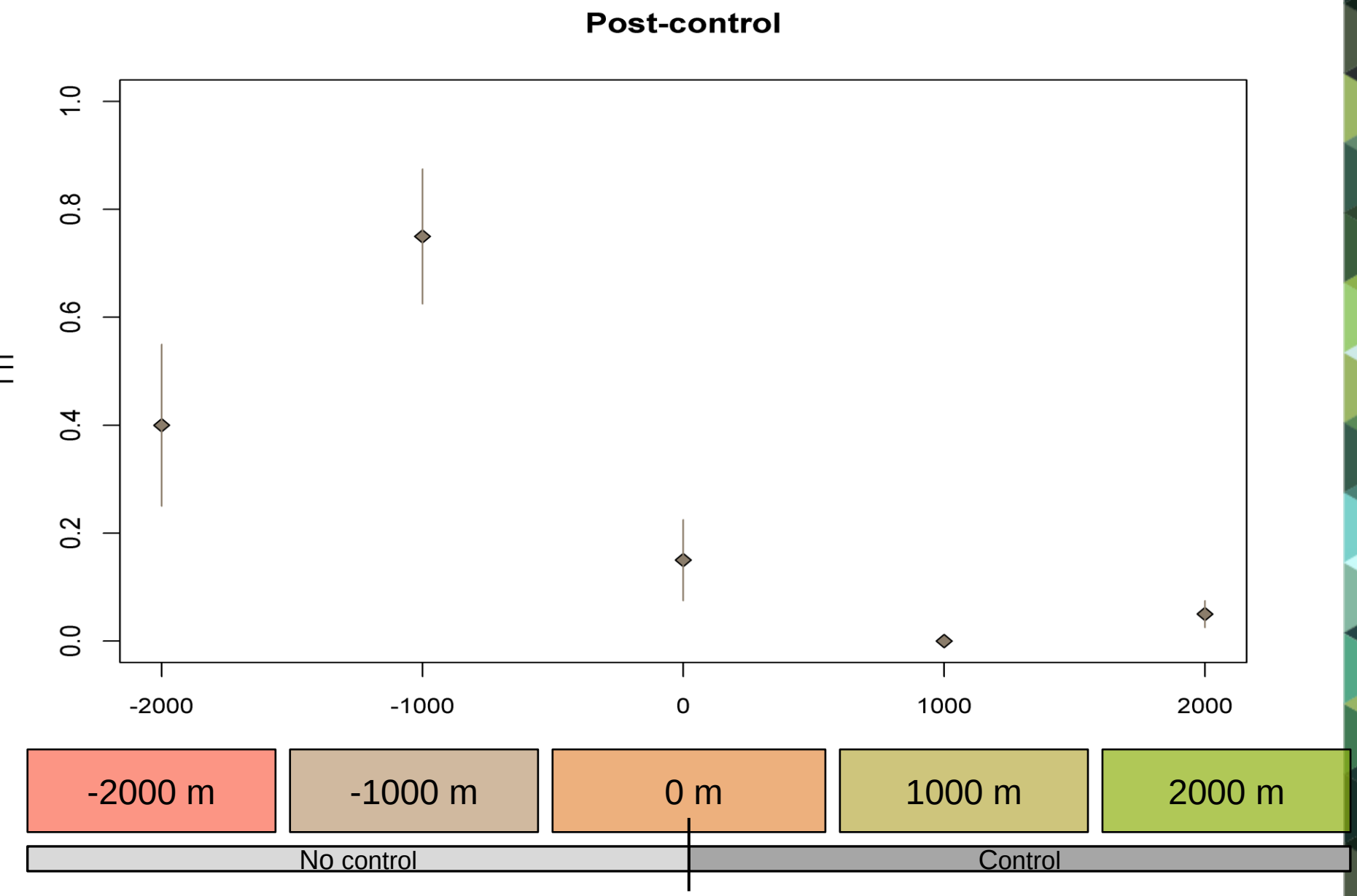

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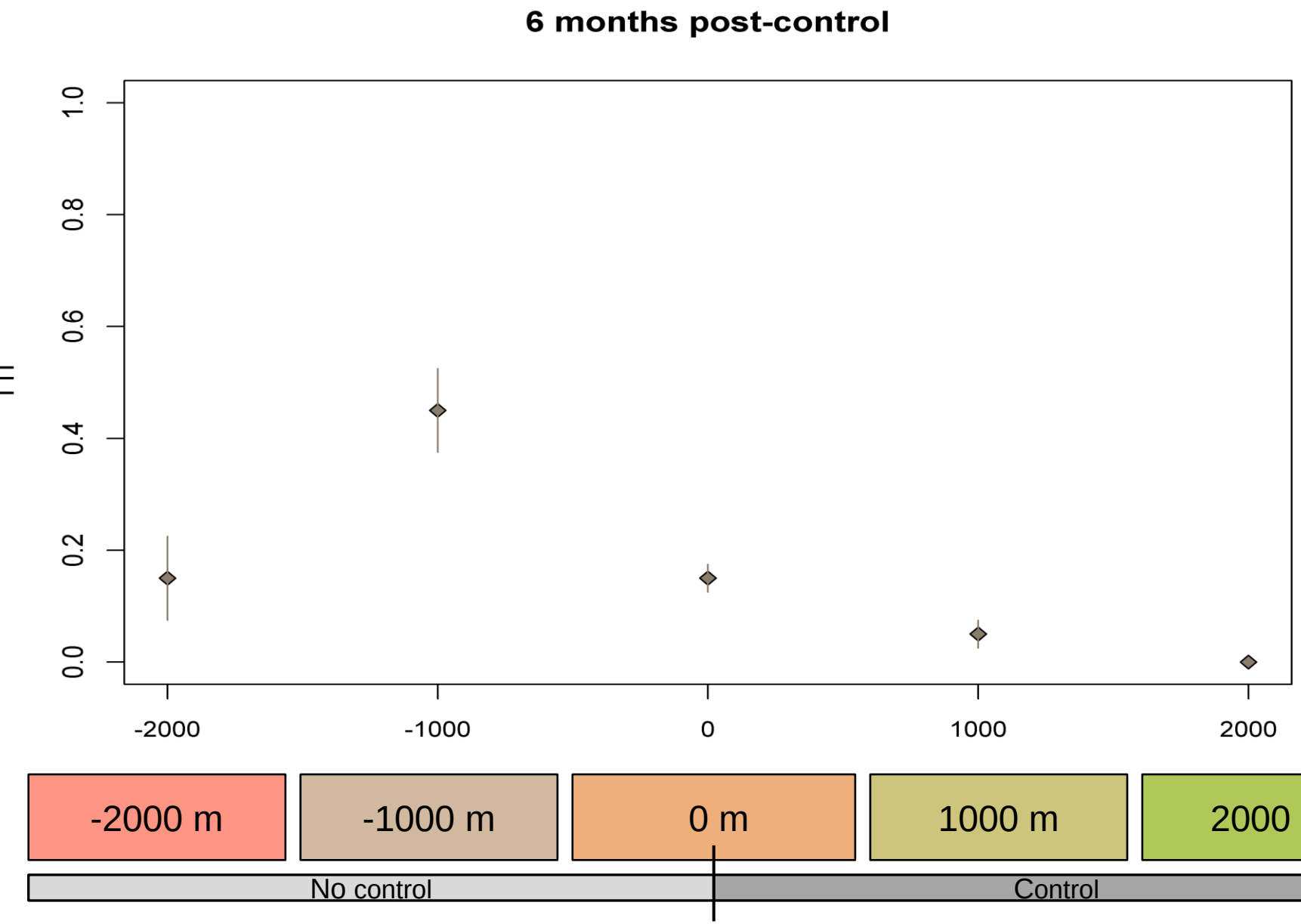

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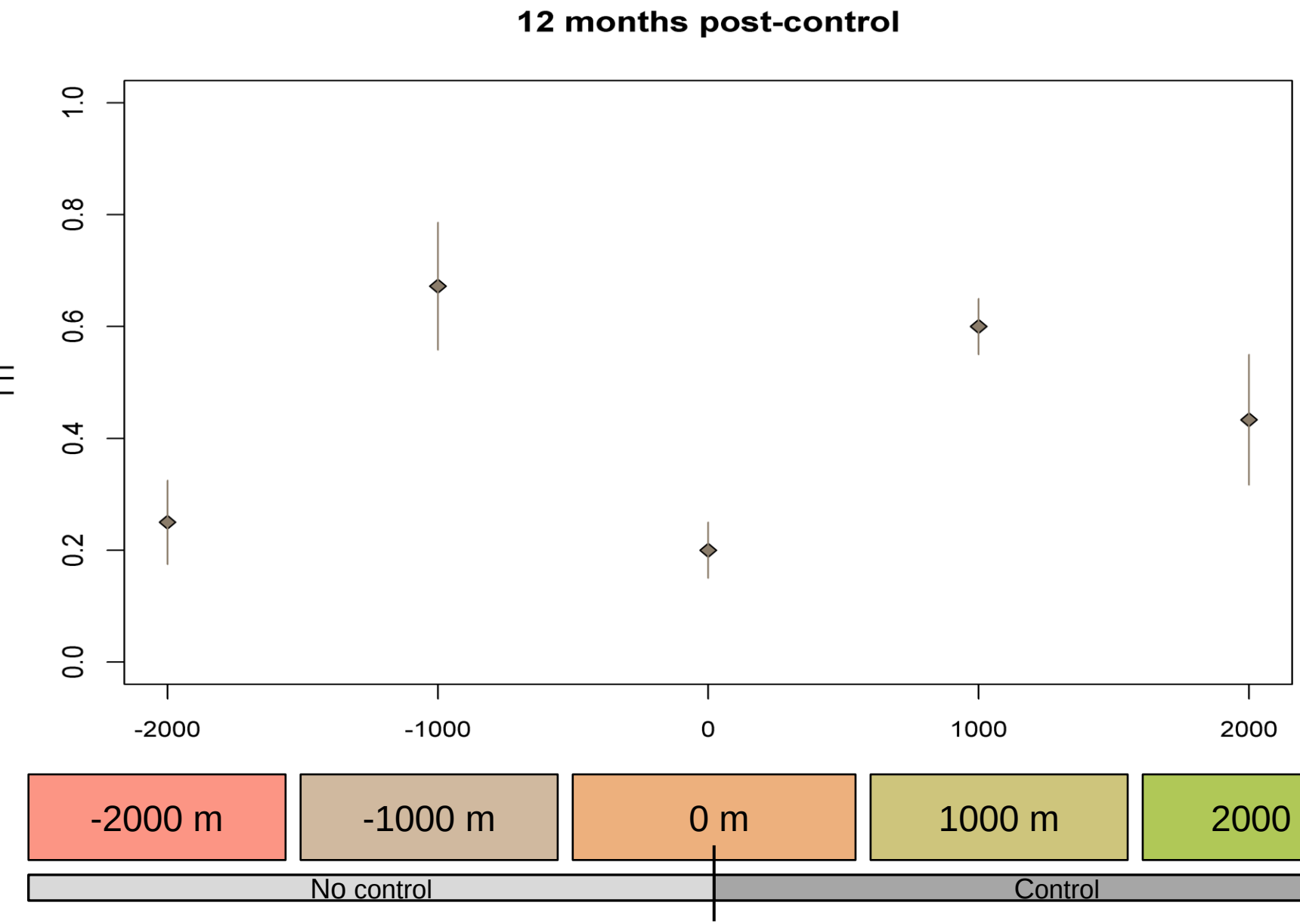

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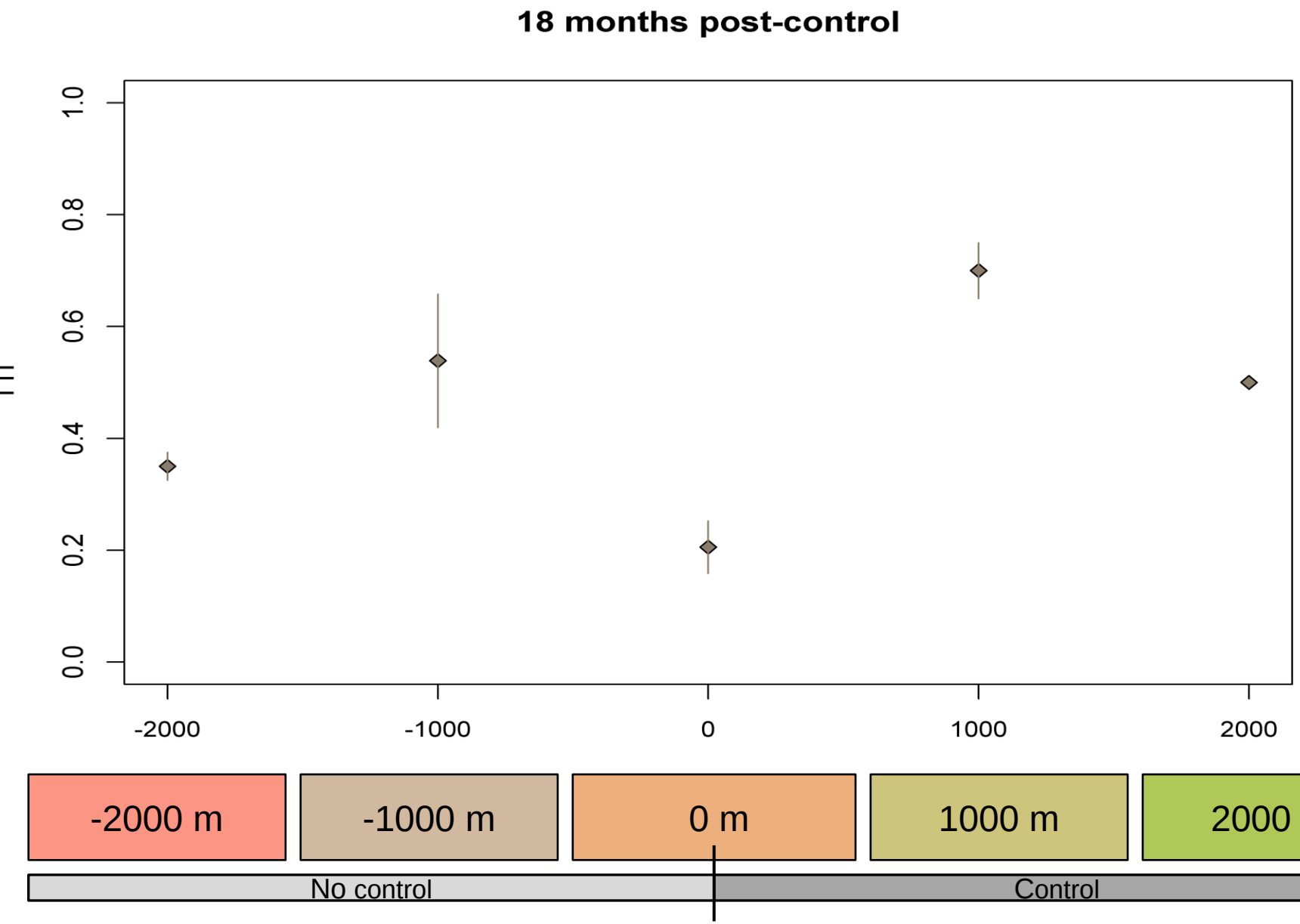
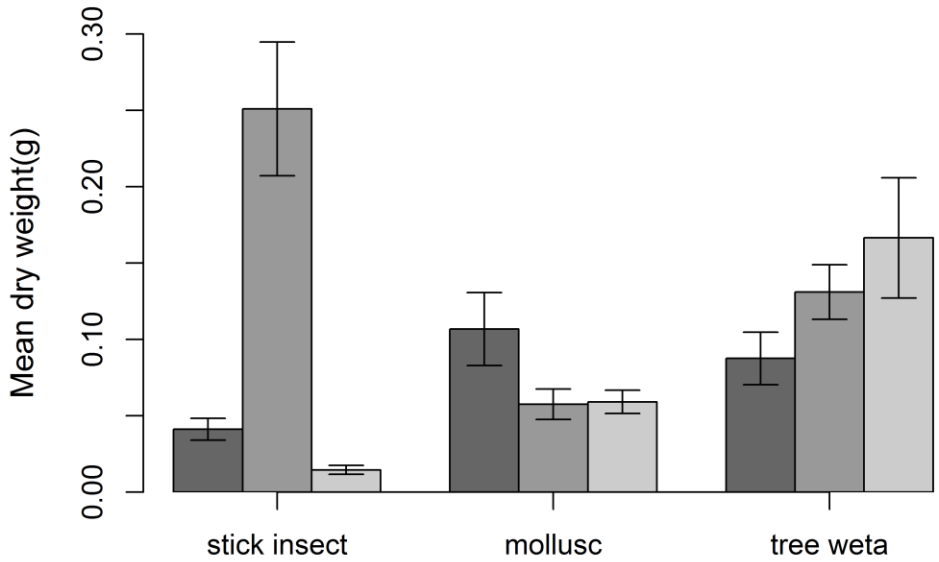


Frass drop method

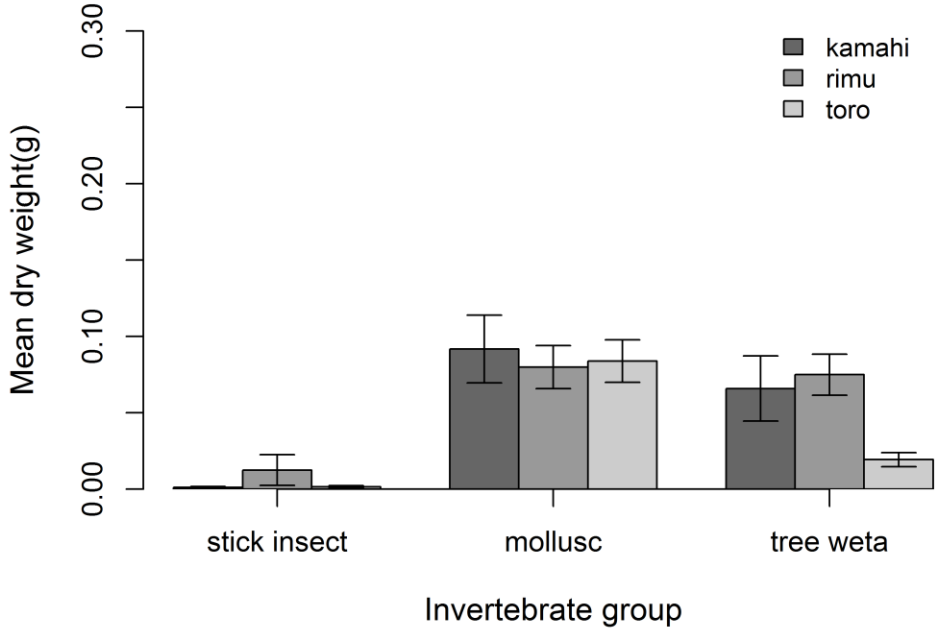
Wellington tree weta frass, *Hemideina crassidens*

Stick insect (Plastmatodea)frass

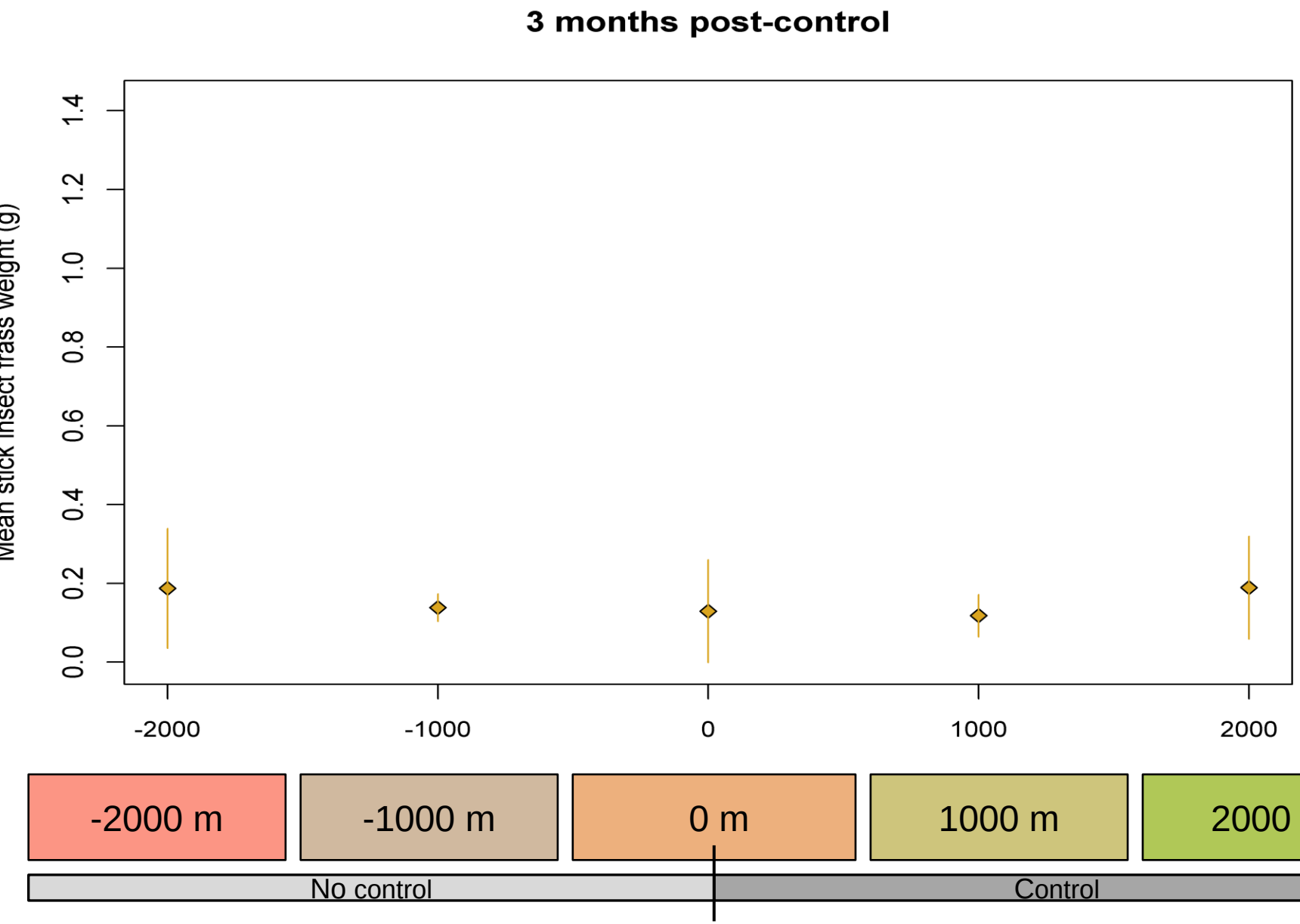
General patterns



b. Waitewaewae



Stick insects – Frass fall weight



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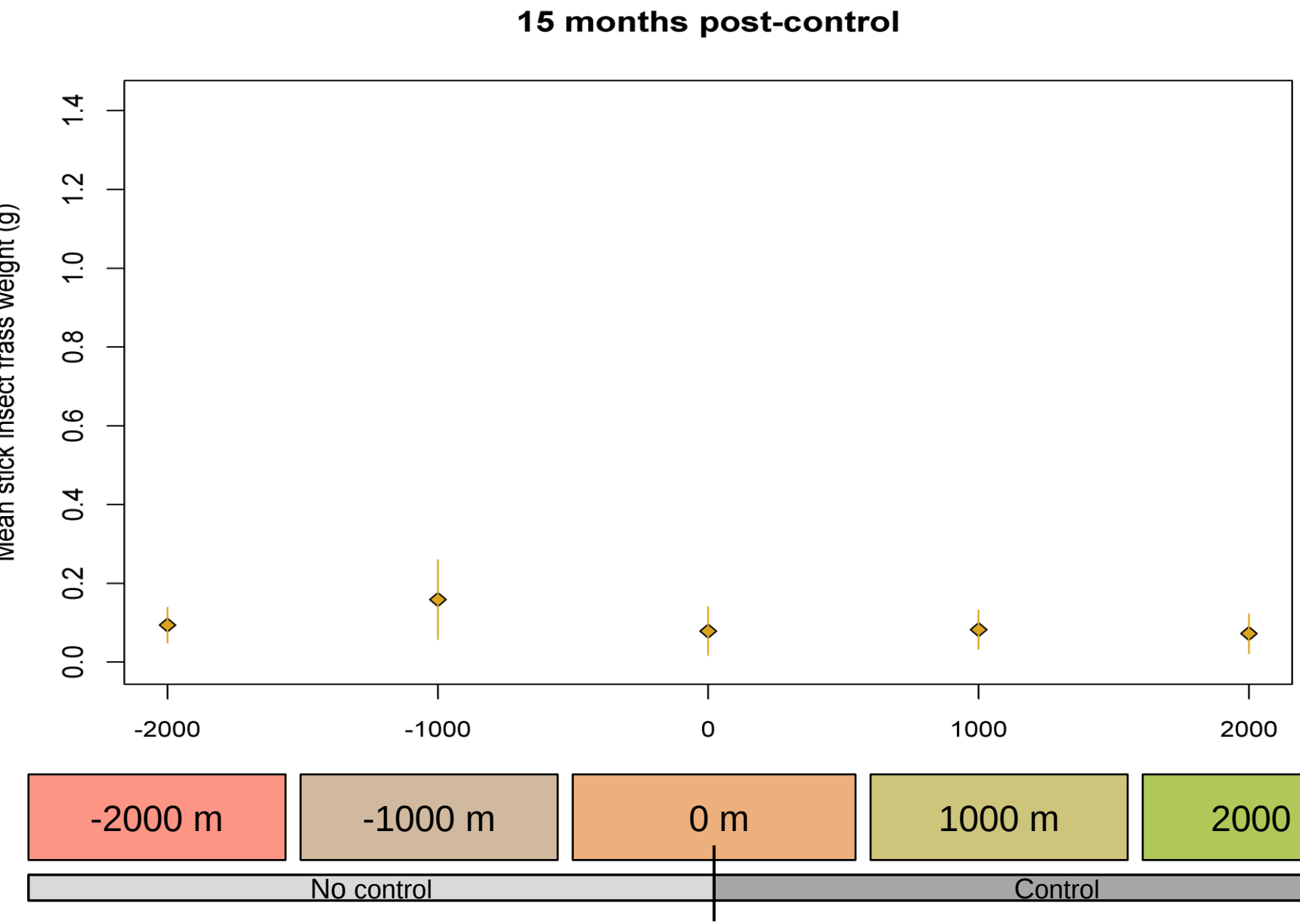

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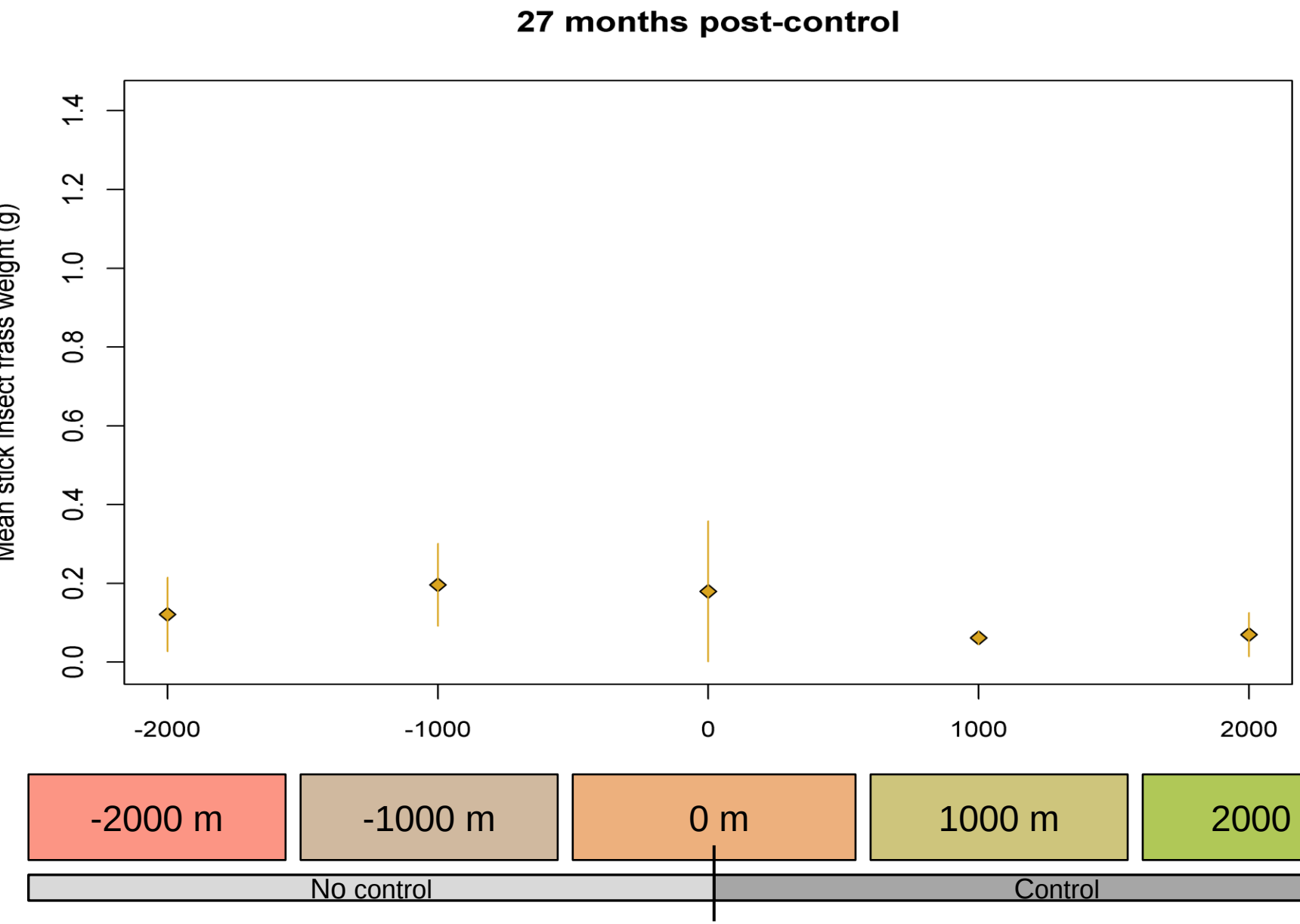
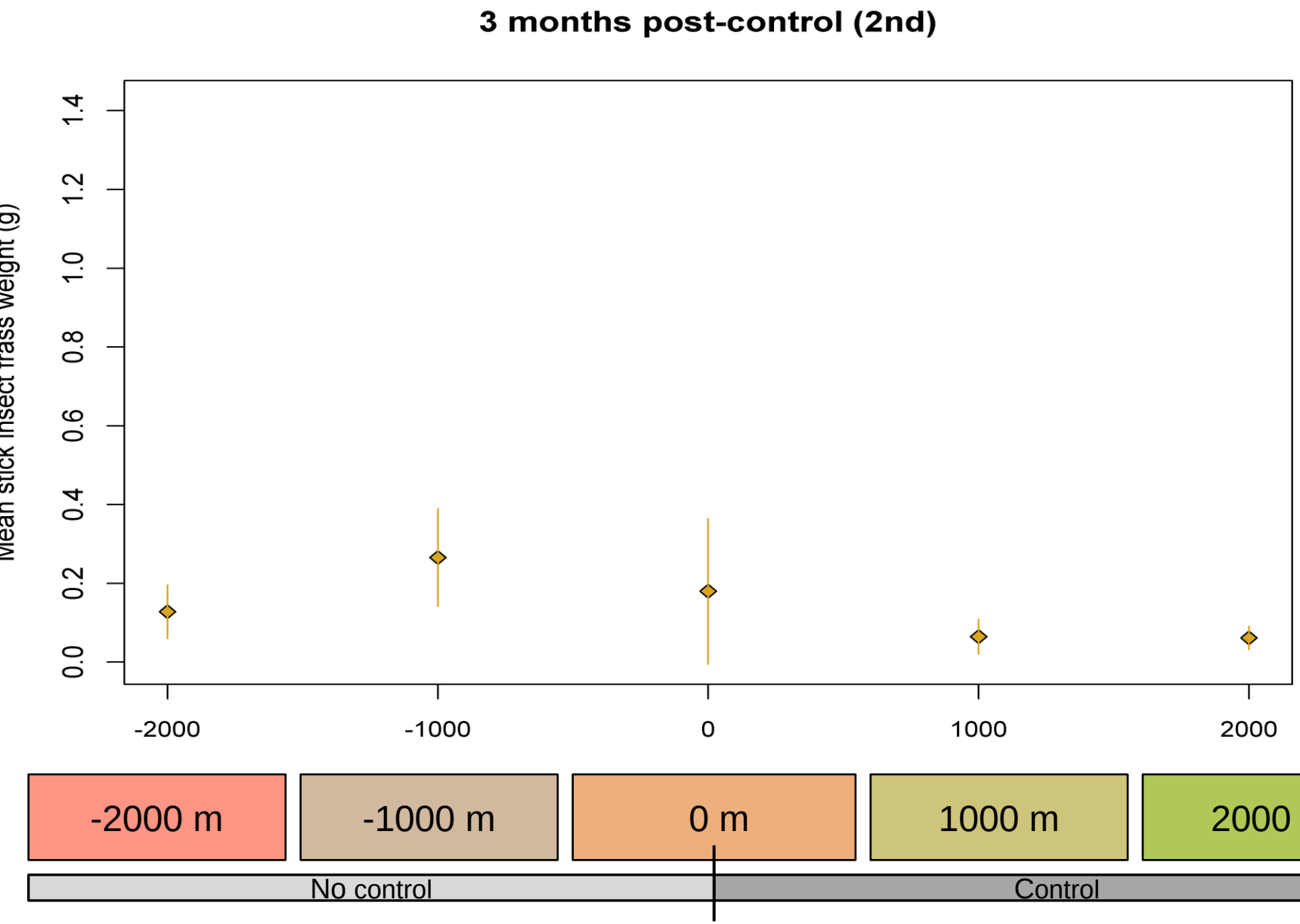
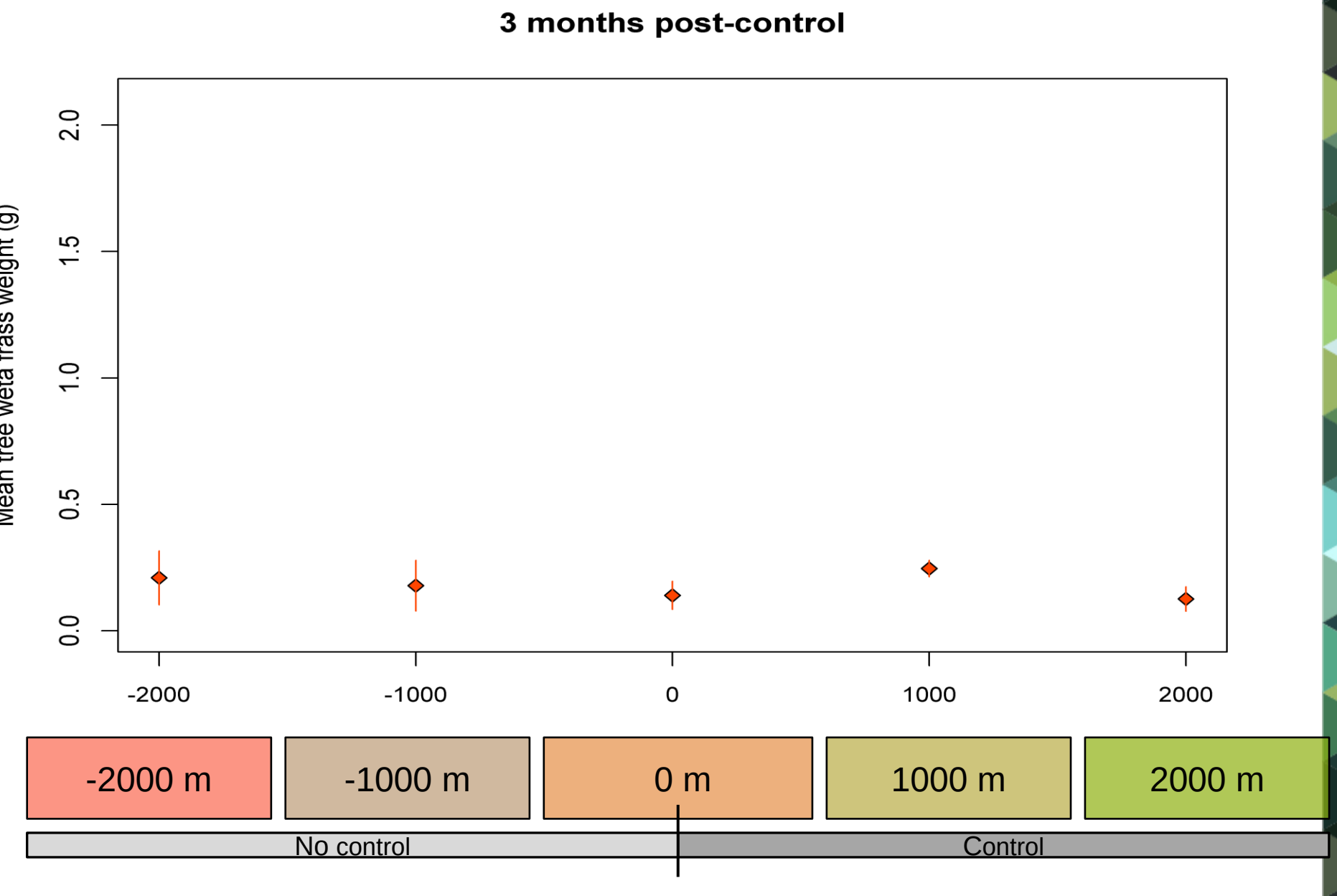


Stick insects – Frass fall weight



Tree weta– Frass fall weight



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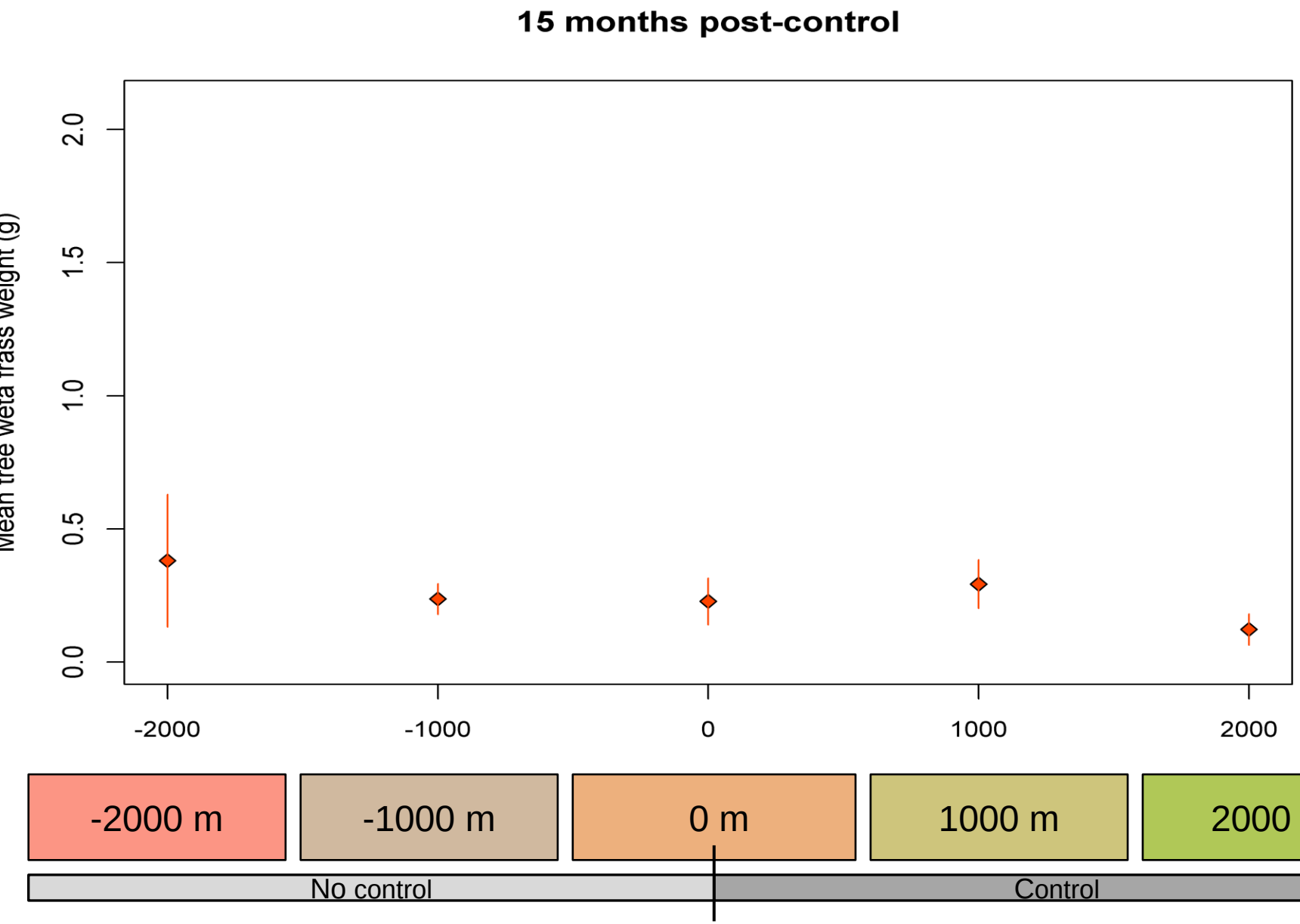

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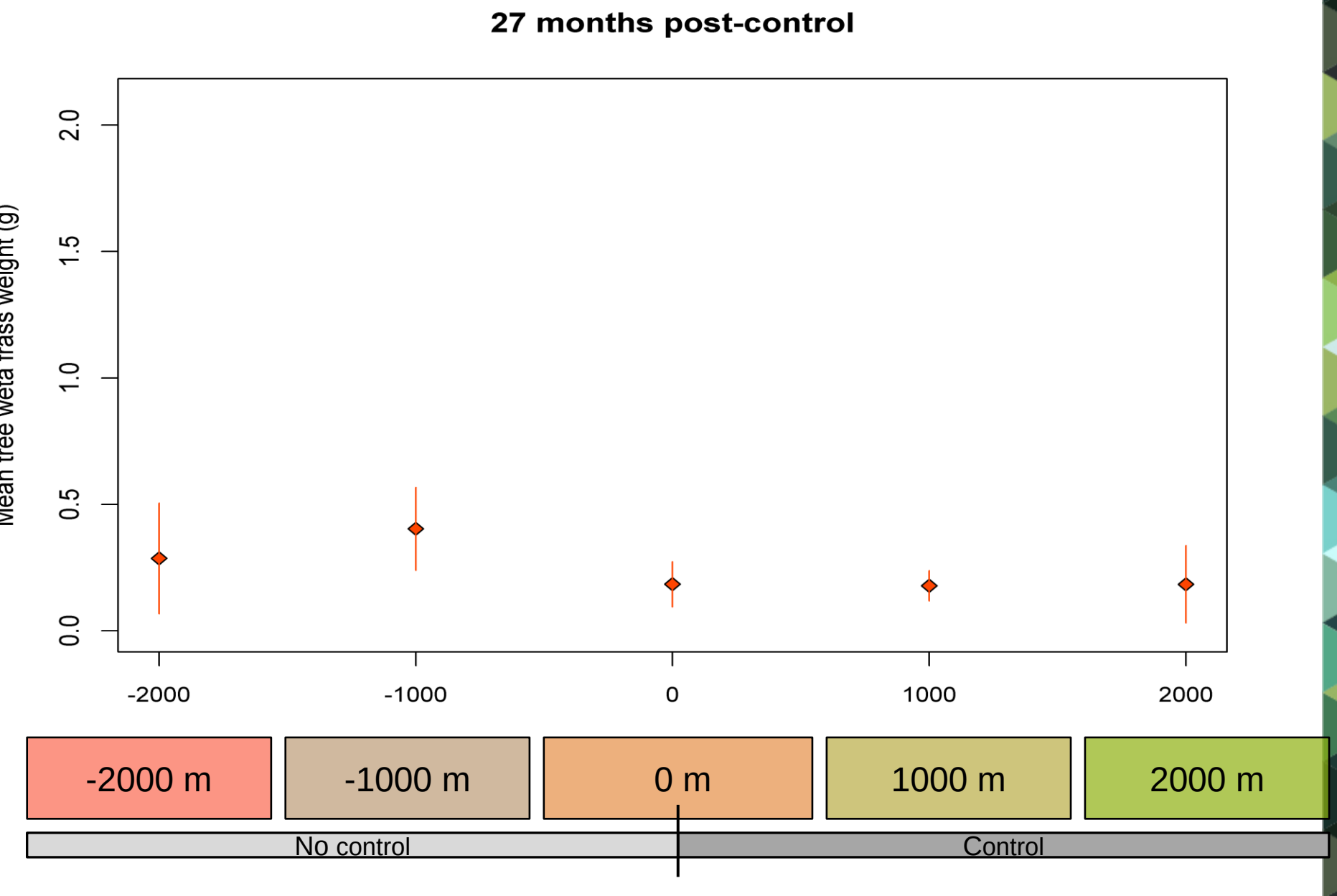
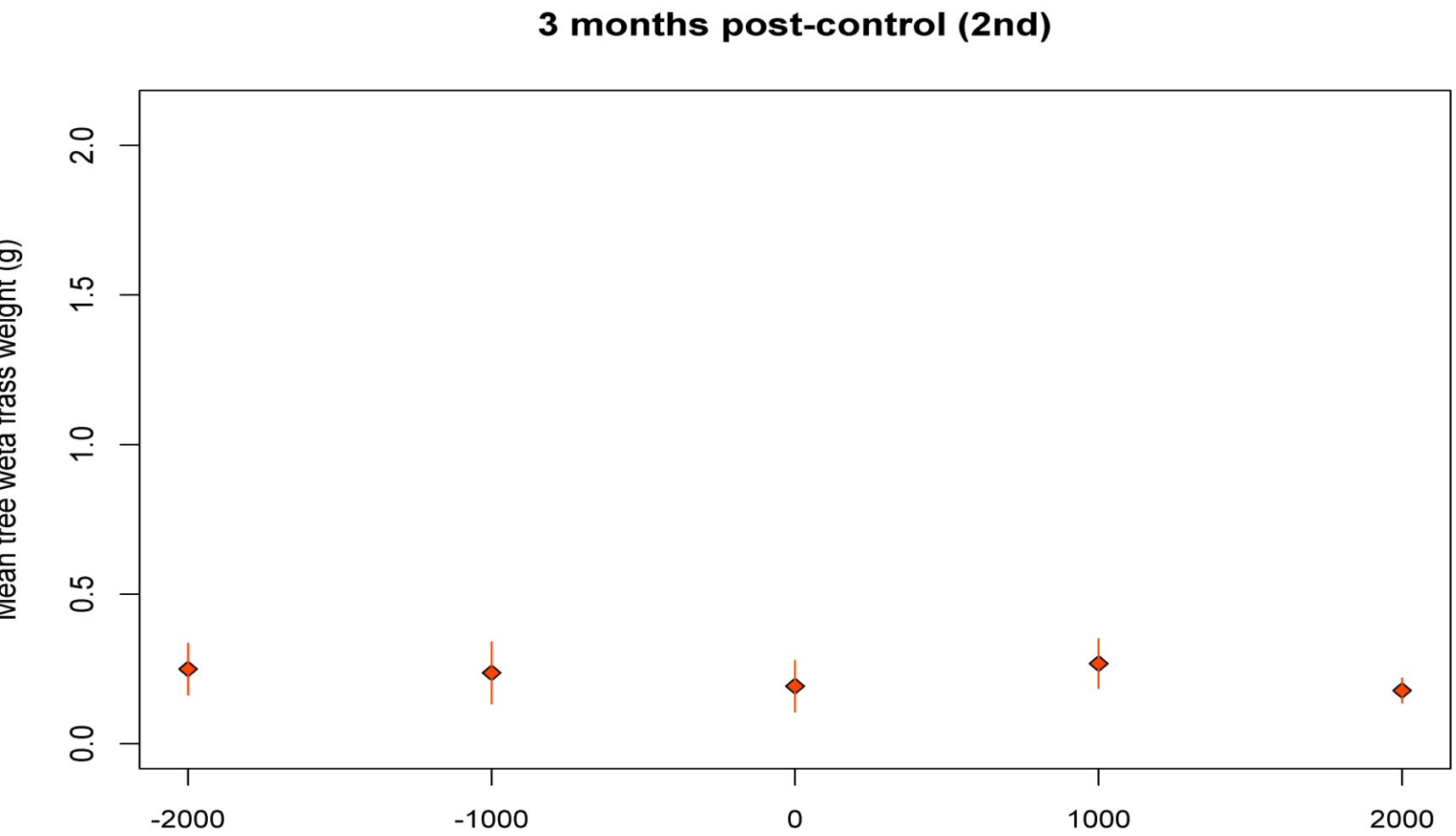
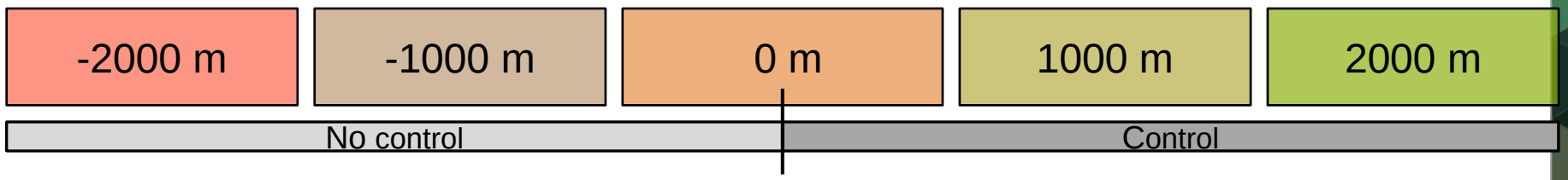
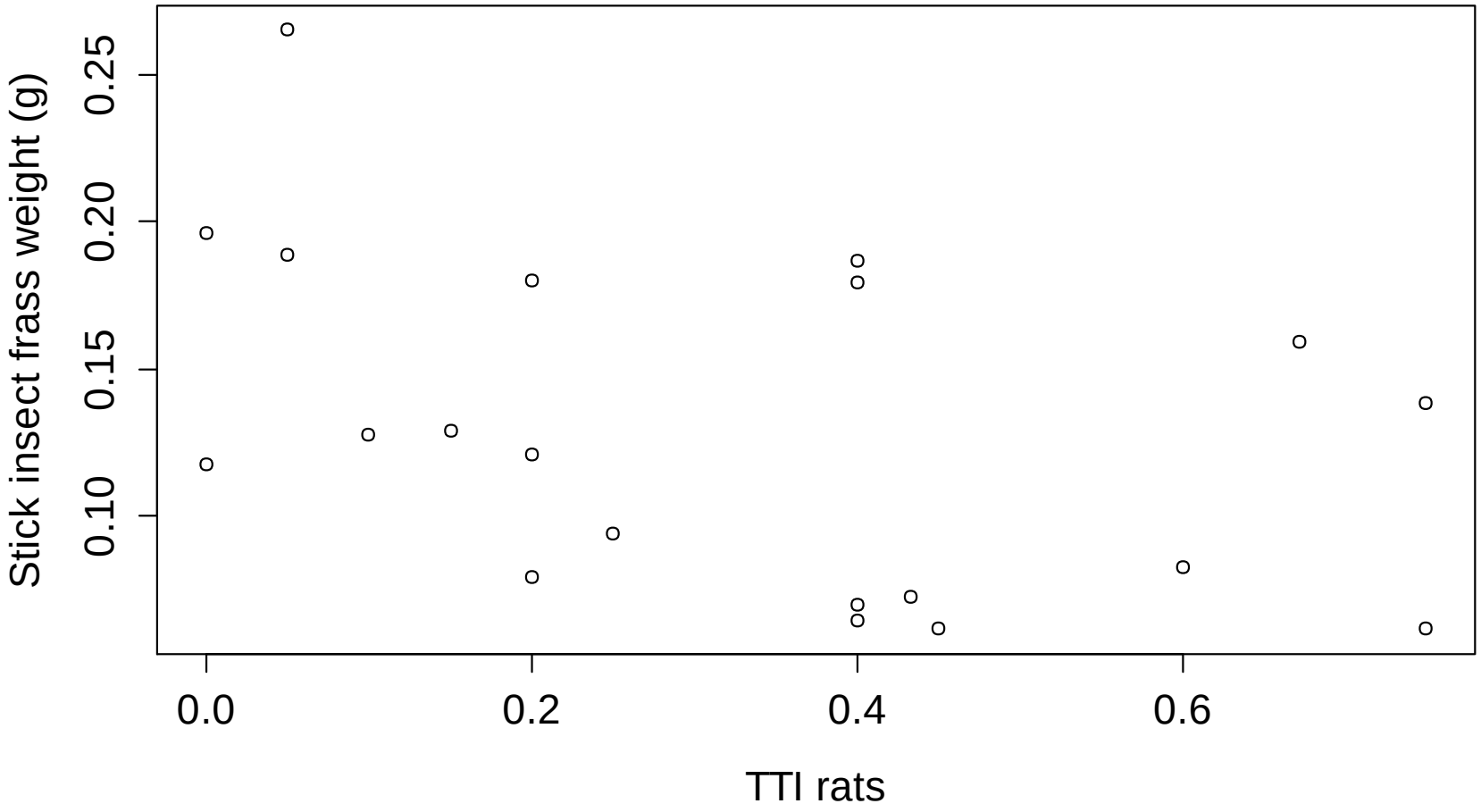


Tree weta– Frass fall weight

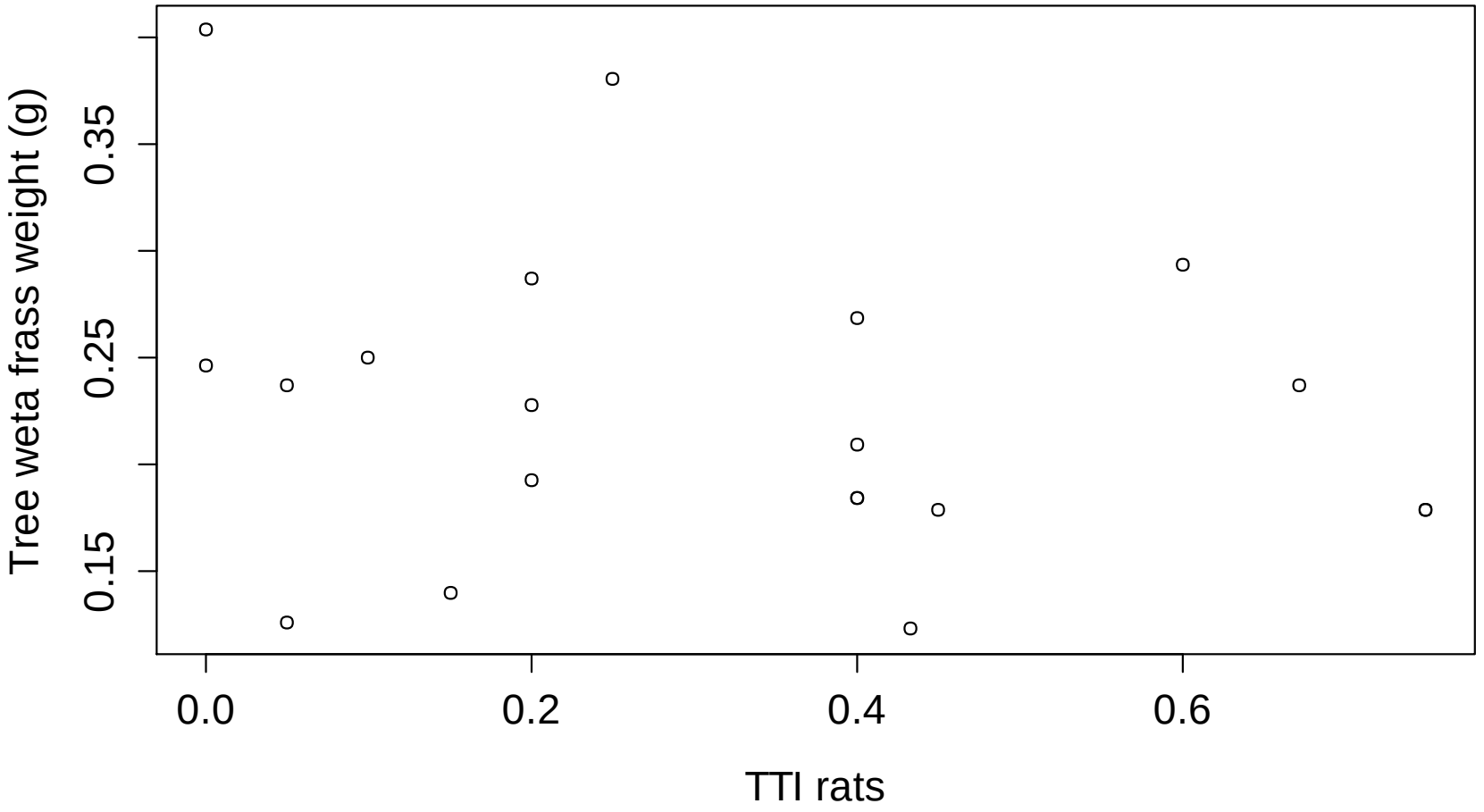




Stick insect frass vs. rats



Tree weta frass vs. rats



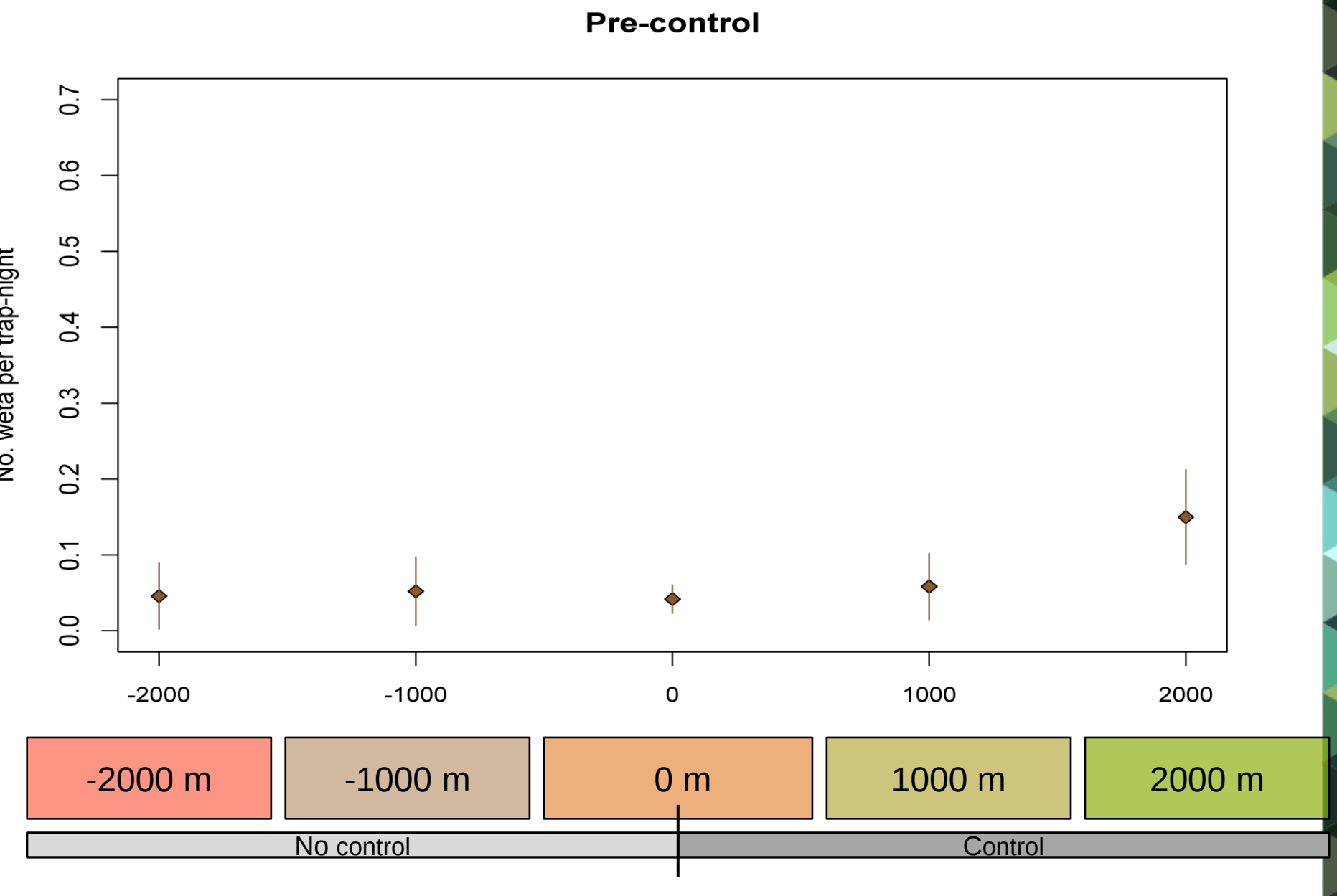
Pros and cons of frass method

- Activity dependent - but doesn’t rely on interaction with device
- Left out for long period so smooths over temporal variability in activity
- Don’t need weathering-in period (c.f. weta hotels)
- Not readily “saturated” (c.f. weta hotels)

Pros and cons of frass method

- More processing and technical ability required (c.f. tracking tunnels)
- Sensitive to predator abundance
- Can monitor multiple species with one device (as well as seed and litter fall)
- Relationship with “true” abundance???

Ground weta – pitfall trap-nights



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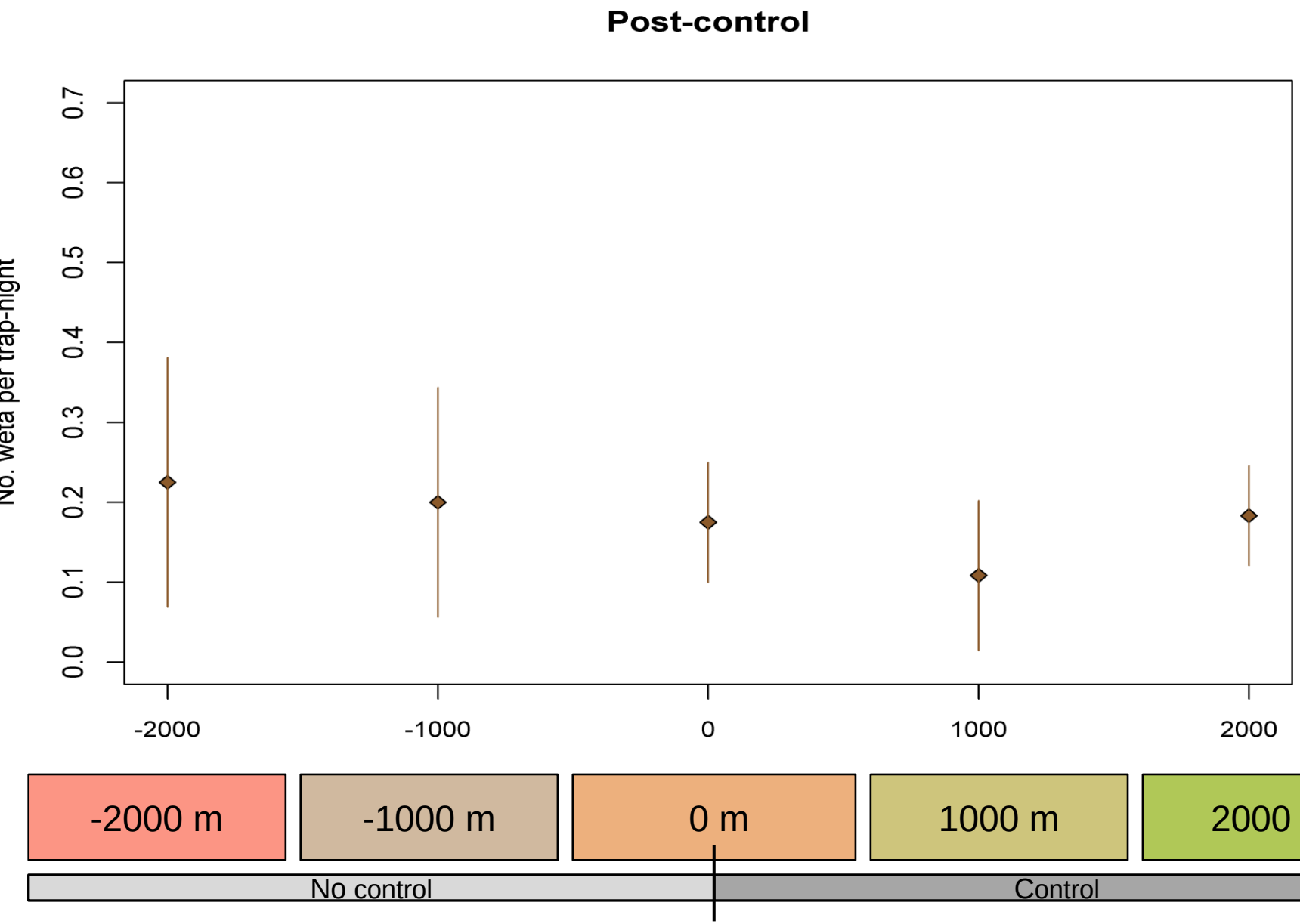

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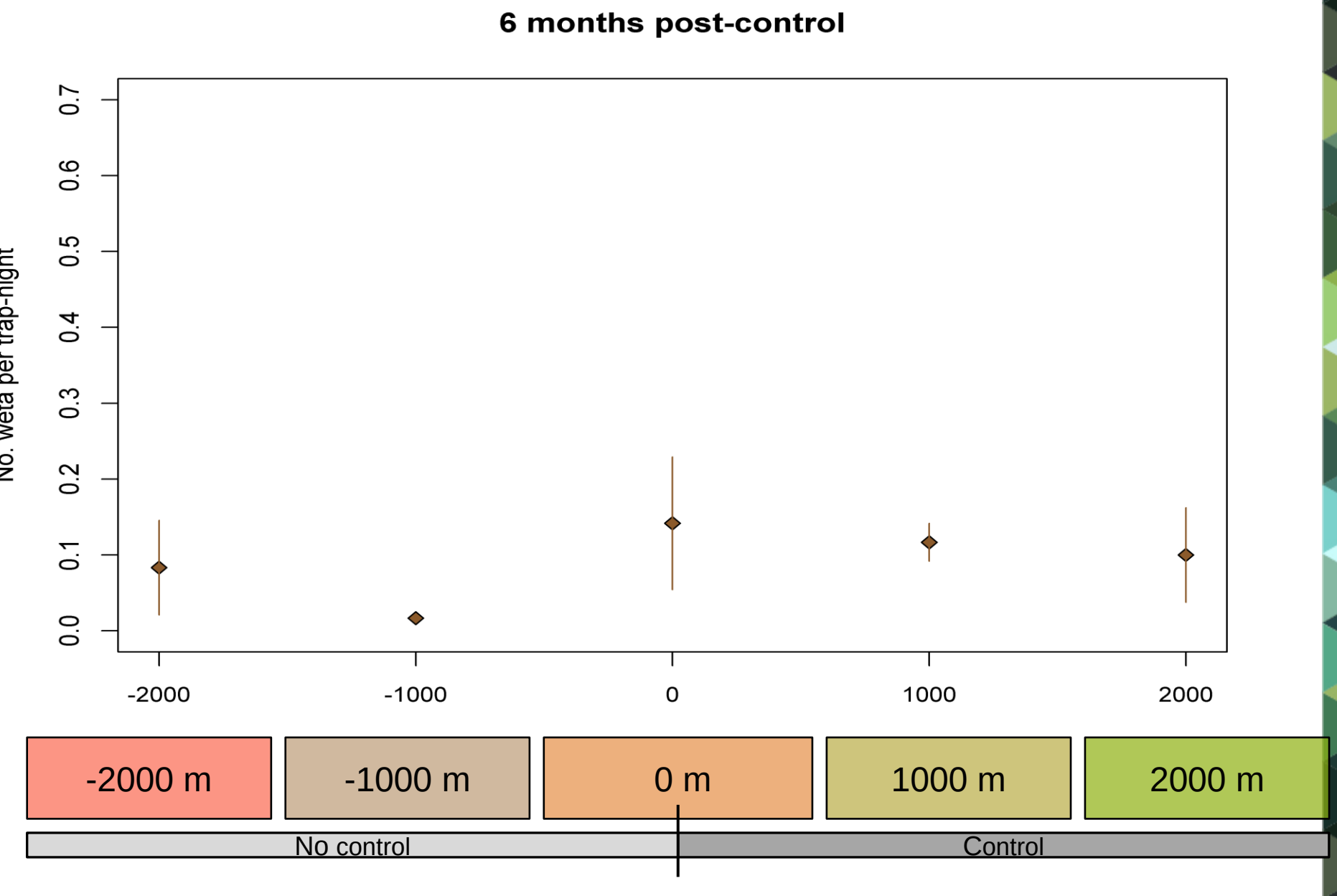

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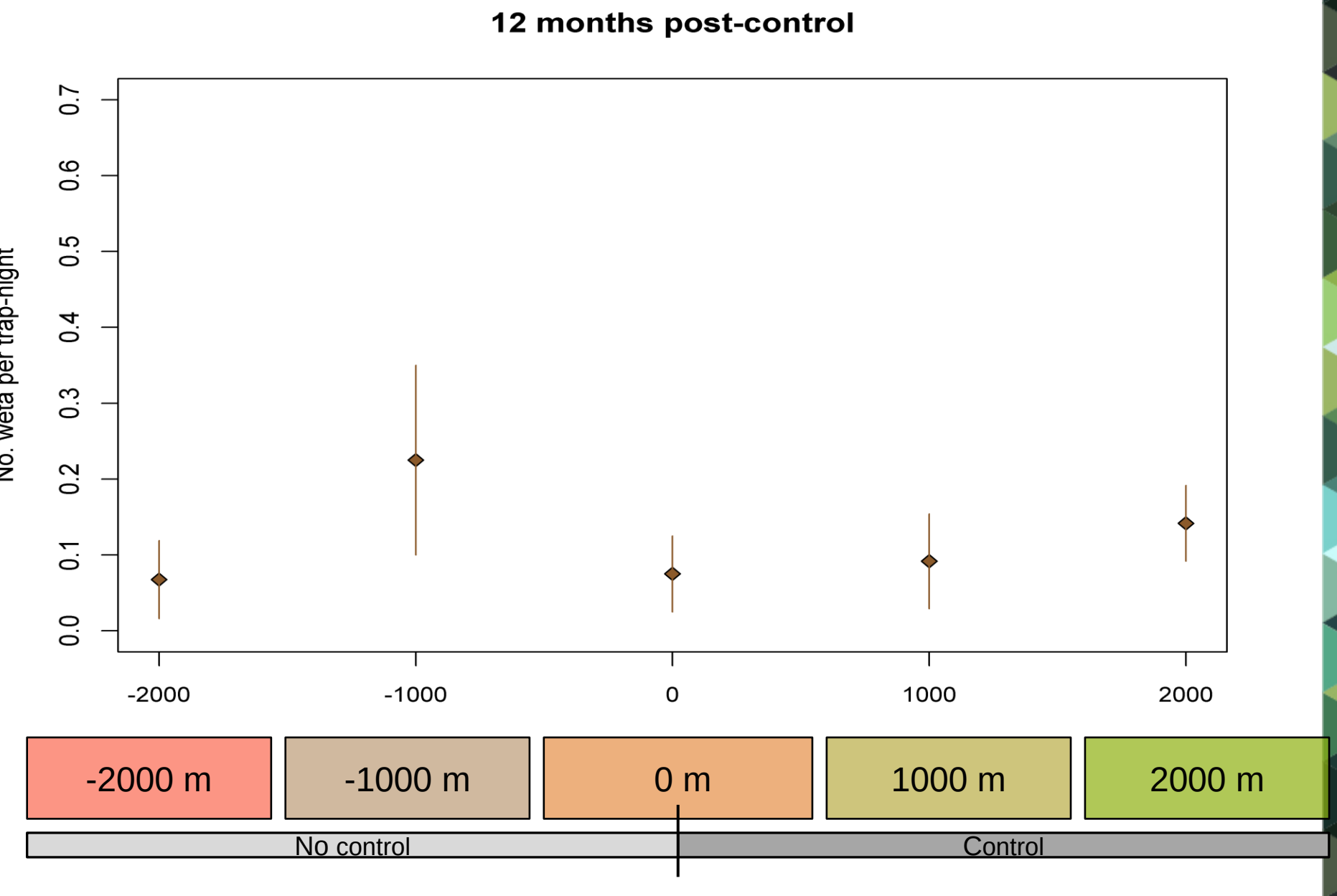

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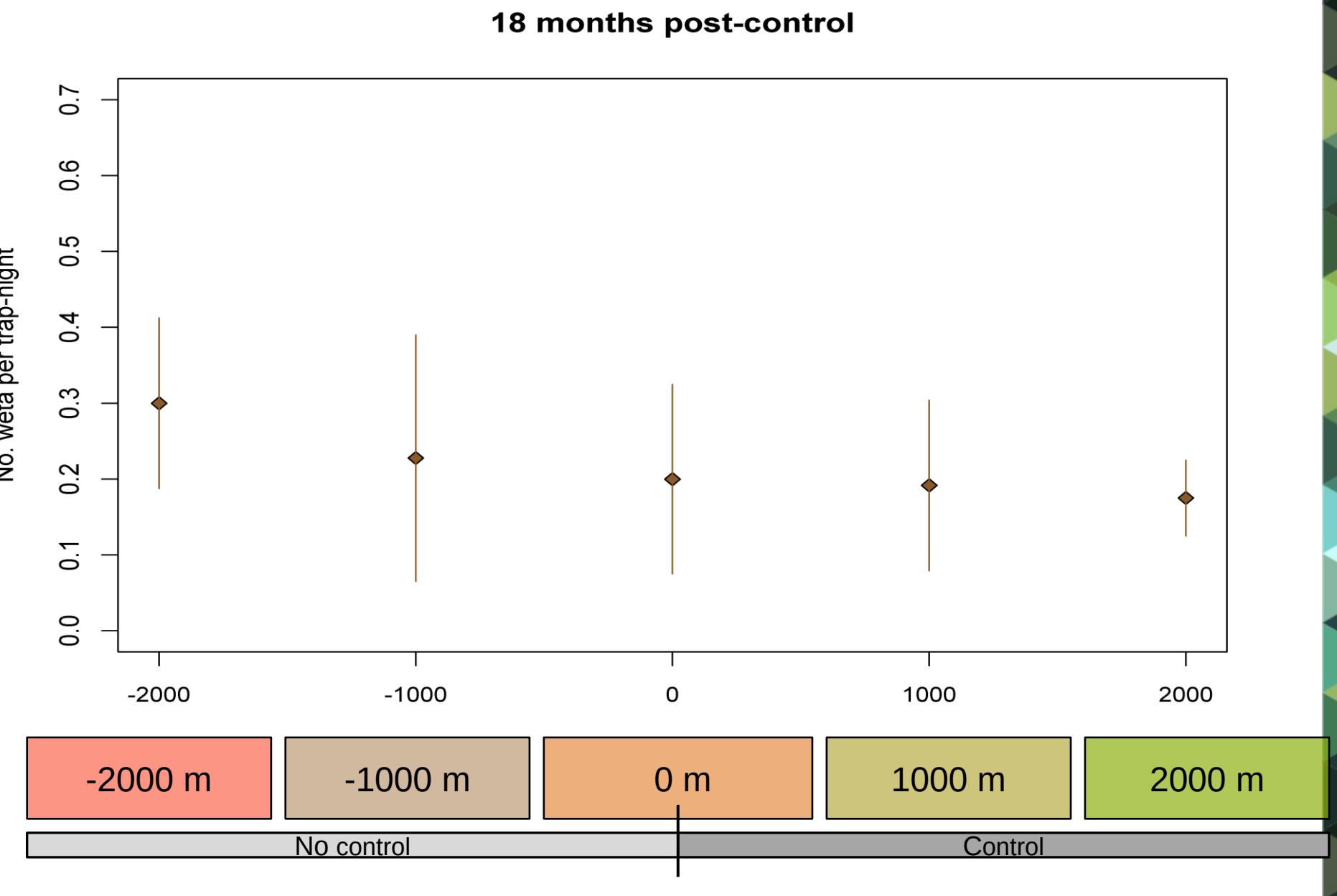
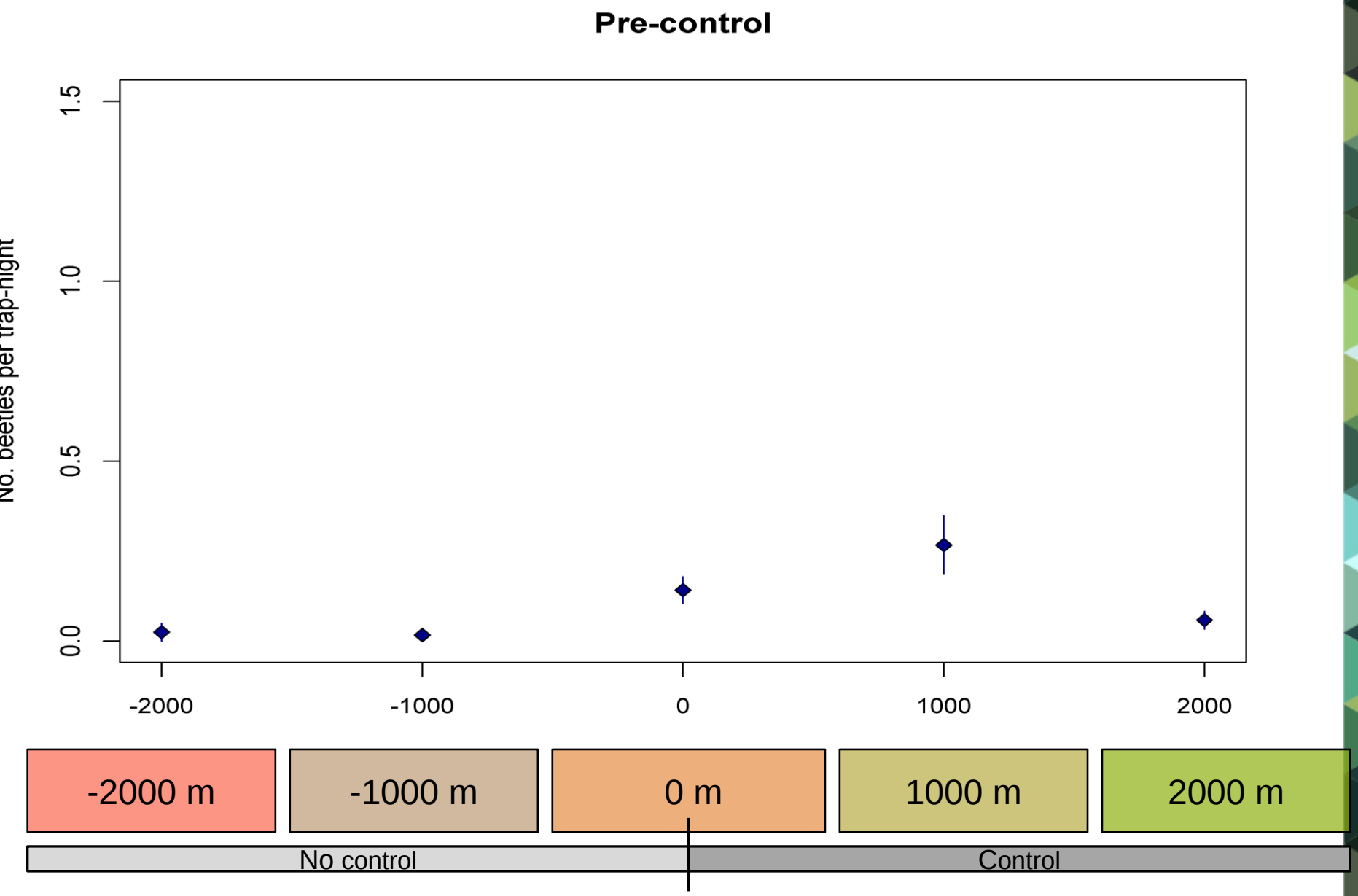


Beetles – pitfall trap-nights



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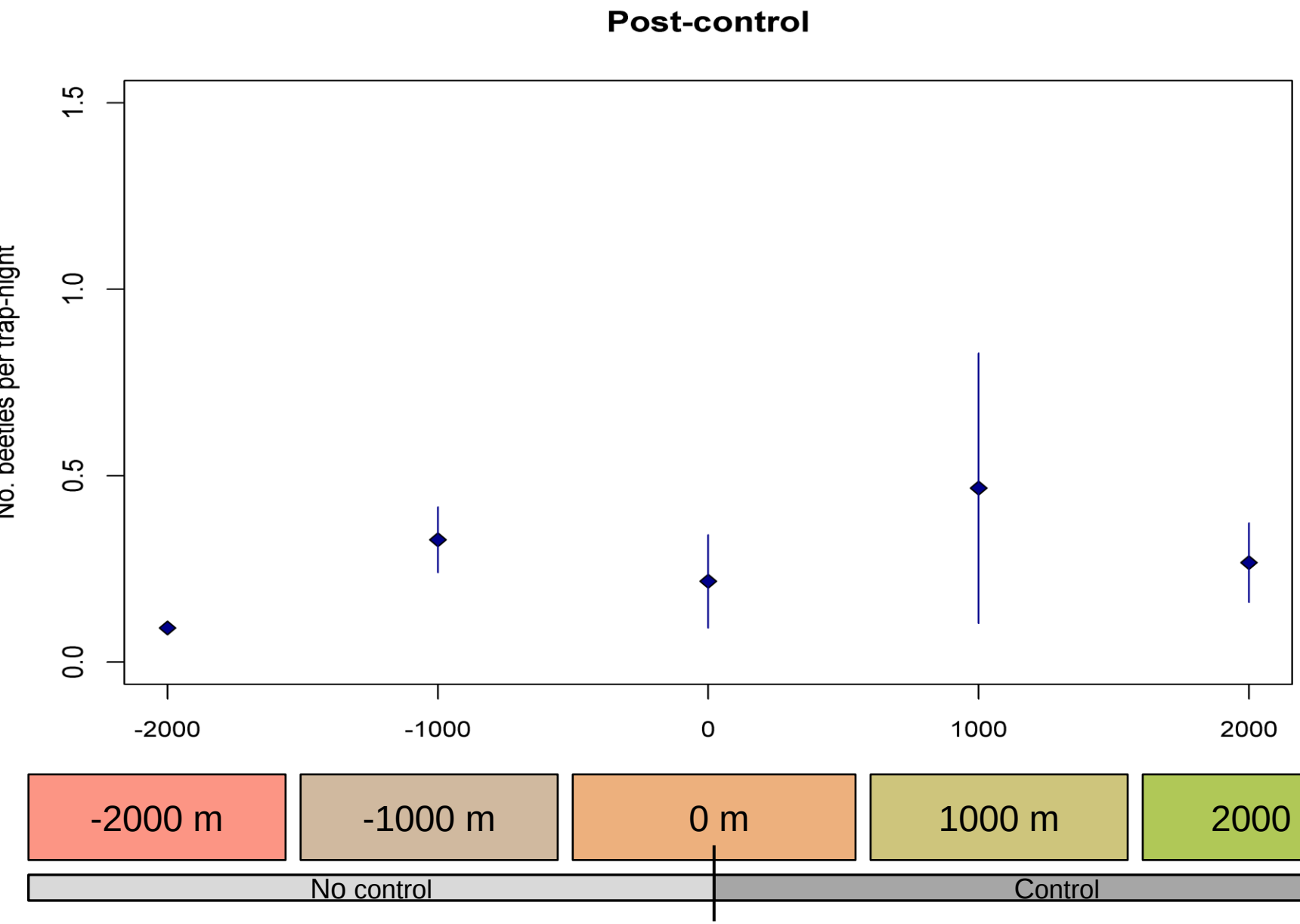

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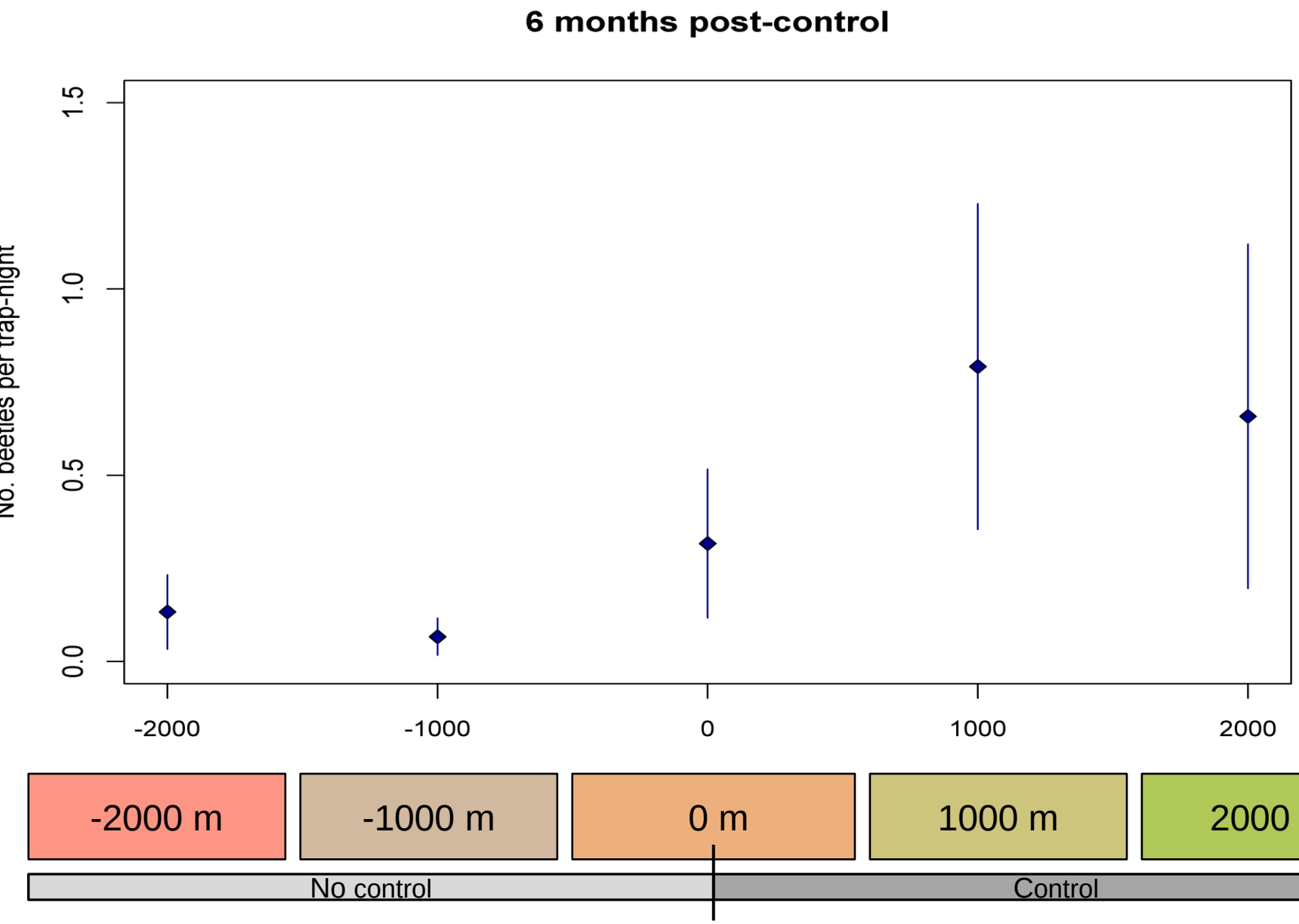

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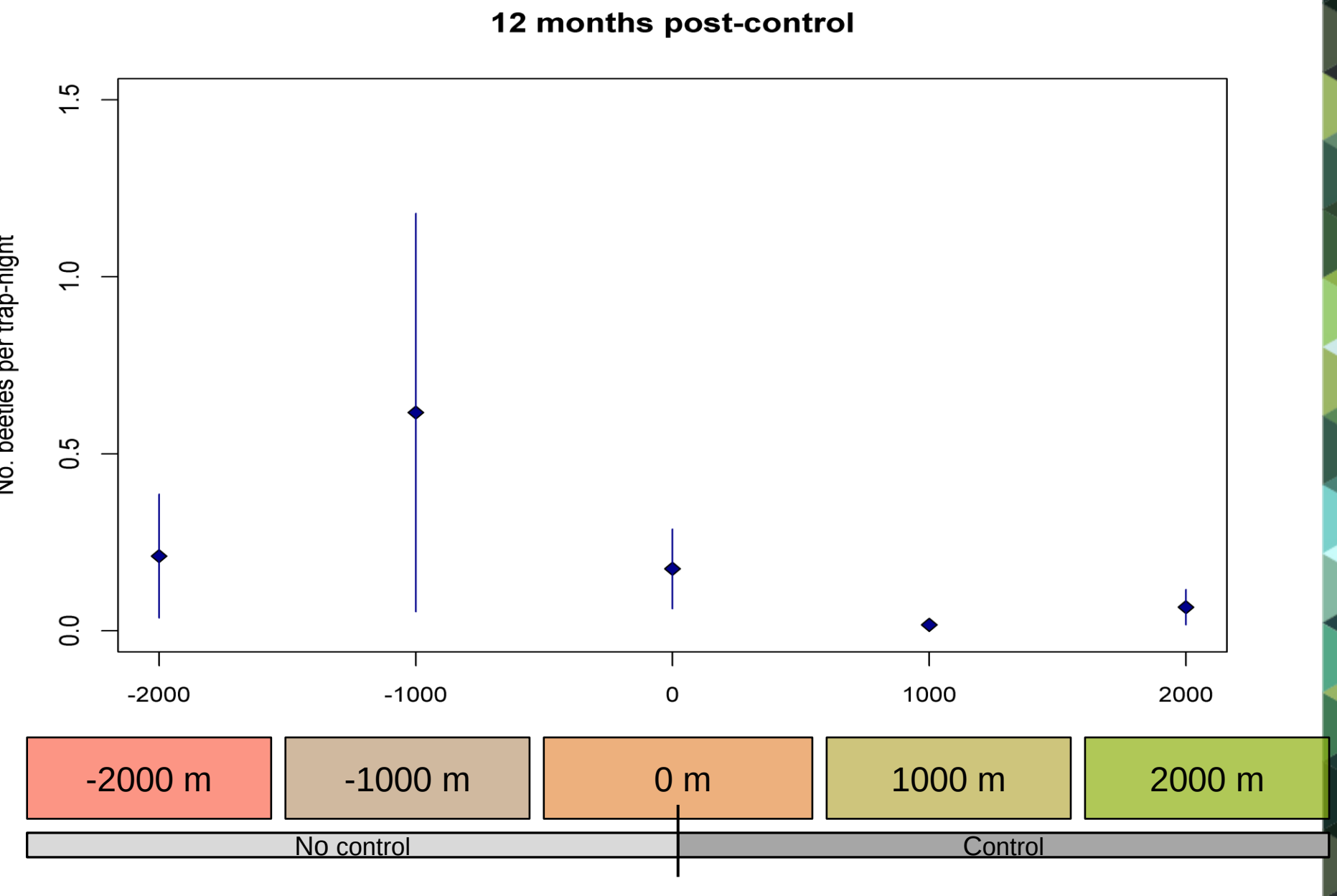
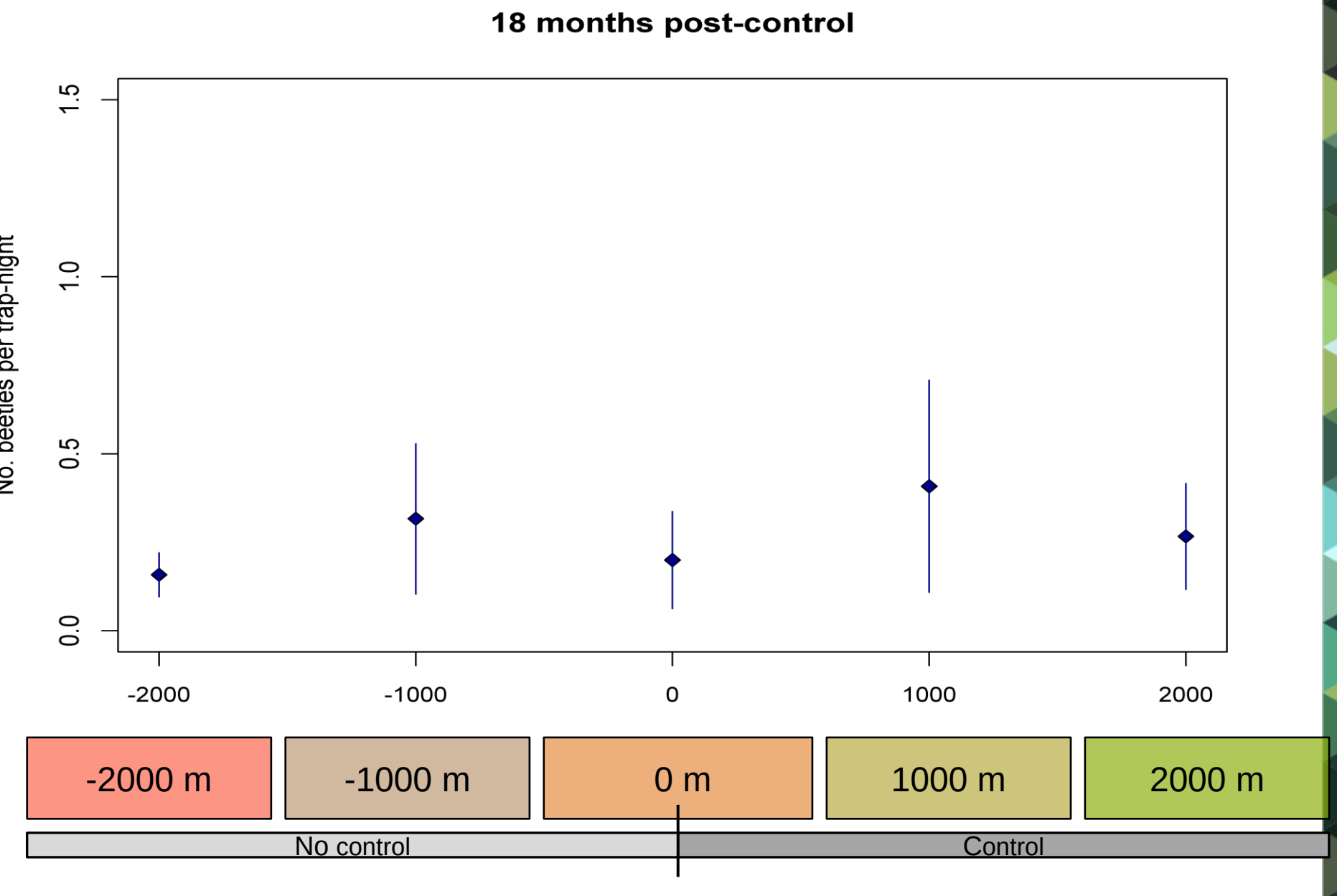
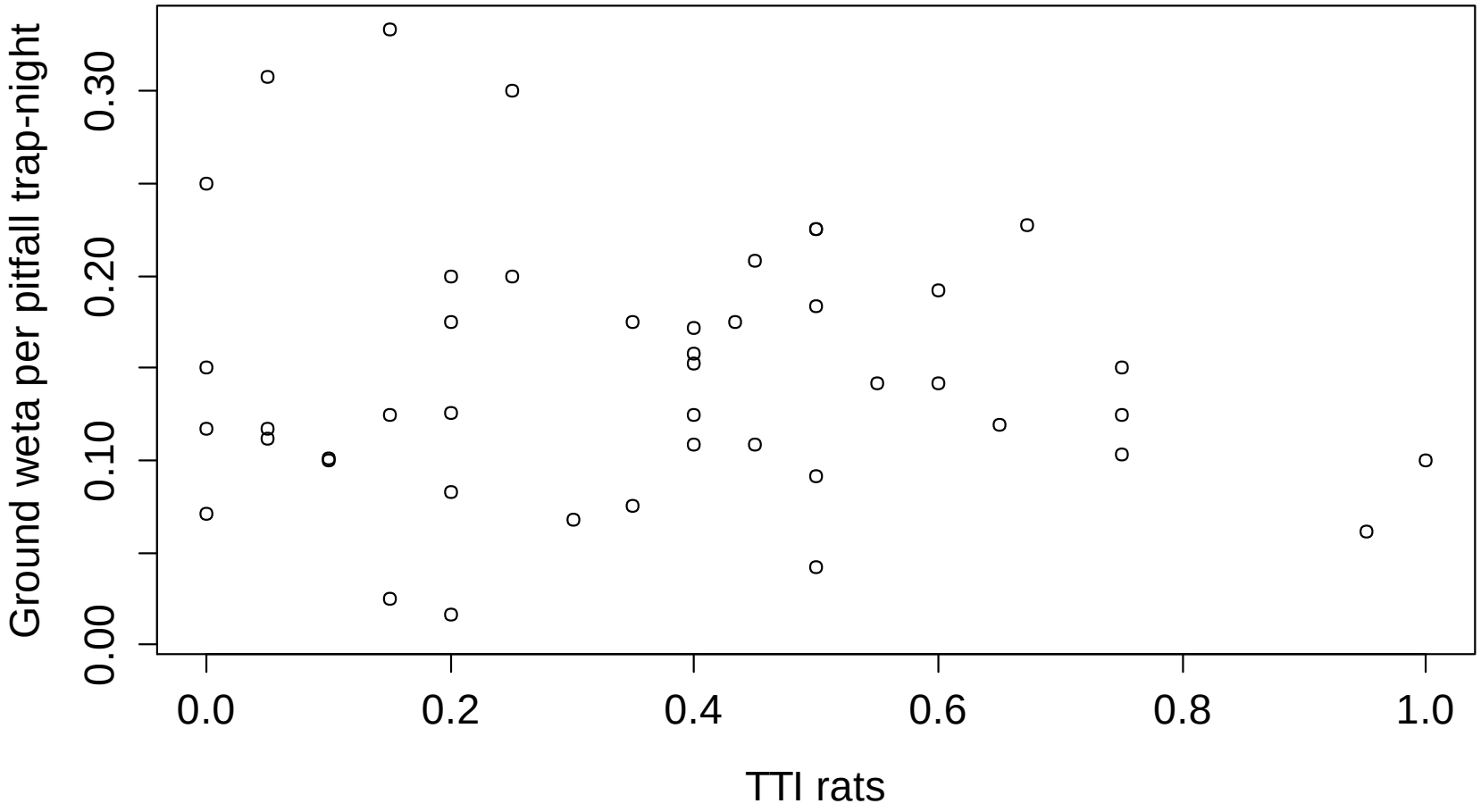


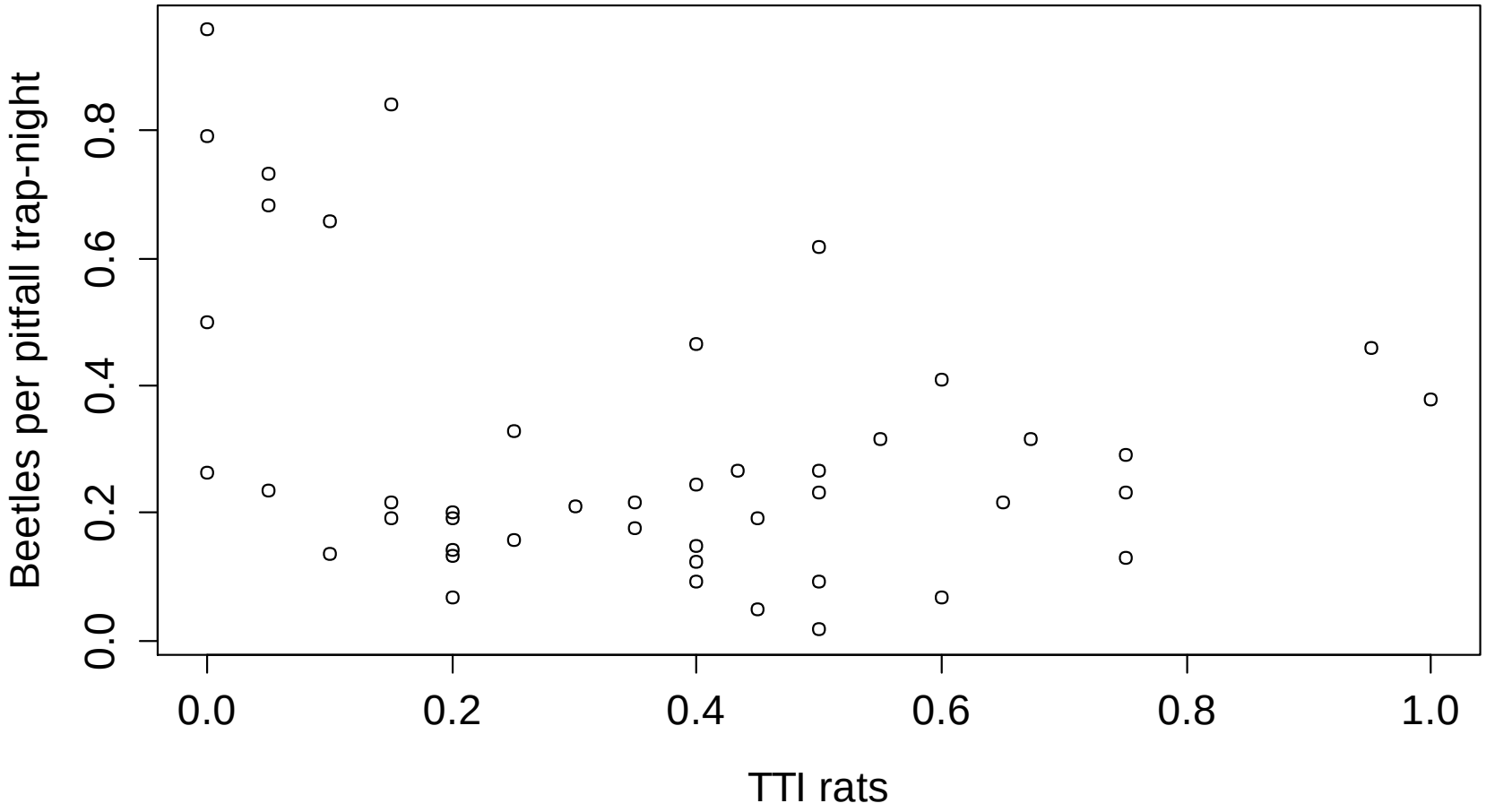
Beetles – pitfall trap-nights



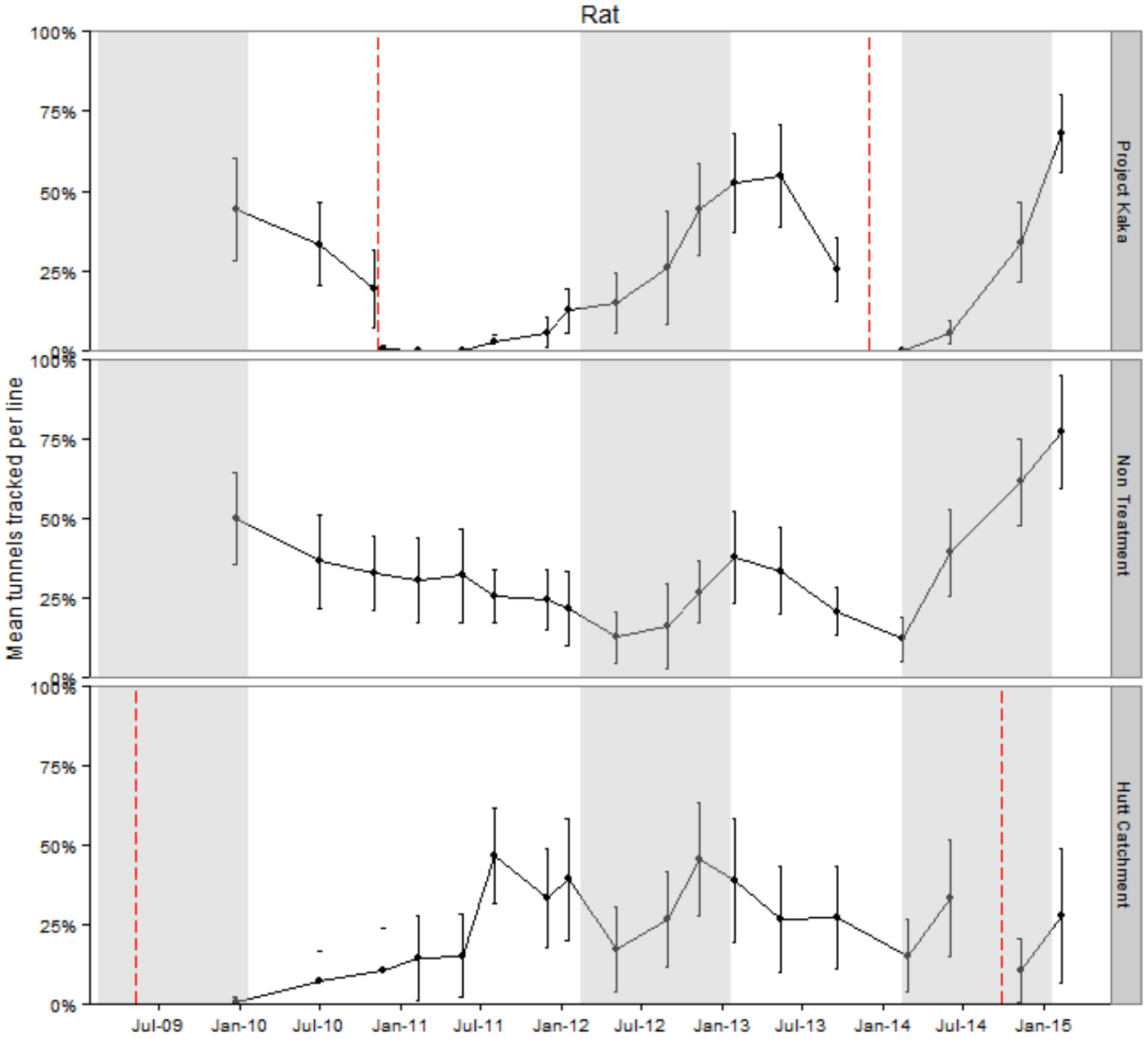
Ground weta vs rats



Beetles vs rats



Large-scale patterns

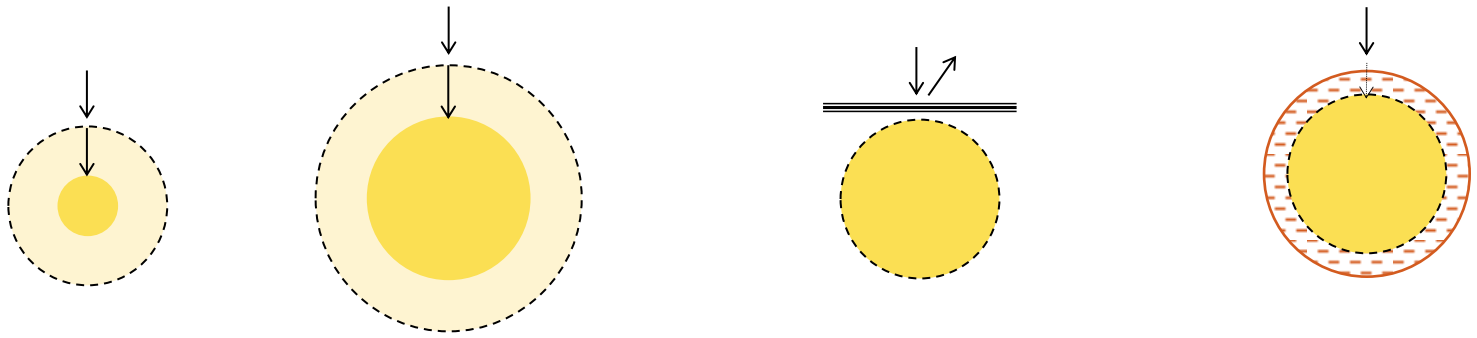


Conclusions

- Core effect for rat suppression and their impacts on biodiversity
- Rapid recovery of rat numbers augmented by reinvasion
- Not just proximity, accessibility (thoroughfares) and desirability (resources) also?

Implications

- To provide adequate window of relief (> 2 yrs) from rat predation requires:
  - Control of larger area (so more core area protected)
  - Prevention of re-invasion (topographical barriers, intensive buffer control)
- Conditional on high initial % kill in control zone
- Cost-effectiveness of different strategies?



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