



Validating The Metabolic Theory of Ecology : Does egg laying efficiency in Bean Beetles vary with temperature?



SCAN ME

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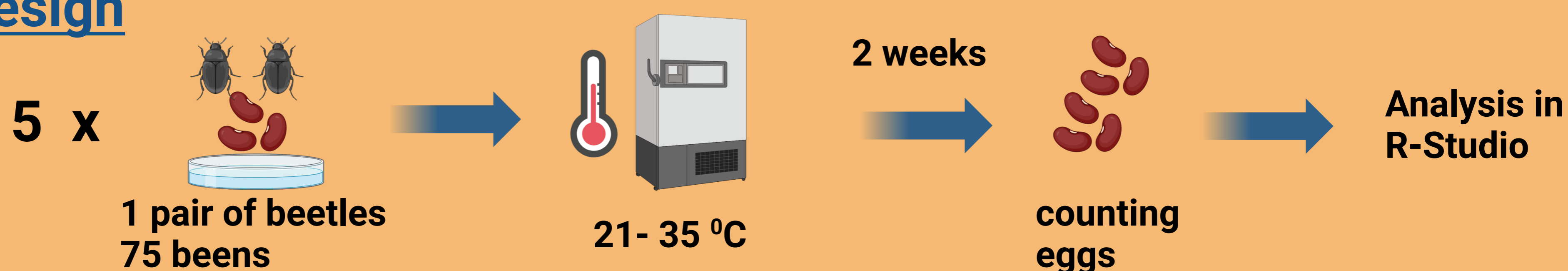
Introduction

Earth's temperature is increasing, affecting all living beings (1). The metabolic theory of ecology (MTE) states that the metabolic rate and nearly all other biological rates is predicted by body size and temperature (2). We wanted to test the metabolic theory of ecology to see if increased temperature influences the life cycle of bean beetles (*Callosobruchus maculatus*), if higher temperatures results in more eggs being laid.

Hypothesis

Egg laying efficiency will increase in higher temperatures.

Study Design



Results

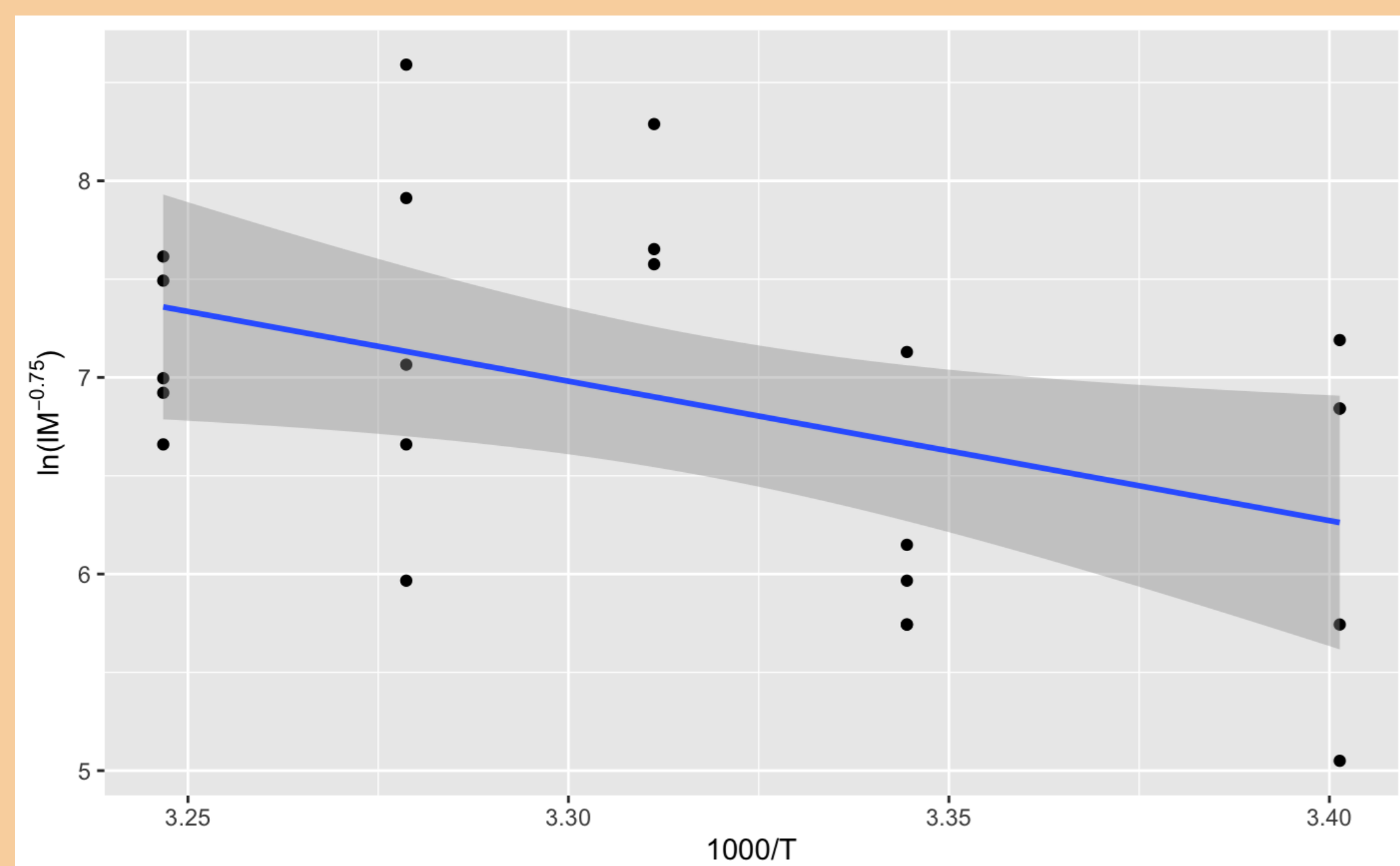


Figure 1: shows the mass corrected rate; number of eggs laid per beetle pair, at different temperatures.

P-value < 0,01

Calculated activation energy = 0,6286 eV

Discussion

- A statistically significant P-value **confirms our hypothesis**
- The **calculated activation energy** from our results are **consistent** with the MTE.
- The results imply that wild bean beetle populations could change their distribution range in response to a warmer climate. Being a pest insect in relation to agriculture, this could affect human food production in some areas (3)
- It would be interesting to try this experiment in higher temperatures to see where the threshold temperature lies.

References

1. Hovedfunn i første del i sjette hovedrapport - Miljødirektoratet. Miljødirektoratet/Norwegian Environment Agency <https://www.miljodirektoratet.no/ansvarsomrader/klimateknikk/fns-klimateknikk-ippcc/dette-sier-fns-klimateknikk/sjette-hovedrapport/hovedfunn-forste-del-sjette-hovedrapport/>.
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3. Beck, C. W. & Blumer, L. S. A Handbook on Bean Beetles, *Callosobruchus maculatus*. (2017).

CRedit authorship

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