Metabolic rate of male *Bactrocera dorsalis* (Hendel) (Diptera: Tephritidae) at a range of temperatures when fed protein and semiochemicals

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Bactrocera dorsalis has rapidly spread across Africa, and the sterile insect technique (SIT) may be a viable control method for this invasive species. Pre-release treatment of males with a protein-supplemented diet and semiochemicals such as methyl eugenol (ME) or eugenol (EU) can boost their reproductive development and mating performance.

We evaluated the effects of sterilisation, diet and semiochemical consumption on the resting metabolic rate (RMR) of male *B. dorsalis* at a range of temperatures.

Methods

- Flow-through respirometry was used to measure the RMR of 14-day-old male flies based on their CO_2 emissions.

- From emergence, males had continuous access to diets of sugar only or sugar and yeast hydrolysate (YH).

- RMR was recorded at 15, 20, 25, or 30˚C.

- The CO_2 emitted by each fly was divided by its body weight to calculate a mass-specific estimate of RMR ($CO_2(\mu l)/mass(g).h^{-1}$).
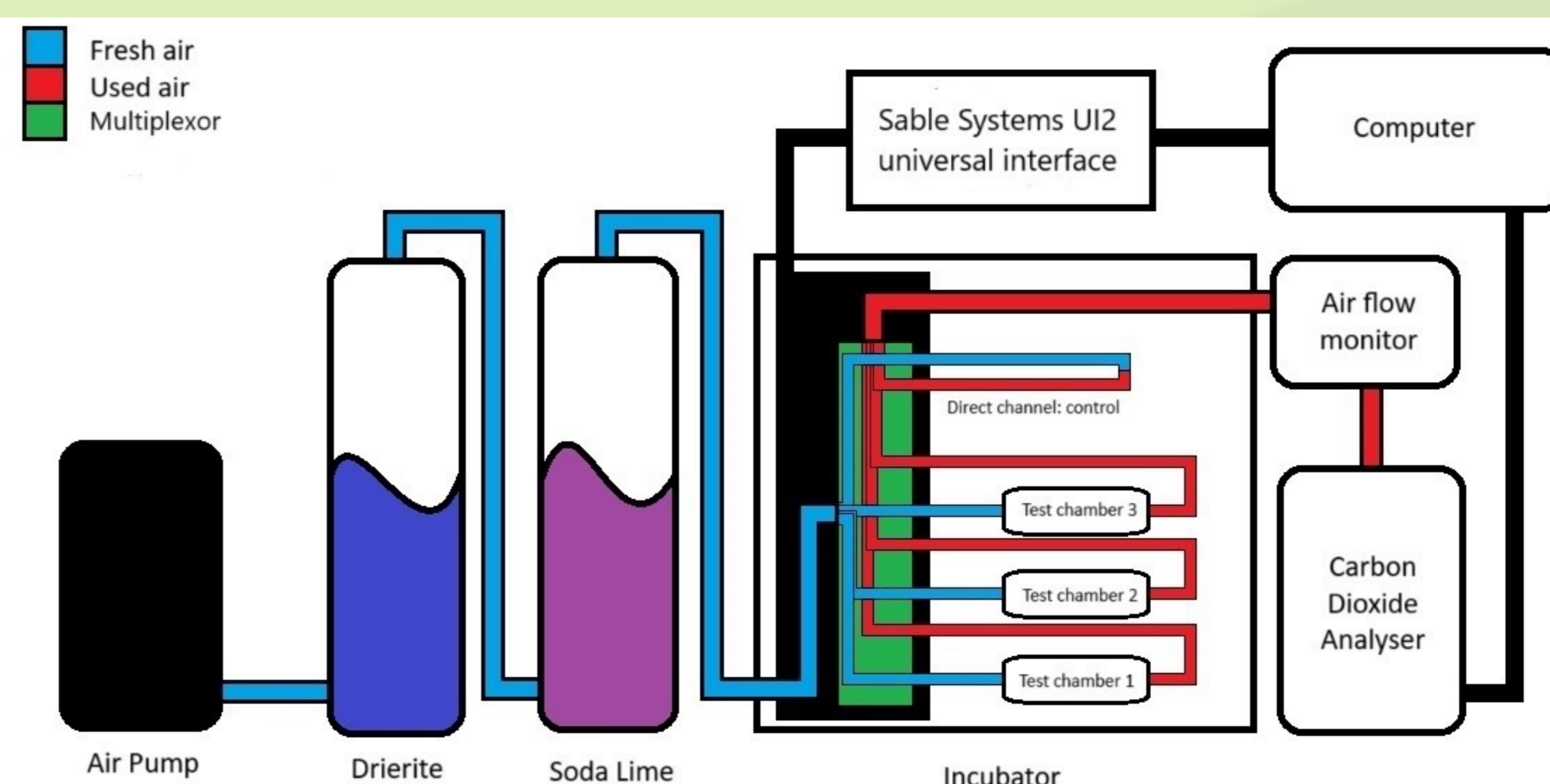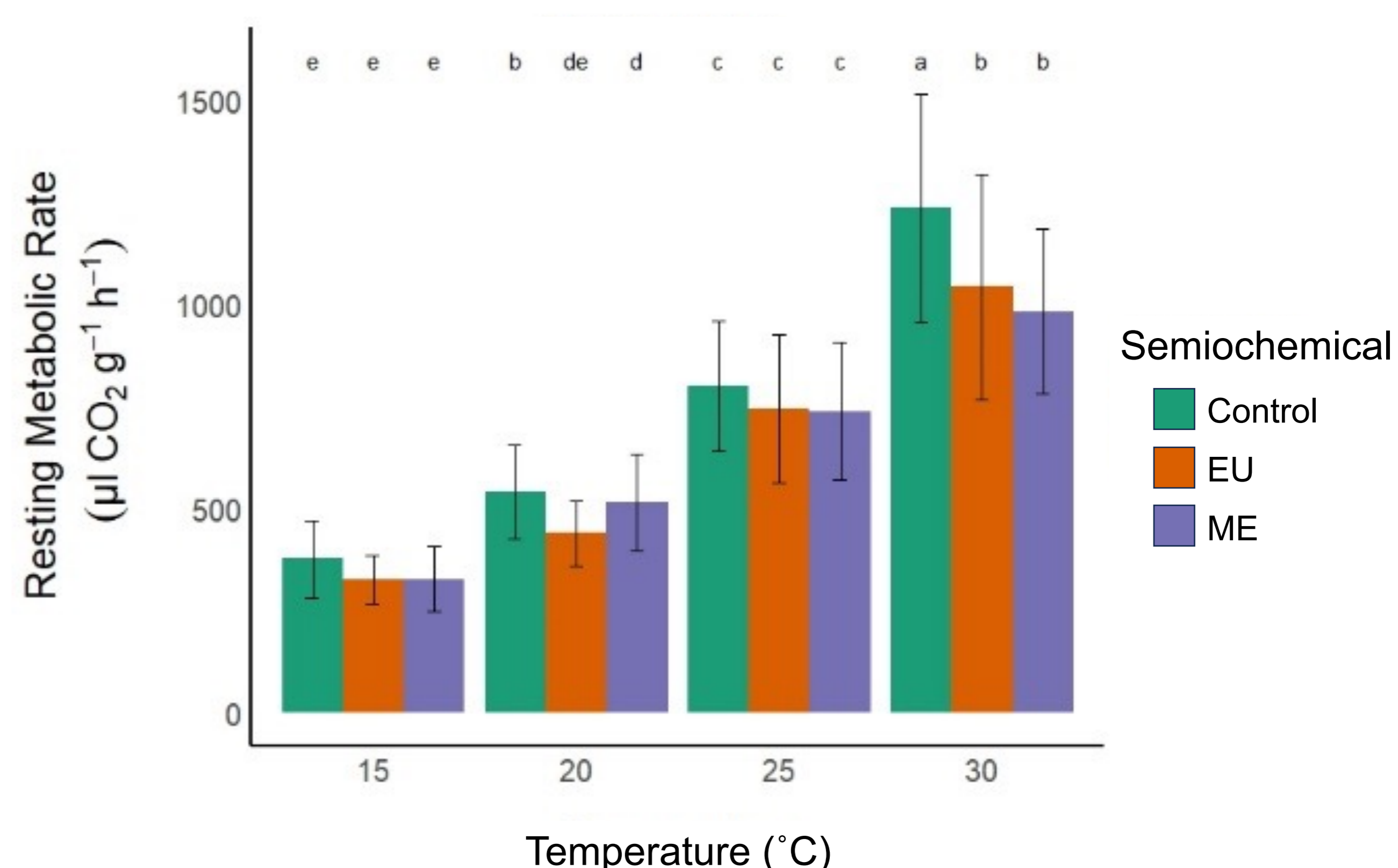

Results
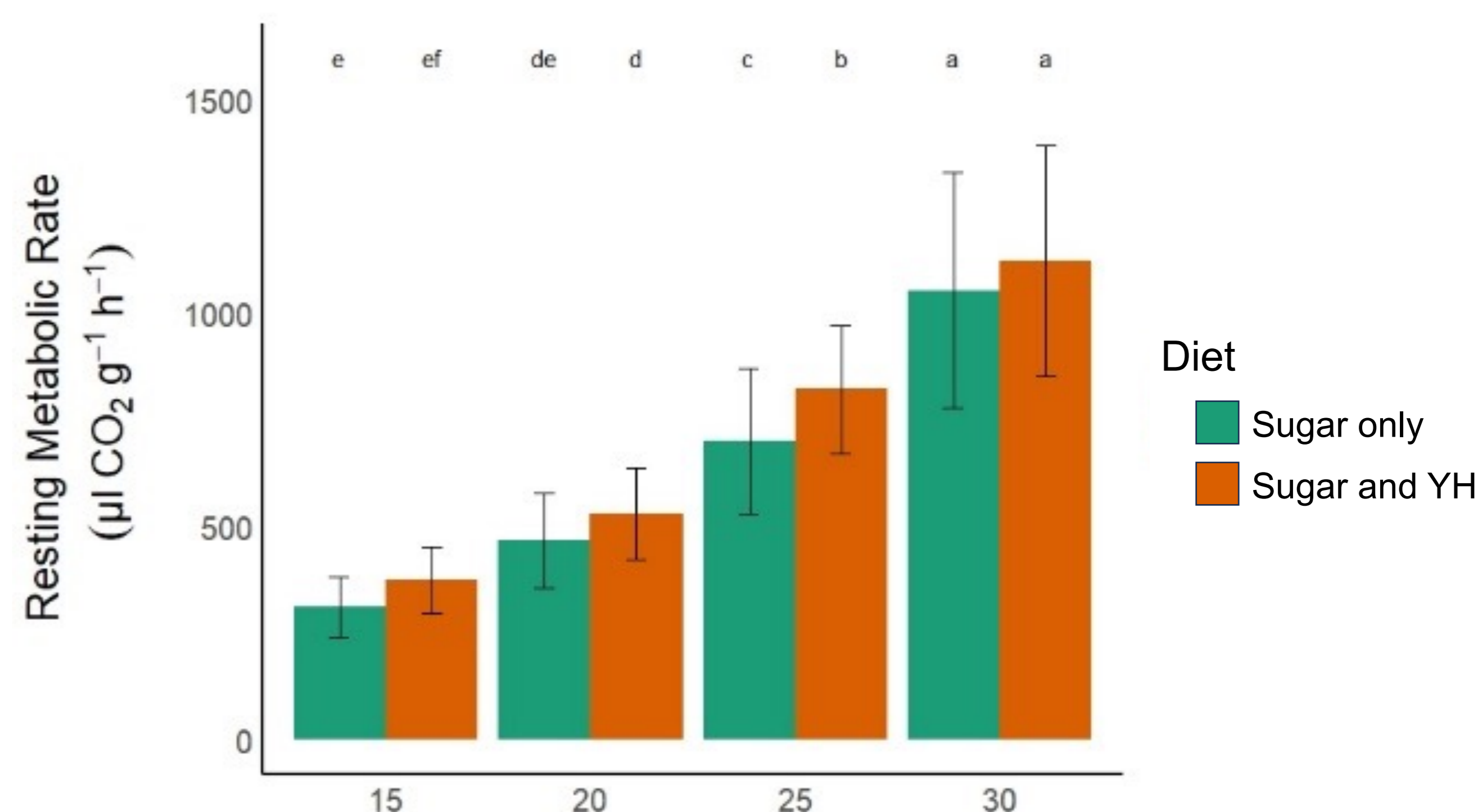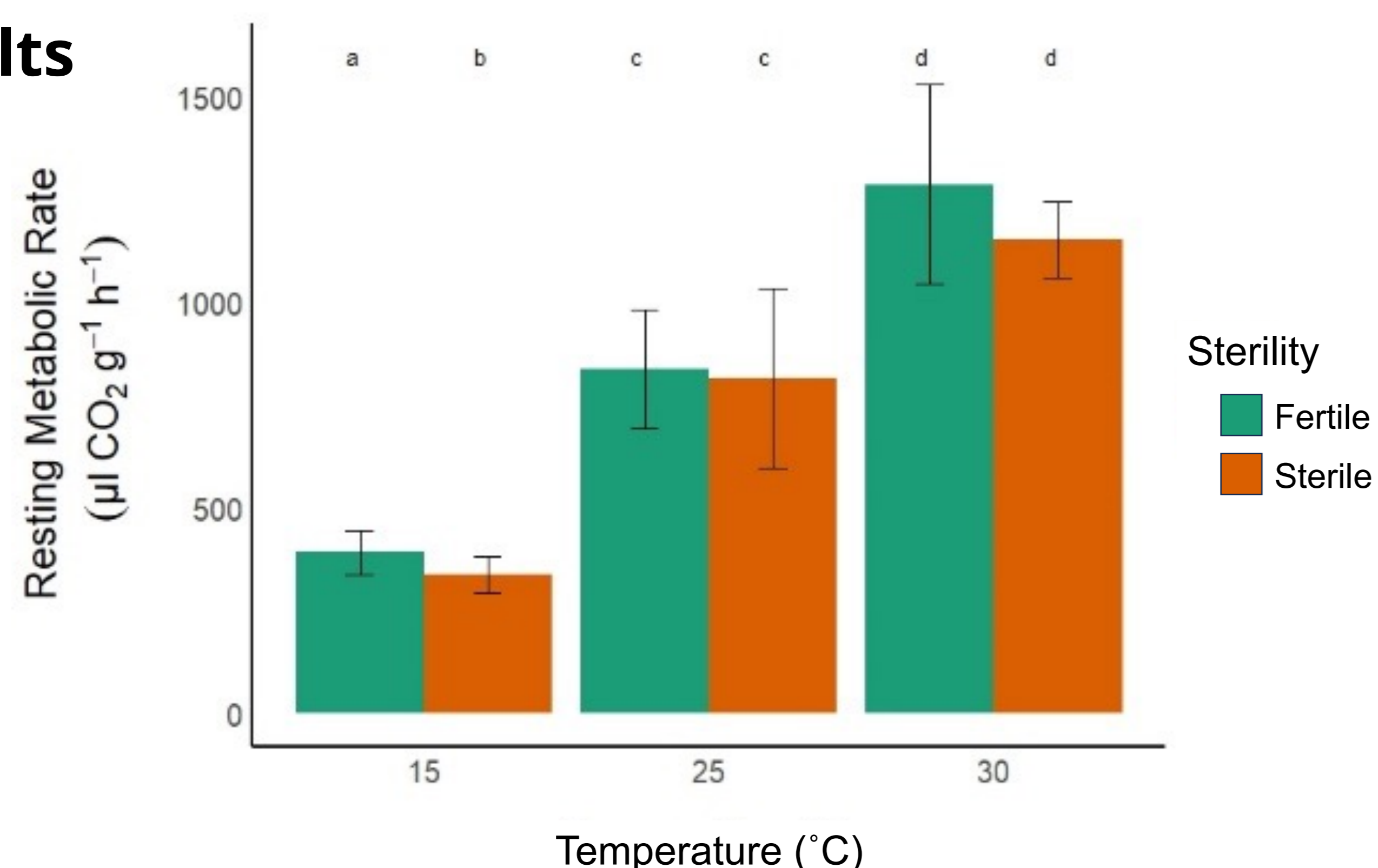
- RMR approximately doubled with a 10˚C increase in temperature.

- Main effect of sterility reduced RMR of male *B. dorsalis.*

- Fertile males fed only sugar had lower RMR than those fed sugar and YH.

- Fertile males exposed to semiochemicals had lower RMR than controls.

High RMR in fertile males fed sugar but not ME or EU

Take-home messages

Higher RMR in males fed YH might be linked to faster reproductive development.

Higher mating competitiveness and reduced lure response in semiochemical-fed males **might compensate for lower RMR**.

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