

AedesTraits: A global dataset of temperature–dependent trait responses in Aedes mosquitoes

Daniele Da Re¹, Veronica Andreo^{2,3}, Tomas San Miguel^{2,3}, Marharyta Blaha⁴, Roberto Rosà⁴,
Annapaola Rizzoli¹, Joe Harrison⁵, Sean Sorek⁵, Leah R. Johnson⁵, and Paul J. Huxley^{5,6}

¹Research and Innovation Centre, Fondazione Edmund Mach, S. Michele all’Adige, Italy; ²Gulich Institute. Argentinian Space Agency (CONAE) and National University of Córdoba, Falda del Cañete, Argentina; ³National Council of Scientific and Technological Research (CONICET), CABA, Argentina; ⁴Center Agriculture Food Environment, University of Trento, S. Michele all’Adige, Italy; ⁵Department of Statistics, Virginia Polytechnic Institute and State University, USA; ⁶Department of Infectious Disease Epidemiology, Imperial College London, UK

Background

Invasive Aedes mosquitoes such as *Ae. aegypti* and *Ae. albopictus* are **major vectors of arboviral diseases** including **dengue, Zika, and chikungunya**. Their **biology and disease transmission** potential are strongly **influenced by temperature**, making **thermal traits critical components of predictive models**. While **many temperature-dependent trait data exist**, they are scattered across studies, reported inconsistently, and **difficult to synthesise**. This problem is even more acute for emerging vector species like *Ae. japonicus* and *Ae. koreicus*, for which data remain extremely limited.

Objective

Starting from a literature review based on PRISMA guidelines, we developed **AedesTraits**, a standardised, open-access, and machine-readable dataset that compiles **temperature-dependent trait observations for four Aedes species**, following the **VectorByte/VecTraits** standards. The dataset includes:

- 127 digitised studies: *Ae. aegypti* (86), *Ae. albopictus* (59), *Ae. japonicus* (1), *Ae. koreicus* (1)
- Data from 1930 to 2024, mostly from 2000 onwards
- Georeferenced locations when available (with resolution tags)
- Data include fixed and fluctuating temperature experiments

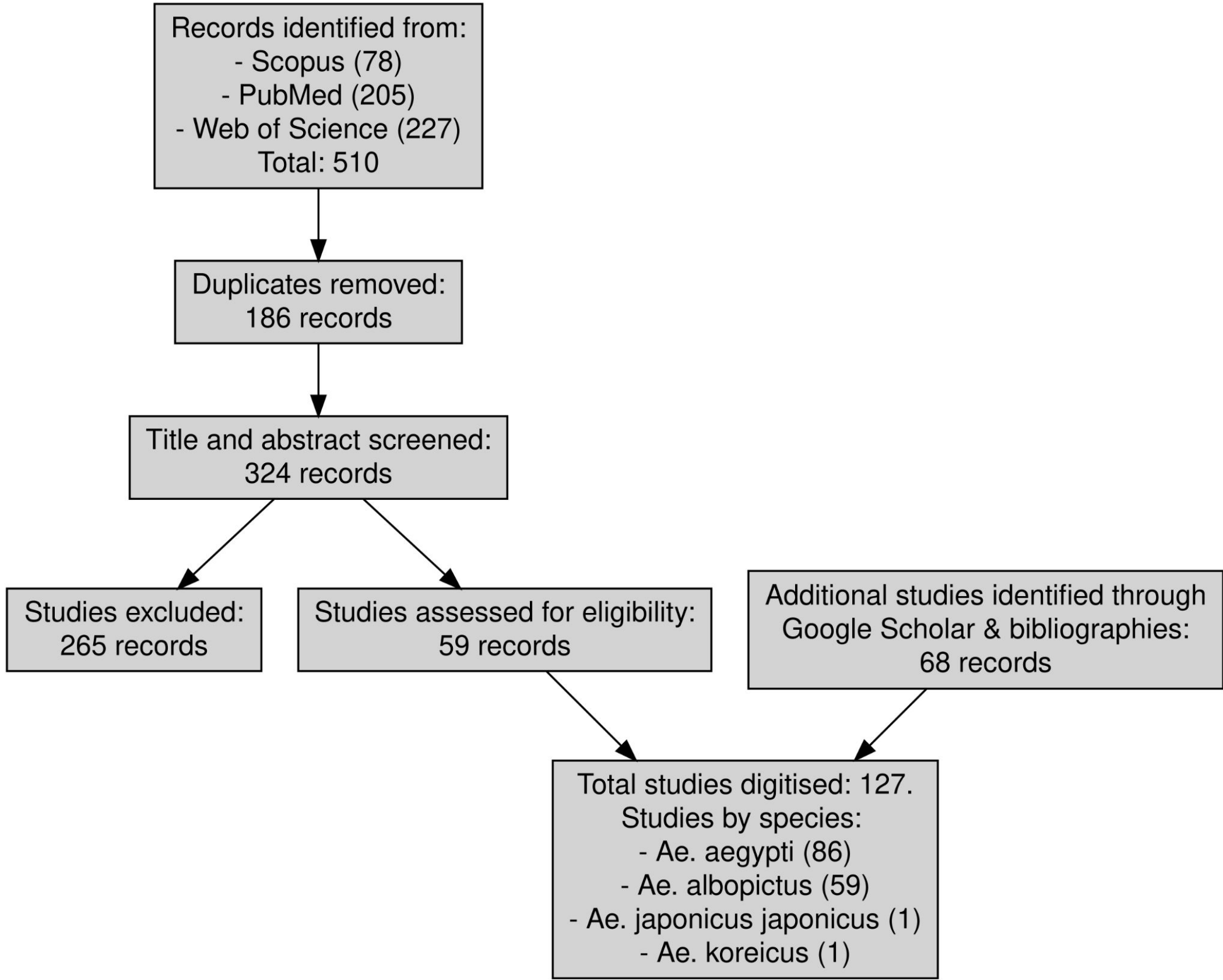


Figure 1. PRISMA flow diagram illustrating the selection process of studies included in AedesTraits following a search in Scopus, PubMed, and Web of Science. Some studies investigated more than one species.

AedesTraits is open-access and free to use!

Do you have data you'd like to contribute? Get in touch — we'll be happy to guide you through the process!

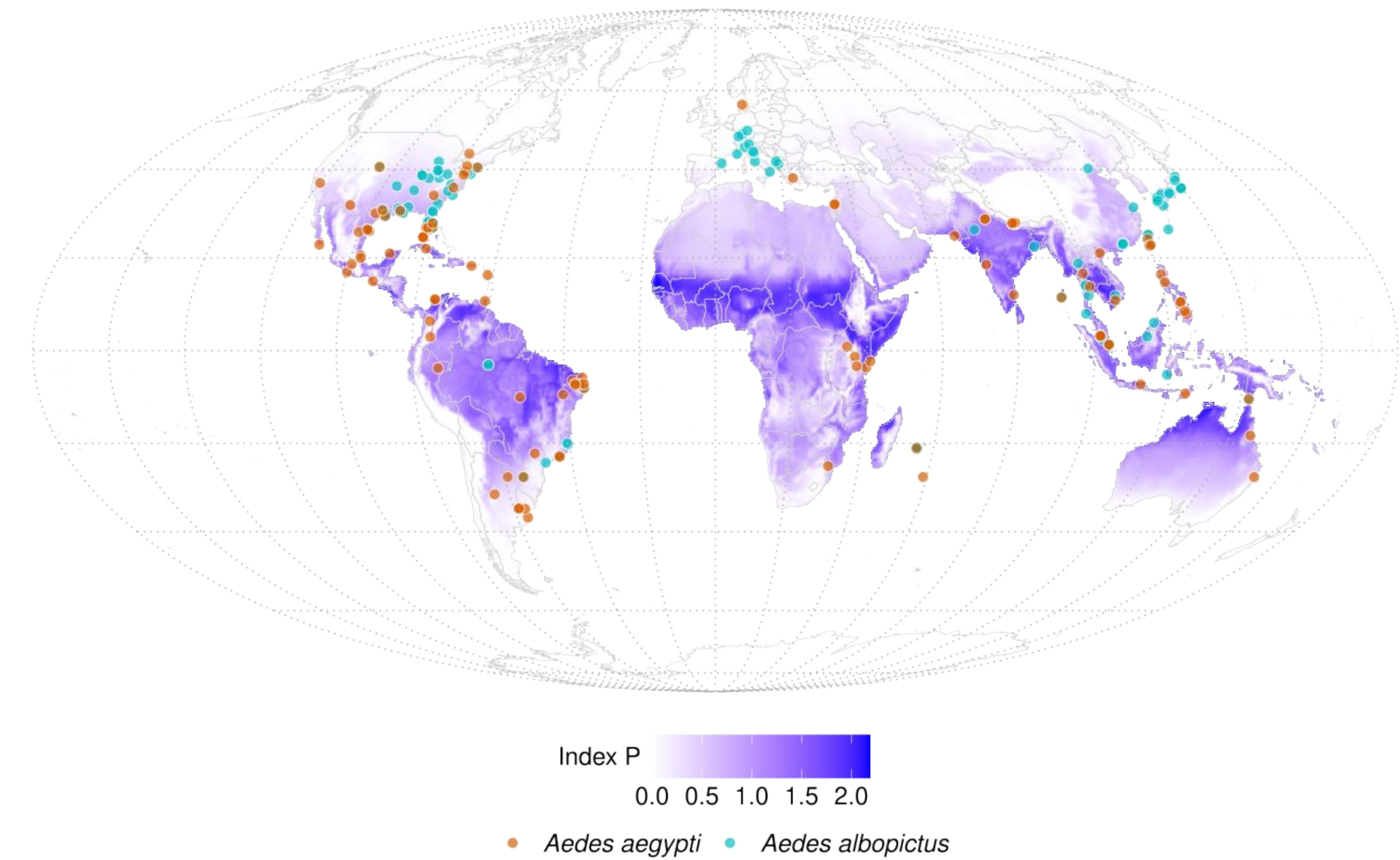


Figure 2. Locations of mosquito populations/experiments included in AedesTraits, overlaid on a dengue transmission suitability index, which reflects mechanistic suitability based on temperature and relative humidity.

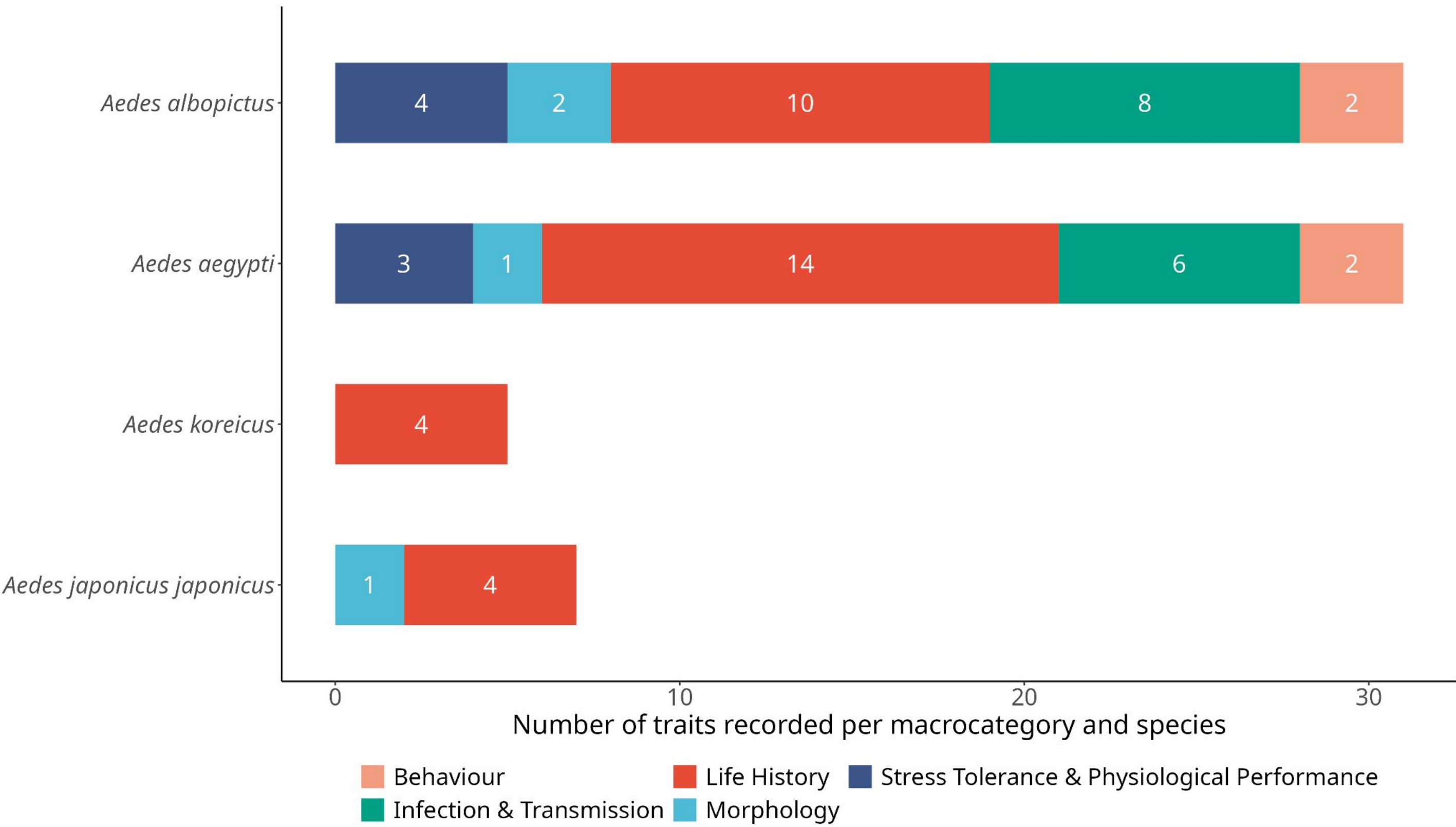


Figure 3. Number of distinct trait types reported per mosquito species across five functional categories. Bars indicate trait diversity, not the number of studies.

Key Insights

Most data in AedesTraits come from studies on *Ae. aegypti* and *Ae. albopictus*, with life history and infection traits being the most frequently recorded. In contrast, trait data for *Ae. japonicus* and *Ae. koreicus* are minimal. Studies are also geographically biased, with most experiments conducted in Europe and North America.

Technical Validation

Inter-operator variability was assessed by re-digitising 10% of the figures, yielding a mean coefficient of variation of 0.1.

Usage Notes

- Not suited for fine-scale spatial analysis due to geolocation uncertainty.
- Trait definitions vary — users should **inspect metadata** before combining.
- Use caution with lab strains and cross-study comparisons.

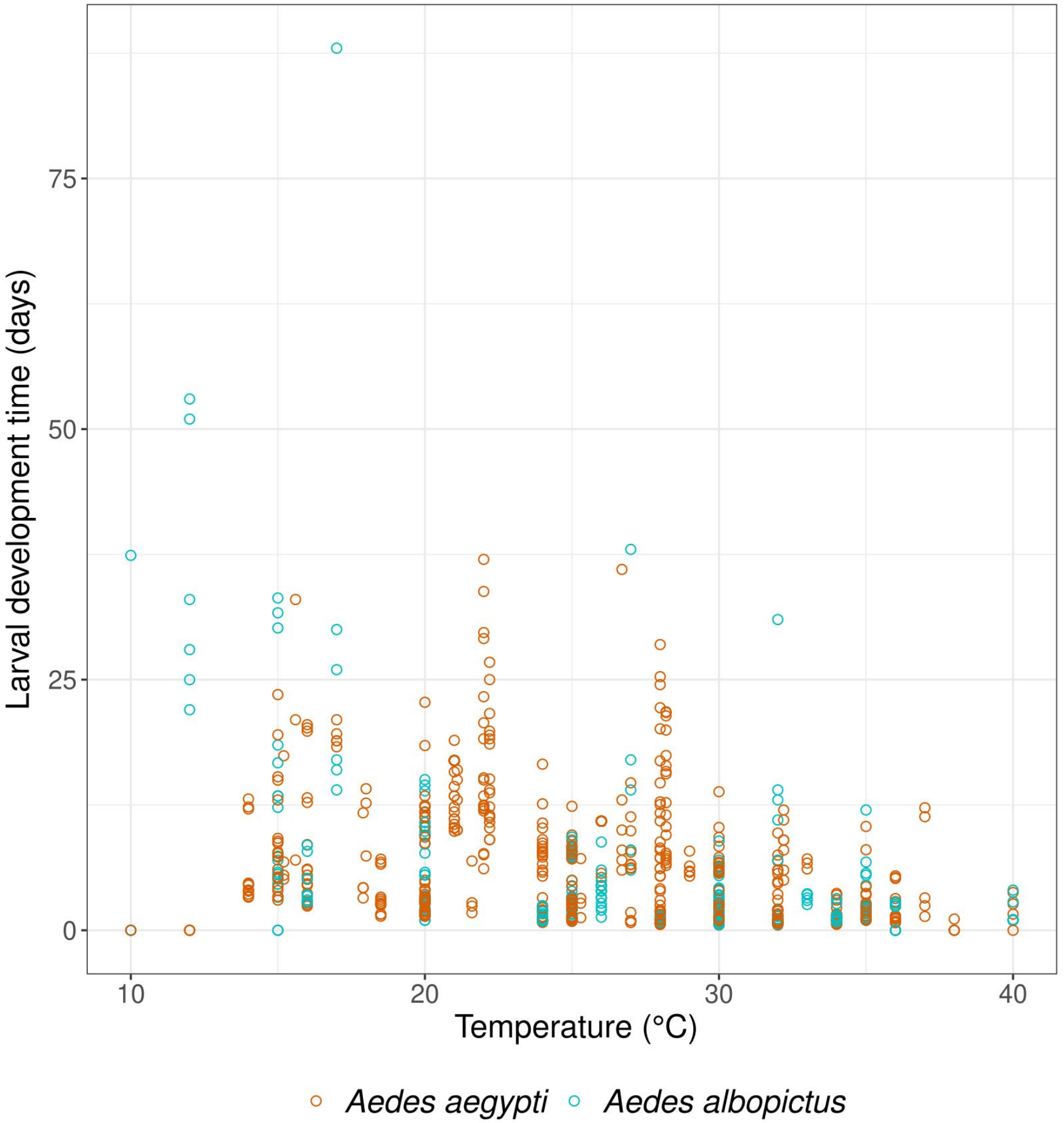


Figure 4. Larval development time for *Ae. aegypti* and *Ae. albopictus* (orange and light blue dots, respectively).



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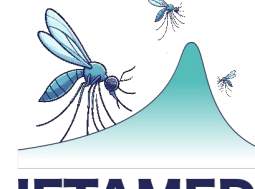


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