

Wild foci of the Chagas disease vectors *Triatoma infestans* and *Mepraia spinolai* in Chile, a country that has declared the interruption of *Trypanosoma cruzi* vectorial transmission.

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Introduction

- Chagas disease: neglected chronic illness caused by *Trypanosoma cruzi*.
- Six million people infected, 10,000 die annually.
- Transmission: vectorial (Fig. 1) → hematophagous insects Subfamily Triatominae (Hemiptera: Reduviidae), primarily distributed in the Americas.
- Some triatomines adapted to living inside human dwellings → higher contact rate → infection risk.
- Triatoma infestans*: species highly adapted to live inside houses, in Peru, Bolivia, Brazil, Paraguay, Uruguay, Argentina and Chile.
- In Chile, *T. infestans* domestic colonies eliminated, but adults continue to invade houses.
- Interruption of intra-domiciliary transmission based on governmental residual insecticide spraying of the house for 3 years after report.
- Mepraia* triatomines mainly sylvatic but frequently found in peridomestic areas; can invade houses.

Figure 1. Diagram of *Trypanosoma cruzi* transmission. A] A naive triatomine feeds on an infected host. B] The parasite develops in the triatomine digestive tract. C] The triatomine feeds on a new mammal host, releasing the infective dejections; the parasite enters through mucous membranes or broken skin; or it is consumed with contaminated food or drinks. D] In humans, besides the vectorial transmission, the parasite can be transmitted vertically, through blood transfusions, and organ transplants.

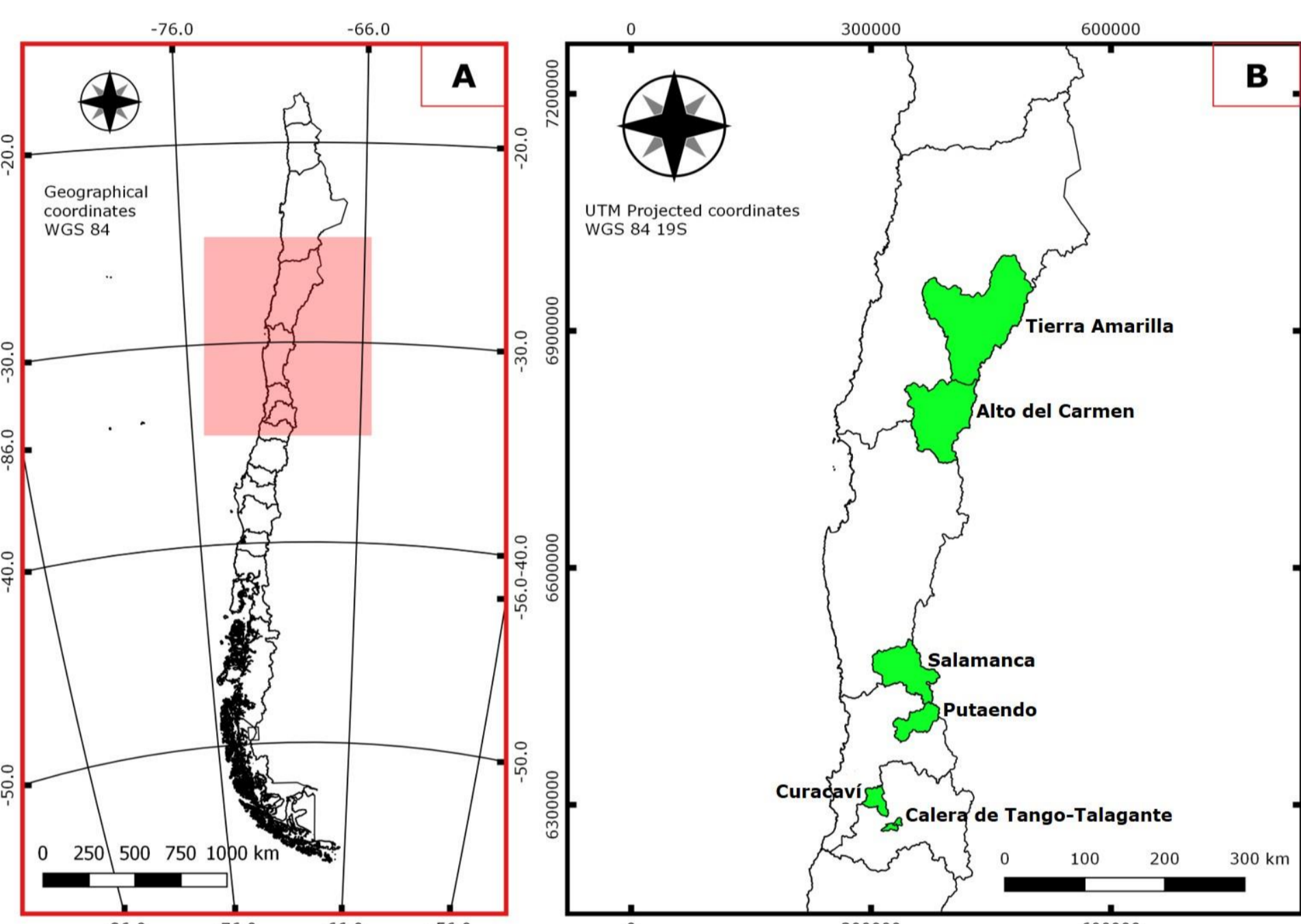
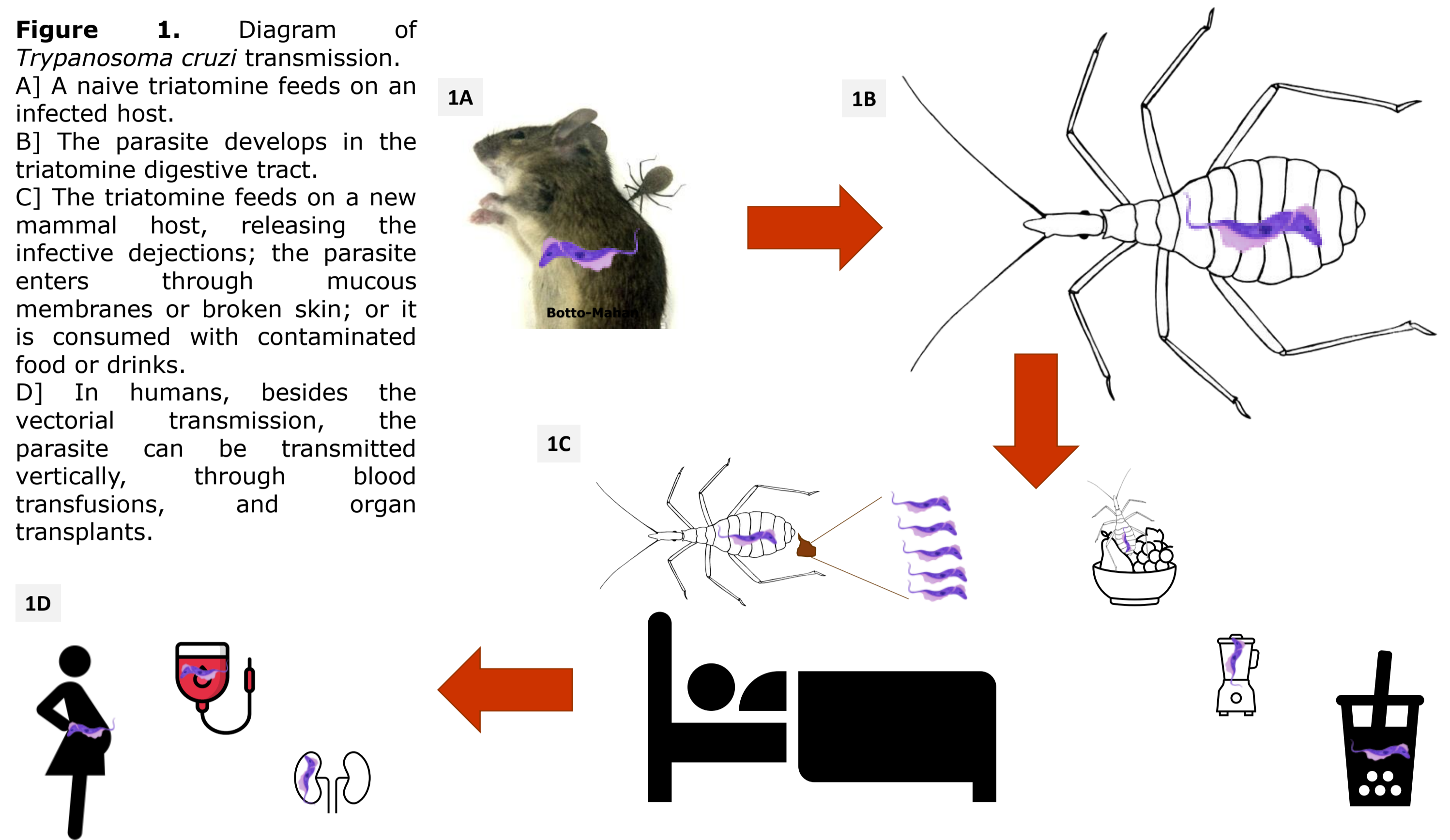


Figure 2. A] Map of Chile, highlighting the area of study in red. B] Six administrative areas of Chile that were included in the study, in the Atacama, Coquimbo, Valparaíso and Metropolitana Regions. C] Flask with trapped male adult of *Triatoma infestans*.



Objectives

Due to repeated findings of *T. infestans* in Chilean dwellings, our goal was to detect sylvatic foci of this species in six endemic areas, to compare them with the specimens found inside houses.

Methods

- ~60 georeferenced yeast-baited traps per night during 5 nights
- Six sylvatic sites spanning a ~600 km latitudinal range that included arid, semiarid and Mediterranean climate (Fig. 2A,B)
- Southern hemisphere summer of 2020-2021
- Triatomines collected, classified, and placed in labelled flasks (Fig. 2C), protected from extreme environmental conditions.

Results

- We captured 260 *T. infestans* and over 4,000 individuals of the non-target species, *M. spinolai* (Fig. 3).
- Altitude of *T. infestans* trapping points: 370-1476 m.a.s.l (738.2±189.1).
- Only one male adult *T. infestans* captured manually at night (Fig. 2C).
- Nymphal instars I-II were most frequently found (Fig. 4).
- The highest *T. infestans* abundance in the southernmost study site (n=132; Fig. 4); only triatomine species recorded there.
- Mepraia spinolai* widespread in several of the studied sites.
- Both species in terrestrial bromeliads (Fig. 5D, 5E) and rock piles (Fig. 5B, 5C); *M. spinolai* in rocky outcrops.
- T. infestans* among rubble (Fig. 5F) and vines' wood piles (Fig. 5A).

Figure 3. Traps with triatomines. A] Fifth nymphal instar of *Triatoma infestans*. B] Different nymphal instars of *T. infestans*. C] Different nymphal instars of *Mepraia spinolai*. D] Adult stages of *M. spinolai*.

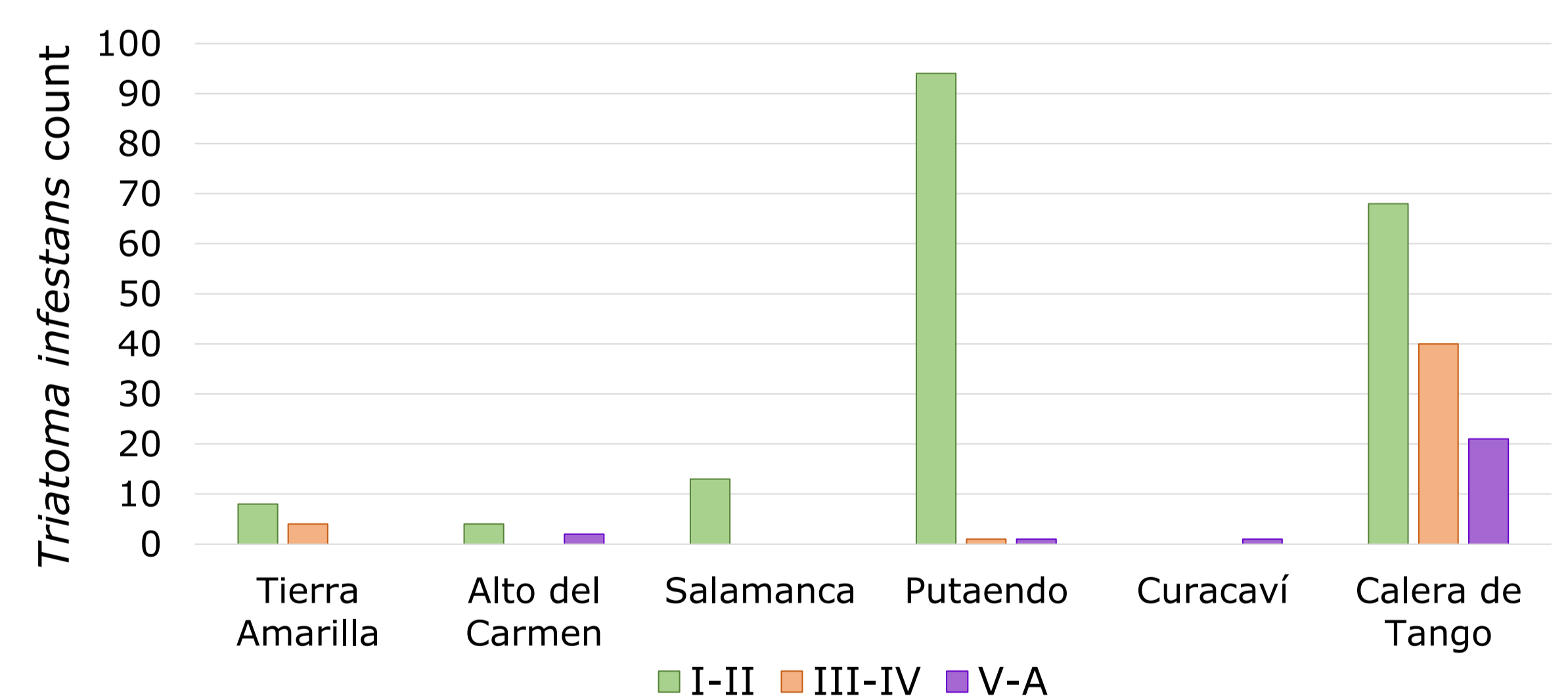
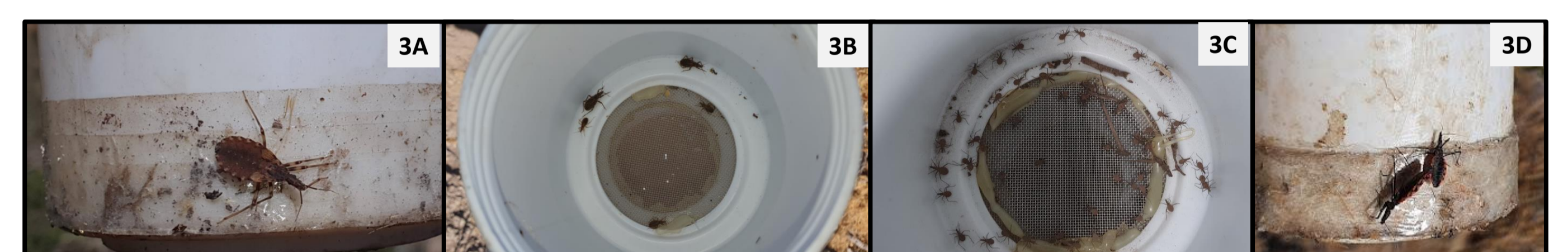
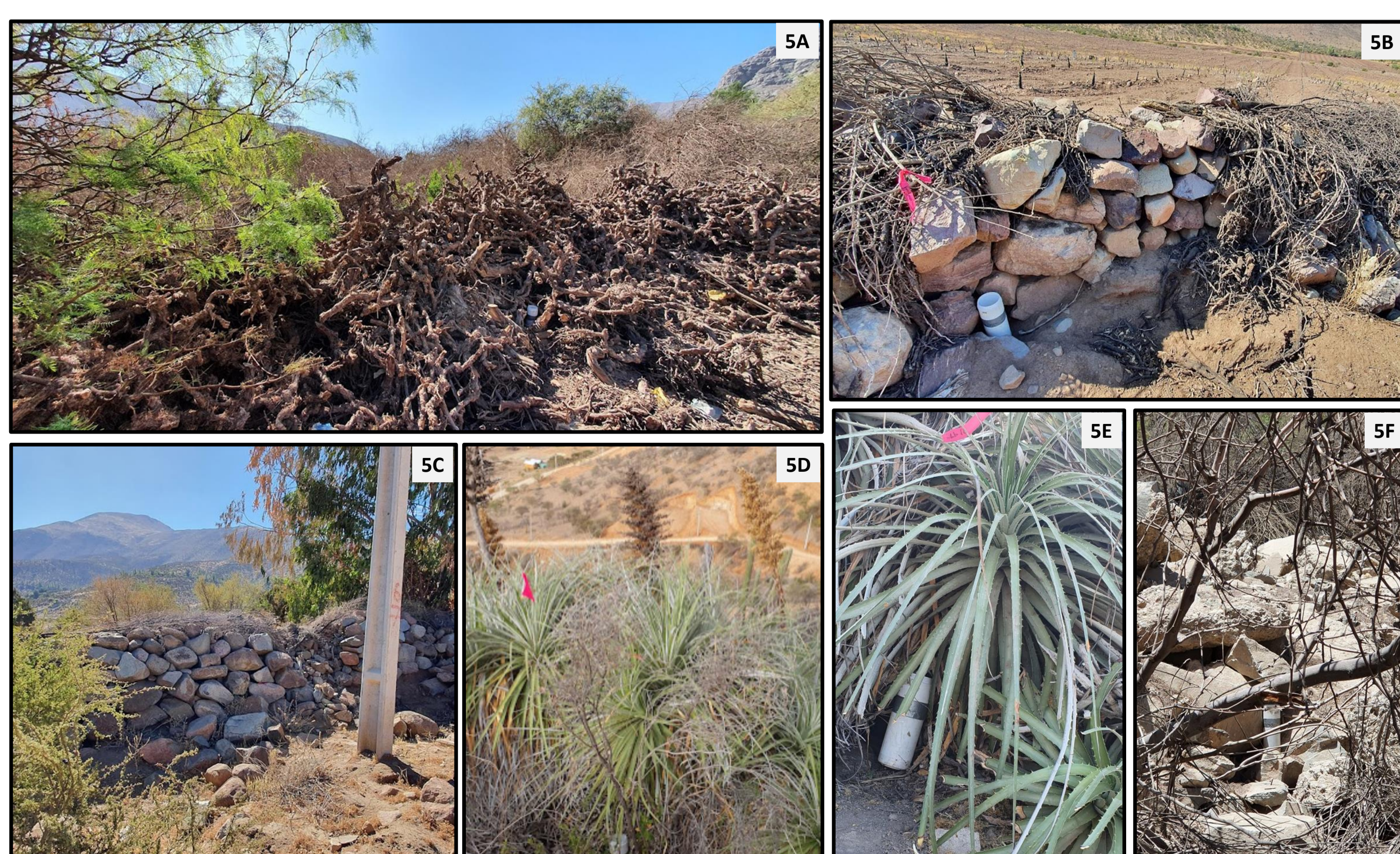


Figure 4. Distribution of *Triatoma infestans* instars captured according to study site.

Figure 5. Photographs of the different ecotopes where sylvatic *Triatoma infestans* was captured in Chile.



Conclusions

- We expand the knowledge of Chilean sylvatic foci for both vector species
- Wild triatomine populations remain a threat in endemic areas, even in countries with high levels of domiciliary vector control.
- Ecotope preferences should be informed in future prevention campaigns displayed at endemic areas, targeted to inhabitants, workers and industries, to avoid risky behaviour that could expose people to vectors.

To continue this work, we are performing DNA extraction, followed by sequencing, to analyse *T. infestans* population genomics, comparing these wild specimens with those found inside houses.

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