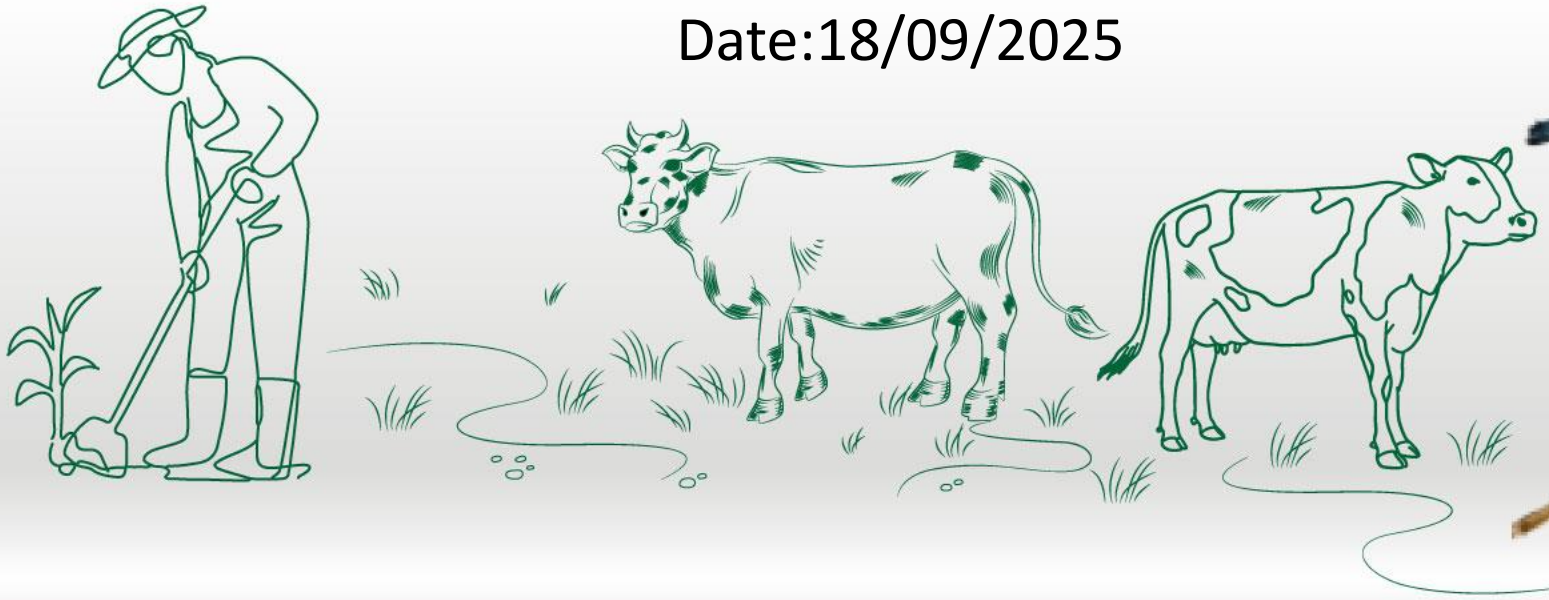
37TH CONFERENCE OF THE INTERNATIONAL SCIENTIFIC COUNCIL FOR TRYPANOSOMIASIS RESEARCH AND CONTROL (ISCTRC)
15 – 19 September, 2025 Nairobi, Kenya

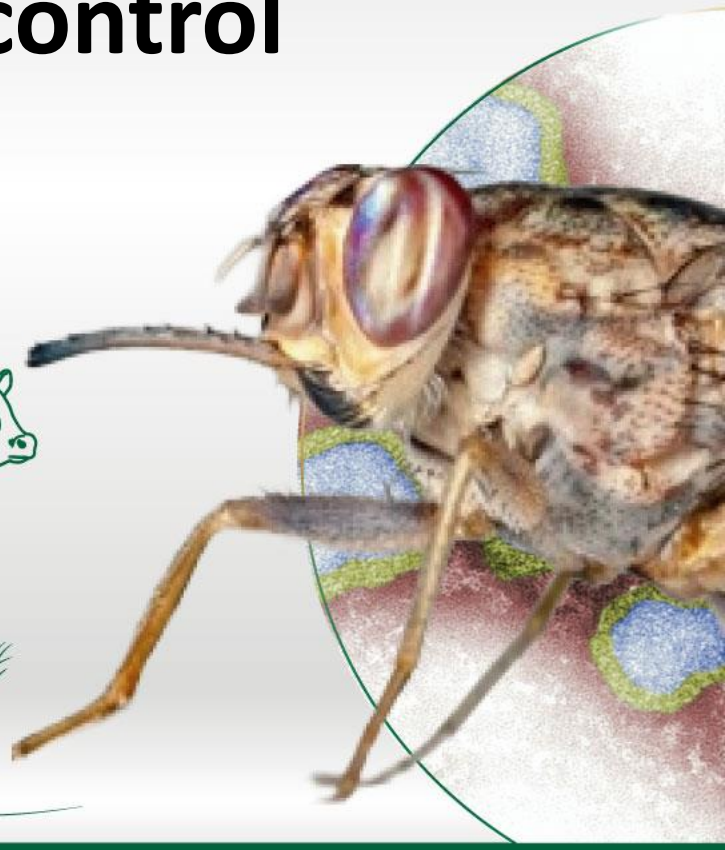
37E CONFÉRENCE DU CONSEIL SCIENTIFIQUE INTERNATIONAL POUR LA RECHERCHE ET LE CONTROLE SUR LA TRYPANOSOMIASE (CSIRCT)
15 – 19 septembre 2025, Nairobi, Kenya

Smelling Out Solutions: Advancing targeted smell-based strategies for Trypanosomiasis control

Presenter: Simon Kiplimo Tawich

Date:18/09/2025





Tsetse fly: A serious disease vector in sub-Saharan Africa



Impact

Diseases

Increased healthcare cost

Lower productivity

Economic loses > $ 4.5 Billion annually

Control methods

Bush clearing

Insecticides

Sterile Insect Technique (SIT)

Trapping

Why vector control

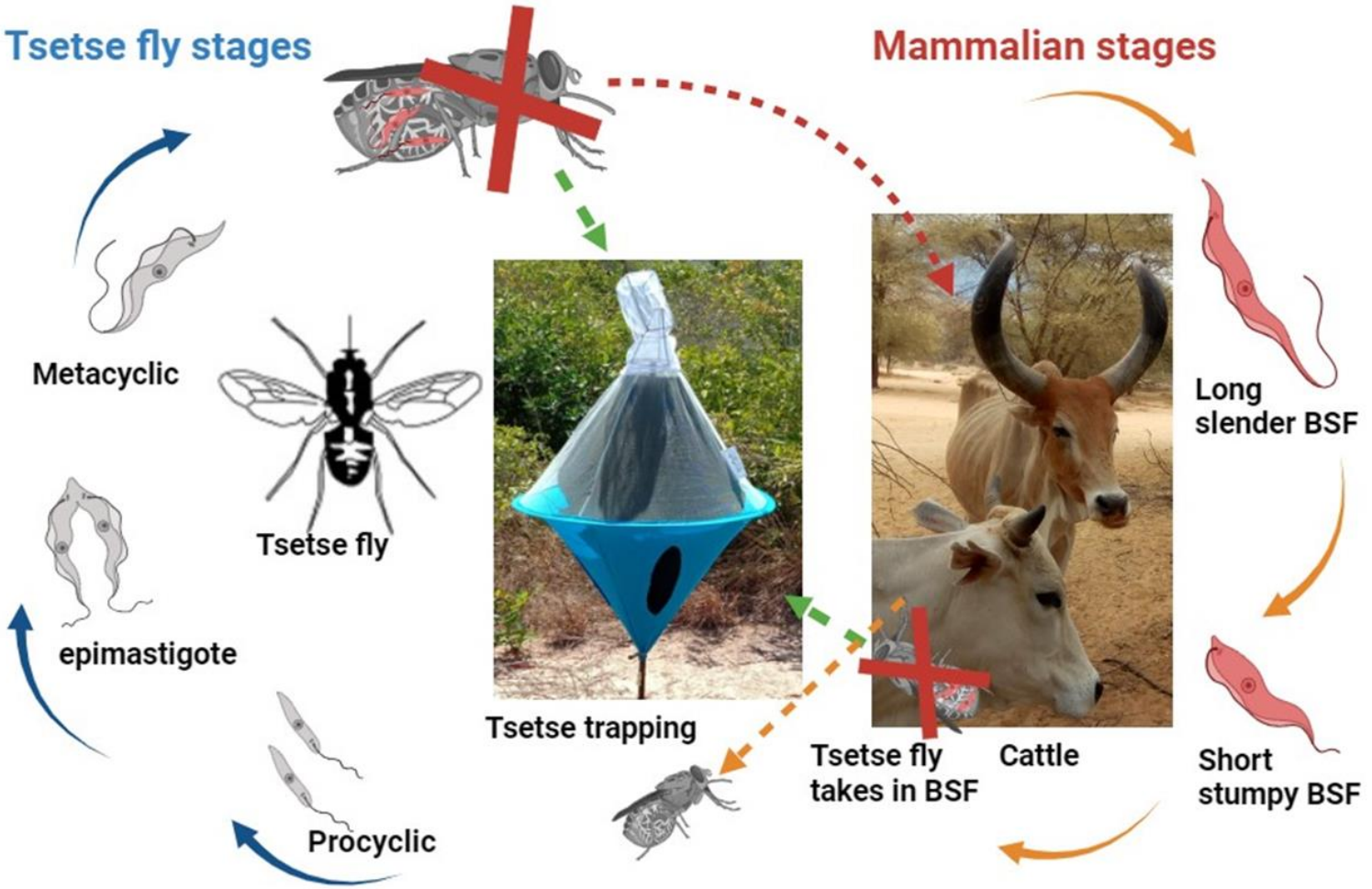
Expensive drugs

Drug resistance

Lack of vaccines

High production cost

Trypanosome-host-vector interactions



Cue Hierarchy:

Olfaction>Vision>Auditory>Thermosensory>mechanosensory>Gustatory

Habitat localization

Host-seeking

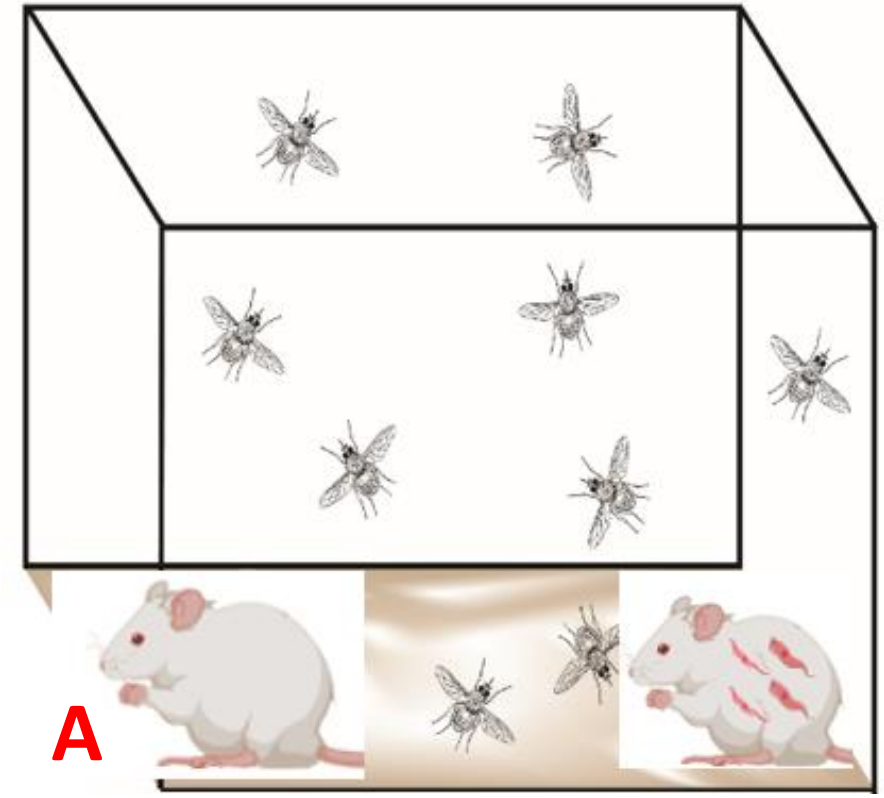
Danger avoidance

Larval site identification

Hypothesis

- *T. congolense* manipulate host chemistry and vector sensory modalities for its own transmission success.

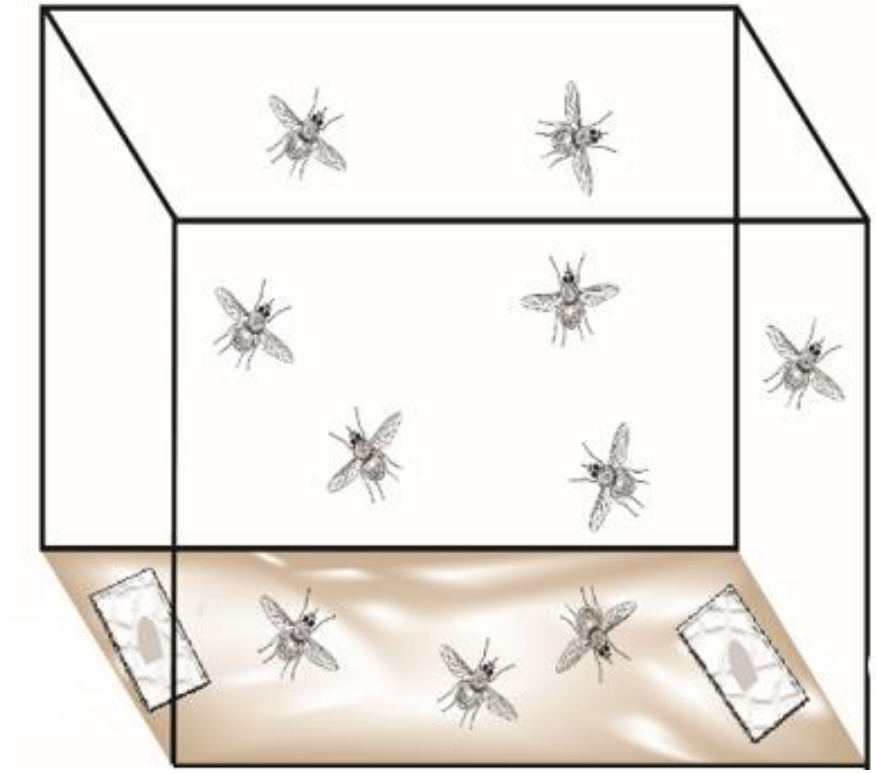
Laboratory behavioral assays



A

Healthy mouse

T. c infected mouse

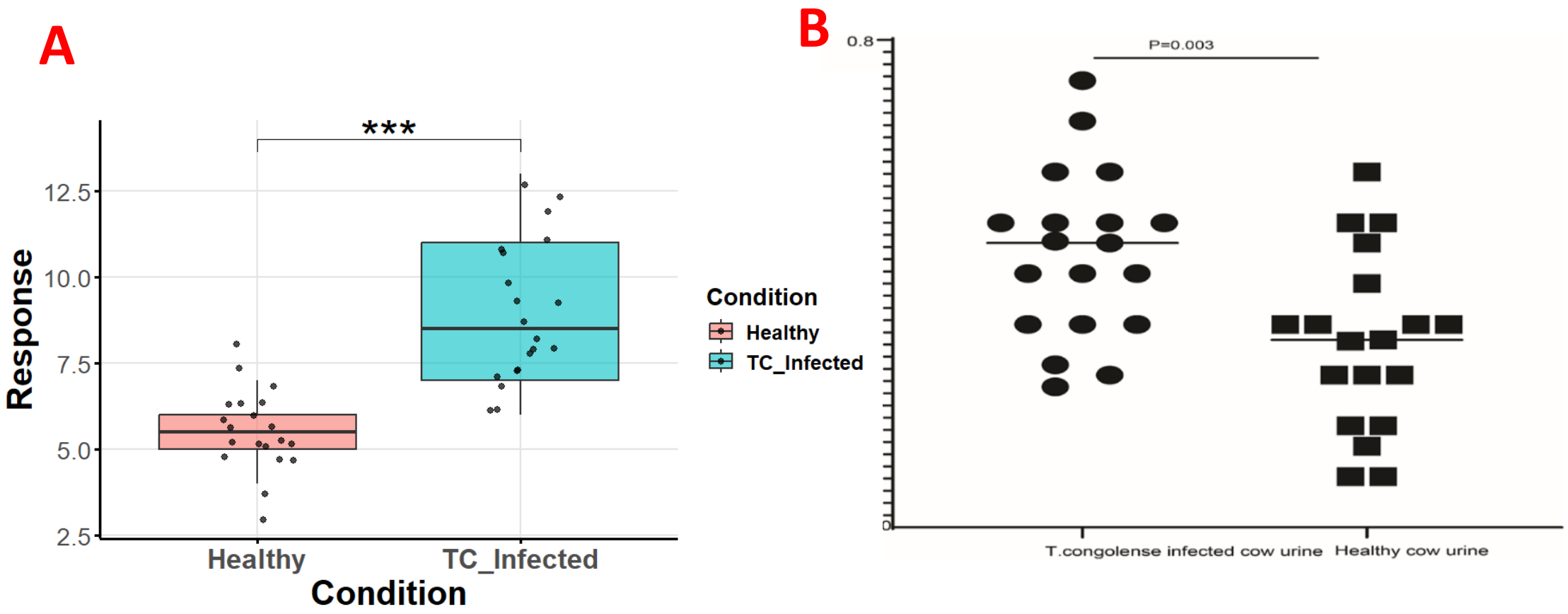


B

Healthy cow urine

T. c infected cow urine

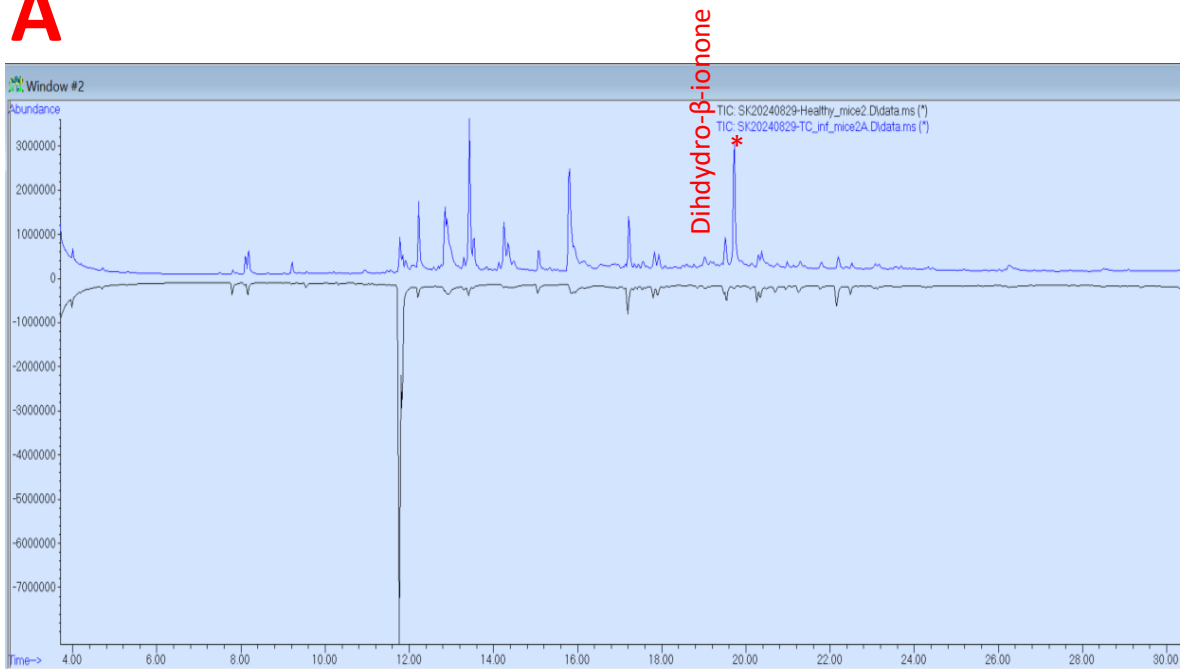
G. pallidipes prefer to feed on *T. congolense* infected host and respond positively to odor from trypanosome infected cow urine



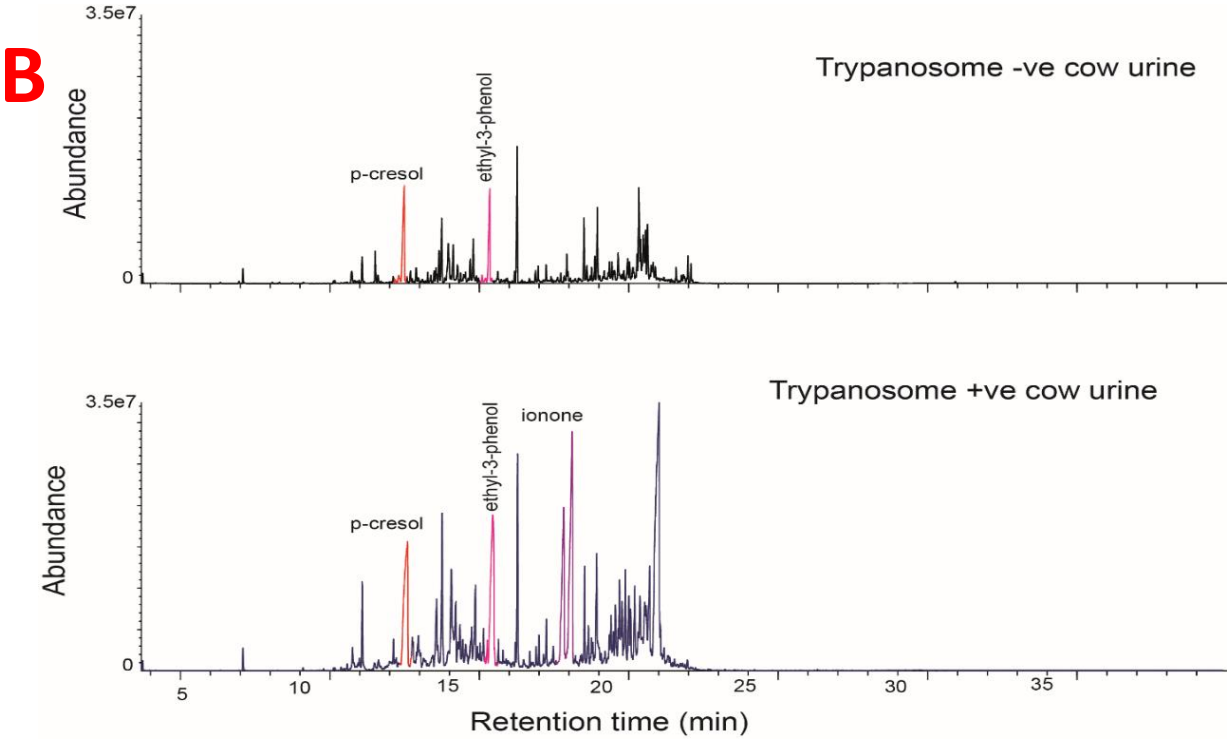
Tawich et al., in prep

Trypanosome infection alter host chemistry and to make them more attractive to *G. pallidipes*

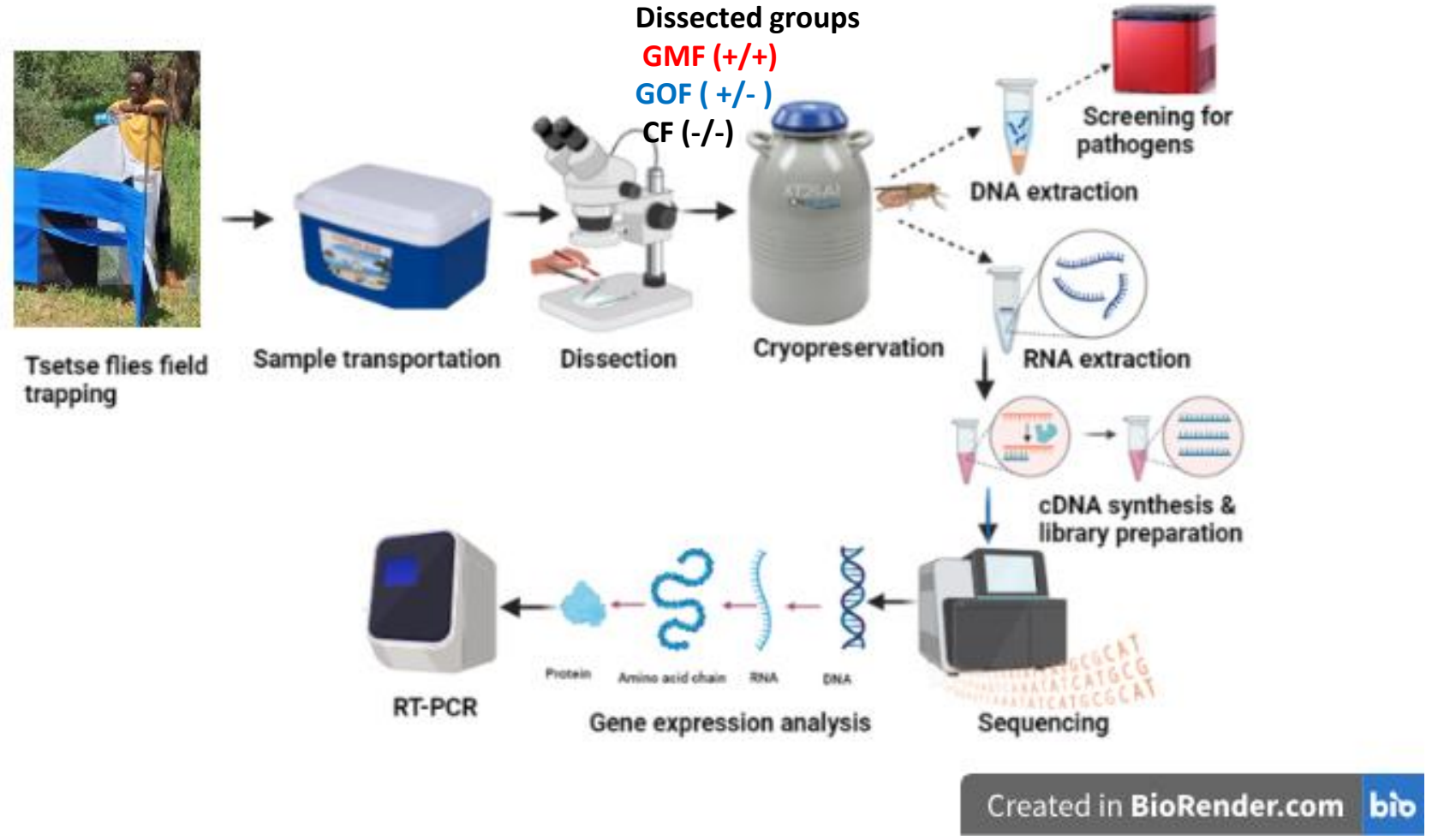
A



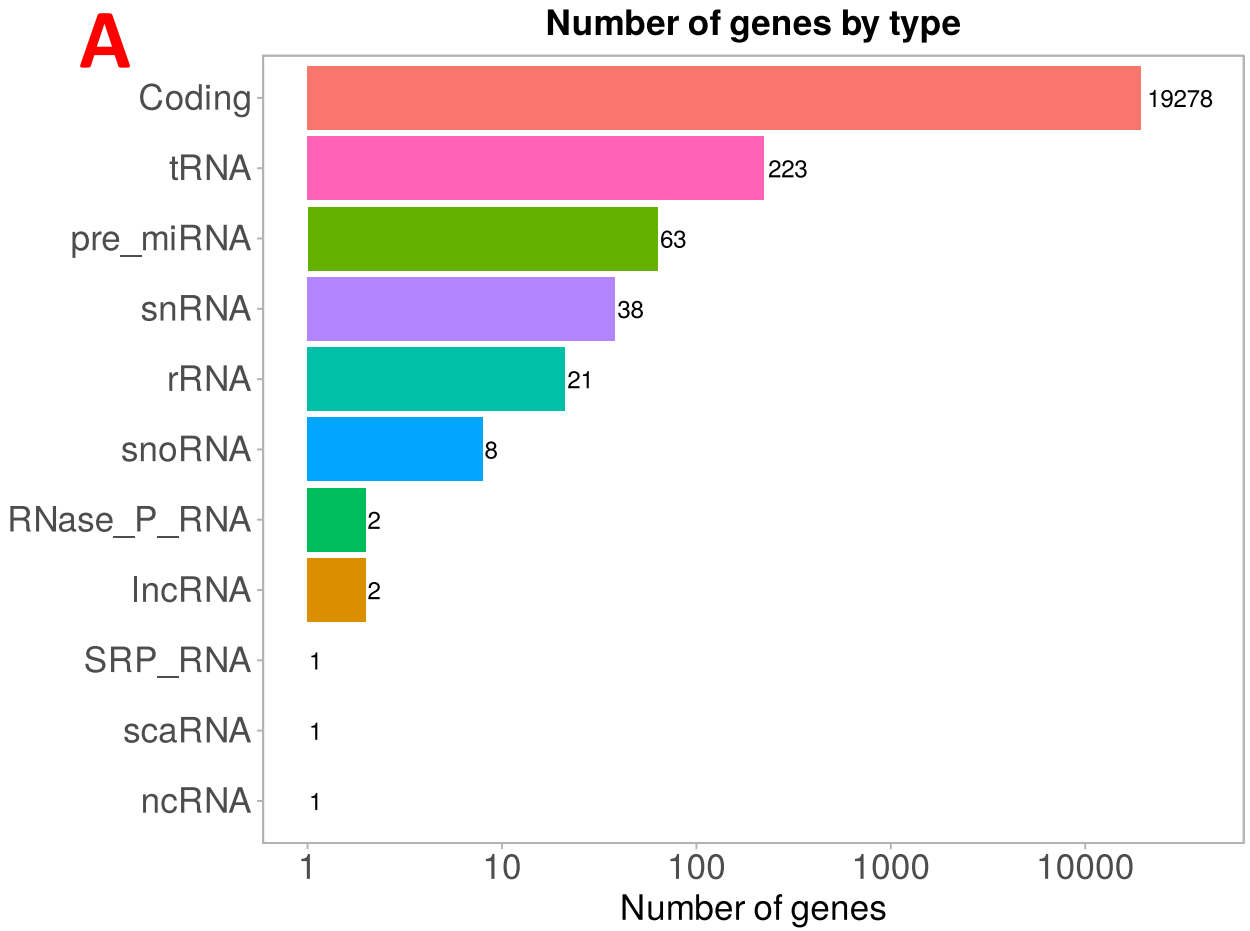
B

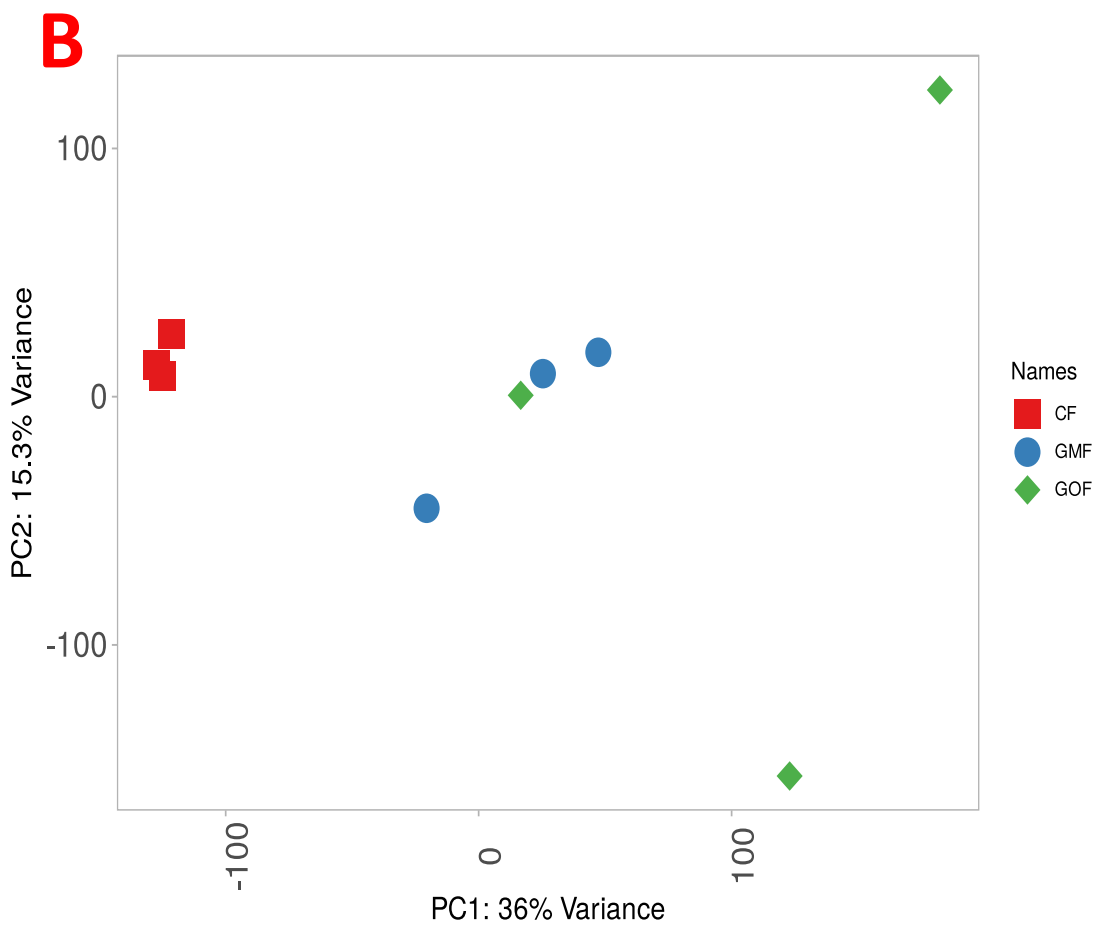


What molecular changes occur in *G. pallidipes* to drive the observed behavioral changes?

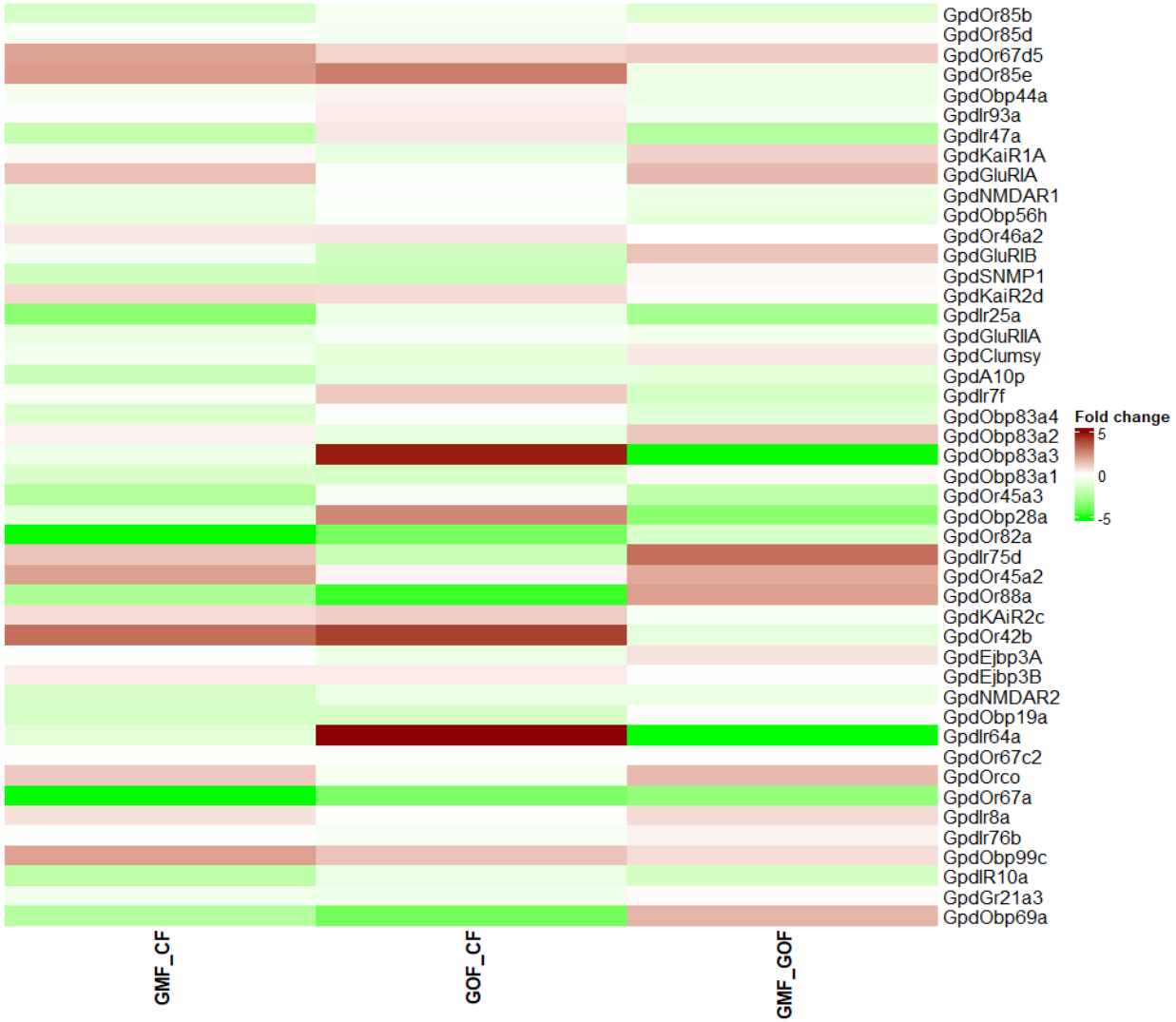


Transcriptome summary



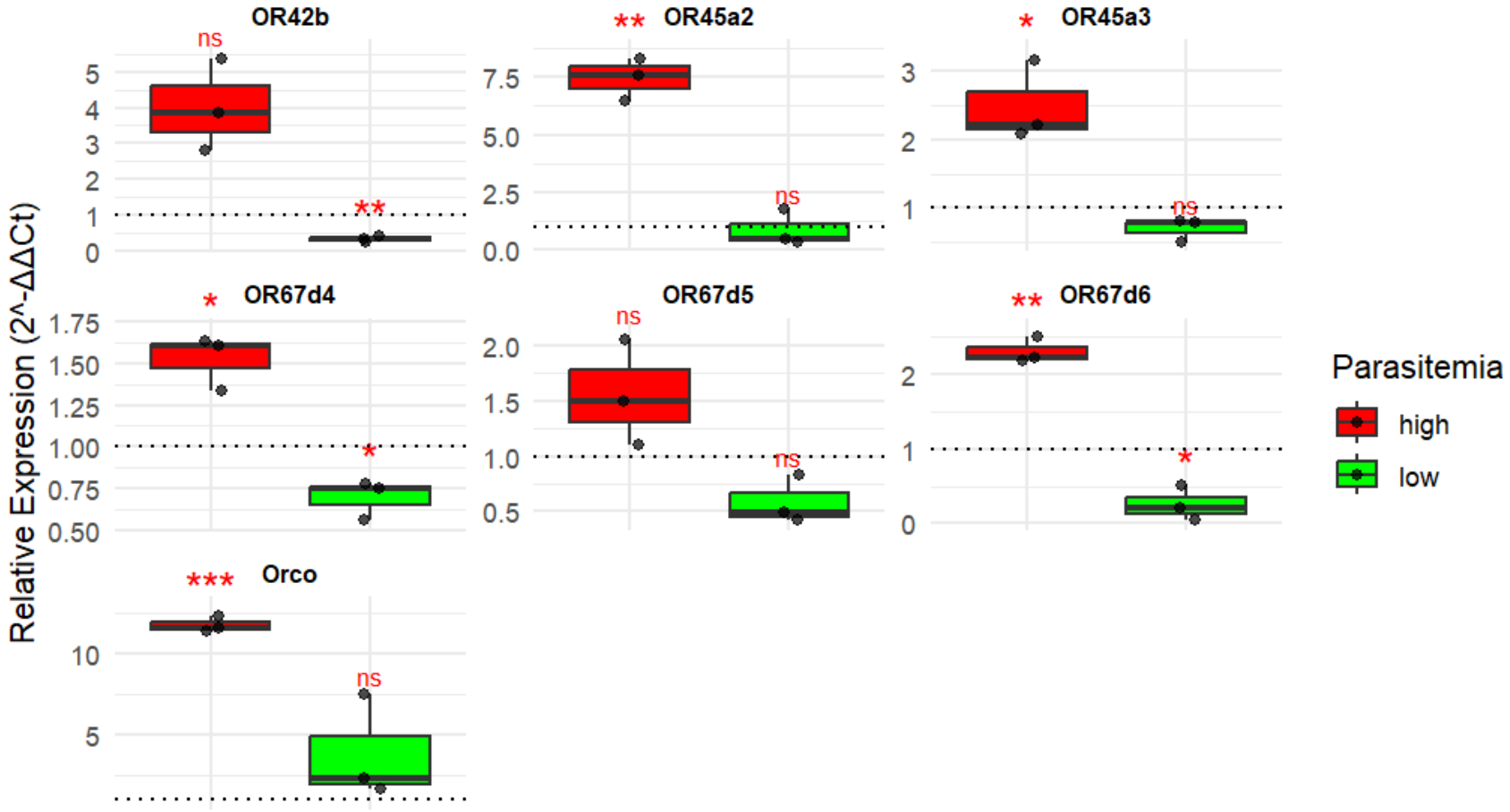


T. congolense modulate *G. pallidipes* chemosensory gene expression



Tawich et al., in prep

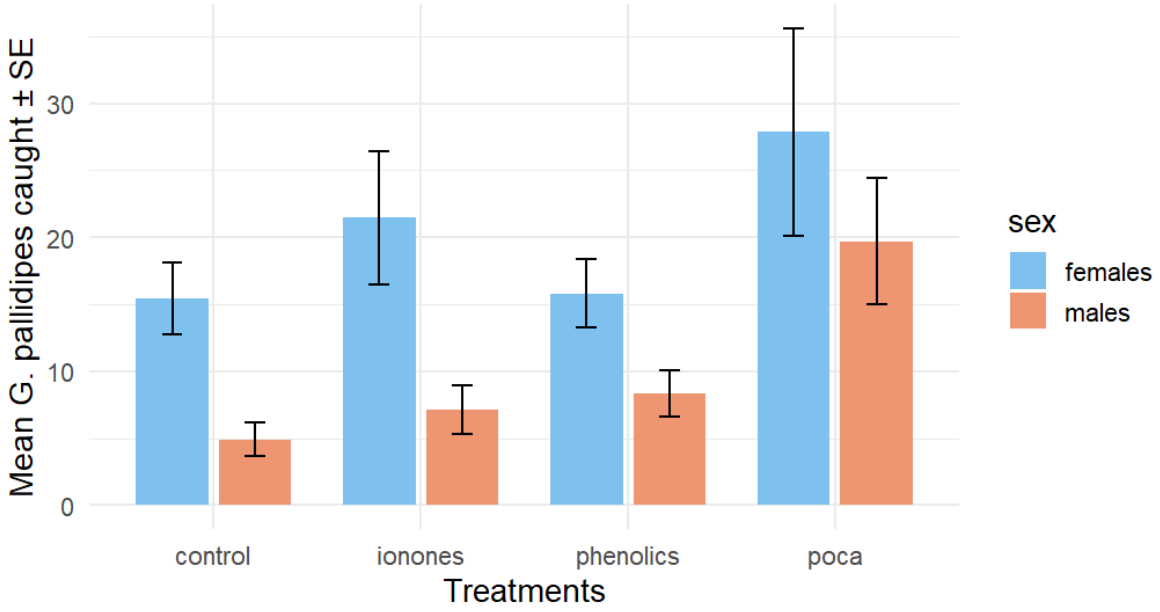
RT-qPCR: *T. congolense* parasites increases odorant receptors gene expression in *G. pallidipes*



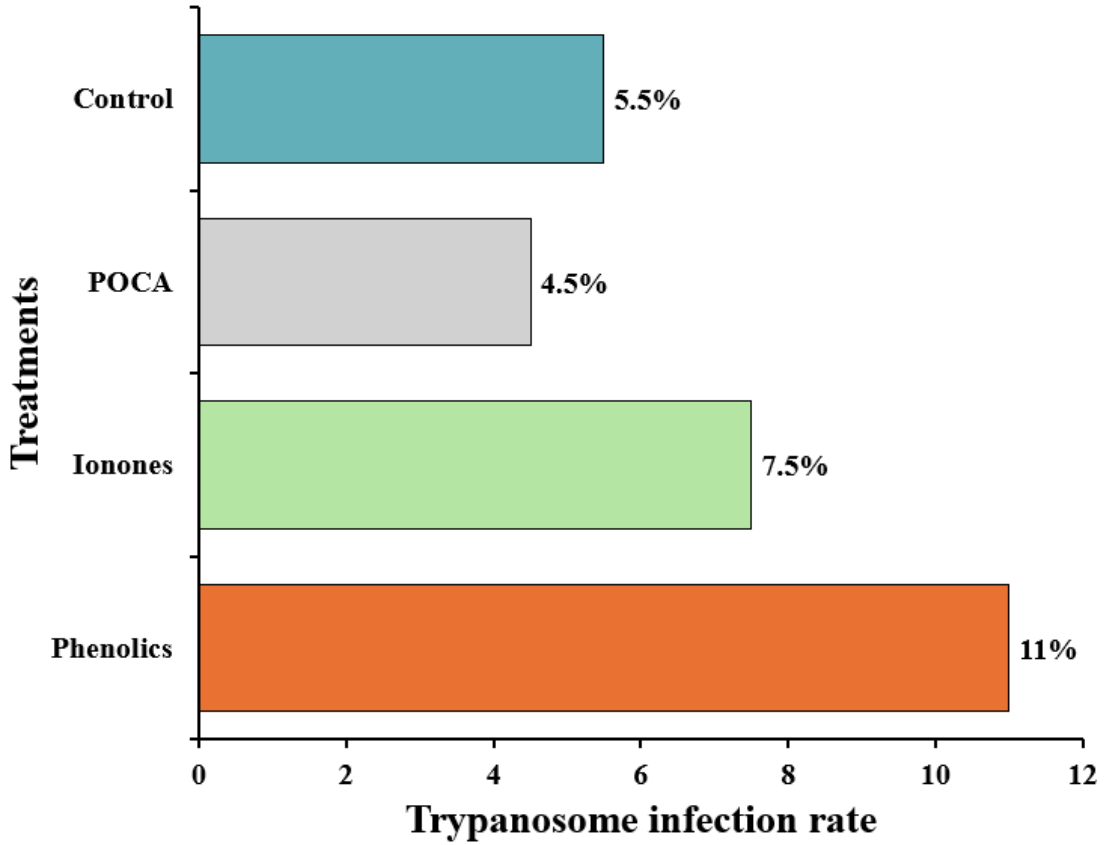
Tawich et al., in prep

Phenolics and ionones baited traps enhanced the attraction of trypanosome infected *G. pallidipes*

A



B



Tawich et al., in prep

Take home message and way forward

- Trypanosome parasites modulates host volatile profile, vector's perception to smell, feeding behavior and thus disease transmission dynamics.

- Understanding the interplay between cues and multisensory behaviors in tsetse flies is vital in disrupting vector behavior, thus vector control.

- **Way forward**: Development and use of baits targeting more of trypanosome infected *G. pallidipes* and application of integrated vector control and treatment approaches is a promising strategy in managing AAT.

Donor Acknowledgement



Harnessing One Health Technologies & Innovations towards Eliminating Trypanosomiasis in Africa

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icipe
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Prof. Christopher Weldon



Dr. Souleymane Diallo

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Thank you | Merci | شكراً لك | Obrigado | Gracias | Asante

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