

STREPSIPTERA: A REAL LIFE XENOMORPH

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Postdoctoral Fellow, Department of Biology UoR

Nerd Nite February 26, 2026



WHAT IS A PARASITE?

PARASITISM PRIMER - HISTORY

- 1530s: Social; human concept about humans
 - Greek *parasitos*: “one who lives at another’s expense, person who eats at the table of another”
- 1640s: Scientific; ecological
 - Animal or plant that lives on or in and at the expense of another



Mom, can I have



?

No, we have



at home.



at home:

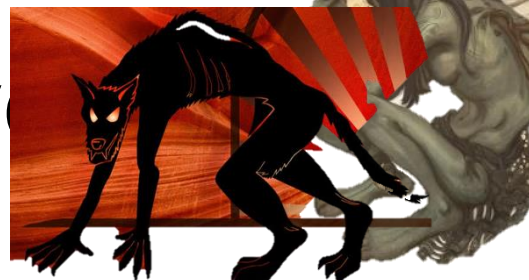


Mom, can I have



?

No, we have



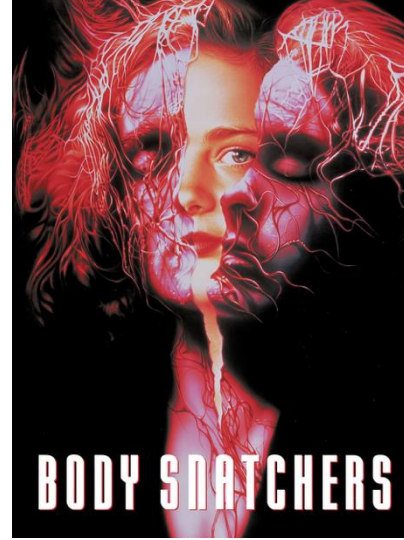
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at home:

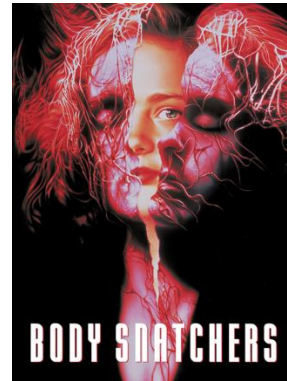


Mom, can I have

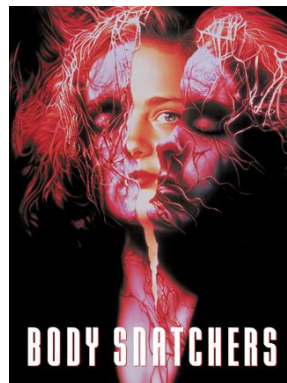


?

No, we have



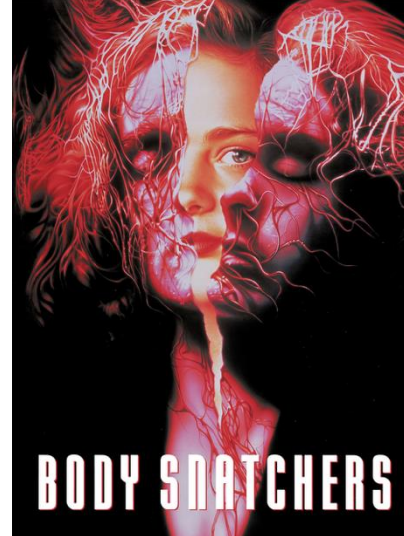
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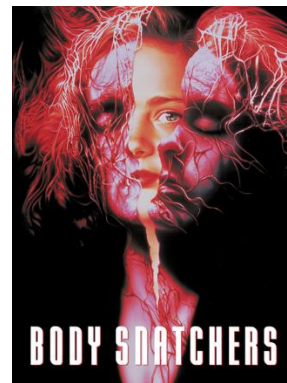
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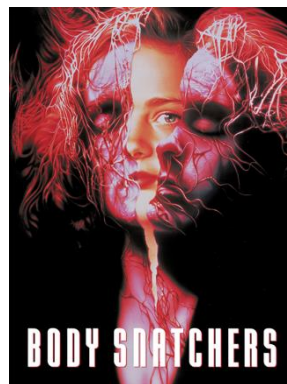
Mom, can I have



No, we have



at home.



at home:



Mom, can I have



?

No, we have



at home.



at home:





EVENT, COMMUNITY EVENT

Creature Feature: The Science of Monster Movies & Community Filmmaking

Sunday, Jun 8, 2025 at 12:00 p.m.

Part of **Open Worlds 2025** and **Open Worlds: Science**



A video player interface. The main content is a presentation slide with a blue background. The slide is divided into two parts. The left part shows a life cycle of a parasitoid: an 'adult' insect is shown at the top left, with an arrow pointing to 'eggs' in the center. A dashed arrow labeled 'from queen or eggmorphing' points from the eggs to a 'free-living larva' at the bottom left. An arrow labeled 'incubation of parasitoid' points from the larva to a 'host attack larval stage' at the bottom right. The right part of the slide shows a circular life cycle of a parasitic wasp: 'adult male' and 'adult female' are at the top, with an arrow labeled 'mating' between them. An arrow labeled 'nest infection' points to a cluster of eggs. An arrow labeled 'incubation of parasite' points to a larva. An arrow labeled 'host attack larval stage' points to another larva. An arrow labeled 'male pupa' points to a pupa. An arrow labeled 'incubation of parasite' points to another pupa. An arrow labeled 'adult female' points to another adult female. A small text at the bottom right of the slide reads 'modified from Heber et al. (2016)'. In the bottom right corner of the video frame, a speaker in a white lab coat stands at a podium with the text 'MUSEUM OF THE MOVING IMAGE' on it. Below the video frame is a YouTube-style interface with a channel name 'Museum of the Moving Image', a 'Subscribe' button, and social media icons for likes, shares, and saves. The video title is '"Alien" vs. Real Life Parasites'.

HOW DO I STUDY PARASITES?

ENTOMOLOGY!





Research



Cite this article: Millena RJA, Rosenheim JA. 2022 A double-edged sword: parental care increases risk of offspring infection by a maternally vectored parasite. *Biol. Lett.* **18**: 20220007.
<https://doi.org/10.1098/rsbl.2022.0007>

Evolutionary biology

A double-edged sword increases risk of offspring infection by a maternally vectored parasite

Rebecca Jean A. Millena^{1,2} and Jay A. Rosenheim^{1,3}

¹RGGGS, Invertebrate Zoology, American Museum of Natural History, New York, NY, USA, ²Department of Ecology and Evolution, Entomology and Nematology, University of California, Davis, CA, USA, ³Department of Entomology and Nematology, and Center for Systematic Entomology, University of California, Davis, CA, USA

RJAM, 0000-0002-5150-7325; JAR, 0000-0002-9222-1000

Parental care can protect offspring from infection by a maternally vectored parasite, but also provides opportunities for parents to vector parasites

Insect Systematics and Diversity, 9(4), 1; 2025, ixaf024
<https://doi.org/10.1093/isd/ixaf024>
Review

Taxonomy

Strepsiptera systematics: past, present and future

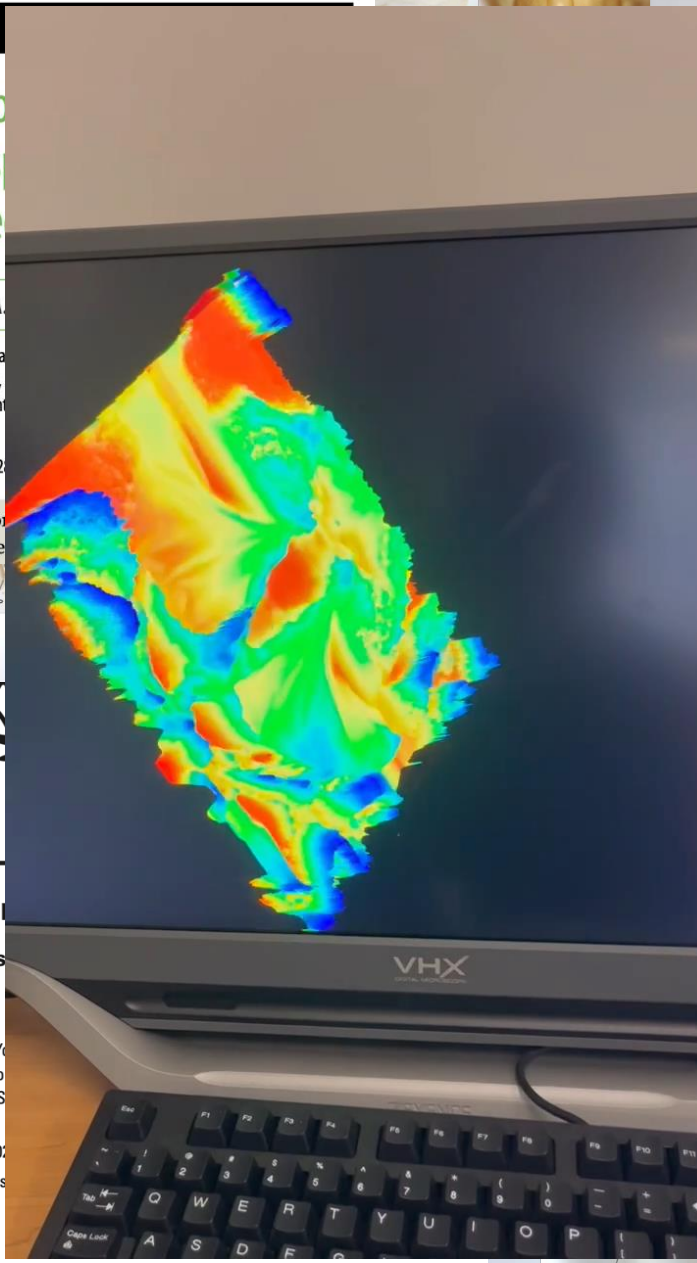
Rebecca Jean A. Millena^{1,2,*}, Meri Lahteenaro³, Markus Jeyaranej Kathirithamby⁵, and Richard Gilder⁴

¹Richard Gilder Graduate School, AMNH, New York, NY, USA
²American Museum of Natural History, Department of Invertebrate Zoology, New York, NY, USA
³Stockholm University and Swedish Museum of Natural History, Department of Zoology, Stockholm, Sweden
⁴Hawkesbury Institute for the Environment, Western Sydney University, Penrith, NSW, Australia
⁵University of Oxford, St. Hugh's College and Department of Biology, Oxford, UK

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Entomology, 53(4), 2024, 740–750
1093/ee/nvae042
Publication Date: 10 June 2024



ENTOMOLOGICAL SOCIETY OF AMERICA
SHARING INSECT SCIENCE GLOBALLY

OXFORD

On methods and distribution modeling for Strepsiptera in the United States

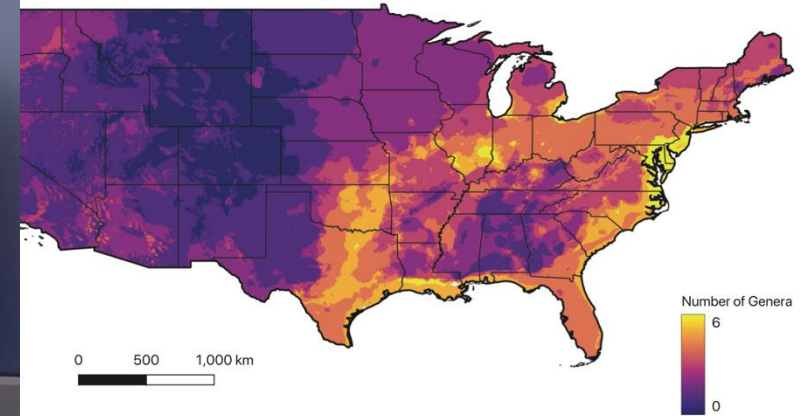
Rebecca Jean A. Millena^{1,*}, Anna Eichert², and Jessica L. Ware³

¹Invertebrate Zoology, American Museum of Natural History, New York, NY, USA, ²Department of Invertebrate Zoology, American Museum of Natural History, New York, NY, USA, ³Department of Invertebrate Zoology, American Museum of Natural History, New York, NY, USA *Corresponding author, mail: rmillena@amnh.org

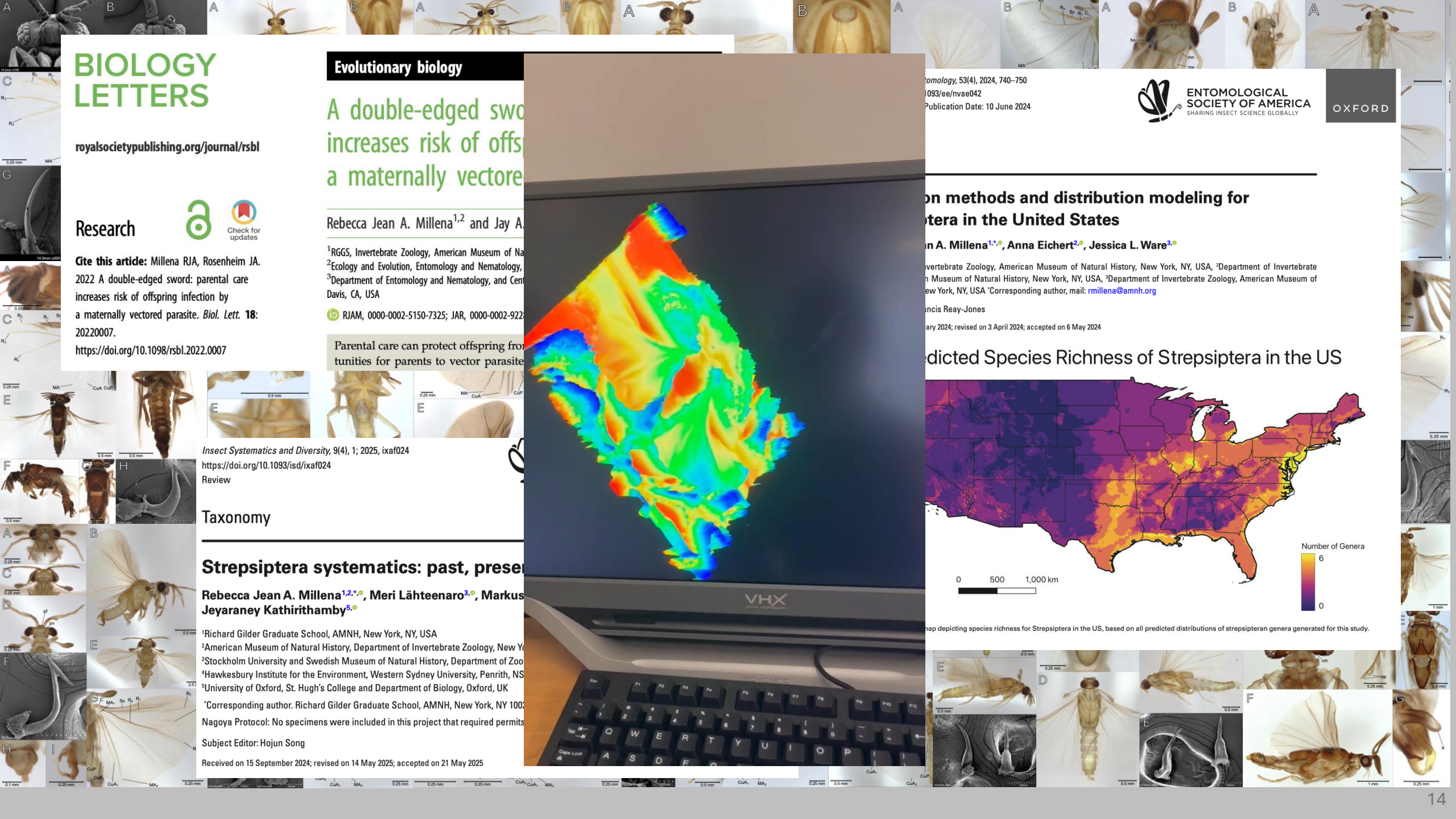
Francis Reay-Jones

Received on 10 May 2024; revised on 3 April 2024; accepted on 6 May 2024

Predicted Species Richness of Strepsiptera in the US



Map depicting species richness for Strepsiptera in the US, based on all predicted distributions of strepsipteran genera generated for this study.



STREPSIPTERA: THE BEST PARASITE???

(YES)






Female *Xenos peckii* extraction
from host wasp *Polistes fuscatus*
by RJ Millena

11:45 📶 79

< Reel insights



Hi pals! RJ again, starting off the day with #Thesi...
May 6 · Duration 0:50

8.3M 100K 942 13.4K 4,366


Overview ⓘ

Accounts reached	5,995,069
Reel interactions	119,366
Profile activity	3,976

Reach ⓘ

5,995,069
Accounts reached

0.1% Followers 99.9% Non-followers



🏠 🔍 + 📺 🌐



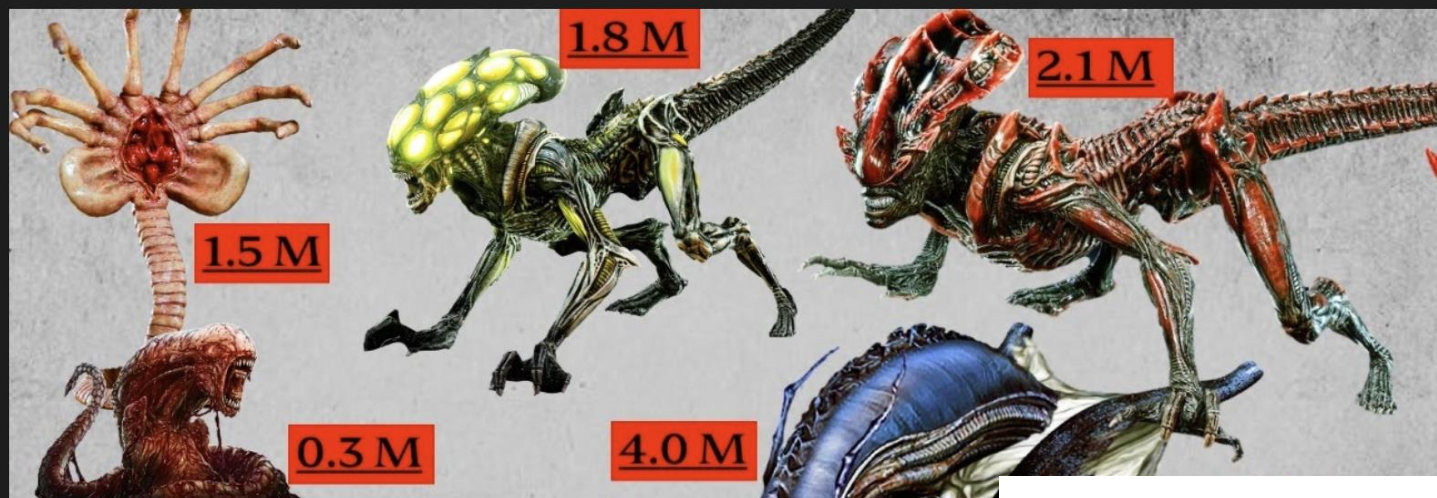
Very tiny parasites of silverfish, cockroaches, mantises, crickets, katydids, stinkbugs, leafhoppers, flies, bees, wasps, ants, maybe more!

Images from iNaturalist (various authors), Abbott Nature Photography, McMahon et al. (2011), Kathy LaPointe



YouTube

Marvelous Videos · 1:28:23

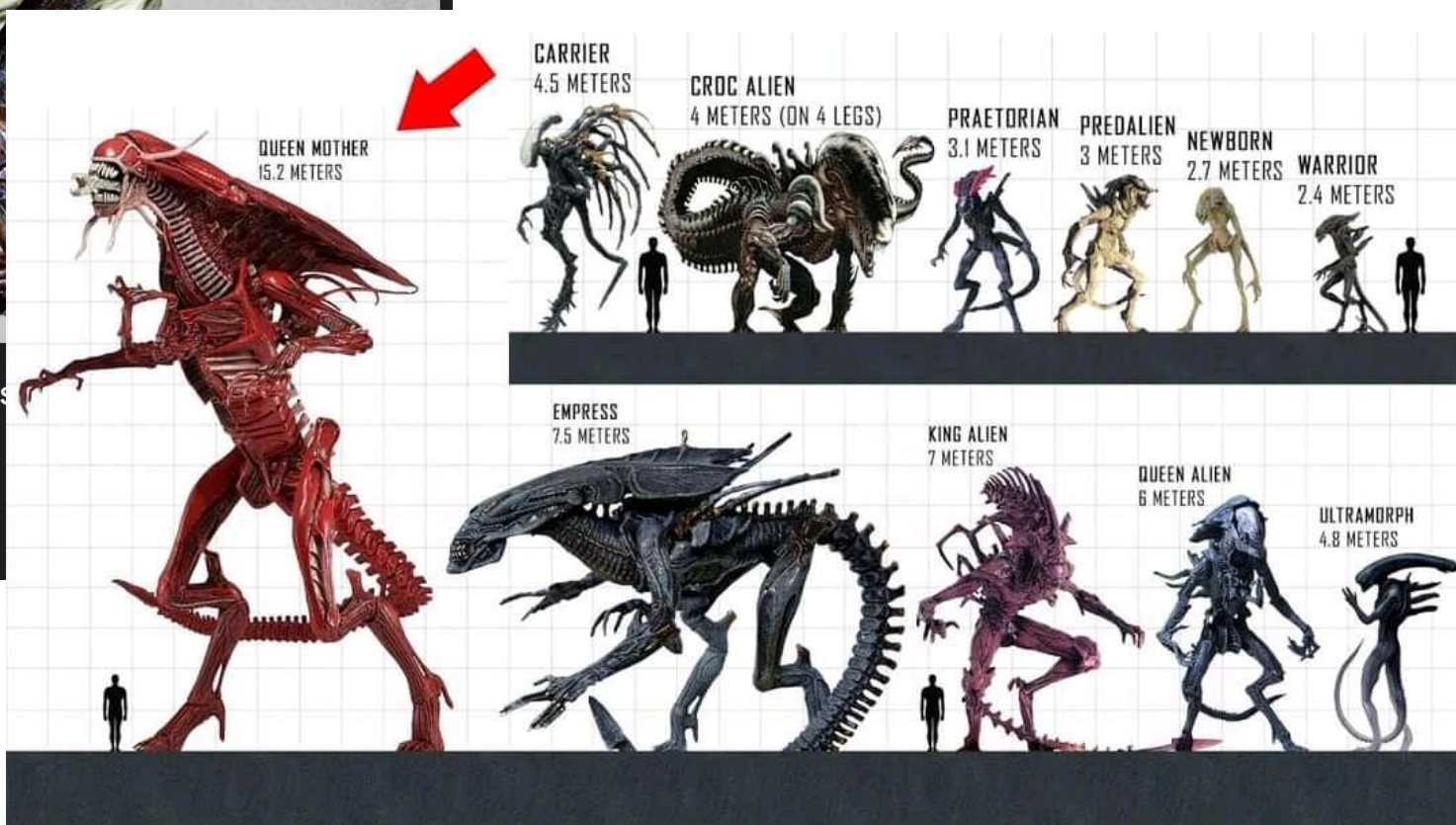


102 (EVERY) XENOMORPH EVER

102 (Every) Xenomorphs That Appeared in Movies, Comics, Novels
Mega List Of Xenomorphs!

Uploaded: Jan 3, 2023 · 15.6K Likes

... , #xenomorphs #aliens #alien





Images from iNaturalist (various authors), Abbott Nature Photography, McMahon et al. (2011), Kathy LaPointe

FUN PHENOMENA & QUESTIONS

BAFFLING SCIENTISTS FOR CENTURIES!!!!!!!

1) WHAT EVEN ARE THEY?

THE STREPSIPTERA PROBLEM!!!!



HALTERIA HYPOTHESIS: FLIES CLOSEST RELATIVES?



House fly slow motion flight

From "15 Flies Captured in Flight | Slow Motion!" by Ant Lab on YouTube

COLEOPTERIDA HYPOTHESIS: BEETLES CLOSEST RELATIVES?

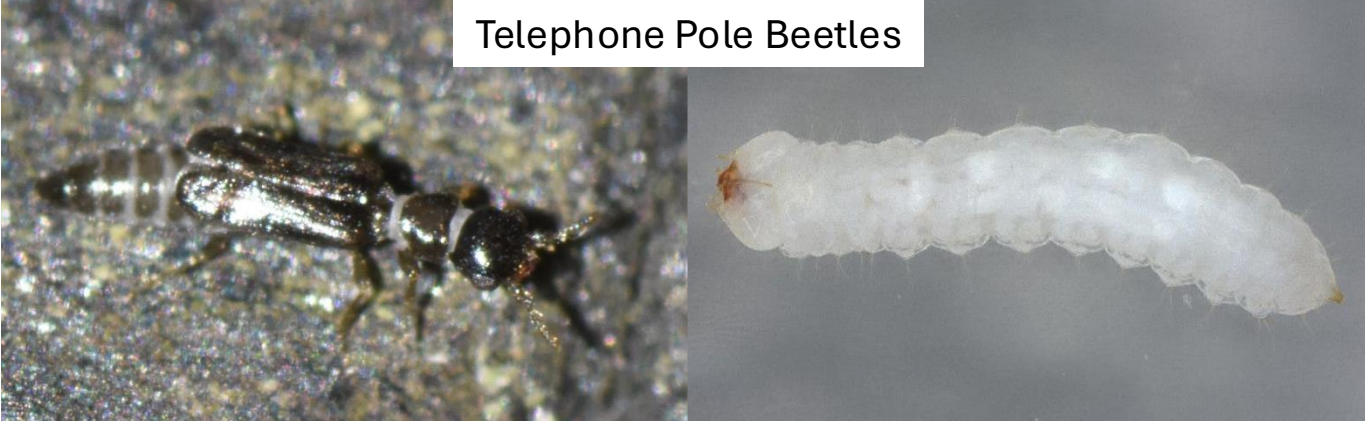
Wedge-Shaped Beetles



Glow Worms



Telephone Pole Beetles



Strepsiptera



Images from iNaturalist (various authors), still from supplemental data of Tröger et al. (2019)

2) ARE THESE THE SAME THING?

UNITING THE SEXES!!!!!!

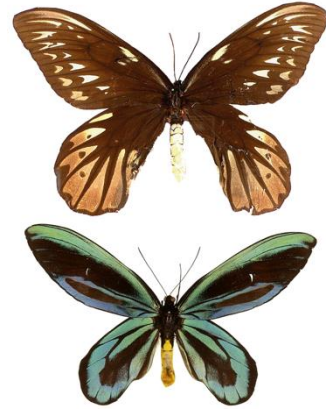
SEXUAL MONOMORPHISM

SEXES LOOK THE SAME!



SEXUAL DIMORPHISM

SEXES LOOK DIFFERENT!



EXTREME SEXUAL DIMORPHISM

SEXES LOOK VERY, VERY, VERY DIFFERENT!

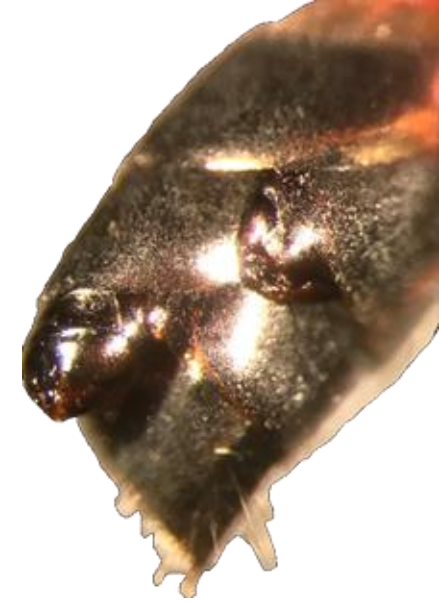




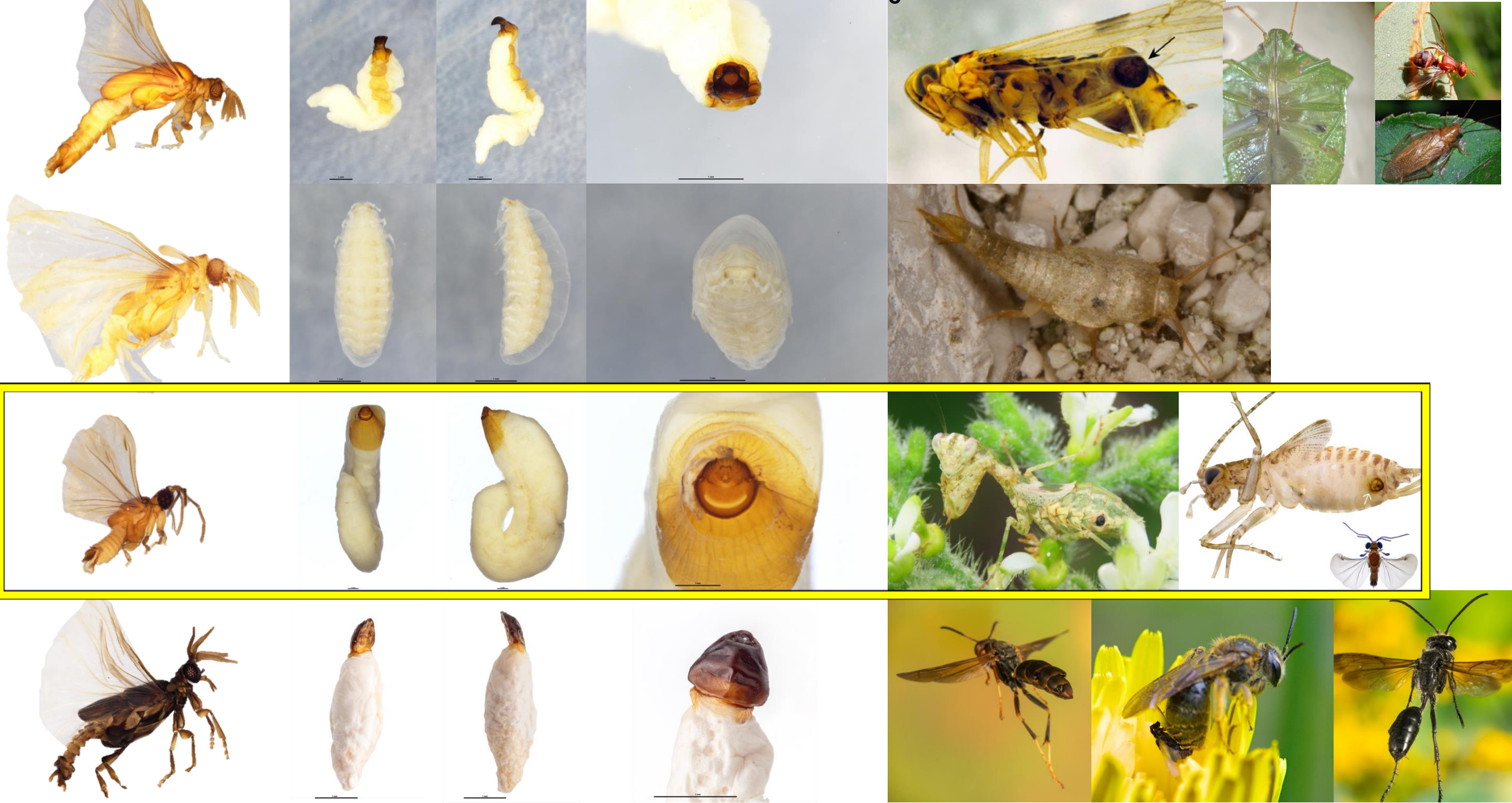
Female *Xenos*



Mobility of female *Eoxenos laboulbenei* (Mengenillidae)
from supplemental data of Tröger et al. (2019)



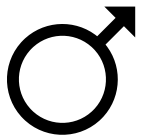
Pupal male
and female
Eupathocera



Images from iNaturalist (various authors), Abbott Nature Photography, McMahon et al. (2011), Millena et al. (2025)

HETEROTROPHIC HETERONOMY?

SEXUAL DIMORPHISM AT A NEW LEVEL!



THE ROYAL SOCIETY **biology letters**

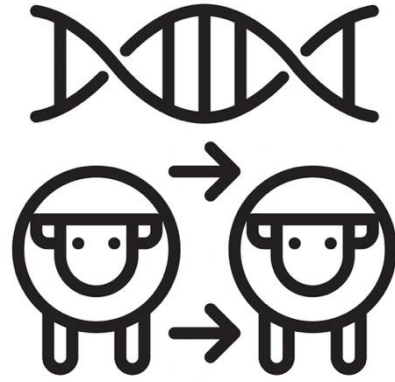
The discovery after 94 years of the elusive female of a myrmecolacid (Strepsiptera), and the cryptic species of *Caenocholax fenyesi* Pierce sensu lato

Jeyaraney Kathirithamby^{1*} and J. Spencer Johnston²



3) HOW ARE THEY REPRODUCING?

LITTLE FREAKS BY HUMAN STANDARDS 😊



TRAUMATIC INSEMINATION

NOT SOMETHING THAT SOUNDS PLEASANT TO US!



Biological Journal of the Linnean Society, 2023, **140**, 206–223. With 7 figures.

‘Stab, chase me, mate with me, seduce me’: how widespread is traumatic insemination in Strepsiptera?

KENNY JANDAUSCH^{1,2,*}, THOMAS VAN DE KAMP^{3,4,°}, ROLF G. BEUTEL^{1,°},
OLIVER NIEHUIS^{2,°} and HANS POHL^{1,*}

¹Entomology Group, Institut für Zoologie und Evolutionsforschung, Friedrich-Schiller-Universität Jena, Erbertstrasse 1, 07743 Jena, Germany

²Department of Evolutionary Biology and Ecology, University of Freiburg, Hauptstraße 1, 79104 Freiburg, Germany

³Institute for Photon Science and Synchrotron Radiation (IPS), Karlsruhe Institute of Technology (KIT), Hermann-von-Helmholtz-Platz 1, 76344, Eggenstein-Leopoldshafen, Germany

⁴Laboratory for Applications of Synchrotron Radiation (LAS), Karlsruhe Institute of Technology (KIT), Kaiserstraße 12, 76131, Karlsruhe, Germany

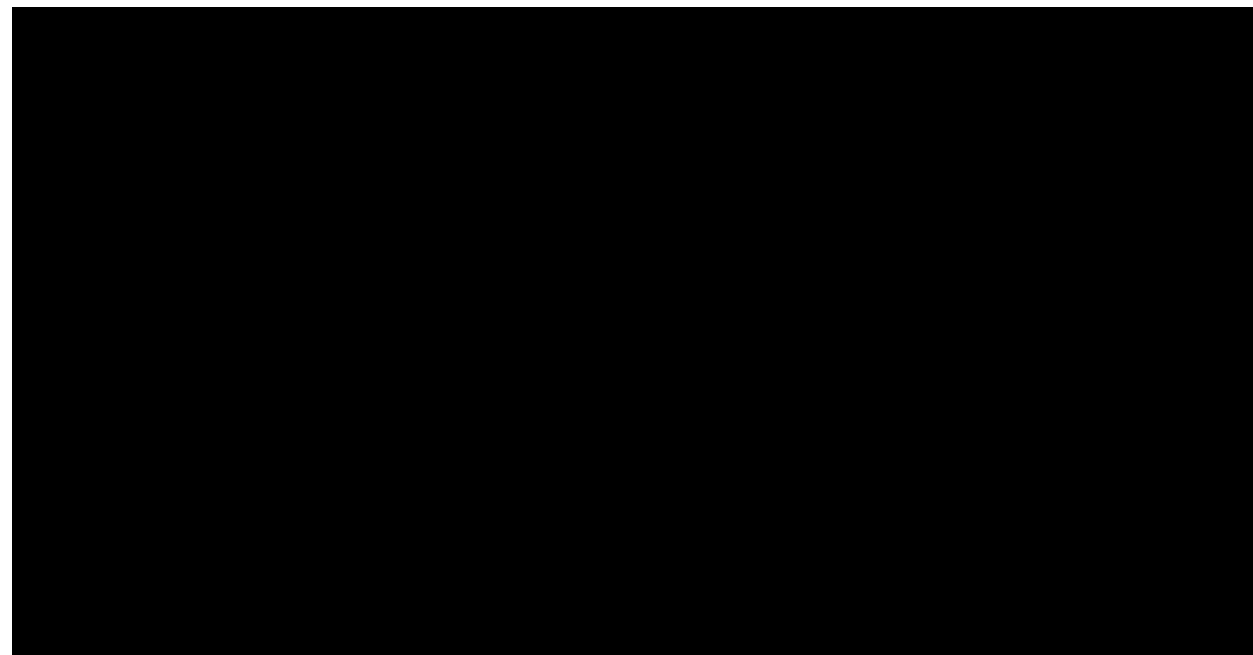
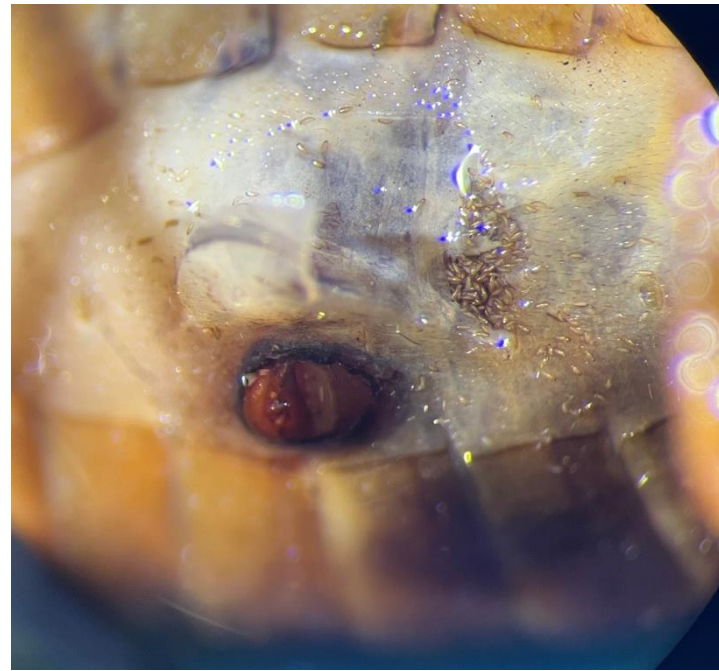
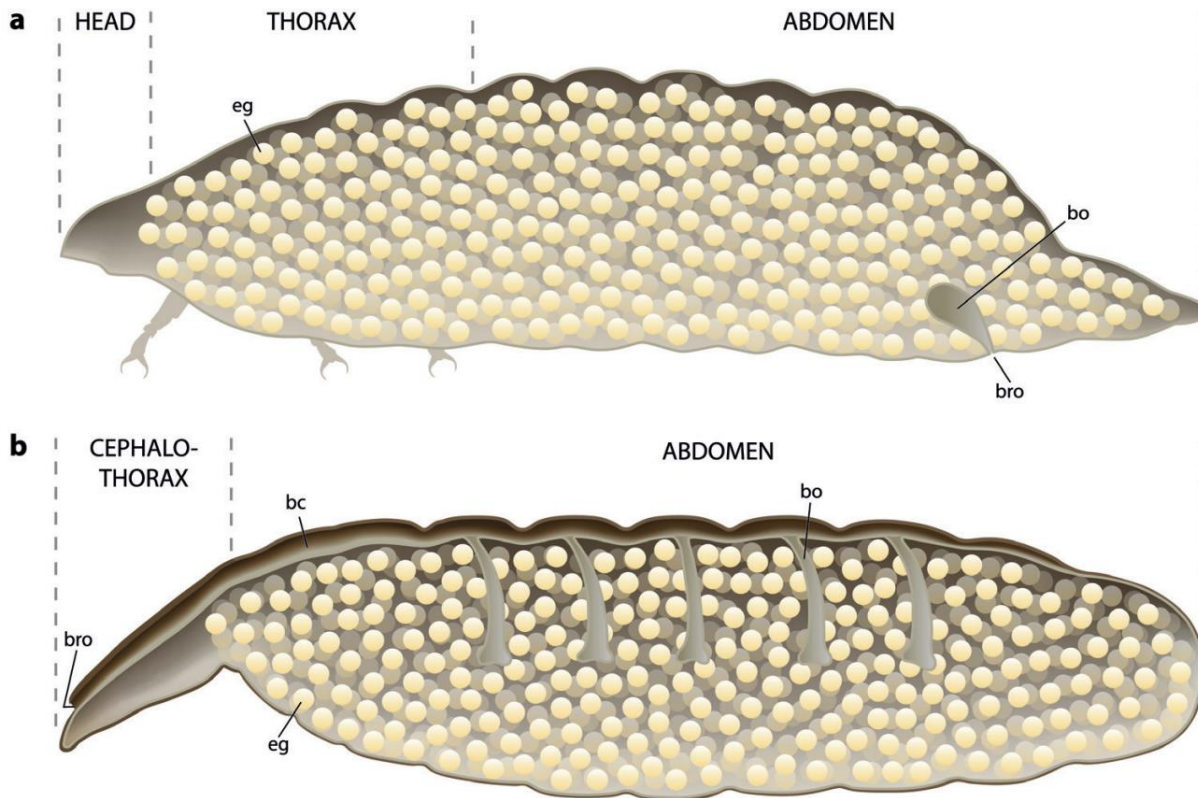
Received 12 January 2023; revised 17 March 2023; accepted for publication 27 March 2023



MATRIPHAGY?

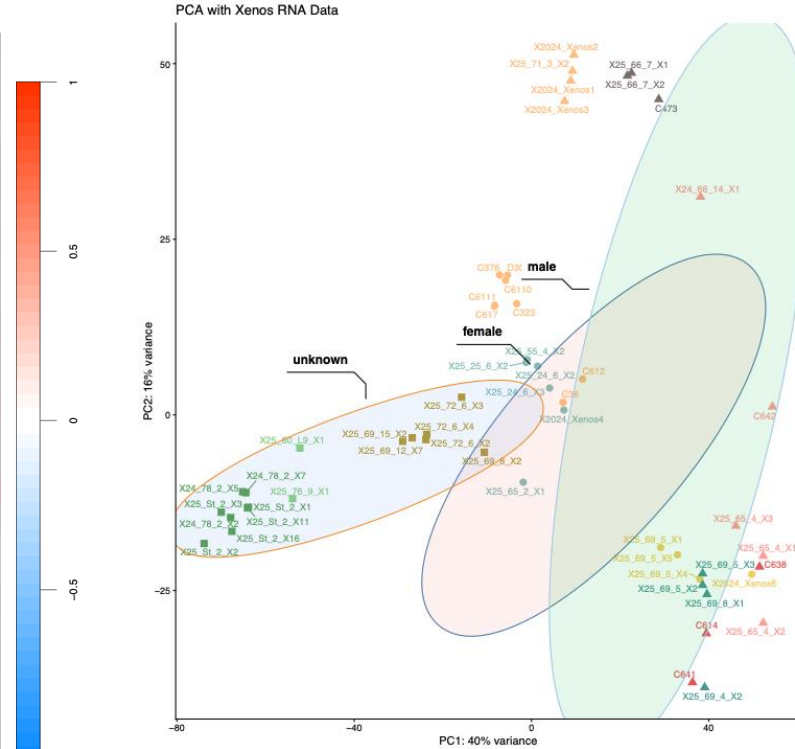
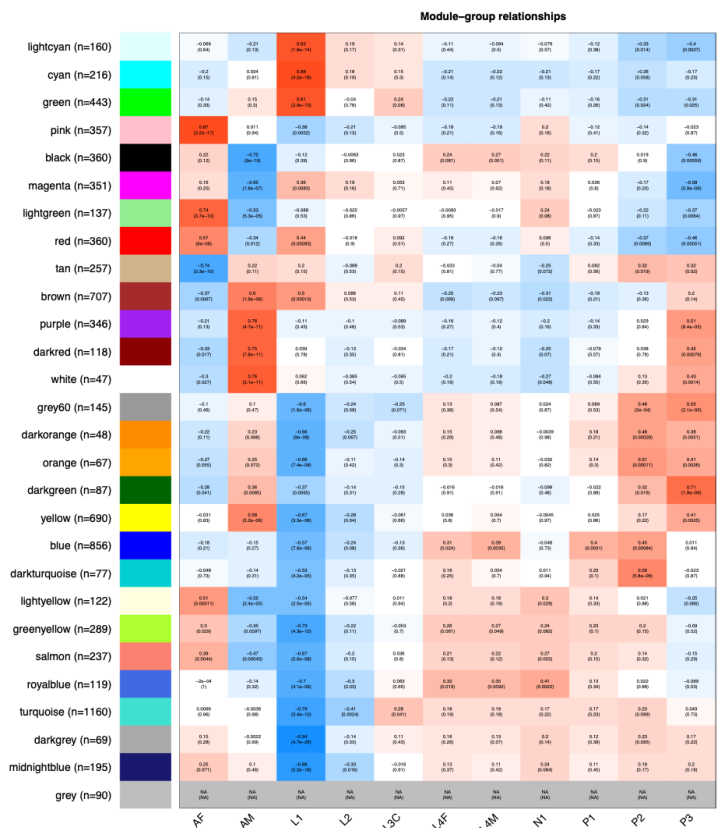
THE ULTIMATE PARENTAL SACRIFICE!

208 K. JANDAUSCH *ET AL.*



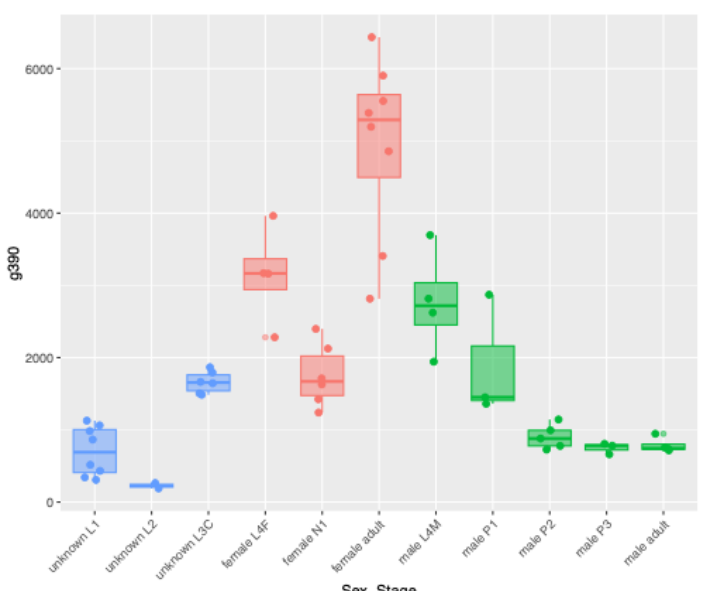
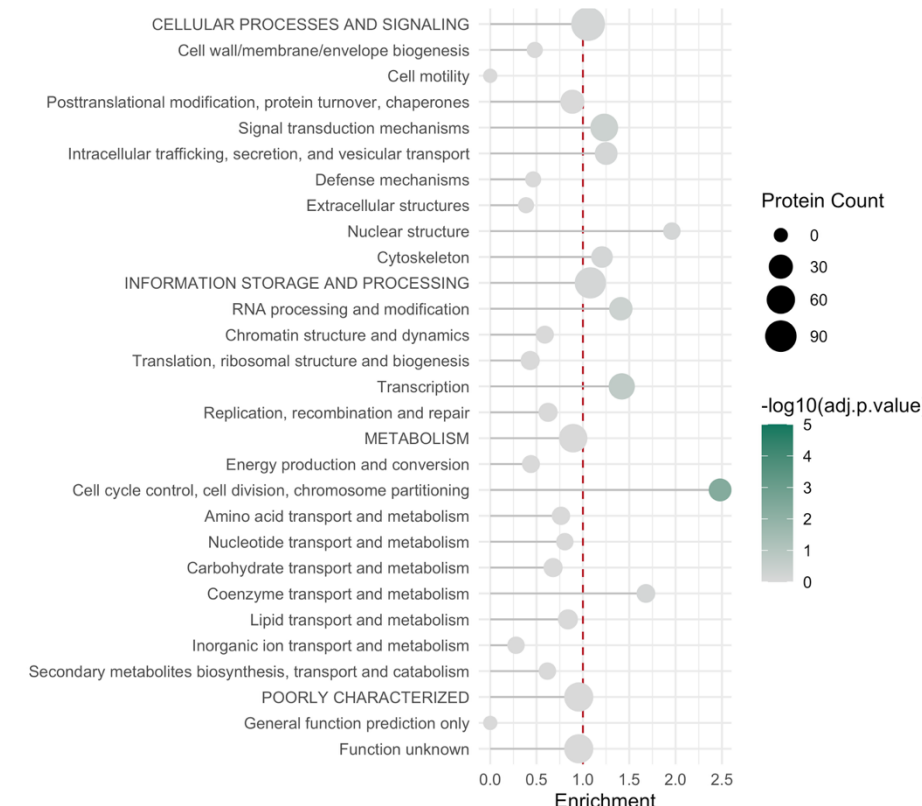
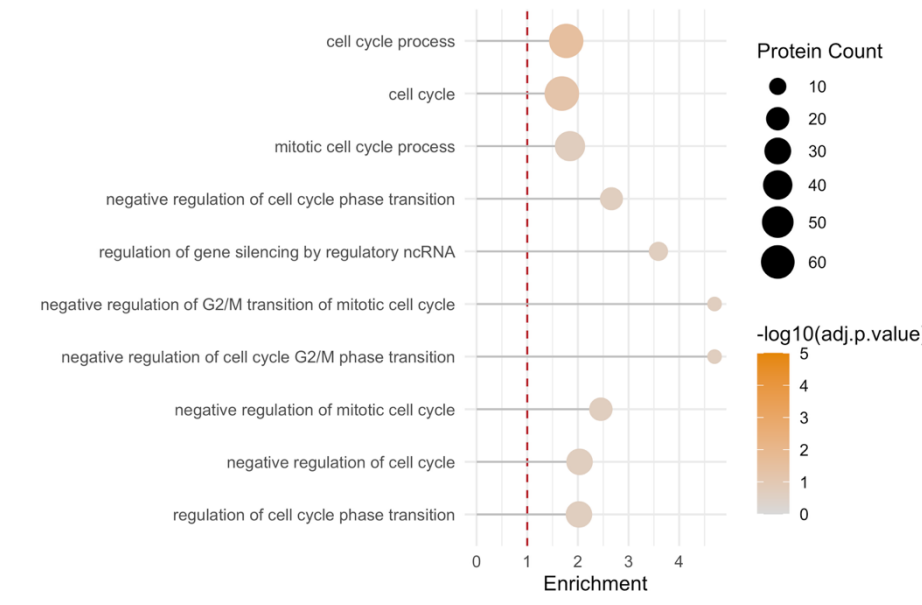
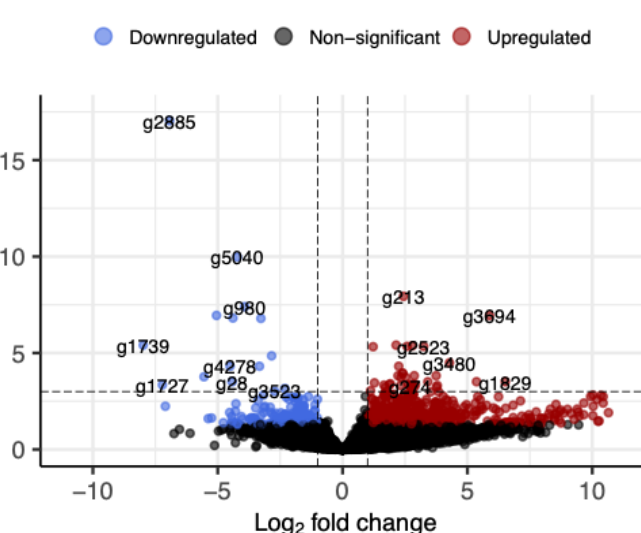
4) WHAT DO THEY DO TO HOSTS?

ZOMBIES? FOUNTAINS OF YOUTH?



Late-Stage Male and Female Xenos

EnhancedVolcano



The horror has been here all along 😊



THANK YOU!



← rjmillena.com

