

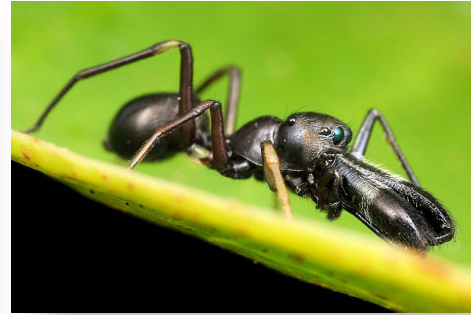
Łukasz Trębicki

**Beautiful and mysterious:
Diversity of jumping
spiders in South East Asia
and Australia**

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Salticidae – Jumping Spiders



Urogelides sp. photo M. Stevens

Myrmarachne sp. photo B. Seccombe

Coccorchestes sp. photo G. Anderson

Maratus sp. photo J. Otto

Mexigonus sp. photo W. Maddison

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Objectives

- Explore the diversity of jumping spiders across Oriental and Australian Zoogeographical Regions
- Develop DNA barcode library for each species
- Apply integrative methods for species redescriptions/descriptions
- Reconstruct phylogeny, distribution and evolution of taxa based on integrative methods
- To propose new model organisms for biological research studies



Species diversity in SE Asia and Australia

Species numbers based on
Jumping Spider Catalogue
(Metzner 2022) and World
Spider Catalogue (WSC 2022):

India + 300

China + 500

Australia + 500

Philippines +120

Thailand + 60



Holt et al. 2013. An Update of Wallace's Zoogeographic Regions of
the World. SCIENCE, VOL 339

Material

- **AMS:** Australian Museum, Sydney
- **QMB:** Queensland Museum, Brisbane
- **WAMP:** Western Australian Museum, Perth
- **ANIC:** Australian National Insect Collection, Canberra
- **MNHN:** Muséum National d'Histoire Naturelle, Paris
- **MCSN:** Museo Civico di Storia Naturale Giacomo Doria, Genoa
- **SMNH:** Swedish Museum of Natural History, Stockholm
- **ZMB:** Zoologisches Museum der Humboldt-Universität, Berlin
- **ZMH:** Zoologisches Institut und Zoologisches Museum, Universität Hamburg
- **NMNH:** National Museum of Natural History (Naturalis), Leiden, Nederland
- **NMFIS:** Natur Museum und Forschungs-Institut Senckenberg, Frankfurt
- **MiIZ:** Museum and Institute of Zoology PAN Warsaw
- **ZMUT:** Zoological Museum, University of Turku
- **AMNH:** American Museum of Natural History, New York
- **UBC:** Beaty Biodiversity Museum, University of British Columbia.



Jumping spiders - Collecting

Expeditions to:

- Philippines and Australia 2019
- Thailand 2020

Results:

- Over 2000 specimens collected
- New insight into the diversity and distribution
- Species/genera new to science



Why interesting to study?

Genus *Cytaea* Keyserling 1882

Salticidae -> *Euophryinae* -> *Cytaea*

Type species - *C. alburna* Keyserling, 1882

N nominal species: 41

(*World Spider Catalog* 2019)

11 – species described based on male specimen

13 – species described based on female specimen

30 species had unclear taxonomic status (morphological distinctiveness from the type species)

Origin: Oriental Zooregion



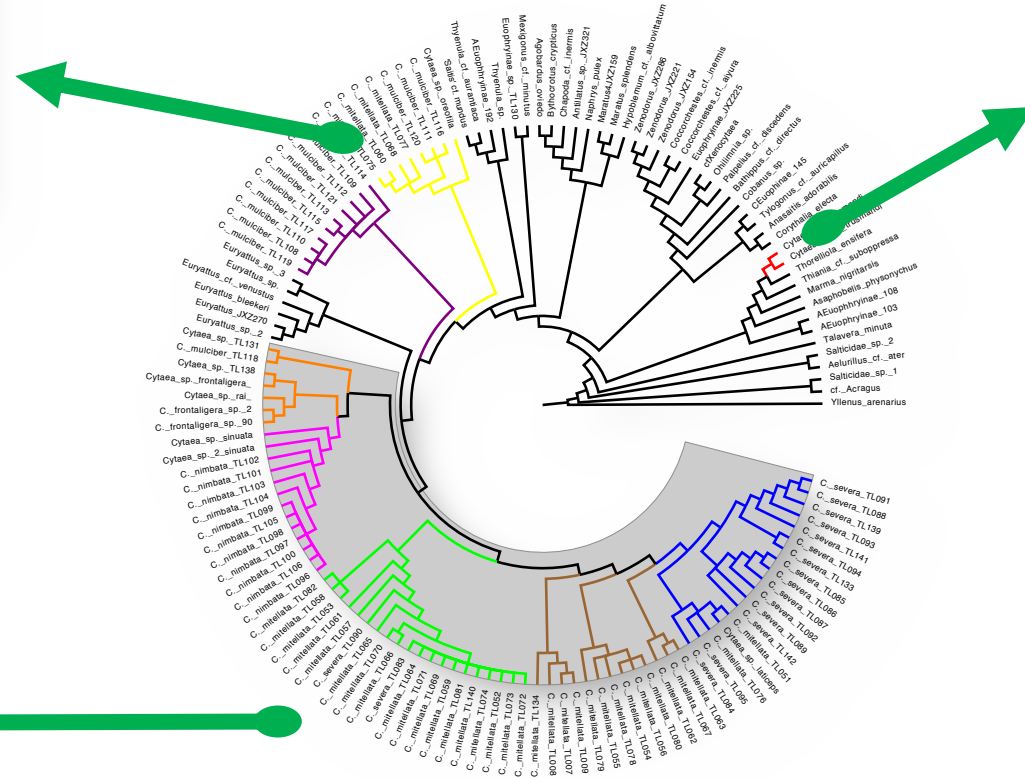
Cytaea distribution (Metzner 2019)

Genus *Cytaea* aims

To understand:

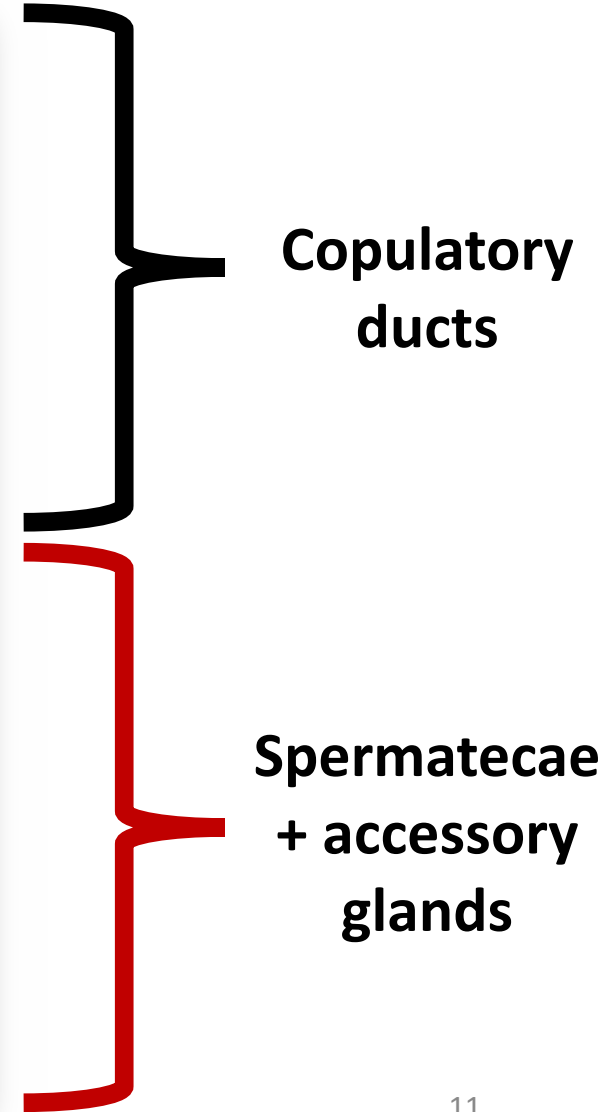
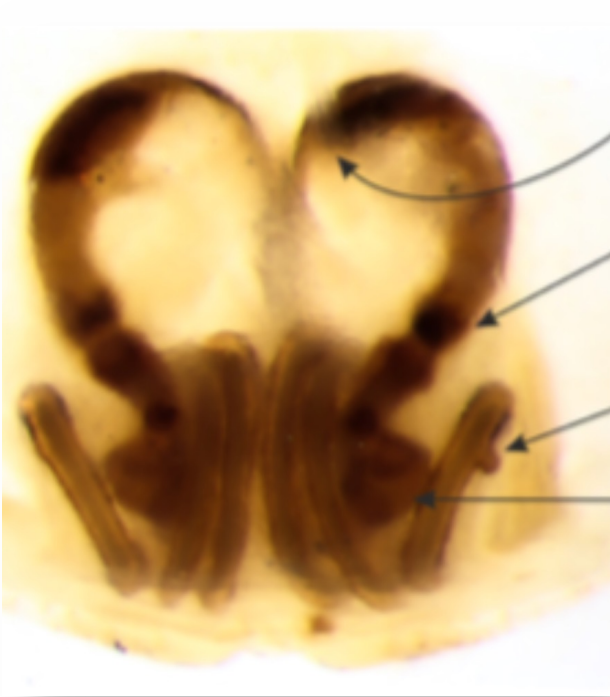
1. Monophyly of the *Cytaea*
2. Genus distribution
3. Number of species

Results – monophyly of *Cytaea*



Maximum likelihood tree based on COI, 16S and 28S (138 taxa, 93 this study)

Results - new morphological characters



Results - new morphological characters



***Cytaea* sp. 34**



***Cytaea* sp. 66**



***Cytaea* sp. 35**



***Cytaea* sp. 56**

Results - new morphological characters



Cytaea nimbata group

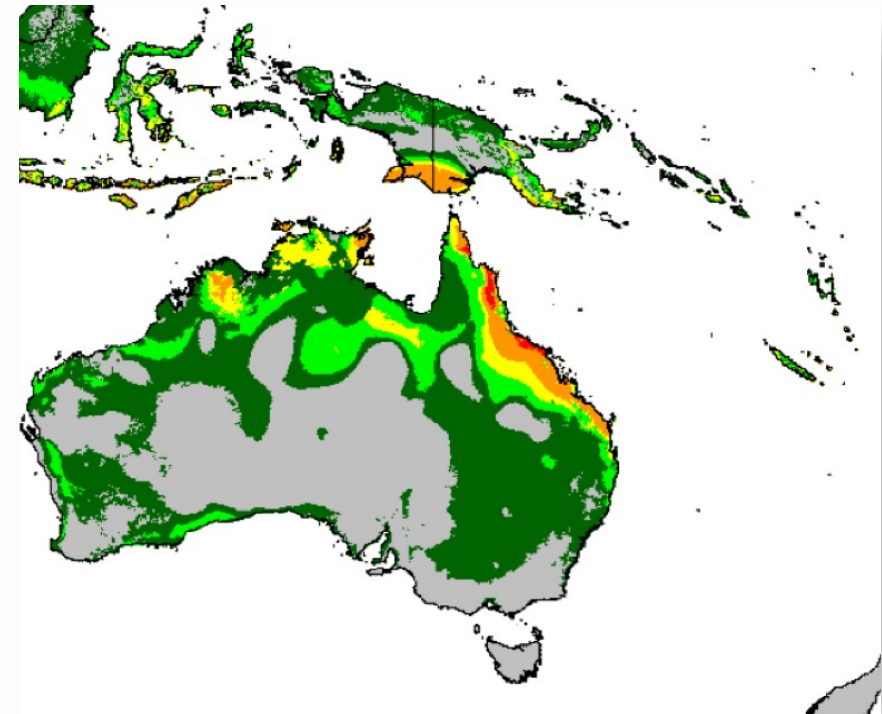
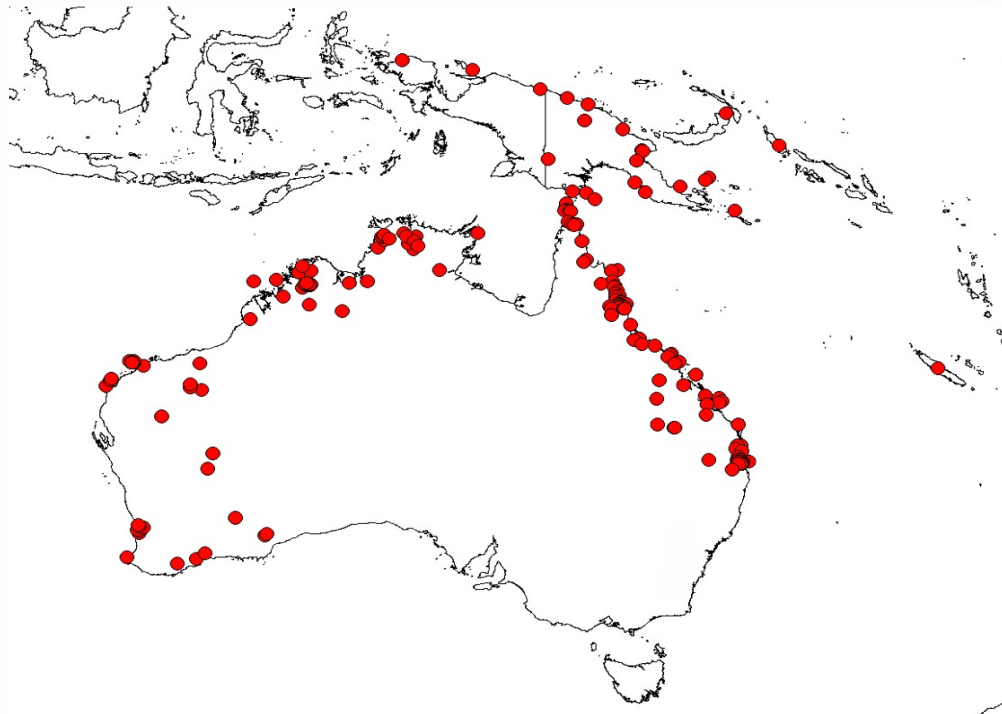
Results – monophyly of *Cytaea*

- Comparative phylogenetic analysis allow to understand monophyly of the *Cytaea* and to precise the genus diagnosis
- From 41 nominal species - **18 belongs to *Cytaea* monophyletic group** - remaining 23 are representatives of other taxa.



Results – distribution of the *Cytaea*

Genus *Cytaea* sensu nov is distributed only in **Australian Region**



Results – species delimitation

- Based on types, new material and field research we discovered ~ 60 new species (5 species groups) of *Cytaea* from Australia.
- The species across groups shows individual variation in genital morphology and body coloration (alcohol preserved!!!) thus their delimitation is highly difficult.



Cytaea – Type specimen

Results – species delimitation



Cytaea sp. 1 mitellata

vs

Cytaea sp. 2 mitellata



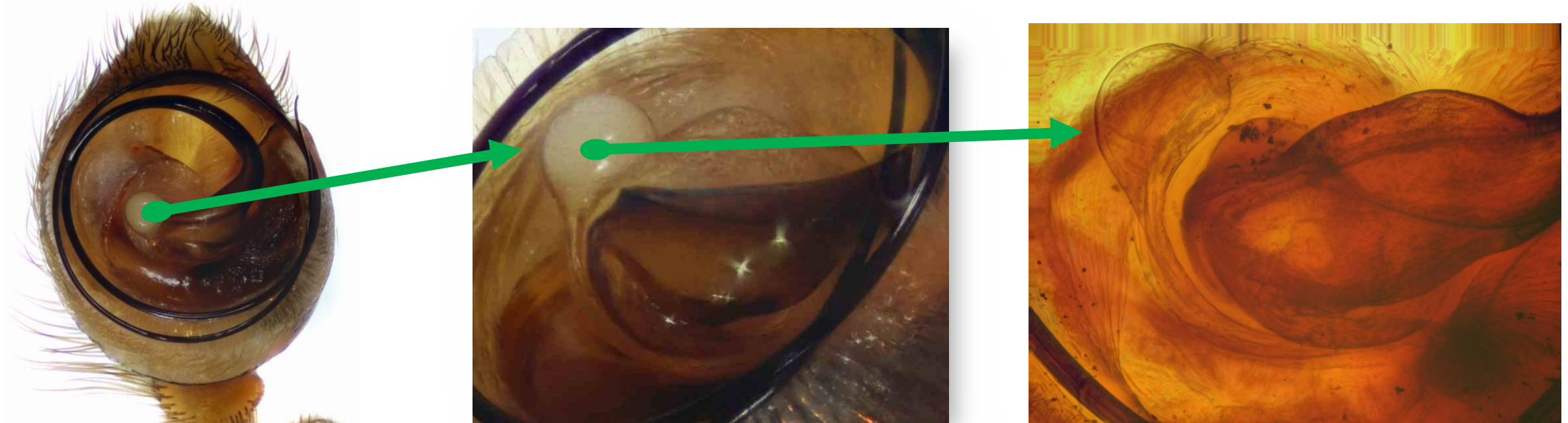
Results – Discovery of **mating plug** in the genus *Cytaea*



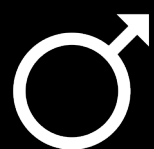
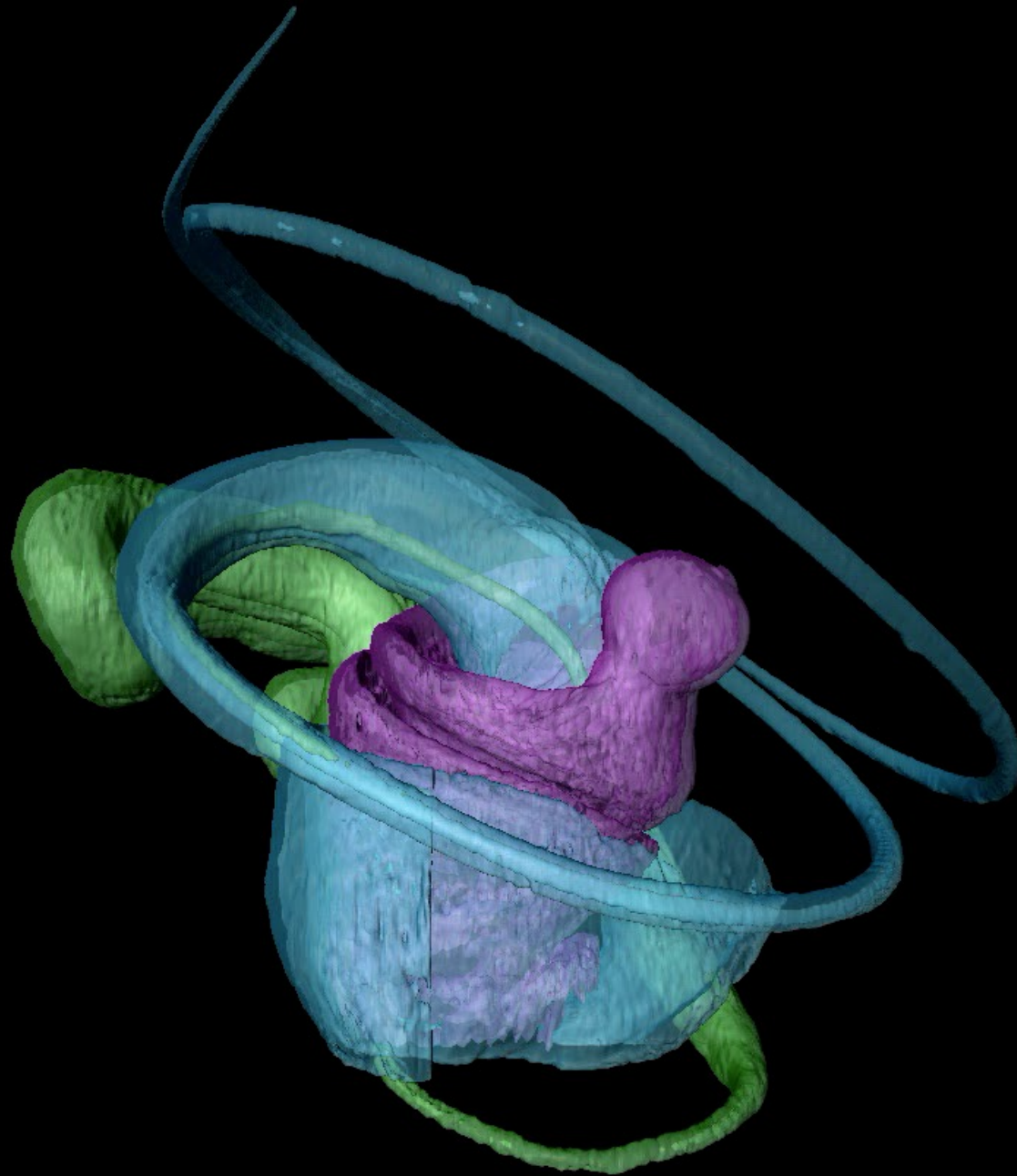
Copulatory ducts
+ mating plug

Spermatecae
+ sperm

Results – Discovery of **mating plug** in the genus *Cytaea*

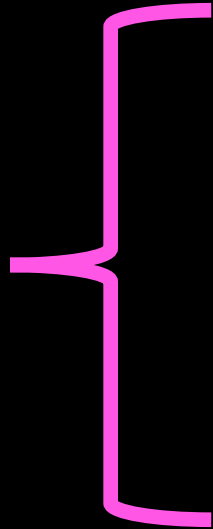


Accessory gland

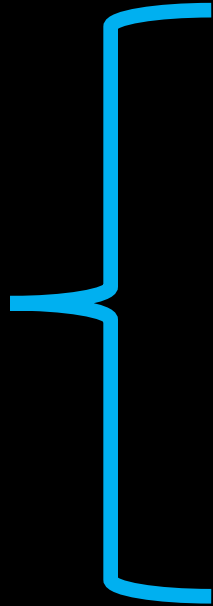


Embolus + accessory gland + spermophore

Copulatory ducts
+ mating plug



Spermatecae
+ sperm



Jumping spiders in Taiwan

Only **60 species** representing **37 genera** recorded so far...

...with only **5 DNA barcodes** available

Thank you for your attention!



Grants:

- IDUB UŁ (2022-2023) - To discover undiscovered - the origin of jumping spider fauna from the Philippines Archipelago
- Miniatura 5 NCN (2022) - Non-obvious evolution - DNA as the key to understanding speciation of spiders

Contact

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