

4-21-2014

Comparing and Informing Morphological Species Identifications and Boundaries in Arthropod Gut- dwelling Protists Using Molecular Phylogenetic Analyses

Mason Hinchcliff

College of Arts and Sciences, Boise State University

Nicole Reynolds

College of Arts and Sciences, Boise State University

Eric Tretter

College of Arts and Sciences, Boise State University

Dustin Heeney

College of Arts and Sciences, Boise State University

Justin Gause

College of Arts and Sciences, Boise State University

See next page for additional authors

Authors

Mason Hinchcliff, Nicole Reynolds, Eric Tretter, Dustin Heeney, Justin Gause, Tyler Pickell, and Prasanna Kandel

Comparing and informing morphological species identifications and boundaries in arthropod gut-dwelling protists using molecular phylogenetic analyses

Mason Hinchcliff¹, Nicole Reynolds¹, Eric D. Tretter¹, Dustin Heeny¹, Justin W. Gause¹, Tyler Pickell¹, Prasanna Kandel¹, Matias J. Cafaro², Laia Guardia-Valle³, Merlin M. White¹

¹Boise State University, 1910 University Dr. Boise, ID 83725; ²Universidad de Peurto Rico, Mayaguez, Puerto Rico 00681; ³Universitat Autonoma de Barcelona, Barcelona, Spain 08193

Objectives

- Examine molecular data to find species clusters
- Morphologically compare specimens to described species
- Record morphological findings and calculate observed averages and ranges of mature thalli

Materials and Methods

- Focused on numerous Norwegian *Paramoebidium* (see tree)
- Reviewed slide vouchers
- Categorized specimens according to host
- Morphometric analyses according to established characters: thallus length and width, holdfast position, etc.
- Compared with LUCID Key (U. Kansas)

Results

- **Identified four potentially new species!**

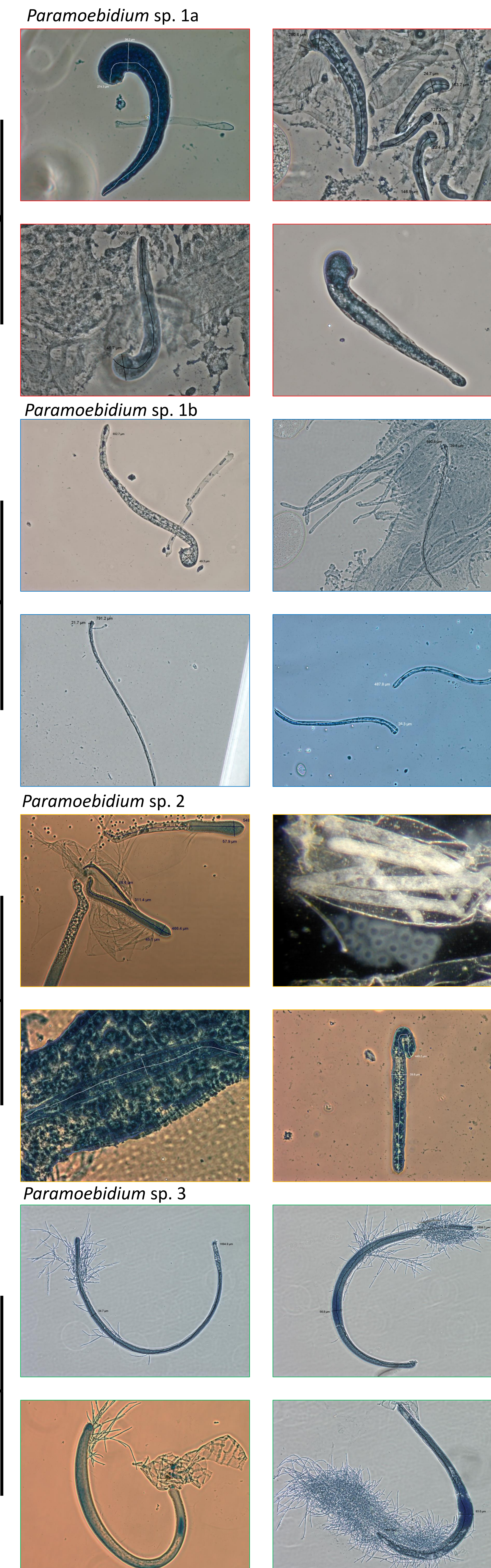
Future Research

- Additional scrutiny is needed to properly identify selected specimens as new species or variable forms of current ones
- Continue to compare molecular and morphological data to clarify the relationships and evaluate utility of morphological characters for taxonomic placement of *Paramoebidium* species.
- The Genus appears to be much more diverse and host specific than previously realized!



Identifying features of *Paramoebidium* morphology

Host Order	Host Family	Established Species	Thallus Length (µm)	Thallus Width (µm)	Thallus Shape	Features	Area
Plecoptera	Taeniopterygidae	<i>Paramoebidium angulatum</i>	400-600	20-35	Cane-shaped	Bend is ±90° and at 1/4 total thallus length	France
Plecoptera	Taeniopterygidae	<i>Paramoebidium sp. 1a</i>	300	40	Comma-shaped	Offset holdfast on incurved side of base	Norway
Plecoptera	Taeniopterygidae	<i>Paramoebidium sp. 1b</i>	500-750	20-40	S-shaped	Offset holdfast on the incurve side of the first curve	Norway
Plecoptera	Nemouridae	<i>Paramoebidium inflexum</i>	1000, 700, 380	21, 7-8, 50-55	Hairpin, boomerang	Three types are listed	France
Plecoptera	Nemouridae	<i>Paramoebidium stipula</i>	650-700	30-80 x 20-45	Irregular	Central holdfast with two unsymmetrical arms	Canada
Plecoptera	Nemouridae	<i>Paramoebidium sp. 2</i>	450-650	35-55	Cane-shaped	Bend is ±120° and at 1/10 total thallus length	Norway
Diptera	Simuliidae	<i>Paramoebidium curvum</i>	140-280	20-60	Open circle/spiral	Lateral basal holdfast on incurved side	USA, Sweden, France, and England
Diptera	Simuliidae	<i>Paramoebidium grande</i>	800	60	Open circle/spiral	Distal taper	Chile
Diptera	Simuliidae	<i>Paramoebidium sp. 3</i>	1200-1850	30-80	Semi-circle	Simuliomyces frequently attached to thallus	Norway
Ephemeroptera	Baetidae	<i>Paramoebidium argentinense</i>	600	30	Cane-shaped	Papillation at distal end	Argentina
Ephemeroptera	Baetidae	<i>Paramoebidium hamatum</i>	150-800	Oct-60	Cane-shaped	Distal taper and differing curvature	USA, Norway



Acknowledgements: MH wishes to thank the larger Team Tricho with a special thanks to Dr. Merlin White for his flexibility and willingness let me pursue this research and Nicole Reynolds for her helpful suggestions during each step. Also, with gratitude for support of DBS and COAS for this opportunity.

