

The Life on the island: leaf-litter insect fauna as a bioindicator of long and short term evolutionary change



NÁRODNÍ
MUZEUM

Faculty of Science
CHARLES UNIVERSITY IN PRAGUE



Landcare Research
Manaaki Whenua



MARIE CURIE ACTIONS



Biosystematics, Informatics, Genomics

Long-term evolution of the Hydrophilidae in New Zealand

(1) Molecular phylogenetics of New Zealand Hydrophilidae



Cyloma new species

Long-term evolution of the Hydrophilidae in New Zealand

- (1) Molecular phylogenetics of New Zealand Hydrophilidae
- (2) Fossil evaluation for lineage divergence time calibrations



Hydrophilidae sp. - Otago fossils

Long-term evolution of the Hydrophilidae in New Zealand

(1) Molecular phylogenetics of New Zealand Hydrophilidae

(2) Fossil evaluation for lineage divergence time calibrations

(3) Ecological niche modelling

→ Understanding role of past geologic and climatic changes in the evolution of Hydrophilidae in New Zealand



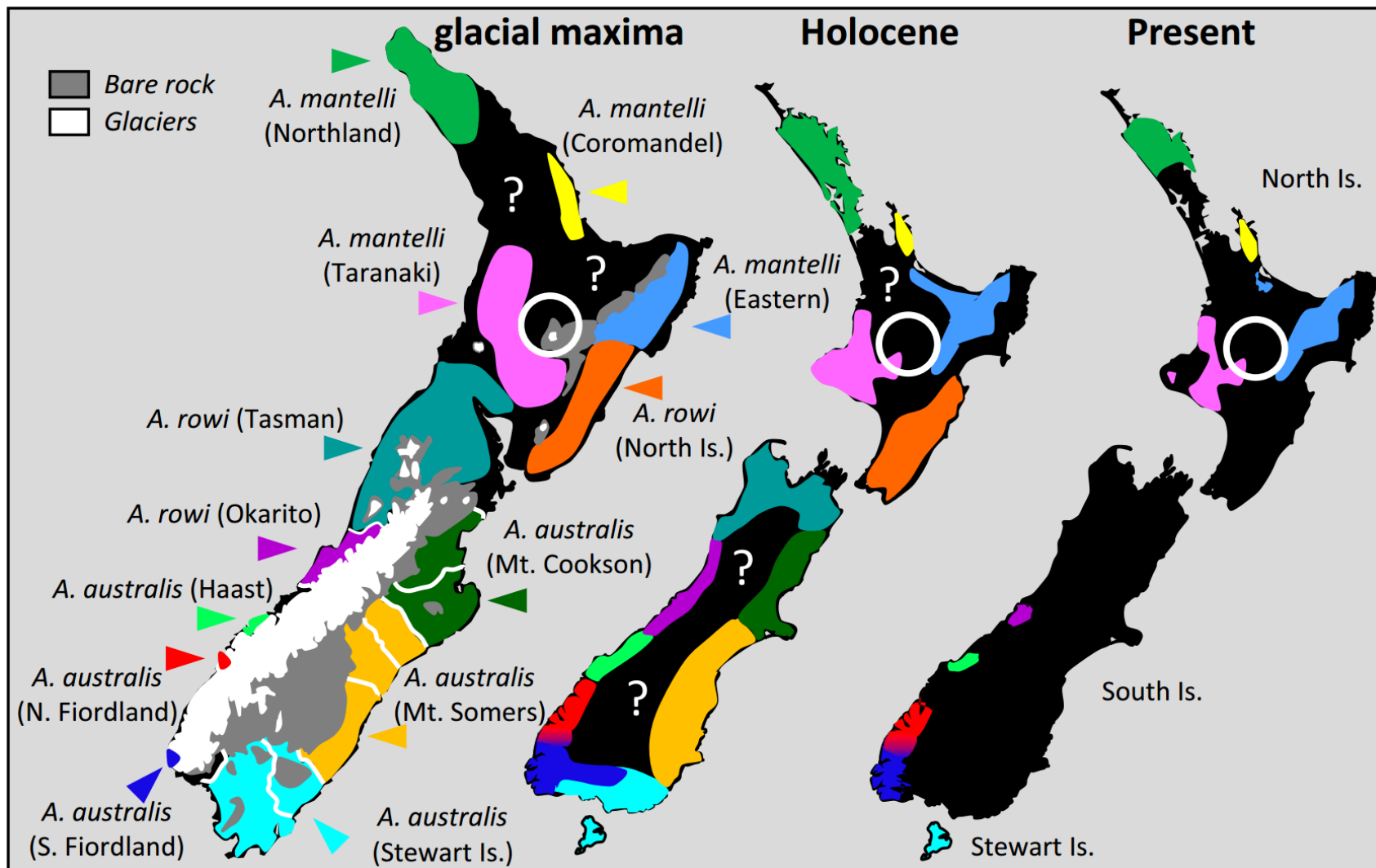
Distribution of Nothofagus forests

Short-term evolution of the leaf litter taxa in New Zealand

(1) Population genetics of three independent leaf litter Coleoptera lineages



Objectives: subtopic 2



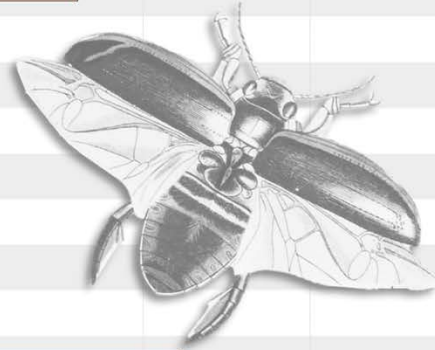
Weir et al. 2016: Explosive ice age diversification of kiwi

Short-term evolution of the leaf litter taxa in New Zealand

- (1) Population genetics of three independent leaf litter Coleoptera lineages
 - (2) To understand the post-glacial faunal reassembly of specific taxa in the 'beech gap' region.
- To infer short-term evolutionary drivers in populations of species in different Coleoptera families.



Results



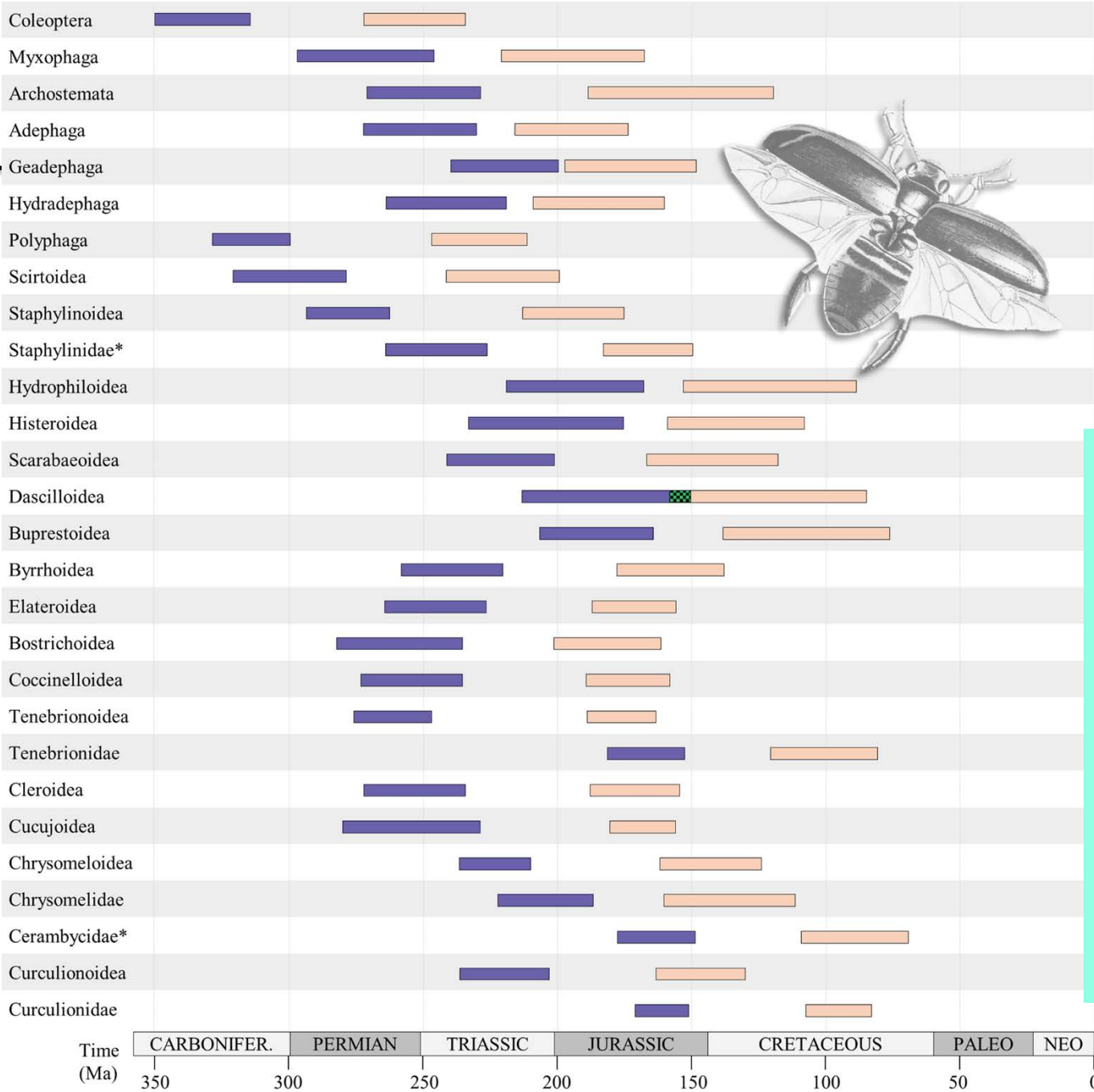
Systematic
Entomology

Hydrophiloidea

Our study: McKenna et al. 2015

190.35
(214.68 to
168.95)

123.93
(151.66 to
88.34)



95% credibility interval overlap

 This study 95% credibility interval

 MCK15 95% credibility interval

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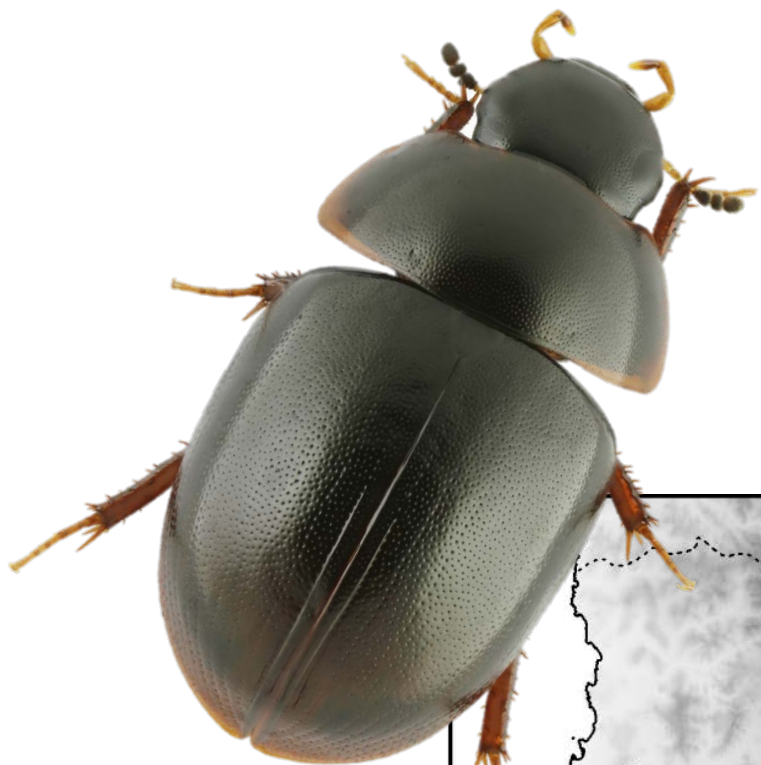
ISSN 0374-1036

<http://zoobank.org/urn:lsid:zoobank.org:pub:221A7F58-99D6-4C58-B357-CDA7DAE0BF49>

Establishment of *Cylominae* Zaitzev, 1908 as a valid name for the subfamily *Rygmodyinae* Orchymont, 1916 with an updated list of genera (Coleoptera: Hydrophilidae)

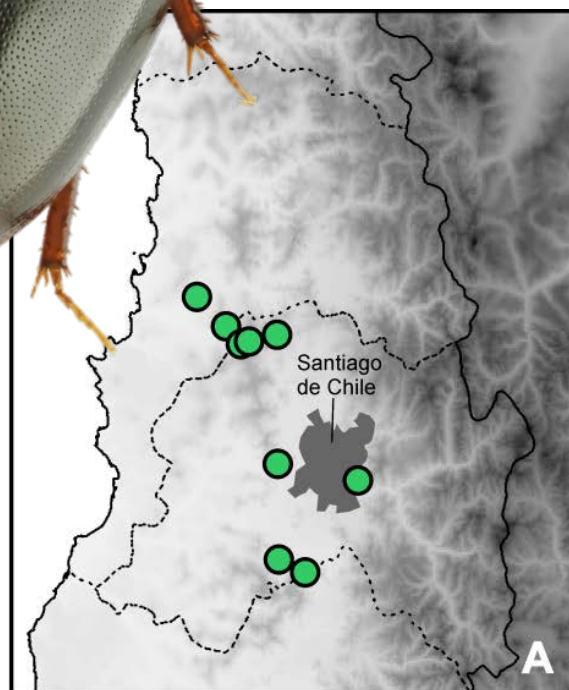
Matthias SEIDEL^{1,2}, Emmanuel ARRIAGA-VARELA^{1,2} & Martin FIKÁČEK^{2,1}

Chilean-South African disjunct genus *Cylorygmus*

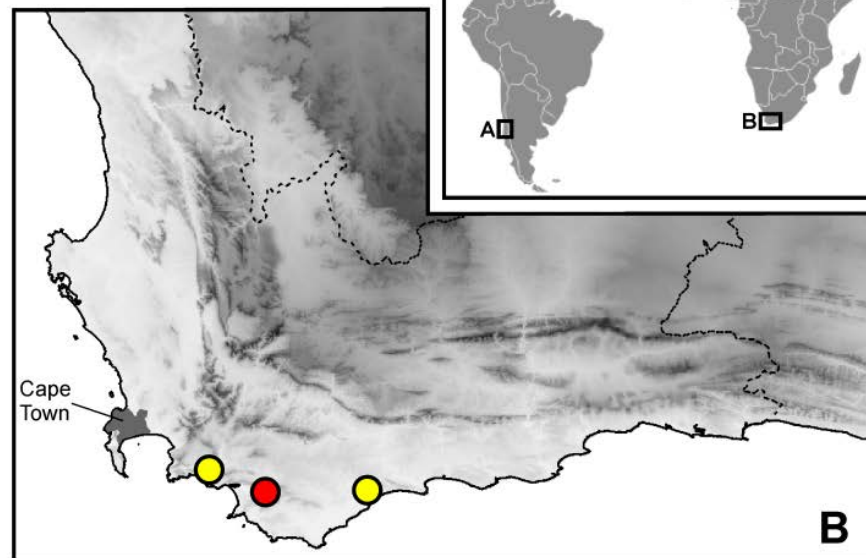


Cylorygmus n. sp. South Africa, Western Cape

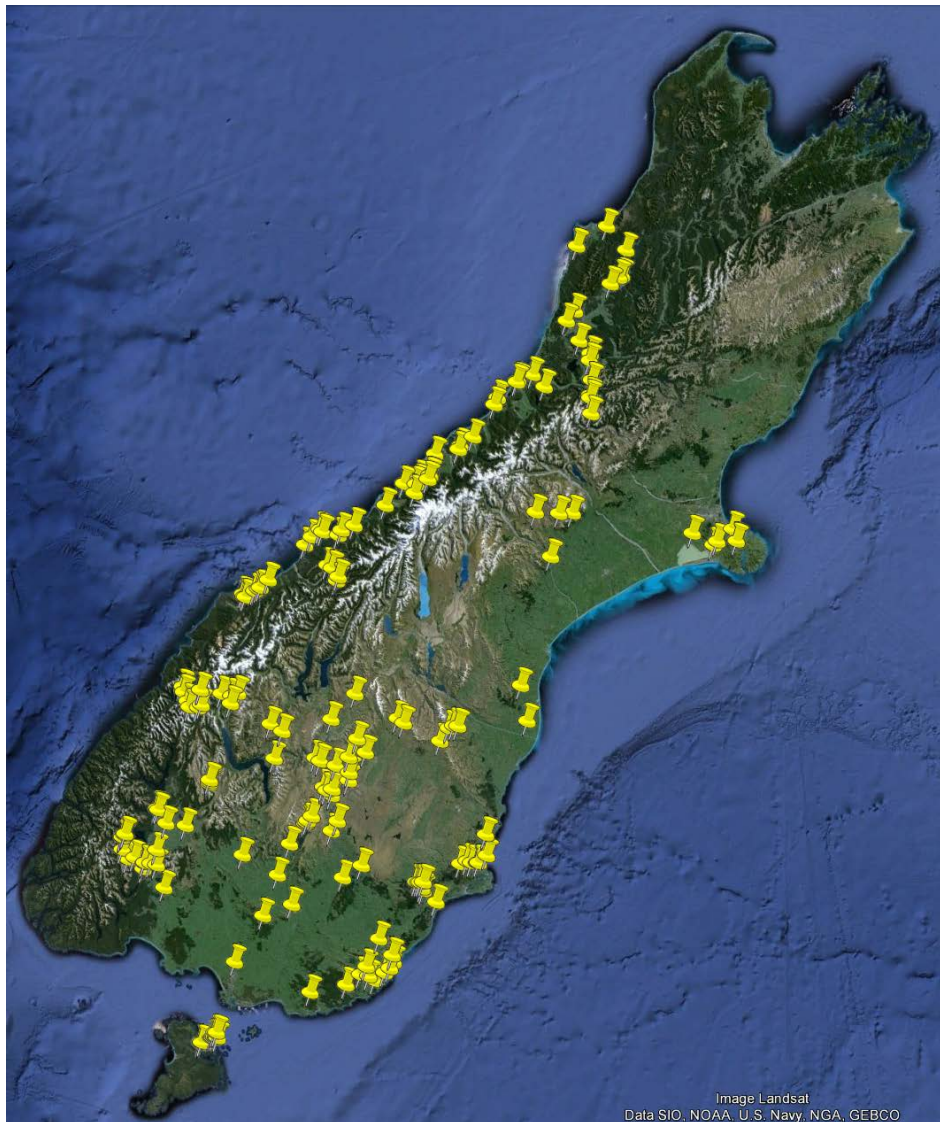
→ crucial for understanding
biogeography of Cylominae



- *Cylorygmus lineatopunctatus*
- *Cylorygmus repentinus*
- *Cylorygmus trevernoahi* sp. nov.



Secondment: Landcare Research



- Fieldwork
- Collection research
- Data collecting

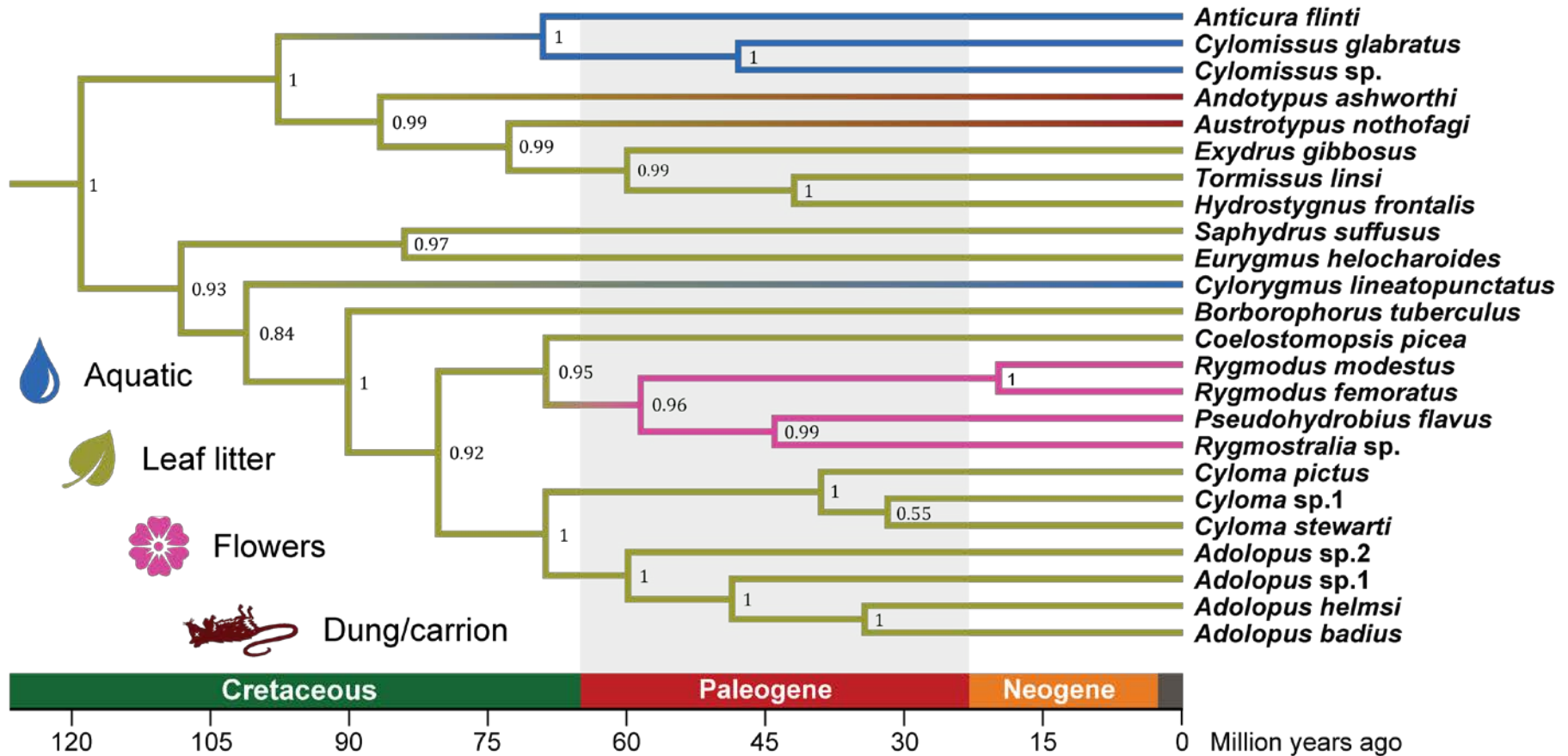


Richard Leschen

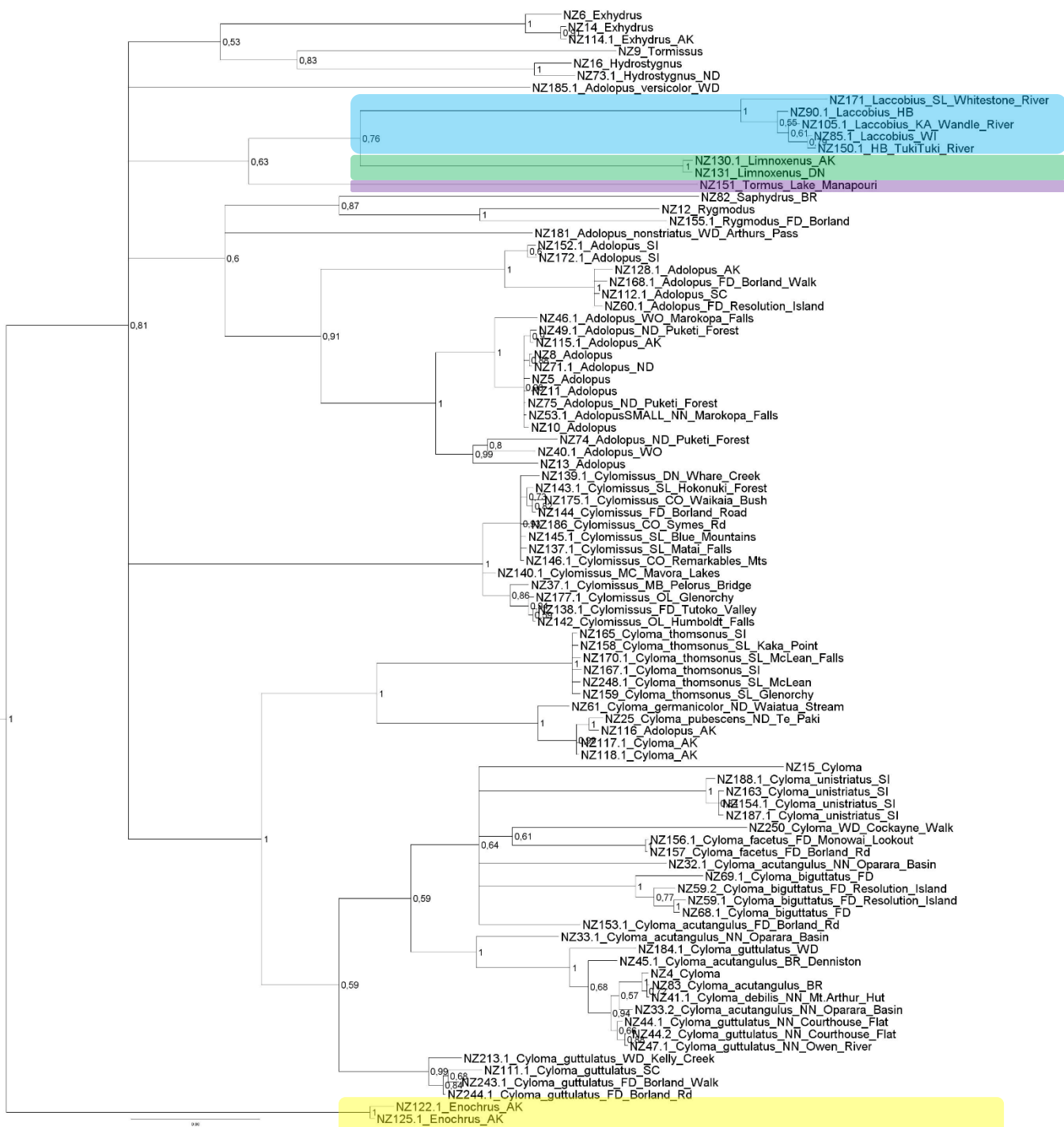


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Phylogenetic results



- Sýkora *et al.* (in prep.)



Laccobius



Limnoxenus

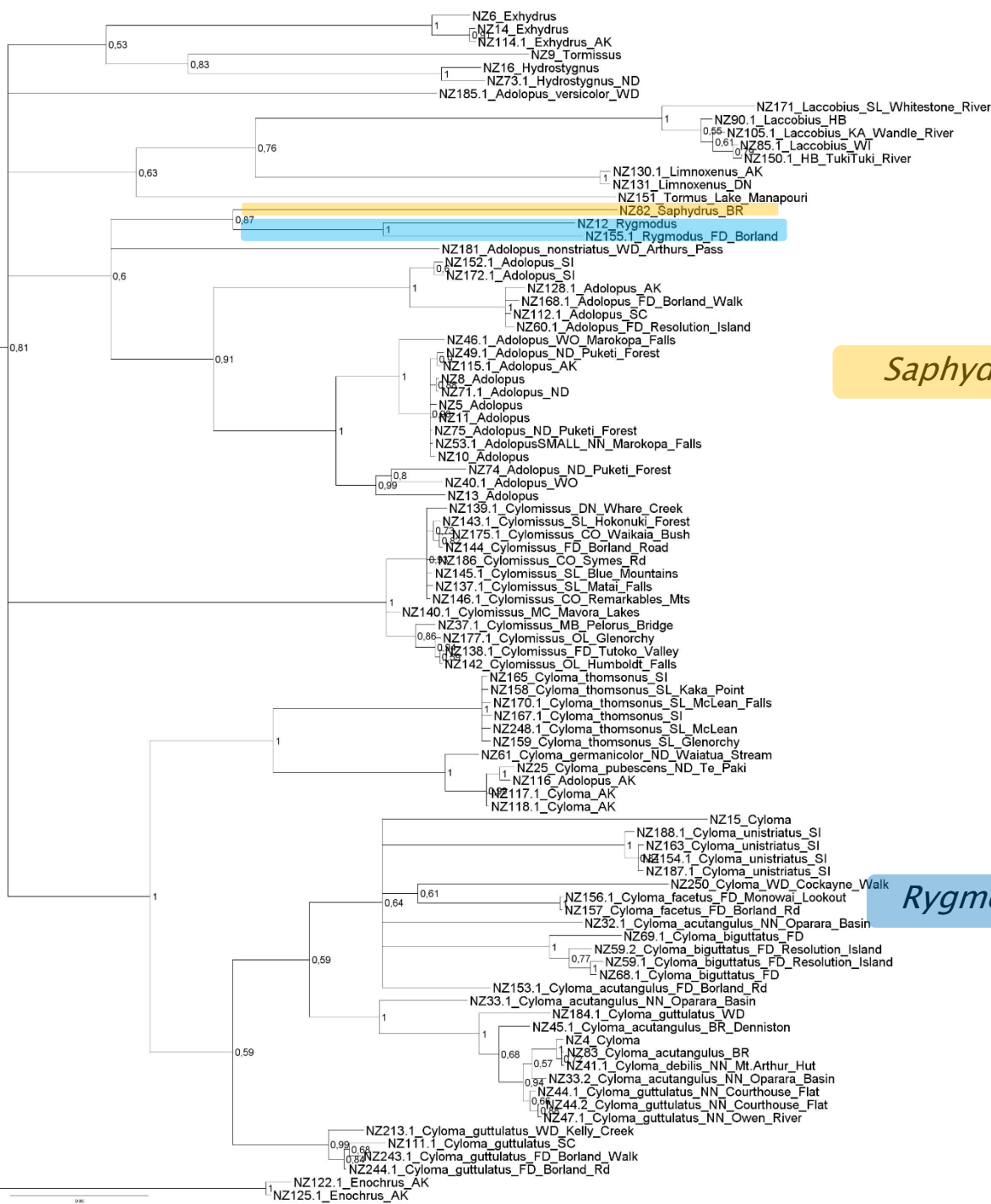


Tormus



Enochrus



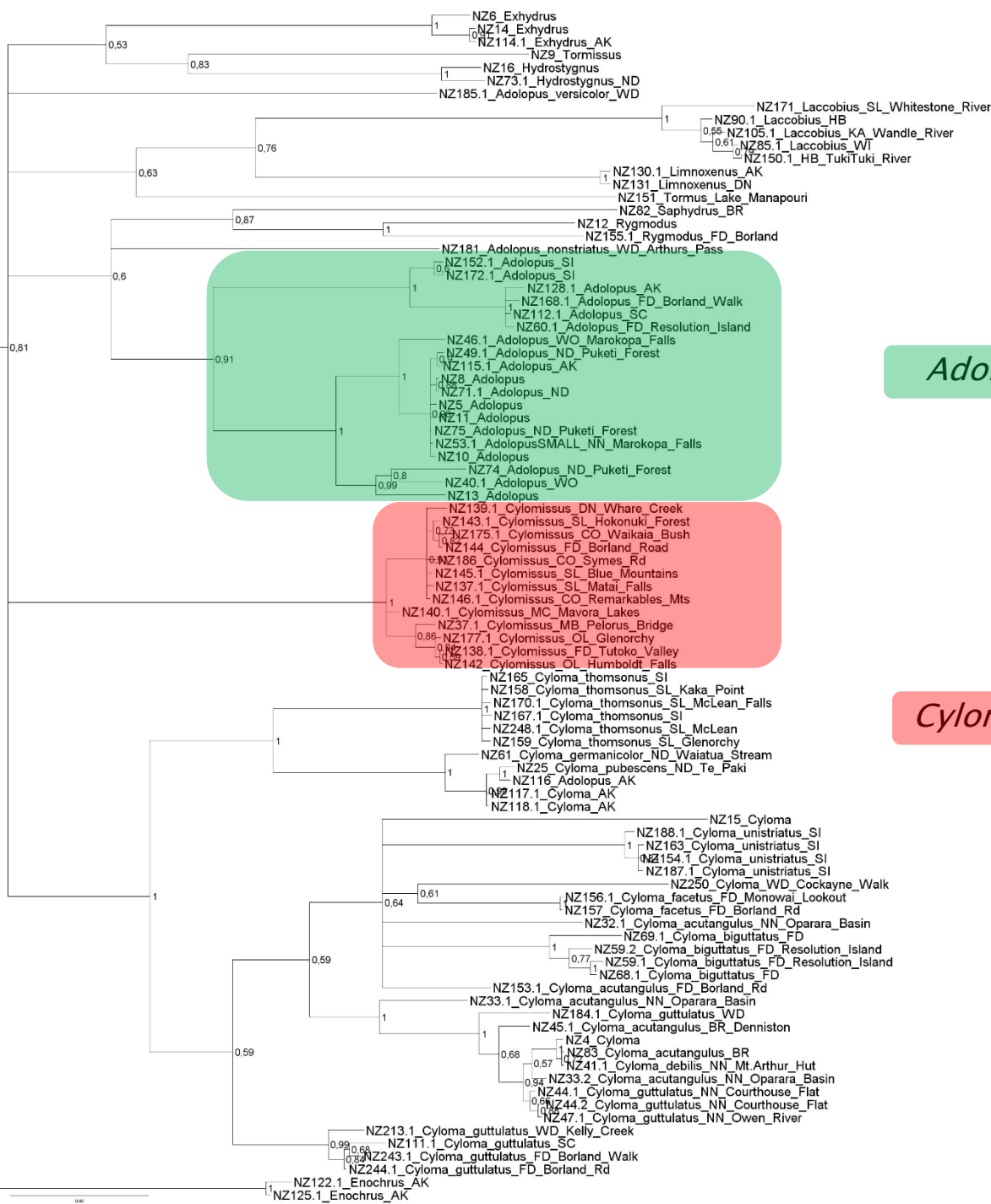


Saphydrus



Rygmodus



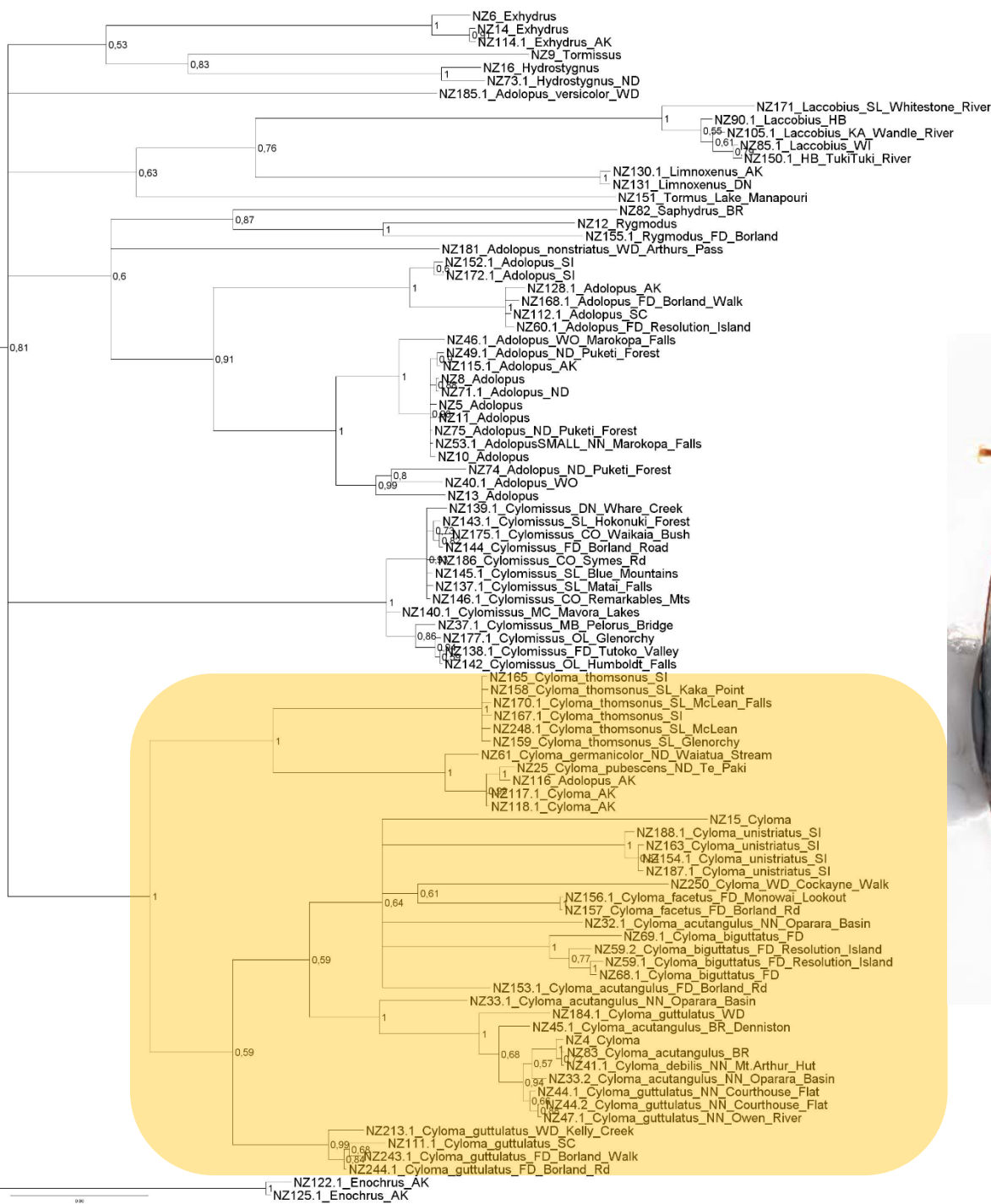


Adolopus



Cylomissus





Cyloma



Secondments & Networking



target enrichment

DNA extraction

NGS

phylogenetic reconstruction

ancient specimens

Phylogenetics

Population genetics



Impact on my career

- new skills in molecular and morphological techniques
- improving skills in paper writing & illustration
- networking for future collaborations
- widening my personal horizon of research interests
- new ideas for future projects
- high-impact publications as foundation for future job opportunities





**NEXT
5 km**

**Thanks for your
attention!**

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