

Aleocharinae (Coleoptera: Staphylinidae) of New Zealand: development of the accelerated workflow to study "dark taxa" in poorly known areas

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Project goals and methods



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graph TD; A[Project goals and methods] --> B[Review of New Zealand genera]; A --> C[Methodological improvements]; B --> D[phylogenetic delimitation of NZ genera]; D --> E[molecular]; D --> F[morphological]; E --> G[modern taxonomic generic treatment]; F --> G; G --> H[estimate of the species diversity of the NZ Aleocharinae fauna]; C --> I[DNA sequencing of selected morphotypes]; I --> J[phylogenetic analysis (Gusarov's datasets)]; J --> K[digital photography]; K --> L[DNA barcoding]
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Review of New Zealand genera

phylogenetic delimitation
of NZ genera

molecular

morphological

modern taxonomic
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estimate of the species
diversity of the NZ
Aleocharinae fauna

Methodological improvements

DNA sequencing of
selected morphotypes

phylogenetic analysis
(Gusarov's datasets)

digital photography

DNA barcoding

What is the problem with study of the Aleocharinae subfamily?

- **Large diversity:** 17,147 sp., 1328 genera, 72 tribes (December 2015).
- **In New Zealand:** 168 sp., 140 are endemic. 65 genera, 27 are endemic (December 2015).
- **Small size** (3-5 mm.)
- **Lack of specialists**
- **Lack of literature**
- **Absent identification guide** for NZ
- **Different taxonomy** (52 – 72 tribes).
- **Lack of studies**, based on **DNA-barcoding**.
- Almost **no paleo-data**
- Mostly **unknown larvae** stages



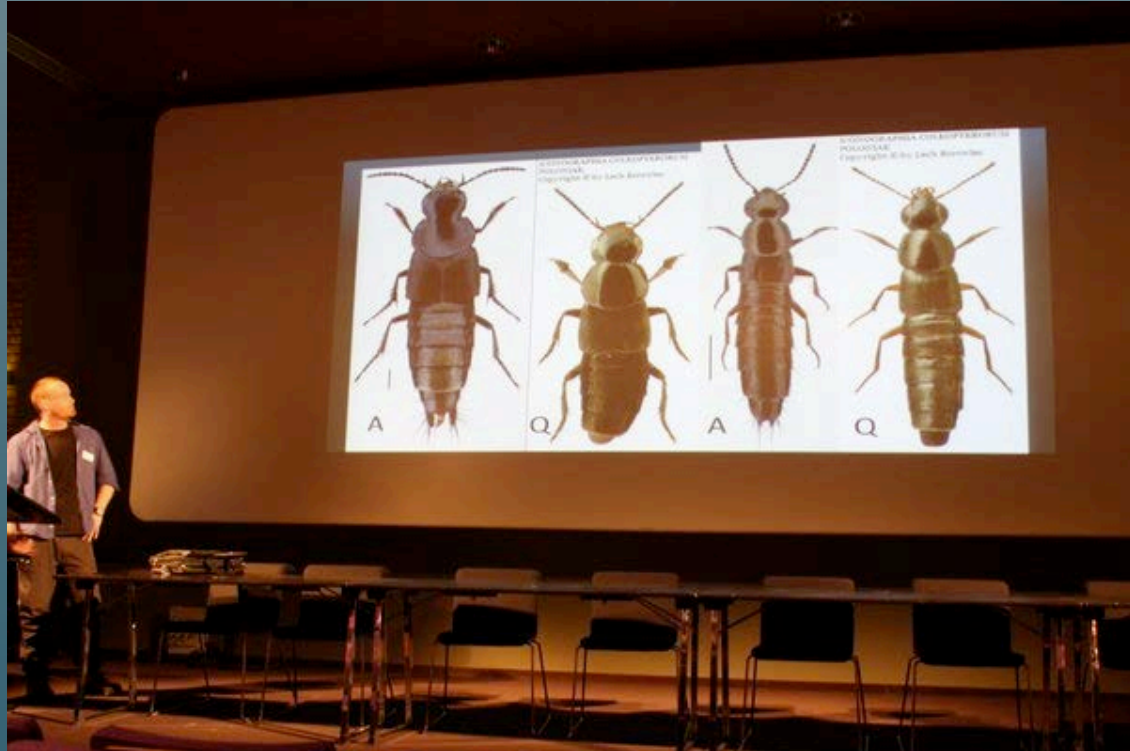
What we have done



- ZMUC Aleocharinae collection was totally renewed. Nov'15 – Jan'16
- The collection has great importance for my future work

Staphylinidae meeting in Brussels

- In May 2016 I visited 31th International meeting on Systematics and Biology of Staphylinidae
- Met with the major experts on Rove Beetles



Expedition to the Italian Alps. May 2016...



- To get fresh material for future studies
- To improve collecting methods

...and Slovenian Alps. June 2016

- To get rare Aleocharinae rove beetles for DNA work
- To learn some specific methods of fieldwork in a High-elevation area
- To have fun ;-)



Field work in Czech Republic June'16



- Continue collecting European Aleocharinae rove beetles
- Continue to improving collecting methods

Work at the Národní muzeum, Prague, June'16

- To get experience with work at museums
- To sort New Zealand Aleocharinae for future work





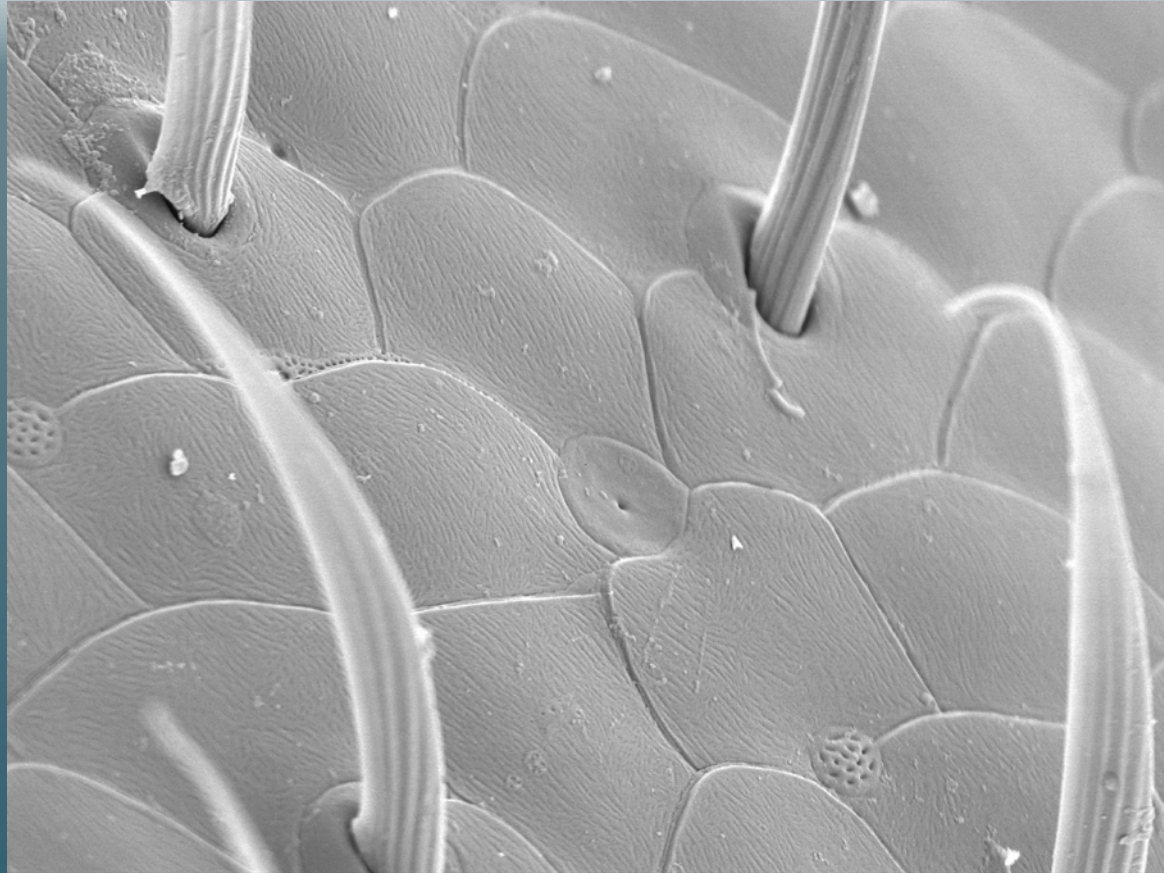
Photosystem setup

Aug – Sept'16

- Selection of photosystem components and their connection
- Manual cleaning of optics and the lenses
- Learning of basics of taking pictures
- Taking pictures of Aleocharinae
- Making a step-by-step guide for our Lab.

Work with a Scanning Electron Microscope

- Learnt the basics of working with a SEM
- Used the SEM pictures for the description of new species for science



NONE

SEI

7.0kV

X4,300

1µm

WD 14.1mm

2. *Leptusa (Halmaeusa) antarctica*
(Kiesenwetter, 1877)
(figg. 1644-1647)

Halmaeusa antarctica Kiesenwetter, 1877: 161; Steel, 1964: 367

Sipalia antarctica: Fauvel, 1877: 294

Leptusa (Halmaeusa) antarctica: Bernhauer & Scheerpeltz, 1926: 556

Antarctophytosus macquariensis Womersley 1937, *Rep. Brit. Austr. N. Z. Antarct. Res. Exp. (B)* 4: 27; Steel, 1964: 367

Halmaeusa nesiotes Steel, 1964: 369, syn. n.

Halmaeusa sparsepunctata Steel, 1964: 371, syn. n.

TIPO. Auckland Is. (Krone leg., ZSM). Tipi richiesti ma non ottenuti perché il Museo è in ristrutturazione (teste dr. G. Scherer, ZSM). La specie è qui intesa nel senso di Steel, che ne vide i tipi e che la illustrò chiaramente.

DESCRIZIONE. Lungh. mm 2,5-3. Corpo da bruno-rossiccio a bruno scuro; talvolta il capo è oscurato; antenne brune, con base, e talvolta anche l'undicesimo antennomero, rossicci. Capo e pronoto fittamente punteggiati; elitre coperte di fitti granuli. Edeago: figg. 1644-1646; spermateca: fig. 1647.

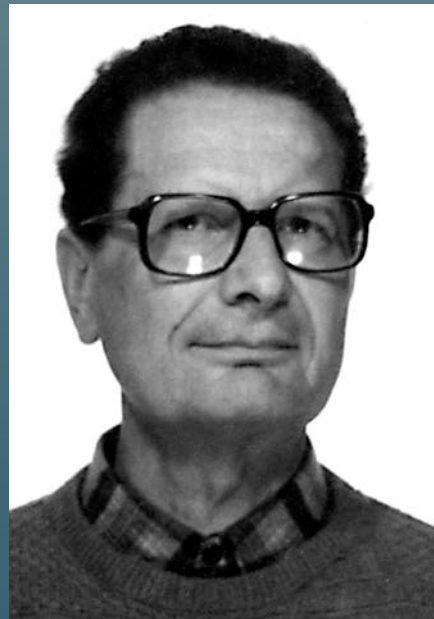
DISTRIBUZIONE. Auckland, Campbell e Macquarie Is.

Per le numerose località di raccolta, v. Steel (1964).

“Subantarctic *Leptusa*” side project



William Owen Steel



Roberto Pace



Leptusa antarctica
Kiesenw.



Leptusa nesiotes
Steel



Leptusa sparsepunctata
Steel



Leptusa sp. nov. 1



Leptusa sp. nov. 2

Possible impacts of action on future career

- Obtain Laboratory work experience
- Learn taxonomical methods of work
- Improve fieldwork methods
- Establishing connection with colleagues
- Improve teaching skills
- Getting experience in writing scientific papers
- Understand main principles in Academia
- Popularization of science in society

Our work in near future

- Dissections of type species of each widespread genus not endemic to New Zealand: **by the end of the year**
- Arrive to New Zealand: **January 31, 2017**
- Preliminary examination of pinned collection to clarify genus-level status and unsorted pinned material: **Feb 28, 2017**
- Commence dissections of one male/female of each genus level taxon: **March 30, 2017**
- Sort DNA grade material: **April 30, 2017**
- Visit John Nunn Collection and start on preliminary manuscript on any new genera: **May 30, 2017**



Keep calm, Igor

**And continue to
study Aleocharinae**



Thank you for your attention!
Any questions?

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THE FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION

HORIZON 2020