Digitisation of the Chalcidoidea collection at the Natural History Museum, London – current projects

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NATURAL HISTORY MUSEUM

Chalcidoidea (Hymenoptera)

Callitula pyrrhogaster

Dirhinus caeruleus

Epanusia bifasciata

Eupelmus vesicularis

Gahanisca gnathocerus

Grandiana armadillo

Mymar puchellum.

Neochrysocharis formosa

Oodera longicollis

Platynocheilus cuprifrons

Pteromalus caudiger

Schizaspidia caeruleiceps

Digitisation projects

Mass digitisation of Chalcidoidea slides

- Part of pilot project
- “Broad and thin” approach: emphasis on maximising the number of specimens digitised
- Inselect software

Digitisation of historical Chalcidoidea specimens

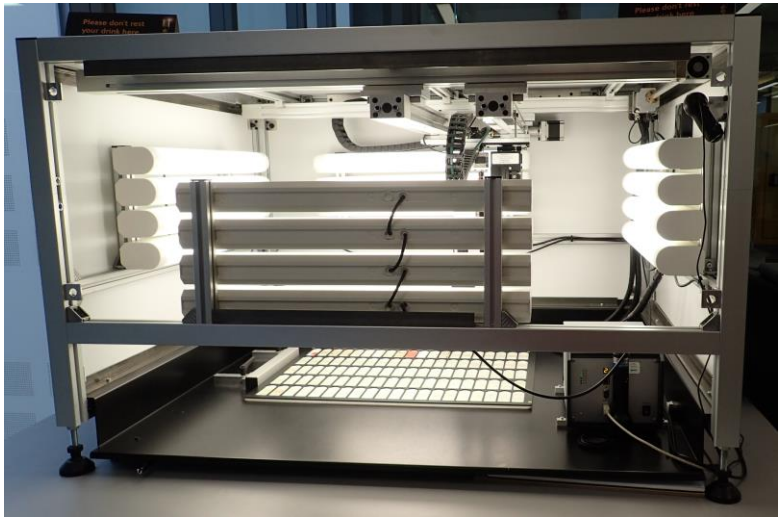
- Specimens collected by Charles Darwin, Alfred Russel Wallace and Henry Walter Bates
- Emphasis on researching the specimens and populating the specimen records

Mass digitisation of slides

- Digitisation of the complete holdings of Eulophidae, Mymaridae, Trichogrammatidae (~ 5,500 slides)
- Whole slide imaging and generation of stub specimen records
- No transcription of labels data (but available from image)

Slide scanning

- Slides transferred to slide templates (100 slides per template)
- Labelled with self-adhesive data matrix barcodes

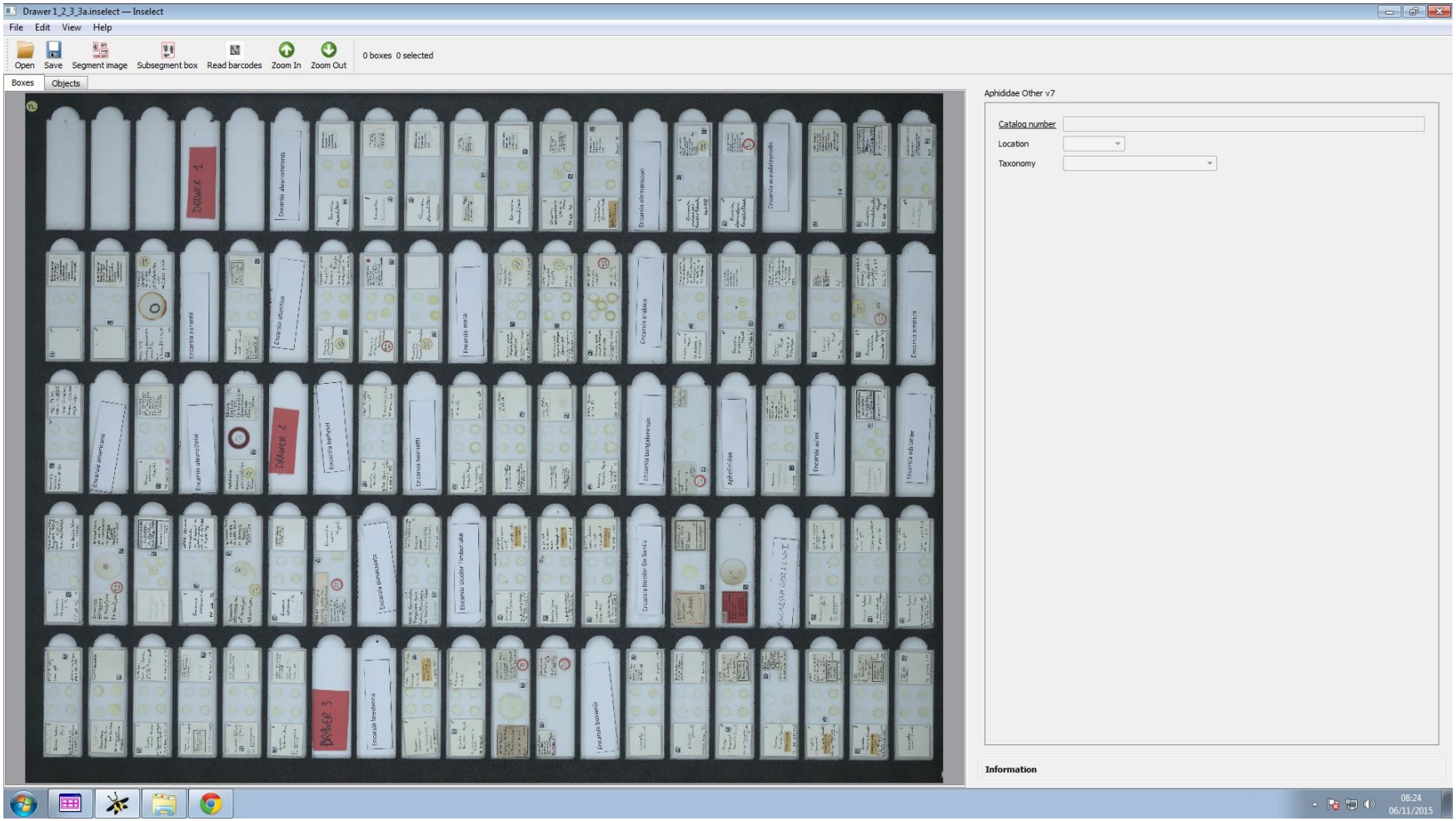


- Imaged with SatScan
- Up to 18 templates scanned a day

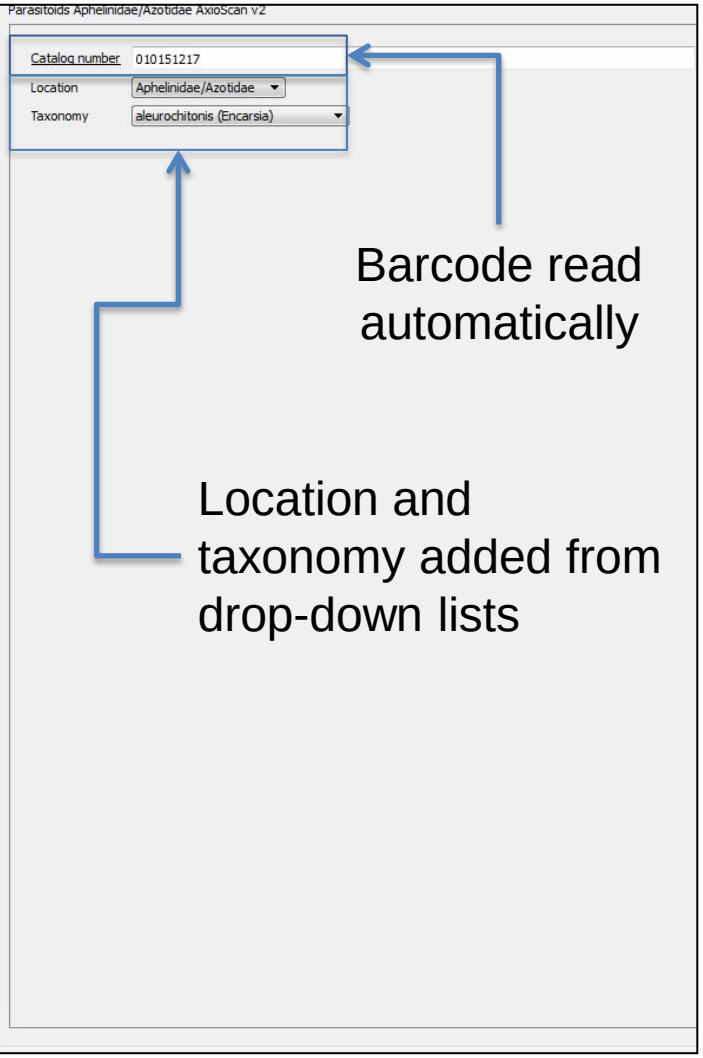
Image segmentation: Inselect software

- Prototype originally developed by Natural History Museum and Stellenbosch University (S. Africa)
- **Automated image segmentation**
- **Automated barcode recognition**
- **Association images with metadata**
- Available on internet (open source) https://github.com/NaturalHistoryMuseum/inselect/releases
- Paper in press

From unprocessed image…



… to annotated segments…



… to individual images

010156819_108834_1684282.jpg

- ~ 20 s per slide from scanning to saved crops
- Image name = barcode number_ IRN location_IRN taxon
- Script to import images into CMS (KE-Emu) and generate specimen records
- Option to export metadata as CSV file

The story so far

Outcomes

- 5,500 Chalcidoidea slides scanned
- Stub specimen records in EMU: barcode, taxon, location

Resources

- Volunteers + one person on temporary contract
- Full time staff (curation, volunteer management)

Challenges

- Maintaining collection database
- Populating stub records (transcription data, specimen imaging, etc.)

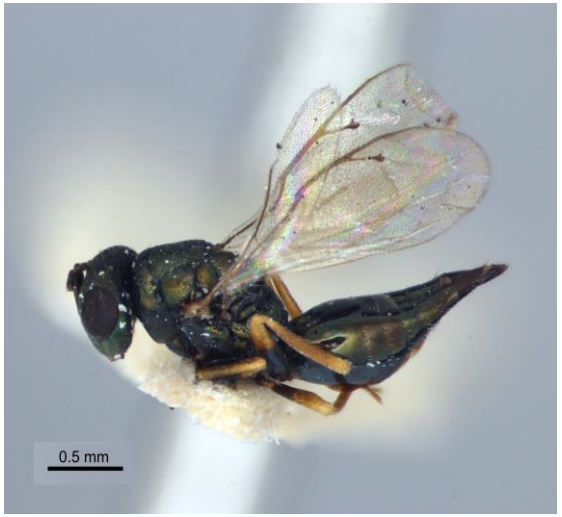
Digitisation of historic specimens

Why digitise historic specimens?

- Make material accessible
- Ensure metadata remains associated with specimens

Digitisation

- Images of labels and specimens (low or high resolution)
- Fully populated specimen records



Pteromalus mydon
Walker, 1839

In Zoology I have done but very little; excepting a large collection of minute diptera and hymenoptera from Chiloe.

Darwin in a letter to Professor Henslow

Additional step: locating specimens

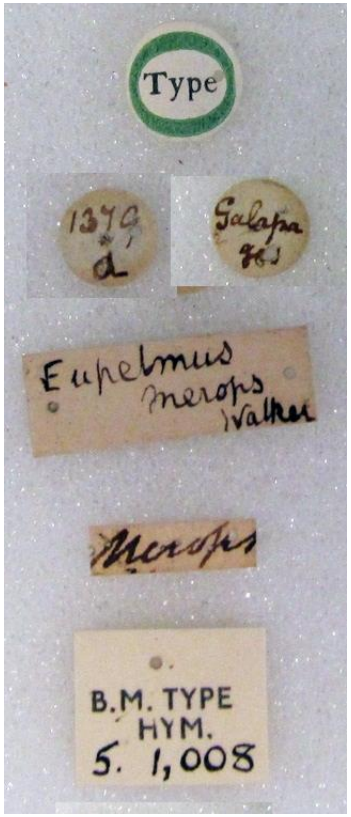
Sources of information

- Entomology accessions registers (named Darwin specimens vs bulk Wallace & Bates accessions)
- Species descriptions (Walker's publications1839-1843 and 1862-1864)
- Walker's 1846 catalogue

Finding the specimens

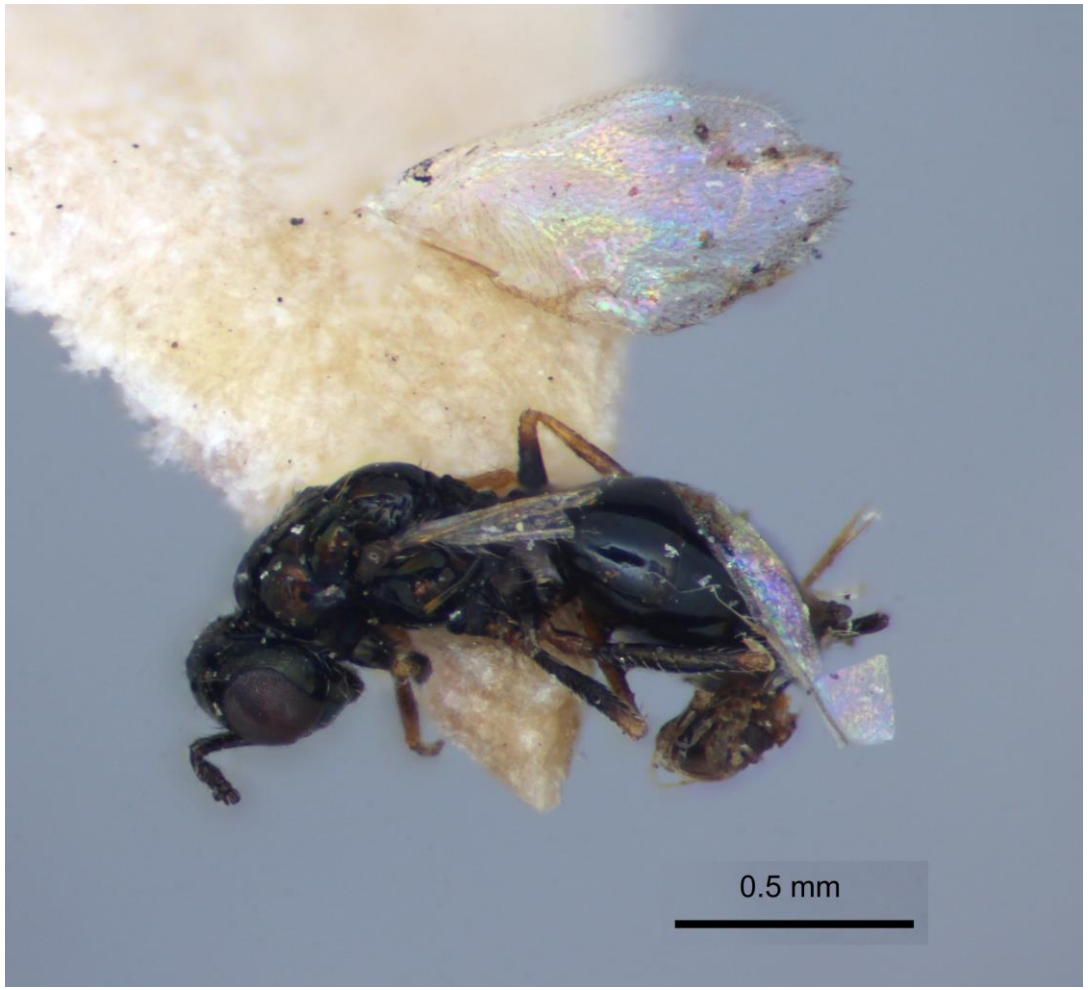
- Types with collector mentioned in original description
- Specimens named in accession registers
- Additional specimens: visual check of drawers

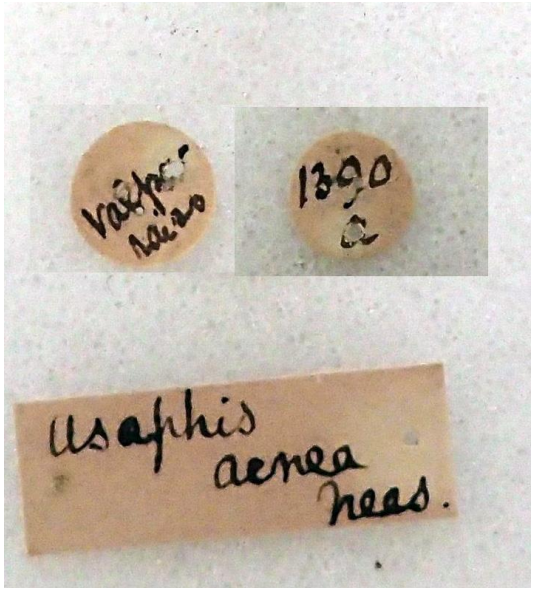
Darwin Chalcidoidea (1)



Eupelmus merops Walker, 1839

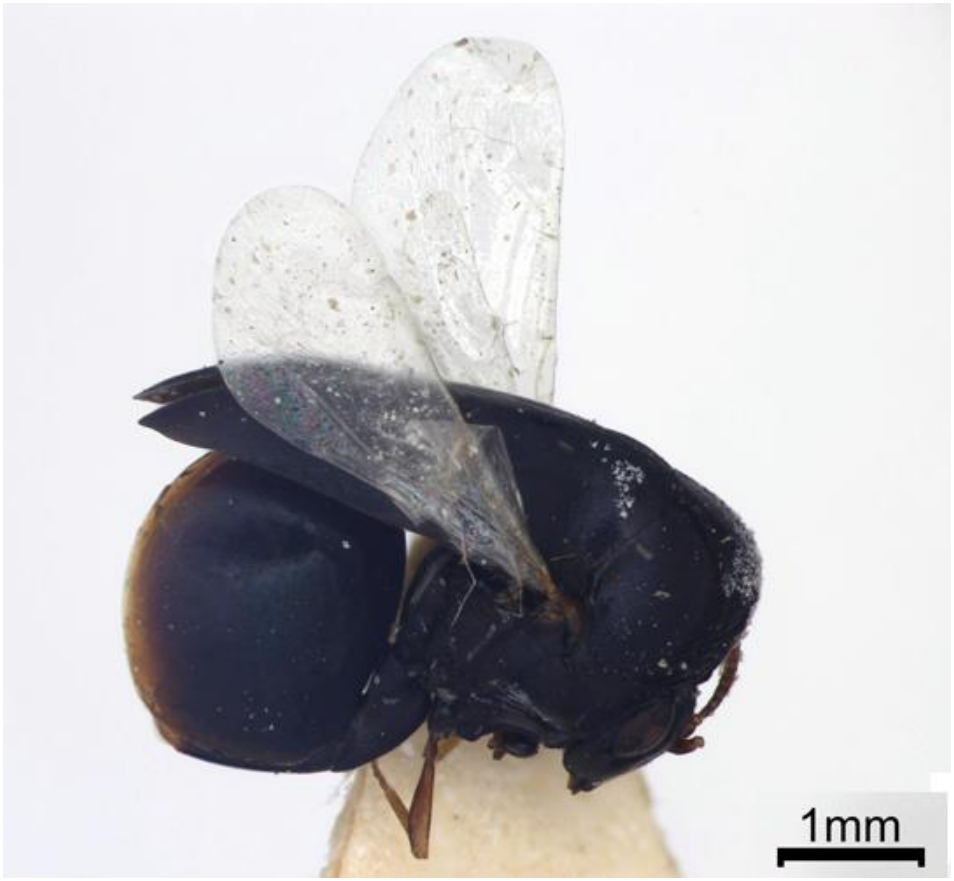
Darwin Chalcidoidea (2)

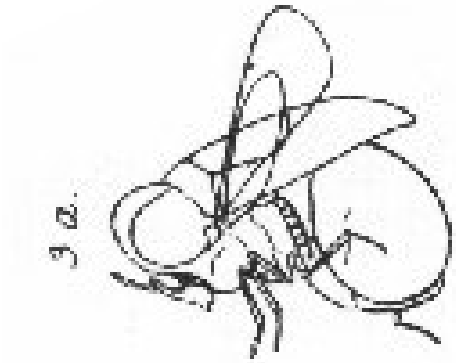




Asaphes vulgaris Walker, 1834

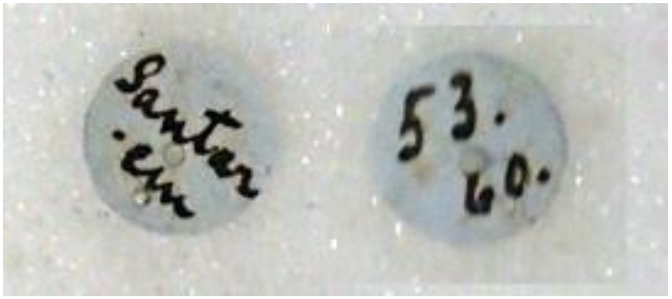
Darwin Chalcidoidea (3)





Galearia coleopteroides
(Waterhouse, 1839)

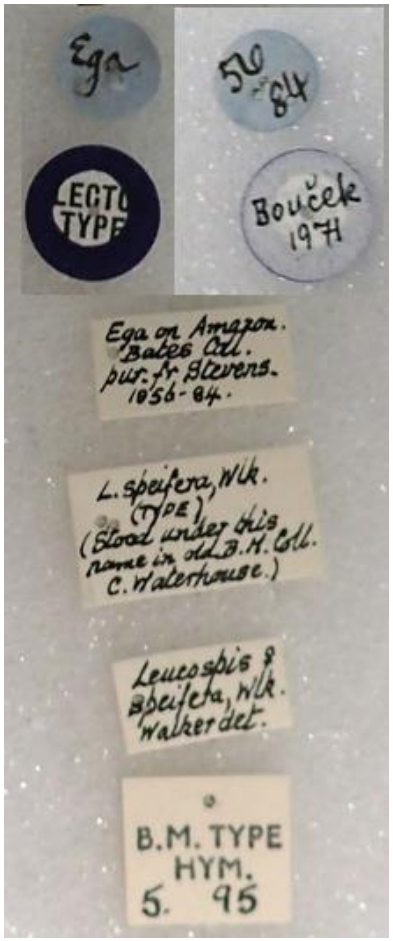
Bates Chalcidoidea (1)



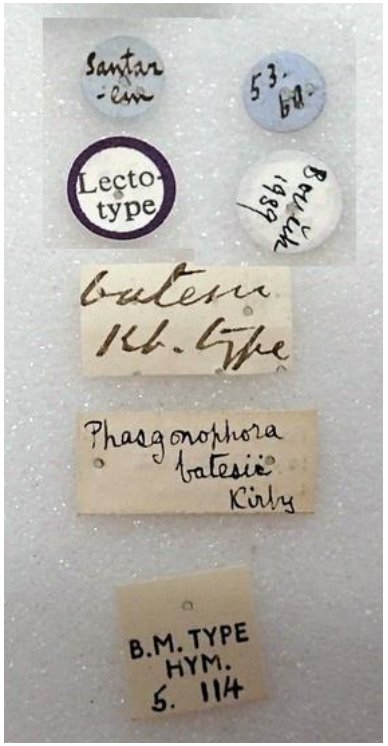
Galearia coleopteroides
(Waterhouse, 1839)

Bates Chalcidoidea (2)

Leucospis speifera Walker, 1862

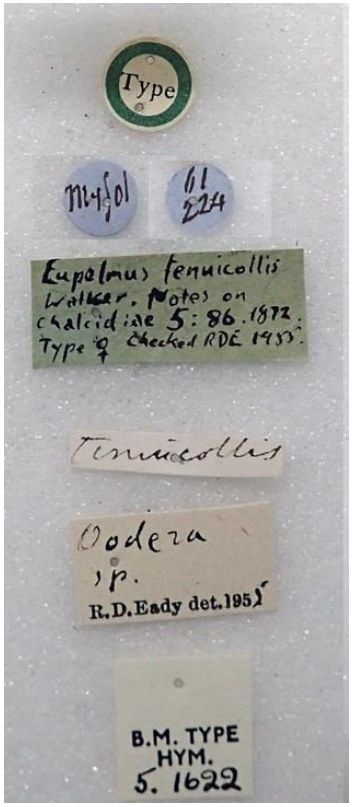


Bates Chalcidoidea (3)



Stypiura batesii (Kirby, 1883)

Wallace Chalcidoidea (1)



Oodera tenuicollis (Walker, 1872)

Wallace Chalcidoidea (2)

*Megalocolus lanceolator (*Walker, 1862)

Wallace Chalcidoidea (3)

Balcha levicollis (Cameron, 1908)

The story so far

Outcomes

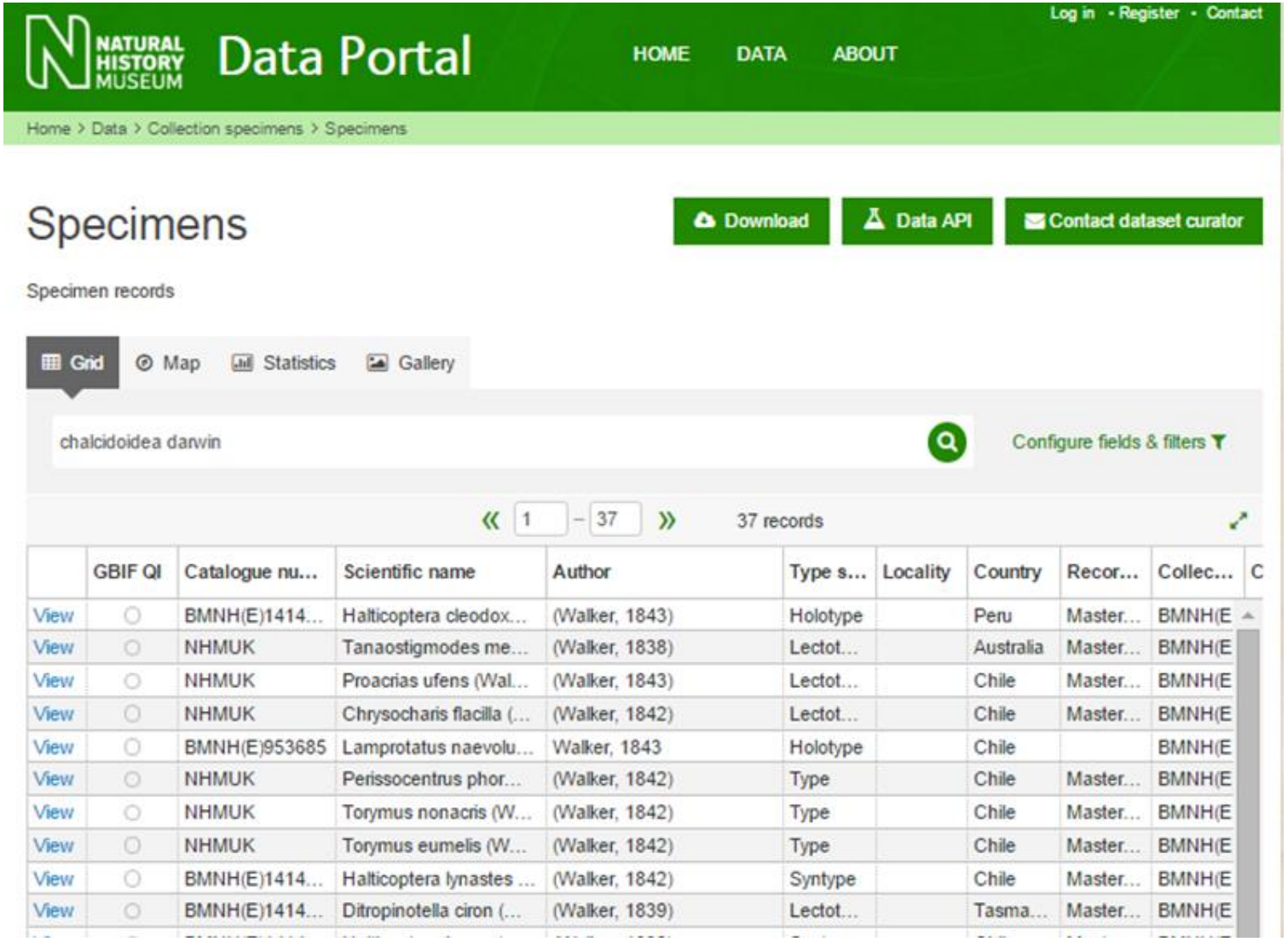
- 333 specimens located
- 99 specimens digitised
  (barcode, specimen record with image of labels, low or high-res image of specimen, collection event, type status, condition notes)
- 2 primary types rediscovered

Challenges

- Accelerate digitisation process
- Locate the remaining specimens…

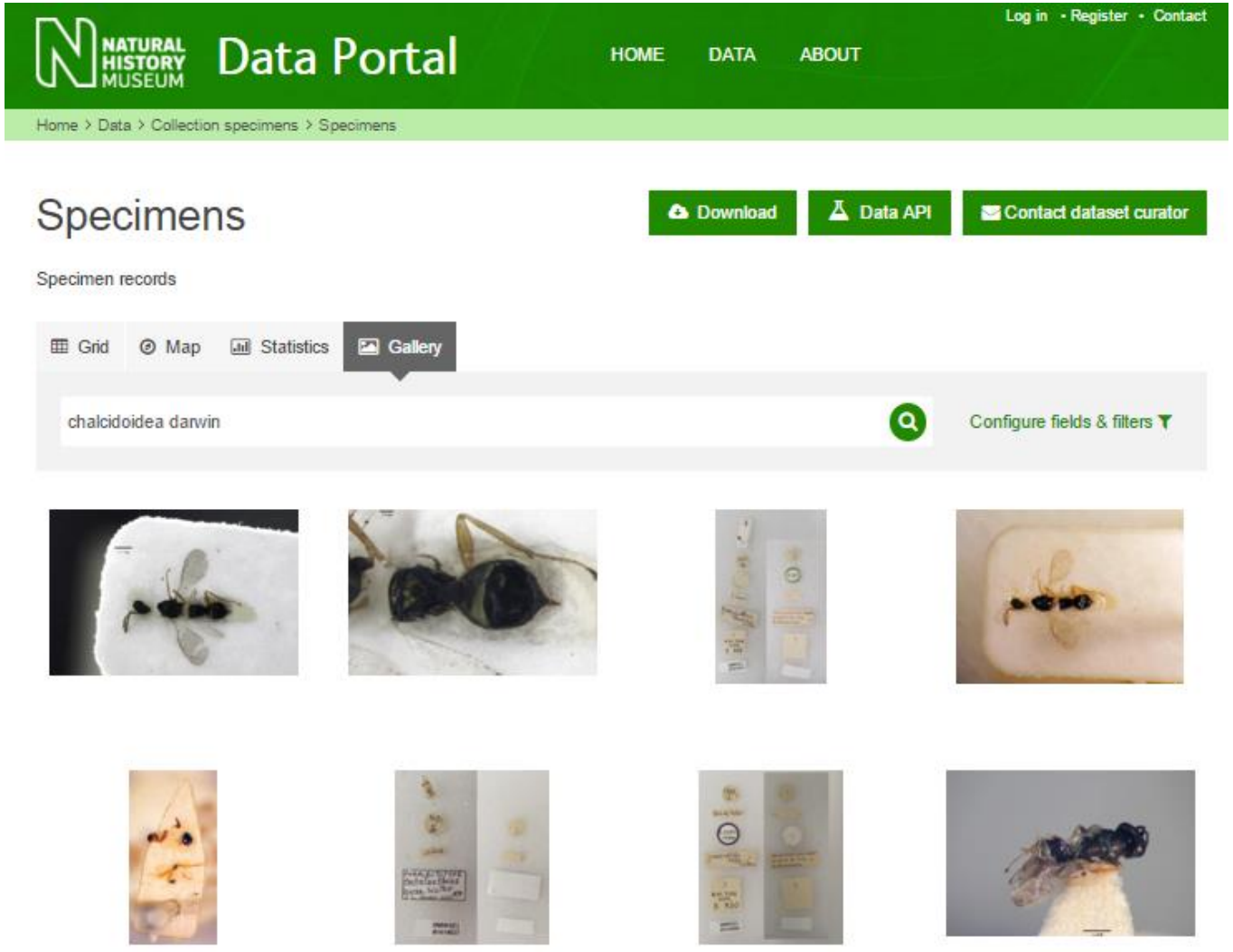
	Bates	Darwin	Wallace
Argentina		1	
Australia		13	
Brazil	28	2	
Chile		23	
Ecuador		2	
Indonesia			7
Malaysia			13
New Zealand		1	
Peru		2	
Singapore			
Tasmania		7	
	28	**51**	**20**

NHM Data portal

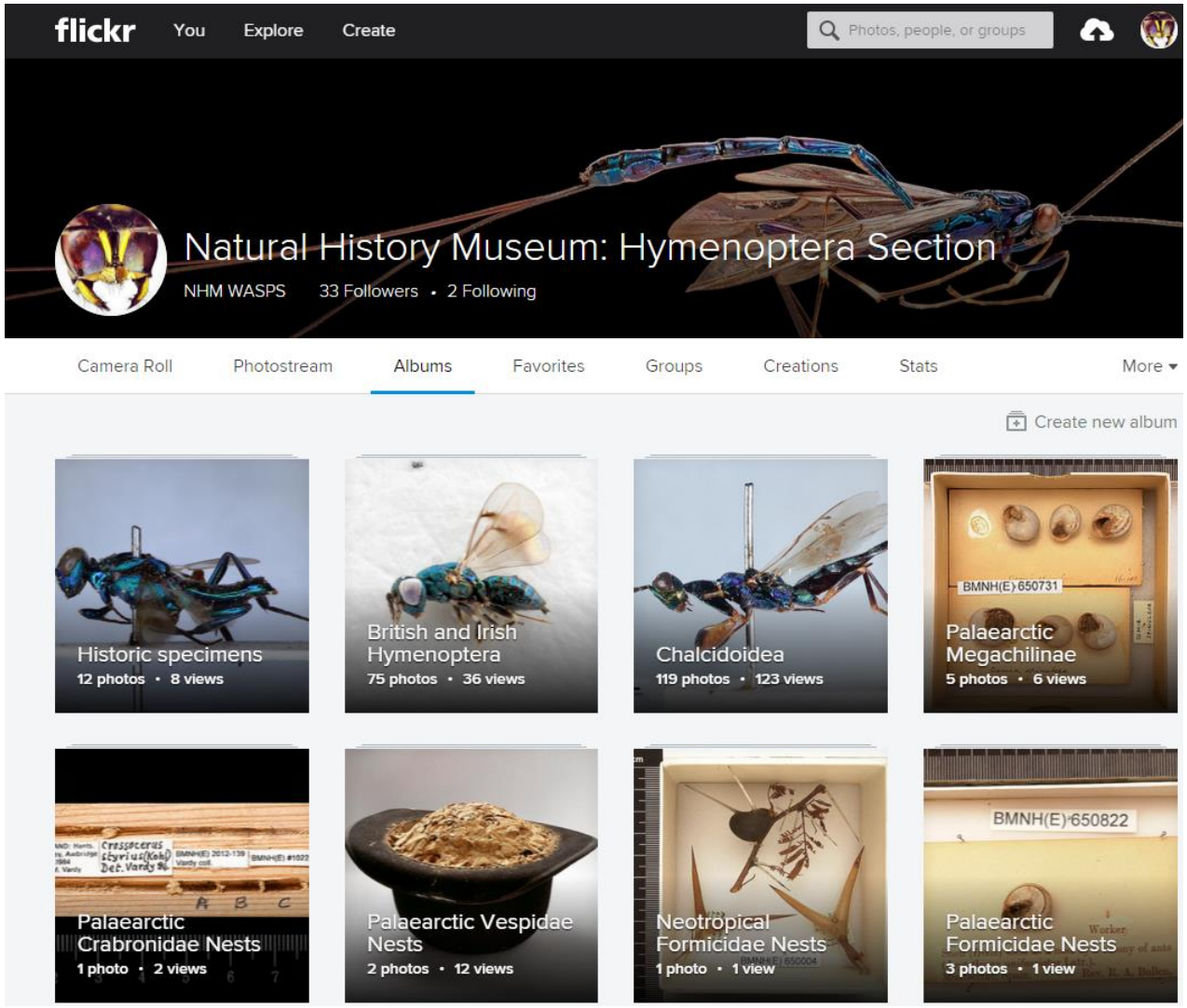


	GBIF QI	Catalogue nu...	Scientific name	Author	Type s...	Locality	Country	Recor...	Collec...	C
View		BMNH(E)1414...	Halticoptera cleodox...	(Walker, 1843)	Holotype		Peru	Master...	BMNH(E	
View		NHMUK	Tanaostigmodes me...	(Walker, 1838)	Lectot...		Australia	Master...	BMNH(E	
View		NHMUK	Proacrias ufens (Wal...	(Walker, 1843)	Lectot...		Chile	Master...	BMNH(E	
View		NHMUK	Chrysocharis flacilla (...	(Walker, 1842)	Lectot...		Chile	Master...	BMNH(E	
View		BMNH(E)953685	Lamprotatus naevolu...	Walker, 1843	Holotype		Chile		BMNH(E	
View		NHMUK	Perissocentrus phor...	(Walker, 1842)	Type		Chile	Master...	BMNH(E	
View		NHMUK	Torymus nonacris (W...	(Walker, 1842)	Type		Chile	Master...	BMNH(E	
View		NHMUK	Torymus eumelis (W...	(Walker, 1842)	Type		Chile	Master...	BMNH(E	
View		BMNH(E)1414...	Halticoptera lynastes ...	(Walker, 1842)	Syntype		Chile	Master...	BMNH(E	
View		BMNH(E)1414...	Ditropinotella ciron (...	(Walker, 1839)	Lectot...		Tasma...	Master...	BMNH(E	

NHM Data portal



Flickr site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Natural History Museum: Hymenoptera Section
NHM WASPS
33 Followers • 2 Following
Camera Roll
Photostream
Albums
Favorites
Groups
Creations
Stats
More
Create new album
Historic specimens
12 photos • 8 views
British and Irish Hymenoptera
75 photos • 36 views
Chalcidoidea
119 photos • 123 views
BMNH(E)650731
Palaearctic Megachilinae
5 photos • 6 views
Palaearctic Crabronidae Nests
1 photo • 2 views
Palaearctic Vespidae Nests
2 photos • 12 views
Neotropical Formicidae Nests
1 photo • 1 view
BMNH(E)650822
Palaearctic Formicidae Nests
3 photos • 1 view

Selected references

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Smith K.G.V. 1987, *Darwin's Insects - Charles Darwin's Entomological Notes*

Walker, F. 1846, *List of the specimens of Hymenopterous insects in the collection of the British Museum. Part 1 Chalcidites*

Universal Chalcidoidea Database
http://www.nhm.ac.uk/our-science/data/chalcidoids/

The Alfred Russel Wallace website
http://wallacefund.info/users/george-beccaloni

Darwin Online
http://darwin-online.org.uk/

Acknowledgments

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Thank you!


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