

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

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# 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

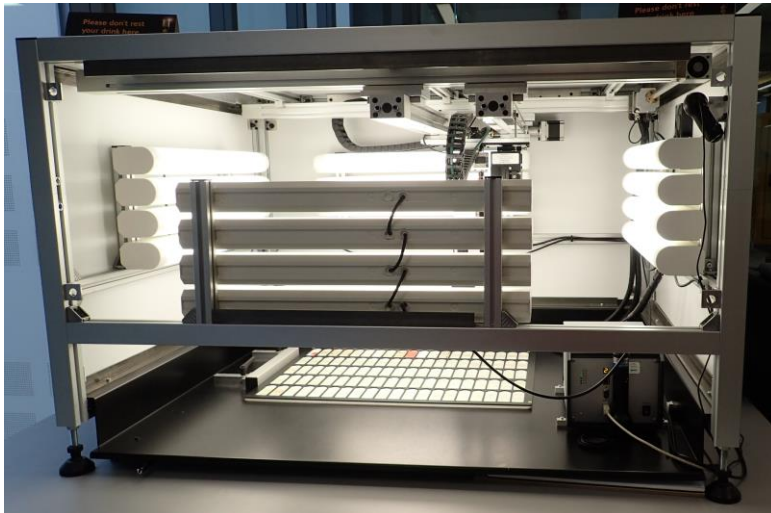
# Mass digitisation of slides

- 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...

The screenshot displays the Insect software interface. The main window, titled "Drawer 1\_2\_3\_3a.insect - Insect", contains a grid of 100 insect specimens arranged in 5 rows and 20 columns. Each specimen is a small white card with a yellow circular label and handwritten text. Three specific drawers are highlighted with red labels: "Drawer 1" (top row, 12th column), "Drawer 2" (middle row, 12th column), and "Drawer 3" (bottom row, 12th column). The interface includes a menu bar (File, Edit, View, Help), a toolbar with icons for Open, Save, Segment image, Subsegment box, Read barcodes, Zoom In, and Zoom Out, and a status bar indicating "0 boxes 0 selected".

On the right side, there is a metadata form titled "Aphididae Other v7". The form contains the following fields:

- Catalog number:
- Location:
- Taxonomy:

At the bottom right, there is an "Information" section. The system tray at the bottom of the window shows the date and time as "06:24 06/11/2015".

# ... to annotated segments...

The image displays a collection of Encarsia wasp specimens, each housed in a small vial with a label. The specimens are arranged in a grid. Some vials are highlighted with green boxes, and others with red boxes. The labels on the vials contain handwritten and printed information, including specimen numbers and dates. The software interface on the right, titled "Parasitoids Aphelinidae/Azotidae Axioscan v2", shows a form with the following fields:

- Catalog number: 010151217
- Location: Aphelinidae/Azotidae
- Taxonomy: aleurochitonis (Encarsia)

Blue arrows indicate that the "Barcode read automatically" text points to the Catalog number field, and the "Location and taxonomy added from drop-down lists" text points to the Location and Taxonomy fields.



# ... to individual images



- ~ 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

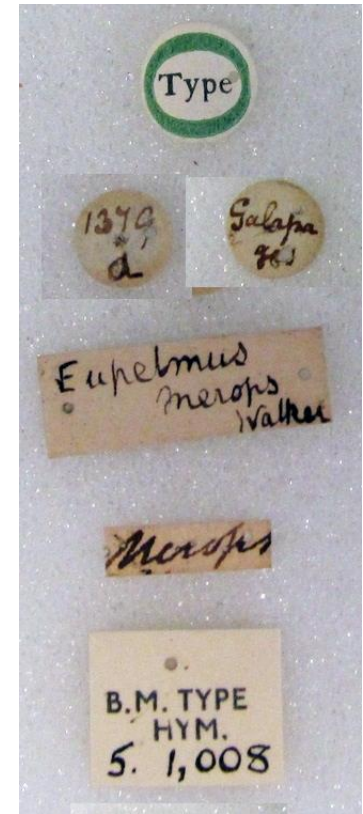
## Sources of information

- Entomology accessions registers (named Darwin specimens vs bulk Wallace & Bates accessions)
- Species descriptions (Walker's publications 1839-1843 and 1862-1864)
- Walker's 1846 catalogue

## Finding the specimens

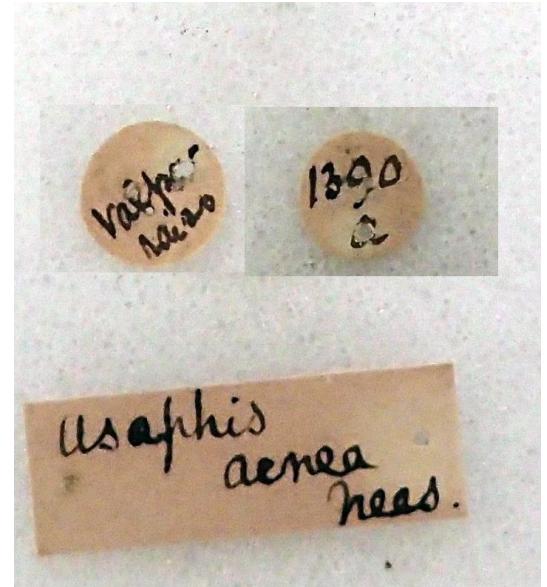
- Types with collector mentioned in original description
- Specimens named in accession registers
- Additional specimens: visual check of drawers

# Darwin Chalcidoidea (1)



*Eupelmus merops* Walker, 1839

# Darwin Chalcidoidea (2)



*Asaphes vulgaris* Walker, 1834

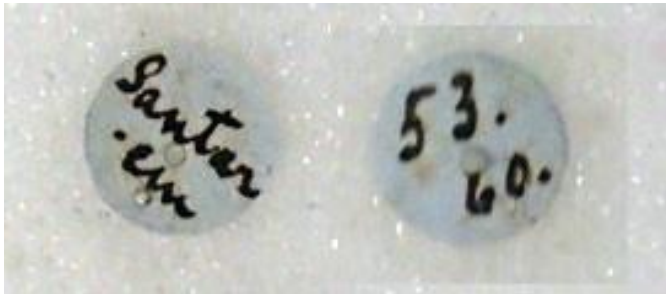
# Darwin Chalcidoidea (3)



*Galaria coleopteroides*  
(Waterhouse, 1839)



# Bates Chalcidoidea (1)



*Galearia coleopteroides*  
(Waterhouse, 1839)



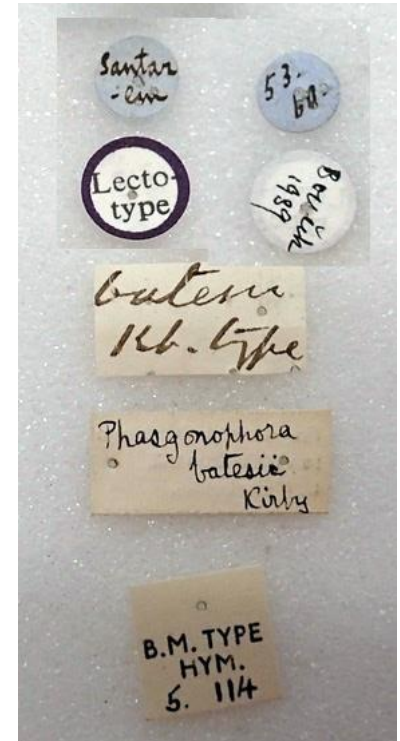
# Bates Chalcidoidea (2)



*Leucospis speifera* Walker, 1862

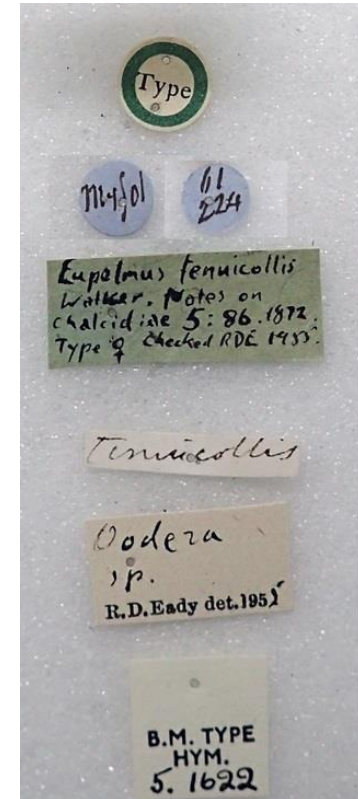


# Bates Chalcidoidea (3)



*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



## Data Portal

Log in - Register - Contact

HOME DATA ABOUT


Home > Data > Collection specimens > Specimens


### Specimens

Download Data API Contact dataset curator

Specimen records

Grid Map Statistics Gallery

chalcidoidea darvin   Configure fields & filters

<< 1 - 37 >> 37 records 

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

# NHM Data portal

## Specimens

-  Download
-  Data API
-  Contact dataset curator

Specimen records

 Grid  Map  Statistics  Gallery

chalcidoidea darvin  [Configure fields & filters](#) 





# Flickr site

The screenshot shows the Flickr profile page for the 'Natural History Museum: Hymenoptera Section'. The header includes the Flickr logo, navigation links for 'You', 'Explore', and 'Create', a search bar with the text 'Photos, people, or groups', and user avatars. The profile banner features a large image of a blue wasp and a circular profile picture of a wasp's head. The profile name is 'Natural History Museum: Hymenoptera Section' with the tagline 'NHM WASPS' and '33 Followers • 2 Following'. Below the banner are navigation tabs for 'Camera Roll', 'Photostream', 'Albums', 'Favorites', 'Groups', 'Creations', 'Stats', and 'More'. A 'Create new album' button is visible in the top right of the album grid. The grid contains eight album thumbnails, each with a representative image, a title, and view/photo statistics.

**flickr** You Explore Create

Photos, people, or groups

**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
- Palaeartic Megachilinae**  
5 photos • 6 views
- Palaeartic Crabronidae Nests**  
1 photo • 2 views
- Palaeartic Vespidae Nests**  
2 photos • 12 views
- Neotropical Formicidae Nests**  
1 photo • 1 view
- Palaeartic Formicidae Nests**  
3 photos • 1 view

# Selected references

**Baker, D.B., 1996**, *Pfeiffer, Wallace, Allen and Smith: the discovery of the Hymenoptera of the Malay Archipelago*

**Baker, D.B. 2001**, *Alfred Russel Wallace's record of his consignments to Samuel Stevens, 1854-1861.*

**Darwin, C, 1845**, *Journal of researches into the natural history and geology of the countries visited during the voyage of H.M.S. Beagle round the world*

**Hudson L.N., in press**, *Inselect: automating the digitization of natural history collections*

**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

- Louise Allan, Vladimir Blagoderov, Ben Price, Emma Sherlock, Rebecca Summerfield
- George Beccaloni
- John Noyes

**Thank you!**



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**NATURAL  
HISTORY  
MUSEUM**