Bringing the Dead Alive

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NATURAL HISTORY MUSEUM

Diptera Collection
- 4 million specimens

NHM Mosquito Collection statistics

- So much known – so little known
- 500 drawers of pinned material – main collection
  - 57,000 specimens
- 11 drawers of pinned material – British collection
  - 2,900 specimens
- 150 drawers of slide material
- 40 jars of spirit material

1,200,000 specimens

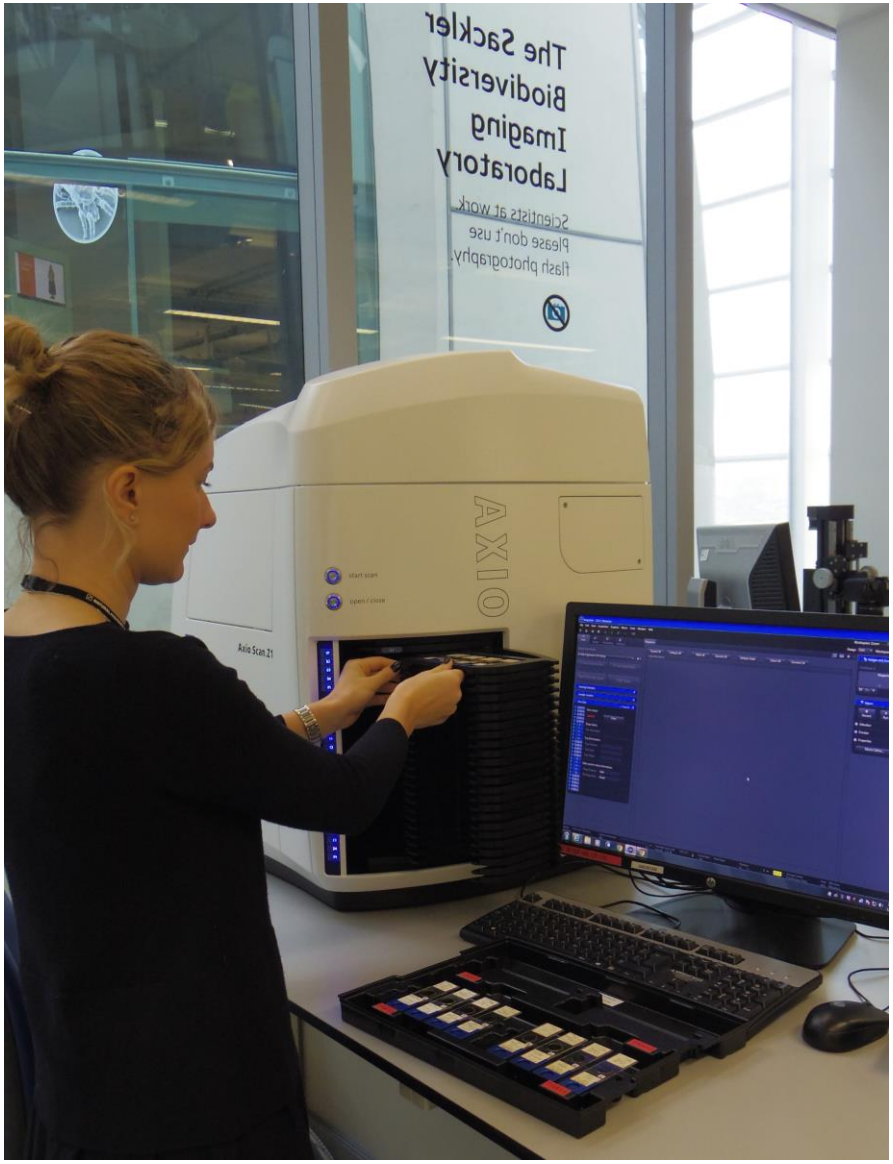
NHM Mosquito Collection statistics

- 2,400 primary and secondary types
- 2,900 species (of 3,500)

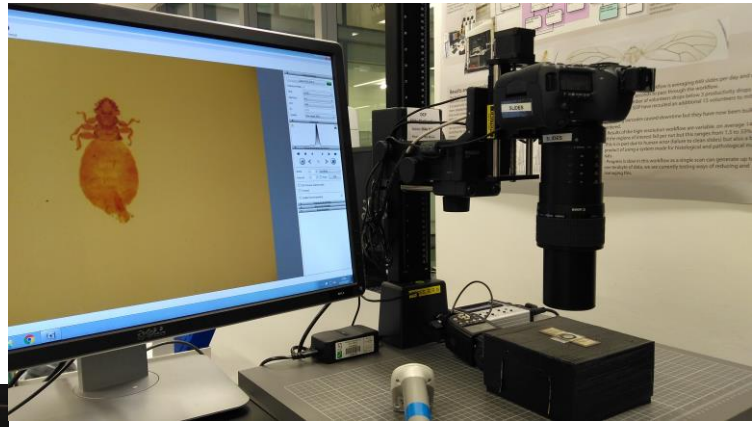
- Individual specimen records – 2139 ☹
- At current rate the mosquito collection will be digitised in 150,000 years

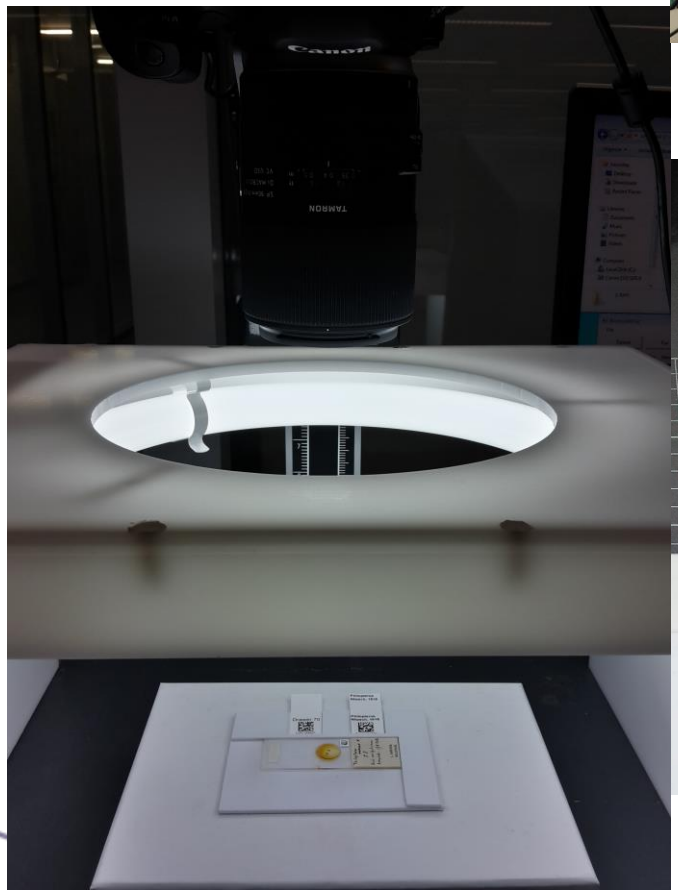
Axio Scan

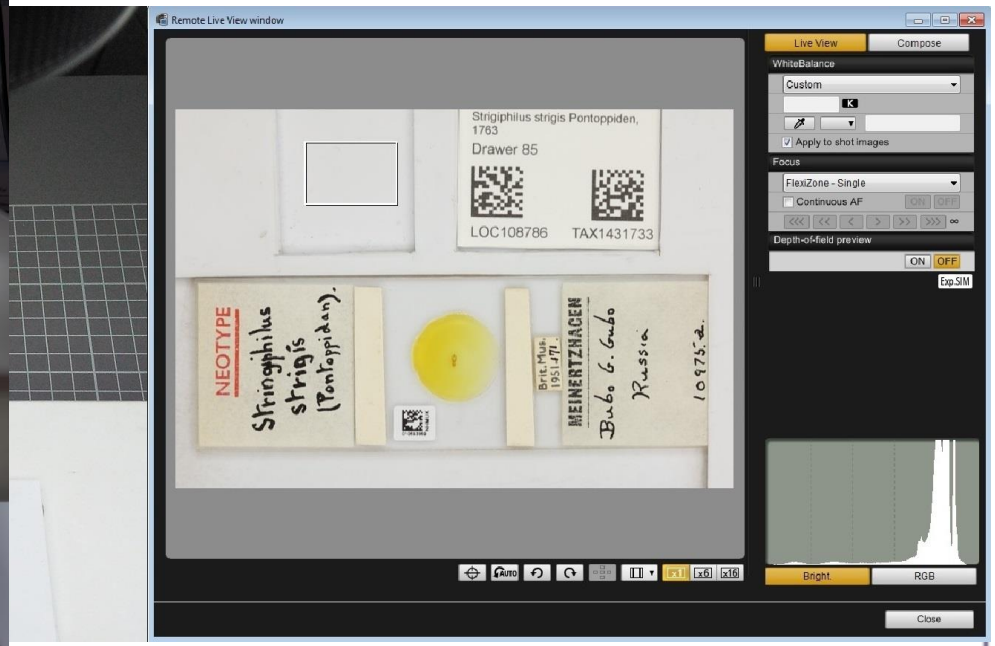

Axio Scan.Z1

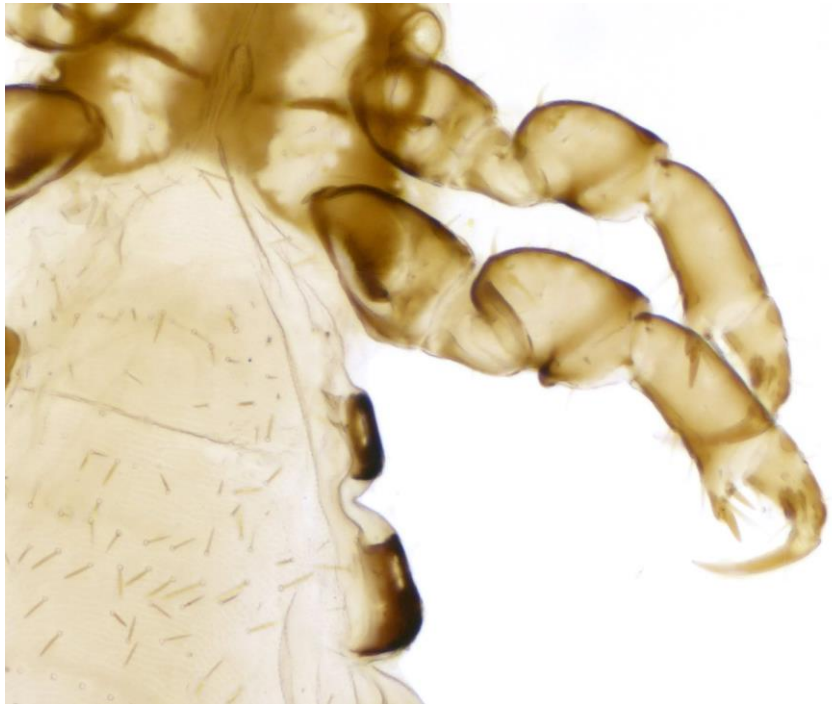

The Sackler
Biodiversity
Imaging
Laboratory
Axio Scan.Z1

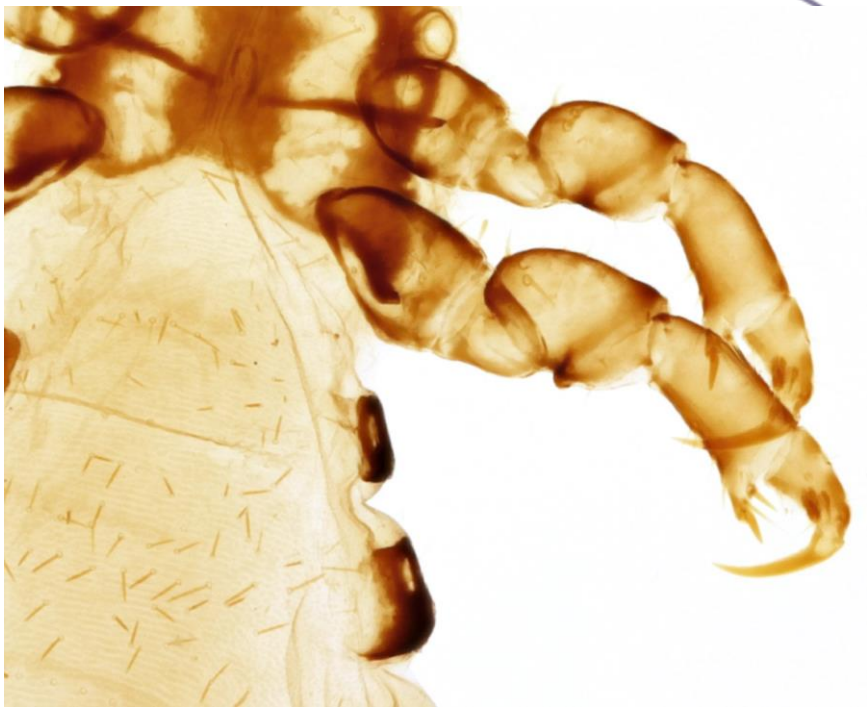
SLR - stackshot











Axio Scan

SLR-StackShot

Explore and download the Natural History Museum's research and collections data.

8.8M	92	33
records	datasets	contributors

Search the Natural History Museum Specimen Collection

3,810,248 of the Museum's 80 million specimens are now available online.

400,705	363,550	668,471	1,003,122	1,374,400
Palaeontology	Mineralogy	Botany	Entomology	Zoology

Insect soup

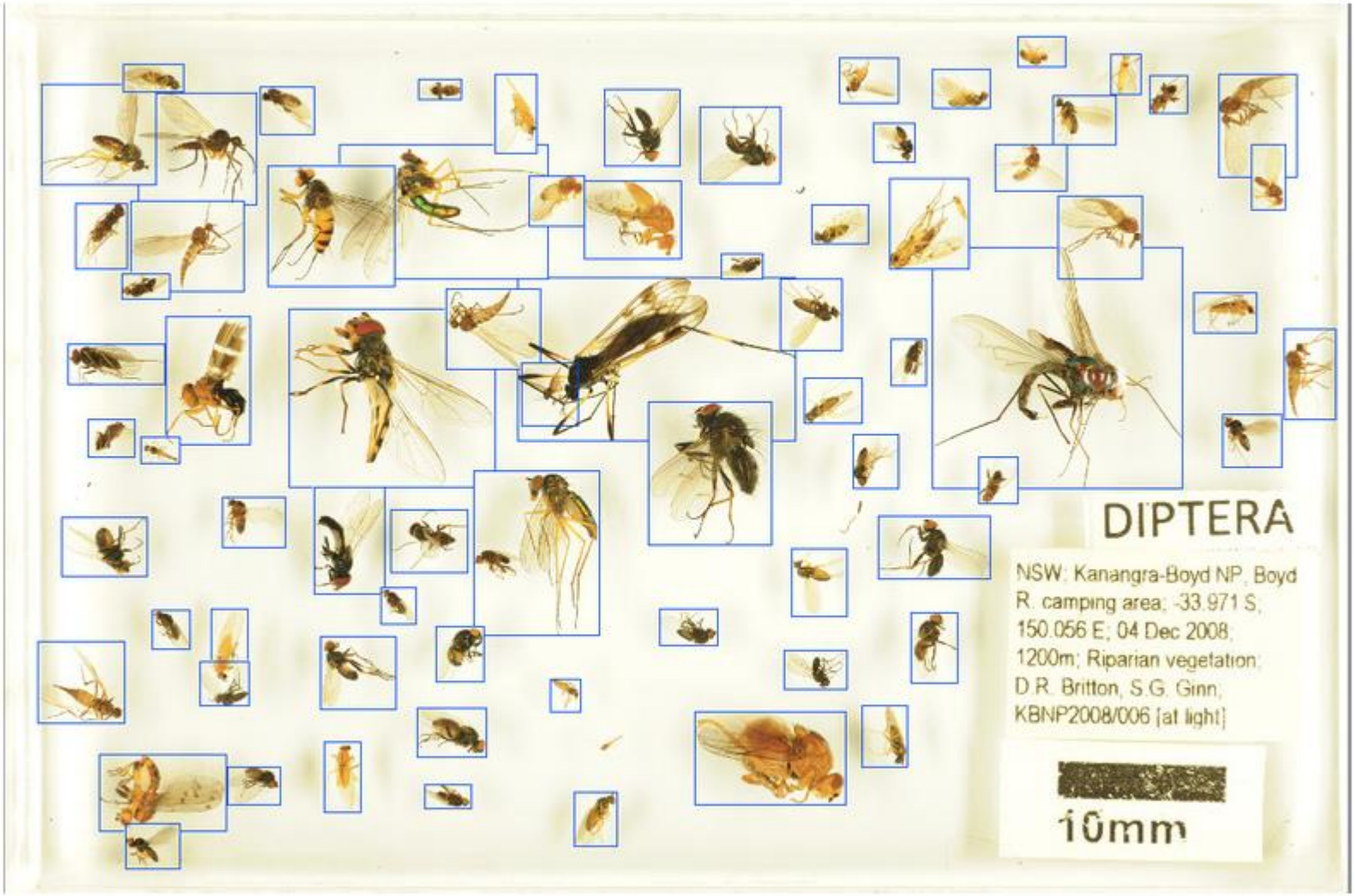
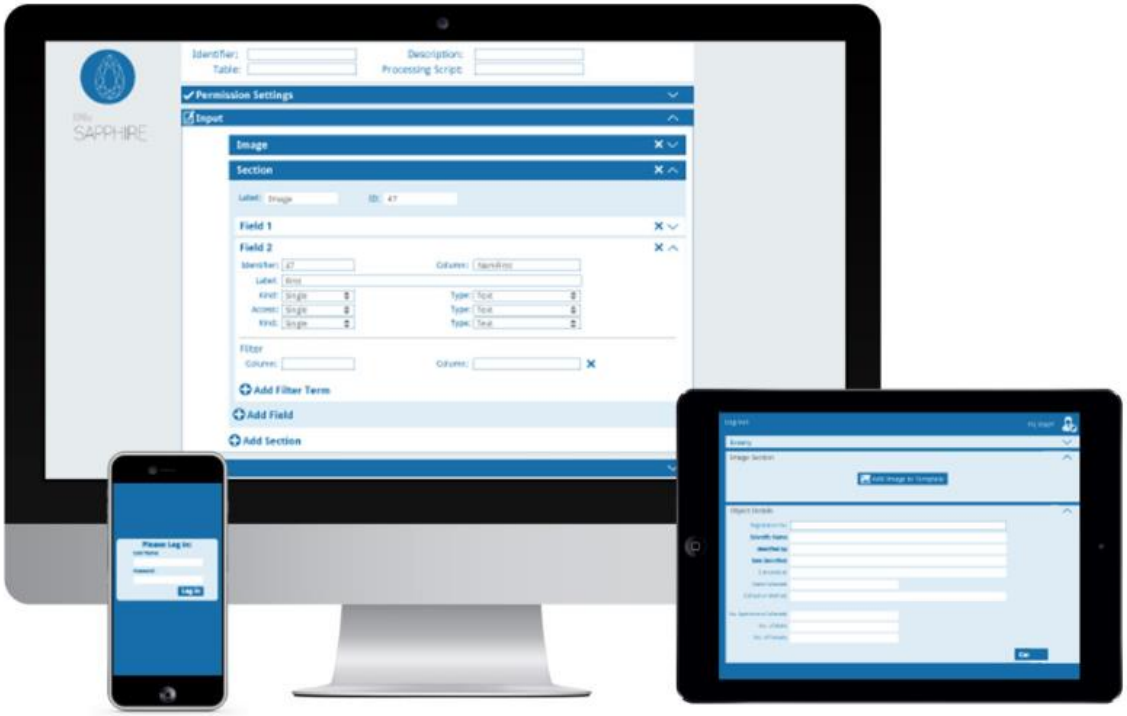
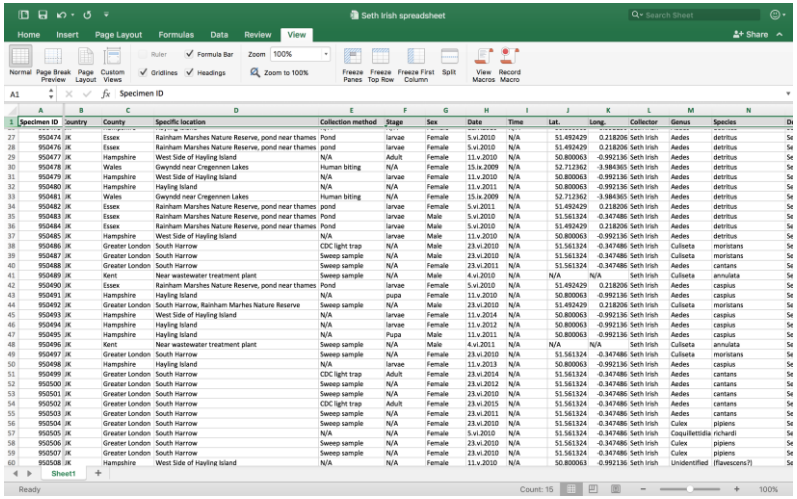


Image from the Australian Museum.

Axiell Sapphire – rapid digitisation work flow



Spatial surveillance



Lack of detailed data on the past and present distribution of mosquito vectors is a major limiting factor for modeling of vector-borne diseases

Lack of data causes problems as problems of local scale within country

Dr. Steve Le Comber

Queen Mary University of London

- 5423 records of mosquitoes in UK – 2900 from NHM
- Specimens are biased!
  - Dirichlet Process Mixture (DPM) model of geographic profiling
  - jack-knifing approach to estimate the bias

DNA extraction

- Underutilized genetic resource
- Most material in collections not used
  - Fragile/valuable specimens
  - DNA sampling can be destructive
  - Badly degraded DNA therefore not suitable for most PCR- based gene sequencing

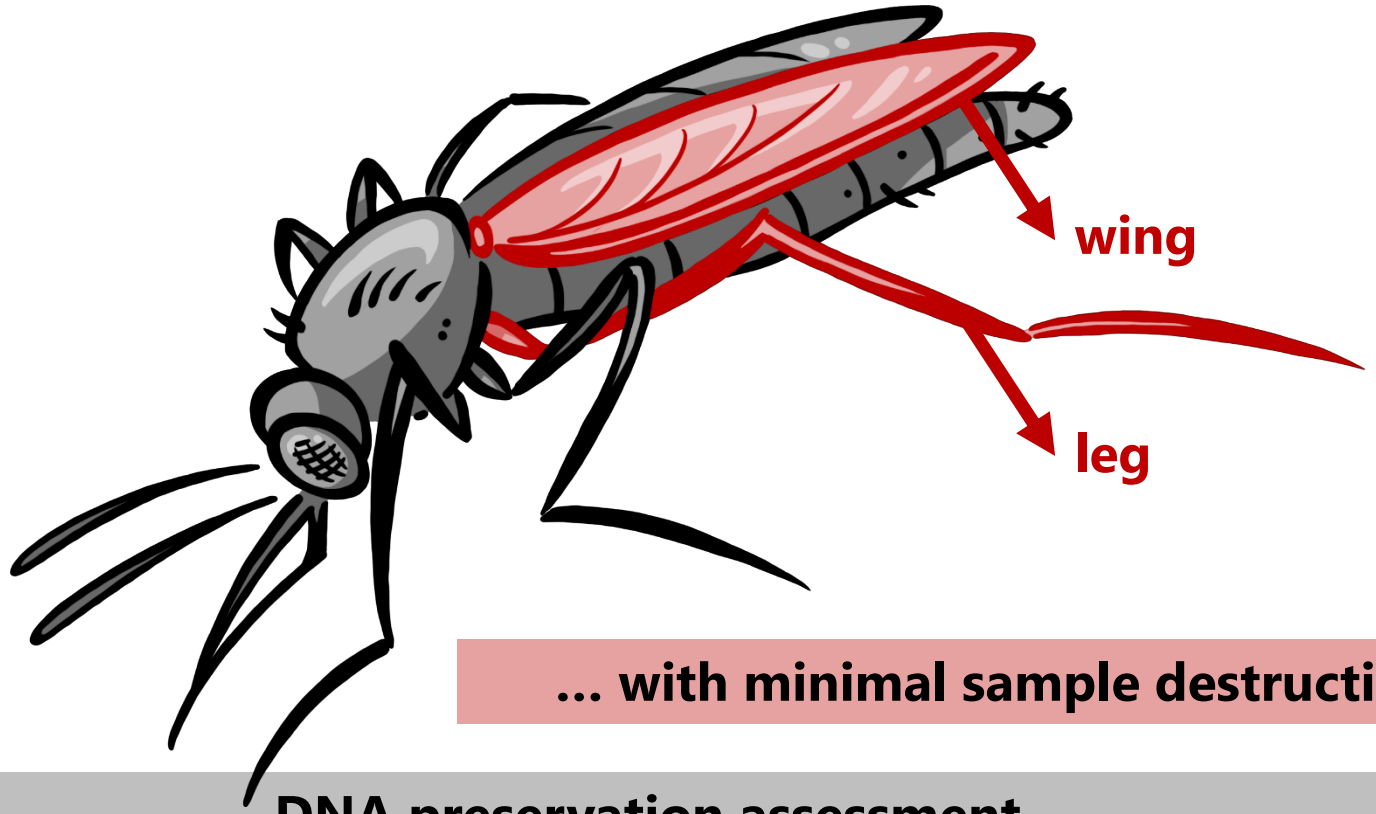
- NGS – able to extract meaningful amounts

A present look into the past

... but what happened over the last 100 years? **last 15 years**

aDNA methods in a historical context

Obtaining *Anopheles* (and *Plasmodium*) genome sequences



… with minimal sample destruction

DNA preservation assessment
Developing new and implementing established aDNA methods

To date….

- Slide scanning and specimen data uploading to portal
- Pinned specimens to be made digi-ready
- Development of aDNA protocols

- Further implications - pollinators

Thanks

- The NHM and all that she encompasses
- The World and all the specimens it has provided
- Mara Lawniczak, Sanger Institute
- Steve le Comber, Queen Mary's University