Managing specimen processing in a large-scale collaborative taxonomic project.

Luciana Musetti, Norman F. Johnson and Sara Hemly
Dept. Evolution, Ecology and Organismal Biology, The Ohio State University, Columbus, OH

http://hol.osu.edu

Introduction

The Platygastroidea PBI is a collaborative project aiming to revise genera and describe species in **several target taxa in parallel**. Cutting-edge information technologies are used to increase efficiency and allow for long-distance collaborations.

The three main objectives of the project are:

- **describe species** of Scelionini
- **analyze** the **phylogenetic relationships** of the Platygastroidea
- **field work** to fill in gaps in existing collections

In order to accomplish these goals, the first step was to acquire specimens for study... lots of specimens.

Sources of Specimens

- **Loans and collaborations:** Eighty three (83) institutions and individuals; dry and ethanol-preserved specimens.
- **Large survey projects:** Colombia, Fiji, Thailand, Madagascar, Central/Mesoamerica, Brazil, etc.
- **PlatyPBI field work:** South Africa, Australia, Malaysia, and in our own backyards.

PlatyPBI bulk samples collected in Malaysia (*left*); yellow-pan trap with catch, in South Africa (*right*).
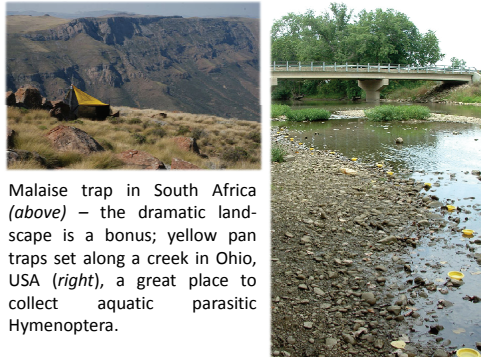
Malaise trap in South Africa (*above*) — the dramatic landscape is a bonus; yellow pan traps set along a creek in Ohio, USA (*right*), a great place to collect aquatic parasitic Hymenoptera.

The Challenges and the Platygastroidea PBI Solutions

The greatest challenge for the PlatyPBI project was to balance the need for quality control & accurate record keeping with the urgency of delivering the target taxa to the researchers.

Platy-specific challenges:

- **large numbers** – hundreds of specimens in a sample is not uncommon.
- specimens are **small** (0.5-9 mm) & **delicate** – handling demands care to avoid damage to specimens.
- specimens **have to be clean & well-mounted** – dirty, poorly mounted specimens are not useful for study .

Solutions: priorities, local sorting, team work

One of our sorting stations

Storage for the non-target material

1) Sorting

- **Prioritization**: sorting the *target taxa* according to project schedule and the progress of the taxonomic work.
- **Local sorting for local use**: sorting centers in Columbus, Cape Town, Adelaide, Toronto, London.
- **Training**: use creativity; team sharing knowledge and experience. Use of images & simplified character sets to train undergraduates and hourly staff to recognize target taxa.

Target specimens for DNA extraction are separated at this stage.

2) Drying

- HMDS: chemical is not necessary, but it greatly accelerates the mounting.
- Multiple samples dried at once, kept in covered containers until mounting.

DNA specimens from non-destructive extraction are individually dried.

3) Mounting

- **Most demanding task:** need for very good hand-eye coordination, steady hands, attention to detail, patience and dedication. Try to match skills & personality with the job. Accept that some people cannot do it.
- **Training:** one-on-one is best; need experienced supervisor, time, frequent reviews and feedback.
- **Best results** – task performed a few hours/day, several days a week.

4) Labeling

- Standardize label formatting (content and size) & handling.
- Print only labels needed and store electronic files for future use.

5) Databasing

Prior to distribution to researchers, specimens are sorted to genus and label data, including georeferenced localities, are recorded into our database.

The process of databasing includes the addition of:

- a **unique identifier** (in this case a barcode label) to every single specimen.
- a **temporary source tag** to all borrowed specimens: coden of the institution on color paper, e.g., USNM.
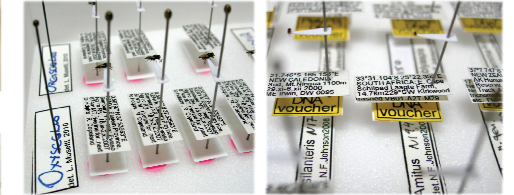
Voucher labels are attached to **special specimens**, e.g., those from which DNA has been extracted or those that have been imaged.

PlatyPBI specimen processing since 2007

- **50,000** specimens mounted & labeled
- **86,289** specimens databased

---

6) Distribution

After processing steps 1-5 are completed, all target taxa are distributed to the **PlatyPBI** members who are committed to the next step of the study.