

Collecting and Sorting Litter Bugs (Hemiptera: Dipsocoromorpha)

A Guide by:

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What are Dipsocoromorpha?



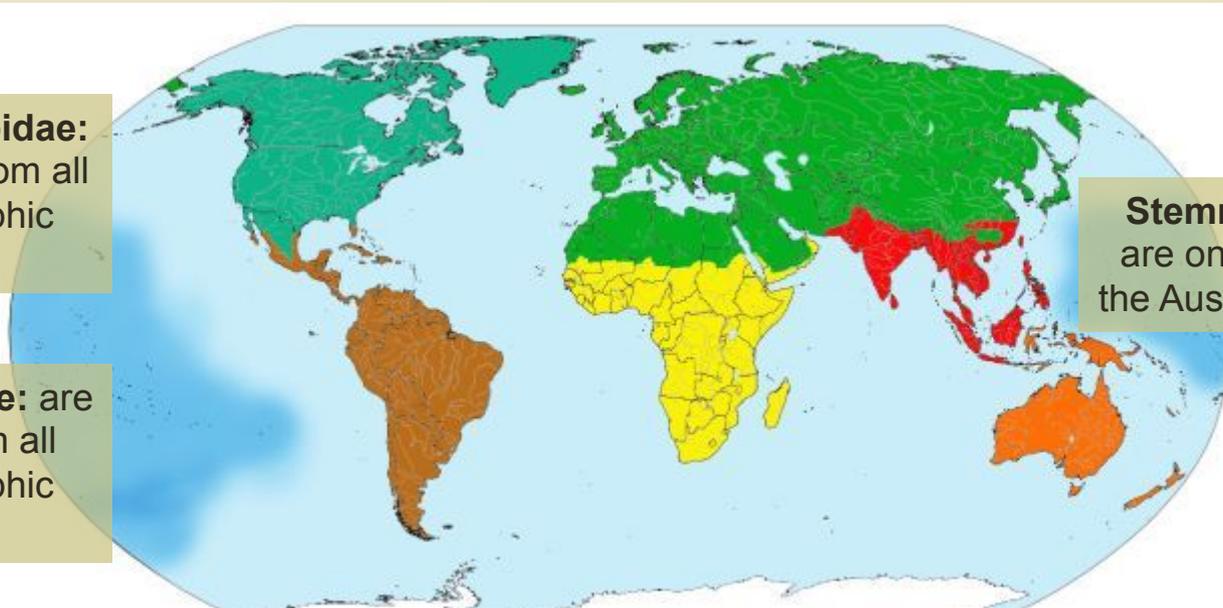
- ❖ 5 morphologically divergent families of Heteroptera, the true bugs
- ❖ ~330 described species
- ❖ **Tiny**, cryptic bugs
- ❖ Symmetrical to asymmetrical and uniquely modified male genitalia
- ❖ Sexual dimorphism slight to extreme, with females often coleopteroid

In which biogeographic regions do Dipsocoromorpha occur?

Schizopteridae: are known from all biogeographic regions. Highest described diversity of Schizopterinae is in the Neotropics, whereas Hypselosomatinae are very diverse in the Australasian region

Ceratocombidae:
are known from all
biogeographic
regions

Dipsocoridae: are
known from all
biogeographic
regions



Stemmocryptidae:
are only known from
the Australasian region

Hysipterygidae: are only known from the Afrotropical and Oriental (= Indo-Malay) regions

Target families for collecting and sorting in the New World are Schizopteridae, Ceratocombidae, and Dipsocoridae

In which habitats do Dipsocoromorpha occur?

The greatest diversity of Dipsocoromorpha is found in humid environments, in particular lush tropical forest. However, some **Schizopteridae** occur under relatively humid temperate and subtropical conditions, e. g., in Tasmania, Japan, or Pacific Coast Canada. Some **Ceratocombidae** are even found in deserts, where they can be associated with palm oases. **Dipsocoridae** are frequently found in the interstitial zone of steams, but also occur in other moist microhabitats such as mosses.



Target families for collecting and sorting in the New World

Schizopteridae

- Tiny (1-2 mm)
- Often hunch-backed
- Most with enlarged forecoxa
- Typically no costal fracture on wing



Corixidea sp.



Schizoptera sp.

Ceratocombidae

- Look like small Miridae (e.g., triangular head, ovoid body), but without cuneus
- Short costal fracture on wings



Ceratocombus sp.

Dipsocoridae

- Similar to Ceratocombidae, but wing with very long costal fracture



Cryptostemma sp.

Schizopteridae



- Largest family and focus of our project:
 - ~56 described genera
 - ~250 described species
- **Divided into 3 subfamilies:**

Schizopterinae



Ogeriinae



Hypselosomatinae



Subfamily Schizopterinae

- Largest subfamily:
~27 described genera
- **Genera in South America:**

- *Schizoptera Fieber*

- *Corixidea Reuter*

- *Hoplonannus McAtee & Malloch*

- *Membracioides McAtee & Malloch*

- *Voragocoris Weirauch*

- *Voccoroda Wygodzinsky*

- *Ceratocomboides McAtee & Malloch*

- *Biturinannus Wygodzinsky*

- *Guapinannus Wygodzinsky*

- *Peloridinannus Wygodzinsky*

- *Nannocoris Reuter*



Corixidea group

You should find lots of both of these groups!



Subfamily Schizopterinae



Schizoptera

Ceratocomboides



Biturinannus

Nannocoris



Guapinannus

Peloridinannus



Corixidea



Voragocoris



Voccoroda



Hoplonannus



Membracioides

You should find lots of them!

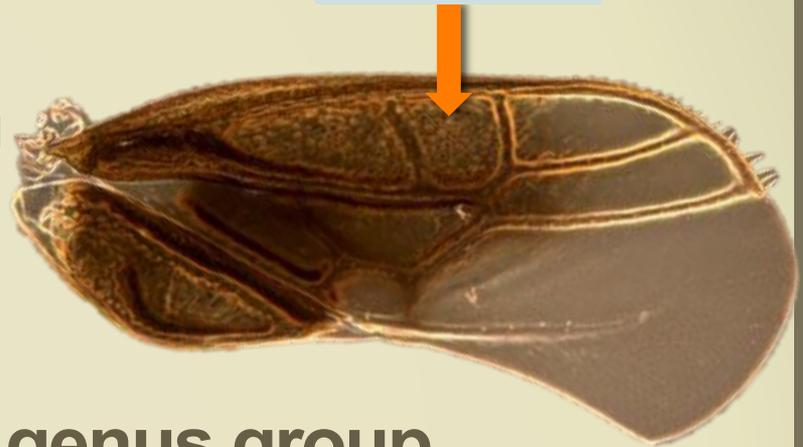


Genus *Schizoptera* Fieber

Diagnostic feature:

1. Square cell on wing

square cell



Corixidea Reuter genus group

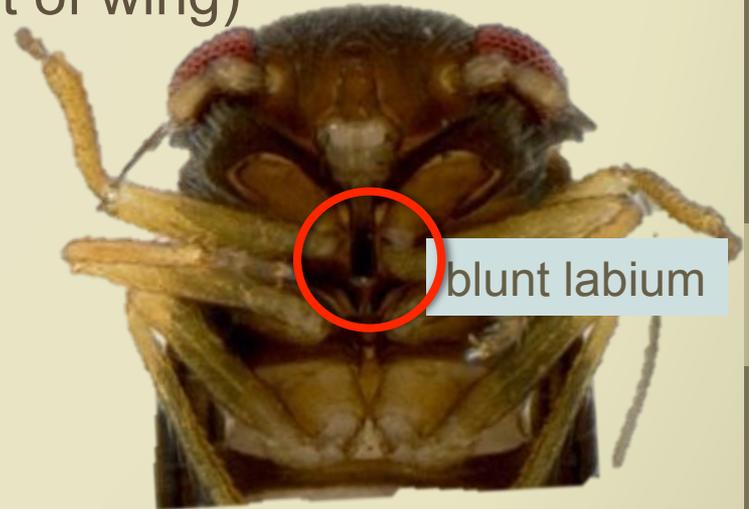
Diagnostic features:

1. Blunt tip of labium (i.e., mouthparts)
2. Costal cells sclerotized (look distinctly different from rest of wing)

costal cells



blunt labium



Subfamily Ogeriinae

- Smallest subfamily:
~7 described genera



Chinannus spp. males

- **Diagnostic features:**
 - Small eyes and head
 - Wing usually with short costal fracture (orange arrows)



Itagunannus (from Wygodzinsky, 1948)



Chinannus trinitatis



Chinannus sp. female

- **Genera in South America:**

- *Chinannus* Wygodzinsky
- *Itagunannus* Wygodzinsky

costal fracture

Chinannus sp.



Subfamily Hypselosomatinae

- ~14 described genera
- **Diagnostic features:**
 - Large eyes
 - Complex wing venation



Williamsocoris sp.



Glyptocombus sp.

- **Genera in South America:**
 - ***Williamsocoris* Carpintero & Dellape**
 - *Ommatides* Uhler
 - *Glyptocombus* Heidemann



Williamsocoris sp. wing

Collecting methods for Dipsocoromorpha

- **Active Sampling:**

- Beating vegetation
- Light trapping
- Hand collecting
- Litter sifting

- **Passive Sampling**

- Yellow pan trapping
- Malaise traps
- Berlese funnels
- Winkler traps
- Flight intercept traps
- Pitfall traps

Beating vegetation

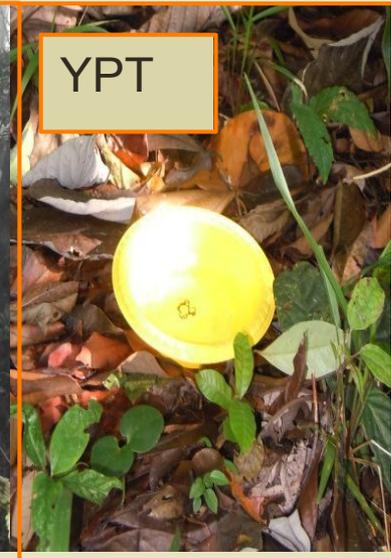


Images: Plant Bug PBI

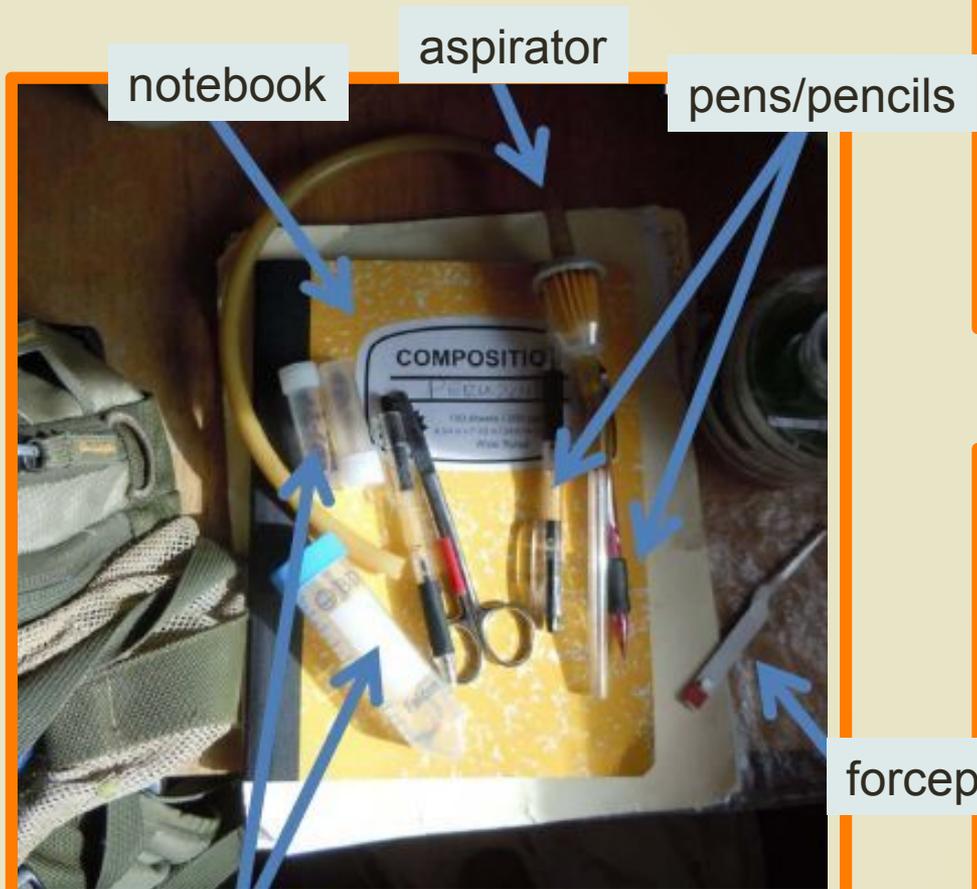
Malaise



YPT



Some important tools for any collecting trip:



notebook

aspirator

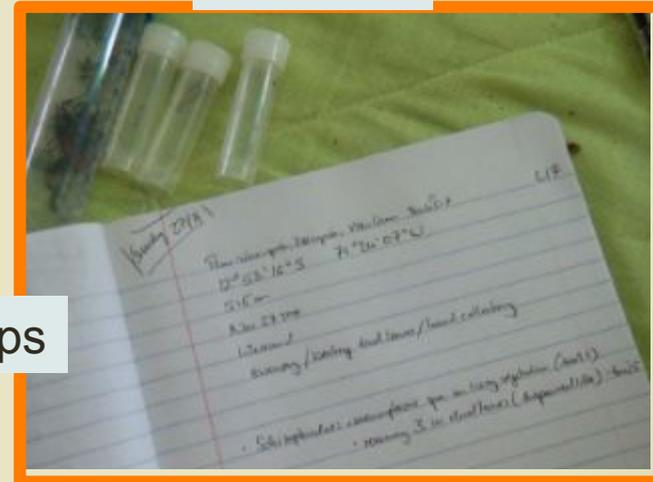
pens/pencils

big and small tubes with 95% ethanol

GPS: coordinates and elevation



notebook



forceps

Beating vegetation

Beating stick



Flowering
vegetation
and
suspended
leaf litter
are beaten
with a
beating
stick



Beating net



Flat beating sheet

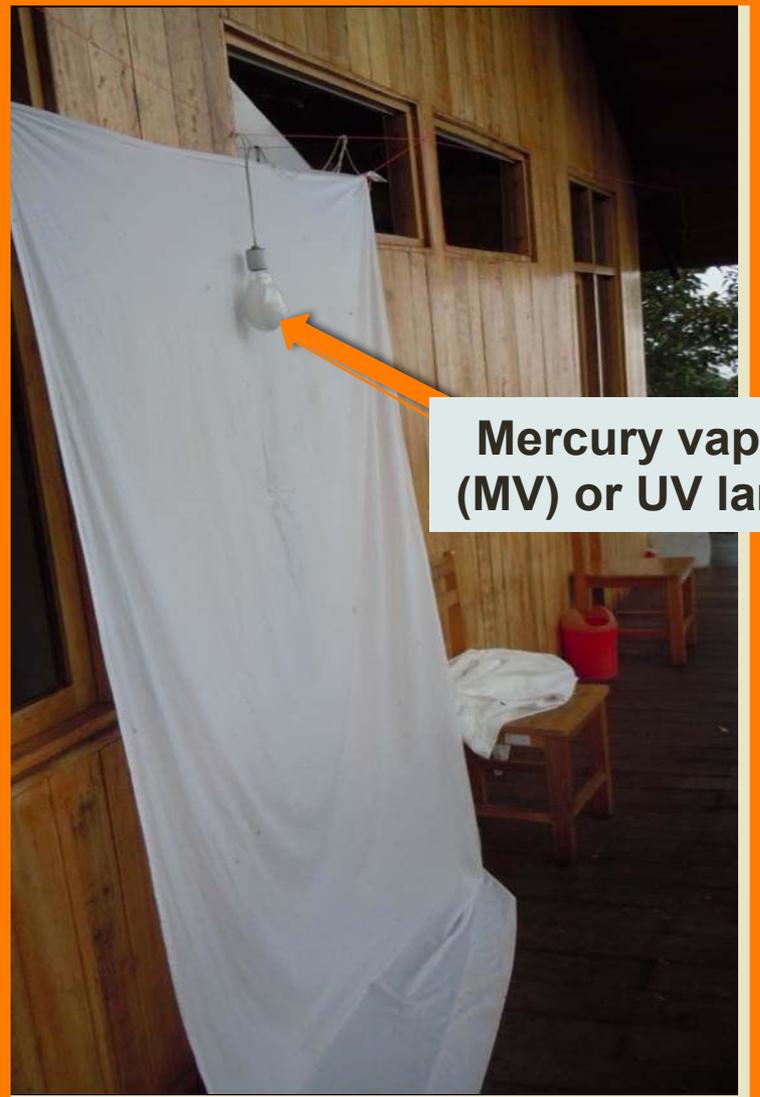


PBI: Planetary Biodiversity Inventory

Material is collected
from net using an
aspirator, then placed
into ethanol vial



Light trapping



Insects aspirated from sheet



Hand collecting



Schizoptera sp. – Honduras 2013

Requires knowledge of habitat; collector is usually on hands and knees!



Issidomimini sp. – Cameroon 2013

Litter Sifting



Leaf litter is placed into sifter and sifted thoroughly



Leaf litter is placed on white sheet and sorted manually using forceps & aspirator



Malaise Trap (MT)

- Ethanol bottle is placed at highest point of the trap
- Insects fly into the tent wall
- Funneled into the ethanol bottle



Flight Interception Trap (FIT)

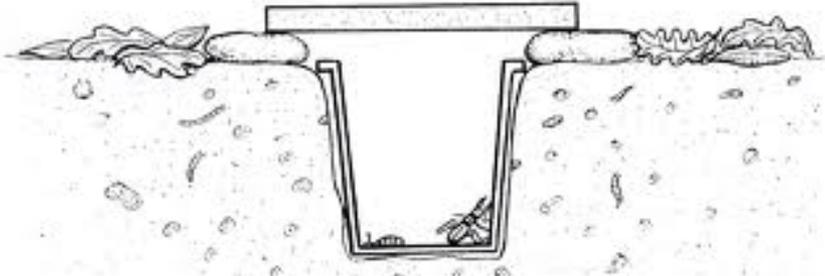


Flight interception traps are based on the principle that some insects move downward when they collide with a barrier

Thin mesh barrier is used to intercept flight; ethanol containers are placed at the bottom to catch insects



Pitfall Traps (PT)



Plastic cup is buried into soil

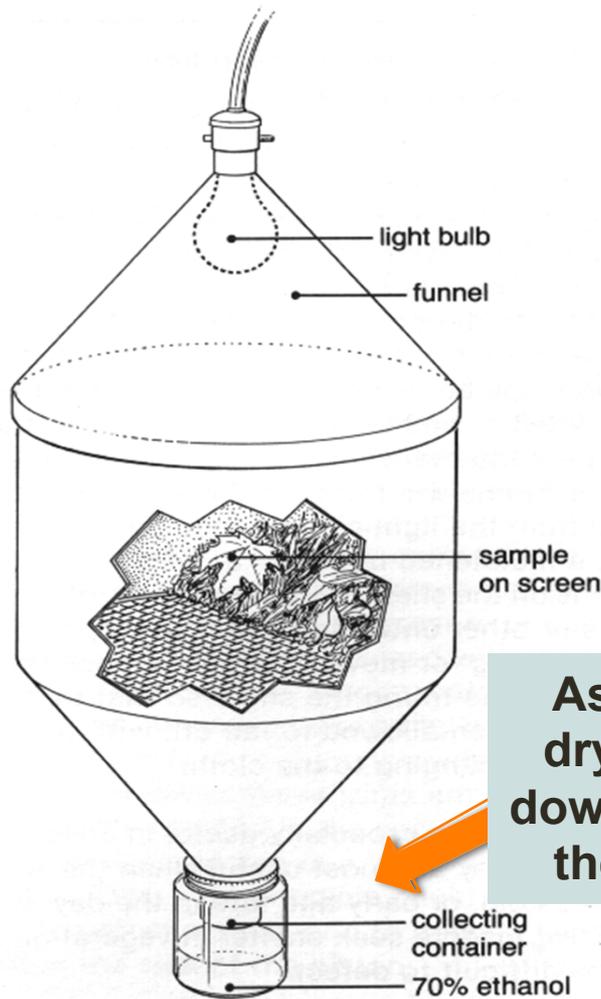
Pitfall traps collect insects that walk on ground surface

Rain cover protects the pitfall trap

Propylene glycol is placed in cup as a killing agent



Berlese Funnel



Sifted leaf litter is placed into Berlese funnel; it is dried for 24 hrs (or longer, depending on humidity)



Light source desiccates soil

As soil begins to dry, insects move down the funnel into the collecting jar



Winkler Bags

Sifted material is added to coarse mesh bag



Mesh bag is placed into Winkler bag

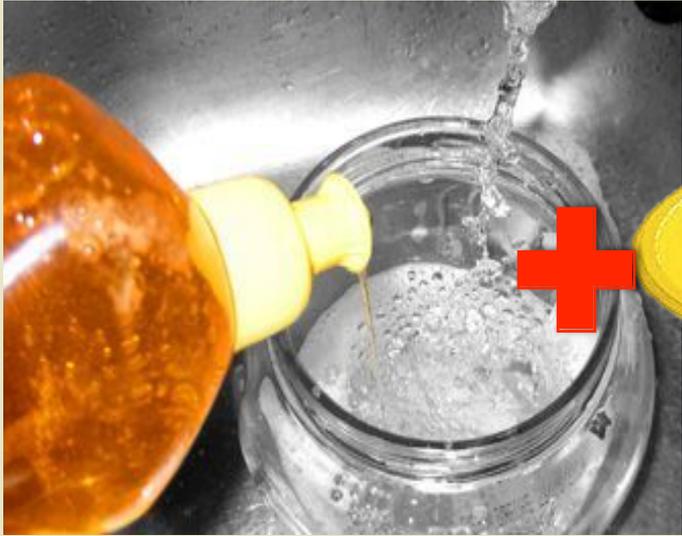


Winkler bag tapers to ethanol container



Bags are left to dry without a light source, for about 2-3 days

Yellow Pan Traps (YPT)



Soapy water has less surface tension than pure water, making it impossible for insects to escape once in the trap

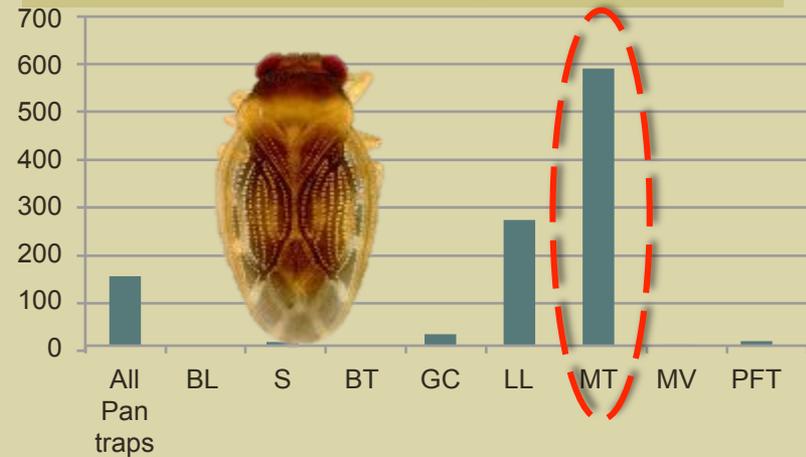


Insects are removed using a small, fine net

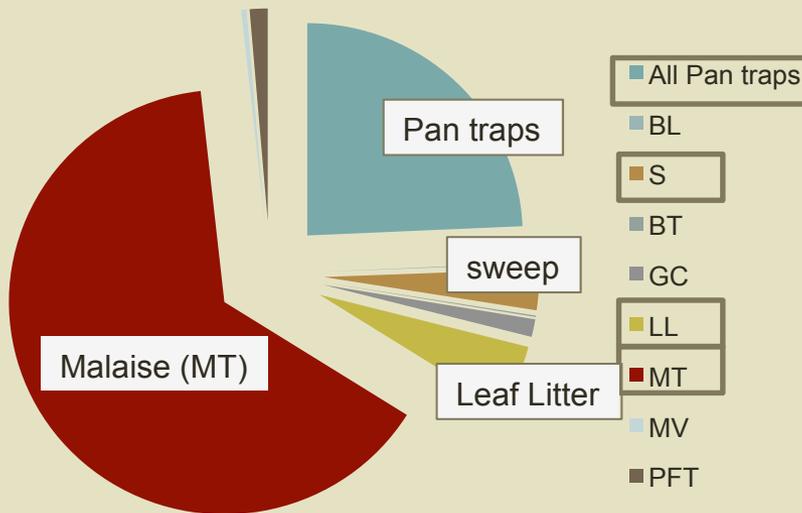


Effectiveness of different passive sampling methods for Schizopteridae and Ceratocombidae (based on the preliminary survey of a small number of bulk samples in the Weirauch lab)

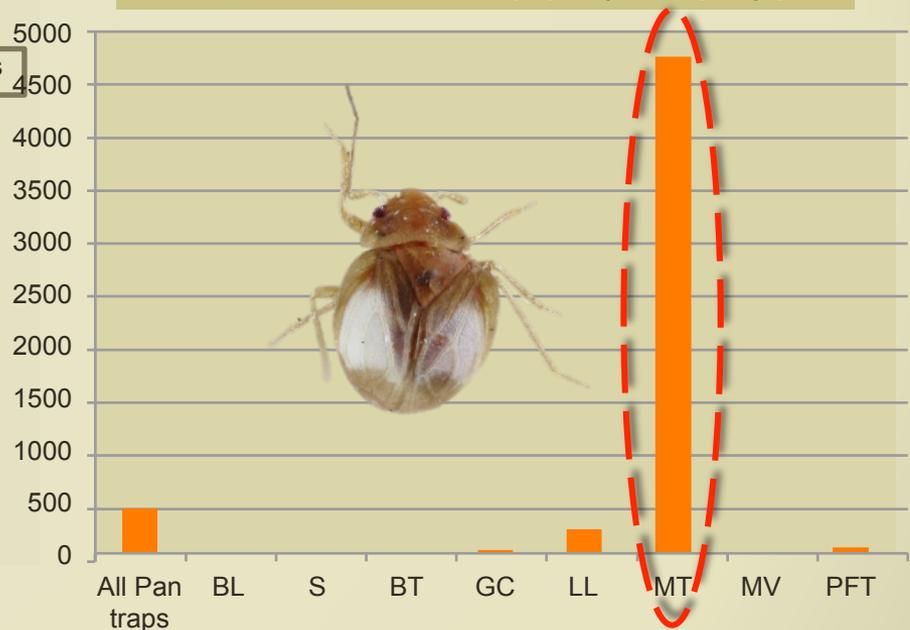
Schizopteridae (#) by trap type



Sorted samples, by collecting method



Ceratocombidae (#) by trap type



Dipsocoromorpha Sorting Preparation

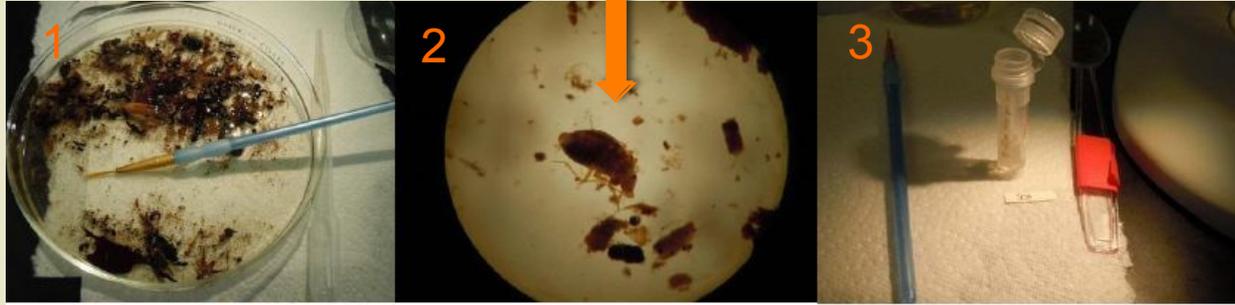
- What you will need:
 - Microscope
 - Large petri dish
 - Soft brushes
 - Soft forceps
 - Plastic pipets
 - Small Sarstedt vials
 - Beakers
 - Funnel
 - Stickers
 - Pencils/Pens
 - Labels



Prepare all your vials ahead of time, by putting in the trip code label inside

Sorting

1



1. Pour contents of falcon tube into a large petri dish or fraction of sample if from a jar.
2. Using a soft brush, sort through the entire sample. **BE CAREFUL** dipsos are very fragile
3. With a pipet, put all dipsos into vials

2



1. Pour sample material into beaker
2. Using a funnel, pour the sample back into the falcon tube or jar
3. Mark all sorted jars/vials with your initials and the date