

NETBIOME – ISLAND BIO-DIV -
SAMPLING REGIME – MACRO-INVERTEBRATES
SPIDERS and BEETLES

COBRA + Adaptations directed to Beetles

(29 samples in 24 hours):

Ten Plots of **50 x 50 m**, collectors free to wander inside the plot.

A semi-quantitative sampling design, with a sampling unit defined as one person-hour of effective fieldwork, is to be followed. For the purpose, collectors should use a stopwatch to control the time that is spent collecting, and to be able to stop the counter when occupied with other activities (e.g. photography, maintenance of tools, eating, etc.; one hour of collecting can take up to 10 or 20 minutes more).

The proposed methods were chosen due to their proved efficiency to sample spiders, and also because they target different fractions of the sampled community, even if with some overlap in a few cases. In our case beetles will be also targeted adding also three other techniques (for all techniques we add a Code to be used in labeling and in the databases throughout all project)

- **Active aerial searching (AAS)** – this method consists in collecting all spiders and beetles found above knee-level by hand, forceps, pooter or brush and immediately transferring them into alcohol. All the time spent searching is to be accounted for.

MATERIAL: Forceps, pooter or brush and vials.

- **Active searching under-bark and lichens and mosses on erect living tree trunks (ABS)** – this method consists in collecting mainly beetles, but also spiders, found above ground level under bark and under lichens and trunks using a small hoe to remove the bark and lichens. Also useful is to use forceps, pooter or brush and immediately transferring animals into alcohol. All the time spent searching is to be accounted for. A Beating tray should be used to accommodate the debris that will be searched for.

- **MATERIAL:** Small hoe, forceps, pooter or brush, Beating Tray, vials.
- **Ground (In dead wood and under stones and trunks on soil) (GWS) –** Similar to the aerial method, but directed towards beetles and spiders seen below knee-level, including species in hidden sites such as below stones or inside hollow trunks, and in dead wood. Use the small hoe to break the wood. A 1m² white cloth sheet should be used to accommodate the debris on the ground and search for animals falling from the wood, transferring animals into alcohol.
- **MATERIAL:** Small hoe, forceps, pooter or brush, white clothe sheet, vials.



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- **Beating (BET) –** A 110x80 cm sheet with a frame should be used as a drop-cloth (Beating Tray) and a wooden pole of at least 1.5 m used to beat tree branches, as high as possible. The effective time includes all the time spent in the activity, like beating, searching for fallen spiders and beetles on the sheet and transferring them to alcohol.
- **MATERIAL:** Beating Tray, forceps, pooter or brush, vials.

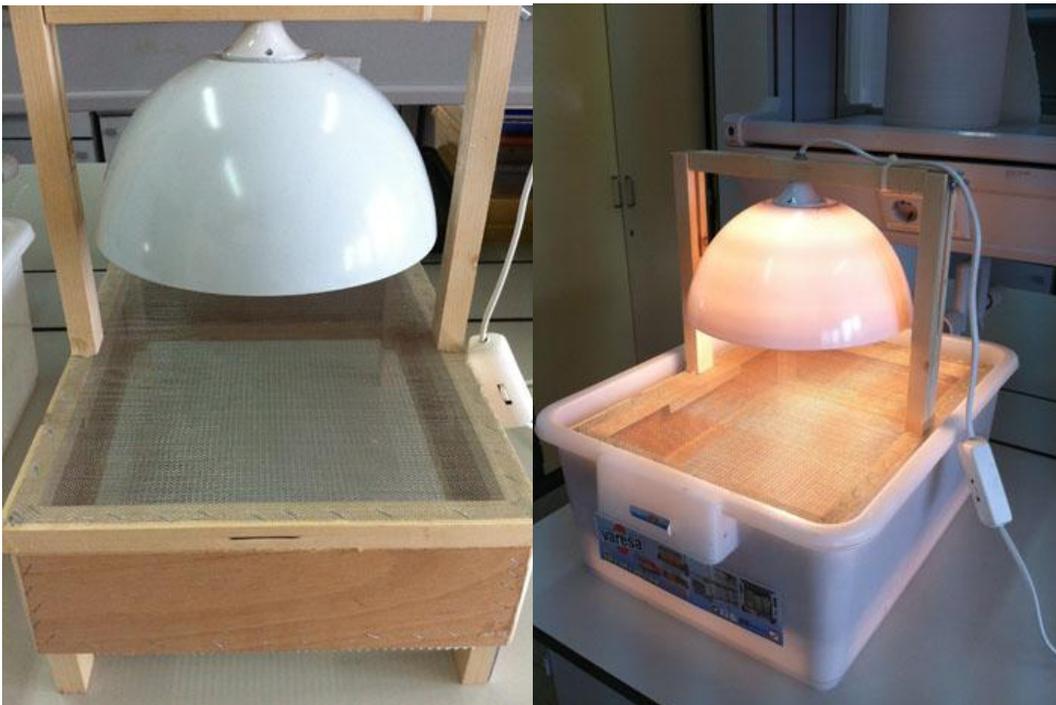


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- **Sweeping (SWE)** – A round sweep net with an opening diameter of 46 cm is used to sweep bushes and tall herbs. All time spent sweeping or searching for dislodged spiders and beetles is accounted for.
MATERIAL: Sweep net with an opening diameter of 46 cm, pooter or brush, vials.
- **Pitfall (PIT)** – Pitfall traps are placed next to the delimited plot (not inside to avoid interference with collectors). Each trap is placed **4 meters** apart from the nearest traps. A sample is a group of 4 contiguous pooled traps. The clumping of traps makes individual sampling effort reasonably comparable with time-based samples, as the effort applied to rig and collect four traps is calculated to be roughly equivalent to one person-hour of work. **Traps should be left in the field for two weeks.** Preference should be given to standard 33 cl plastic cups, 8 cm wide at the top and 12 cm high. One-third of each cup is filled with a preservative liquid containing 100% propylene glycol and a drop of detergent to break surface tension, covered with a rounded plastic plate placed about 2 cm above the ground, fixed to the ground by two pieces of wire. **As the traps are sometimes fragile two cups could be placed one inside the other.**
- **MATERIAL:** Small hoe; standard 33 cl plastic cups, 8 cm wide at the top and 12 cm high; plastic Picnic plates, Pieces of wire.



- **Litter Sampling (LIT)** – A WINKLER apparatus with an opening diameter of 28 cm is used to sieve litter in the field. The minimum area to be sampled is 2 square metres. This area is to be sampled as eight 0.5m x 0.5m quadrats. All leaf litter within a 0.5m x 0.5m quadrat is collected and shaken vigorously in the winkler apparatus, and the filtrate is collected in the bottom of the winkler device. Filtrate material is transferred to sealable plastic bags for transport to the lab. Sampling a total of 2 square metres of very dense leaf litter generates sieved material that will fill four of the light extraction boxes in the lab, to a height of approximately 2cm. In areas with a lesser depth of leaf litter, a larger total area should be sampled, such that the 4 light extraction boxes can be filled. This sampling means that we can standardise across plots when it comes to data analyses because we will have recorded for each plot the total area sampled, and we can standardise down to an area of 2 square metres. In this way data can be analysed by the unit area of leaf litter sampled, and by the total volume of sieved material. In the lab, sieved material is spread across the extraction boxes. Extraction boxes have a mesh size of 5mm x 5mm. The plastic box contains a 100% solution of propylene glycol with some detergent to break the surface tension. A cover with fine mesh should be placed on top of the extraction box to prevent invertebrates both escaping and entering. A lamp is placed above the cover to generate the temperature gradient for extraction.
- **MATERIAL:** Winkler apparatus, plastic sealable bags, extraction box, mesh lid, plastic box, lamp, propylene glycol, detergent.





NUMBER OF SAMPLES

48 pitfall traps (PIT) - 33cl cups with 8cm mouth width (PROPYLENE GLYCOL). Each four contiguous traps is a sample (**12 samples in total**). The content of the four traps forming a sample will not be mixed up, and all the 48 samples will be sorted

individually. The mixing will be performed in the Excel database later. This will allow the use of 48 samples for other kind of studies (accumulation curves, etc.).

Active aerial searching (AAS) (active beetles and spiders)- 4 hours during the night, each hour is one sample (**4 samples in total**).

Beating trees/high shrubs (BET) - 2 hours during the day, 2 during the night, each hour is one sample (**4 samples in total**).

Sweeping low bushes/herbs (SWE) - 2 hours during the day, 2 during the night, each hour is one sample (**4 samples in total**).

Active searching under-bark and lichens and mosses on erect living tree trunks (ABS) - 2 hours during the day, each hour is one sample (**2 samples in total**).

Ground (In dead wood and under stones and trunks on soil) (GWS) - 2 hours during the day, each hour is one sample (**2 samples in total**).

Litter Sampling (LIT)- The minimum area to be sampled is 2 square metres. This area is to be sampled as eight 0.5m x 0.5m quadrats. See details above (**1 sample in total**).

For details about COBRA see: http://www.ennor.org/pro_cobra.html

DISTRIBUTION OF SAMPLING DURING TWO DAYS OF FIELD WORK PER SITE
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DAY ONE

-In the morning TWO field workers will setup the 48 pitfalls plus the Rope in the 50 x 50 m quadrat being the Pitfalls placed with a 4m distance which will allow fitting them

in the 200 meters perimeter. (Workers 1 and 2). The rope will be removed after all the sampling have taken place by both the entomological and plant teams.

13h00-14h00 - **Beating trees/high shrubs** – (Workers 1 and 2)

14h30-15h30 - **Sweeping low bushes/herbs** - (Workers 1 and 2)

16h00 – SOIL SAMPLES for COLLEMBOLA(Workers 1 and 2)

16h30 – Litter Samples (Workers 1 and 2)

(TOTAL – (“12”Pitfall)+ 2 + 2+ 1 = 5 Samples)

DAY TWO (Two weeks later)

15h00—16h00 - **Under-Bark and lichens and mosses in tree trunks** - (Workers 1 and 2)

16h30 -17h30 - **Dead wood and under stones on soil** (Workers 1 and 2)

18h00 – RECOVERING OF PITFALL TRAPS (Workers 1 and 2)

21h00-22h00 - **Active aerial searching** (Workers 1 and 2)

Beating trees/high shrubs – (Worker 3 and 4)

22h00 - 23h00 - **Active aerial searching** (Workers 3 and 4)

Sweeping low bushes/herbs (Workers 1 and 2)

(TOTAL =12 Pitfall+ 2+ 2 + 2 + 2 + 2+ 2= 24 Samples)