

Entomology 489 – Field Entomology
Device / Technique Sheet (beating sheet)

Beating Sheets

(beating umbrellas, beating trays, ground sheets)

Basic Elements

sheet

size (small, “standard” [2’-3’ on edge/diameter], to very large [ground sheets])
outline (square, rectangular, circular, irregular)
concavity (none [flat], concave)
material (fabric [canvas, rip-stop nylon (strong, lightweight), metal [rare]])
material surface friction (high, low)
color (white, orange, etc.)
support attachment (none, corner tabs, sewn in)
weight (dry, wet [from rain/dew]; lighter is generally better)
tautness (taut, loose)
location (hand-held, ground)
weights (none, chain)

beater

kind (rod, dowel, ax handle, branch, net handle, etc.)
length (2’-3’ [usual])
material (wood, metal)

Usual Additional Elements (absent for ground sheets)

sheet supports

number (2 [usual, in articulated X arrangement], 3+)
arrangement (crossed, radial, marginal)
material (wood, metal, plastic, fiberglass, etc.)
length (short to long)
weight (lighter is generally better)
thickness (thinner is generally better)
flexion (to hold sheet taut, to provide clearance from sheet, both)

Optional Elements (rarely present)

collector

container (jar, canister)
container size (moderate sized [ca. 1/2 to 1 liter])
container material (plastic, metal, glass?)
collector screen (none, present)
collector funnel (none, present)
collector position (sheet corner)
collector attachment (sheet support)

Notes/Comments

- beating sheets are designed to capture specimens that rest on or loosely adhere to elevated vegetation, particularly living or dead woody vegetation; specimens dislodged by thrashing vegetation with a beater fall onto a hand-held or ground 'sheet' placed below the vegetation and are subsequently collected off the sheet, typically by hand or with an aspirator
- designed primarily for the capture of insects that do not fly too quickly off the sheet when dislodged
- color of sheet should provide a contrasting background behind specimens to increase their visibility
- hand-held sheets are cleared by simply tipping and shaking
- for portability, select a hand-held sheet whose supports collapse conveniently and will fit in a suitcase
- concave hand-held sheets help to contain specimens, but also tend to bunch debris into larger piles in which possible specimens are more difficult to see
- 'slick' sheets (made out of materials with low surface friction) also tend to bunch debris into larger piles in which specimens are more difficult to see; sheet materials with higher surface frictions help to spread debris and specimens out more thinly and evenly for easier viewing
- an old umbrella can easily be converted to a concave beating sheet by putting a 90-degree bend in its handle
- *tip*: some (relatively clumsy) specimens can be temporarily 'held' on sheet by jiggling it (to give you time to engage your aspirator!); this seems to work because these insects appear to like to take off from a stable platform
- *tip*: use a heavy beater [ax handle or stout stick] to work dead wood (dead tree trunks or limbs, windfalls, brush piles, etc.) to dislodge specimens from on or under bark
- ground sheets are also commonly used with light sheets and light traps to catch specimens falling below the light

Some Characteristics of Beating Sheets

- *overall* (good for quick sampling of knee- to head-height vegetation, particularly for plant inhabiting taxa that don't fly too readily, e.g., some beetles, psocids, neuropterans, bugs, homopterans)
- *advantages* (can generate moderate numbers of specimens; active technique, so permits individual selection of specimens [low 'waste'] and collection of high-quality host plant data; apparatus simple and portable, easy to build and repair)
- *disadvantages* (active technique, so requires more field time; not suitable for sampling low vegetation [use a sweep net instead] or high vegetation [use a long-handled net or other technique]; sloppy and less effective when vegetation is wet [rain, dew])
- *good for sampling taxa* (particularly some beetles, psocids, neuropterans, bugs, homopterans)
- *good for sampling microhabitats* (applicable primarily for sampling knee- to head-height vegetation)
- *taxon mobility* (slow-moving insects)
- *portability/disassembly* (apparatus simple and portable, easy to build, assemble and repair)
- *cost* (readily homemade; commercially available, relatively inexpensive)

References

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