

**Entomology 489 – Field Entomology**  
**Device / Technique Sheet (trap, funnel, Lindgren)**

## **Lindgren Funnel Traps**

(multi-funnel traps)

### Basic Elements

#### ***funnels***

size (small, “standard” [6”-10”], large)  
number (few, “standard” [5-15], many)  
material (plastic [usual], metal?)  
color [usually dark] (brown, black)  
connections (plastic links, knotted cords?)  
support [hangs from] (tree, frame, stand, building, cross-piece [rope, cord, wood] between objects)

#### ***collector***

container (jar, canister)  
container size (moderate sized [typically 1-2 liter])  
container material (plastic, metal, glass?)  
container drain (screened side hole [for ‘wet’ catch], screened bottom hole [for ‘dry’ catch])

### Optional Elements

#### ***killing system***

kind and agent (dry [cyanide, vaponal], wet [antifreeze, soapy water, salt water, alcohol, oil])  
containment of killing agent (free in container, variously positioned and restricted)

#### ***hood***

material (plastic, metal, wood, cardboard)  
size (small, large)  
hood attachment (permanent, removable/adjustable [cord ties])

#### ***bait***

kind (pheromone [usual for bark beetles], fruit, carrion, other)  
location (in collector, on funnels, separate bait holder)

#### ***storage vessel***

container (bucket, pail)  
container material (plastic [usual], metal?)

### Notes/Comments

- Lindgren funnel traps (a specialized kind of flight intercept trap) capitalize on the behavior of many insects (particularly beetles) to drop toward the ground after hitting a solid object in flight, specimens hitting any of the funnels arranged in a vertical array are deflected and fall into the next lowest funnel, then pass through the lower funnels, and eventually into the collector attached below the bottom-most funnel
- trap efficiency is increased by use of funnels to which specimens can not adhere (e.g., smooth plastic, not screen)

- the slender linear form (and generally dark color) of Lindgren funnel traps is designed to mimic a tree trunk, and thus be passively attractive to insects (particularly bark- and wood-associated beetles) that are attracted to the boles of standing trees
- trap catch can be augmented by the use of baits, typically pheromones for bark beetles, but any bait may be used
- trap typically suspended at least several feet off the ground (to avoid disturbance from small mammals) from an overhead support
- longer funnel arrays present more intercept surface area and may increase tree-trunk mimicry
- for notes on killing agents see device/technique sheet on Killing Agents & Preservatives
- *tip*: in rainy weather or when traps are set up for long periods of time between tending (a week or more), add a separate rain hood to keep water and debris out of the collector; the hood should be sufficiently wide – 2'-3' from center of trap in all directions – to prevent rain falling at a modest slant from entering trap
- *tip*: multiple traps can be strung end-to-end, with or without intervening spacing, on the same suspension line to simultaneously sample at different canopy heights
- named after Canadian entomologist Staffan Lindgren, who developed the design and pioneered its use in bark beetle studies in western Canada

### Some Characteristics of Lindgren Funnel Traps

- *overall* (good for extended surveys of certain taxa, particularly wood-associated beetles)
- *advantages* (fairly broad taxon diversity of flying insects (particularly beetles); generate moderate numbers of specimens with proper placement; can be suspended high in canopy; easy set up, take down and servicing; can be set up in good numbers along trap routes; slender vertical form adaptable to many environments)
- *disadvantages* (need to carry substantial amounts of trap fluid to set up numbers of traps if collector has large volume; requires an overhead support)
- *good for sampling taxa* (particularly Coleoptera; almost entirely flying insects)
- *good for sampling microhabitats* (broadly applicable in above-ground areas, particularly in forested habitats; a good, simple, canopy sampling technique)
- *weather resistance* (good, traps typically ruggedly built)
- *taxon mobility* (fast- and slow-moving insects)
- *portability/disassembly* (good designs collapse into a highly portable compact mass stored in a bucket; set up and take down quick and easy)
- *cost* (can be homemade or purchased commercially [ca. \$40-\$70/trap depending on funnel array length])

### References

Finnamore, A. T.; Winchester, N. N.; Behan-Pelletier, V. M. (viewed 2004.viii.18). Protocols for measuring biodiversity: Arthropod monitoring in terrestrial ecosystems. Canopy Arthropods – Lindgren Funnel Traps. <http://www.eman-rese.ca/eman/ecotools/protocols/terrestrial/arthropods/lindgren.html>