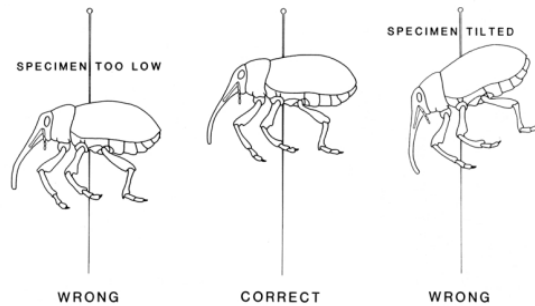
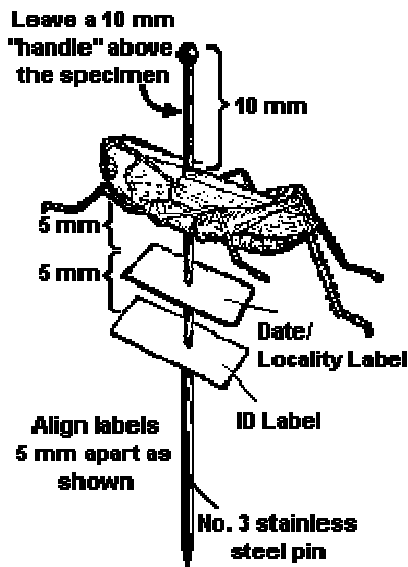


A Guide to Mounting Insects on Pins

The groups normally mounted on insect pins are: Odonata, Orthoptera, Dermaptera, Hemiptera (Heteroptera), Homoptera (Auchenorrhyncha), Neuroptera, Coleoptera, Mecoptera, Lepidoptera, Diptera, and Hymenoptera.

Large Insects

Pin the insect, dorsal side up, so that precisely 10 mm of the shaft is free above the specimen. Generally, the pin should pass through the insect's mesothorax, slightly to the right of center. The insect's ventral surface should be perpendicular to the pin. Consider visibility, breakage, and space when positioning parts. Lepidoptera and Odonata are best positioned on a spreading board -- with Lepidoptera spread so that the trailing edge of the fore wing just overlaps the leading edge of the hind wing, the line of juncture being perpendicular to the longitudinal axis of the body.



Small Insects

Insects too small to receive the shaft of a #3 pin may be glued to pinned paper points (points are cut from 36 lb. linen paper). Using alcohol soluble glue, firmly attach the point to the insect's right side just above the middle right leg (mesothorax), dorsal side up.

Align labels 5 mm apart as shown to protect the specimen and conserve space.

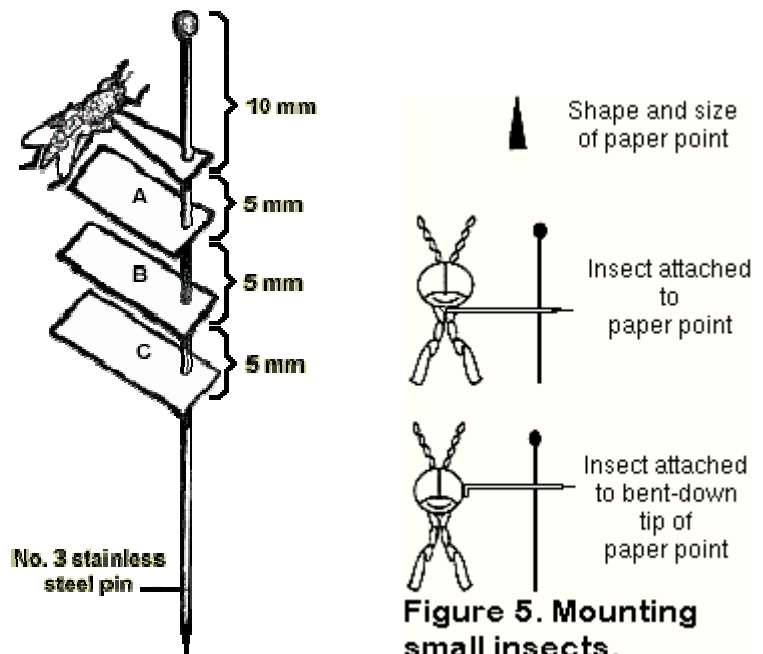


Figure 5. Mounting small insects.

Data Labels

Use index card stock or equivalent. Labels should be lettered in black, waterproof ink or printed with a laser printer. **Size:** no larger than 4-6 cm, 1-4 lines of writing per individual label.

Format:

1. Top level -- **Date/locality label** (general to specific)
 - Line 1: Place of collection (country, state and county)
 - Line 2: City (nearest post office)
 - Line 3: Date collected (day, month in Roman, year in full as 26-VII-2008)
 - Line 4: Collector's name (first initial and last name)
2. Second level -- **Identification label**
 - Give order and common name for each of the pinned insects
3. Third level -- **Ecological label**
 - Use code words found in the list below
 - A single specimen may fulfill two or more ecological categories -- if so, print all the category code names on a single ecological label.

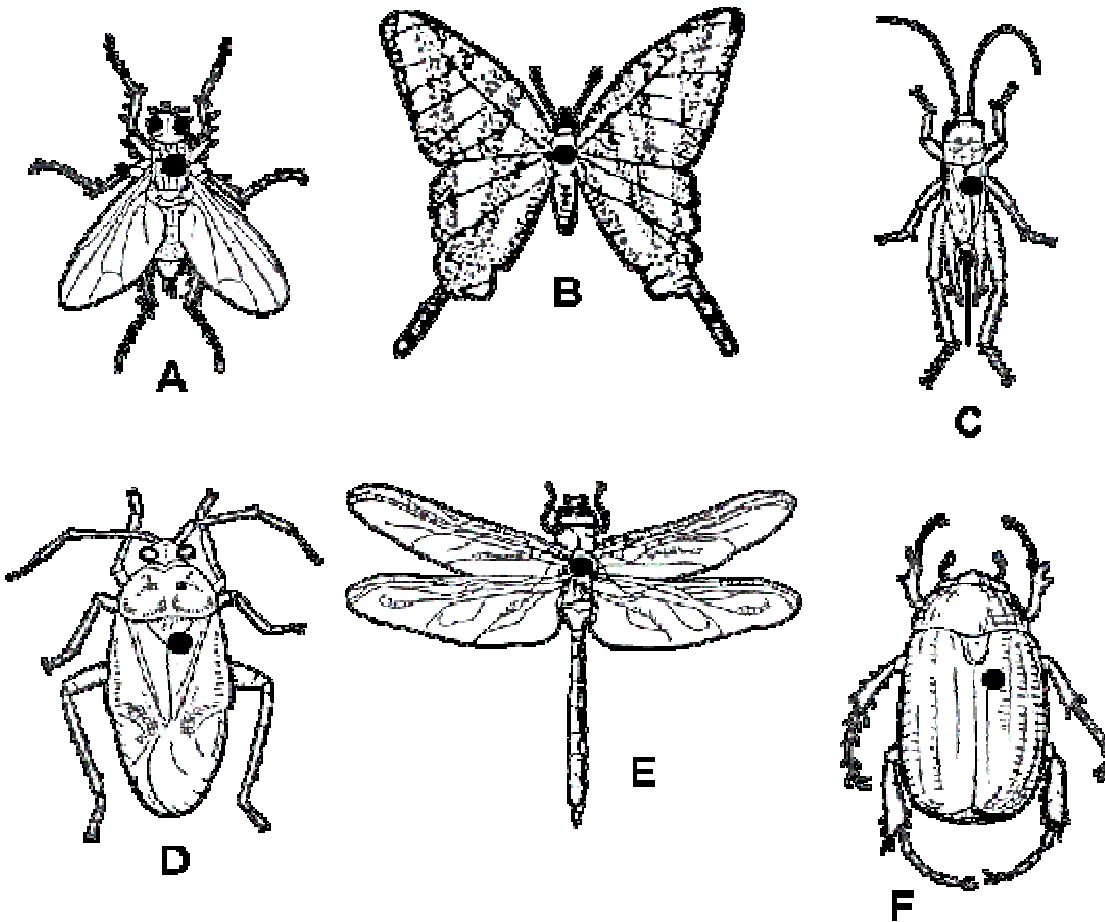
Ecological label codes

# Families	Category	Code for Label	Example
2	Leaf feeding (chewing)	LEAF CHEWING	grasshopper
2	Plant sucking	PLANT SUCKING	aphid
2	Feeds on vertebrates	VERT. PARASITE	mosquito
2	Predatory on insects	INSECT PREDATOR	dragonfly
2	Parasite (parasitoid) on other insect*	INSECT PARASITE	ichneumon wasp
2	Aquatic as adults	AQUATIC ADULT	water boatman
2	Litter inhabitant	LITTER	ground beetle
2	Rotten wood dwelling	WOOD	termite
2	Household pest	HOUSE PEST	house fly
2	Nocturnally active	NIGHT	moth
2	Social insects	SOCIAL	paper wasp
1	Sound producer	ACOUSTIC	cricket
2	Pollinators	POLLINATOR	honey bee
2	Aposematic coloration	WARNING COLOR	yellow jacket
2	Camouflage coloration	CRYPTIC COLOR	katydid
1	Casemaking insect	CASE MAKER	caddisfly larva
1	Stem borer**	BORER	corn borer
1	Soil burrower	SOIL	solitary bee
1	Seed feeder	SEED	flour beetle
1	Leaf roller	LEAF ROLLER	maple leafroller
2	Aquatic nymph	AQUATIC NYMPH	mayfly naiad
1	Batesian mimic	MIMIC	hover fly
2	Chemical defenses	CHEM DEFENSE	stink bug
1	Gall inhabitant	GALL	oak gall wasp
2	Agricultural pests	AG PEST	alfalfa weevil
1	Leaf miner	LEAF MINER	locust miner
1	Dung or carrion feeder	SAPROPHYTE	dung beetle
1	Series - at least five individuals of the same species and stage of development that show polymorphism or individual variation	SERIES	spittle bugs

*Adults whose larvae fulfill this category may be used

**Stem must be 1" or less in diameter (i.e., not a log)

Diagram of Pinning Locations



Correct location of pin for various insect body types:

- A. Flies and bees
- B. Butterflies and moths
- C. Grasshoppers and crickets
- D. True bugs
- E. Dragonflies and damselflies
- F. Beetles and weevils

Instructions for Spreading Insect Wings

1. Pin the insect through the center of its thorax, leaving exactly 10 mm of the pin above the specimen.
2. Push the pin down into the spreading board's central groove until the wings are just even with the top surface.
3. Slip a paper strip between the wings (if they are upright) and use it to force the wings on one side down into position. Pin the ends of the paper down to hold the wings loosely in place. Do the same with the wings on the other side, also pinning the ends of the paper down.
4. Now take another insect pin or needle and slip the point through the leading edge of the right forewing (there is a strong vein just at the front edge of each wing) near its attachment to the thorax. Be careful not to tear the wing. Loosen the forward end of the paper strip and gradually bring the forewing up into final position. Pin the wing down with a paper strip. **NEVER PIN ON THE WINGS OF THE SPECIMENS!** Repeat this procedure with the forewing on the other side. Using the same technique bring both hindwings into proper position and fasten all four wings firmly with the paper strips.
5. Note carefully that the *rear edge of the two forewings should make a perfectly straight line across the back*. The hindwings should be pinned so that the rear edge is held just slightly away from the abdomen. Position antennae with pins and if the abdomen has drooped, prop it up with pins so that it dries in a natural position.
6. Allow specimens to dry for several days before you remove the pins. Drying "freezes" the wing muscles of the insect in position.
7. Carefully pull the pinned insect out of the spreading board's groove. Handle with care -- your specimen will be very brittle.
8. Note: Large-bodied moths like Cecropia should be cut open on the underside of the abdomen and the contents removed with a cotton swab. The body cavity should be filled with cotton so that the specimen looks natural from above. If this is not done, the fatty material in the abdomen will decompose, releasing oils which may discolor and ruin the specimen.

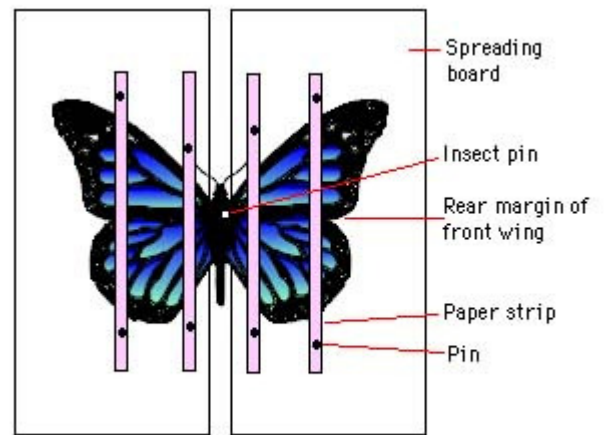
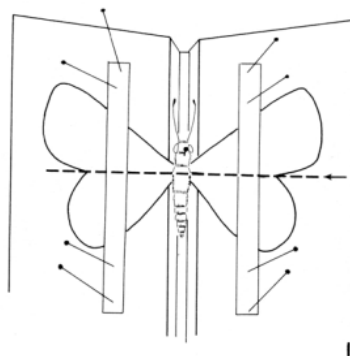
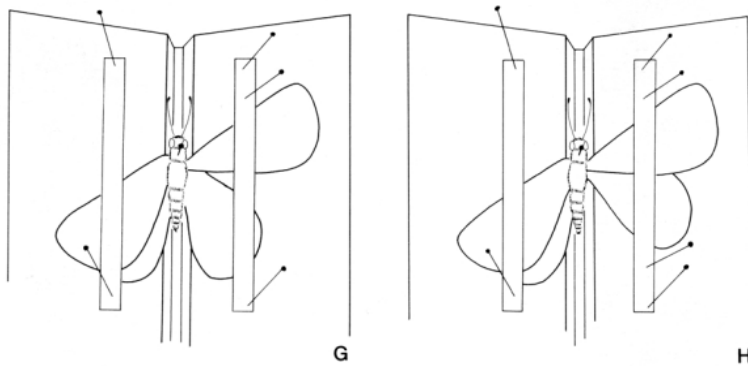
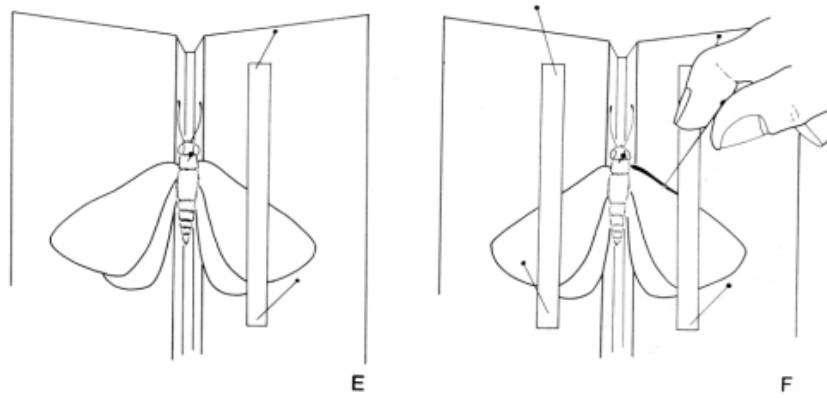
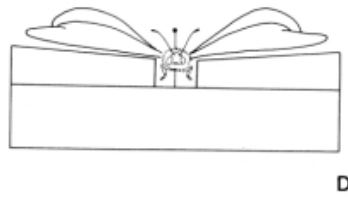
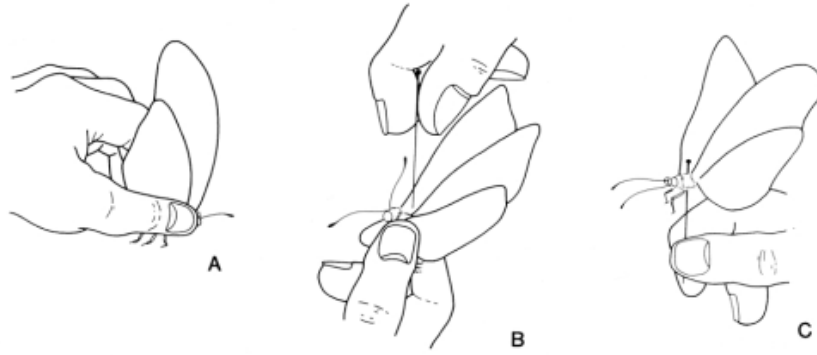


FIGURE 1: Properly pinned butterfly

Class Insecta

1. Ametabola

1. Order Archeognatha (Bristletails)
2. Order Thysanura (Silverfish, Firebrats)

2. Hemimetabola

1. Order Ephemeroptera (Mayflies)
2. Order Odonata (Dragonflies, Damselflies)
3. Order Plecoptera (Stoneflies)
4. Order Embiodoptera (Webspinners)
5. Order Orthoptera (Grasshoppers, Crickets)
6. Order Grylloblattodea (Rockcrawlers)
7. Order Mantophasmatodea (Gladiators)
8. Order Dermaptera (Earwigs)
9. Order Blattodea (Cockroaches)
10. Order Isoptera (Termites)
11. Order Mantodea (Praying Mantids)
12. Order Phasmatodea (Walkingsticks)
13. Order Zoraptera
14. Order Hemiptera
 1. Suborder Heteroptera (True Bugs)
 2. Suborder Homoptera (Aphids, Cicadas, Leafhoppers, et al.)
15. Order Thysanoptera (Thrips)
16. Order Psocoptera (Booklice, Barklice)
17. Order Phthiraptera (Lice)

3. Holometabola

1. Order Neuroptera (Lacewings)
2. Order Coleoptera (Beetles)
3. Order Strepsiptera (Twisted-wing Parasites)
4. Order Hymenoptera (Ants, Wasps, Bees)
5. Order Mecoptera (Scorpionflies)
6. Order Trichoptera (Caddisflies)
7. Order Lepidoptera (Moths, Butterflies)
8. Order Diptera (True Flies)
9. Order Siphonaptera (Fleas)