KEY TO ADULT SOIL AND LITTER INVERTEBRATES

1a. Body segmented.....2

1b. Body not segmented, usually with a coiled shell.....Gastropoda (snails)

2a. Appendages segmented.....3

2b. Appendages (if present) not segmented.....Annelida (segmented worms)

3a. Antennae present.....7

3b. Antennae absent.....4

4a. Three pairs of legs.....Protura

4b. Four pairs of legs (pedipalps in front of legs & may appear leg-like).....5

5a. Pedipalps with pincher-like claws, abdomen segmented.....Pseudoscorpionida (psuedoscorpions)

5b. Pedipalps without pincher-like claws, abdomen not segmented.....6

6a. Cephalothorax & abdomen joined by a narrow connection.....Araneae (spiders)

6b. Cephalothorax & abdomen joined by a broad connection.....Acarina (mites)

7a. Three pairs of legs (Insects).....12

7b. More than three pairs of legs.....8

8a. Distinct head followed by a series of segments.....9

8b. Distinct head absent.....Isopoda (pillbugs)

9a. 9-12 pairs of legs.....10

9b. More than 12 pairs of legs.....11

10a. Antennae branched.....Pauropoda

10b. Antennae not branched.....Symphyla

11a. Two pairs of legs on most body segments.....Diploda (millepedes)

11b. One pair of legs on each body segment.....Chilopoda (centipedes)

12a. Winged or with plate over thorax.....16

12b. No wings and no plate over thorax.....13

13a. Narrow-waisted, ant-like.....Hymenoptera (ants)

13b. Not narrow-waisted & ant-like.....14

14a. Abdomen with 2-3 finger-like appendages on tail.....Thysanura (bristletails) **not** fork-like

14b. Abdomen without finger-like appendages.....15

15a. Fork-like (2-part) jumping appendage on tail.....Collembola (springtails)

15b. No fork on tail.....Thysanoptera (thrips)

16a. Front wings hard or leathery, covering hind wings.....Coleoptera (beetles)

16b. Front wings not hard or leathery or not present.....17

17a. Front wings thickened at base, membranous at tip, sucking mouth parts .....Hemiptera (bugs)

17b. Wings with veins, overlapping or held rooflike (if present, plate over thorax, chewing mouth parts....Orthoptera (grasshoppers)

Biodiversity Laboratory

Illustrated Guide to Major Groups of Soil Invertebrates

Taxonomic Organization of Terrestrial Invertebrates

Phylum **Arthropoda:** major **CLASSES**, Orders and (common names)**

ARACHNIDA (arachnids)
- Araneida (spiders)
- Acarina (mites, ticks)
- Peudoscorpinida (pseudoscorpions)

INSECTA (insects)
- Microcoryphia (jumping bristletails)
- Thysanura (bristletails)
- Ephemeroptera (mayflies)
- Odonata (dragonflies)
- Plecoptera (stoneflies)
- Dictyoptera (cockroaches, mantids, termites)
- Notoptera (grylloblattids)
- Dermaptera (earwigs)
- Grylloptera (crickets, long-horned grasshoppers, etc.)
- Orthoptera (short-horned grasshoppers, etc.)
- Cheleutoptera (stick insects)
- Psocoptera (book-lice,bark-lice)
- Phthiraptera (lice)
- Hemiptera (true bugs)
- Homoptera (aphids, cicadas, leafhoppers)
- Thysanoptera (thrips)
- Megaloptera (alderflies,etc.)
- Raphidioptera (snakeflies)
- Neuroptera (lacewings, antlions)
- Coleoptera (beetles)
- Lepidoptera (butterflies, moths)
- Trichoptera (caddisflies)
- Hymenoptera (ants, wasps, bees, etc.)
- Siphonaptera (fleas)
- Diptera (true flies)
- Mecoptera (scorpionflies)

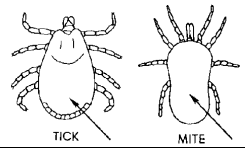
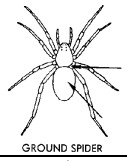
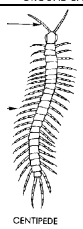
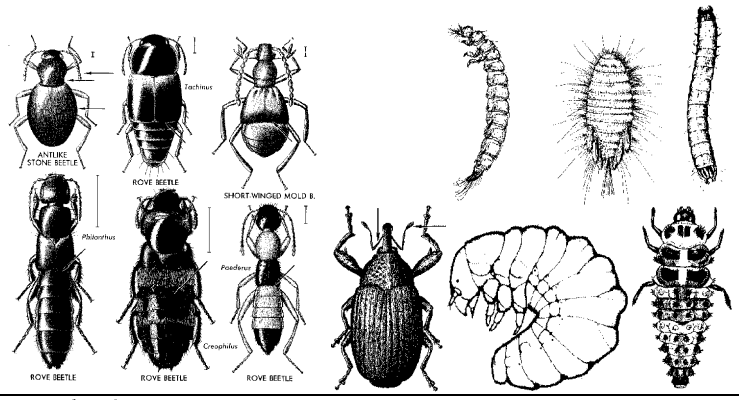
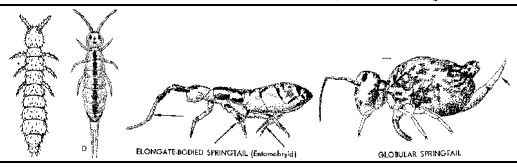
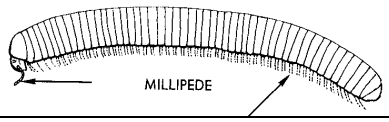
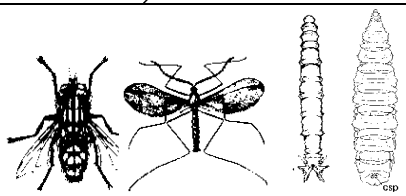
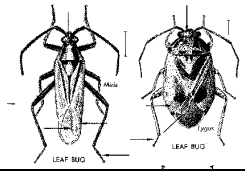
TARDIGRADA (water bears)
PENTASTOMIDA (tongue-worms)
ISOPODA (woodlice, pillbugs, isopods)
PAUROPODA (pauropods)
DIPLOPODA (millipedes)
CHILOPODA (centipedes)
SYMPHYLA (symphylans)
PROTURA (proturans)
COLLEMBOLA (springtails)
DIPLURA (diplurans)

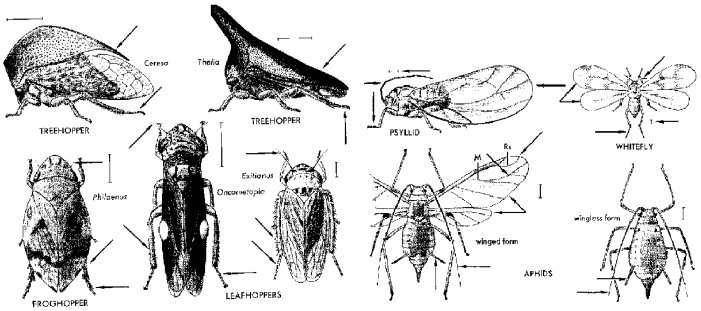
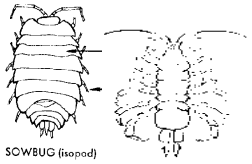
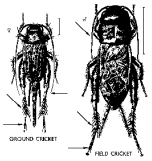
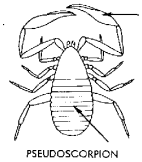
Other Non-Arthropod **Phyla** and (common names):
Nematoda (nematodes and unsegmented worms)
Oligochaeta (earthworms and other segmented worms)
Mollusca (slugs and snails)

****Based on previous work, shaded taxa are not expected to be found in our samples.

Descriptions of Taxonomic Groups of Common Soil Invertebrates

(Not drawn to scale)

Acarina (ticks and mites)	Eight legs, abdomen unsegmented and broadly joined to cephalothorax.	
Araneida (spiders)	Eight legs, abdomen unsegmented and strongly constricted at base.	
Chilopoda (centipedes)	Elongate, wormlike, segmented body flattened with one pair of legs per segment.	
Coleoptera (beetles, weevils)	Front wing, a hardened shell, covers the hind wing in adults. Larvae are variable, usually with chewing mouth parts.	
Collembola (springtails)	Minute, wingless, with forked structure on penultimate abdominal segment.	
Diplopoda (millipedes)	Elongate, wormlike, body cylindrical, with two pairs of legs per segment.	
Diptera (flies)	Adults with only <u>one</u> pair of wings; antennae often very short and three-segmented. Larvae maggot-like without legs, variable in form, usually with pointed head.	
Hemiptera (true bugs)	Front wings leathery at base, membranous at tips; sucking mouthparts.	

Homoptera (hoppers, cicadas, whiteflies)	Includes winged and wingless species; wings usually membranous; sucking mouthparts.	
Hymenoptera (bees, wasps, ants)	Two pairs of wings; antennae usually long (≥10 segments); abdomen constricted at base; chewing mouthparts.	
Isopoda (pillbugs, isopods)	Dorsoventrally flattened; seven pairs of leg-like appendages.	
Lepidoptera (butterflies, moths, caterpillars)	Adults with two pairs of scaled wings. Larvae cylindrical with three pairs of thoractic legs, and usually five pairs of abdominal prolegs.	 
Mollusca (slugs and snails)	These leg-less, soft-bodied gastropods are essentially a head possessing extensible antennae connected to a flattened foot.	
Nematoda (nematodes, unsegmented worms)	Thin wirelike unsegmented worms, pointed at both ends, often coiled or sinusoidally curved in samples	
Oligochaeta (segmented worms, earthworms)	Legless segmented worms with a thickened region (clitellum) part way along body.	
Orthoptera (crickets, roaches)	Winged (adult) or wingless (immature); antennae often long and hair-like; two or three filaments or clasping protuberances at end of abdomen.	
Pseudo-scorpionida (pseudoscorpions)	Apparently ten legs (first pair large and claw-like); abdomen segmented.	

Illustrated Key to Wingless or Apparently Wingless Insect Orders

(Adult or nymphal forms only, e.g., does not include larvae)