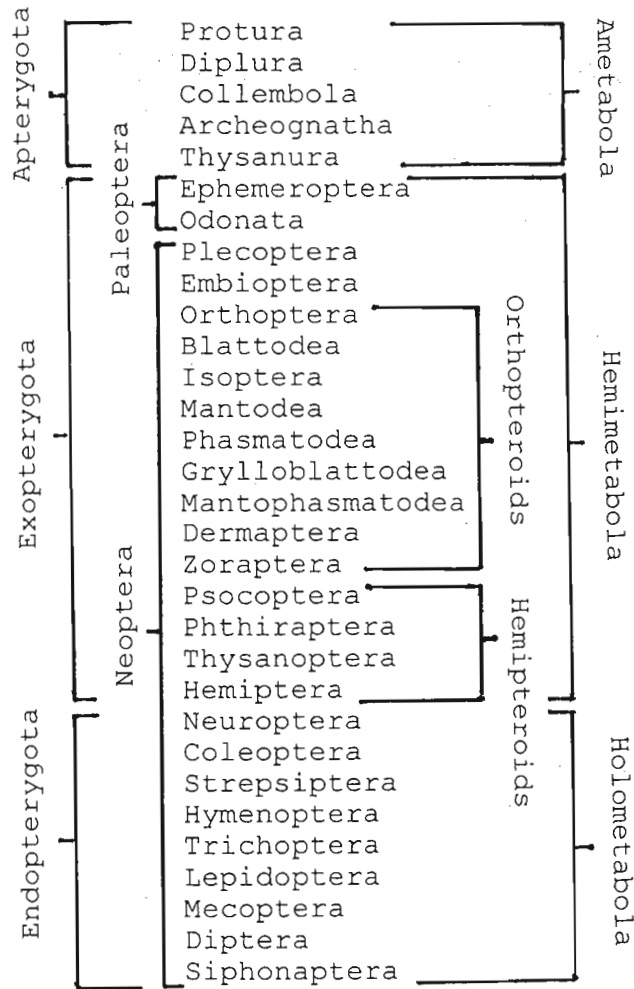


INSECT TAXONOMY AND SYSTEMATICS
Lecture Outline

I. Major Developments Marking Differences Between Taxa in the Annelids and the Arthropods

1. Segmented Body (Annelida)
2. Jointed legs with claws (Onychophora)
3. Exoskeleton (Arthropoda)
4. Chewing mouthparts (Mandibulata)
5. Terrestrial (Insecta and Myriapoda)
6. Three tagmata - six legs (Hexapoda)
7. Ectognathous mouthparts (Insecta)
8. Simple metamorphosis (Hemimetabola)
9. Wings (Exopterygota)
10. Wing folding mechanism (Neoptera)
11. Concentration of abdominal ganglia (Hemipteroids and Holometabola)
12. Piercing-sucking mouthparts (Hemipteroids)
13. Complete metamorphosis (Holometabola)

II. Classification Schemes for the Major Hexapod Orders



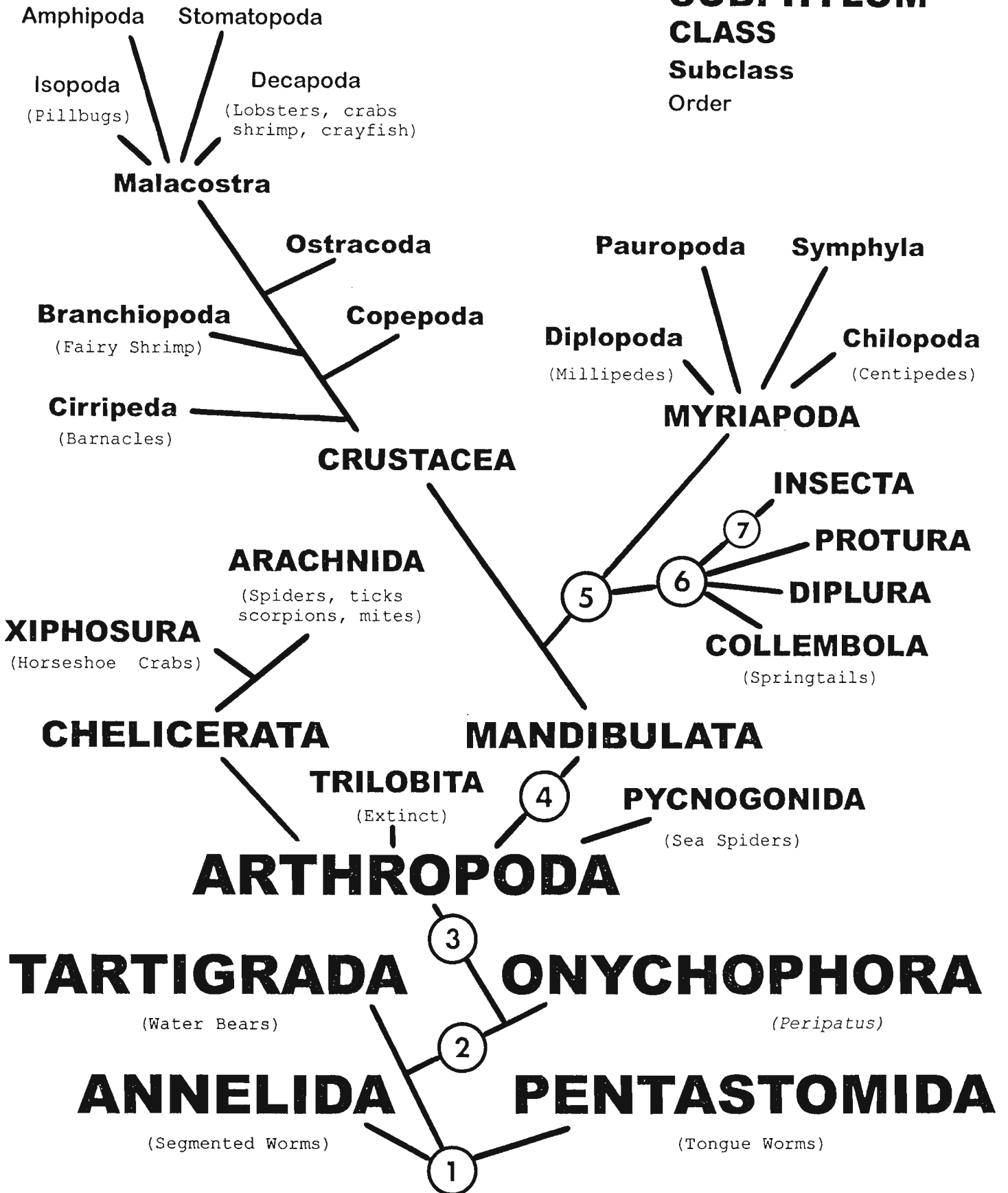
Arthropod Phylogeny

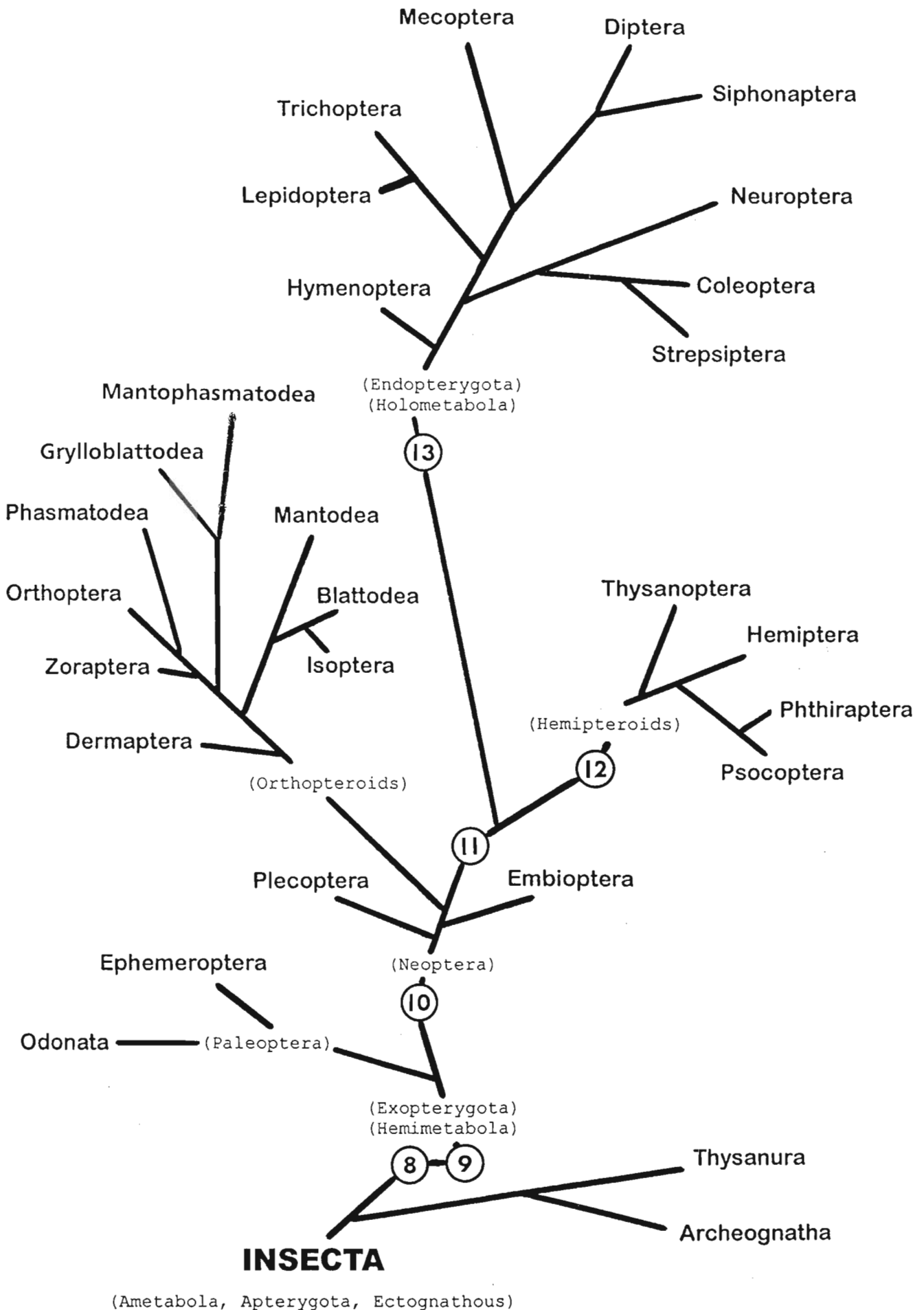
after Boudreaux, 1979

PHYLUM
SUBPHYLUM
CLASS

Subclass

Order





Ordinal Classification of the Hexapods

"Splitters"	ENT 425	"Lumpers"
1. Protura	1. Protura	1. Protura
2. Diplura	2. Diplura	2. Diplura
3. Collembola	3. Collembola	3. Collembola
4. Archeognatha	4. Archeognatha . . . }	4. Thysanura
5. Thysanura	5. Thysanura . . . }	
6. Odonata	6. Odonata	5. Odonata
7. Ephemeroptera	7. Ephemeroptera	6. Ephemeroptera
8. Plecoptera	8. Plecoptera	7. Plecoptera
9. Embioptera	9. Embioptera	8. Embioptera
10. Orthoptera	10. Orthoptera . . . }	
11. Blattodea	11. Blattodea . . . }	
12. Mantodea	12. Mantodea . . . }	9. Orthoptera
13. Phasmatodea	13. Phasmatodea . . . }	
14. Grylloblattodea	14. Grylloblattodea . . . }	
15. Mantophasmatodea	15. Mantophasmatodea	10. Mantophasmatodea
16. Dermaptera	16. Dermaptera	11. Dermaptera
17. Isoptera	17. Isoptera	12. Isoptera
18. Zoraptera	18. Zoraptera	13. Zoraptera
19. Psocoptera	19. Psocoptera	14. Psocoptera
20. Mallophaga . . . }	20. Phthiraptera	15. Phthiraptera
21. Anoplura . . . }		
22. Thysanoptera	21. Thysanoptera	16. Thysanoptera
23. Hemiptera . . . }	22. Hemiptera	17. Hemiptera
24. Homoptera . . . }		
25. Megaloptera . . . }	23. Neuroptera	18. Neuroptera
26. Raphidioptera . . . }		
27. Neuroptera . . . }		
28. Coleoptera	24. Coleoptera . . . }	19. Coleoptera
29. Strepsiptera	25. Strepsiptera . . . }	
30. Mecoptera	26. Mecoptera	20. Mecoptera
31. Diptera	27. Diptera	21. Diptera
32. Siphonaptera	28. Siphonaptera	22. Siphonaptera
33. Trichoptera	29. Trichoptera	23. Trichoptera
34. Lepidoptera	30. Lepidoptera	24. Lepidoptera
35. Hymenoptera	31. Hymenoptera	25. Hymenoptera

THE HEXAPOD ORDERS

Order Name	Common Names	Habitat	Ecological Importance	Economic Importance
Protura		Soil/Litter	Decomposers	+
Diplura		Soil/Litter	Decomposers	+
Collembola	Springtails	Soil/Litter	Decomposers	+
Archeognatha	Bristletails	Soil/Litter	Decomposers	+
Thysanura	Silverfish	Urban	Decomposers	- Books/Paper
	Firebrats	Soil/Litter	Decomposers	+
Ephemeroptera	Mayflies	Water/Air	Herbivores	0
Odonata	Dragonflies	Water/Air	Predators	+ Beneficial
	Damselflies	Water/Air	Predators	+ Beneficial
Plecoptera	Stoneflies	Water/Land	Scavengers	+ Fish food
Embioptera	Webspinners	Soil/Bark	Scavengers	0
Orthoptera	Grasshoppers	Land plants	Herbivores	- Crops
	Crickets	Plants/Soil	Herbivores	- Crops
	Katydids	Land plants	Herbivores	- Crops
Blattodea	Cockroaches	Ubiquitous	Scavengers	- Food/Disease
Mantodea	Praying Mantids	Land Plants	Predators	+ Beneficial
Phasmatodea	Walkingsticks	Land Plants	Herbivores	-
Grylloblattodea	Rock Crawlers	Rock/Ice	Scavengers	0
Mantophasmatodea		Land Plants	Predators	0
Dermaptera	Earwigs	Soil/Plants	Scavengers	0
Isoptera	Termites	Soil/Wood	Decomposers	- Wood Prod.
Zoraptera		Soil/Sawdust	Scavengers	0
Psocoptera	Booklice	Urban/Soil	Scavengers	0
	Barklice	Soil/Bark	Scavengers	0

Order Name	Common Names	Habitat	Ecological Importance	Economic Importance
Thysanoptera	Thrips	Plants	Herbivores Predators	- Plant Path. + Beneficial
Hemiptera				
Heteroptera	True bugs	Land/Water Plant/Anim. Animals	Herbivores Predators Parasites	- Crops + Beneficial - Disease
Homoptera	Cicadas Leafhoppers Aphids Scale Insects Whiteflies	Plants Plants Plants Plants Plants	Herbivores Herbivores Herbivores Herbivores Herbivores	- Crops - Plant Path. - Plant Path. - Crops - Crops
Phthiraptera	Chewing Lice Sucking Lice	Bird/Mammal Mammals	Parasites Parasites	- Irritation - Disease
Neuroptera	Lacewings Dobsonflies Antlions	Various Aquatic Terrestrial	Predatory Predatory Predatory	+ Beneficial + Fish Food + Beneficial
Coleoptera	Beetles Weevils	Nearly All Plants	Herb/Pred Herbivores	-/+ - Crops
Strepsiptera		Bugs/Wasps	Parasites	+
Mecoptera	Scorpionflies	Sylvan	Scavengers	0
Diptera	Flies Mosquitoes	Nearly All Aquatic	Herb/Scav Pred/Paras. Parasites	- Crops + Beneficial - Disease
Siphonaptera	Fleas	Bird/Mammal	Parasites	- Disease
Trichoptera	Caddisflies	Aquatic	Pred/Scav	+ Fish Food
Lepidoptera	Butterflies Moths	Plants Plants	Herbivores Herbivores	-/+ - Crops
Hymenoptera	Sawflies Bees Wasps Ants	Plants Plants Various Soil	Herbivores Pollinators Pred/Paras. Various	- Crops + Beneficial + Beneficial -/+