

BIO 475 - Parasitology

Spring 2009

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Northern Arizona University

<http://www4.nau.edu/isopod>

Lecture 24

Subphylum Hexapoda (Insecta)

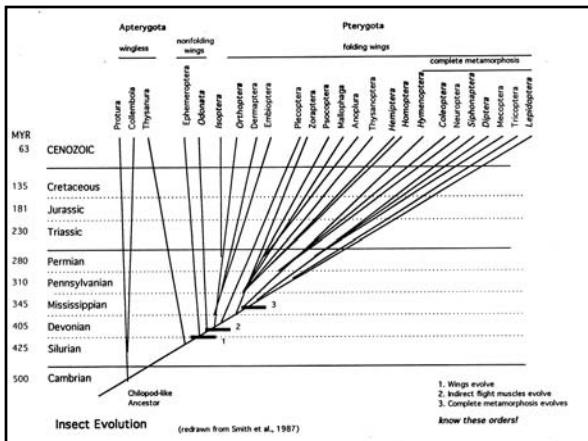
1. Characteristics

- a. Six legs,
- b. Head, thorax abdomen
- c. Often with winged adults

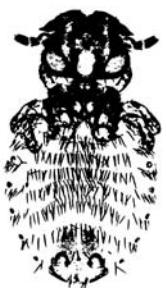


2. Main Parasitic Orders

- a. Mallophaga
- b. Anoplura
- c. Hemiptera
- d. Siphonaptera
- e. Diptera



Order Mallophaga



(b)

FIGURE 35.6
Trichodectes canis (Mallophaga, Ischnocera), the chewing louse of dogs.
 (a) Male; (b) female.



FIGURE 35.5
Calumma c. c. columbianum (Malagasy, Ichniavari), the slender pigmy lemur.
 Courtesy of Jim Dickey.

*Order
Anoplura*



Order Anoplura

1. Vectors of disease

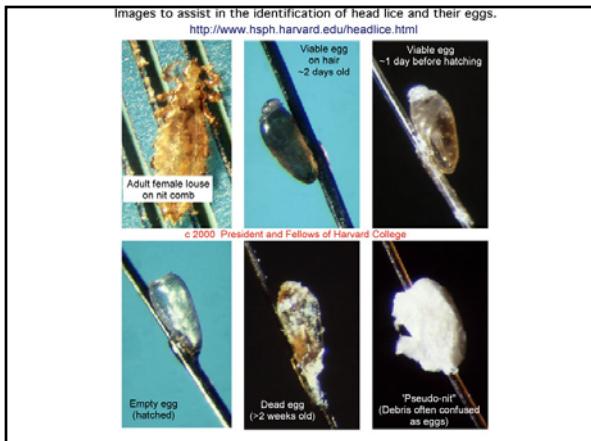
- a. *Rickettsia* (typhus)
- b. *Rhochalimaea* (trench fever)
- c. *Borrelia* (relapsing fever)

2. Important species

- a. *Pediculus humanus humanus* (clothing)
- b. *Pediculus humanus capitatus* (smaller, head)
- c. *Phthirus pubis*







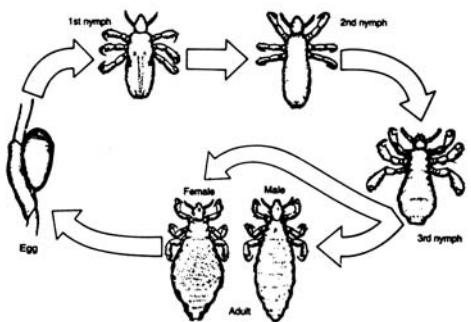
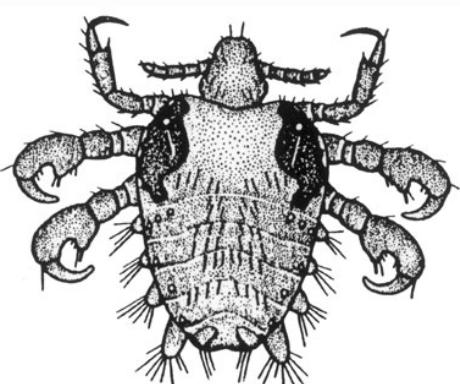


FIGURE 35.1

Life cycle of the head louse, *Pediculus humanus capitis*. The eggs (nits) are cemented to hairs and require 5 to 10 days to hatch. The life cycle above 31 days from egg to egg. Source: H. D. Pratt and K. S. Long, *Life of Public Health Importance and Their Control*. Department of Health, Education, and Welfare, Pub. No. (CD-77-4265, 1973, U.S. Government Printing Office, Washington, D.C.



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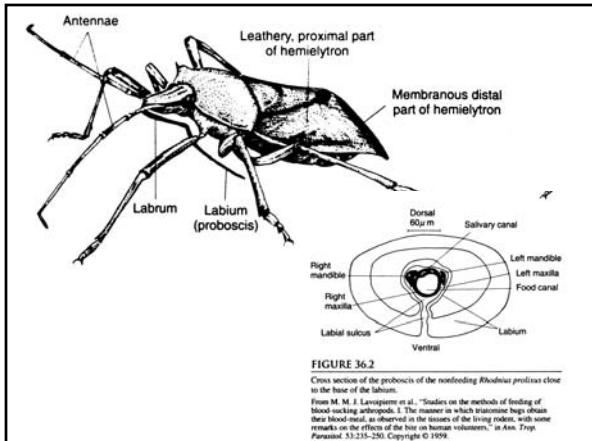
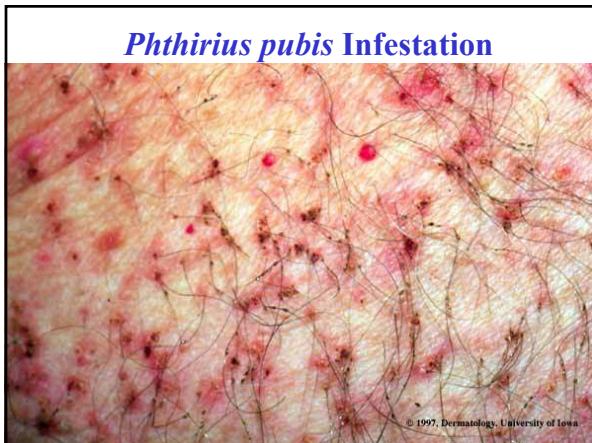
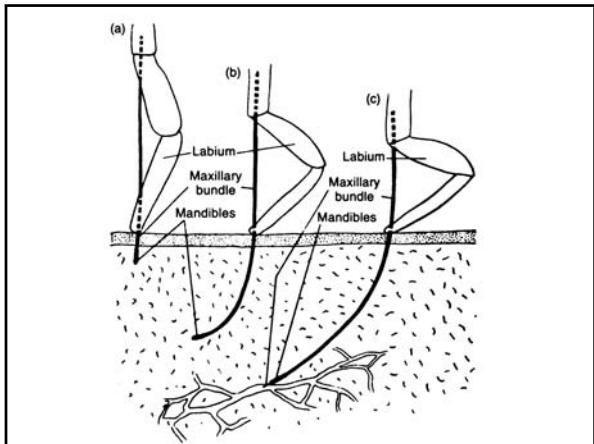
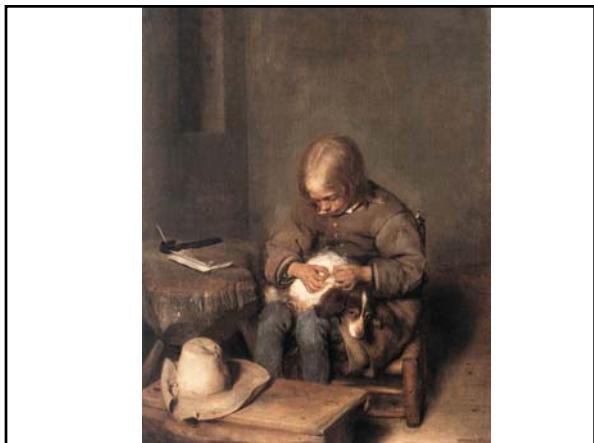
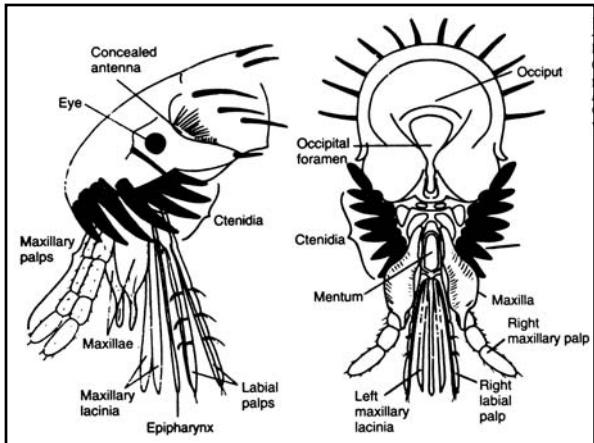


FIGURE 36.2
Cross section of the proboscis of the nonfeeding *Rhodius pubicus* close to the base of the labium.
From M. M. J. Lavazza et al., "Studies on the methods of feeding of blood sucking arthropods. I. The manner in which tritoma bugs obtain their blood meal as compared to the sucking of ticks and roaches," with some remarks on the effects of the bite on human volunteers," in Ann. Trop. Parasitol. 53:235-250. Copyright © 1959.



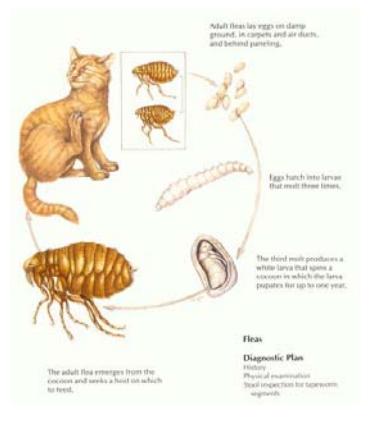




Order Siphonaptera

1. Are *holometabolous* insects.

a. Have egg -> larvae -> pupae -> adult.



Order Siphonaptera

Excellent jumpers:

Click mechanism in thorax permits 140g force in 1/1000 sec.

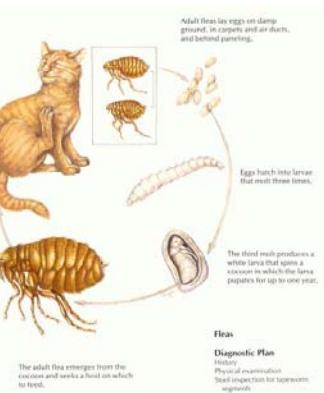
Equals 800 foot standing jump!



Order Siphonaptera

Often host specific with particular affinities.

Associated with nests or hosts, hair or feathers, surface or burrowing.



Nest Associated

Most rodent fleas.

Including prairie dogs.

Xenopsylla cheopis



Disease Transmission

Plague (*Yersinia pestis*).

Usually associated with *Xenopsylla cheopis*.

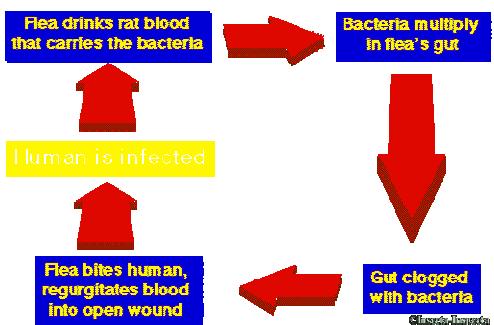
Also:

Murine typhus

Myxomatosis

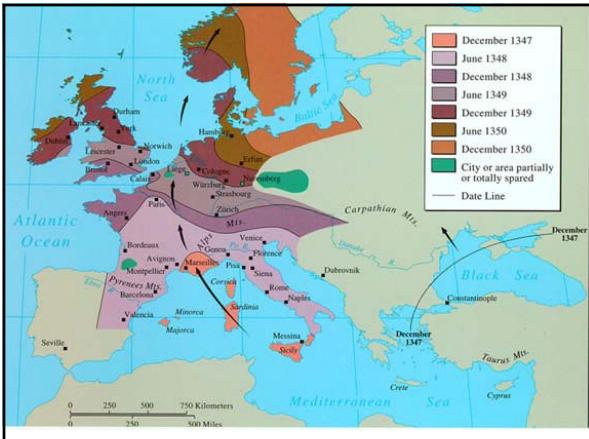
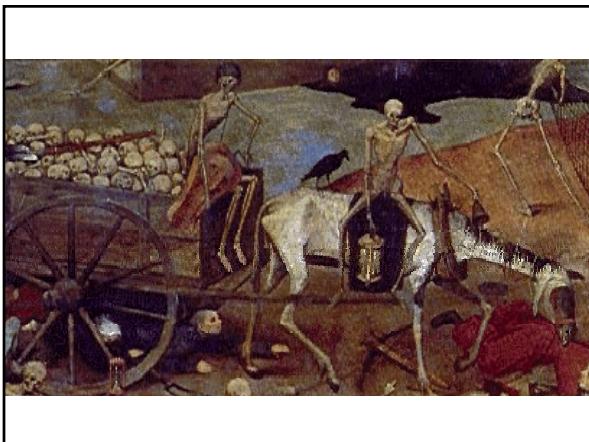


Plague Transmission





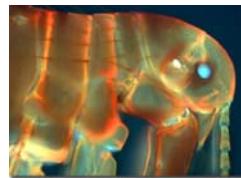
The bubonic plague was the most commonly seen form of the Black Death. The mortality rate was 30-75%. The symptoms were enlarged and inflamed lymph nodes (around arm pits, neck and groin). The term 'bubonic' refers to the characteristic *bubo* or enlarged lymphatic gland. Victims were subject to headaches, nausea, aching joints, fever of 101-105 degrees, vomiting, and a general feeling of illness. Symptoms took from 1-7 days to appear.



Host Associated

Most fleas including:

The human flea,
Pulex irritans



Rabbit fleas,
Nosopsyllus

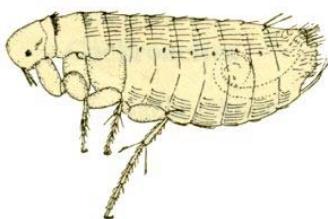


Cat fleas,
Ctenocephalides

Attached Fleas

Chicken fleas
(stick tight fleas)

Echidophaga



Burrowing Fleas

Tunga penetrans



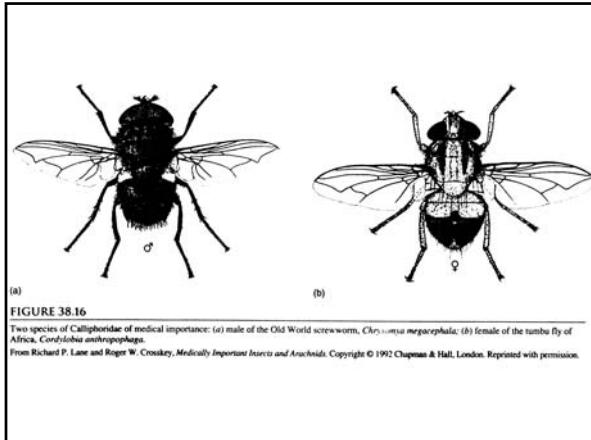
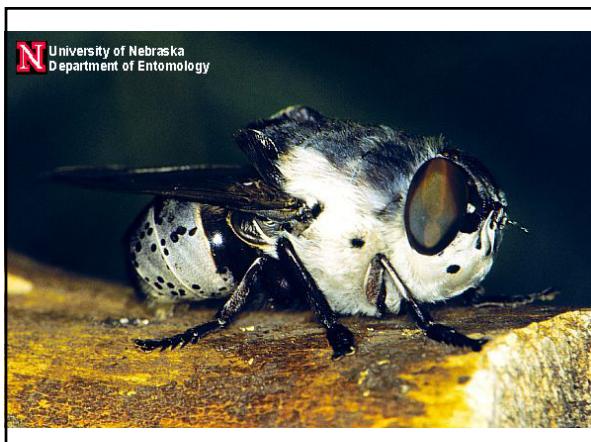


FIGURE 38.16

Two species of Calliphoridae of medical importance: (a) male of the Old World screw worm, *Oenosoma megacephala*; (b) female of the tumbu fly of Africa, *Cordylobius anthropophaga*.
From Richard P. Lane and Roger W. Crosskey, *Medically Important Insects and Arachnids*. Copyright © 1992 Chapman & Hall, London. Reprinted with permission.



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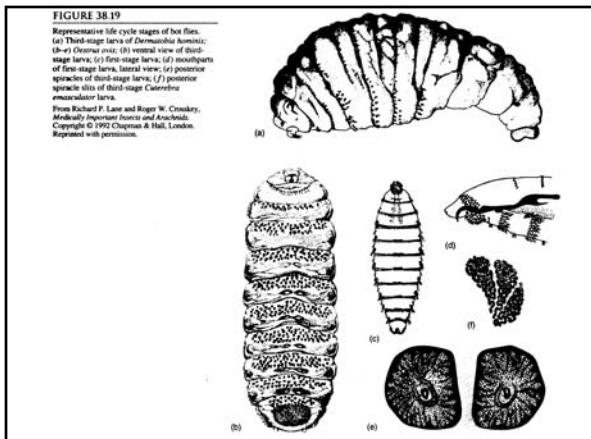
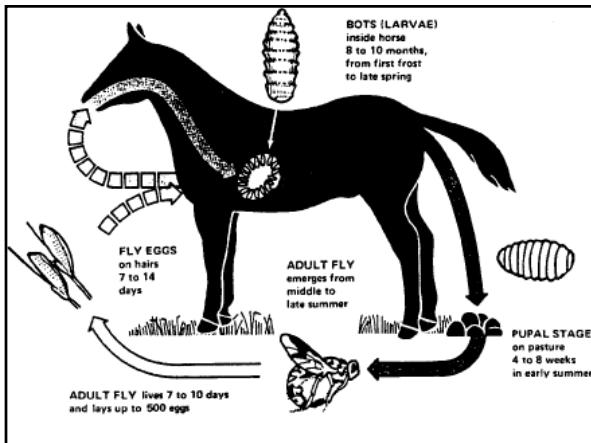


FIGURE 38.19

Representative life cycle stages of bot flies.
(a) Third-stage larva of *Dermatobia hominis*.
(b-e) *Ostracothrix* eggs; (b) ventral view of third-stage eggs; (c) dorsal view of third-stage eggs; (d) apical segments of first-stage larva, lateral view; (e) posterior spiracles of third-stage larva; (f) posterior spiracles of fourth-stage *Cnephia emenacularis* larva.
From Richard P. Lane and Roger W. Crosskey, *Medically Important Insects and Arachnids*. Copyright © 1992 Chapman & Hall, London. Reprinted with permission.





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