

## Agricultural insect pests in Hymenoptera (Bees, Wasps and Ants)

Insects with two pairs of membranous wings, the hind wings smaller than forewings and often attached to the fore wings with minute hooks, mouth parts primarily adapted for biting and often for lapping or sucking also (chewing -- lapping ). Abdomen usually basally constricted and its first segment fused with the meta-thorax. Females with ovipositor often specialized for piercing, sawing, stinging organ. Metamorphosis complete and cocoon generally present.

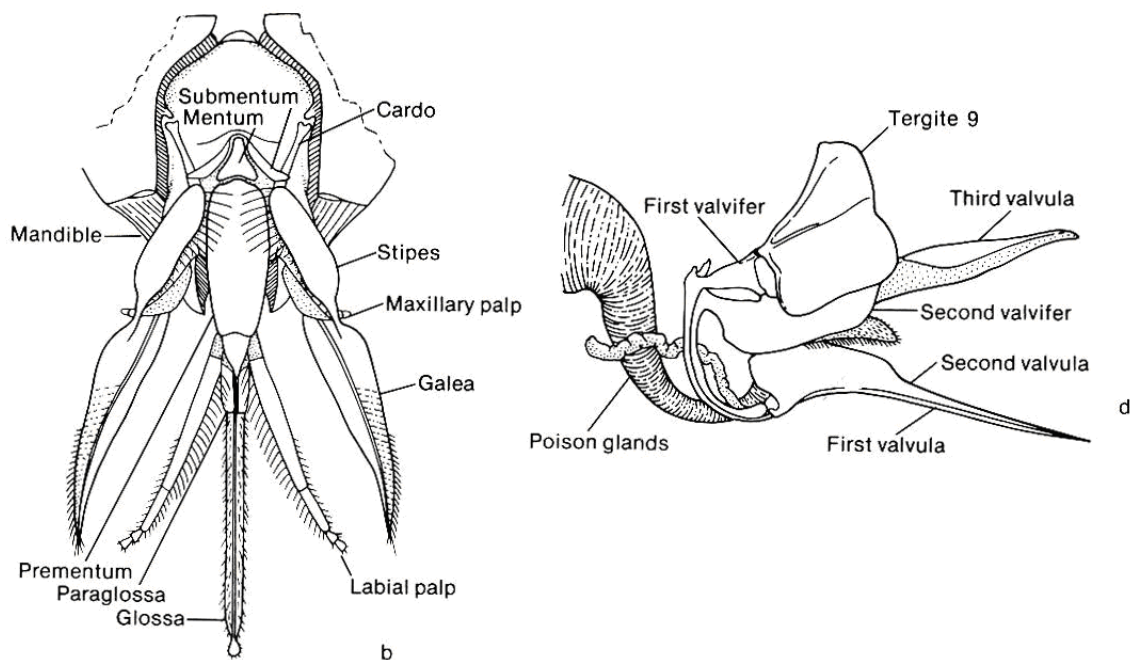


Figure 1 Structural features of Hymenoptera:  
*b*, mouthparts of *Apis mellifera*; *d*, dissected sting of *Apis mellifera*; (adapted from Daly, H.V. et al, 1978)

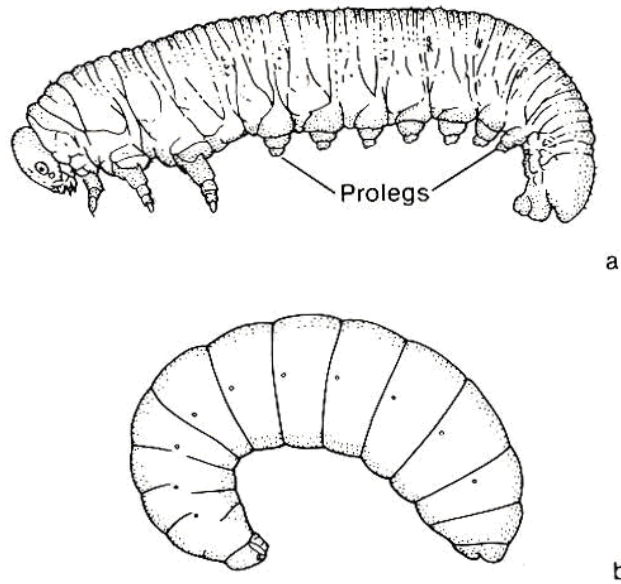


Figure 2 Larvae of Hymenoptera: a, eruciform larva of Symphyta (Diprionidae, *Neodiprion lecontei*); b, apodous larva of Apocrita (Apidae, *Xylocopa virginica*). (adapted from Daly H.V. et al. 1978)

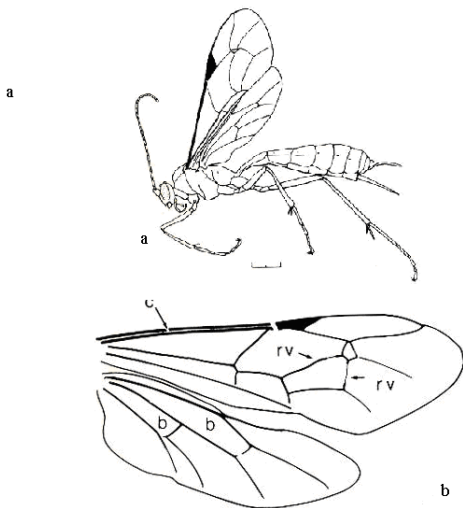


Figure 3 Representative Apocrita:  
 a. Ichneumonoidea, Ichneumonidae (*Netelia leo*; scale equals 2 mm);  
 b. wings of Ichneumonidae (*Catadelphus atrax*); f, wings of Braconidae (*Cremnops haematodes*). rv, recurrent veins; c, costal cell; b, basal cell.

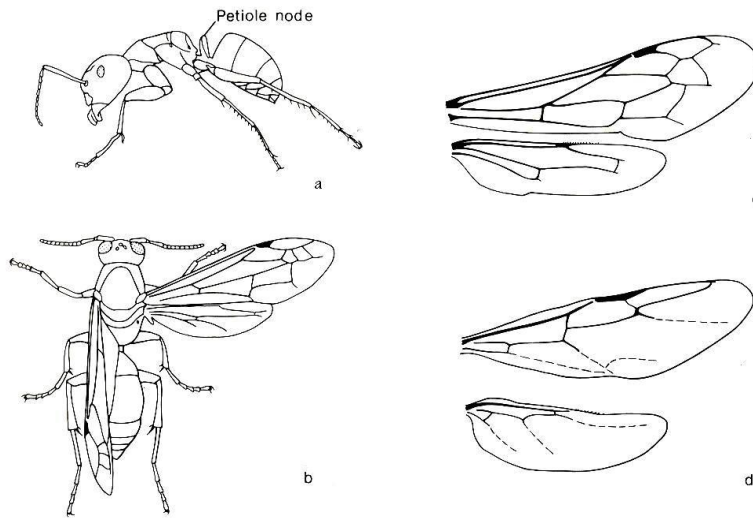


Figure 4 a. Formicoidea, Formicidae (*Camponotus*); b, Vespidae (*Polistes metricus*); c. Vespidae, wings (*Pseudomasaris vespoides*); d, Formicidae, wings (*Camponotus morosus*); scale equal 1 mm, *h*, horizontal furrow on mesopleuro

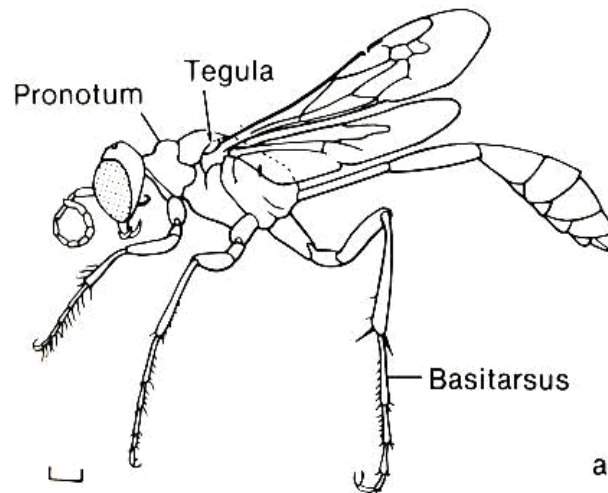


Figure 5. Sphecoidea, Sphecidae: a, *Ammophila Cleopatra*; Scale equal 1 mm

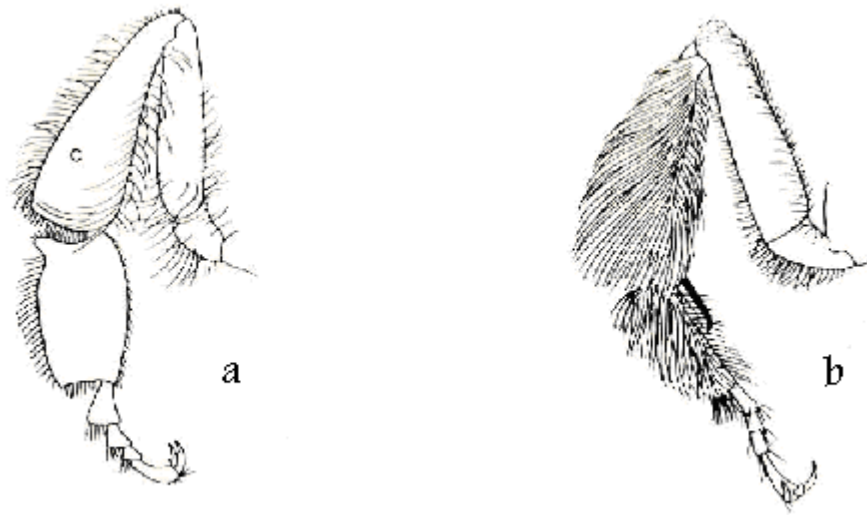
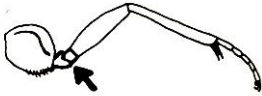

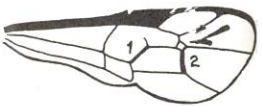


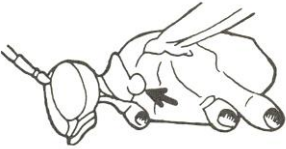
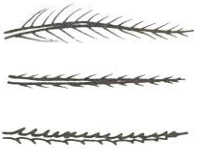




Figure 6. a. Hind tarsus of Apidae, showing corbicula (*Apis mellifera*); b. hind tarsus of Anthophoridae, showing scopa (*Anthophora curta*)

 <p>Figure 7</p>	 <p>Figure 8</p>	 <p>Figure 9</p>
 <p>Figure 10</p>	 <p>Figure 11</p>	 <p>Figure 12</p>
 <p>Figure 13</p>	 <p>Figure 14</p>	 <p>Figure 15</p>







**Keys to the major economic families of Hymenoptera:**

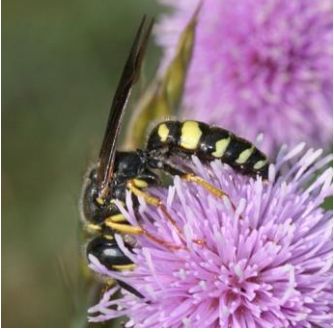



- 1-- Abdomen broadly jointed to thorax ( non---constricted abdomen group) -- 12  
 ---Abdomen jointed to thorax by a slender petiole or waist.(constricted abdomen group) ----- 2
- 2---Posterior trochanter consisting of two segments. ----- 3  
 ---Posterior trochanter consisting of a single segment(Figure7) ----- 5
- 3--Fore wings with a conspicuous dark spot (stigma) about mid way on leading edge, venation not highly reduced----- 4  
 --- Fore wings without a conspicuous dark spot on leading edge, venation highly reduced (Figure 8)----- Chalcididae
- 4--- Two recurrent veins in forewing, small submarginal cell often present (Figure 9) ----- Ichneumonidae  
 --- One recurrent vein in forewing, small sub marginal cell not present ----- Braconidae
- 5--- Antennae geniculate, first 1—2 abdominal segments often with dorsal hump (Figure 10)----- Formicidae  
 --- Antennae not geniculate, first 1--2 abdominal segments with out hump ----- 6
- 6--First discodal cell very long (Figure. 11) ----- Vespidae  
 --- First discodal cell not usually long ----- 7
- 7---Body hair unbranched, abdomen often petiolate, posterior angle of pronotum lobe-like (Figure 12) ----- Sphecidae  
 --- Body hairs, especially on thorax, branched, abdomen not petiolate, posterior angle of pronotum not lobe- like (Figure 13) ----- 8
- 8-- Basal vein strongly arched, often with metallic colors (Figure 14)--Halictidae  
 --- Basal vien not strongly arched, with out metallic colours----- 9
- 9-- With two sub marginal cells in fore wings, abdomen typical boat shaped (Figure 15)----- Megachilidae

--- Usually with 3 sub marginal cells in forewing, abdomen not typical boat shaped (Figure 16)----- Apidae




Representative of the families.



<u>Ichnominidae</u>		
<p><i>Pimpla roporator</i></p> <p><i>Pimpla sp.</i></p>	 <p><a href="http://www.galerie-insecte.org">www.galerie-insecte.org</a></p>	<p>حشرة البمبلا</p>
<p><i>Brachymeria femorata</i></p>	 <p><a href="http://www.ruf.rice.edu">www.ruf.rice.edu</a></p>	<p>حشرة البراكييميرى</p>
<u>Braconidae.</u>		
<p><i>Camponotus maculatus</i></p> <p><i>Camponotus sp.</i></p>	 <p><a href="http://www.amonline.net.au">www.amonline.net.au</a></p>	<p>نملة الأشجار</p>
<p><i>Monomorium pharonis</i></p>	 <p><a href="http://www.idph.state.il.us">www.idph.state.il.us</a></p>	<p>النملة الفرعونية (المنزلية)</p>

<u>Formicidae</u>		
<i>Vespa orientalis</i>	 <a href="http://www.muenster.org">www.muenster.org</a>	دبور البلح الأحمر (الشرقي)
<u>Vespidae</u>		
<i>Polistes hebrocus</i>  <i>Polistes sp.</i>	 <a href="http://www.inhs.uiuc.edu">www.inhs.uiuc.edu</a>	
<u>Vespidae</u>		
<i>Tachysphex aegyptiacus</i>  <i>Tachysphex sp.</i> <u>Sphecidae</u>	 <a href="http://cedarcreek.umn.edu">cedarcreek.umn.edu</a>	الدبور الأصفر

<p><i>Philanthus abdelkader</i>  <i>Philanthus</i>_sp.  <u>Sphecidae</u></p>	 <p><a href="http://www.pbase.com">www.pbase.com</a></p>	
<p><u>Fam. Eumenidae</u></p>		
<p><i>Eumenes maxillosa</i></p>	 <p><a href="http://nathistoc.bio.uci.edu">nathistoc.bio.uci.edu</a></p>	<p>دبور الطين الباني</p>
<p><u>Fam, Apidae</u></p>		
<p><i>Apis mellifera</i></p>	 <p><a href="http://people.virginia.edu">people.virginia.edu</a></p>	<p>نحل العسل</p>
<p><u>Fam. Megachilidae</u></p>		
<p><i>Megachile</i> sp</p>	 <p><a href="http://www.raakkila.fi">www.raakkila.fi</a></p>	



<p><u>Fam. Halictidae</u></p>		
<p><i>Halictus</i> sp</p>	 <p><a href="http://www.pbase.com">www.pbase.com</a></p>	
<p><u>Fam. Chrysididae</u></p>		
<p><i>Stilbum splendidum</i></p>	 <p><a href="http://www.chrysis.net">www.chrysis.net</a></p>	<p>الدبور الأزرق</p>
<p><u>Fam. Xylocopidae</u></p>		
<p><i>Xylocopa aestuans</i> <i>Xylocopa</i> sp.</p>	 <p><a href="http://www.thebugmaniac.be">www.thebugmaniac.be</a></p>	<p>نحلة الخشب</p>
<p><u>Fam. Scolidae</u></p>		

<p><i>Dielis collaris</i></p> <p><i>Dielis</i> sp.</p>	 <p><a href="http://agspsrv34.agric.wa.gov.au">agspsrv34.agric.wa.gov.au</a></p>	<p>الدبور الحافر</p>
<p>Fam. Pompilidae</p>		
<p><i>Cyphononyx flavicornis</i></p> <p><i>Cyphononyx</i> sp.</p>	 <p><a href="http://www.agri.tohoku.ac.jp">www.agri.tohoku.ac.jp</a></p>	<p>دبور العناكب</p>

## References

- Daly, H.V., J.T. Doyen, P.Q. Ehrlich. (1978) Introduction to Insect Biology and Diversity. McGraw-Hill. New York.
- Borror, D.J., D.M. DeLong, and C.A. Triplehorn, (1981) An Introduction to The Study of Insects. 5<sup>th</sup> ed. Saunders. Philadelphia
- Pfadt, R.E., (1985) Fundamentals of Applied Entomology. 4<sup>th</sup> Ed. McMillan Publishing Company. New York.