ACARINA: ILLUSTRATED KEY TO SOME COMMON ADULT FEMALE MITES AND ADULT TICKS
Harry D. Pratt and Chester J. Stojanovich

1. Last segment of first leg with a depression known as Haller’s organ; most species with a toothed hypostome on capitulum; size usually over 4 mm. (Fig. 1 A). Ticks ............ 21

Last segment of first leg without such a depression known as Haller’s organ; hypostome not toothed; most species less than 4 mm. long (Fig. 1 B). Mites....................... 2

Fig. 1 A

Fig. 1 B

2. Respiratory system with a spiracle on each side opening lateral to the bases of the 3rd or 4th pair of legs, frequently spiracles leading into slender tubes that extend forward laterally to the bases of the 1st or 2nd pairs of legs (Fig. 2 A). Mesostigmatic Mites. 3

Respiratory system without spiracles, or with spiracles opening near bases of the chelicerae (Fig. 2 B)................................................................. 13

Fig. 2 A

Fig. 2 B

3. Anus surrounded by a plate bearing only 3 setae, one on each side and one behind the anal opening; first tarsus bearing caruncle and claws at tip (Fig. 3 A)...................... 4

Anus surrounded by a plate bearing more than 3 setae; first tarsus without caruncle and claws (Fig. 3 B)................................................. Many species of Macrocheles

Fig. 3 A

Fig. 3 B

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia
– Revised 1966 by Harold George Scott
4. Anal opening more than its length behind anterior margin of anal plate; chelicerae strongly narrowed apically, needle-like, movable chela absent or extremely small (Fig. 4 A). **Genus Dermanyssus** ................................................................. 5

Anal opening less than its length or about its length, behind anterior margin of anal plate; chelicerae not narrowed apically and needle-like, shear-like, bearing conspicuous shear-like chela at tip which may or may not bear teeth (Fig. 4 B). ......................... 7

![Fig. 4 A](image)

![Fig. 4 B](image)

5. Dorsal surface of body with a single plate (Fig. 5 A)................................................. 6

Dorsal surface of body with two plates, a large anterior plate and a small posterior plate (Fig. 5 B). **Dermanyssus sanguineus** ......................... HOUSE MOUSE MITE

![Fig. 5 A](image)

![Fig. 5 B](image)

6. Peritreme tube somewhat sinuous and extending anteriorly to a point opposite coxa 2 (Fig. 6 A). **Dermanyssus gallinae** .................................................. CHICKEN MITE

Peritreme tube short, extending forward for a distance less than half the diameter of coxa 3 (Fig. 6 B). **Dermanyssus americanus** .................. AMERICAN BIRD MITE

![Fig. 6 A](image)

![Fig. 6 B](image)
7. Dorsal plate not covering entire dorsal surface of mite; genito-ventral plate typically narrowed posteriorly behind 4th coxae; chelae on cheliceræ without teeth or setae (Fig. 7 A). Genus Ornithonyssus. ................................................................. 8

Dorsal plate almost covering entire dorsal surface of mite; genito-ventral plate typically expanded posterior to 4th coxae; one or both chelæ of cheliceræ with teeth and a seta (Fig. 7 B). Family Laelapridæ. ................................................................. 10

8. Sternal plate with anterior and middle pairs of sternal setæ on the plate, posterior pair usually just off the plate (Fig. 8 A). On Birds... Ornithonyssus sylvianum. .......................... NORTHERN FOWL MITE

Sternal plate with the usual three pairs of setæ on the plate (Fig. 8 B). ........................................ 9

9. Dorsal plate narrowed posteriorly; setæ in middle dorsal row of plate longer than the distance between their bases (Fig. 9 A). Normally on mammals or man... Ornithonyssus bacoti ........................................... TROPICAL RAT MITE

Dorsal plate broader posteriorly; setæ in middle dorsal row of plate much shorter than the distance between their bases (Fig. 9 B). Normally on birds... Ornithonyssus bursæ... TROPICAL BIRD MITE
10. Genito-ventral plate with many fine setae; anal plate transverse, wider than long (Fig. 10 A). On domestic rats and a wide variety of wild mammals. *Eulaelaps stabularis*

Genito-ventral plate with one to four pairs of setae; anal plate longer than wide (Fig. 10 B).

![Fig. 10 A](image1)

---

11. Genito-ventral plate with only a single pair of setae (Fig. 11 A). On domestic rats and mice and a wide variety of mammals and birds. *Haemolaelaps glasgowi*. **COMMON RODENT MITE**

Genito-ventral plate with four pairs of setae (Fig. 11 B). Normally on domestic rats.

![Fig. 11 A](image2)

---

12. Anal plate contiguous with the genito-ventral plate, anterior margin rounded and fitting into a strong concavity in genito-ventral plate; larger species averaging 1-2 mm long. (Fig. 12 A). *Echinolaelaps echidninus*. **SPINY RAT MITE**

Anal plate somewhat separated from genito-ventral plate, anterior margin almost straight with definite anterior-lateral corners; small species averaging 0.5-1 mm long (Fig. 12 B). *Laelaps nuttalli*. **DOMESTIC RAT MITE**

![Fig. 12 A](image3)

---
13. First pair of legs very long, much longer than other three pairs; anterior margin of body with four distinct flattened scales and somewhat flattened scales on other dorsal surfaces of body (Fig. 13 A). Plant feeders which invade buildings but do not bite man. *Bryobia pratiosa* ............................................. CLOVER MITE

**First pair of legs not markedly longer than the other three pairs of legs; no flattened scales on body (Fig. 13 B).** ............................................. 14

![Fig. 13 A](image)

![Fig. 13 B](image)

14. Surface of body without fine parallel lines or folds; tarsi without stalked suckers (Fig. 14 A). Adults never true parasites (Cheese or Flour mites) ............................................. 15

**Surface of body with fine parallel lines or folds, tarsi often provided with stalked suckers (Fig. 14 B). Scabies or mange mites parasitic in all stages, chiefly on vertebrates** ............................................. 16

![Fig. 14 A](image)

![Fig. 14 B](image)

15. Tarsi tapering markedly to tip (Fig. 15 A). ............................................. *Glycyphagus prunorum*

**Tarsi not tapering markedly to tip (Fig. 15 B). Many cheese and flour mites which are difficult to separate except with very specialized literature and a reference collection.** ............................................. Genus *Tyrophagus*, Genus *Caloglyphus*, Etc.

![Fig. 15 A](image)

![Fig. 15 B](image)
16. Body elongate, somewhat cigar-shaped and prolonged behind; the abdomen somewhat ringed; legs very short, apparently three-segmented; tiny species less than 1 mm. (Fig. 16 A). In hair follicles or sebaceous glands of mammals.  

Demodex folliculorum.  

PORE OR FOLLICLE MITE

Body not prolonged behind and cigar-shaped (Fig. 16 B). Occasionally female grain itch somewhat balloon-shaped; larger species not found in hair follicle or sebaceous glands of mammals.  

17. A club-shaped or clavate hair between bases of first and second pairs of legs, body divided into cephalothorax and abdomen, the latter often enormously enlarged (Fig. 17 A)  

Pyemotes ventricosus formerly Pediculoides ventricosus.  

STRAW ITCH MITE

Setae on cephalothorax normal, no club-shaped or clavate hair between bases of first and second pairs of legs; no distinct division into cephalothorax and abdomen (Fig. 17 B)  

18. Legs short and stubby (Fig. 18 A).  

Legs longer and more slender (Fig. 18 B).  

19

20
19. Suckers of tarsi with segmented pedicels (Fig. 19 A). Non-burrowing itch mites on mammals in the genus *Psoroptes*, a common species causing scab and crusts in the ears of rabbits is the *Psoroptes cuniculi* ........................................ RABBIT EAR MITE

Suckers of tarsi without segmented pedicels (Fig. 19 B). ................................................................. *Dermatophagoides scheremetewskyi*

![Fig. 19 A](image1)

![Fig. 19 B](image2)

20. Anal opening on the dorsal surface of the body; dorsal surface of the body with only short, sharp setae (Fig. 20 A). .............................................................. *Notoedres*

Anal opening at tip of body or slightly on ventral side; dorsal surface of body with pointed scales and blunt stout spines (Fig. 20 B). *Sarcoptes scabiei* ........................................ SCABIES OR MANGE MITE

![Fig. 20 A](image3)

![Fig. 20 B](image4)
21. Capitulum at anterior end of body, visible from above and below; scutum or dorsal shield present, short in female, long in male (Fig. 21 A & B). Family Ixodidae. HARD TICKS

Capitulum on under side of body, hidden by body when seen from above though palpi may project anteriorly; scutum absent (Fig. 21 C & D). Family Argasidae. SOFT TICKS

22. Ornate ticks, with some white markings on dorsal shield (Fig. 22 A) ................................................... 23

Inornate ticks, without white markings on dorsal shield (Fig. 22 B) ............................................................... 28

23. Palpi long, much longer than basis capituli; second segment of palpus about twice as long as wide (Fig. 23A). Genus Amblyomma ................................................................. 24

Palpi short, about as long as basis capituli; second segment of palpus about as long as wide (Fig. 23 B). Genus Dermacentor ................................................................. 25
24. Next to last segment of second, third, and fourth pairs of legs without paired terminal spurs; female with a distinct pale marking near posterior end of dorsal shield (Fig. 24 A). *Amblyomma americanum* ......................................................... LONE STAR TICK

Next to last segment of second, third, and fourth pairs of legs with long, paired terminal spurs; female with more diffuse markings on dorsal shield (Fig. 24 B). .......................................................... GULF COAST TICK

25. Spiracular plate without dorsal prolongation (Fig. 25 A). *Dermacentor albipictus* ............ .............................................................. WINTER TICK

Spiracular plate with dorsal prolongation (Fig. 25 B) .......................................................... 26

26. Basis capituli with long cornua (Fig. 26 A). *Dermacentor occidentalis* PACIFIC COAST TICK

Basis capituli with short cornua (Fig. 26 B) .......................................................... 27
21. Cotlets or spiracular plate large and less numerous; Rocky Mountain species. (Fig. 27 A) *Dermacentor andersoni*.................................................. ROCKY MOUNTAIN WOOD TICK

cotlets of spiracular plate very small and numerous; east of the Rocky Mountains and on the Pacific coast. (Fig. 27 B) *Dermacentor variabilis*............................... AMERICAN DOG TICK

28. Sides of basis capituli laterally produced; distinctly angulate; eyes present on sides of scutum (Fig. 28 A & B). .................................................. 29

Sides of basis capituli not laterally produced; more or less parallel (Fig. 28 C); eyes absent............................................................. 30

29. Fore coxa deeply cleft; festoons present; easily seen in unengorged specimens; anal groove distinct in unengorged specimens (Fig. 29 A). (principally on dogs or in houses) *Rhipicephalus sanguineus*................................................. BROWN DOG TICK

Fore coxa not deeply cleft; festoons absent; anal groove indistinct (Fig. 29 B). (On cattle and deer). *Rhipicephalus annulatus*.................................................. CATTLE TICK
30. Second segment of palpus laterally produced; anal groove behind anus, not attaining posterior margins of body (Fig. 30 A & B). *Haemaphysalis leporispalustris* .... RABBIT TICK

Second segment of palpus not laterally produced; anal groove extending as an inverted U from in front of anus to posterior margins of body (Fig. 30 C). ........... Genus *Ixodes*

FAMILY ARGASIDAE - SOFT TICKS

31. Margin of body with a definite sutural line separating dorsal and ventral surfaces; dorsal surface with conspicuous "discs" arranged somewhat in radiating lines (Fig. 31 A). *Argas persicus* ................................................................. FOWL TICK

Margin of body lacking definite sutural line, thick and rounded (Fig. 31 B) ........... 32

32. Hypostome with well-developed teeth (Fig. 32 A); integument not spinose. ........... Genus *Oribatodes* .............................. 33

Hypostome of adult vestigial or without effective teeth; integument of nymph (stage usually seen) spinose (Fig. 32 B). Usually on cattle and horses. .......................... SPINOSE EAR TICK
33. Strong dorsal humps absent on all tarsi (Fig. 33 A) ............................. 34
   Strong dorsal humps present on tarsi of first, second and third legs (Fig. 33 B) .... 35

Fig. 33

Fig. 33 B

34. Cheeks absent (Fig. 34 A). *Ornithodoros hermsi*................................HERMS' RELAPSING FEVER TICK
   Cheeks present (Fig. 34 B).............................................................*Ornithodoros talaje*

Fig. 34 A

Fig. 34 B

35. Eyes present on sides of body above second and third coxae (Fig. 35 A); tarsus of fourth leg with a prominent, pointed, subterminal spur (Fig. 35 B).............................. Ornithodoros coriaceus ....................................................... PAJARELLO TICK
   Eyes absent; tarsus of fourth leg without such subterminal spur (Fig. 35 C) ........ 15

Fig. 35 A

Fig. 35 B

Fig. 35 C

36. Mammillae large, relatively few and not crowded; in mid-dorsal region about 10 per linear mm.; hypostome over 1/2 mm. long. Southeastern United States and Mexico north to Kansas and Florida. *Ornithodoros turicata* ............................................. RELAPSING FEVER TICK
   Mammillae small, crowded, and numerous; in mid-dorsal region about 18 per linear mm.; hypostome less than 1/2 mm. long. Pacific coast and Rocky Mountain states............... *Ornithodoros parkeri* .................................................. PARKER'S RELAPSING FEVER TICK
TICKS: KEY TO GENERA IN UNITED STATES

Harry D. Pratt

Capitulum inferior; scutum absent

FAMILY ARGASIDAE - SOFT TICKS

Capitulum anterior; scutum present

FAMILY IXODIDAE - HARD TICKS

Margin of body with definite
sutural line.

Margin of body thick, rounded,
without definite sutural line.

Hypostome with well
developed teeth, integument
mamilated

Hypostome vestigial or with-
out effective teeth, integu-
ment tuberculated or granu-
lated.

Ornithodoros

Integument of adult granular;
of nymph (stage usually seen)
very spinose. Hypostome of
adult vestigial. Usually on
cattle, horses, or rodents.

Otohion

OGAS

ANTRICOLA

Integument of adult and nymph
tuberculated. Hypostome of
adult scooped out. Associated
with bats.

IXODES

Second segment of palp not
laterally produced.

Second segment of palp laterally produced.

HAENAPHYSALIS

Mouthparts much longer than
basis capituli.

Mouthparts as long as basis capituli.

AMBLYOMMA

APONOMMA

Scutum with eyes

Scutum without eyes

Basis capituli laterally pro-
duced.

Basis capituli not laterally produced.

BOOPHILUS

KHFRICPHALUS

DERMACENTOR

ANGECENTOR (OTOCENTOR)

Palpi ridged dorsally and
lateral:

Festoons absent. Palpi not ridged. Festoons present.

Festoons absent

Festoons seven

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia - 1961
TICKS AND MITES: KEY TO SPECIES COMMONLY INFESTING PIGEONS

Harold George Scott & Chester J. Stojanovich

Argas reflexus
PIGEON TICK

with lateral spiracles

Laminiosiotes cysticola
FOWL CYST MITE

without lateral spiracles

Ornithonyssus bursa
TROPICAL FOWL MITE or
Dermanyssus gallinae
CHICKEN MITE

with horizontal setae

Syringophilus bipunctatus
or Syringophilus columbi
PIGEON QUIL MITES

without horizontal setae

Pleuraphagous strictus
BODY-FEATHER MITE

Falculifer rostratus
WING-FEATHER MITE

Megninia gingydimera
or Megninia cubitalis
CONTOUR-FEATHER MITES

mouthparts ventral
adult 6-9 mm. long

mouthparts anterior
under 0.6 mm. long

without M-shaped peritreme

legs I and II simple

legs I and II projected
TICKS: PICTORIAL KEY TO SOME COMMON SPECIES
Harry D. Pratt

HARD TICKS
- Capitulum visible from above, scutum present, family Ixodidae
- Female
- Male

SOFT TICKS
- Capitulum not visible from above, scutum absent, family Argasidae
- Ventral
- Dorsal
- Sutural line present
- Sutural line absent

Argas persicus
Fowl Tick
Ornithodoros
Relapsing Fever Tick

Amblyomma americanum
Lone Star Tick

Dermacentor variabilis and D. andersoni
American Dog Tick and Wood Tick

Rhipicephalus sanguineus
Brown Dog Tick

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia - 1961
MITE DIAGRAM WITH STRUCTURES LABELED

Harry D. Pratt

[Diagram of a mite with labeled parts such as chelicera, palpus, hypostome, tritosternum, coxa, trochanter, femur, patella, tibia, tarsus, caruncle, claw, anal plate, genito-ventral plate, sternal plate, peritreme, spiracle, metapodal plate.]
MITES: PICTORIAL KEY TO SOME COMMON SPECIES OF PUBLIC HEALTH IMPORTANCE

Harold George Scott and Chester J. Stojanovich

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia — 1963
1. With club-like hair between bases of legs I and II ........................................... 5
   Without club-like hair between bases of legs I and II ..................................... 2

2. Claws, if present, not on stalks (*Glycyphagus domesticus*, formerly) .......... SUGAR MITE
   Claws on stalks ......................................................................................... 3

3. Internal apical hair (on joint between femur I and tibia I) less
   than three times as long as external apical hair ............................................. 4
   Internal apical hair (on joint between femur I and tibia I) more
   than three times as long as external apical hair (*Acarus farinae*,
   formerly *Tyroglyphus farinae*) ................................................................. HAM MITE

4. Tarsus with one stout dorsal and five small ventral terminal spines
   (*Acarus siro*, formerly *Tyroglyphus siro*) .................................................. GRAIN MITE
   Tarsus with only three small ventral spines (*Tyrophagus castellani*,
   formerly *Tyroglyphus longior*) ................................................................... CHEESE MITE

5. Tarsus IV of female ending in claws and a fleshy protuberance; leg
   IV of male smoothly curved inwards (*Pyemotes ventricosus*, formerly
   *Pediculoides ventricosus*) ....................................................................... STRAWITCH MITE
   Tarsus IV of female ending in two long hairs of unequal length; leg
   IV of male sharply bent (*Tarsonemus Floricolus*) ...................................... FLORICOLUS GRAIN MITE

---

*Acarus farinae*, *Tyrophagus castellani*, *Pyemotes ventricosus*
SILVERFISH. PICTORIAL KEY TO DOMESTIC SPECIES
Chester J. Stojanovich and Harold George Scott

**THERMOBIUS DOMESTICUS**
**FIREBRAT**
- without setae combs
- color silver
- with setae combs

**LEPISMA SACCHARINA**
**COMMON SILVERFISH**
- 2 pairs of styli
- color gray
- 3 pairs of styli
- color brown

**CTENOLEPISMA URBANA**
**GIANT SILVERFISH**
- *Ctenolepisma longicauda* of some authors

**CTENOLEPISMA QUADRIRERIATA**
**FOUR LINED SILVERFISH**
COLLEMBOLA: PICTORIAL KEY TO COMMON DOMESTIC SPECIES

Harold George Scott, and Chester J. Stojanovich

prothorax well developed

eyes absent

prothorax reduced

eyes present

abd IV long

abd IV short

without anal spines

with anal spines

Oncichirus filiformis

Oncichirus armatus

unguiculus present

body marbled

body not marbled

Hypogastrura manubrialis

Hypogastrura armata

Hypogastrura pseudarmata

dens with ventral scales

dens without ventral scales

anus ventral

anus terminal

eyes absent

eyes present

scales present

scales absent

Iantomonas temula

Folsomia quadricolorata

Prosotoma frisoni

6-segmented

4-segmented

all blue

blue marked

Lepidocyrtus curvicollis

Sira bucki

Sira platani

Orchesella albosa

form simplicial

body not striped

some body segments striped

all body segments striped

Entomobrya griseolivata

Entomobrya atrocineta

Entomobrya nivalis

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE. Communicable Disease Center, Training Branch, Atlanta, Georgia - 1961
COLLEMBOLA: PICTORIAL KEY TO WORLD SUBFAMILIES
Harold George Scott, Ph.D.

Suborder ARTHROPLEONA
- Body elongate, segmented

Suborder SYMPHYPLEONA SMINTHRIDAE
- Body subglobose, fused

Poduridae
- Prothorax well developed
- Antenna longer than head
- Ant IV subequal to or longer than III

Entomobryidae
- Prothorax reduced
- Antenna shorter than head
- Ant IV shorter than III

Podurinae
- Furcula not reaching beyond colophore
- Ant III sense organ with rods and cones eyes absent
- Thoracic sutures indefinite colophore warty

Oxychuruinae
- Furcula reaching beyond colophore
- Ant III sense organ with rods only eyes usually present
- Thoracic sutures evident colophore smooth

Mandible with molar surface

Mandible without molar surface

Onychurinae
- Ant III and IV subsegmented

Hypogastrurinae

Neanurinae
- Ant III and IV not subsegmented

Tomocerinae

Isotominae

Sminthuridae
- Ant IV at least twice III
COLLEMBOLA: PICTORIAL KEY TO NEARCTIC GENERA
Harold George Scott, Ph.D.

SUBFAMILIES PODURINAE, HYPOGASTRURINAE, AND ONYCHIURINAE

PODURINAE
- postantennal organ

Podura aquatica Linnaeus
only species in subfamily

HYPOGASTRURINAE
- eyes present
- eyes absent

ONYCHIURINAE
- unguiculus well developed
- unguiculus reduced or absent

Onychiurus
body slender

body stout

Tullbergia
Hoffia

eyes 2 and 2
eyes 8 and 8

anal spines present
furcula absent
anal spines absent
furcula present

Mesacherutes
Hypogastrura
Knoultonella
Neobecherella

Willemia
Stachiomella
Xenylla

postantennal tubercles 4-12
postantennal tubercles I

postantennal organ present
postantennal organ absent

postantennal tubercles 4-8
postantennal tubercles I

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE. Communicable Disease Center, Training Branch, Atlanta, Georgia – 1961