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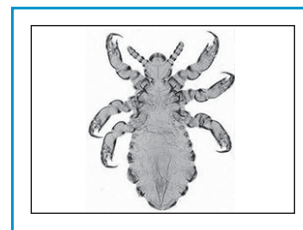


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## Chapter 31

### Insecta : Phthiraptera

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and SOUMYASREE SEN<sup>3</sup>



Order Phthiraptera includes 466 species from India out of 5,136 species known globally. A total of 130 species belonging to 38 genera and 8 families has been listed in the present checklist from the Indian Himalaya. The Central Himalaya (2C) showed the maximum number of species (62) present in the Himalaya, followed by the North-West Himalaya (47), West Himalaya (45), Ladakh Mountains (42), Tibetan Plateau (32) and East Himalaya (14). Phthirapterans are host specific, and mostly they live on a single species. Therefore, their distribution and threats are related to that of their hosts.

#### INTRODUCTION

The wingless insects in the order Phthiraptera are ectoparasites of warm-blooded animals, mostly birds and mammals which are widely known as lice. The order Phthiraptera is divided into 4 suborders: Amblycera, Ischnocera, Rhynchophthirina, and Anoplura. The suborders Amblycera, Ischnocera, and Rhynchophthirina are ectoparasites of birds termed as chewing lice whereas as the species in Anoplura survive on mammals as sucking lice (Price *et al.*, 2003; Ahmad *et al.*, 2011, 2013, 2015). The species in suborder Ischnocera mostly rely on the feathers and skins of the hosts for feeding, thus weakening their body, creating irritation and shredding of feathers. The species in Amblycera, on the other hand, feed on blood and lymph of the host, due to which the hosts stops eating, feels weak, and start losing weight (Mullen and Durden, 2002; Aksin, 2010). There are about 5,136 species of this order so far described from the world (Zhang, 2013), of which about 400 species are reported from India (Ghosh, 1996; Chandra, 2011). In this chapter a systematic list of species order Phthiraptera is compiled with its distribution in different biotic provinces (1A: Trans Himalaya-Ladakh Mountains, 1B: Trans Himalaya-Tibetan Plateau, 1C: Trans Himalaya-Sikkim, 2A: Himalaya-North-West, 2B: Himalaya-West Himalaya, 2C: Himalaya-Central Himalaya and 2D: Himalaya-East Himalaya) of Indian Himalaya biogeographic zone. (Rodgos & Pandor 1988).

#### HISTORICAL RESUME

Like other insect taxa, the preliminary descriptions of Phthirapteran fauna from India can be found in the works of Linnaeus (1758), Fabricius (1775, 1798), Nitzsch (1818), Kellogg (1908), Kellogg and Pain (1914), Kellogg and Nakayama (1915), Gaiger (1910, 1915) and Paine (1912). All of the pioneers studied them in birds and other animals either from the zoological collections or the collections made from zoos.

Before Keler (1960) studies on Mallophaga in India was scanty. Although, Keler (1960) listed some of the Indian Mallophaga species but a comprehensive bibliography on Indian Mallophaga was first compiled by Lakshminarayana (1968, 1970, 1979, 1980, 1986). Some of the noticeable works on Indian Mallophagan fauna were carried out by mainly by Ansari (1956, 1957), Emerson and Elbel (1961), Tandan (1972), Rai (1977), Agarwal and Saxena (1979), Chandra *et al.* (1988, 1990), Saxena *et al.* (1996, 2009, 2011). In recent times, Gupta *et al.* (2007), Khan *et al.* (2008, 2009), Rajput *et al.* (2009), Agarwal *et al.* (2011), Arya *et al.* (2011), Ahmad *et al.* (2011, 2013, 2015), and Mishra *et al.* (2016) have provided some of the significant works on population of Indian Mallophaga species. Recently Sheela *et al.* (2015) provided the information on type specimens of order Phthiraptera housed in the National Zoological Collection of Zoological Survey of India, Kolkata.

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The studies on Indian Anopluran species were mainly carried out by Quadri (1949), Ansari (1951), Wattal and Tandon (1965), Mitchell *et al.* (1966), Wattal *et al.* (1967), Srivastava and Wattal (1970), Mishra (1972), Mishra and Bhatt (1972), Mishra *et al.* (1974), Mishra and Dhanda (1975), Mishra (1981), and Rashmi *et al.* (2016). Recently Adhikary and Ghosh, (1994) reported 56 species of Anoplura from India. Among these studies mentioned above, Wattal and Tandon, (1965), Srivastava and Wattal, (1970), and Mishra *et al.*, (1974) were mainly carried out on the Indian Himalaya.

### SPECIES DIVERSITY

The present chapter includes the information of about 130 species belonging to 38 genera under 8 families from Indian Himalaya. The maximum number of species belong to suborder Ischnocera (82 species under 25 genera) followed by Anoplura (28 species under 6 genera), and Amblycera (20 species under 7 genera). The suborder Rhynchophthirina is not yet represented in the lice fauna of the region. The present study also revealed that most of the Phthiraptera species occur in the Central Himalaya with 25.6 percent (62 species) of the total diversity followed by North-West Himalaya with 19.4 percent (47 species), West Himalaya with 18.5 percent (45 species), Ladakh Mountains with 17.3 percent (42 species), Tibetan Plateau with 13.2 percent (32 species) and East Himalaya with 5.7 percent (14 species) respectively (Fig. 1). There is no record from Sikkim region in Trans Himalayan zone.

### ENDEMISM

Endemism of in this order cannot be assessed due to lack of detailed distributional range of the species.

### THREATS

However, since as like any other parasites, species of Phthiraptera are very specific to their hosts. Therefore, threats or extinction of those host species can be of concern to the existence of Phthiraptera species.

### GAP AREAS

The studies about host-parasite relations, host choice, distributions, and DNA based molecular studies are needed to understand the interrelation of the species in this order. The effect of seasonal variations, influence in the host fitness and the symptoms and economic loss caused by their parasitic nature to the domestic animals are some challenging aspects yet to be taken into consideration.

### DISCUSSION

The present study indicates that species *Goniodes dissimilis*, *G. eurygaster*, *G. sectus*, and *Lipeurus caponis* were recorded from 2B and 2C. All of their hosts belong to family Phasianidae (Blood Pheasant, Cheer Pheasant and Himalayan Monal) of order Galliformes. These are range restricted species occurring in the Himalaya between the elevations of 1450 to 4000 m. *Goniodes dispar* is the only species found in 1A and 2B. The host of the species is Chukar Partridge (*Alectoris*

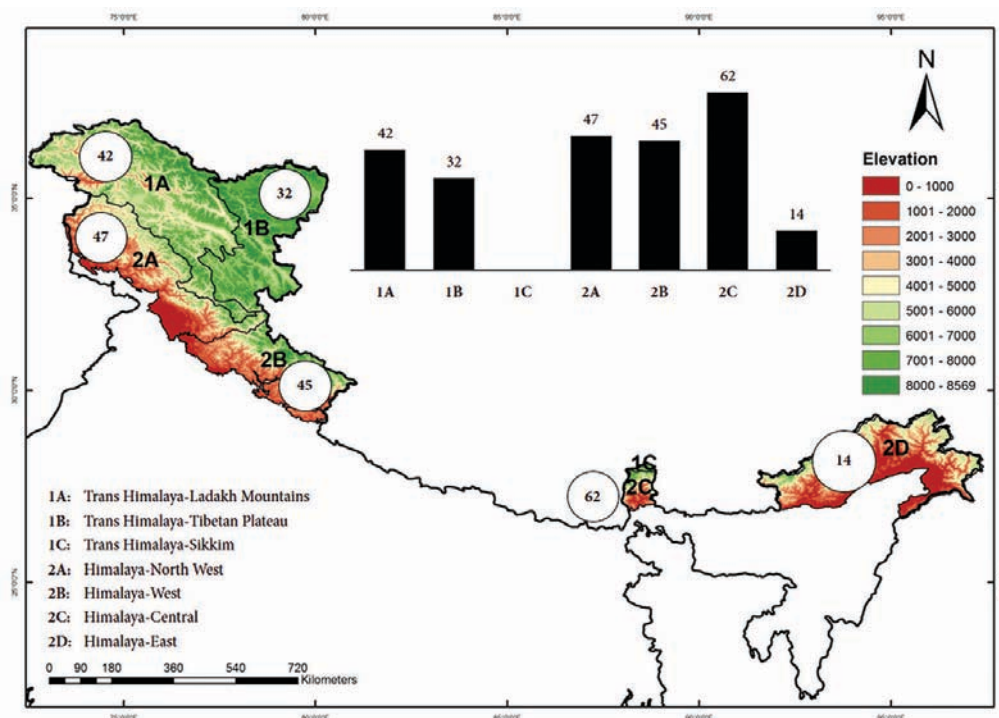


Fig. 1. Map showing the species composition of order Phthiraptera in different biotic provinces of Indian Himalaya.

*chukar*) which is restricted to the high hills of west Himalaya.

*Menacanthus cornutus*, *M. eurysternus*, *M. kalatitar*, *M. stramineus*, *Menopon gallinae*, *Myrsidea assamensis*, *M. himalayensis*, *Hoplopleura ramgarh*, *Columbicola guimaraesi*, *Goniocotes chrysocephalus*, *G. jirufti*, *Goniodes colchici*, *G. gallinae*, *G. gigas*, *Lipeurus lawrensis*, *Oxylipurus pucrasia*, *Bovicola caprae*, and *Damalinia forficulas* are distributed in West Himalaya. Their hosts range from pigeons and doves to the pheasants of the higher altitude.

*Hoplopleura phaiomydis*, *Linognathus stenopsis*, *Polyplax serrate*, and *Syrrhoptocercus tibetanus* were recorded from 1B. Their host species are restricted to the Trans-Himalaya of Ladakh and Northern most of Sikkim. Apart from the wild birds and mammals, they have also been recorded from the domestic sheep and goats of high altitudes. This particular choice of host species makes these phthirapteran species extremely endemic to the Trans-Himalayan regions.

*Colpocephalum tirkhan* is restricted to 2A and 2B of the Himalaya. Its host species is *Picus squamatus* or Scaly-bellied Woodpecker is restricted to West Himalaya with an altitude range of 600 to 3700m. *Goniodes spinicornis* is distributed 2A, 2B and 2C, whose host are mainly pheasants. *Cuclotogaster tetraogallus* is restricted to the biogeographic zone of 1A and 2C. *Tetraogallus himalayensis* or the Himalayan Snowcock is the host species for *T. himalayensis*. These species occurs in the Trans Himalayan regions of Ladakh and Sikkim between the elevations of 3600 to 4570m. Host species like these limits the distribution of the parasitic species very much.

Among the other recorded species of Phthiraptera from the Himalaya *Degeeriella rufa* and *Goniodes costatus* of biogeographic zone 1A and 2C, *Goniodes ocellatus* of biogeographic zone 1A and 2D, *Phlopterus garruli* of the biogeographic zone 1A, 2C, 2D, *Brueelia myiophoneae* and *Actornithophilus grandiceps* of the biogeographic zone 1A and 2A, *Hoplopleura pacifica* and *Polyplax reclinata* with distributions all over Himalaya is notable.

## SYSTEMATIC LIST

Order PHTHIRAPTERA Haeckel, 1896  
Suborder AMBLYCERA Kellogg, 1896  
Family LAEMOBOTHRIIDAE Mjöberg, 1910  
Genus *Laemobothrion* Nitzsch, 1818  
*maximum* (Scopoli, 1763): 2C  
Host: *Aviceda jerdoni*.  
Family MENOPONIDAE Mjöberg, 1910  
Genus *Actornithophilus* Ferris, 1916  
*grandiceps* (Piaget, 1880): 1A, 2A  
Host: *Ibidorhyncha struthersii*.  
Genus *Colpocephalum* Nitzsch, 1818  
*tirkhan* (Ansari, 1951): 2A, 2B

Host: *Picus squamatus squamatus*.  
Genus *Kurodaia* Uchida, 1926  
*deignani* Elbel and Emerson, 1960: 2C  
Host: *Glaucidium cuculoides*.  
Genus *Menacanthus* Neumann, 1912  
*cornutus* (Schommer, 1913): 2B  
Host: *Gallus gallus*.  
*eurysternus* Burmeister, 1838: 2B  
Hosts: *Garrulus lanceolatus*, and *Pycnonotus leucogenys leucogenys*.  
*kalatitar* Ansari, 1951: 2B  
Host: *Francolinus pondicerianus*.  
*stramineus* (Nitzsch, 1818): 2B  
Hosts: *Gallus gallus*, *Lophura leucomelana*, *Pavo cristatus*, and *Tragopan satyra*.  
Genus *Menopon* Nitzsch, 1818  
*gallinae* (Linnaeus, 1758): 2B  
Host: *Gallus gallus murghi*.  
Genus *Myrsidea* Waterston, 1915  
*assamensis* Tandan, 1972: 2B  
Host: *Garrulax leucolophus leucolophus*.  
*brunnea* (Nitzsch, 1866): 2A  
Host: *Nucifraga caryocatactes hemispila*.  
*dukhunensis* Ansari, 1951: 2A  
Host: *Motacilla alba dukhunensis*.  
*flavivirata* Ansari, 1951: 2A  
Host: *Kitta flavivirata flavivirata*.  
*himalayensis* Klockenhoff, 1969: 2B  
Host: *Corvus macrorhynchos intermedius*.  
*macraidoia* Tandan, 1972: 2C  
Host: *Garrulax albogularis albogularis*.  
*sehri* Ansari, 1951: 2A  
Host: *Garrulax lineatus lineatus*.  
*sikkimensis* Tandan, 1972: 2C  
Host: *Garrulax striatus sikkimensis*.  
*singularis* Tandan, 1972: 2C  
Host: *Garrulax subunicolor subunicolor*.  
*sultanpurensis* Ansari, 1951: 2C  
Host: *Myiophoneus caeruleus temminckii*.  
*tibetana* Klockenhoff and Schirmers, 1976: 2A  
Host: *Corvus corax tibetanus*.  
Suborder ANOPLURA Leach, 1815  
Family HOPLOPLEURIDAE Ewing, 1929  
Genus *Ancistroplax* Waterston, 1929  
*crocidurae* Waterston, 1929- 2D  
Hosts: *Suncus etrusca*, and *Crocidura horsfieldii*.  
Genus *Hoplopleura* Enderlein, 1904  
*acanthopus* (Burmeister, 1839): 2C  
Hosts: *Rattus rattus*, and *Pitymys sikkimensis*.  
*alticola* Mishra and Bhat, 1972: 2A  
Host: *Alticola roylei*.  
*captiosa* Johnson, 1960: 1A, 1B, 2A, 2B  
Host: *Mus booduga*.  
*himalayana* Mishra, Kulkarni and Bhat, 1974: 1A, 1B, 2A, 2B  
Host: *Apodemus flavicollis*.  
*kondana* Mishra, 1981: 1A, 1B, 2A  
Host: *Millardia meltada*.  
*maniculata* (Neumann, 1909): 1A, 1B, 2A, 2B  
Hosts: *Funambulus palmarum*, *F. pennant*, and *F. tristriatus*.  
*pacifica* Ewing, 1924: 1A, 1B, 2A, 2B, 2D  
Host: *Rattus nitidus*.  
*pahari* Johnson, 1972: 2C

- Host: *Mus pahari*.  
*phaiomys* Ferris, 1921: 1B
- Host: *Microtus sp.*  
*ramgarh* Mishra, Kulkarni and Bhat, 1972: 2B
- Host: *Mus platythrix*.  
*sicata* Johnson, 1964: 1A, 1B, 2A, 2C
- Hosts: *Niviventer eha*, and *N. niviventer*.  
*silvula* Johnson, 1972: 1A, 1B, 2A, 2B
- Host: *Vandeleuria oleracea*.
- Family LINOGNATHIDAE (Webb, 1946)
- Genus *Linognathus* Enderlein, 1905  
*africanus* Kellogg and Paine, 1911: 2B
- Hosts: Domesticated Sheep and Goat.  
*ovillus* (Neumann, 1907): 1A, 1B, 2A, 2B
- Hosts: Domesticated Sheep and Goat.  
*setosus* (Von Olfers, 1816): 1A, 1B, 2A, 2B
- Hosts: Dog (domesticated), Fox, Rabbit and Ferret.  
*stenopsis* (Burmeister, 1838): 1B
- Hosts: Domesticated Sheep and Goat.
- Family PEDICINIDAE Enderlein, 1904
- Genus *Pedicinus* Gervais, 1844  
*ancoratus* Ferris, 1934: 1A, 1B, 2A
- Hosts: Primates.  
*eurygaster* (Burmeister, 1838): 1A, 1B, 2A
- Hosts: Primates.  
*obtusus* (Rudow, 1869): 1A, 1B, 2A
- Hosts: Primates.
- Family POLYPLACIDAE Fahrenholz, 1912
- Genus *Neohaematopinus* Mjoberg, 1910  
*echinatus* (Neumann, 1909): 1A, 1B, 2A, 2B
- Host: *Funumbulus sp.*  
*palearctus* Olsoufieff, 1938: 1A, 1B, 2A
- Host: *Marmota caudate*.  
*petauristae* Ferris, 1923: 1A, 1B, 2A
- Hosts: *Petaurista philippensis*, and *P. petaurista*.
- Genus *Polyplax* Enderlein, 1904  
*asiatica* Ferris, 1923: 1A, 1B, 2A, 2B
- Host: *Nesokia indica*.  
*indica* Mishra and Kulkarni, 1974: 1A, 1B, 2A
- Host: *Golunda ellioti*.  
*reclinata* (Nitzsch, 1864): 1A, 1B, 2A, 2B, 2D
- Host: *Suncus murinus*.  
*serrata* (Burmeister, 1838): 1B
- Host: *Mus musculus*.  
*spinulosa* (Burmeister, 1838): 1A, 1B, 2A, 2B, 2C, 2D
- Host: *Niviventer niviventer*.
- Suborder ISCHNOCERA Kellogg, 1896
- Family PHILOPTERIDAE Burmeister, 1838
- Genus *Alcedoecus* Clay and Meinertzhagen, 1939  
*capistratus* (Neumann, 1912): 2A
- Host: *Halcyon smyrnensis smyrnensis*.
- Genus *Anaticola* Clay, 1936  
*anseris* Linne, 1758: 1A, 1B, 2A, 2B, 2C, 2D
- Hosts: *Anser anser*, and *A. indicus*.  
*crassicornis* (Scopoli, 1763): 2A
- Hosts: *Anas crecca crecca*, and *Myiophonus caeruleus temminckii*.
- Genus *Brueelia* Kéler, 1936  
*antennatus* Ansari, 1956: 2C
- Host: *Garrulax striatus sikkimensis*.  
*avinus* Ansari, 1956: 2C
- Host: *Garrulax subunicolor subunicolor*.  
*daumae* (Clay, 1936): 1A, 1B, 2A, 2B, 2C, 2D
- Host: *Zootbera dauma dauma*.  
*grandalae* (Clay, 1936): 2C
- Host: *Grandala coelicolor coelicolor*.  
*husaini* Ansari, 1956: 1A, 1B, 2A
- Hosts: *Kitta flavirostris cucullata*, and *K. erythrorhyncha occipitalis*.  
*longisternus* Ansari, 1956: 2C
- Host: *Cutia nipalensis nipalensis*.  
*marginata* (Burmeister, 1838): 2A
- Hosts: *Kitta erythrorhyncha occipitalis*, *K. flavirostris flavirostris*, and *Garrulax lineatus lineatus*.  
*multipunctata* (Clay, 1936): 1A
- Host: *Nucifraga caryocatactes multipunctata*.  
*myiophoneae* (Clay, 1936): 1A, 2A
- Host: *Myiophoneus caeruleus temminckii*.  
*nipalensis* Ansari, 1956: 2C
- Host: *Garrulax striatus sikkimensis*.  
*novofacies* Ansari, 1956: 2C
- Host: *Garrulax subunicolor subunicolor*.  
*punjabensis* (Ansari, 1947): 2A
- Host: *Megalaima virens marshallorum*.  
*sehri* Ansari, 1955: 2A
- Host: *Garrulax lineatum griscentior*.  
*stresemanni* (Clay, 1936): 2C
- Host: *Zoothera monticola monticola*.  
*varia* (Burmeister, 1838): 1A
- Hosts: *Corvus corax*, and *Pica pica bactriana*.  
*zootherae* (Clay, 1936): 1A, 1B, 2A, 2B, 2C, 2D
- Host: *Zoothera marginata*.
- Genus *Campanulotes* Kéler, 1939  
*heteroceros* Tendeiro, 1969: 2C
- Host: *Columba leuconota leuconota*.
- Genus *Chelopistes* Kéler, 1939  
*lervicola* (Clay, 1941): 2C
- Host: *Lerwa lerwa*.
- Genus *Coloceras* Taschenberg, 1882  
*indicum* (Tendeiro, 1973): 2C
- Host: *Columba hodgsonii*.  
*lativentris* (Uchida, 1916): 1A, 1B, 2A, 2B, 2C, 2D
- Host: *Streptopelia chinensis tigrina*.  
*piriformes* (Tendeiro, 1969): 2C
- Host: *Chalcophaps indica indica*.  
*setosum* (Piaget, 1880): 2C
- Host: *Treron pompadora phayrei*.
- Genus *Columbicola* Ewing, 1929  
*elbeli* Tendeiro, 1965: 2C
- Host: *Treron sphenura*.  
*guimaraesi* Tendeiro, 1965: 2B
- Host: *Chalcophaps indica*.  
*tschulyschman* Eichler, 1942: 2C
- Hosts: *Columba rupestris turkestanica*, and *C. leuconota leuconota*.
- Genus *Craspedorrhynchus* Kéler, 1938  
*nisi* (Denny, 1842): 2C
- Host: *Spilornis cheela melanotis*.
- Genus *Cuclotogaster* Carriker, 1936  
*heterographus* (Nitzsch, 1866): 2A
- Host: *Alectoris graeca pallescens*.  
*tetraogallus* (Clay, 1938): 2A, 2C
- Hosts: *Tetraogallus himalayensis himalayensis*, and *T. tibetanus tibetanus*.

- Genus *Degeeriella* Neumann, 1906  
*punctifer* (Gervais, 1844): 2C  
 Host: *Gypaetus barbatus aureus*.  
*rufa* (Burmeister, 1838): 1A, 2C  
 Host: *Falco tinnunculus*.  
 Genus *Falcolipeurus* Bedford, 1931  
*quadripustulatus* (Burmeister, 1838): 1A, 1B, 2A, 2B, 2C, 2D  
 Host: *Gyps himalayensis*.  
 Genus *Goniocotes* Burmeister, 1838  
*chrysocephalus* Giebel, 1874: 2B  
 Host: *Lophura leucomelana hamiltoni*.  
*jirufti* Ansari, 1951: 2B  
 Host: *Francolinus pondicerianus*.  
 Genus *Goniodes* Nitzsch, 1818  
*cervinicornis* Giebel, 1874: 1A, 1B, 2A, 2B, 2C, 2D  
 Host: *Lophura leucomelana lathami*.  
*colchici* Denny, 1842: 2B  
 Host: *Lophura leucomelana hamiltoni*.  
*costatus* (Kéler, 1939): 1A, 2C  
 Hosts: *Tetraogallus himalayensis himalayensis*, *T. tibetanus tibetanus*, and *T. tibetanus aquilonifer*.  
*dispar* Burmeister, 1838: 1A, 2B  
 Host: *Alectoris graeca chukar*.  
*dissimilis* Denny, 1842: 2B, 2C  
 Hosts: *Ithaginis cruentus*, and *Gallus gallus murghi*.  
*eurygaster* Piaget, 1885: 2B, 2C  
 Host: *Lophophorus impejanus*.  
*gallinae* (de Geer, 1778): 2B  
 Host: *Gallus gallus*.  
*gigas* (Taschenberg, 1879): 2B  
 Host: *Gallus gallus*.  
*indicus* (Kellogg and Paine, 1914): 2C  
 Host: *Arborophila rufogularis*.  
*intermedius* Neumann, 1913: 1A  
 Host: *Pucrasia macrolopha biddulphi*.  
*ithaginis* Clay, 1940: 2C  
 Host: *Pucrasia macrolopha biddulphi*.  
*megaceros* Kellogg and Paine, 1914: 2C  
 Host: *Lophophorus impejanus*.  
*ocellatus* (Rudow, 1869): 1A, 2D  
 Hosts: *Lophophorus impejanus hamiltoni*, and *Pucrasia macrolopha macrolopha*.  
*processus* Kellogg and Paine, 1914: 2C  
 Hosts: *Arborophila rufogularis*, *A. torqueola torqueola*, and *A. torqueola millardi*.  
*sectus* Kellogg and Paine, 1914: 2B, 2C  
 Host: *Catreus wallichii*.  
*spenicornis* (Nitzsch, 1866): 2A, 2B, 2C  
 Hosts: *Tragopan blythi*, and *Tragopan satyra*.  
*temporalis* (Kéler, 1939): 2C  
 Host: *Francolinus gularis*.  
*tragopan* Clay, 1940: 1A  
 Host: *Tragopan melanocephalus*.  
 Genus *Lagopoecus* Waterston, 1922  
*heterotypus* (Megnin, 1880): 2C  
 Host: *Lophophorus impejanus*.  
*meinertzhageni* Clay, 1938: 2C  
 Host: *Lerwa lerwa*.  
 Genus *Lipeurus* Nitzsch, 1818  
*caponis* (Linnaeus, 1758): 2B, 2C  
 Hosts: *Lophura leucomelana melanota*, and *Gallus gallus murghi*.  
*eurycnemis* Taschenberg, 1882: 1A, 1B, 2A, 2B, 2C, 2D  
 Host: *Lophophorus impejanus*.  
*introducatus* Kellogg, 1896: 2C  
 Host: *Lophura leucomelana hamiltoni*.  
*lawrensis* Bedford, 1929: 2B  
 Genus *Oxylipeurus* Mjoberg, 1910  
*burmeisteri* (Taschenberg, 1882): 2C  
 Host: *Lophophorus impejanus*.  
*himalayensis* (Rudow, 1869): 1A  
 Host: *Tragopan melanocephalus*.  
*ithaginis* Clay, 1938: 2C  
 Host: *Ithaginis ithaginis cruentus*.  
*longus* (Piaget, 1880): 2C  
 Host: *Tragopan satyra*.  
*megalops* (Piaget, 1880): 2C  
 Host: *Rollulus roulroul*.  
*nitzschi* (Kéler, 1958): 2C  
 Host: *Arborophila torqueola torqueola*.  
*pucrasia* Clay, 1938: 2B  
 Host: *Pucrasia macrolopha macrolopha*.  
*robustus* (Rudow, 1869): 2C  
 Host: *Lophura leuconalana*.  
*unicolor* (Piaget, 1880): 2C  
 Hosts: *Arborophila rufogularis*, *A. rufogularis torqueola*, *A. rufogularis millardi*, and *A. rufogularis rufogularis*.  
 Genus *Penenirmus* Clay and Meinertzhagen, 1938  
*pici* (Fabricius, 1798): 2A  
 Host: *Picus squamatus squamatus*.  
 Genus *Philoapterus* Nitzsch, 1818  
*atratus* Nitzsch, 1818: 1A  
 Host: *Corvus corax*.  
*crassipes* (Burmeister, 1838): 2A  
 Host: *Nucifraga caryocatactes hemispila*.  
*garruli* Boisduval and Lacordaire, 1835: 1A, 2C, 2D  
 Hosts: *Kitta flavirostris flavirostris*, *Dendrocitta formosae himalayensis* and *Pica pica bactriana*.  
*thryptocephalus* (Kellogg and Paine, 1914): 1A  
 Host: *Graculus graculus*.  
 Genus *Picicola* Clay and Meinertzhagen, 1938  
*Snodgrassi* (Kellogg, 1896): 2C  
 Host: *Dendrocopos darjellensis*.  
 Genus *Quadriceps* Clay and Meinertzhagen, 1939  
*altoasiaticum* (Timmermann, 1954): 1A, 1B, 2A, 2B, 2C, 2D  
 Host: *Ibidorhyncha struthersi*.  
 Genus *Ricinus* de Geer, 1778  
*fringillae* de Geer, 1778: 2C  
 Host: *Prunella strophiatea strophiatea*.  
*ivanovi* Blagoveshtchensky, 1951: 2C  
 Host: *Leucosticte brandti*.  
 Genus *Strigiphilus* Mjoberg, 1910  
*macrogenitalis* Emerson and Elbel, 1957: 2C  
 Host: *Glaucidium cuculoides rufescens*.  
 Genus *Syrrhaptoecus* Waterston, 1928  
*tibetanus* Waterston, 1928: 1B  
 Host: *Syrrhaptes tibetanus*.  
 Family TRICHODECTIDAE Kellogg, 1896  
 Genus *Bovicola* Ewing, 1929  
*caprae* (Gurlt, 1843): 2B  
 Host: Domestic goat.  
 Genus *Damalinia* Mjoberg, 1910  
*forficulas* (Piaget, 1880): 2B  
 Host: *Cuon javanicus*.

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