

## SEKCJA II. FAUNISTYKA

### A. PASOŻYTY ZEWNĘTRZNE PTAKÓW I SSAKÓW SYNANTROPIJNYCH

WIADOMOŚCI PARAZYTOLOGICZNE

T. XXXII, NR 4 - 6: 1986

## WILD BIRD AND MAMMAL ECTOPARASITES

JADWIGA ZŁOTORZYCKA

Department of General Parasitology, Microbiol. Inst., Wrocław University

The production of the Polish parasitologists during the last five years, concerning the arthropod parasitism on wild birds and mammals<sup>1</sup>, is the following.

Faunistic studies in various parts of Poland comprised lowland, submontane and montane areas. The authors often paid particular attention to the character of biotopes in relation to the qualitative and quantitative specificity of hosts and parasites. For instance, Haitlinger (1984 a) compared the arthropod communities in two shrew species: *Sorex araneus* L. and *S. minutus* L., inhabiting woodland and open habitats. The same author (1981 a, 1983 c) studied in detail the structure and seasonal dynamics of the arthropods living on *Microtus arvalis* (Pall.) which inhabits, among others, cultivated areas.

The arthropod faunistics on areas undergoing strong anthropopressure, e.g. city agglomerations, was the subject of Haitlinger's (1984 b) paper in which he analyzed thoroughly the parasite fauna sensu stricto, as well as the nest — host fauna and the nest inhabitants of the ruderal territories of Wrocław compared with rural areas, associated with *Crociodura suaveolens* (Pall.). When summarizing the state of knowledge on the occurrence of Argasid ticks in Poland, Siuda (1984) precised the known distribution ranges of *Argas reflexus* Fabr. and *A. polonicus* Siuda et al., parasites of domestic pigeon, especially in cities.

Animals in zoological gardens also undergo a strong anthropopressure. The effect of such anthropogenic factors was analyzed by Złotorzycka (1983). The author considered also the adaptive tendencies in biting lice,

---

<sup>1</sup> *Ixodides* as parasites of small rodents and *Nematocera* were considered by Wegner in her review at the V Medical and Veterinary Acarology Symposium in Gdańsk, 1985.

basing on species introduced on atypical hosts. The results of Złotorzycka and Modrzejewska (1985), supplemented with the paper presented at the Symposium, seem to indicate that the relatively frequent appearance of teratological changes in biting lice living on pheasant (*Phasianus colchicus* L.), as compared with the lower frequency of similar development anomalies in hen biting lice, could be caused by some anthropogenic factors, e.g. chemical pollution of the natural habitat of pheasants.

Results of the faunistic studies on the habitats least polluted by industry and agriculture can serve as a base to establish a comparative scale for host and parasite population changes under the conditions of increased anthropopressure. Such requirements are fulfilled by natural reserves and some other lowland and montane areas in Poland. During the last years' studies on ectoparasites of small mammals of montane areas were rather numerous. For instance Bartkowska (1981) considerably increased the knowledge on flea fauna (*Siphonaptera*) of small mammals in Łysogóry mountain range. She recorded as many as 11 species new for that area, while before only 8 species had been known. A comprehensive study on *Acarina* of small mammals of Pieniny Mts. was done by Haitlinger (1983 a). In the list of 61 species quoted by him haematophages dominate. The same author (1981 c), when studying the occurrence of two trombiculid mites, found that in montane biotopes mainly *Neotrombicula talmiensis* (Schlug.) occurred, while on lowlands — *N. vulgaris* (Schlug.). Also Haitlinger's (1983 b) paper on ectoparasites (*Siphonaptera*, *Anoplura*, *Acarina*) of *Clethrionomys glareolus* (Schreb.) in Sowie Mts., Pieniny Mts., Carpathian Mts. and other areas of Poland is worth notice. The author studied among others the percentage of the mentioned parasite groups in various habitats, the seasonal population dynamics and differences in the infection between males and females of the host species. Thus, for example in Sowie Mts. *Ixodidae* are especially often found on males. This seems to be related to the differences in the mode of life of both sexes of the host. Finally, the results of the comparative analysis of small mammal ectoparasites of various mountain zones in the Transbaical mountains were described by Nikulina in her paper at this Symposium.

Faunistic studies on the mammal ectoparasites of lowland nature reserves during last years were not very extensive. For instance, only one paper deals with the fauna of Białowieża Forest: Haitlinger and Ruprecht (1982) who studied there the mites living on bats.

Besides, Haitlinger mentioned species of *Myobiidae*, *Cheyletidae*, *Pygmephoridae* and *Trombiculidae* from insectivorous mammals and rodents, new for Poland. Especially penetrative is, in faunistic-ecological respect, his study on arthropods of *Neomys fodiens* (Penn.), *N. anomalus* Cabr. and their nests (1984 c). Species of *Acarina* and *Anoplura*, new

for these hosts, were given, as well as new localities of collected *Acarina*, *Anoplura* and *Siphonaptera*. Quantitative data on parasites, their topography and zoogeographical aspects were also taken into consideration and discussed.

Among the faunistic-bionomical studies the interpretation of Skura-towicz (1981) concerning the effect of the mode of life in carnivorous mammals (*Carnivora*) on the dispersal of fleas (*Siphonaptera*) deserves particular attention. The author attributed a great importance to the vagility of host animals which penetrate various biotopes when migrating. Feeding contacts have a considerable significance as regards parasite dispersal. An essential role can be played also by so-called prey stores of small predators and a tendency to catch prey in excess and carry it for great distances, e.g. in foxes. Furthermore, den and nest contacts of animals, man — animal contacts and also contacts with synanthropic and domestic animals, with a simultaneous access to refuse heaps, were taken into account. Direct contacts of parasites of the game animals with man can be of significance in the infectious disease transfer.

The parasites of game animals were dealt with by Kadulski (1982) who gave faunistic data on the distribution of two lice species: *Haemodipsus lyriocephalus* (Burm.) and *H. setoni* Ewing, living on hare (*Lepus europaeus* Pall.) in Poland, and the numerical characteristics of the infestation of hosts at different age, males and females. The seasonal population dynamics of the parasites from various development stages of host was also considered. At present in his short paper, Kadulski (1985) analyzes among others the topography of biting lice (*Cervicola meyeri* (Tasch.)) on roe-deer (*Capreolus capreolus* L.), stating — judging from roe-deer hair thickness and claw span and breadth of alimentary groove in lice — that thick hair in host groins are best "fitted" for the parasite claws which to a great extent corresponds to the natural localization of the parasite.

Of the few faunistic-ecological papers on bird ectoparasites (however, collected in nests only) a wide range of problems was considered in the study of Kaczmarek (1982) on the parasites of passeriform birds of northern Poland. The author detected mainly *Siphonaptera* and *Acarina*, much rarer were *Heteroptera* and *Diptera*, and in single cases *Mallophaga*, the latter group being accidentally introduced to nests. The same author, in his paper at this Symposium, provides interesting data on similarities and differences between parasite arthropod communities in nests of two swallow species: *Hirundo rustica* L. and *Delichon urbica* (L.). The studies on the arthropod fauna of bird nests supplement the state of knowledge on temporal parasites and predators, since the parasites found on hosts are mainly permanent, such as *Mallophaga* and *Ana-*

*Igesoidea*. Only exceptionally on chicks and fledgelings also parasitic *Diptera* appear. For example Żukowski in his paper at this Symposium signals the first record of female *Carnus hemapterus* on young black stork.

During the last five years also some faunistic papers were published, based on foreign materials. Skuratowicz et al. (1983) mentioned new species of fleas (*Siphonaptera*) from Bulgaria, and Żukowski (1984) listed ticks (*Ixodidae*) of Yugoslavia.

Zoogeographical aspects were considered by Kiefer et al. (1982). The authors distinguished three zoogeographic regions in Mongolia, basing on the analysis of 144 flea species (*Siphonaptera*). Złotorzycka (1984 a) wrote on the zoogeography of biting lice (*Mallophaga*) when she explained numerous cases of specific distribution of some groups by certain historical events, e.g., changes in host distribution, primary and secondary infections, vicariance and absence of parasites related to geographic barriers and evolutionary trends.

Also in the last five years some papers appeared based on Polish materials. The papers dealt with the systematics of bird and mammal ectoparasites. Złotorzycka and Eichler (1984) described a new genus and species of biting louse (*Prunellides annae*) from *Prunella modularis* (L.) (*Passeriformes*). To find a new genus in the relatively well studied subfamily *Philopterinae* was a surprise. Kadulski (1984) made an attempt at distinguishing closely related and often synonymized species of lice (*Anoplura*) from roe-deer (*Solenopotes capreoli* Fr.) and deer (*S. burmeisteri* Fahr.). Some papers of foreign authors at this Symposium mention the pathogenic significance of mammal ectoparasites. Suciu et al. observed pathological changes in *Mustela vison* caused by flea (*Monopsyllus sciurorum sciurorum* (Schrank)) which — attacking also man — caused unpleasant allergic symptoms. In another paper, Smirnova and Shalajeva revealed the tapeworm invasion (*Hymenolepis horrida* and *Paranoplocephala omphalodes*) in a free living springtail (*Hypogastrura tullbergii*, *Insecta*, *Apterygogenea*) in steppe tundra of north-eastern Siberia. The authors suppose that the springtails living in plant rhizosphere can be a natural food of rodents thus favouring their infection by tapeworms.

One of the sessions of the XIV PTP Meeting (1984) was devoted to the methodology of acarontomological studies. Lonc presented principles and use of numerical taxonomy in insect (biting lice) systematics. Morzejewska characterized diagnostic features of each development stage of selected species of biting lice, Piotrowski analyzed the usefulness of the *Anoplura* nymphs in the systematics, and Złotorzycka pointed to the differences in diagnostic value of some morphological characters in *Mallophaga*.

The use of electron microscopy proved to facilitate the studies on

arthropod receptor organs. The papers of Złotorzycka et al. at the XIV PTP Meeting (1984) and the 18th Polish Electron Microscopy Conference in Kraków (1985) on antennal sensillae in various species of *Mallophaga* in the scanning electron microscope can serve as examples. The electron microscopy cannot, however, replace the traditional light microscope studies. Therefore, Szadziewski's (1985) modification of preparing microscope slides of small insects in Canada balsam is also worth notice.

The studies on bionomics of permanent ectoparasites of wild animals are extremely difficult, and experiments may throw some light on the problem. For instance, Rem and Złotorzycka (1982) found that the survival rate of the pigeon biting lice outside their host at room temperature varies (3 - 45 days) among the studied species. Boczek et al. (1985) analyzed the thermic adaptation abilities in insects and suggested that forms in their natural habitat are more plastic in this respect than those in farms of domestic animals.

The summary of the present state of knowledge on the ectoparasite fauna of Polish birds and mammals can be found in some of the papers at the present Symposium. For example, Haitlinger characterized briefly communities of *Acarina* associated with various mammals (1985, p. 16) and various arthropods from *Sorex alpinus* (p. 17). General data on bird infestation are contained in two strictly corresponding papers of Siuda (1985, pp. 47, 48) who divided ticks (*Ixodidae*) into obligatory, facultative and accidental ornithophils.

Books published within the last five years are an important contribution to the popularization of the knowledge on parasitic arachnids and insects. Keys to hippoboscids flies (Borowiec, 1984) deserve attention. Twenty two species were taken into account of which ten were found in Poland to occur on birds or mammals. Concise information on parasitic arthropods are contained in the handbook of Rajski (1984), especially vol. II, and in the new edition of Grabda's handbook (1985).

The production of the Polish acarontomologists presented above comprised, within the last five years, mostly faunistic papers and reports. They often constitute a base for the analysis of some more complicated problems. Attention, though, should be paid to the progress in systematics, as well as in bionomical and epidemiological studies. The role of ectoparasites in the transfer of various diseases can prove especially important. Comprehensive works, such as determination keys, catalogues and monographs facilitate numerous studies, and such works are still lacking in case of many parasitic arthropod groups. Studies of this kind are a starting point for the beginners and at the same time compendia of knowledge for their teachers. It depends on the latter what successors they will leave.

*Adres autorki:*

51-146 Wrocław, Przybyszewskiego 63

## LITERATURE

1. Bartkowska, K.: *Siphonaptera* drobnych ssaków Łysogór (Góry Świętokrzyskie). — *Fragm. Faun.*, 25, 411 - 422, 1981.
2. Boczek, J., Davis, R., Pankiewicz-Nowicka, D., Kruk, M.: Termiczne zdolności adaptacyjne owadów. — *Wiad. Entom.*, 5, 127 - 134, 1985.
3. Borowiec, L.: Klucze do oznaczania owadów Polski, Cz. 28, Muchówki — *Diptera*, Zesz. 77, Wpleszczowate — *Hippoboscidae*, Nr ser. 131, PWN, Warszawa - Wrocław, 40 ss., 65 ff., 1984.
4. Grabda, E.: Zoologia bezkręgowców, tom 2, część 1, 2, PWN, Warszawa, 1985.
5. Haitlinger, R.: Structure of arthropod community occurring on *Microtus arvalis* (Pall.) in various habitats. I. Faunistic differentiation, dominance structure, arthropod infestation intensiveness in relation to habitats and host population dynamics. — *Polish Ecol. Stud.*, 7, 271 - 292, 1981a.
6. Haitlinger, R.: Kilka nowych dla fauny Polski gatunków *Acarina* zebranych z drobnych ssaków. — *Wiad. Parazytol.*, 27, 659 - 663, 1981b.
7. Haitlinger, R.: *Neotrombicula vulgaris* (Schluger, 1955) i *N. talmiensis* (Schluger, 1955) (*Acarina*; *Trombiculidae*) w Polsce. — *Przegl. Zool.*, 25, 527 - 530, 1981c.
8. Haitlinger, R.: *Acarina* (*Myobiidae*, *Cheyletidae*, *Pygmephoridae*, *Trombiculidae*, *Dermanyssidae*) nowe lub rzadkie w faunie Polski. — *Wiad. Parazytol.*, 28, 435 - 444, 1982.
9. Haitlinger, R.: The mites (*Acarina*) of small mammals of the Pieniny Mts, Poland. — *Acta Zool. Cracov.*, 26, 355 - 386, 1983a.
10. Haitlinger, R.: Invertebrates associated with the bank vole. Arthropod communities. — *Acta Theriol., Suppl.*, 1, 55 - 68, 1983b.
11. Haitlinger, R.: Struktura zgrupowań stawonogów występujących na *Microtus arvalis* (Pall.) w różnych środowiskach. II. Dynamika średniej intensywności zarażenia liczniejszych gatunków stawonogów występujących na *M. arvalis* na obszarze nie poddawany zabiegom agrotechnicznym. — *Wiad. Parazytol.*, 29, 351 - 362, 1983c.
12. Haitlinger, R.: Zgrupowania stawonogów występujące na *Sorex araneus* L. i *Sorex minutus* L. w środowisku leśnym i bezleśnym Wzgórz Niemczańskich. — *Wiad. Parazytol.*, 30, 345 - 367, 1984a.
13. Haitlinger, R.: Stawonogi występujące na *Crocidura suaveolens* (Pall.) (*Mammalia*, *Insectivora*) w Polsce ze szczególnym uwzględnieniem aglomeracji miejskiej. — *Wiad. Parazytol.*, 30, 521 - 529, 1984b.
14. Haitlinger, R.: Stawonogi występujące w Polsce na *Neomys fodiens* (Penn.) i *Neomys anomalus* Cabr. (*Mammalia*, *Insectivora*). — *Wiad. Parazytol.*, 30, 603 - 616, 1984c.
15. Haitlinger, R.: Stawonogi występujące na *Sciurus vulgaris* L. w Polsce. — *Pol. Pismo Entom.*, 55, 429 - 431, 1985a.
16. Haitlinger, R.: Stan znajomości fauny roztoczy występujących na ssakach w Polsce. — Materiały V Sympozjum Akarontologii Medycznej i Weterynaryjnej, Gdańsk, 19 - 21 września 1985, p. 16, 1985.
17. Haitlinger, R.: Stawonogi występujące na *Sorex alpinus* Schinz (*Mammalia*, *Insectivora*) w Polsce. — Materiały V Sympozjum Akarontologii Medycznej i Weterynaryjnej, Gdańsk, 19 - 21 września 1985, p. 17, 1985.
18. Haitlinger, R., Ruprecht, A. L.: *Spinturnix acuminatus* (Koch, 1836)

- (*Acarina, Spinturnicidae*) nowy gatunek roztocza dla fauny Polski. — *Przegl. Zool.*, 26, 171 - 172, 1982.
19. Kaczmarek, S.: Pasożyty zewnętrzne ptaków północnej Polski. — *Wiad. Parazytol.*, 28, 449 - 463, 1982.
  20. Kaczmarek, S.: Pasożyty zewnętrzne z gniazd jaskółek *Hirundo rustica* L. i *Delichon urbica* (L.) zebrane z okolic Szczecina. Materiały V Sympozjum Akarontomologii Medycznej i Weterynaryjnej, Gdańsk, 19 - 21 września 1985, p. 19, 1985.
  21. Kadulski, S.: Występowanie *Haemodipsus lyriocephalus* (Burm.) i *Haemodipsus setoni* Ewing (*Anoplura*) u zająca *Lepus europaeus* Pall. na terenie Polski. — *Wiad. Parazytol.*, 28, 427 - 433, 1982.
  22. Kadulski, S.: *Solenopotes* ssp. (*Phthiraptera: Linognathidae*) rzadkie pasożyty jelenia i sarny. — Materiały XIV Zjazdu PTP, Wrocław - Zamek Książ, 20 - 22 września 1984, s. 161, 1984.
  23. Kadulski, S.: *Cervicola meyeri* (Tasch.) (*Ischnocera: Phthiraptera*) z sarny. — Materiały V Sympozjum Akarontomologii Medycznej i Weterynaryjnej, Gdańsk, 19 - 21 września 1985, p. 20, 1985.
  24. Kiefer, M., Klimaszewski, M., Krumpal, M.: Zoogeographical regionalization of Mongolia on the basis of flea fauna (*Siphonaptera*). — *Pol. Pismo Entom.*, 52, 13 - 29, 1982.
  25. Lonc, E.: Zasady i zastosowanie taksonomii numerycznej w systematyce pasożytniczych *Arthropoda* (referat wygłoszony na XIV Zjeździe PTP, Wrocław - Zamek Książ 1984). — *Wiad. Parazytol.*, 31, 515 - 518, 1986.
  26. Modrzejewska, M.: Cechy diagnostyczne poszczególnych stadiów rozwojowych u *Mallophaga* (referat wygłoszony na XIV Zjeździe PTP, Wrocław - Zamek Książ 1984). — *Wiad. Parazytol.*, 31, 513, 1986.
  27. Nikulina, N.: Występowanie pasożytów zewnętrznych drobnych ssaków w różnych biotopach doliny rzeki Czary. — Materiały V Sympozjum Akarontomologii Medycznej i Weterynaryjnej, Gdańsk, 19 - 21 września 1985, p. 32, 1985.
  28. Piotrowski, F.: Przydatność nimf *Anoplura* do systematyki (referat wygłoszony na XIV Zjeździe PTP, Wrocław - Zamek Książ 1984). — *Wiad. Parazytol.*, 31, 511 - 512, 1986.
  29. Rajski, A.: Zoologia, tom 2, Część systematyczna, PWN, Warszawa 1984.
  30. Rem, R., Złotorzycka, J.: An experimental study of the survival rate of some *Mallophaga* outside of *Columba livia* dom. body. — *Acta Parasitol. Pol.*, 28, 179 - 185, 1982.
  31. Siuda, K.: Stan wiadomości nad rozmieszczeniem w Polsce obrzeżków z rodzaju *Argas* (*Acarina: Ixodides: Argasidae*). — *Wiad. Parazytol.*, 30, 595 - 601, 1984.
  32. Siuda, K.: Kleszcze *Ixodidae* (*Ixodida, Acari*) pasożytujące na ptakach w Polsce. I. Bezwzględnie ornitofilne. — Materiały V Sympozjum Akarontomologii Medycznej i Weterynaryjnej, Gdańsk, 19 - 21 września 1985, p. 47, 1985a.
  33. Siuda, K.: Kleszcze *Ixodidae* (*Ixodida, Acari*) pasożytujące na ptakach w Polsce. II. Względnie i przypadkowo ornitofilne. — Materiały V Sympozjum Akarontomologii Medycznej i Weterynaryjnej, Gdańsk, 19 - 21 września 1985, p. 48, 1985b.
  34. Skuratowicz, W.: Pchły (*Siphonaptera*) występujące na ssakach drapieżnych (*Carnivora*) w Polsce. — *Fragm. Faun.*, 25, 369 - 410, 1981.
  35. Skuratowicz, W., Bartkowska, K., Batchvarov, G.: Fleas (*Siphonaptera*) collected on small mammals and birds in Bulgaria. — *Fragm. Faun.*, 27, 101 - 140, 1983.

36. Smirnova, L., Shalajeva, N.: Znaczenie *Collembola* (*Insecta: Apterygogenea*) w krążeniu tasiemców drobnych ssaków w tundrze stepowej. — Materiały V Sympozjum Akaroentomologii Medycznej i Weterynaryjnej, Gdańsk, 19 - 21 września 1985, p. 49, 1985.
37. Suciū, M., Milla, C., Chencea, T.: *Monopsyllus sciurorum sciurorum* (Schrank) (*Insecta: Siphonaptera*) jako pasożyt norki amerykańskiej (*Mustela vison*). — Materiały V Sympozjum Akaroentomologii Medycznej i Weterynaryjnej, Gdańsk, 19 - 21 września 1985, p. 54, 1985.
38. Szadziwski, R.: Szybka metoda sporządzania totalnych preparatów mikroskopowych z drobnych muchówek. — *Wiad. Entom.*, 6, 95 - 100, 1985.
39. Złotorzycka, J.: Mallophagenfunde aus Vögeln und Säugetieren in zoologischen Gärten. — *Angew. Parasitol.*, 24, 166 - 178, 1983.
40. Złotorzycka, J.: Problemy zoogeograficzne *Mallophaga*. — *Wiad. Entom.*, 5, 1 - 15, 1984a.
41. Złotorzycka, J.: Diagnostyczność cech u *Mallophaga* (z uwzględnieniem ultrastruktury) (referat wygłoszony na XIV Zjeździe PTP, Wrocław - Zamek Książ 1984). — *Wiad. Parazytol.*, 31, 519 - 521, 1986.
42. Złotorzycka, J., Eichler, Wd.: *Notulae Mallophagologicae*. XIV. *Prunellides annae* nov. gen. et spec. von *Prunella modularis*. — *Angew. Parasitol.*, 25, 219 - 221, 1984.
43. Złotorzycka, J., Kassner, J.: Sensilla czułkowe u *Mallophaga*. — 18 Ogólnopolska Konferencja Mikroskopii Elektronowej, Kraków, 12 - 13 września 1985 (plakat).
44. Złotorzycka, J., Kassner, J., Otfinowska, B.: Człkowe organy sensoryczne u *Mallophaga* (*Ischnocera*). — Materiały XIV Zjazdu PTP, Wrocław - Zamek Książ, 20 - 22 września 1984, s. 202, 1984.
45. Złotorzycka, J., Modrzejewska, M.: Quantitative und qualitative Untersuchungen über die Teratologie von Fasanen- und Hühnermallophagen. — *Angew. Parasitol.*, 26, 167 - 177, 1985a.
46. Złotorzycka, J., Modrzejewska, M.: Teratologia i traumatologia u wszołów (*Mallophaga*). — Materiały V Sympozjum Akaroentomologii Medycznej i Weterynaryjnej, Gdańsk, 19 - 21 września 1985, p. 61, 1985.
47. Żukowski, K.: Przyczynek do znajomości roztoczy niektórych gatunków drobnych ssaków Jugosławii. — Materiały XIV Zjazdu PTP, Wrocław - Zamek Książ, 20 - 22 września, 1984.
48. Żukowski, K.: Przyczynek do znajomości muchówek *Carnus hemapterus* Egg. — Materiały V Sympozjum Akaroentomologii Medycznej i Weterynaryjnej, Gdańsk, 19 - 21 września 1985, p. 62, 1985.

## PASOŻYTY ZEWNĘTRZNE PTAKÓW I SSAKÓW DZIKO ŻYJĄCYCH

J. ZŁOTORZYCKA

Na tle doniesień na V Sympozjum Akaroentomologii Medycznej i Weterynaryjnej omówiono dorobek polskich parazytologów dotyczący stawonogów - pasożytów dziko żyjących ptaków i ssaków, z wyjątkiem *Ixodidae* drobnych gryzoni i *Nematocera*. Większość osiągnięć to prace na temat faunistyki i sezonowej dynamiki populacji pasożytów zbieranych zarówno z gniazd, jak i z żywicieli. Należy pod-



kreślić, że w pracach tych uwzględniano charakter biotopów pod kątem jakościowej i ilościowej specyfiki żywicieli oraz pasożytów, zajmowano się przy tym wpływem czynników antropogennych. Przedmiotem innych prac były: bionomia, ekologia i zoogeografia pasożytów zewnętrznych ptaków i ssaków, taksonomia i systematyka wszołów i wszy (*Phthiraptera*) oraz nowoczesne techniki przydatne do badań akaroentomologicznych.

W ostatnim pięcioleciu ukazały się także obszerniejsze pozycje, takie jak klucze do oznaczania owadów Polski (muchówki pasożytnicze) oraz podręczniki z obszernymi opisami pasożytów zewnętrznych ptaków i ssaków.