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THE TICK FAUNA OF CZECHOSLOVAKIA

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Abstract. The paper presents briefly the main data about the distribution, hosts and bionomics of 20 tick species known to date from the territory of Czechoslovakia.

The ticks belong to the most harmful ectoparasites and their role in the transmission of diseases of man and animals is well known. Therefore the knowledge about species distribution, their hosts and bionomics is of great importance for the understanding of the circulation of pathogens in natural foci and the control measures against these vectors. The first survey of Czechoslovak ticks was made by Rosický (1953). Since that time many papers have appeared dealing with these parasites. The present communication summarizes the state of the investigations of various tick species in Czechoslovakia at the beginning of 1971. The extensive literature dealing with laboratory isolations and transmission experiments as well as the morphological literature is not included. Neither are mentioned the results of all investigations carried out in natural foci of diseases. Up to now 3 argasid species and 17 ixodid species have been reported from the territory of Czechoslovakia.

ARGASIDAE

1. *Argas (Argas) reflexus* (Fabr., 1794)

Distribution: Known records from central Bohemia and southern Moravia (Rosický and Havlík 1952).
Its occurrence is connected with pigeons but exact data from Czechoslovakia are missing.

2. *Argas (Persicargas) persicus* (Oken, 1818)

Distribution: Southern Slovakia. Host: *G. gallus*. Bionomics: Some ecological and ethological data are given by Rosický and Havlík (1952) and Mačička and Nosek (1958a). First record from the Czechoslovak territory by Dudich et al. (1940).

3. *Argas (Carios) vespertilionis* (Latr., 1796)

Distribution: Mainly southern parts of Bohemia, Moravia and Slovakia. Hosts: *P. pipistrellus* (Rosický and Havlík 1952), *Eptesicus serotinus* (Šebek 1958), *M. myotis*, *M. mystacinus*, *M. blythi*, *Vespertilio murinus*, *Plecotus auritus*, *Miniopterus schreibersi* (Dusbábek 1963). Bionomics: The species is frequently to be found in some caves. Some ecological data are given by Dusbábek (1963).

IXODIDAE

1. *Ixodes (Ixodes) ricinus* (L., 1758)

Distribution: In suitable habitats (Rosický 1954) throughout the country. Hosts: Mainly small and medium-sized mammals and birds are parasitized by larvae and nymphs, bigger mammals by adults (Rosický and Balát 1954, Rosický and Černý 1954, 1960, Mačička and Nosek 1958b, Grulich 1960, Černý 1961a, Nosek et al. 1967). Members of the genus *Lacerta* are often parasitized by immature stages (Grulich et al. 1957, Nosek et al. 1962). The immature stages were also found on some species of water birds (Balát 1964) or in their nests (Daniel and Černý 1963). Domestic ruminants are important hosts of adult ticks in the areas of grazing (Mačička 1956, Černý 1960a). The localization of *I. ricinus* on their body in comparison with other exophilic species is discussed in the paper by Mačička and Rosický (1956), further data are given by Zapletal (1955) and Černý (1960a). The tick infestation is frequently observed also in domestic carnivores (Dyk 1957a, 1961a, Kolář 1967). In some cases *I. ricinus* was found under the skin of the fox *V. vulpes* (Lebeda 1962). Until now 47 species of mammals, 55 species of birds and 4 species of reptiles have been recorded as hosts of various stages of the common tick.
Bionomics: It is a species inhabiting predominantly deciduous and mixed forests of lower altitudes. The developmental cycle lasts mostly 3 years, its duration varies between 2—6 years (Černý 1958, Nosek et al. 1967, Chmela 1969). The curve of seasonal activity in nature has usually two peaks (Rosický 1954, Černý 1957a, Kašpar 1964a, b, Černý et al. 1965). The diurnal activity in relation to temperature and humidity has been also studied (Dyková 1963, Boučková and Dyk 1968a, b, Dyk and Boučková 1968). The species was found at higher altitudes in the Tatra and Krkonoše mountains, as high as 1600 m above sea level (Mačička 1955, Dyk 1957b, Černý 1959a). The changes of numbers of *I. ricinus* in different years and the possibility of their forecast were also studied (Černý 1961b, Dyk 1962). Some other problems of the bionomics of this species are included in the papers by Zapletal 1955, Korbel 1956, Dyk 1957c, 1958, 1961b and Černý 1959b, c.

New methods used in the study of the environmental temperature of the tick *I. ricinus* were described by Daniel and Černý (1967). The paper by Dusbábek, Daniel and Černý (1971) deals with the problem of stratification of engorged *I. ricinus* larvae overwintering in soil. Survival of ticks of this species submerged in water is studied by Honzáková (1971).

2. *Ixodes (Ixodes) apronophorus* P. Sch., 1924

Distribution: Known records from Moravia and Slovakia. Hosts: Larvae and nymphs on *Microtus arvalis*, *Arvicola terrestris*, *Apodemus agrarius* (Rosický 1953, Mrciak 1967), *M. oeconomus* (Černý 1957b), *Sorex araneus* (unpublished data), adults on *A. terrestris* (Rosický 1953) and *M. oeconomus* (unpublished data). Turček (1953) reports nymphs from *Sus scrofa*. Bionomics: The species occurs predominantly in wet habitats. The knowledge of its bionomics is very incomplete, only Rosický (1953) gives some data about seasonal occurrence.

3. *Ixodes (Ixodes) laguri* Ol., 1929

Distribution: Southeastern Slovakia. Host: *C. citellus*. Bionomics: Very little is known about the bionomics of this species. It is relatively abundant in the nests of susliks. From the territory of Slovakia a new subspecies *I. laguri slovacicus* was described (Černý 1960b).

4. *Ixodes (Scaphixodes) pari* Leach, 1815

Only one finding from southern Moravia on *Parus major* recorded as *I. frontalis* (Panzer, 1798) (Rosický 1953).

5. *Ixodes (Pholeoixodes) hexagonus* Leach, 1815

Distribution: Throughout the country. Hosts: All stages mainly on *Erinaceus europaeus* and *E. roumanicus*, often on *V. vulpes*, *M. meles*, *P. putorius*, *P. eversmanni*, rarely on *Lepus europaeus* (Rosický 1953 as *I. crenulatus* Koch, 1844), further on *Mustela nivalis*, *Martes* sp. (unpublished data). Some data on hosts are given in the papers by Turček (1954) and Černý (1961c). Dogs are often infested (Dyk 1957a). Bionomics: The developmental cycle under natural conditions lasts 2—6 years, mainly 3 years (Chmela and Lichard 1971).

6. *Ixodes (Pholeoixodes) arboricola* P. Sch. and Schl., 1929

Distribution: Known records from Moravia and Slovakia. Hosts: *Ficedula albicollis*, *Parus ater*, *P. coeruleus*, *P. cristatus*, *P. major*, *P. palustris*, *Passer domesticus*, *P. montanus*, *Phoenicurus phoenicurus*, *Sitta europaea*, *Sturnus vulgaris* (Černý and Balát 1960), other records by Rosický (1953) and Černý (1961a). The ecology of this species was studied by Černý and Balát (1960), the development under laboratory conditions by Černý (1963).

7. *Ixodes (Pholeoixodes) lividus* Koch, 1844

Distribution: Probably throughout the country together with its host. Host: *R. riparia*. Bionomics: The first record originates from Kruis (1947). Some data on the host infestation are given in the paper by Balát (1961).

8. *Ixodes (Pholeoixodes)* sp.

Distribution: Throughout the country. Hosts: *V. vulpes*, *M. meles*. The exact taxonomic position and correct designation of the specimens from foxes and badgers require further investigations (Černý 1969). They are recorded as *I. vulpicola* P. Sch. (Rosický 1953), *I. melicola* P. Sch. and Schl. (Černý 1961a) or *I.* aff. *canisuga* Johnst. (Rosický et al. 1961).

9. *Ixodes (Exopalpiger) trianguliceps* Bir., 1895

Distribution: Throughout the country. Hosts: Larvae and nymphs on *Sorex araneus*, *S. alpinus*, *S. minutus*, *Talpa europaea*, *Neomys fodiens*, *Crocidura suaveolens*, *Apodemus flavicollis*, *A. sylvaticus*, *Clethrionomys glareolus*, *Pitymys tatricus*, *P. subterraneus*, *Microtus agrestis*, *M. nivalis*, *Arvicola terrestris* (Nosek et al. 1967), further on *A. agrarius* and *M. arvalis* (Rosický 1953). Adults are known from *A. flavicollis*, *A. sylvaticus*, *C. glareolus* (Nosek et al. 1967), further from *P. subterraneus* (Černý 1959a), *S. araneus*, *M. arvalis*, *A. terrestris* (unpublished data). Bionomics: It is primarily a species of hilly land and mountains. The ecology of *I. trianguliceps* in the High Tatras was studied by Lichard (1965) where it was found as high as 1800 m (Mačička 1955) and 2016 m (Rosický 1953). Some ecological characteristics are also given by Rosický (1953) and Nosek et al. (1967). Further records not mentioned above have been made by Turček 1953, Černý 1954, 1961 and Mrciak 1967.

10. *Ixodes (Eschatocephalus) vespertilionis* Koch, 1844

Distribution: Throughout the country. Hosts: *Rhinolophus hipposideros*, *Plecotus auritus* (Rosický 1953), *R. ferrumequinum*, *R. euryale*, *M. myotis*, *M. blythi*, *Mini-*

opterus schreibersi (Dusbábek 1963). Bionomics: Some data about infestation of bat species are given in the paper by Dusbábek (1963) who considers this tick to be mostly a cave form.

11. *Ixodes (Pomerantzevella) simplex* Neum., 1906

Another bat-infesting species was recorded from Czechoslovakia in the paper by Dusbábek (1963) as *Ixodes pospelovae* Emčuk, 1955 after Grulich and Zapletal (unpublished data). According to Beaucournu (1966) this species is a synonym of *I. simplex*. When examining the material collected from some bat species we found a larva of this species on *Miniopterus schreibersi* from the cave Čertova diera (southeastern Slovakia). The distribution and host range of this species will require further investigations.

12. *Haemaphysalis (Haemaphysalis) concinna* Koch, 1844

Distribution: Southern Moravia and southwestern and southeastern Slovakia. Hosts: Larvae and nymphs found on *Anthus trivialis, C. coccothraustes, Emberiza citrinella, Erithacus rubecula, Fringilla coelebs, Lanius collurio, Locustella fluviatilis, Parus coeruleus, P. major, Sturnus vulgaris, Sylvia nisoria, Turdus merula, T. philomelos, Upupa epops* (Rosický and Balát 1954), *Luscinia megarhynchos, Sitta europaea, O. oriolus, Garrulus glandarius, Erinaceus roumanicus, Talpa europaea, Lepus europaeus, Oryctolagus cuniculus, Sciurus vulgaris, Apodemus flavicollis, A. sylvaticus, Clethrionomys glareolus, Capreolus capreolus, Cervus elaphus* (Nosek et al. 1967), *Lacerta agilis* (Grulich et al. 1957), *L. viridis, Anas platyrhynchos, Phasianus colchicus, V. vanellus, E. europaeus, Sorex araneus, S. minutus, Microtus arvalis, M. oeconomus, Arvicola terrestris, Micromys minutus, C. citellus, Mustela nivalis* (Nosek 1971), adults on *C. capreolus, C. elaphus E. roumanicus*, cattle, dog (Rosický 1953), *M. meles*, sheep, goat (Nosek et al. 1967), *E. europaeus, O. cuniculus, L. europaeus, V. vulpes* (Nosek 1971). Bionomics: It is a species of swampy woods and horn-beam oak woods in lowland with spring and summer activity of adults. Its developmental cycle lasts 3 years (Černý and Kratochvílová-Králová 1963, Nosek et al. 1967). Data on its ecology are also given by Rosický (1953), Korbel (1956), Nosek (1958) and are summarized by Nosek (1971).

13. *Haemaphysalis (Alloceraea) inermis* Bir., 1895

Distribution: Southern part of central Slovakia. Hosts: Larvae found on *A. flavicollis, A. sylvaticus, M. arvalis, Sus scrofa, Lacerta viridis*, nymphs on the same hosts and *Lepus europaeus, V. vulpes*, dog, *Erinaceus europaeus, C. capreolus, Cervus elaphus*, domestic cattle and goat. Known hosts of adults are *S. scrofa, C. capreolus, C. elaphus*, domestic cattle, goat, sheep, dog, *V. vulpes, L. europaeus, E. roumanicus* and man (Mačička 1958, Nosek et al. 1967), *D. dama* (Mačička and Nosek 1958b). Bionomics: It is a forest-steppe species with winter activity of adults. Its bionomics was studied by Mačička (1958). The developmental cycle under natural conditions lasts 2—3 years (Nosek et al. 1967). Some bionomical data are also given by Rosický (1953).

14. *Haemaphysalis (Aboimisalis) punctata* Can. et Fanz., 1877

Distribution: Southern parts of central Slovakia. Hosts: Larvae on *Emberiza citrinella, Turdus merula, A. flavicollis, C. glareolus, S. vulgaris*, nymphs on *L. europaeus, O. cuniculus, S. vulgaris, E. roumanicus*, goat, adults on cattle, goat, sheep, pig, *C. elaphus, C. capreolus, L. europaeus*, dog (Nosek et al. 1967). Bionomics: It is a forest-steppe species of lowland and upland with spring and autumn activity of adults. Its

developmental cycle lasts 2—3 years (Nosek et al. 1967). Some data about its bionomics are also given by Rosický (1953).

15. *Dermacentor marginatus* (Sulzer, 1786)

Distribution: Southern parts of central and eastern Slovakia. Hosts: Larvae and nymphs on *M. arvalis*, *A. glareolus*, *A. flavicollis*, *A. sylvaticus*, *A. microps*, *A. agrarius*, *Muscardinus avellanarius*, *Dryomys nitedula*, *Eliomys quercinus*, *C. citellus*, dog, *L. europaeus*, *O. cuniculus*, *S. araneus*, *E. roumanicus*, adults on cattle, goat, pig, sheep, horse, dog, *Sus scrofa*, *D. capreolus*, *C. elaphus* and man (Mačička et al. 1955, Nosek et al. 1967). Bionomics: It is a species of steppe habitats with early spring and autumn activity of adults. The developmental cycle is normally completed in 1 year. The bionomics of *D. marginatus* was studied in detail by Mačička et al. (1955). Further data are given by Rosický (1952, 1953), Rosický and Mačička (1955), Mačička (1956), Gdovin and Mačička (1958) and Nosek et al. (1967).

16. *Dermacentor reticulatus* (Fabr., 1794)

Distribution: Southern Moravia (confluence of the rivers Morava and Dyje), southwestern Slovakia (along the Danube), eastern Slovakia (along the river Latorica). Hosts: Larvae and nymphs on *M. arvalis*, *A. flavicollis*, *A. agrarius*, *C. glareolus*, *S. araneus* (Mačička et al. 1956), further on *C. suaveolens*, *E. roumanicus*, *L. europaeus*, *Garrulus glandarius* (Nosek 1958), adults on cattle, sheep, goat, horse, dog, pig, *C. capreolus*, *C. elaphus*, *V. vulpes*, *L. europaeus*, *E. roumanicus* and man (Rosický 1953, Mačička et al. 1956). Bionomics: It is a species of inundated lowland forests and pastureland with early spring and autumn activity of adults. The developmental cycle is normally completed in 1 year. The bionomics of this species was studied thoroughly by Mačička et al. (1956), further data are given by Korbel (1956) and Nosek (1958).

17. *Hyalomma (Hyalomma) marginatum* Koch, 1844

This species is regularly transported to Czechoslovakia by spring migrating birds. The nymphs were found on *Anthus trivialis*, their exuviae on *Luscinia suecica* and *Erithacus rubecula* (Černý and Balát 1957). Due to unfavorable conditions for its existence, *H. marginatum* has not established local populations here. The only known unpublished record of a female from cattle originates from Šafárikovo, Slovakia (10. 8. 1937, leg. Dr. Rašín).

ФАУНА ИКСОДОИДНЫХ КЛЕЩЕЙ ЧЕХОСЛОВАКИИ

В. Черны

Резюме. В работе приводятся основные данные о распространении, хозяевах и биономии 20-ти видов клещей до сих пор известных на территории Чехословакии.

REFERENCES

BALÁT F., Zool. listy 10: 180—182, 1961.

—, Festschrift zum 25jährigen Bestehen der Nordrhein-Westfälischen Vogelschutzwarte Essen-Altenhundem 115—120, 1964.

BEAUCOURNU J. C., Ann. Par. hum. comp. 41: 495—502, 1966.

BOUČKOVÁ J., DYK V., Ang. Parasitol. 9: 36—40, 1968a.

—, —, Sborník VŠZ v Brně B 37: 115—131, 1968b.
ČERNÝ V., Přír. sborník Ostr. kraje 15: 503—510, 1954.
—, Čs. parasit. 4: 57—84, 1957 a.
—, Čas. čs. spol. ent. 54: 391—395, 1957 b.
—, Čs. parasit. 5: 21—26, 1958.
—, Sbor. Nár. mus. v Praze B 15: 156—160, 1959 a.
—, Vet. čas. 8: 455—460, 1959 b.
—, Zool. listy 8: 208—212, 1959 c.
—, Vet. čas. 9: 393—401, 1960 a.
—, Čas. čs. spol. ent. 57: 178—184, 1960 b.
—, Biológia 16: 574—585, 1961 a.
—, Ang. Parasitol. 2: 106—109, 1961 b.
—, Zool. zhurn. 40: 184—188, 1961 c.
—, Zool. listy 12: 172—173, 1963.
—, Folia parasit. (Praha) 16: 348, 1969.
—, BALÁT F., Zool. listy 6: 81—83, 1957.
—, Zool. listy 9: 217—226, 1960.
—, KRATOCHVÍLOVÁ KRÁLOVÁ E., Zool. listy 12: 259—261, 1963.
—, ROSICKÝ B., AŠMERA J., KADLČÍK K., KOBÍK V., KRATOCHVÍLOVÁ E., LAUTERER P., NOVÁK D., PAULEOVÁ E., ŠEBEK Z., ŠVEC J., TĚMÍN K., Čs. parasit. 12: 125—131, 1965.
DANIEL M., ČERNÝ V., Ang. Parasitol. 4: 201—208, 1963.
—, —, Folia parasit. (Praha) 14: 177—183, 1967.
DUDICH E., KOLOSVÁRY G., SZÁLAY L., A. Matem. és Termész. Közl. 37: 55. 1940.
DUSBÁBEK F., Čas. čs. spol. ent. 60: 332—340, 1963.
—, DANIEL M., ČERNÝ V., Folia parasit. (Praha) 18: 261—266, 1971.
DYK V., Sborník VŠZL v Brně B 5: 53—57, 1957a.
—, Sborník VŠZL v Brně B 5: 265—271, 1957b.
—, Sborník VŠZL v Brně B 5: 335—339, 1957c.
—, Sborník VŠZL v Brně B 6: 333—338, 1958.
—, Sborník VŠZL v Brně B 9: 341—344, 1961a.
—, Sborník VŠZL v Brně B 9: 143—147, 1961b.
—, Ang. Parasitol. 3: 4—6, 1962.
—, BOUČKOVÁ I., Ang. Parasitol. 9: 83—87, 1968.
DYKOVÁ I., Ang. Parasitol. 4: 104—108, 1963.
GRULICH I., Zool. listy 9: 171—187, 1960.
—, KUX Z., ZAPLETAL M., Zool. listy 6: 315—328, 1957.
HONZÁKOVÁ E., Folia parasit. (Praha) 18: 155—159, 1971.
CHMELA J., Folia parasit. (Praha) 16: 313—319 1969.
—, LICHARD M., Folia parasit. (Praha) 18: 79—83, 1971
KAŠPAR H., Sborník VŠZ v Brně B 12: 83—90, 1964a.
—, Sborník VŠZ v Brně B 12: 103—109, 1964b.
KOLÁŘ Z., Sborník VŠZ v Brně B 36: 529—534, 1967.
KORBEL L., Acta Fac. Rer. Nat. Univ. Comen., Zoologia 1: 67—78, 1956.
KRUIS V., Čs. ornitholog 14: 10, 1947.
LEBEDA M., Vet. čas. 11: 193—205, 1962.
LICHARD M., Biológia 20: 348—358, 1965.
MAČIČKA O., Zool. a ent. listy 4: 384—388, 1955.
—, Sbor. Prírodné ohniská nákaz: 267—277, 1956.
—, Čs. parasit. 5: 121—124, 1958.
—, NOSEK J., Vet. čas. 7: 283—286, 1958a.
—, —, Biológia 13: 489—495, 1958b.
—, —, ROSICKÝ B., Biolog. práce, edícia sekcie biol. a lekár. vied SAV, 2, 12: 1—49, 1956.
—, ROSICKÝ B., Vet. čas 5: 111—122, 1956.
—, —, ČERNÝ V., Práce II. sekcie SAV, séria biologická, I, 1: 1—43, 1955.
MRCIAK M., Acta Fac. Rer. Nat. Univ. Comen., Zoologia 12: 19—27, 1967.
NOSEK J., Vet. čas. 7: 610—615, 1958.
—, Z. Parasitenk. 36: 233—241, 1971.
—, LICHARD M., SZTANKAY M., Bull. Wld. Hlth Org. 36, Suppl. 1: 49—59, 1967.
—, ŘEHÁČEK J., ERNEK E., GREŠÍKOVÁ M., Čs. Epidem. 11: 381—385, 1962.
ROSICKÝ B., Zool. a ent. listy 1: 85—89, 1952.
—, Zool. a ent. listy 2: 1—12, 1953.
—, Věst. čs. zool. spol. 18: 41—70, 1954.
—, BALÁT F., Čs. parasit. 1: 45—76, 1954.
—, ČERNÝ V., Zool. a ent. listy 3: 37—46, 1954.
—, —, Office of Publication, The Rockefeller Foundation, 1—14, 1960.
—, —, DANIEL M., DANIELOVÁ V., MRCIAK M., Sborník Niektoré prírodno-ohniskové nákazy na východnom Slovensku: 9—29, 1961.
—, HAVLÍK O., Zool. a ent. listy 1: 81—84, 1952.
—, MAČIČKA O., Čs. parasit. 2: 161—176, 1955.
ŠEBEK Z., Vlastivěd. sbor. Vysočiny, odd. věd. přír. 2: 113—115, 1958.
TURČEK F. J., Biológia 8: 231—234, 1953.
—, Biológia 9: 464—468, 1954.
ZAPLETAL M., Sborník VŠZL v Brně A Nr. 4: 275—289, 1955.

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