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TICKS OF SMALL MAMMALS FROM THE HINDU KUSH (AFGHANISTAN)*

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Abstract. During the First Czechoslovak expedition to the East Hindu Kush in June—September 1965 a total of 193 hosts belonging to 12 species was examined on the presence of ticks. Specimens of the genera *Ixodes*, *Haemaphysalis*, *Dermacentor* and *Rhipicephalus* were found. Data and comments are given for the species collected.

The present paper has been based on the tick material collected by the junior author during the First Czechoslovak mountaineering expedition to the East Hindu Kush (Afghanistan, the region of Vakhan) in 1965. It contains the results obtained by examining 8 species of rodents, 2 species of lagomorphs, 1 species of insectivores and 1 species of lizards. Materials from bats, containing only representatives of the family Argasidae, were processed earlier (Dusbábek 1970). Attention has been paid primarily to high altitude small mammals.

MATERIAL

Collections were made in July and August in two high altitude valleys (Ishmurkh Darrah and Chap Darrah) within the altitudes of 2750–4550 m. In addition, material from other localities of Afghanistan was collected in June and September of the same year: environs of the city of Kabul, high altitude steppes near a series of small lakes Band-i-Amir (Central Hindu Kush) and environs of the towns Faisabad and Kunduz (NE Afghanistan).

A total of 193 hosts were captured, the number of positive hosts is given with each species in brackets next to the number of individuals examined: *Alticola roylei* (Ogilby) 65 (19), *Apodemus sylvaticus* (L.) 22 (4), *Cricetulus migratorius* (Pallas) 6 (6), *Crocidura russula* Hermann 20 (0), *Marmota caudata* Geoffroy 7 (5), *Meriones meridianus* (Pallas) 3 (1), *Microtus afghanus* Thomas 9 (0), *Mus musculus* L. 5 (0), *Nesokia indica* Gray 2 (2), *Ochotona roylei* (Ogilby) 15 (12), *Ochotona rufescens* Gray 20 (11), *Agama himalayensis* (Steindachner) 19 (9).

COLLECTING LOCALITIES (with enumeration of trapping and collecting results)

Kunduz, 36. 47 N, 68. 51 E (Kunduz province), ±400 m a.s.l. Untended gardens around dwellings
5. IX. — *Nesokia indica* 1 (1)

Faisabad, 37. 05 N, 70. 40 E (Badakhshan province), ±1500 m
a) pastureland near rocks along the river Kokcha
12.–13. VII. — *Agama himalayensis* 5 (5)
b) fallow land in the fields on hill slopes, garden walls
13.–14. VII. — *Meriones meridianus* 3 (1), *Mus musculus* 1 (0), *Nesokia indica* 1 (1)

Kabul, 34. 30 N, 69. 10 E (Kabul province), ±1800 m. Along irrigation canals and adjoining fields
24. VI., 1.–7. VII. — *Apodemus sylvaticus* 6 (1), *Microtus afghanus* 9 (0), *Mus musculus* 4 (0)

Band-i-Amir, 34. 49 N, 67. 12 E (Bamiyan province), 2000–2500 m. Surroundings of a series of small lakes, about 80 km W. of Bamiyan
26. VI. — *Ochotona rufescens* 16 (9)

*) Scientific results of the Czechoslovak expeditions to the Hindu Kush and Himalaya. Communication No. 24.

Shakkar Darrah, 34. 50 N, 69. 10 E (Kabul province), 2500–3000 m. Valley in the Paghman Mts., N. from Kabul

2. VII. — *Agama himalayensis* 9 (3)

Shibar Pass, 34. 54 N, 68. 14 E (Parwan province), and its surroundings, ±3000 m. Rocky slopes.

25.–27. VI. — *Ochotona roylei* 1 (0), *Ochotona rufescens* 4 (2) *Agama himalayensis* 5 (1)

Ishmurkh village, 36. 57 N, 72. 22 E (Badakhshan province), 2750 m. Banks of irrigation canals, growth and walls between fields

18.–19. VII. — *Apodemus sylvaticus* 2 (2), *Cricetulus migratorius* 6 (6)

Ishmurkh Darrah, 36. 50 N, 72. 25 E (Badakhshan province), 2850–4550 m. A valley about 10 km S.S.E. of Ishmurkh

a) willow coppice, 2850 m

22.–27. VIII. — *Alticola roylei* 21 (4), *Apodemus sylvaticus* 14 (1), *Crocidura russula* 20 (0), *Ochotona roylei* 1 (1)

b) grassy area and moraines near the front of glacier, 3800–4000 m

21.–25. VII., 3.–5. VIII., 28. VIII. — *Alticola roylei* 13 (1), *Ochotona roylei* 2 (0)

c) islet of ice-free rocky terraces at the confluence of eastern and western branch of the Ishmurkh glacier (a place called Shangri La), 4550 m

8.–11. VIII. — *Alticola roylei* 13 (0)

Chap Darrah, 36. 53 N, 72. 21 E (Badakhshan province), 3700 m. A valley parallel to the Ishmurkh Darrah, about 6 km S. of Ishmurkh. The upper part consists of a steppe of the association *Artemisia leucotricha* + *Stipa himalaica*

15.–20. VIII. — *Alticola roylei* 15 (14), *Marmota caudata* 7 (5), *Ochotona roylei* 11 (11)

Detailed characteristics of the high-mountain biotopes are included in the paper of Hadač (1970).

SURVEY OF SPECIES

Ixodes aff. *redikorzevi* Olenev, 1927

Material examined: 1 L from *O. rufescens*, Shibar Pass, 25. 6. 65; 1 N from *O. rufescens*, Band-i-Amir, 26. 6. 65; 1 L from *A. himalayensis*, Shakkar Darrah, 2. 7. 65.

The two specimens from pikas are damaged, the nymph being without capitulum. They seem to represent the true *I. redikorzevi*. The larva from agama differs in some minor characters of capitulum and in having only 2 pairs of dorsomedian setae and it may represent a closely related taxon.

Haemaphysalis sulcata Canestrini et Fanzago, 1877

Material examined: 1 N from *A. himalayensis*, Shibar Pass, 27. 6. 65; 11 L from 3 *A. himalayensis* Shakkar Darrah, 2. 7. 65; 35 L 75 N from 5 *A. himalayensis*, Faisabad, 12.–13. 7. 65.

Our findings confirm the close relations to reptiles as hosts of immature stages of this species.

Haemaphysalis danieli Černý et Hoogstraal, 1977

Material examined: 3 L from 3 *A. roylei;* 1 N from *M. caudata;* 15 L 4 N from 7 *O. roylei;* all from Chap Darrah, 15.–20. 8. 65.

This species has been recently described by Černý and Hoogstraal (1977) from Pakistan and Afghanistan. Only larvae, nymphs and a female are known. *Alticola roylei, Apodemus flavicollis, Cricetulus migratorius, Marmota caudata* and *Ochotona roylei* are reported as hosts of immature stages. The hosts of adults are probably chiefly wild and domestic ovine and caprine artiodactyls. The species was collected between 2310—3700 m. In Afghanistan it was found only in one locality—Chap Darrah.

Dermacentor sp.

Material examined: 21 L 1 N from 8 *O. rufescens*, Band-i-Amir, 26. 6. 65; 1 L from *O. rufescens*, Shibar Pass, 27. 6. 65; 1 N from *M. meridianus*, Faisabad, 13. 7. 65; 15 L from 2 *A. sylvaticus*, Ishmurkh, 19. 7. 65; 71 L 22 N from 6 *C. migratorius*, Ishmurkh, 19. 7. 65; 70 L 3 N from 14 *A. roylei*, Chap Darrah, 16. – 20. 8. 65; 11 L 28 N from 5 *M. caudata*, Chap Darrah, 15. – 19. 8. 65; 111 L 54 N from 11 *O. roylei*, Chap Darrah, 15. – 18. 8. 65; 1 L from *A. sylvaticus*, Ishmurkh Darrah, 22. 8. 65; 4 N from 4 *A. roylei*, Ishmurkh Darrah, 26. 8. 65; 7 N from *O. roylei*, Ishmurkh Darrah, 22. 8. 65.

Due to the fact that only immature stages were collected and due to the absence of comparative material from this area we preferred to omit the specific determination, especially when many specimens were partly or fully engorged. *Dermacentor marginatus* (Sulzer, 1776), *D. niveus* Neumann, 1897 and *D. raskemensis* Pomerantsev, 1946 are reported from the territory of Afghanistan (Hoogstraal 1973a).

Rhipicephalus turanicus Pomerantsev, 1940

Material examined: 5 L from *A. sylvaticus*, Kabul, 1. 7. 65; 2 L from *N. indica*, Faisabad, 14. 7. 65; 1 L from *A. sylvaticus*, Ishmurkh, 18. 7. 65; 1 L from *N. indica*, Kunduz, 5. 9. 65.

Our finding of one larva in Ishmurkh (2750 m) confirms the penetration of this species into higher altitudes observed also in Pakistan (Begum et al. 1970).

DISCUSSION

In the material collected undoubtedly the most interesting were the finds of larvae and nymphs which were described as new species, *Haemaphysalis danieli*, representing the fifth or the sixth known representative of the subgenus *Allophysalis*. Remarkable was also the finding of *Ixodes* aff. *redikorzevi* from agama.

As could be anticipated, some species of rodents (*Alticola roylei, Cricetulus migratorius*) and lagomorphs (*Ochotona roylei, O. rufescens*) proved to be important hosts of ticks. Primarily large species (*Marmota caudata* and *O. roylei*) proved to be hosts of nymphs. The highest number of ticks from one host was collected from *O. roylei* in the locality of Chap Darrah (3700 m): 45 larvae, 10 nymphs *Dermacentor* sp. and 4 larvae *H. danieli*. Also some agamas were heavily parasitized by *H. sulcata*. For example, in the locality of Faisabad 21 larvae and 28 nymphs were collected from one host. On the other hand, *Crocidura russula* did not prove as a tick host, although 20 specimens were examined in a locality where 12.8 % of other hosts proved to be positive. *Microtus afghanus* (9 specimens) and *Mus musculus* (5 specimens) were negative.

The vertical tick distribution could be well observed in the genus *Dermacentor* in the Ishmurkh valley (Table 1). In its lowest part (Ishmurkh village), where ticks were collected, the incidence of infestation and mean infestation per host were high. In a locality situated 100 m higher both indices were already lower. This difference apparently results from the fact that goats and sheep are regularly pastured in the vicinity of the village. The tick occurrence at places 1000 m higher was sporadic. *Alticola roylei* was found to be a positive host as high as 3900 m, in a locality near the front of Ishmur khglacier. On one of 9 hosts trapped there a single nymph was found which unfortunately got lost and could not be determined and most probably belonged to the same genus. At the altitude of 4000 m (3 voles) and 4550 m (13 voles) all hosts proved to be negative.

The altitude itself, however, is not the only decisive factor in the tick occurrence. This is evidenced if two closely situated localities, Ishmurkh Darrah and Chap Darrah, are compared. While in the former, situated at 2850 m, 6 (10.2 %) out of 59 hosts and 6 (15.4 %) out of 39 rodents and lagomorphs were positive, in the latter (3700 m) 30

Table 1. Vertical distribution of *Haemaphysalis* and *Dermacentor* ticks in high altitude biotopes in the East Hindu Kush

Locality	Host			*Haemaphysalis danieli*				*Dermacentor* sp.			
	Species	collected	with ticks	positive hosts	larvae collected	nymphs collected	mean infestation per host	positive hosts	larvae collected	nymphs collected	mean infestation per host
Ishmurkh village 2,750 m	*Cricetulus migratorius*	6	6	0	–	–	–	6	71	22	15.5
	Apodemus sylvaticus	2	2	0	–	–	–	2	15	0	7.5
Ishmurkh Darrah 2,850 m	*Crocidura russula*	20	0	0	–	–	–	0	–	–	–
	Ochotona roylei	1	1	0	–	–	–	1	0	7	7.0
	Alticola roylei	24	4	0	–	–	–	4	0	4	0.17
	Apodemus sylvaticus	14	1	0	–	–	–	1	1	0	0.07
Surroundings of Ishmurkh glacier front 3,800 to 4,000 m	*Ochotona roylei*	2	0	0	–	–	–	0	–	–	–
	Alticola roylei	13	1*)	0	–	–	–	0	–	–	–
Rocky island Shangri La 4,550 m	*Alticola roylei*	13	0	0	–	–	–	0	–	–	–
Chap Darrah 3,700 m	*Ochotona roylei*	11	11	7	15	4	1.7	11	111	54	15.0
	Alticola roylei	15	14	3	3	0	0.20	14	70	3	4.9
	Marmota caudata	7	5	1	0	1	0.14	5	11	28	5.6
In total		128	45	11	18	5	0.18	44	279	118	3.1

*) One nymph collected, unfortunately lost.

(90.9 %) out of 33 hosts were infested with ticks, the mean infestation per positive host being 2.0 and 9.2. The species *Haemaphysalis danieli* was collected only in the Chap Darrah locality.

The difference between the compared valleys of Chap Darrah and Ishmurkh Darrah is primarily due to the configuration of terrain, entailing the origin and existence of different plant communities and consequently different conditions for the existence of large mammals, primarily artiodactyls, the hosts of adult ticks of the genera *Dermacentor* and *Haemaphysalis*. At the altitude of 3700 m, where ticks were collected, the Chap Darrah valley (narrow at lower altitudes) considerably expands and its bottom consists of sediments forming a gradually ascending plain 1.5×0.4 km large. This plain constitutes a worm wood steppe (see Hadač 1970) which is the most extensive area covered with vegetation in the Hindu Kush region visited. All over the plain burrows of *Marmota caudata* were dispersed. The plain was daily visited by a herd of ibex (more than 20 head of *Capra ibex sibirica*). The Ishmurkh Darrah valley, on the other hand, had no large areas with vegetation. Parts of scree fields and moraines fortified by turf were very small in area and maintained only a relatively low populations of small mammals *Alticola roylei*. The occurrence of pikas and marmots was very sporadic and during the whole stay of the expedition the presence of ibex could not be ascertained.

Among tick species found of greatest medical importance may be representatives of the genus *Dermacentor*, known as vectors of various viroses (particularly of the B group), rickettsioses, bacterial diseases and haemorrhagic fevers of still vague etiology. The virus Hazara (Crimean-Congo HF group) was isolated from the species *I. redikorzevi* in the Pakistani Himalaya, the virus Manawa (Uukuniemi group) from *R. turanicus* in Pakistan and the KFD virus (group B) from the same species in India (Hoogstraal 1973b).

ИКСОДОВЫЕ КЛЕЩИ МЕЛКИХ МЛЕКОПИТАЮЩИХ ИЗ ГИНДУКУША (АФГАНИСТАН)

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Резюме. Во время первой чехословацкой экспедиции в восточный Гиндукуш с июня по сентябрь 1965 г. на наличие клещей были обследованы 193 хозяева, относящиеся к 12 видам. Были обнаружены особи родов *Ixodes*, *Haemaphysalis*, *Dermacentor* и *Rhipicephalus*. В работе приведены данные и примечания к отдельным видам.

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