

THE OCCURRENCE OF *IXODES ELDARICUS* (DZHAPARIDZE, 1950) (ACARINA : IXODIDAE) IN ISRAËL

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IXODES ELDARICUS
HOSTS
DISTRIBUTION

ABSTRACT : *Ixodes eldaricus* is reported from the western foothills of Judea. A total of 53 larvae, 26 nymphs and 5 adult ticks were collected in the field by dragging and flagging, mainly on the northern and western slopes. Thirty-two larvae were collected from two species of rodents — *Acomys cahirinus* and *Mus musculus*. *A. cahirinus* is a new host record for *I. eldaricus*. The ticks appeared in the field and on the mammals only during the winter-spring months (November-April). All three stages were found in the same season and no cases of tick paralysis were recorded in local livestock.

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RÉSUMÉ : *Ixodes eldaricus* est rapportée des pieds des collines dans l'Ouest de Judea. Au total 53 larves, 26 nymphes et 5 tiques adultes ont été récoltées par un balayage du pâturage à l'aide du drapeau. La plupart des tiques ont été trouvées sur les pentes nord-ouest des collines dans la zone d'étude. Trente-deux larves ont été récoltées sur deux espèces de rongeurs : *Acomys cahirinus* et *Mus musculus*. *A. cahirinus* est un nouveau hôte, inconnu auparavant pour *I. eldaricus*. Les tiques ont été trouvées dans le pâturage et sur les rongeurs seulement les mois d'hiver et de printemps (Novembre-Avril). Les trois stades ont été trouvés à la même saison. Des cas de paralysie par les tiques chez le bétail n'ont pas été enregistrés.

I. eldaricus has been reported from different regions in Asia (BERDYEV, 1973 ; FILIPPOVA, 1974). Immature and adult stages of the tick have been collected from birds (SHCHERBINIA, 1970 ; DZHAPARIDZE, 1950) and bats (KHADZIEV and DUBOVCHENKO, 1970, cited in BERDYEV, 1973), but have been reported only once on rodents (BERDYEV, 1973).

The present paper records *I. eldaricus* found on trapped rodents and in the field. Seasonal and geographical distributions and habitat preferences are compared to those of *I. ricinus gibbosus*.

MATERIALS AND METHODS

Field observations were conducted from 1983 to 1985 around Givat-Shemesh in the Judean foothills (30 km west of Jerusalem), 250-350 m above sea level. The average annual precipitation is 400-500 mm, the average temperature 21-28°C and the average relative humidity 55-60 %. The vegetation includes the chief components of Mediterranean maqui on Rendzina soil.

Ticks were collected in the field by dragging and

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flagging with a white flannel flag (1 × 1 m), every 2 weeks.

Rodent traps were set for two consecutive nights, every second week between November and May, at sites showing signs of animal presence. All traps were baited with bread and peanut butter.

The trapped animals were anesthetized and examined for ectoparasites. Ticks were collected for identification and breeding. Domestic animals (sheep, goats, cattle, donkeys, horses, dogs) and people were also examined for ticks.

Larvae and nymphs collected in the pasture were fed in the laboratory on gerbils (*Meriones tristrami*). Larvae collected from the trapped rodents, and engorged larvae and nymphs which dropped off the gerbils, were reared in the laboratory as described by CWILICH and HADANI (1966) and HADANI *et al.* (1969). Climatic data were obtained from the meteorological station at Bet-Dagan, located 20 km west of the site.

RESULTS

During the survey period of 2 years (1983-1985) 54 rodents were captured, representing two species. The *Acomys* mouse (*Acomys cahirinus*) accounted for 68.5 % (n = 37) and the house mouse (*Mus musculus*) accounted for 31.5 % (n = 17) of the captured mammals. Age and sex of the hosts were not recorded. Trapped mammals yielded three species of ticks; *I. eldaricus* was the prevailing tick species, representing 94 % (n = 32 larvae) of all ticks collected.

Twelve (33.3 %) *A. cahirinus* and six (36.3 %) *M. musculus* were parasitized by larvae of *I. eldaricus* (Table 1). Other tick species included larvae of *Rhipicephalus* and *Hyalomma* spp.

TABLE 1 : Infestation of field rodents with larvae of *Ixodes eldaricus* — Givat-Shemesh (1983-1985).

Rodent species	No. hosts		<i>I. eldaricus</i> larvae	
	trapped	infested	Total ticks	aver./animal
<i>Acomys cahirinus</i>	37	12 (32.4 %)	24	2
<i>Mus musculus</i>	17	6 (35.2 %)	8	1.3

I. eldaricus was not found on farm animals (cattle, sheep, goats, donkeys, horses and dogs) in the study area, nor were any cases of tick paralysis recorded.

Larvae, nymphs and adults showed a clear pattern of seasonal activity both on the host and in the field. All stages were collected during the winter months of November-April of the same year. *I. eldaricus* larvae increased in number in late November, were most abundant in January -March and decreased throughout April.

Thirty-two larvae were sampled from the rodents (24 from *A. cahirinus* and eight from *M. musculus*), and 53 larvae, 26 nymphs and five adults were found in the field. Most of the ticks were collected from the northern and western slopes of the hills, and only four nymphs were collected from the southern slopes (Table 2).

TABLE 2 : *Ixodes eldaricus* ticks collected in the field around Givat-Shemesh (1983-1985).

Tick stage	Northern slope	Western slope	Southern slope
Larvae	37	16	0
Nymphs	13	9	4
Adults	4	1	0

DISCUSSION

I. eldaricus was mainly considered a bird parasite, until BERDYEV (1973) also found this tick species on seven species of rodents.

The tick population was estimated by counting the ticks on the captured rodents and those on a cloth flag dragged over the pasture.

Despite the small numbers of ticks collected both on the rodents and in the field, certain patterns could be discerned. Infestation was found on 33.3 % of the *A. cahirinus* and 36.3 % of the *M. musculus* trapped. Rodent infestation rates were very low, 2 and 1.3 larvae on average per animal for *A. cahirinus* and *M. musculus*, respectively (Table 1). The relatively low tick burden in the study area during the survey period was probably due to the scarcity of specific hosts.

No nymphs or adults of *I. eldaricus* were found

on the trapped rodents, and their hosts in this region are still unknown. *A. cahirinus* is a new, formerly unrecorded host for *I. eldaricus*. This tick was not found on the farm animals routinely examined in the area. Larvae of *Ixodes ricinus* have been reported to parasitize a greater range of hosts than nymphs or adults (MILNE, 1949). Larvae, nymphs and adults were active during the winter months of November-April. A similar seasonal pattern has also been described in Turkmenia (BERDYEV, 1973). Throughout the rest of the year virtually no ticks were collected from the field, nor were any removed from mammals.

In the field, the ticks were most abundant on the northern and western slopes, which are more humid (Table 2). The microclimate and plant communities on these slopes differ from those of the southern slopes. The latter are much drier with poorer vegetation cover. The vegetation consists of typical Mediterranean plant species.

The shade and humidity in the microhabitat seem to be the most important factors ensuring the survival of the non-parasitic stages of this species. Similar findings have been reported for *I. ricinus gibbosus* in Israel (FELDMAN-MUHSAM and SATUREN, 1961) and *I. ricinus* (MILNE, 1950; MERMOD *et al.*, 1974). COLBORNE *et al.* (1981) observed that most African *Ixodes* species are restricted to specific, humid habitats and parasitize a limited range of hosts. *I. eldaricus* has been occasionally recovered from the nests and burrows of its hosts (SHCHERBINIA, 1970; BERDYEV, 1973), which by no means constitute their only microhabitat.

The relatively high number of larvae found on the local rodents indicates that the latter might serve as principal hosts, while nymphs and adults prefer other, yet unknown ones. *I. eldaricus* has only been found in the southern part of the country, with all developmental stages occurring concurrently. This tick species was not found on livestock and no cases of tick paralysis were encountered in livestock in the area. This is in sharp contrast to *I. ricinus gibbosus* reported from the northern part of the country (HADANI *et al.*, 1971). Its developmental stages occur successively over 3 years on livestock, and cause tick paralysis at the adult stage.

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