

DIVERSITY IN TICKS (ACARI) OF WEST BENGAL

A. K. SANYAL & S. K. DE

Zoological Survey of India, M-Block, New Alipore, Kolkata-700 053.

INTRODUCTION

The ticks are a small group of acarines under the order Metastigmata or Ixodida. They occur throughout the world, but are more frequently encountered in tropical and subtropical realms. They are grouped into three families *viz.*, Argasidae or soft ticks, Ixodidae or hard ticks and Nuttalliellidae (known only from Africa).

The ticks show morphological characters typical of other acari, but their peculiarities and greater size (2,000 μm to over 30,000 μm) clearly distinguish them from most other acarines. Besides, there are certain characters which are present and distinct throughout the ontogeny of ticks. A hypostome armed with retrose teeth serves to anchor the tick to its host. A complex sensory setal field, Haller's organ, is located on the dorsal side of tarsus-I in all postembryonic stages, providing sites for contact or olfactory chemoreception. Other distinguishing features are : a pair of stigmata situated posterior to coxa IV or dorsal to coxa III-IV, palp with only three or four segments, chelicera 2-segmented, digits of chelicerae working in horizontal plane with their dentate faces directed externally.

The argasid ticks are non-scutate with leathery integument, sexual dimorphism slight, spiracles small and anterior to coxa-IV and pads, porose areas and festoon are absent. The ixodid ticks are scutate with terminal capitulum, sexual dimorphism well marked, spiracles posterior to coxa-IV and pads, porose areas and festoon are present.

The ticks live as ectoparasites of vertebrates and feed obligatorily on the blood of mammals, reptiles and birds. Some of them are significant pests of man and animals. In temperate and tropical countries, they surpass all other arthropods as transmitters in the number and variety of diseases of man and domestic animals. They cause paralysis and anaemia and serve as reservoir and vectors for many infective viruses, rickettsia, bacteria, sporozoans and spirochaetes. Ticks are the main vectors of Kyasanur Forest Disease (KFD) in man and monkeys in Karnataka state. Other arboviruses like Kaisodi, Ganjam and Bhanja have also been isolated from ticks in India. Ticks are oviparous. The life history passes through egg, larva, nymph and adult stages.

Though the study of ticks in India was initiated by Linnaeus in 1758, the first record of tick from West Bengal was done by Rudow (1870). He described an ixodid tick *Amblyomma bengalense* from

Python sp. But Neumann (1911) reported the species as doubtful and since then there is no record of the species.

The first record of any valid species of ixodid tick from West Bengal was made by Warburton (1910). Later, medical entomologists and acarologists got interested about ixodid tick of the state and described and recorded a good number of genera and species of ticks from the state. The detailed accounts of those studies have been summarised by Sanyal and De (1991, 1992).

RANGE OF DIVERSITY

The number of tick species of West Bengal (Table-I). When compared with the total number of species known from India, it is noted that West Bengal alone represents 30% of the total Indian tick fauna. The total number of taxa of ticks so far known from West Bengal is represented by 9 genera

Table-I. Total number of taxa of tick in India and West Bengal.

Place	Genera	Species
India	12	107
West Bengal	09	32
Bankura	02	04
Bardhaman	04	04
Birbhum	03	03
Calcutta	06	11
Darjiling	07	18
Howrah	03	03
Hooghly	04	05
Jalpaiguri	05	13
Coochbihar	03	03
Malda	02	02
Medinipur	05	07
Murshidabad	02	02
Nadia	03	03
North 24-Parganas	05	06
South 24-Parganas	03	03
Purulia	04	06
West Dinajpur	03	03

and 32 species under one family Ixodidae. There is no record of tick of the family Argasidae from the state. This may be due to lack of attention to this family by the acarologists.

While analysing the status of taxa of ticks in West Bengal, it is observed that three species of ixodid tick viz., *Hyalomma brevipunctata*, *Haemaphysalis darjeeling* and *H. ramachandrai* have been described as new to science from this state. It is also recorded that among the species so far known from West Bengal, *Boophilus microplus*, *Dermacentor auratus*, *Haemaphysalis bisponosa* and *Hyalomma anatolicum anatolicum* are most dominant in population in the state.

Table-II showing the host and distribution of ticks in the state, indicates that they have adapted themselves to live on different hosts in different areas in the state from plains to higher elevation of the Himalayas.

The Zoogeographical relationship of ticks so far known from West Bengal is shown in Figure-I. It shows that the tick species recorded from the state show maximum similarity in species composition with Palaearctic region (25%). The other regions in order of degree of similarity are Ethiopian (12.5%), Pacific (9.4%), Nearctic and Neotropical (each 6.3%). It is also noted from the figure that 62.5% of tick species found in West Bengal are known to occur only in the oriental region. The available data records that *Amblyomma supinoi* is known only from West Bengal. Table-II also shows that none of the species of tick known from West Bengal is endemic as all the species are known from outside India.

DISTRIBUTION OF TICK FAUNA IN WEST BENGAL

The number of genera and species of ticks in different districts of West Bengal is shown in Table-I and Figure-2. These indicate that ticks are known from all the districts in the state. They show that Darjiling district alone represents 77.8% of genera and 56.3% of species of the total genera and species of tick known from the state and the district occupies highest position among the other districts. The district Jalpaiguri occupies the second highest position (40.8%). The other districts in order of number of total species are Calcutta (34.4%), Medinipur (21.9%), North 24-Parganas and Purulia (each 18.8%), Hooghly (15.6%), Bankura and Bardhaman (each 12.6%), Birbhum, Howrah, Coochbihar, Nadia, South 24-Parganas and West Dinajpur (each 9.4%) and Malda and Murshidabad (each 6.3%).

ACKNOWLEDGEMENTS

The authors express gratefulness and sincere thanks to the Director, Zoological Survey of India for extending working facilities.

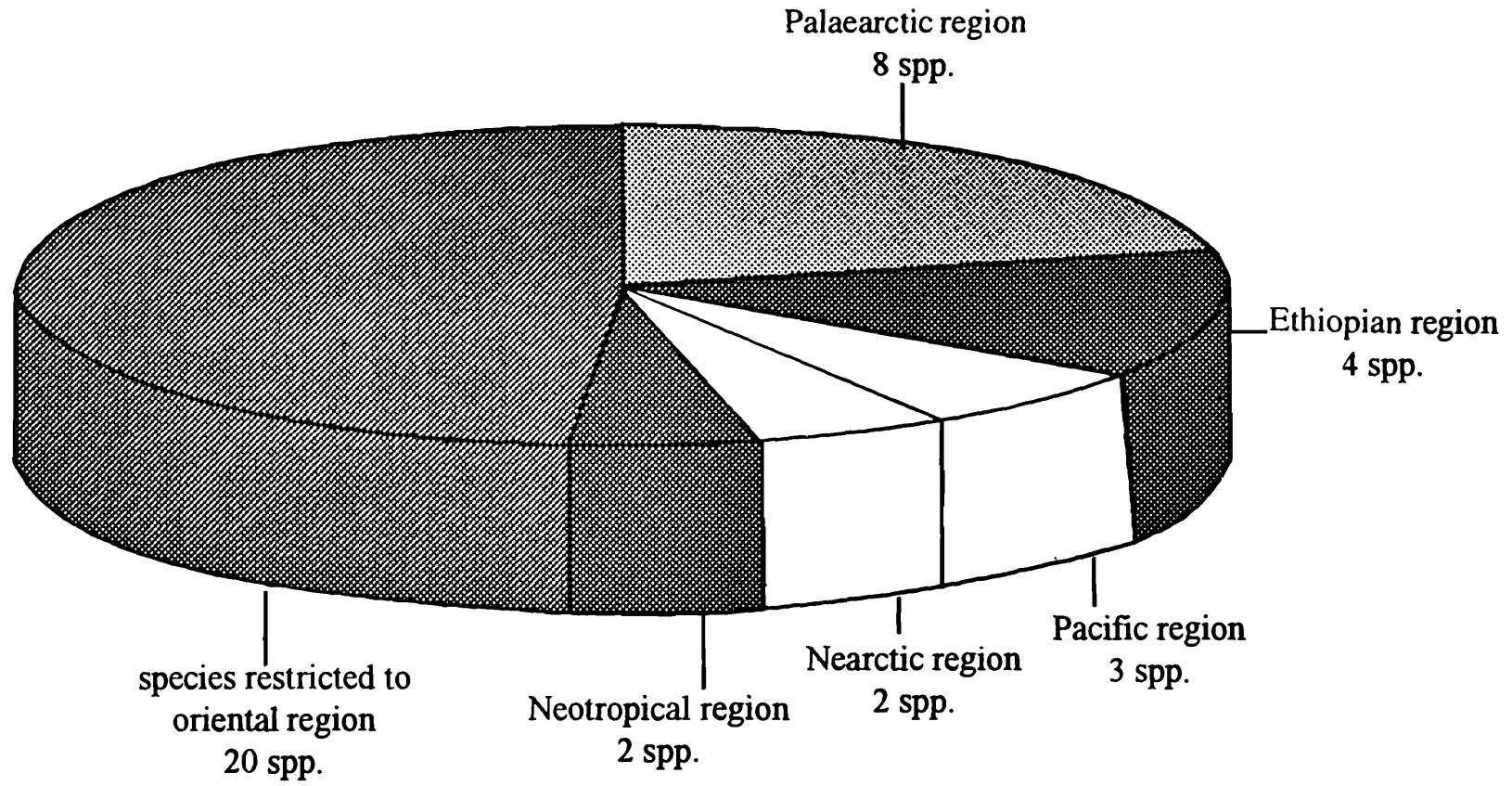


Fig. 1. Zoogeographical distribution of tick species of West Bengal.

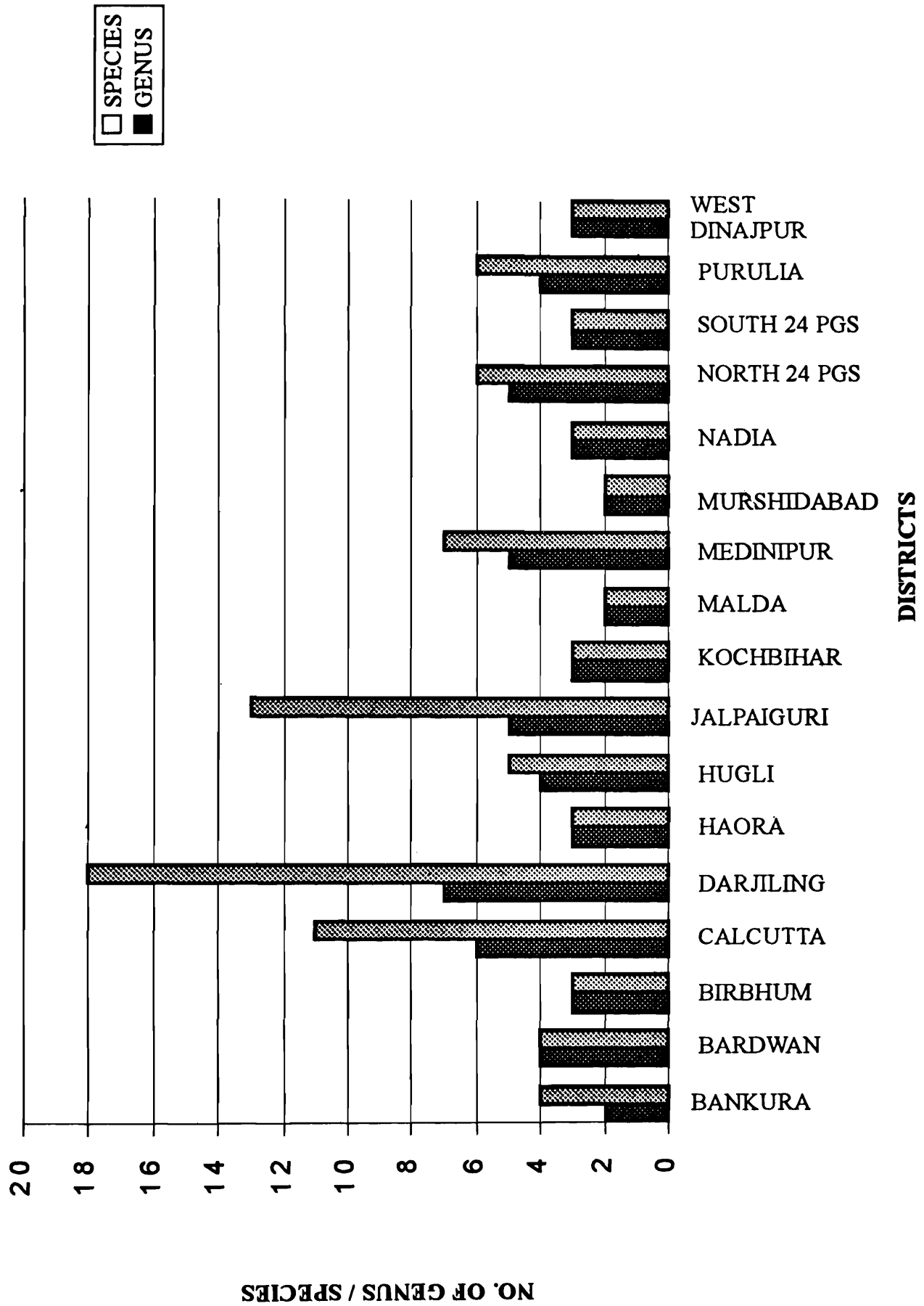


Fig. 2. District-wise distribution of ticks in West Bengal.

Table-II. Species of tick known from West Bengal with their hosts and distribution.

Sl. No.	Species	Hosts recorded in West Bengal	Distributed in India and elsewhere
1	<i>Amblyomma helvolum</i> Koch	<i>Geomyda grandis</i> , <i>Varanus sp.</i> , <i>Naja naja</i>	India : Andaman & Nicobar Islands, Orissa, West Bengal (Calcutta). Elsewhere : Australia, Indonesia, Malaysia, New Guinea, Philippines, Taiwan, Thailand, Singapore, Vietnam.
2	<i>Amblyomma javanense</i> (Supino)	<i>Manis pentadactyla</i> , <i>Nicoria tricarinata</i>	India : Bihar, Gujarat, Karnataka, Maharashtra, Orissa, Uttar Pradesh, West Bengal (Calcutta, Jalpaiguri). Elsewhere : Bangladesh, China, Indonesia, Malaysia, Myanmar, Pakistan, Philippines, Vietnam.
3	<i>Amblyomma supinoi</i> Neumann	<i>Testudo elongata</i> , <i>Geomyda spinosa</i>	India : West Bengal (Jalpaiguri). Elsewhere : Myanmar.
4	<i>Amblyomma testudinarium</i> Koch	Buffalo, tiger	India : Arunachal Pradesh, Assam, Karnataka, Maharashtra, Orissa, Sikkim, West Bengal (North 24-Parganas, Darjiling, Jalpaiguri). Elsewhere : Bangladesh, Indonesia, Japan, Malaysia, Myanmar, Philippines, Sri Lanka.
5	<i>Aponomma gervaisi</i> (Lucas)	<i>Naa tripudians</i> , <i>Varanus bengalensis</i>	India : Assam, Maharashtra, Manipur, Orissa, Uttar Pradesh, West Bengal (Calcutta). Elsewhere : Africa, Indonesia, Nepal, Pakistan, Sri Lanka.
6	<i>Aponomma varanensis</i> (Supino)	<i>Varanus salvator</i> , <i>Varanus nebulosus</i> , <i>Naia tripudians</i> , <i>Python molurus</i> , <i>Python reticulatus</i> , <i>Zamensis mucosus</i> , <i>Bos frontalis</i> , <i>Ovis nahura</i>	India : Andaman & Nicobar Islands, Assam, Bihar, Madhya Pradesh, Orissa, Uttar Pradesh, West Bengal (Calcutta, Bardhaman). Elsewhere : Bangladesh, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Singapore, Sri Lanka, Thailand, Vietnam.
7	<i>Boophilus microplus</i> (Canestrini)	Cattle	India : Andaman & Nicobar Islands, Assam, Bihar, Gujarat, Himachal Pradesh, Jammu & Kashmir, Maharashtra, Madhya Pradesh, Meghalaya, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal (all districts). Elsewhere : Africa, Australia, Central America, Formosa, Indonesia, Japan, Myanmar, New Guinea, Philippines, South America, Sri Lanka.
8	<i>Dermacentor auratus</i> Supino	Deer, Man	India : Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Bihar, Karnataka, Meghalaya, Orissa, Uttar Pradesh, West Bengal (Calcutta, Darjiling, Jalpaiguri, South 24-Parganas). Elsewhere : Indonesia, Myanmar, Sri Lanka.

Table-II. Contd.

Sl. No.	Species	Hosts recorded in West Bengal	Distributed in India and elsewhere
9	<i>Haemaphysalis aborensis</i> Warburton	Barking deer, <i>Parus monticulus</i> , <i>Gallus gallus murghi</i> , <i>Susscrofa cristatus</i> , vegetation	India : Arunachal Pradesh, Assam, Meghalaya, West Bengal (Darjiling, Jalpaiguri). Elsewhere : Laos, Mayanmar, Nepal, Thailand, Vietnam.
10	<i>Haemaphysalis aponommoides</i> Warburton	Cattle, Man, vegetation	India : Arunachal Pradesh, Sikkim, West Bengal (Calcutta, Darjiling). Elsewhere : China, Nepal, Formosa.
11	<i>Haemaphysalis birmaniae</i> Supino	<i>Muntiacus muntzak vaginalis</i> , <i>Capricornis sumatraensis thar</i> , <i>Antelope cervicapra</i>	India : Arunachal Pradesh, Assam, Uttar Pradesh, West Bengal (Darjiling). Elsewhere : Mayanmar, Nepal.
12	<i>Haemaphysalis bispinosa</i> Neumann	Cattle, dog, tiger, vegetation	India : Andaman & Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Gujarat, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Mizoram, Orissa, Punjab, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal (most of the districts). Elsewhere : Australia, China, New Zealand, Pakistan, Sri Lanka, Thailand.
13	<i>Haemaphysalis cornigera shimoga</i> Trapido and Hoogstraal	Sambar	India : Kerala, Karnataka, Meghalaya, West Bengal (Jalpaiguri). Elsewhere : Sri Lanka.
14	<i>Haemaphysalis darjeeling</i> Hoogstraal and Dhanda	<i>Capricornis sumatraensis</i> , <i>Susscrofa cristatus</i> , <i>Muntiacus muntzak vaginalis</i>	India : Assam, Manipur, West Bengal (Darjiling). Elsewhere : Malaysia, Mayanmar, Thailand.
15	<i>Haemaphysalis himalaya</i> Hoogstral	Barking deer	India : Himachal Pradesh, Uttar Pradesh, West Bengal (Darjiling). Elsewhere : Nepal.
16	<i>Haemaphysalis hystricis</i> Supino	Vegetation	India : Arunachal Pradesh, Assam, Uttar Pradesh, West Bengal (Darjiling, Jalpaiguri). Elsewhere : Japan (Okinawa Islands, Ryukyu Islands), Myanmar, Taiwan, Vietnam.
17	<i>Haemaphysalis indica</i> Warburton	Bengal fox, domestic dog, jackle	India : Bihar, Gujarat, Karnataka, Orissa, Uttar Pradesh, West Bengal (Calcutta, Hooghly). Elsewhere : Nepal, Pakistan, Sri Lanka.
18	<i>Haemaphysalis montgomeryi</i> Nuttall	Goat	India : Himachal Pradesh, Jammu and Kashmir, Punjab, Uttar Pradesh, West Bengal (Darjiling). Elsewhere : Nepal, Pakistan.

Table-II. Contd.

Sl. No.	Species	Hosts recorded in West Bengal	Distributed in India and elsewhere
19	<i>Haemaphysalis obesa</i> Larrousse	Cattle, vegetation	India : Meghalaya, West Bengal (Jalpaiguri). Elsewhere : Malaysia, Thailand, Vietnam.
20	<i>Haemaphysalis ramachandrai</i> Dhanda, Hoogstraal and Bhat	Cattle, vegetation	India : Himachal Pradesh, Sikkim, West Bengal (Darjiling, Jalpaiguri). Elsewhere : Nepal.
21	<i>Haemaphysalis spinigera</i> Neumann	Cattle, vegetation	India : Andaman & Nicobar Islands, Andhra Pradesh, Madhya Pradesh, Maharashtra, Karnataka, Kerala, Orissa, Tamil Nadu, West Bengal (Darjiling, Jalpaiguri). Elsewhere : Nepal, Sri Lanka.
22	<i>Hyalomma anatolicum anatolicum</i> Koch	Cattle	India : Andhra Pradesh, Assam, Chandigarh, Delhi, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal (most of the districts). Elsewhere : Afganisthan, Border of Mediterranean sea, Canary Islands, East Africa, Pakistan, Portugal, Russia, Southern Europe, West Asia.
23	<i>Hyalomma marginatum isaaci</i> Sharif	Cattle, goat	India : Andhra Pradesh, Arunachal Pradesh, Bihar, Delhi, Gujarat, Himachal Pradesh, Jammu and Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal (Bankura, Medinipur, Purulia). Elsewhere : Afganisthan, Nepal, Pakistan, Sri Lanka, West Asia.
24	<i>Hyalomma brevipunctata</i> Sharif	Cheeta, Sambar	India : Andhra Pradesh, Bihar, Delhi, Gujarat, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Orissa, Punjab, Tamil Nadu, Uttar Pradesh, West Bengal (Medinipur). Elsewhere : Pakistan.
25	<i>Hyalomma hussaini</i> Sharif	Cattle	India : Andhra Pradesh, Bihar, Delhi, Goa, Gujarat, Himachal Pradesh, Jammu and Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, West Bengal (North 24-Parganas). Elsewhere : Mayanmar, Pakistan.
26	<i>Ixodes acutitarsus</i> (Karsch)	Man	India : Arunachal Pradesh, Assam, Himachal Pradesh, Sikkim, Uttar Pradesh, West Bengal (Darjiling). Elsewhere : Formosa, Japan, Myanmar, Tibet.

Table-II. Contd.

Sl. No.	Species	Hosts recorded in West Bengal	Distributed in India and elsewhere
27	<i>Ixodes granulatus</i> Supino	<i>Epimys rufescens</i>	India : Arunachal Pradesh, Himachal Pradesh, Uttar Pradesh, West Bengal (Darjiling). Elsewhere : Indonesia, Malaysia, Myanmar.
28	<i>Ixodes ovatus</i> Neumann	Vegetation	India : Arunachal Pradesh, Himachal Pradesh, Jammu and Kashmir, Sikkim, Uttar Pradesh, West Bengal (Darjiling). Elsewhere : China, Formosa, Japan, Myanmar, Nepal, Taiwan, Thailand.
29	<i>Nosomma monstrosus</i> (Nuttall & Warburton)	Sambar	India : Bihar, Delhi, Goa, Jammu and Kashmir, Maharashtra, Orissa, Karnataka, Punjab, Uttar Pradesh, West Bengal (Medinipur). Elsewhere : Bangladesh, Laos.
30	<i>Rhipicephalus haemaphysaloides</i> Supino	Barking deer, cattle, goat, <i>Capricornis sumatraensis</i> , vegetation	India : Arunachal Pradesh, Assam, Bihar, Gujarat, Himachal Pradesh, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Mizoram, Orissa, Punjab, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal (Darjiling, Jalpaiguri, North 24 Parganas). Elsewhere : China, Indonesia, Myanmar, Sri Lanka, Taiwan, Thailand, Vietnam.
31	<i>Rhipicephalus sanguineus</i> (Latrielle)	Bullock, dog	India : Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Jammu and Kashmir, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal (Calcutta, Medinipur, Purulia). Elsewhere : Africa, America, Asia, Europe.
32	<i>Rhipicephalus turanicus</i> Pomerantzev	<i>Bandicota bengalensis</i> , cattle, dog, <i>Furnumbulus palmarum</i> , <i>Mus musculus</i> , <i>Rattus rattus</i> , <i>Suncus murimus</i>	India : Andhra Pradesh, Gujarat, Himachal Pradesh, Jammu and Kashmir, Madhya Pradesh, Maharashtra, Tamil Nadu, West Bengal (Calcutta, Hooghly, Nadia, Purulia). Elsewhere : China, Iran, Russia, Western Sudan, Countries bordering the Mediteranen sea.

SUMMARY

The study on tick fauna of West Bengal was initiated by Rudow (1870). Later many workers studied the taxonomy of ticks of the state and till date 9 genera and 32 species under the family Ixodidae are known from West Bengal. No argasid tick is known from the state. Ticks have been recorded from all the districts, in which Darjiling occupies highest position in number of species.

The tick species recorded from the state show maximum similarity in species composition with Palaearctic region (25%). *Amblyomma supinoi* is known only from West Bengal.

REFERENCES

- Linnaeus, C. 1758. *Systema naturae*. 1 : 823 pp.
- Neumann, L. G. 1911. Note rectificative a propose de deux especes d'Ixodinae. *Arch. Parasit.*, **14**(3) : 415.
- Rudow, F. 1870. Einige neue Ixoden. *Z. ges. Naturw.*, **35**. n.f. 1 : 14–20.
- Sanyal, A. K. and De, S. K. 1991. Acari : Metastigmata. *Animal Resources in India* (ed., Director, ZSI), Zoological Survey of India, pp 513–517.
- Sanyal, A. K. and De, S. K. 1992. Ixodid ticks (Acari : Ixodidae). *State Fauna Series 3 : Fauna of West Bengal part 3* : 17–60.
- Warburton, C. 1910. On two collections of Indian ticks. *Parasitology*. **3**(4) : 395–407.