Tick fauna of Baluran Wildlife Reserve, Indonesia

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SUMMARY

Thirteen species of ticks, both ixodids and argasids, from Baluran Wildlife Reserve, Indonesia, were collected between 1960 and 1975 from different hosts as well as from vegetation. Records of each species are provided with additional notes on its distribution, hosts association and other remarks relative to its occurence in Indonesia.

Designated as such in 1937, Baluran Wildlife Reserve has attracted many biologists to write on this interesting area. Many publications dealt with this reserve, but no one has ever reported on its tick fauna. The information of tick fauna is of medical and veterinary importance (Hoogstraal, 1966, 1967; Zumpt, 1959), while that of tick fauna of wildlife reserve is also of biological interests, because the areas and the fauna have remained relatively isolated and undisturbed (Dhanda & Rao, 1964).

This paper concerns with the study on tick fauna in Baluran Wildlife Reserve, based on results of surveys conducted between 1960–1975 by the team of the Muzeum Zoologicum Bogoriense (MZB) and on recorded ticks by other collectors.

DESCRIPTION OF THE AREA

Situated on the Eastern tip of Java Island, Baluran Wildlife Reserve includes the volcano Gunung Baluran (7°50'S, 114°22'E) and covers approximately 25.000 ha. of land (Fig. 1). The elevation is not higher than 50 m. above sea-level. The 800–900 mm. of its annual rainfall against the 2.400 mm. elsewhere in East Java, the lack of brooks and rivers, and the prevailing strong winds have greatly contributed to the steppelike character of the landscape. A distinct rainy season from January to March results in an explosive renewal of the vegetation. The vegetation is dominated by graminous plants and herbs such as *Andropogon caricosus, Echinochloa colona, Themeda frondosa, Ophiurus exalta,* with some scattered high trees and palms, such as *Tamarindus indicus, Albizzia lebbeckioides, Protium javanicum, Borassus flabellifer.* Banteng (*Bos javanicus*), wild buffalo *Bubalus bubalis),* kancil *(Tragulus javanicus),* panther *(Panthera tigris),* wild dog *(Cuon javanicus),* green pea fowl *(Gallus gallus varius)* and jungle fowl *(G.g. bankiva)* are some of the wild animals reported or thought still in existence among the inhabitants in Baluran (Pfeiffer, 1965; Sinaga, 1966; Schenkel, 1969; Hoogerwerf, 1974).

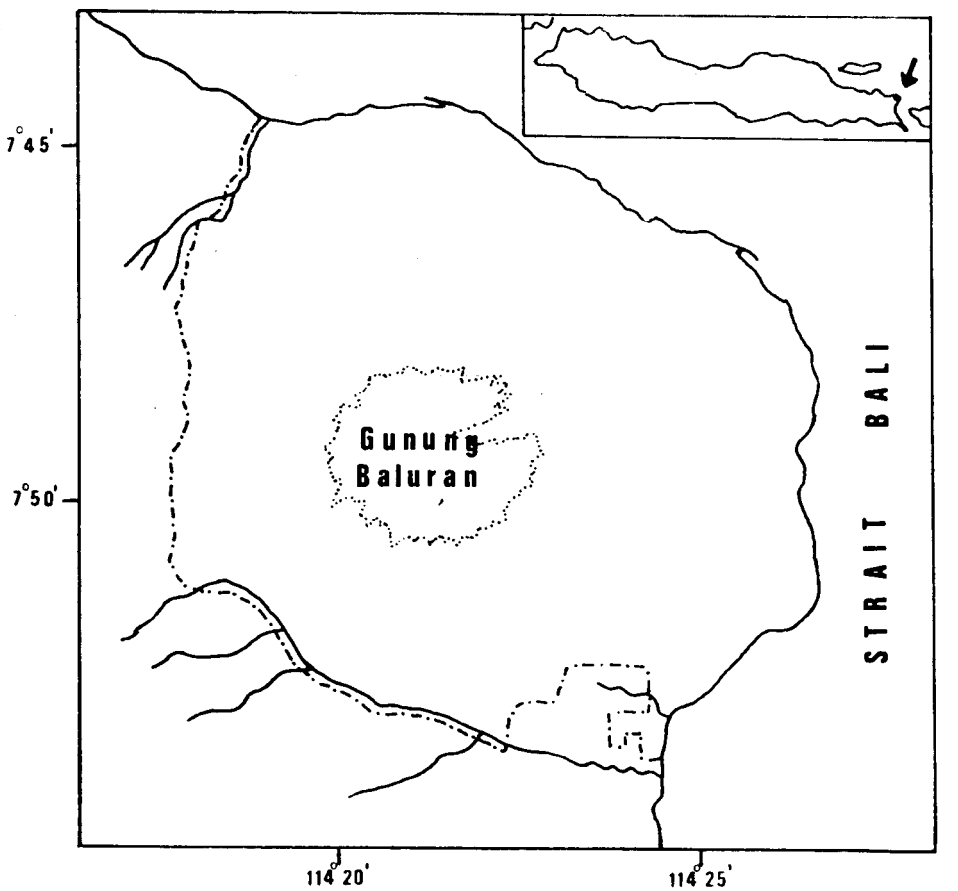

Fig. 1. Baluran Wildlife Reserve area on the Eastern tip of Java Island.

MATERIALS AND METHODS

During the surveys by the team of the Muzeum Zoologicum Bogoriense sweeping with a towel on a wooden bar onto surfaces of small vegetation was the main technique employed for collecting ticks in the field. The other technique was searching for ticks on the bodies of bats, birds and rats, having been captured by means of mist nets, and life-traps.

In addition to the informations collected during the surveys, other data on tick species in Baluran and the hosts were obtained from listed ticks at the muzeum Zoologicum Bogoriense.

RESULTS AND DISCUSSION

At present 13 species of ticks are recorded from Baluran Wildlife Reserve, collected from different host species as well as from vegetation. Each species is discussed according to its distribution and other important records relative to its occurence in Indonesia. Table 1 gives the summary of the ticks collected and the dates of collections.

Argas sp. : 2 LL off *Rousettus amplexicaudatus.*

Preliminary examination of these larvae disclosed that they are near to *Argas (Carious) vespertilionis* Latreille, and definitive identification is yet to be done.

Dermacentor atrosignatus Neuman, 1906 : 1 F by sweeping.

This species has a wide distribution in Indonesia. They have been collected from Kalimantan, Sulawesi, Sumatra and other parts of Java Island. Wild pigs, such as *Sus barbatus, S. scrofa milleri, S. S. vittatus* and *S. verrucosus* are the common hosts for the adults (MZB, unpubl. data).

Following controversy whether there are species other than *D. auratus* Supino in Indo-Malayan region (Neuman, 1901, 1906), studies on larval ixodid ticks of Indonesia by Kadarsan (1971), unveiled that at least 2 species of the genus *Dermacentor* occur in Indonesia, namely *D. atrosignatus* Neuman, and possibly a third species *D. auratus* Supino. These 3 species of *Dermacentor* are thought to be present in Southeast Asia.

Dermacentor compactus Neumen, 1901 : 1 F off *Sus cristatus.*

Like *D. atrosignatus, D. compactus* also has a wide distribution in Indonesia, wild pigs being the common hosts.

Dermacentor sp. : 1 L off *Rattus surifer.*

The exact identity of the specimen can not be determined.

Haemaphysalis cornigera Neuman, 1897: 10 MM, 7 FF and 1 N off.

Bos javanicus : 21 MM, 21 FF and 1 N off *Cervus unicolor equinus.*

1 N off *Rattus argentiventer;* 2 MM, 5 FF and 141 NN by sweeping.

This species is widely distributed throughout Indonesia and is known to occur in Southeast Asia (Anastos, 1950). Collection on other parts of Indonesia indicates that *H. cornigera* might be confined to forested lowland areas (Kadarsan, 1971). Recorded hosts are tiger, domestic and wild herbivores.

Haemaphysalis hylobatis Schulze, 1933 : 1 N off human; 4 NN and 17 LL off *Rattus niviventer;* 1 F, 1 M and 2 N by sweeping.

The first description of this species of Indonesia was made by Schulze (1933) from specimens collected from Sumatra off *Hylobates sundactylus.* Later on *H. hylobatis* has been found also in Java off human and by sweeping, in Sumatra off *Centropus* sp. (MZB, unpubl. data).

To our knowledge, the occurence of *H. hylobatis* outside Indonesia has not yet been reported.

Haemaphysalis hirsuta Hoogstraal, Trapido & Kohl, 1966 : 1 N by sweeping.

This species was described for the first time by Hoogstraal, Trapido & Kohls (1966) from specimens deposited in Muzeum of Comparative Zoology, Harvard University, which had been collected from Java off dog and pig. Further collection works made by the MZB in Sumatra and Java, resulted only in adults and nympha. They were collected almost by sweeping and off *Sus scrofa milleri*. No report has yet been made on the occurence of *H. hirsuta* outside Indonesia.

Haemaphysalis renschi Schulze, 1933 : 1 M and 1 F off *Bos javanicus;* 10 MM, 12 FF and 2 NN off *Cervus unicolor equinus*.

As a native Indonesian tick, the first identification of this species was done by Schulze (1933). Later it was redescribed by Hoogstraal & Anastos (1968), who also gave the distribution, hosts and both medical and economic importance. It has been recorded from Sumatra, Java, Karimunjawa and Komodo Island off wild pigs and large herbivores.

Haemaphysalis wellingtoni Nuttal & Warburton, 1908 : 7 M off *Gallus gallus bankiva;* 2 FF off *Copsychus saularis;* 1 F by sweeping.

This species is widely distributed in the Orient (Anastos, 1950; Hoogstraal *et al.*, 1969). In Indonesia it has been collected from Sumatra, Java, Kalimantan, Madura, Mentawai and Natuna Island. Attacking mammals, *H. willingtoni* is usually a parasite of fowl-like birds.

Ixodes sp. : 1 N off *Rattus exulans*.

Although there are 4 species of the genus *Ixodes* to occur in Indonesia, namely *I. granulatus* Supino, *I. kopsteini* Oudemans, *I. spinicoxalis* Neuman and *I. werneri* Kohls, the identification of the specimen is still doubtful.

Ornithodoros collocaliae Hoogstraal, Kadarsan, Kaiser & Van Peenen, 1974 : 46 MM, 37 FF and 4 NN off broken nests of *Collocalia esculenta linohi*.

As a new species, the description was done and reported for the first time by Hoogstraal *et al.* (1974) from specimens mentioned above. That is the only report available on *Ornithodoros* of Indonesia. So far the species has also been recorded from Pelabuhan Ratu, West Java.

Rhipicephalus pilans Schulze, 1935 : 19 NN and 4 LL off *Rattus argentiventer;* 6 NN and 3 LL off *R. exulans;* 1 N and 1 L off *R. niviventer;* hundreds of MM and FF by sweeping.

The species is restrictedly distributed to Southern and Eastern parts of the Oriental region. It is a common parasite of large wild and domestic animals. In Indonesia, it has been recorded from Java, Bawean, Alor, Sumatra, Kalimantan, Sumbawa, Sumba, Komodo, Flores, Sawu, Roti, Sulawesi and Timor Islands (Anastos, 1950; Krijgsman & Ponto,

Table 1. List of ticks collected between 1960–1975 from Baluran Wildlife Reserve, Indonesia

No.	Species of tick	Stage and number				Date	Host
		M	F	N	L		
1.	*Argas* sp.	–	–	–	2	28 Sept. 1971	*Rousettus amplexicaudatus*
2.	*Dermacentor atrosignatus*	–	1	–	–	28 May 1974	Sweeping
3.	*Dermacentor compactus*	–	1	–	–	13 July 1960	*Sus cristatus*
4.	*Dermacentor* sp.	–	–	–	1	28 Sept. 1971	*Rattus surifer*
5.	*Haemaphysalis cornigera*	31	28	2	–	10–13 July 1960	*Bos javanicus, Cervus unicolor equinus*
		–	4	128	–	5–12 Sept. 1968	Sweeping
		1	–	13	–	8–9 June 1969	Sweeping
		–	–	1	–	29 Sept. 1971	*Rattus argentiventer*
		1	1	–	–	10–11 Aug. 1972	Sweeping
6.	*Haemaphysalis hylobatis*	1	1	7	17	25–28 Sept. 1971	*Rattus niviventer*, human, sweeping
7.	*Haemaphysalis hirsuta*	–	–	1	–	8 June 1969	Sweeping
8.	*Haemaphysalis renschi*	11	13	1	–	10–13 July 1960	*Bos javanicus, Cervus unicolor equinus*
		–	–	1	–	19 Dec. 1974	*Cervus unicolor equinus*

9.	*Haemaphysalis wellingtoni*	–	1	–	–	7 Sept. 1968	Sweeping
		7	–	–	–	19 Dec. 1974	*Gallus gallus bankiva*
		–	2	–	–	24 May 1975	*Copsychus saluaris*
10.	*Ixodes* sp.	–	–	1	–	26 Sept. 1971	*Rattus exulans*
11.	*Ornithodoros collocaliae*	46	37	4	–	10 Aug. 1972	Broken nests of *Collocalia esculenta linchi*
12.	*Rhipicephalus pilans*	7	13	–	–	5–9 Sept. 1968	Sweeping
		6	14	–	–	9 June 1969	Sweeping
		9	4	23	8	23–29 Sept. 1971	*Rattus argentiventer, R. exulans, R. niviventer,* sweeping
		2	2	–	–	10 Aug. 1972	Sweeping
		x	x	3	–	22–30 May 1975	*Rattus argentiventer,* human sweeping
13.	*Rhipicephalus sanguineus*	y	y	–	–	22–30 May 1975	Sweeping

M=Male; F=Female; N=Nymph; L=Larva; x=Hundreds; y=Tenths.

1931, 1932; Schulze, 1936; Kadarsan, 1971).

Rhipicephalus sanguineus Latreille, 1806: Tenths of MM and FF by sweeping.

Wellknown as a cosmopolitan tick, this species has been recorded in Indonesia from Sumatra, Java, Sulawesi, Bali, Alor, Ambon, Sumba, Timor and Madura Islands (Krijgsman & Ponto, 1931, 1932; Anastos, 1950). The common hosts are dogs, but it parasitizes also wild pigs, goats, cattle, *Bos javanicus, Bubalus bubalis, Cervus unicolor equinus* and even chicken.

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RINGKASAN

Dilaporkan sebanyak 13 jenis caplak, Ixodidae dan Argasidae, dari daerah Suaka Margasatwa Baluran, Jawa Timur. Catatan tersebut diperoleh dari hasil kerja koleksi pada serangkaian survai fauna-caplak di antara tahun 1960–1975 oleh tim Museum Zoologicum Bogoriense dan kolektor-kolektor lainnya. Keterangan untuk setiap jenis dilengkapi dengan data daerah penyebarannya di Indonesia, keanekaragaman induk semang dan hal-hal penting lainnya.

REFERENCES

Anastos, G. 1950. The scutate ticks, or Ixodidae of Indonesia. **Entomol. Am.** 30 : 1–144.

Dhanda, V. and T.R. Rao. 1964. A report on a collection of ixodid ticks in the North East Frontier Agency, India. **Ind. J. Med. Res.**, 52 : 1–15.

Hoogerwerf, A. 1974. **Report on a visit to wildlife reserves in East Java, Indonesia.** Medel. No. 21, Ned. Comm. Intern. Natuurbescherm., Austerlitz, Holland. 51 pp.

Hoogstraal, H. 1966. Ticks in relation to human diseases caused by viruses. **Ann. Rev. Entomol.** 11 : 261–308.

Hoogstraal, H. 1967. Ticks in relation to human diseases caused by **Rickettsia** species. **Ann. Rev. Entomol.** 12 : 377–420.

Hoogstraal, H., H. Trapido and G.M. Kohls. 1966. Studies on Southeast Asian **Haemaphysalis** ticks (Ixodoidea, Ixodidae) speciation in the **H. (Kaiseriana) obesa** group, **H. semermis** Neum, **H. obesa** Lar., **H. roubandi** Toum., H. montgomeryi Nut., and **H. hirsuta** sp.n. **J. Parasitol.** 52 : 169–191.

Hoogstraal, H. and G. Anastos. 1968. Studies on Southeast Asian **Haemaphysalis** ticks (Ixodiodea, Ixodidae). Redescription of **H. (Kaiseriana) renschi** Schulze (resurrected), and its hosts and distribution in Indonesia. **J. Parasitol.** 54 : 1214–1222.

Hoogstraal, H., B.L. Lim and G. Anastos. 1969. **Haemaphysalis (Kaiseriana) bispinosa** Neuman (Ixodoidea, Ixodidae) evidence for consideration as an introduced species in

the Malay Peninsula and Borneo. **J. Parasitol.** 55 : 1075 – 1077.

Hoogstraal, H., S. Kadarsan, M.N. Kaiser and P.F.D. Van Peenen. 1974. **Ornithodoros (Alectorobius) collocaliae,** new species (Ixodoidea : Argasidae), parasitizing cave swiftlets (Aves : Apodidae) in Java. **Ann. Entomol. Soc. Amer.** 67 : 224 – 230.

Kadarsan, S. 1971. **Larval ixodid ticks in Indonesia (Acarina : Ixodidae).** Ph.D. thesis, Fac. Grad. School. Univ. Maryland, USA.

Krijgsman, B.J. and S.A.S. Ponto. 1931. Die verbreitung der Zecken in Niederlandisch Ostindien. **Z. Parasitenk.** 4 : 140 – 146.

Krijgsman, B.J. and S.A.S. Ponto 1932. De teken van den Oost-Indischen Archipel. **Veearts. Med. Dep. Landbouw Ned. Ind.** 79 : 1 – 62.

Neuman, L.G. 1901. Revision de la familie des Ixodides. Mem. Soc. **Zool. Er.** 14 : 249 – 372.

Neuman, L.G. 1906. Notes sur les Ixodides. IV. **Arch. Parasitol.** 10 : 195 – 219.

Schenkel, R. 1969. **Progress report on WWF-Projects,** No. 22. World Wildlife Fund, Morges.

Pfeiffer, P. 1965. Esquisse ecologique de la Reserve de Baluran (Java Est). **La Terre et la Vie.** 3 : 199 – 215.

Schulze, P. 1933. Ixodiden der Deutschen Limnologischen Sunda-Expedition. **Arch. Hydrobiol.,** Supp. Bd. XII. **Trop. Binnengew.** Bd. IV : 490 – 503.

Schulze, P. 1936. Zwei neue **Rhipicephalus** und eine neue **Haemaphysalis** nebst bemerkungen uber Zeckenarten aus verschiedenen Gattungen. **Z. Parasitenk.** 7 : 167 – 171.

Sinaga, W. 1966. The Baluran Games Reserves. **Rimba Indonesia,** Th. XI : 21.

Zumpt, F. 1959. A preliminary survey of the distribution and host specificity of ticks (Ixodoidea) in the Bechuana land protectorate. **Bull. Entomol. Res.** 59 : 201 – 223.