

## A human case of tick bite by *Ixodes persulcatus*

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**Abstract:** The first case of tick bite by *Ixodes persulcatus* in Korea is reported. The tick was found on the skin of right lower axilla region of a 60-year-old woman.

**Key words:** *Ixodes persulcatus*, tick bite, Korea

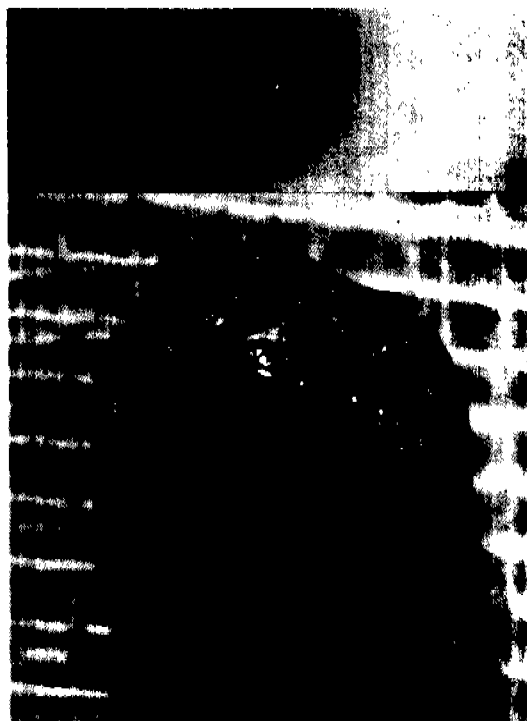
Ticks are widely known as reservoirs and vectors of infectious and parasitic diseases. They are part of two major families belonging to the order Ixodida in Korea: the Ixodidae, including 26 species in 6 genera, and the Argasidae, including 3 species in one genera. The most common species causing tick bites are *Ixodes* sp., *I. nipponensis*, *I. ovatus*, and *Hamaphysalis flava*. *Ixodes nipponensis* was the most common causative species of ticks responsible for tick bites (Cho *et al.*, 1995). We found a tick from the patient and report here its morphological characteristics.

In July 1995, a 60-year-old woman first noted the pruritic small nodule of bean size attached on the right lower axilla area after going out for a walk on a hill near her house in Seoul. As the black particle became gradually bigger accompanied by increasing pain, the patient visited a physician for a check up 3 weeks later.

By physical examination, a tick with 5.40 × 3.30 mm in size was recognized on the erythematous skin of right lower axilla (3 × 1 cm in size). On observation a bean-like worm with several black thread-like legs adhered closely to the skin (Fig. 1).

Laboratory examinations after the tick bite were normal or negative for the following tests:

hemoglobin 13.6 g/dl, hematocrit 42.9%, white blood cells 5,700/mm<sup>3</sup> (neutrophil 51%, lymphocyte 41%, monocyte 4.9%, eosinophil 1.9%), erythrocyte sedimentation rate 6



**Fig. 1.** A tick is attached firmly on skin of right axillary region surrounded by the erythematous lesion (upper). Tick is engorged with blood meal (lower).

• Received 15 July 1997, accepted after revision 19 December 1997.

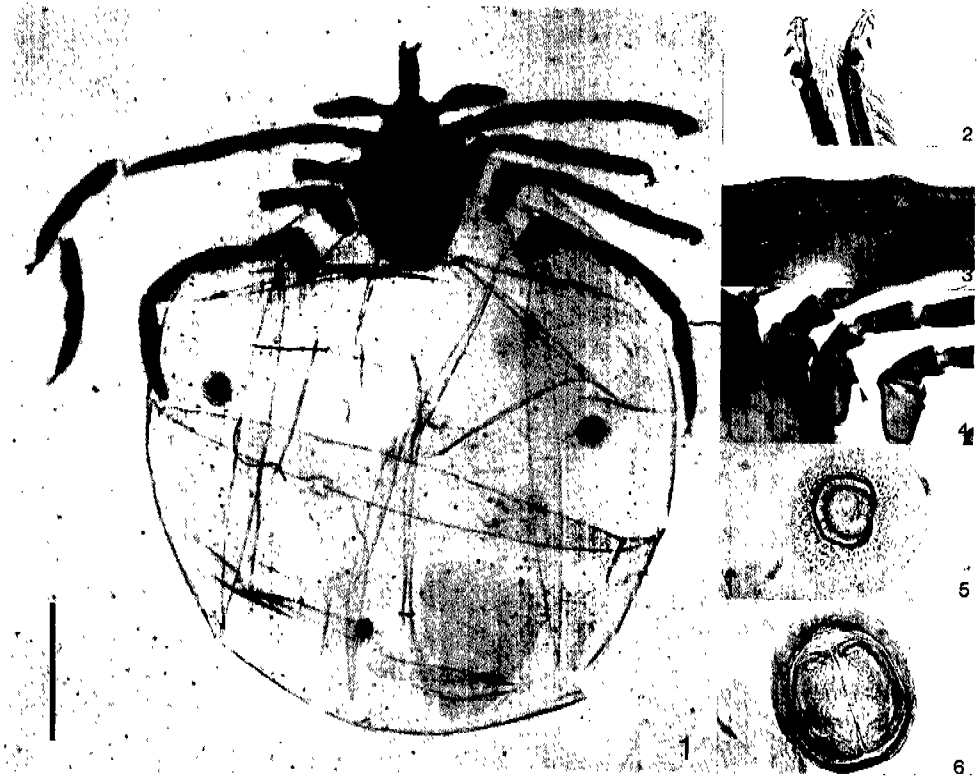
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mm/hr, serum glutamicoxaloacetic transaminase 12 units, serum glutamic pyruvic transaminase 11 units, cholesterol 221 mg/dl. But eosinophil count was 110/ $\mu$ l.

Morphological characteristics of the tick specimen is as follows: The capitulum consists of the basis capituli, the paired 2-segmented chelicerae and hypostome (Fig. 2-1). Situated dorsal to the hypostome are the 2-segmented cheliceral digits, relatively massive, short structures which bear laterally directed cutting edges. Both digits have sharp denticles. The hypostome was blunt at the tip (Fig. 2-2). A complex sensory apparatus, Haller's organ, is present on the dorsal surface of the tarsus of leg I (Fig. 2-3). The coxa of the first leg (coxa I) had internal spur and external spurs. The coxa I possessed a pair of spurs of which the internal spur was very much larger than the external spur, pointed sharply, and extending long to overlap some parts of the coxa II. Internal spurs are absent on coxae of the second, third, and fourth legs (Fig. 2-4).

The spiracular plates are prominent ovoid-shape structures located on the ventro-lateral surface posterior to the coxa of leg IV. Within the plate itself are numerous small circular structures, the goblets, which appear as depressions or cavities (Fig. 2-5). The anal apertures take ovoid shape and anal valve is simple (Fig. 2-6). Postscutal setae are needle-shaped, with a sharp tail. The genital aperture undeveloped. This specimen was identified to be a nymphal stage of *I. persulcatus* (Pomerantzev, 1959; Yamaguti *et al.*, 1971; Kang *et al.*, 1985; Kang and Jang, 1985).

*Ixodes persulcatus* occurs in a broad band across eastern Europe and through Asia to the islands of Japan (Anderson, 1989). The geographical distribution of *I. persulcatus* in Korea was reported to be confirmed to eastern areas of the highland in Kangwon-do (Kang *et al.*, 1985; Shim *et al.*, 1994). Many cases of tick bites on humans have been reported in Korea. The incidence and causative species are different depending on the geographic areas.



**Fig. 2.** Morphological characteristics of *Ixodes persulcatus* nymph. 1. Whole body. 2. Hypostome. 3. Tarsus I of leg. 4. Internal and external spur. 5. Spicular plate. 6. Anus. Bar = 1 mm.

The most frequent location was the scalp and other locations were the axilla, leg, trunk, and genital area (Cho *et al.*, 1995). The ticks infest human most frequently during spring (March) and autumn (October). This pattern depends on the tick (nymphs and adults) activity in nature.

Recently medical attention has been paid to tick bites mainly because they transmit *Borrelia burgdorferi*, the causative spirochete of Lyme disease. In Russia, *I. persulcatus* is the main vector of tick-borne encephalitis virus and *B. burgdorferi*, the etiologic spirochete of Lyme borreliosis (Korenberg, 1994). In China and Japan, *I. persulcatus* has been suspected as the vector of Lyme disease (Kawabata *et al.*, 1987; Ai *et al.*, 1988). In Korea, there has been no confirmed case of Lyme disease yet, but *B. burgdorferi* was isolated recently from the tick (Kee *et al.*, 1994; Park *et al.*, 1994; Shim *et al.*, 1994).

#### REFERENCES

- Ai C, Wen Y, Zhang Y, *et al.* (1988) Clinical manifestations and epidemiological characteristics of Lyme disease in Hailin Country, Heilongjiang Province, China. *Ann New York Acad Sci* **539**: 302-313.
- Anderson JF (1989) Epizootiology of *Borrelia* in *Ixodes* tick vectors and reservoir hosts. *Rev Infect Dis* **11**: S1451-S1459.
- Cho BK, Nam HW, Cho SY, Lee WK (1995) A case of tick bite by a spontaneously retreated *Ixodes nipponensis*. *Korean J Parasitol* **33**: 239-242.
- Kang YB, Jang DH (1985) A description with scanning electron microscopy on the tick *Ixodes persulcatus* (Schulze, 1930) male and female specimens. *Korean J Parasitol* **23**: 305-312.
- Kang YB, Jang DH, Cho JG (1985) *Ixodes persulcas* (Schulze 1930): Redescription and collection records in the Republic of Korea. *Seoul Univ J Vet Sci* **10**: 187-201 (in Korean).
- Kawabata M, Baba S, Iguchi K, *et al.* (1987) Lyme disease in Japan and its possible incriminated tick vector, *Ixodes persulcatus*. *J Infect Dis* **156**: 854.
- Kee SH, Hwang KJ, Oh HB, *et al.* (1994) Isolation and identification of *Borrelia burgdorferi* in Korea. *J Korean Soc Microbiol* **29**: 301-310.
- Korenberg EI (1994) Comparative ecology and epidemiology of Lyme disease and tick-borne encephalitis in the Former Soviet Union. *Parasitol Today* **10**: 157-160.
- Park KH, Hanh MJ, Lee SH, *et al.* (1994) Isolation and antigenic identification of *Borrelia burgdorferi* from ticks in Korea. *J Korean Soc Microbiol* **29**: 607-617 (in Korean).
- Pomerantzev BI (1959) Fauna of U.S.S.R. arachnida, Ixodid ticks (Ixodidae). *Am Inst Biol Sci Vol.* **IV(2)**: 38-43.
- Shim JC, Yoon YH, Cho YB, *et al.* (1994) Studies on the potential vector of ticks (Ixodidae) in transmitting of Lyme disease (*Borrelia burgdorferi*) (III). *Rep NIH Korea* **31**: 149-155 (in Korean).
- Yamaguti N, Tipton VJ, Keegan HL, Toshioka S (1971) Ticks of Japan, Korea and the Ryukyu Islands. *Brigham Young Univ Sci Bull Biol Ser* **15**: 142-148.

= 초록 =

### 산림참진드기 (*Ixodes persulcatus*)에 의한 인체교상

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연세대학교 의과대학 기생충학교실, 열대의학연구소<sup>1)</sup> 및 일반의과학교실<sup>2)</sup>

1995년 7월에 60세 여자의 오른쪽 겨드랑이 피부에 기생한 진드기는 산림참진드기 (*Ixodes persulcatus*)의 약충으로 동정되었다. 한국에서 보고된 증례의 대부분이 일본참진드기 (*I. nipponensis*)에 의한 것이며, 산림참진드기에 의한 피부교상 증례는 처음인 것으로 사료된다.

(기생충학잡지 36(1): 63-65, 1998년 3월)