

**A record of morphological anomalies in the tick *Dermacentor nuttalli* Olenov (Acari: Ixodidae)**

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**Abstract:** A previously undescribed malformed half-engorged female *Dermacentor nuttalli* was noticed in our tick specimen collection. This tick exhibited abnormal legs compared with normal *D. nuttalli* ticks. The first leg on the right side and the third leg on the left side were much smaller than normal ticks, and reduced to a small and degenerated appendix, respectively. Both of their pulvillus and claws were absent.

**Key Words:** ticks, morphological anomalies, *Dermacentor nuttalli*

Malformed species is of great importance in systematic and taxonomic studies. Although morphological anomalies in ticks occur at relatively low frequencies in nature, many cases of tick malformations have been reported in scientific literatures (Neumann 1899, Feldman-Muhsam 1950, Latif et al. 1988, Estrada-Pena 2000, Dergousoff and Chilton 2007, Keskin et al. 2012, Nowak-Chmura 2012, Chen et al., 2015). There are various teratological changes in ticks, including gynandromorph (chimeric individuals simultaneously possess male and female characteristics), body asymmetry, structural deformities of idiosoma and appendages. More than 80 cases of malformed ticks have been documented in the family Ixodidae, while only 7 cases of 6 species in the genus *Dermacentor*, namely *D. marginatus*, *D. niveus*, *D. pictus*, *D. occidentalis*, *D. andersoni* and *D. atrosignatus* (Robinson 1920, Campana-Rouget 1959, Oliver and Delfin 1967, Homsher and Yunker 1981, Dergousoff and Chilton 2007). In this study, a female

morphological anomaly in ticks was described.

### **Materials and methods**

The abnormal half-engorged *D. nuttalli* described here was collected from naturally infested sheep in Heilongjiang province, Northeast China in 1959, and was placed in a glass vial containing 75% ethanol. The external morphology of this specimen was photographed under a Keyence VHX 600 digital microscope.

### **Results**

The scutum of the abnormal female tick was 2.02 mm in length and 1.85 mm in width, and the capitulum was 0.59 mm in length and 0.72 mm in width. Except for legs, this tick specimen seemed normal in dorsal and ventral views (Fig. 1A and 1B), and was similar to other *D. nuttalli* ticks. The first leg on the right side and the third leg on the left side were much smaller than normal ticks, and their tarsi were reduced to small and degenerated appendixes. Both of their pulvillus and claws were absent (Fig. 2A and 2B).

### **Discussion**

*D. nuttalli* is widely distributed in Russia, Mongolia and north of China (Teng and Jiang 1991, Chen et al. 2010). Numerous adult ticks have been identified by many acarologists up to date, but there have been seldom such reports of morphological anomalies in the tick *D. nuttalli*. Thus, it appears that abnormal *D. nuttalli* is rare. Similar cases have been described in other tick species, including *D. andersoni* with seven legs, *Hyalomma savignyi* (Gervais) which is a synonym of *Hyalomma anatolicum* Koch, with four abnormal tarsi (Dergousoff & Chilton 2007;

Feldman-Muhsam 1950). However, different from other morphological abnormal cases, this case reported here had eight legs, but two of them were small in size and had two abnormal tarsi. Additionally, many reported abnormal ticks were found in the laboratory population, and may be due to the inbreeding. This case was reported from the field which was different from the most reported cases, thus further researches should be carried to reveal the mechanism.

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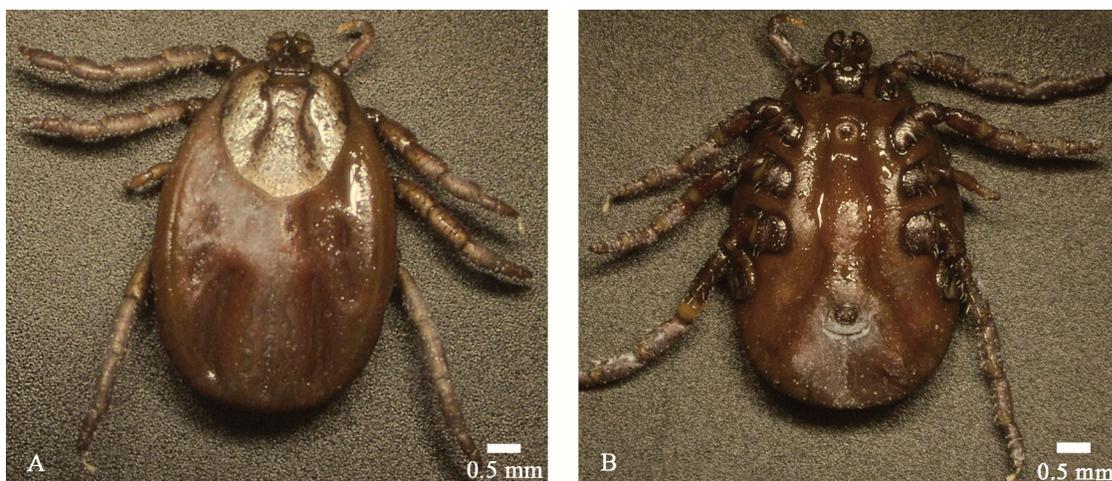


Figure 1. Abnormal half-engorged *Dermacentor nuttalli*. A, Dorsal view; B, Ventral view.

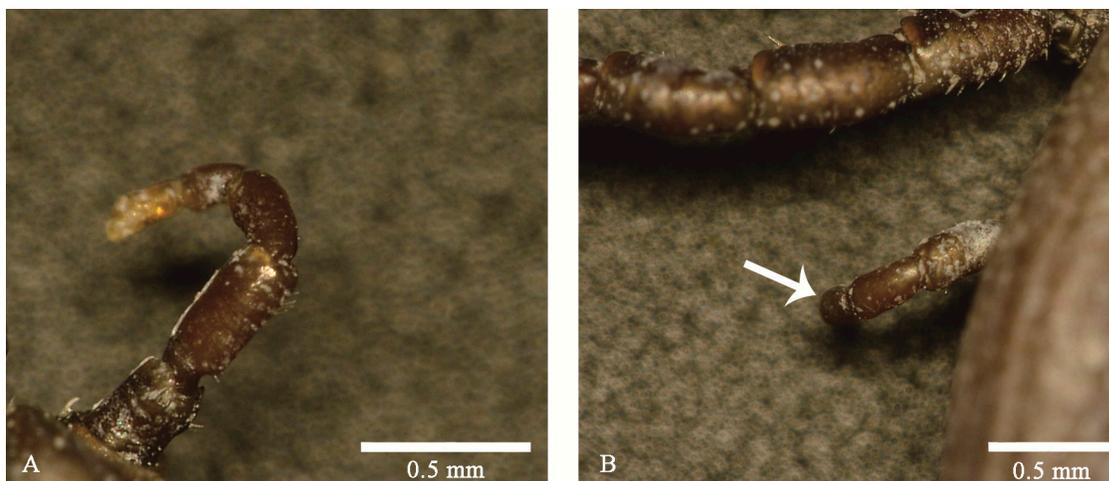


Figure 2. Abnormal legs of *Dermacentor nuttalli*. A, First leg on the right side; B, Third leg on the left side, as shown by the arrow.