Systematic & Applied Acarology 19(2): 253–256. http://dx.doi.org/10.11158/saa.19.2.17 ISSN 1362-1971

http://zoobank.org/urn:lsid:zoobank.org:pub:B7967D0D-EF06-427B-B92A-7A663FCBF066

Article

Variability in ornamentation of adult *Dermacentor parumapertus* Neumann (Acari: Ixodidae): implications for tick identification

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Abstract

The hard tick *Dermacentor parumapertus* is an ectoparasite commonly found on hares and rabbits and occurs over much of the western United States. These ticks are rarely encountered except by hunters or scientists collecting rabbits for study. Herein we describe 74 adult *D. parumapertus* ticks (21F, 53M) removed from 8 black-tailed jackrabbits, *Lepus californicus*, in central Utah, and 13 adult *D. parumapertus* (7F, 6M) found on 4 *L. californicus* in western Texas. The Utah ticks were barely ornamented. Females displayed only slight gray ornamentation near the posterior edge of the scutum and whitish-gray spots distally on the femur of legs II, III, and IV; males were completely devoid of any ornamentation. In contrast, Texas specimens were richly ornamented in white, closely resembling *D. variabilis*. Females were brightly marked with white (not gray) on the scutum and had white spots distally on all femurs. Males from Texas were variously ornamented along the posterolateral margins of the scutum and displayed white spots distally on all femurs. Documentation of this variability in ornamentation in *D. parumapertus* is important, particularly as white-marked specimens can easily be confused with *D. variabilis* and since both species have been reported from rabbit hosts.

Key words: *Dermacentor parumapertus*, sampling, identification, ornamentation, Utah, Texas

Introduction

The hard tick *Dermacentor parumapertus* Neumann (Acari: Ixodidae) occurs throughout much of the Great Basin of the western United States. Adults are relatively host-specific and commonly found on hares and rabbits, particularly the black-tailed jackrabbit, *Lepus californicus* Gray. For this reason, these ticks are rarely encountered except by hunters or scientists collecting rabbits for study. Records of *D. parumapertus* are relatively scarce and little information is available about their taxonomy, biology, and ecology beyond the work conducted in the first half of the 20th Century (Hooker *et al.* 1912, McCampbell 1926, Cooley 1938, Fremling & Gastfriend 1955). Historically, a "variety" of *D. parumapertus* called *D. parumapertus* var. *marginatus* was reported based primarily on abundant white ornamentation on a few specimens taken from California, New Mexico, and Texas (Banks 1908, Cooley 1938, Arthur 1960). This is in contrast to gray ornamentation on most *D. parumapertus* specimens (Cooley 1938). Contemporary tick taxonomists no longer consider *D. parumapertus* var. *marginatus* as a *bona fide* variety of *D. parumapertus.*

This present study, part of a broader tick-borne disease survey, was initiated to sample ticks from *L. californicus* at two locations, one almost in the center of *D. parumapertus* geographic distribution (central Utah), and the other at the far eastern edge of its distribution (western Texas). Here we report wide variability in ornamentation among specimens collected from the two sites, including specimens displaying the white ornamentation of the previously named variety *marginatus*, which closely resembles specimens of *D. variabilis*.

Methods

Most historic reports of *D. parumapertus* have resulted from ticks procured from jackrabbits in the western U.S. Therefore, our collections were focused on a remote region of central Utah approximately 113 km southwest of Salt Lake City and 34 km from the nearest populated area. *Dermacentor parumapertus* are almost never obtained any other way except by sampling jackrabbits; therefore, appropriate institutional and state permissions were obtained to collect rabbits by rifle or shotgun (animal protocol number 2532). Rabbits were examined immediately, and any specimens of *D. parumapertus* removed by forceps and placed into 70% ethanol. In addition to the Utah jackrabbit survey, arrangements were made to receive *D. parumapertus* specimens from a wildlife survey (jackrabbits) conducted by the Texas Department of Parks, Wildlife, and Fish, at Black Gap Wildlife Management Area, near Alpine in western Texas. In that case, ticks were also removed from jackrabbits and shipped to the authors. At both locations all tick collections were made between July 8 and July 16, 2013. Back at the lab, ticks were carefully examined, identified to species (Arthur 1960), photographed, and notes/drawings made as to any ornamentation on the scutum, capitulum, or legs. One male/female pair from each of the two collection sites was sent to Dr. Richard G. Robbins (Armed Forces Pest Management Board, Washington, D.C.) for confirmation.

Results and Discussion

Seventy-four adult *D. parumapertus* ticks (21F, 53M) were removed from 8 black-tailed jackrabbits in central Utah, while 13 adult *D. parumapertus* (7F, 6M) were found on 4 jackrabbits in western Texas. Three of the Utah rabbits had no ticks on them, while others were heavily parasitized. Ticks were primarily found in the ears and on the head. As for ornamentation, the Utah specimens were barely ornamented. Females displayed only slight gray ornamentation near the posterior edge of the scutum and small spots of whitish-gray distally on the femurs of legs II, III, and IV; males were completely devoid of any ornamentation (Fig. 1). The description of female *D. parumapertus* ornamentation in Arthur's monograph (Fig. 2) almost exactly matches the pattern we observed in the Utah samples (Arthur 1960). In contrast, Texas specimens were richly ornamented in white. Females were brightly marked with white (not gray) on the scutum very similar to *D. variabilis* (Fig. 3), and had white spots distally on all femurs. Males from Texas were variously ornamented along the posterolateral margins of the scutum and displayed white spots distally on all femurs.

FIGURE 1. Scant gray ornamentation seen on Utah specimens of *Dermacentor parumapertus*.

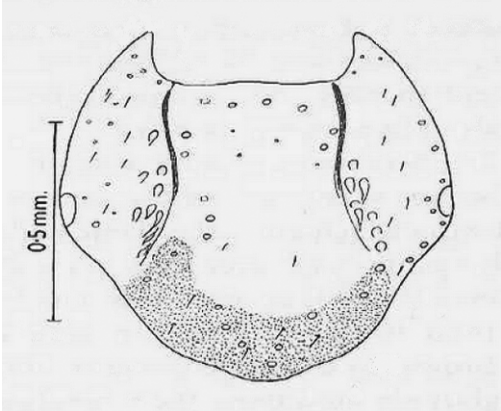

FIGURE 2. Drawing of ornamentation on female *Dermacentor parumapertus* scutum (from Arthur 1960).

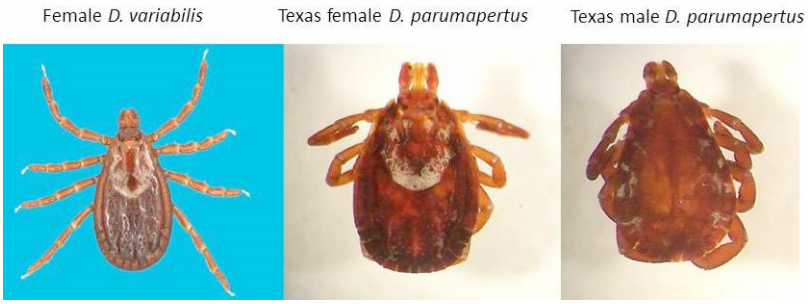

FIGURE 3. Abundant white ornamentation seen on Texas specimens of *Dermacentor parumapertus* and the similarity with *D. variabilis*.

Knowledge of this wide variability in ornamentation in *D. parumapertus* is important, and not just for the sake of studies in variation. Wildlife biologists, mammalogists, and ecologists not familiar with tick identification may easily confuse white-marked specimens of *D. parumapertus* with *D. variabilis*. The distributions of these two species overlap in parts of California and perhaps in western Texas (Cooley 1938, Bishopp & Trembley 1945, Smith *et al.* 1946). Further, *D. parumapertus* has occasionally been reported from hosts other than rabbits, such as deer and coyotes (Boyton 1933, Cooley 1938), and *D.variabilis* has been reported from jackrabbits and other rabbits (Bishopp & Trembley 1945), so the two species could be on the same host.

Acknowledgements

We are indebted to Tom Becker (Utah Division of Wildlife Resources), Travis Smith (Texas Parks and Wildlife Department), and Rosella M. Goddard (Mississippi State University) for valuable technical assistance during this field study. This article has been approved for publication as Journal Article No. J-12527 of the Mississippi Agriculture and Forestry Experiment Station, Mississippi State University.

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Accepted by Richard G. Robbins: 9 Jun. 2014; published 27 Jun. 2014