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Authors: Goldberg, Stephen R., and Bursey, Charles R.

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## Duration of Attachment of the Chigger, *Eutrombicula lipovskyana* (Trombiculidae) in Mite Pockets of Yarrow's Spiny Lizard, *Sceloporus jarrovi* (Phrynosomatidae) from Arizona

Stephen R. Goldberg<sup>1</sup> and Charles R. Bursey,<sup>2</sup> <sup>1</sup> Department of Biology, Whittier College, Whittier, California 90608, USA; <sup>2</sup> Department of Biology, Pennsylvania State University, Shenango Valley Campus, 147 Shenango Avenue, Sharon, Pennsylvania 16146, USA

**ABSTRACT:** Duration of attachment was determined for the chigger, *Eutrombicula lipovskyana* in mite pockets of the phrynosomatid lizard, *Sceloporus jarrovi* from Arizona. *Eutrombicula lipovskyana* remained attached in mite pockets for as long as 52 days. Infestations in other body areas were of shorter duration. The mite *Geckobiella texana* was also found to infest *S. jarrovi*.

**Key words:** Chigger, *Eutrombicula lipovskyana*, mite, *Geckobiella texana*, *Sceloporus jarrovi*, Phrynosomatidae, mite pocket, prevalence.

Chiggers, the larvae of trombiculid mites, are common reptile ectoparasites which suck fluids from hosts during their larval stages (Frye, 1991). They may be important pests in reptile collections causing dermatitis, blood loss and possible spread of infectious diseases (Frye, 1991). The length of time chiggers remain on their reptilian hosts is highly variable. Melvin et al. (1943) reported attachment times of 30 to 65 days for *Trombicula alfreddugesi* on *Phrynosoma* sp.; Loomis and Stephens (1973) reported 30 to 90 days for *Neotrombicula harperi* on *Uta stansburiana* and Goldberg and Bursey (1991) reported *Neotrombicula californica* to remain 7 days on *Sceloporus graciosus* and *Uta stansburiana*.

The focus of our study was the mite pockets. Arnold (1986) reported the occurrence of mite pockets, small skin invaginations in the neck, axilla, groin and postfemoral regions, in ten lizard families; namely, Chamaleonidae, Crotophytidae, Gekkonidae, Iguanidae, Lacertidae, Opluridae, Phrynosomatidae, Polychrididae, Scincidae and Tropiduridae. Mite pockets are present in newly hatched lizards and embryos of viviparous forms and

are thought to have evolved as sites to contain mites and their resultant damage (Arnold, 1986). In *Sceloporus jarrovi*, the mite pockets are in one area, on each side of the gular region. They always are paired. In this report we give the duration of attachment for the chigger, *Eutrombicula lipovskyana* in mite pockets of Yarrow's spiny lizard, *Sceloporus jarrovi* from Arizona (USA).

Lizards were collected by hand-held noose at Kitt Peak (31°95'N, 111°59'W, elevation 1,889 m) in the Baboquivari Mountains, 85 km southwest of Tucson, Pima County, Arizona. Twenty-four animals were captured in November 1990 and 23 in June 1991. The November sample averaged 66.8 mm snout-vent length (SVL) (SD, 14.1) while the mean SVL for the June sample was 75.3 mm (SD, 7.31). The number, identification and location of ectoparasites were determined with the aid of a dissecting microscope. Lizards were maintained in separate gallon glass jars in the laboratory at Whittier College, Whittier, California (USA). They were examined at 4-day intervals for the 52-day duration of the study.

The predominant ectoparasite in the mite pockets was *Eutrombicula lipovskyana* (Tables 1, 2); Goldberg and Holshuh (1992) reported *E. lipovskyana* to cause focal ulcerative dermatitis in all age classes of *S. jarrovi*. The pterygosomatid mite, *Geckobiella texana* also was found there occasionally. Smaller aggregations of *E. lipovskyana* and *G. texana* were seen on other areas of the body, particularly along the rear flanks with some individual ectoparasites deeply embedded between scales. These ectoparasites, not associated

TABLE 1. Mean intensity, range, and prevalence of *Eutrombicula lipovskyana* from mite pockets of 24 captive *Sceloporus jarrovi* at four day intervals from November 1990.

| Days in captivity | Number of chiggers/infested lizard |       | Prevalence % |
|-------------------|------------------------------------|-------|--------------|
|                   | Mean (SD)                          | Range |              |
| 0                 | 31.9 (43.8)                        | 3–199 | 100          |
| 4                 | 29.9 (37.7)                        | 3–149 | 100          |
| 8                 | 26.5 (33.6)                        | 1–143 | 100          |
| 12                | 19.4 (22.9)                        | 2–104 | 100          |
| 16                | 12.5 (15.2)                        | 1–72  | 100          |
| 20                | 11.0 (10.5)                        | 1–42  | 96           |
| 24                | 7.7 (6.2)                          | 1–23  | 83           |
| 28                | 6.3 (5.1)                          | 1–19  | 75           |
| 32                | 3.7 (2.9)                          | 1–10  | 71           |
| 36                | 3.0 (2.1)                          | 1–8   | 63           |
| 40                | 2.7 (2.3)                          | 1–8   | 46           |
| 44                | 1.9 (1.4)                          | 1–5   | 33           |
| 48                | 1.5 (0.6)                          | 1–2   | 17           |
| 52                | 1.5 (0.7)                          | 1–2   | 8            |

TABLE 2. Mean intensity, range, and prevalence of *Eutrombicula lipovskyana* from mite pockets of 23 captive *Sceloporus jarrovi* at four day intervals from June 1991.

| Days in captivity | Number of chiggers/infested lizard |       | Prevalence % |
|-------------------|------------------------------------|-------|--------------|
|                   | Mean (SD)                          | Range |              |
| 0                 | 23.5 (14.4)                        | 4–59  | 87           |
| 4                 | 26.1 (16.3)                        | 3–65  | 87           |
| 8                 | 25.8 (16.9)                        | 3–71  | 87           |
| 12                | 24.8 (15.5)                        | 3–66  | 87           |
| 16                | 20.2 (11.3)                        | 3–39  | 87           |
| 20                | 14.8 (8.8)                         | 4–39  | 87           |
| 24                | 10.8 (6.6)                         | 1–22  | 87           |
| 28                | 9.0 (4.8)                          | 2–16  | 83           |
| 32                | 6.3 (3.9)                          | 1–12  | 78           |
| 36                | 5.0 (2.9)                          | 1–9   | 74           |
| 40                | 3.0 (1.9)                          | 1–7   | 74           |
| 44                | 2.6 (1.1)                          | 1–6   | 56           |
| 48                | 2.0 (1.4)                          | 1–4   | 17           |
| 52                | 1.7 (1.0)                          | 1–3   | 17           |

with mite pockets, left their lizard hosts shortly after capture making it impossible to accurately assess their attachment time. Voucher specimens were deposited in the U.S. National Helminthological Collection (Beltsville, Maryland, USA) as number 81992 for *E. lipovskyana*, and number 82007 for *G. texana*.

There was no significant difference in the number of chiggers between left and right mite pockets (November sample, Kruskal-Wallis statistic = 0.13, 1 df,  $P > 0.05$ ; June sample, Kruskal-Wallis statistic = 0.05, 1 df,  $P > 0.05$ ). The mean number of chiggers per mite pocket was higher on lizards collected in November (Table 1) than June (Table 2); but differences in the intensity of infestation between the November and June samples were not statistically significant (Kruskal-Wallis statistic = 0.08, 1 df,  $P > 0.05$ ) (Eckblad, 1984). The mean number of chiggers decreased with time (Tables 1, 2), both samples detaching at about the same rate. A few chiggers remained attached throughout the 52 days of the study. We consider 52 days to represent a minimum attachment time since we have no way of estimating the length of attachment before capture. We

have observed *E. lipovskyana* in the mite pockets of *S. jarrovi* collected in winter (Goldberg and Bursey, unpubl.); thus, at least a portion of the chigger population overwinters on the lizards.

Bennett (1977) reported seven species of chiggers from *Sceloporus jarrovi*: *Acomatacarus arizonensis*, *Eutrombicula alfreddugesi*, *Eutrombicula lipovskyana*, *Eutrombicula* sp., *Hyponeocula sauricola*, *Kayella lacerta*, and *Microtrombicula aequalis*; attachment times were not determined. Of these seven species, only *E. alfreddugesi* was previously recorded from *S. jarrovi* at Kitt Peak (Bennett, 1977); however, it was not present in our samples. Kitt Peak is a new location record for *E. lipovskyana*.

We also noted occasional *Geckobiella texana* on both November and June samples of *S. jarrovi*. These mites wandered freely over the body and were rarely seen in the mite pockets. They occurred concurrently with *E. lipovskyana*. The November sample had a prevalence of 88% (21/24) for *G. texana* with a mean intensity of 8.1 (SD, 7.6; range, 1–31) on infested lizards. Prevalence (39% (9/23)) and intensity (4.3 (SD, 2.9; range, 1–9)) was

lower in the June collection. Infestation of the November and June samples by *G. texana* was not significantly different (Chi-square = 2.7, 1 df,  $P > 0.05$ ) (Eckblad, 1984).

Goldberg and Bursey (1991) previously reported that the attachment of the chigger, *Neotrombicula californica* on the lizards *Sceloporus graciosus* and *Uta stansburiana* lasted approximately one week on both lizard species. It is clear from Tables 1 and 2 that *E. lipovskyana* stayed much longer on *S. jarrovi*. In fact, the duration of attachment we found for *E. lipovskyana* on *S. jarrovi* was more like that given for *Trombicula alfreddugesi* on *Phrynosoma* by Melvin et al. (1943) and *Neotrombicula harperi* on *Uta stansburiana* by Loomis and Stephens (1973). The reasons for this difference in attachment time may reflect behavioral differences of these chiggers.

Another factor may be differences in the attachment sites. In both *S. graciosus* and *U. stansburiana*, the preferred attachment area for chiggers was the eyelids. In contrast, most chiggers on *S. jarrovi* were in the mite pockets. Whether chiggers associated with mite pockets remain attached longer than chiggers found on other parts of the lizard body is yet to be determined. Subsequent studies on location and duration of attachment for additional species will be required before chigger ectoparasite patterns can be established.

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