

**NOTES ON GESTATION PERIODS AND LITTER SIZE IN THE ARENICOLOUS  
BUTHID SCORPION *Leiurus quinquestriatus* (EHRENBERG, 1828) (Scorpiones:  
Buthidae)**

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**ABSTRACT:** The following notes on gestation periods and litter size in seven specimens of *Leiurus quinquestriatus* are presented as observational data. Specimens of *Leiurus quinquestriatus* from southern Egypt and southern Israel were mated in the laboratory during 2007; afterwards, gestation periods and litter sizes of all females were recorded. Previous studies on this species reported that the gestation period ranged from 150 to 155 days and that litter size was between 12 and 99 offspring. In the present study, gestation periods in specimens from both geographic regions varied from 155 to 227 days and litter sizes were between 35 and 87 offspring. The current contribution expands on previously published data on gestation periods and supports previously reported litter size in *Leiurus quinquestriatus*.

**KEY WORDS:** scorpions, Buthidae, *Leiurus quinquestriatus*, gestation period, litter size.

**CONFLICTS OF INTEREST:** There is no conflict.

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## INTRODUCTION

Attempts to explain present patterns of phylogeny, biogeography, ecology and biological diversity cannot be fully achieved without precise knowledge of the reproductive biology, postembryonic development and life history of scorpions (1). Species of the primarily cosmopolitan family Buthidae C. L. Koch, 1836 are the most abundant and globally distributed of extant scorpions; occurring on all continents except Antarctica. Currently, the family Buthidae represents 81 (48.8%) of the 166 described scorpion genera and 700 (46.7%) of the approximately 1,500 described scorpion species (2). While all scorpions possess venoms, all but two of the approximately 30 to 50 medically significant species are members of the family Buthidae (3, 4). Due to their widespread geographic distribution, synanthropic habits and medical significance to large human populations in many tropical and subtropical regions, there has been greater interest and research conducted with buthid scorpions than with any other group (1, 5). However, a paucity of data exists regarding the life history and postembryonic development of the majority of buthid scorpions, with data reported for less than 40 (5.7%) species (1, 5).

*Leiurus quinquestriatus* (Ehrenberg, 1828) (Buthidae) is a large (80 to 110 mm; 1.0 to 2.5 g) and nocturnally active species that inhabits pre-existing spaces under rocks, abandoned burrows of other animals, or self-excavated burrows of 20 cm under rocks in arid and hyperarid regions of North Africa and the Middle East (6-12). *Leiurus quinquestriatus* venom is the most toxic reported among scorpion species (LD50: 0.25 mg/kg), capable of provoking both dysfunction and failure of cardiovascular and respiratory systems (13-21). Neurotoxic venoms are particularly toxic to infants and young children, due to their weight-dependent effects (14). Whereas a large number of studies have been published on the biochemistry, toxicology and epidemiology of *L. quinquestriatus* and its venom, much less is known about its life history.

Heretofore, only a single study has provided data on the gestation of this scorpion species. Thornton (22) reported that the gestation period of a single *L. quinquestriatus* female from Sudan was 155 days while three additional specimens gestated for five months. Haseeb (23) registered a gestation period greater than 48 days for a Sudanese female. However, the short gestation period reported by this author indicated the number of days in captivity before the female gave birth (23).

In contrast to scarce data regarding gestation, there have been numerous studies reporting *L. quinquestriatus* litter size that usually ranges from 12 to 99 individuals. In the aforementioned work, Haseeb (23) reported a single litter of 99 offspring for a Sudanese female. Similarly, Thornton (22) observed litter sizes of nine females from Sudan, which comprised from 41 to 82 young scorpions. Abushama (8) reported litters of 35, 38, 39 and 40 offspring from four Sudanese females. Additionally, Levy and Amitai (12) registered litter sizes of specimens from Israel, which ranged from 12 to 35. Based on previously published studies, *L. quinquestriatus* litter size varied between 12 and 99 offspring, while its gestation periods ranged from 150 to 155 days.

In March 2007, adult male (n = 6) and female (n = 4) specimens of *L. quinquestriatus* were acquired from field collectors in Aswan, southern Egypt. In April 2007, additional males (n = 2) and females (n = 3) were obtained from another field collector in southern Israel. Specimens from Egypt (Aswan desert) and Israel (Negev desert) were collected during the day from spaces and shallow chambers under rocks. During May 2007, females were randomly paired with males in specially prepared mating arenas. Courtship and mating behaviors of *L. quinquestriatus* have been reported by several authors (8, 9, 22, 24-26) and will not be discussed in the present study. After termination of mating sequences, all females were removed from mating arenas and maintained in 9.5 L glass enclosures (dimensions: 30 x 12.5 x 20 cm), with a dry 5-6 cm layer of sand and a large fragment of terracotta plant pot to serve as retreat during periods of inactivity. Throughout the gestation period, females were maintained under a 14-hour-light/10-hour-dark cycle at constant temperatures of  $27 \pm 1^\circ\text{C}$ . Relative humidity was not controlled and was estimated at  $60 \pm 10\%$  during the study period. Water was provided every 3 to 5 days by misting a small area of the enclosure wall, at and slightly above substrate level. Females received a single adult (18 to 25 mm) common house cricket (Orthoptera: Gryllidae: *Acheta domesticus* L.) each week. Within a 45-day period, mesosomal distension was noted in all the seven mated females. After gestation periods of 155, 157, 159, 159, 217, 221 and 227 days (mean = 185 days), females gave birth to litters of 35, 39, 54, 60, 81, and 87 (mean = 62.7) young. Based on the present study and references herein, it is possible to consider that *Leiurus quinquestriatus* gestation periods commonly range from 150 to 227 days. Litter size observed in the present study (35-87), in turn, corresponds to those already reported by previous authors.

While the small sample size examined herein excludes statistical analysis, there appeared to be a correlation between female size and number of offspring produced, with larger females producing larger litters. Warburg and Elias (27) reported that *L. quinquestriatus* females from cooler and more mesic Mediterranean regions of northern Israel presented smaller average size (1.0 g) and produced fewer oocytes than did specimens of *L. quinquestriatus* (2.0 g) inhabiting warmer xeric regions of the south (e.g. Negev desert). It does not appear that a correlation exists between female size and size of individual offspring, with all females producing offspring of approximately the same size regardless the number produced in a litter. Based on limited personal observations reported in the present study, females of *L. quinquestriatus* appear to invest more reproductive energy into producing larger number of offspring, but not into producing larger offspring (27-28).

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