Laboratory temperature preferences of the wolf spider *Pardosa riparia* (Araneae: Lycosidae)

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Summary

Many lycosid species have particular temperature preferences that may differ between sexes and the breeding status of the females. In a laboratory experiment using a temperature gradient apparatus, 31 males, 31 females before egg-laying and 31 females with an egg-sac of the wolf spider *Pardosa riparia* (C. L. Koch, 1833), were tested to determine their preferred temperature. We found no difference between these three groups with respect to their temperature preference. We determined the optimal temperature of *P. riparia* to be between 35°C and 42°C. In its natural habitat at 1960 m a.s.l. the preference of *P. riparia* for high temperatures compensates for the short snow-free season.

Introduction

Temperature plays a major role in different aspects of a spider’s life, e.g. in habitat choice (Wise, 1993), web building (Barghusen *et al*., 1997), development and survival (Li, 2002; Li & Jackson, 1996), copulation duration (Costa & Sotelo, 1984) and escape behaviour (Cobb, 1994). In a field study at the Swiss alpine timberline, we observed that the dominant species, *Pardosa riparia* (C. L. Koch, 1833), a free-hunting wolf spider (Lycosidae), shows a particular distribution pattern. It prefers open sites such as meadows and dwarf shrub heath and avoids the immediate surroundings of the tree trunks (Frick *et al*., 2007). This could mean that the habitat choices of this species are the result of thermal preferences. Laboratory studies have shown that many lycosid species have distinct thermal preferences (Hackman, 1957; Almquist, 1970; Hallander, 1970; Humphreys, 1987) and that there are even differences between males, females without and females with an egg-sac (Sevacherian & Lowrie, 1972; Humphreys, 1987). Therefore, we tested males, females before egg-laying and females with an egg-sac of *P. riparia* for their temperature preferences.

Material and methods

We collected 93 specimens (31 males [M], 31 females before egg laying [F] and 31 females with an egg-sac [FE]) of *P. riparia* at the timberline (1960 m a.s.l.) on Alp Flix (Switzerland, Grisons, Fig. 1). Sixty-five specimens were collected on 14 June 2004 (31 M, 30 F and 4 FE) and tested. Another 28 specimens were collected on 4 July 2004 (1 F and 27 FE), and tested. Spiders were kept in the laboratory for one week in separate plastic boxes, supplied with drinking water and fed daily before testing.

We used three equally illuminated (approx. 350 lux) circular temperature-gradient apparatuses, each covered by a transparent plexiglass sheet, forming a circular test chamber of 6.5 cm width, 5.0 cm depth and c. 185 cm...