Abdominal Shape Change in Individual *Argiope protensa*

by W. F. Humphreys

Recently, while examining the solar orientation and temperature of *Argiope protensa* L. Koch, I noticed that the abdomens of the females can markedly alter their shape and size. On their webs the spiders' abdomens were long and spindle-shaped so that the spiders resembled an elongate grass seed, thus rendering them cryptic (Fig. 1a). Two such individuals kept in vials for several hours developed rotund abdomens (Fig. 1b) with barely a hint of the post-spinneret tail which had contributed largely to their elongate form on the webs. Although oviposition was occurring in the field population, the change in shape did not seem to be associated with egg laying as no egg-sacs were found in the vials over the following days. Later that evening both specimens were found to have elongate abdomens again, as they now do as preserved specimens.

I photographed the specimens in both abdominal states because shape is relevant to their postural thermoregulation. Only later did Mark Harvey suggest that the ability of an individual spider to change its abdominal shape substantially may not have been recorded. I am interested to know whether any diurnally active spiders which remain at the hub of the web in sunlight are able to change their abdominal shape or, indeed, whether such changes in shape have previously been recorded.

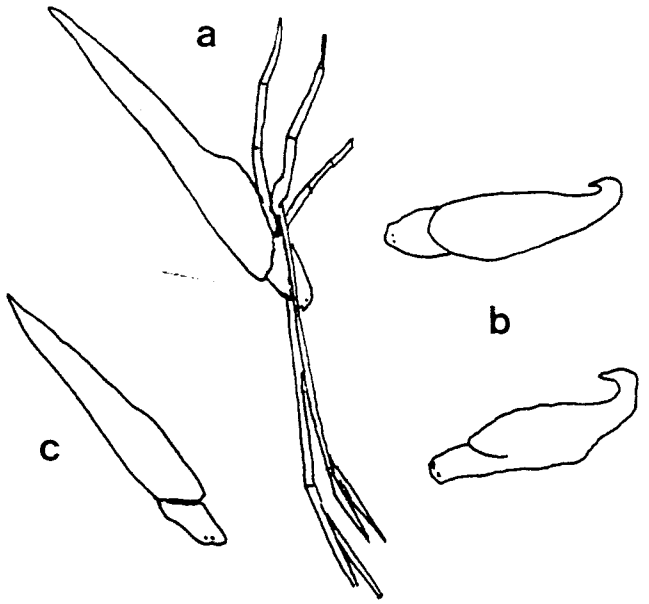

Figure 1. Outlines of an individual ***Argiope protensa*** *sketched from photographs to approximately the same scale.* ***a,*** *on web showing the elongate abdomen;* ***b,*** *dorsal and dorso-lateral views showing the rotund abdomen with almost complete recession of the post-spinneret tail;* ***c,*** *later . . . partial re-extension of the post-spinneret tail.*

A third specimen arrived in the laboratory in the contracted state and remained in that condition in a jar for several days during which time it rested on a tissue. Transferred to an indoor terrarium, where it made a web, the post-spinneret tail fluctuated in length such that the body length varied by up to 27% over several days. The terrarium was then placed in sunlight and within 30 minutes the length had increased by about 50%; the spider oviposited that day. The shape change was reversible for when the spider was moved indoors it assumed a more spherical shape; it could be induced to elongate by moving the terrarium into direct sunlight. On being placed in the sun the following day the length increased to *c.* 160% of the minimum length recorded showing a mean rate of change in total length of 9.3 mm h^{-1} over 45 minutes (Fig. 2). As the total body length to the spinneret was about 13 mm, this means that the 'tail' varied in length about five fold, assuming that there was no change in the length of the pre-spinneret abdomen.

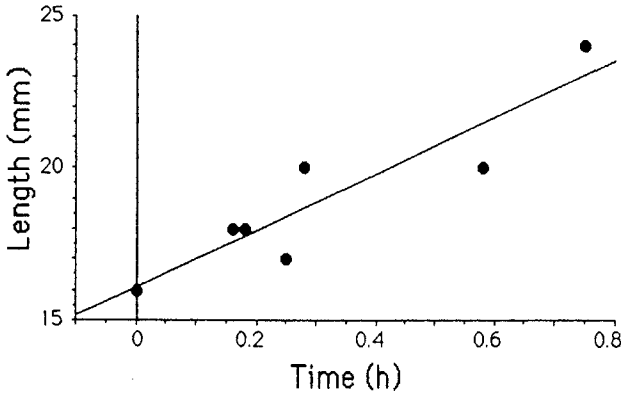

Figure 2. Regression of total body length (mm) on time (hours) for ***Argione protensa.*** *The spider was placed in a terrarium in strong sunlight at time zero.*

A. protensa is widely recorded in the taxonomic literature as having very variable abdominal shape, but it does not seem to have been recorded that this variation in shape may occur within individuals. This variability has caused much confusion in the taxonomy of *Argiope* and, in a recent revision (Levi, 1983), nine species were found to be synonymous with *A. protensa.* Indeed Levi states (p. 285) that 'the shape of the abdomen is very variable: short, with almost no tail, or a post-spinneret tail of variable length . . . At present I believe they are all one species because of the similarity of the genitalia'.

I thank Mark Harvey for suggesting the relevance of this observation, for assistance with the literature and for a specimen.

Reference

Levi, H. W. (1983) The orb-weaver genera *Argiope, Gea* and *Neogea* from the Western Pacific Region (Araneae, Araneidae, Argiopinae). *Bull. Mus. comp. Zool., Harv.* **150:** 247-338.

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Arachnology of the Namib Desert Dunes

by J. L. Cloudsley-Thompson

The Namib Desert fringes the coast of south western Africa for some 2,000 km, between the Olifants River in Cape Province and southern Angola. Although it is virtually rainless, there is a rich fauna depending mainly upon wind-blown detritus and moisture from fog engendered by the cold Benguela current. Even in the absence of fog, the coastal region is sufficiently humid to provide moisture for lichens and other specialised types of vegetation. Further east, the average humidity decreases sharply and the temperature increases. Between 30 to 60 km inland, the early mornings are usually damp and cool while, later in the day, the