Bull.Brit.Arach.Soc. (1972) 2 (6), 111-112

Growth Rate and Longevity in Two Species of Orb-weaving Spiders (Araneae:Argiopidae)

Charles F. Reed
Temple University,
Philadelphia, Pennsylvania

Peter N. Witt
North Carolina Department of Mental Health,
Raleigh, North Carolina

Spiderlings from the same cocoons (*Araneus diadematus* Clerck and *Argiope aurantia* Lucas) show considerable variation in size during the first month of life, even under apparently optimal rearing conditions (Witt, 1971). Both species may have individuals surviving as long as fifteen months in the laboratory but, in general, deaths are distributed over several months following attainment of maximum size.

In a cocoon from each species, we found that animals with early growth-spurts died early, without apparent disease or accident in moulting. The last survivors of a cocoon were all slow growers. Since animals from these cocoons had been removed for other experiments, it was necessary to record longevity from hatching to death in two undisturbed samples.

Cocoons in which hatching was already underway were brought into the laboratory and placed in rearing boxes. The largest spiderlings were placed in individual cages immediately; the remaining animals were caged as they left the communal web to build individual webs.

In the rearing boxes, water and a supply of gnats provided an *ad lib* diet; in the individual cages fruit flies were given daily until the spiders were large enough to accept a housefly every other day.

In the case of *A. diadematus*, the course of growth for six females who had outlived all their littermates was compared with that of twelve females who had died at least four months earlier (Fig. 1).

The mean growth-rate for the short-lived animals was 1.06 mg/day in the first two months post-hatching, 2.00 mg/day in the third month, and 1.26 mg/day in the fourth month. The corresponding rates for the long-lived spiders were 0.29, 0.39 and 1.55 mg/day. At the time of death a mean of 3.83 moults had been recorded for the short-lived and 6.33 moults for the long-lived spiders.

In the case of the cocoon of *A. aurantia*, two females died well before their littermates, and five survived several weeks beyond the life-span of the remainder of the litter. The mean growth-rates in the short-lived animals were 0.52, 2.04 and 1.51 mg/day for the second, third and fourth months respectively. Corresponding rates for the long-lived spiders were 0.11, 1.24 and 1.54 mg/day.

In both species, the mean weights were significantly different in the first four months of life, but by the time of death the mean weights of short-lived

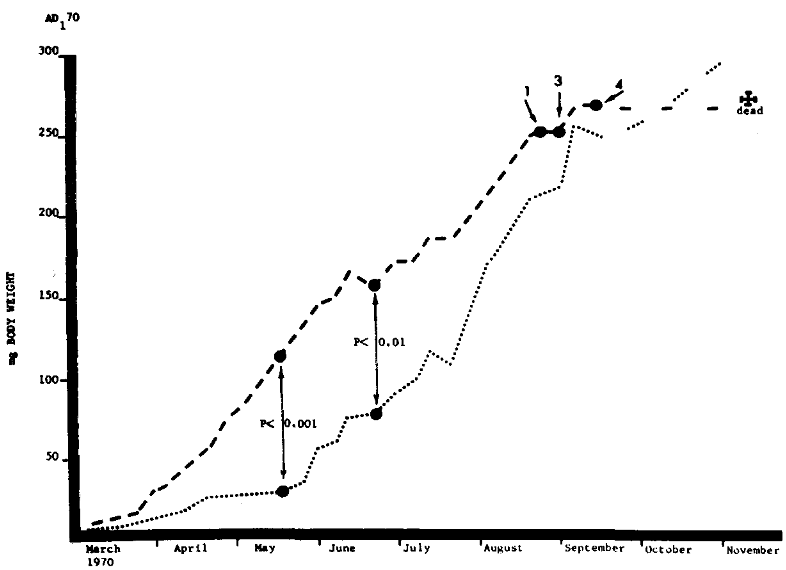

Fig. 1: Weekly mean body-weights for the six female *Araneus diadematus* living longest of all hatchlings from a single cocoon are connected by the dotted line, mean weights for twelve females dying earliest of all cocoon-mates are connected by a dashed line. T-tests were calculated at the points indicated by vertical arrows: the means for the long-lived animals were significantly below those of the short-lived spiders in both cases. Numerals indicate number of short-lived animals dying during a week; all had died by 10 November. Long-lived animals survived at least to March of the following year.

Bull.Brit.Arach.Soc. (1972) 2 (6), 112-115

and long-lived spiders were essentially equal. The small number of cases for *A. aurantia* require large differences in order to be significant, however.

Unless the laboratory imposes conditions significantly unrepresentative of population forces in the natural environment, it would appear that early rapid growth in the two species of orb-weavers occurs at the expense of endurance.

If this relationship is valid, its basis is nevertheless unclear. Portions of broods of insects have been reported to eclose at different times (Rupert, 1949 for example), producing morphologically distinct adults. Our animals appear to hatch at the same time and to be similar except for rate of development.

Poetsch (1963) has observed the hatching of cocoons at two different times for the same species of spider, presumably providing an advantageous distribution of egg-production over time. Our observations, however, apply to a single hatching, although differential maturing might provide similar advantage. In any case, death does not follow egg-laying closely in the long-lived animals.

We did not observe cannibalism among the hatchlings before separation. While cannibalism in the cocoon might account for differences in size, it would not account for length of life.

At the moment, we cannot say which of the two extremes of longevity, if either, are remarkable, whether rapid growth has lethal consequences or slow growth aids in surviving developmental crises such as moulting. We have begun to assemble the records of the webs built by the spiders throughout life, in order to examine the possibility that the short-lived and long-lived animals can be distinguished on other grounds, for instance in thread-production and patterns of movement.

This work was supported by National Sciences Foundation Grant No. GB 6246.

References

POETSCH, J. 1963: *Von der Brutfuersorge Heimischer Spinnen.* Wittenberg, Ziemsen.

RUPERT, L. R., 1949: A revision of the North American species of the genus Plagodus. *J.N.Y.Entomol.Soc.*, **57**, 19-49.

WITT, P. N., 1971: Instructions for working with orb-weaving spiders in the laboratory. *Bioscience*, **21**, 23-25.

Observations on the classification of some European chernetid pseudoscorpions

William B. Muchmore
Department of Biology
University of Rochester
Rochester, New York 14627
U.S.A.

The aim of the present paper is to point out that lack of critical study and comparison of European and American chernetid pseudoscorpions has led to some serious misunderstandings of their relationships. It is hoped that it will lead to renewed study of many forms and increased cooperation among workers in the field.

The studies upon which the following remarks are based were prompted by some observations by Weygoldt (1970) on the courtship and mating behaviour of certain pseudoscorpions. In particular, Weygoldt puzzled over the similarities in behaviour between *Dinocheirus tumidus* (Banks) and *Dendrochernes morosus* (Banks), and between *Chernes cimicoides* (Fabricius) and *Hesperochernes sanborni* (Hagen), because in each example the first named species was considered to belong to the tribe Chernetini Beier while the second was placed in the tribe Hesperochernetini Beier. As I have pointed out to Dr. Weygoldt (*in litt.*), the former case is easily resolved because the genus *Dinocheirus*, like *Dendrochernes*, has four setae in the cheliceral flagellum and rightfully belongs in the tribe Hesperochernetini. The confusion over *Dinocheirus* emerged after Chamberlin (1929) failed to mention the number of setae in the flagellum of *D. tenoch* Chamberlin, the type species of the genus, and Beier (1932, p. 138) erroneously recorded the number as three, placing *Dinocheirus* into his newly erected tribe Chernetini. Chamberlin corrected this error in 1934 (p. 128) and showed that *Epaphochernes* Beier was a synonym of *Dinocheirus*. Beier (1933, p. 100) accepted the correction, but other European workers evidently were unaware of it (cf. Vachon, 1936).

The second case, regarding *C. cimicoides* and *H. sanborni*, was, however, quite perplexing and I suggested that a comparative morphological study of *Chernes* and *Hesperochernes* might be fruitful. Dr. Weygoldt kindly obliged by sending me four specimens each of *C. cimicoides* and *C. hahni* (L. Koch) to