Web Height as a Niche Separator in Two Antillean Orb-weaving Spiders

Choice of foraging site is a critical decision for any sit-and-wait predator. For web-building spiders, which must invest heavily in spinning a web, this decision may be a semi-permanent one. Accordingly, we expect a given species to have fairly characteristic web and web-site features. In a comparison of several web parameters in nine orb-weaving species in Ghana, including one *Gasteracantha* sp. and one *Leucauge* sp., Edmunds and Edmunds (2001) found that each species-pair could be separated according to at least one parameter. Our purpose here is to consider just one parameter, height above the ground.

Leucauge sp. (Tetragnathidae) and *Gasteracantha cancriformis* (Araneidae) are widepread orb-weavers which are locally abundant in the Antilles (pers. obs.). In January, 2006 we found *Leucauge* sp. in abundance in gardens, open areas and lowland forests on Nevis, Lesser Antilles. On the same island *G. cancriformis* was common only in open areas, especially at the edges of secondary forest, where it was interspersed with *Leucauge* sp.

Although the two species differ in size – *G. cancriformis* is strongly sexually dimorphic, so that females are larger than those of *Leucauge* sp., while males are smaller than *Leucauge* sp. males – their webs

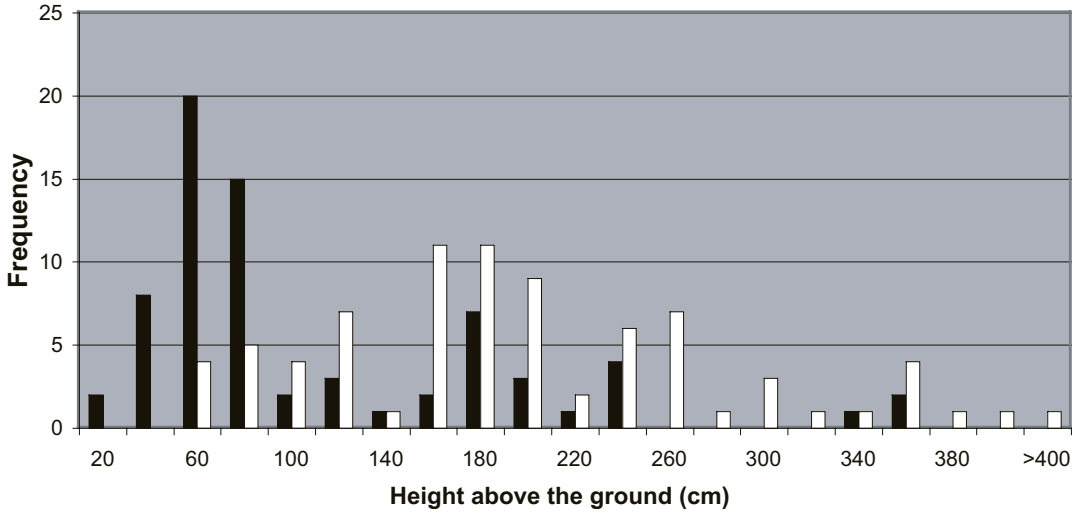

Fig. 1. Frequency of web heights of 71 female *Leucauge* sp. (black bars) and 80 female *Gasteracantha cancriformis* (white bars) in open areas near Gingerland, Nevis. The height of the hub is estimated to the nearest 20 cm.

are comparable in size, form and apparently in strength, and it is fair to assume that they are suited to capture similar arrays of prey, although those of *G. cancriformis* appear on average to be oriented closer to the vertical. This gives rise to the question of the ecological niche separation between them where they co-occur.

Under these circumstances, we might expect separation through the simple parameter of web height. In farmland in the Gingerland area, we estimated to the nearest 20 cm web heights of apparent mature and subadult females of both species as we found them, mostly along the edges of secondary forest.

As seen in Fig. 1, there is a substantial overlap between them. However, the mean web height of *G. cancriformis* (198 cm) is significantly greater than that of *Leucauge* sp. (111 cm; Mann-Whitney U test, $p<0.01$). This result is consistent with the hypothesis that web height by itself leads to differences in the array of prey captured.

Fig. 2

G. cancriformis is quite variable in colouration, even at a single locality, so that it was long thought to comprise a number of distinct species (Levi 1996). Part of this variation is seen in the usually very large central pale area on the top of the female abdomen (Fig. 2). At least in the Lesser Antilles, this can be either white or bright yellow, not intermediate in our experience, and is strongly reduced in some individuals. In the Gingerland area we recorded 47 white and 30 yellow females, as well as three in which the abdomen was mostly black above. The adaptive significance, if any, of this polychromism is unknown.

Specimens of both species collected and identified by the authors on Nevis and deposited in the Land Arthropod Collection at the University of the West Indies will serve as vouchers. Support for this project came from the University of the West Indies and the Nevis office of the Ministry of Agriculture. Thanks also to Quentin Henderson and Pam Barry for local facilitation, Bruce Cutler for comments on the species, and John Agard for statistical advice.

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