A STUDY OF RELATIVE GROWTH OF LEG AND ANTENNAL SEGMENTS IN TWO SPECIES OF *ORTHOTYLUS* (HETEROPTERA : MIRIDAE)*

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The species dealt with in this paper are two of three closely allied species of the genus *Orthotylus* that have been studied from the ecological and evolutionary viewpoints by Professor O. W. Richards and his associates at Silwood Park, Berks., England. They are *O. adenocarpi* (Perris) and *O. virescens* (Douglas and Scott).

Waloff and Southwood (1960) have discussed the recognition of nymphal stages of these species. The present paper attempts to clarify further the distinction of their nymphal stages by studying the relative growth of leg and antennal segments. While the comparison of growth pattern is itself of interest, the work has another aim, namely that of testing hypotheses that have been put forward by the author in connection with the study of relative growth in Gerridae (1961). The hypotheses were: (1) when the growth ratio (slope) or the initial growth index (Y-intercept) varies for a segment among a group of related species, the ratio or the index for other segments varies in a parallel fashion; and (2) among a group of related species, the growth patterns (growth ratio or initial growth index or both) of segments with higher growth ratios are more similar than those of the other segments with lower growth ratios.

Material and Methods

The material consisted of ten individuals of each stage of each species. Measurements were made under the binocular microscope. Each leg and antenna was removed from the body and laid flat on the bottom of a syracuse watch glass in 80 per cent. alcohol. The formula used was $Y = bX^k$, where Y is the allometrically growing segment; b is the theoretical value of Y when the standard measurement X equals unity and is called the initial growth index; k is the constant at which Y grows in relation to the standard measurement X and is called the growth ratio. The width of the head was chosen as the standard measurement, for it is the most solid part of the body and is therefore subject to the least change in size because of the physiological condition of the individual. As may be seen from figures 1 and 2, there is a strong tendency for almost all segments to grow more slowly from the first to the second stage, and to grow very rapidly at the final stage of development into the adult. In all there are three rather well defined phases of development. The calculation of the growth ratio and the initial growth index was therefore made for the second phase, which lasts longest. Correlation coefficients in all calculations here were over 0·99. The formula therefore should suffice for describing growth patterns.

Results and Discussion

The growth ratios and initial growth indices for both species are shown in Table I. The growth ratios of all segments in *O. virescens* are consistently greater than those for homologous segments in *O. adenocarpi*, and the differences between homologous segments are all statistically significant ($P < 0{\cdot}01$). The initial growth indices in

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