

THE COEXISTENCE OF THREE SPECIES OF *ORTHOTYLUS*
(HETEROPTERA, MIRIDAE)

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Scotch broom, *Sarothamnus scoparius* (L.) Wimmer is a native shrub. In southern England it supports a large insect fauna which includes 35 species confined to it. Amongst these are five species of Miridae—*Heterocordylus tibialis*, *Asciodema obsoletum* and three closely related species—*Orthotylus adenocarpi*, *O. virescens* and *O. concolor*. Their coexistence may be facilitated by a number of factors and although there is a considerable overlap in the times of their occurrence, the periods of their maximum abundance are spread out in time. *O. adenocarpi* is the earliest and *O. concolor* the latest species to hatch. Eclosion spreads over three months and this is reflected in their geographical distribution. *O. adenocarpi* has a wide southern Atlantic range (Southwood, 1957), whereas *O. virescens* extends into southern Europe, Asia Minor and North Africa. The distribution of *O. concolor* is less well documented but it is probably similar to that of *O. virescens*.

The three species differ in details of their behaviour. They show a tendency to oviposit in somewhat different parts of the broom shoots and while *O. virescens* and *O. concolor* lay in one year old stems, *O. adenocarpi* mostly lays in two year old ones. There are also differences in their feeding habits (Dempster, 1960) which may be related to the differences in the lengths of rostrum: *O. adenocarpi* with the longest rostrum is a more predacious species than *O. virescens* with the shortest rostrum. Further there is some evidence that large numbers of adults emigrate from overcrowded conditions and that *O. virescens* and *O. concolor* are capable of dispersing more rapidly over a wide area than the other broom Miridae (Waloff and Bakker, 1963).

The abundance of broom mirids is partly controlled by parasites of eggs and nymphs. Three *Leiophron* spp. (Euphorinae, Braconidae) lay eggs in the first instar nymphs of the five mirid species. There appears to be no strict host specificity, but the degree of parasitism is related to the times of emergence of parasites and of hatching of mirids. (Professor O. W. Richards is now working on the taxonomy of these Braconids).

Both *O. concolor* and *O. virescens* have been introduced together with broom into California: *O. concolor* is the least abundant of broom mirids in England, but in California it reaches a degree of abundance which exceeds that of all the five species in southern England. In the foothills of the Sierras it is the only broom mirid and I did not find any parasitised nymphs. In British Columbia *Asciodema* is found with the two above species, but there it is *O. virescens* which occurs in greatest numbers. Nymphs are parasitised, probably by a *Leiophron* sp., but extremely lightly. In all probability even in the absence of *O. adenocarpi* and some nymphal parasites there is competition between the other two broom species of *Orthotylus*, but simultaneously the climatic background affects their abundance as a seesaw.