MORPHOLOGICAL VARIATION WITH INTERSPECIFIC IMPLICATIONS IN A POPULATION OF *SIGARA DORSALIS* (LEACH) (HEMIPTERA HETEROPTERA: CORIXIDAE), AND A REQUEST FOR BRITISH SPECIMENS

ALAN A. SAVAGE AND KARL FEAKES

(Dr A. A. Savage, Department of Biological Sciences, University of Keele, Staffordshire ST5 5BG, and Mr K. Feakes, Crewe & Alsager College of Higher Education, Crewe, Cheshire CW1 1DU, England.)

Introduction

Sigara dorsalis (Leach 1817) belongs to a very closely related group of six species forming the subgenus *Sigara sensu strictu* (Jansson 1986; Leston 1955). The other five species are *Sigara albiventris* (Horvath 1911), *Sigara assimilis* (Fieber 1848), *Sigara janssoni* Lucas 1983, *Sigara servadeii* Tamanini 1965 and *Sigara striata* (Linnaeus 1758). In essence, each of the six species has a distinct allopatric geographical distribution in Europe. 5. *albiventris* is known principally from South East Asia, reaching Europe only along the west coast of the Caspian Sea, while S. *assimilis* is recorded only from Yugoslavia to Mongolia. 5. *striata* is the most common and widespread species, occurring from Asia throughout the whole of Europe except for the most western areas. It occurs in the extreme South East of the British Isles (Lansbury & Leston 1966; Savage 1989). *S. janssoni* is known only from the Iberian Peninsula and 5. *servadeii* only from Corsica and Sardinia. 5. *dorsalis* is the typical British species but it also is found in West Scandinavia and through parts of France into Italy (Jansson 1986). Although first described by Leach it was regarded as synonymous with 5. *striata* until Macan (1954a) showed that it was a separate species. He first described it as a new species, *Corixa lacustris* Macan 1954 but soon realized that his new name was a synonym of *S. dorsalis* (Macan 1954b, 1955). This action was confirmed only recently (Macan 1961; Macan & Leston 1978; finally confirmed by the International Commission on Zoological Nomenclature - Opinion 1274/1984). Thus, the three endemic European species additional to S. *striata* were recognised only in the last few decades, largely owing to their collective close similarity. This evidence suggests that a study of intra- and interspecific variation in relation to geographical distribution in species of the subgenus *Sigara* may illuminate post-glacial faunistic changes. The present brief paper describes some initial results.

Variation in S. dorsalis from the North West Midlands

The British Isles lie approximately in the centre of the geographical range of *S. dorsalis* (Jansson 1986). Furthermore, it is sympatric with *S. striata* in the extreme South East where morphological evidence suggests that natural hybrids occur (Savage 1989, Figs 52, 53, 70). As already stated, all six species are similar. Females cannot usually be separated and males only by differences in the palae (fore tarsi) and genital parameres (Jansson 1986; Savage 1989). Macan (1954a) noted that there was considerable intraspecific variation in the right paramere of British 5. *dorsalis,* a fact confirmed by one of the present authors (A. A. S.) while examining material for the preparation of a recent key (Savage 1989, Fig. 53 a-f). Jansson (1986) extended this idea into a European dimension.

Studies were started on a series of populations in the North West Midlands of England. All the populations examined, except one, contained only males with the typical diagnostic features of *S. dorsalis,* albeit with considerable variation. These are a relatively straight row of distal palar pegs, a slight point on the dorsal surface of the left paramere, and an abrupt constriction (step) just proximal to the apex of the right paramere (Savage 1989, Figs 52, 53) (Fig. 1 a, b). One pond near Congleton, Cheshire (National Grid Reference SJ 839622) situated in a permanent-ley pasture and apparently free from pollution contained typical S. *dorsalis* males but, in addition, many atypical individuals. Forty-one males, taken at random from a sample collected on 15 February 1990, were examined. All possessed left parameres with the slight point on the dorsal surface characteristic of 5. *dorsalis .* Twenty-four (58%) possessed right parameres with an abrupt apical constriction (step), again characteristic of 5. *dorsalis* (Fig. 1a, b). Three (7%) possessed a right paramere totally lacking an apical constriction (Fig. 1 h, i) while thirteen (32%) possessed an intermediate form of right paramere (Fig. 1 d-g); one of these specimens possessed a pala with a marked proximal curve in the distal row of pegs, a characteristic of *S. striata* (Savage, 1989 Fig. 52 sr b). The possibly aberrant right paramere of the final specimen is illustrated in Fig. 1c. Thus, with the single exception of a pala, major variation was restricted to the right paramere but occurred in sixteen (39%) individuals.

Hybrids between S. dorsalis and S. striata

Laboratory crosses of *S. striata* from Finland with 5. *dorsalis* from Scotland produced, among other differences, hybrid males with right parameres which were intermediate between the two species and with progeny showing a closer resemblance to the female parent species (Jansson 1979 Fig. 5). All the hybrids with *S. dorsalis* as the female parent possessed a

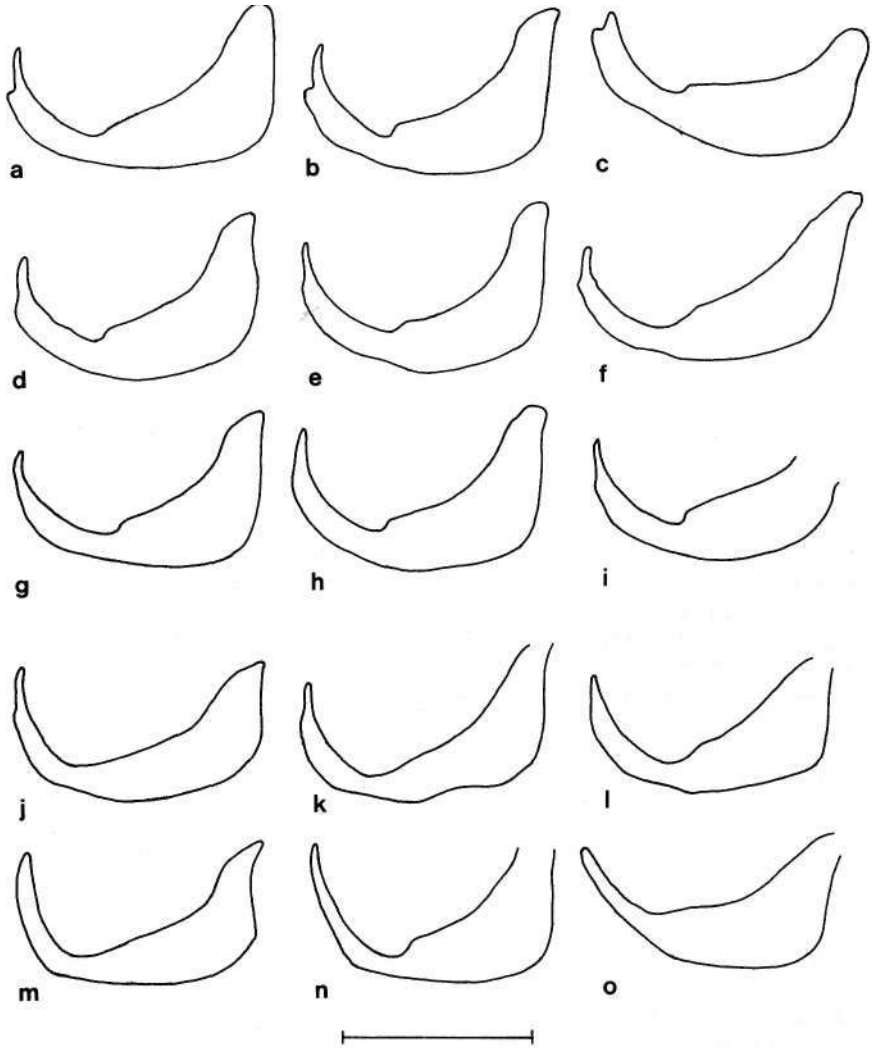


FIG. 1. Right parameres of males: a-b, typical *Sigara dorsalis* from pond SJ 839622; c, aberrant *Sigara dorsalis* from pond; d-i, intermediate *Sigara dorsalis* from pond; j, assumed natural hybrid of *Sigara dorsalis* x *S. striata* from South East England; k-l, experimental hybrid of male *S. striata* x female *S. dorsalis*; m, *S. striata* from South East England; n, *S. striata* from Denmark; o, aberrant *S. dorsalis* from Hebrides, Scotland. (j & m, redrawn from Savage 1989; k & l, from Jansson 1979; o, from Walton 1942) (Scale line 0.5mm).

left parmere with a dorsal point but showed considerable variation in the right paramere; two are shown here (Fig. 1 k, l). A comparison with Fig. 1 d-i shows that the right parameres of the experimental hybrids are indistinguishable from those of the sixteen (39%) males designated as intermediate, or lacking an apical construction, in the North West Midlands pond near Congleton (SJ 839622). Similarly, the left parameres cannot be separated. All overlap with assumed natural hybrids from the South East of England (Fig. 1j).

Two intermediate forms and a single aberrant (Fig. 1 o) right paramere of 5. *dorsalis* (originally identified as *Corixa striata* (Linnaeus), but see above) were described from specimens taken in the Hebrides, Scotland (Walton 1942). All were later re-examined by Macan (1954a) who confirmed the aberrant nature of the latter. It is possible that one of our specimens had an aberrant right paramere (Fig. 1 c) but the high proportion (39%) of individuals with intermediate right parameres is almost certainly a reflection of the genotypic variation of the pond population.

There is clear evidence that almost half of the supposed *S. dorsalis* males in the Congleton pond possessed morphological features intermediate between *S. dorsalis* and *S. striata.* Two explanations seem possible. Either they are hybrid progeny, probably from a male 5. *striata* and a female *S. dorsalis,* or a British population shows phenotypic, and by implication genotypic, characteristics shared with *S. striata.* At present, there is no evidence that *S. striata* occurs in the North West Midlands of England although the authors have seen, collectively, thousands of specimens which they have identified as 5. *dorsalis.* Furthermore, we are unlikely to have misidentified a male 5. *striata* (A. A. S has persistently looked for it in the North West for the past twenty-five years!). Thus, it appears highly probable that the variation in the morphological features reflects genuine genotypic variation in a natural population of *S. dorsalis* which, in turn, reflects the closeness of the relationship with 5. *striata.* If speciation has occurred, it must have taken place rather recently,

Request for specimens

We should like to extend our investigations to cover populations of S. *dorsalis* and 5. *striata* throughout the British Isles. We should be most grateful to those who can provide samples containing at least ten males from a specific population together with the date of collection and National Grid Reference. Specimens from Scotland, Ireland, the North East and South West of England would be especially welcome. May we emphasise that large unidentified collections of corixids likely to contain either of the two species would be equally welcome.

Acknowledgements

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