THE UNUSUAL RECOMBINATION POTENTIAL AND ITS ECOLOGICAL IMPLICATIONS IN *COENAGRION M. MERCURIALE* (CHARP.) FROM LIECHTENSTEIN (ZYGOPTERA: COENAGRIONIDAE)

In the Alps, this atlanto-mediterranean species approaches the eastern limits of its European (closed up) range, appears highly specialized as to the habitats, and the number of its populations is generally declining (cf. e.g. H. SCHIESS & J. DEMARMELS, 1979, *Jber. naturf. Ges. Graubünden* 98: 67-91). We were eager, therefore, to examine its karyotype, which has so far been unknown. Our friend, Rector Josef Biedermann (Planken, Liechtenstein), recently discovered a large and stable population in the Nature Reserve "Schwabbrünnen Äscher" in Liechtenstein, where we were able to collect a good series on June 16, 1988. (cf. J. BIEDERMANN, 1987, *Ber. bot.-zool. Ges. Liechtenstein-Sargans-Werdenberg* 16: 39-56). Four dissected specimens yielded some 20 micrographs of various spermatocyte stages, showing a very unusual karyotype; n ♂ = 13 (Fig. 1).

Save for a significantly larger bivalent, apparently originating from a fusion of 2 pairs of the primary complement, the elements/bivalents are graded in size, there are no *m*-chromosomes, and the medium-sized X is the smallest of the primary spermatocyte metaphase set.

Two features make the karyotype distinct from all other cytologically examined *Coenagrion* species, viz. (1) its secondary nature, resulting in the unusually low chromosome number for a member of this genus, and (2) the recombination, fixed apparently at a single chiasma per bivalent, the large "secondary" bi-

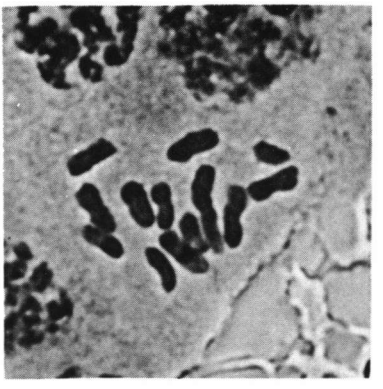

Fig. 1. *Coenagrion m. mercuriale* (Charp.): primary spermatocyte metapnase. (Aceto-carmine squash; X 2250)

valent not excluded. In this way, the recombination potential in *C. mercuriale* is exceptionally low, limiting the flexibility of the species, i.e. its adaptability to environmental variation. Through its low recombination, it may have increased the reproductive stability of its genome, but the low recombination index may well be the reason for the inability of *mercuriale*, at least under alpine conditions, to survive in any but the specific, well defined (essentially stenothermic and calcareous) environment.

In the southern (primary [?]) portions of its range, this is a strictly rheophilous species, tending at infraspeciation. In dragonflies, the latter is invariably accompanied by variation in recombination indices in different geographic populations, caused by variation in chromosome number or/and in chiasma frequency. It would not be surprising, therefore, if the subspecies *castellani* Roberts in Italy, and *hermeticum* (Sel.) in northwestern Africa , or the Transcaucasian populations would turn out to be cytologically essentially different from the alpine nominate form.

B. Kiauta and M. Kiauta, S.I.O. Central Office, P.O. Box 256, NL-3720 AG Bilthoven, The Netherlands.