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Karyotype of a Noemacheiline Loach, *Lefua echigonia*

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Of the three Japanese species of loach of the subfamily Noemacheilinae (Cobitididae: Cypriniformes), two, *Lefua nikkonis* Jordan et Fowler and *Barbatula toni* (Dybowski), have been studied karyologically (Hitotsumachi et al., 1969). The chromosomes of the remaining species, *Lefua echigonia* Jordan et Richardson, have only been examined by the classic gonad section method (Nogusa, 1960), and the karyotypic details of this species are not clearly known. It is the purpose of the present study to present a description of the karyotype of *L. echigonia* and a comparison of the karyotypes of these three neomacheiline species.

Material and methods

Six specimens, 32.3～48.0 mm in standard length, collected from an irrigation canal at Eda, Kanagawa Pref., Japan, were supplied for this study. Kidney, gill and testis tissues were used for chromosome analysis. Methods of chromosome preparation are the same as those employed in Suzuki et al. (1982). The classification of chromosomes followed Levan et al. (1964).

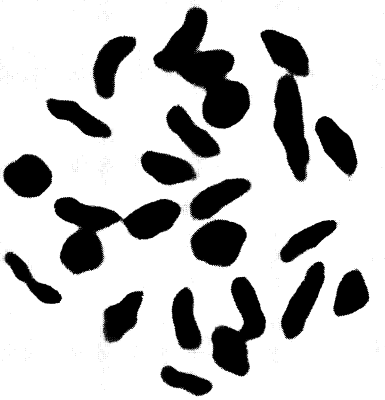

Fig. 1. Meiotic metaphase I in *Lefua echigonia* with 25 bivalents.

Table 1. Frequency distribution of somatic and meiotic chromosome counts in *Lefua echigonia*.

Somatic chromosomes					Meiotic chromosomes	
					Primary division	Secondary division
46	47	48	49	50	25 (biyalents)	25 (chromosomes)
1	1	5	5	36	24	4

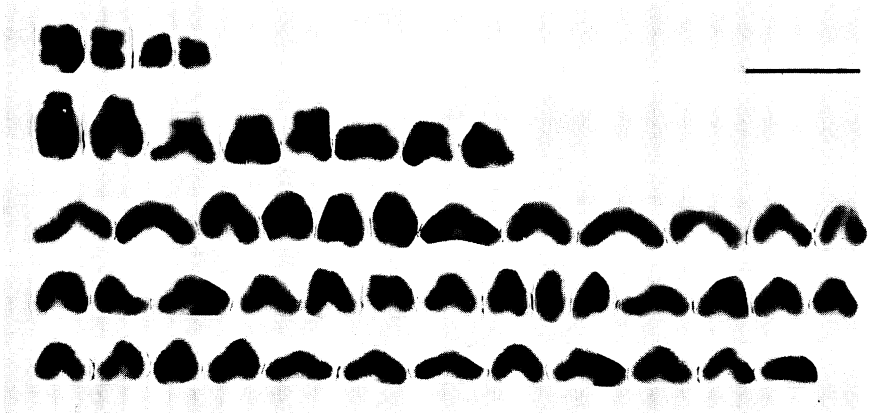

Fig. 2. Karyotype of *Lefua echigonia*. 2n=50. Top row, metacentrics; second row, submetacentrics; third to fifth rows, subtelo- and acrocentrics. Scale indicates 5 μm.

Results

The chromosome number was determined as 2n=50 on the basis of chromosome counts for both somatic and meiotic plates (Table 1; Fig. 1). The karyotype contained four metacentric, eight submetacentric, 38 subtelo- and acrocentric chromosomes (Fig. 2). Heteromorphic element was not observed.

Discussion

Nogusa (1960) reported 50 rod-like chromosomes in *Lefua echigonia*. Observations in the present study revealed that the 50 chromosomes contain both biarm and monoarm elements.

The chromosome complement of *Lefua echigonia* is hardly distinguishable from that of *L. nikkonis* which consists of 12 meta- to submetacentrics and 38 telo- to subtelocentrics (Hitotsumachi et al., 1969). Whereas it differs clearly from the karyotype of *Barbatula toni* which contains 19 meta- to submetacentrics and 34 telo- to subtelocentrics (Hitotsumachi et al., 1969).

The two species of *Lefua*, while geographically isolated (*L. echigonia* in Honshu and Shikoku and *L. nikkonis* in Hokkaido), are close in morphological characters and even regarded as two subspecies of the same species by some authors (Miyadi et al., 1976). Setting aside the question whether such a taxonomic treatment is acceptable or not, it is beyond dispute that the karyotypic affinity of the two species indicates their close relationship.

Acknowledgments

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ホトケドジョウの核型

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ホトケドジョウ *Lefua echigonia* の染色体は 2n=50 で，核型は 4 本の中部着糸染色体，8 本の次中部着糸染色体，38 本の次端部・端部着糸染色体で構成されていた．本種とエゾホトケ *L. nikkonis* の核型はひじょうによく似ており，両種の近縁性を示している．他方，この 2 種と同じフクドジョウ亜科に属するフクドジョウ *Barbatula toni* の染色体は構成が異なっている．

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