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Karyotypes of Pangasiid Catfishes, *Pangasius sutchi* and *P. larnaudii*, from Thailand

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Catfishes of the genus *Pangasius* are the members of the family Pangasiidae (Nelson, 1984). *Pangasius sutchi* Fowler and *P. larnaudii* Bocourt are distributed in Central Thaliand and the Mekong Basin.

Recently, we observed the chromosomes of these two catfishes. As far as we know, the present paper is the second report on pangasiid karyotypes (Manna and Prasad, 1971). As karyotypes seem to be important data for the study on phylogenetic systematics of *Pangasius*, we will describe them.

Materials and methods

Twelve specimens of *Pangasius sutchi* and eight specimens of *P. larnaudii* were collected from Nakhonsawan, Central Thailand. *Pangasius sutchi*, 75 to 112 mm in standard length, and *P. larnaudii*, 118 to 135 mm in standard length, were used in this study.

Mitotic metaphase chromosome preparation was obtained from the kidney tissue by essentially the same method as that described by Ojima and Kurishita (1980). Ratio of long arm to short arm (L/S) and relative length (RL) of each chromosome were calculated for karyotype analysis. Relative length was calculated by the following formula: total length of each chromosome pair $\times 100$/total length of all chromosomes in the complement. Classification of chromosomes followed Levan et al. (1964). Metacentrics and submetacentrics are described as two-arm chromosomes, and subtelocentrics and acrocentrics as one-arm chromosomes.

Results

Pangasius sutchi. As shown in Table 1, 60 cells of *P. sutchi* were examined. A photograph of mitotic metaphase chromosomes and its karyotype of *P. sutchi* are shown in Fig. 1A. The karyotype comprises 10 pairs of metacentric, 6 pairs of submetacentric, 2 pairs of subtelocentric, and 12 pairs of acrocentric chromosomes. The arm number was 92. As regards chromosome length, the largest is a pair of submetacentrics (11th in Fig. 1A: RL$\geq$6.5), the second to fourth are 3 pairs of submetacentrics (12th, 13th, 14th in Fig. 1A: 6.0$\leq$RL$<$6.5), and the others are smaller than 4 pairs of submetacentrics described above (RL$\leq$5.0). The lengths of two-arm chromosomes ranged from 1.3 to 5.0 μm, while those of one-arm chromosomes from 1.6 to 5.4 μm. The largest pair of acrocentrics was more than three times of the smallest pair of acrocentrics.

Pangasius larnaudii. A photograph of mitotic metaphase chromosomes and its karyotype of *P. larnaudii* are shown in Fig. 1B. The karyotype comprises 12 pairs of metacentric, 10 pairs of submetacentric, 2 pairs of subtelocentric and 6 pairs of acrocentric chromosomes. The arm number was 104. As regards chromosome length, the largest is a pair of submetacentrics (13th in Fig. 1B: RL$\geq$6.5), the second to fourth are three pairs of submetacentrics (14th to 16th in Fig. 1B: 6.0$\leq$RL$<$6.5), and the others are smaller than 4 pairs of submetacentrics described above (RL$\leq$5.0). The lengths of two-arm chromosomes ranged from 1.2 to 5.0 μm, and those of one-arm chromosomes from 1.4 to 6.0 μm. The largest acrocentric was more than three times of the smallest acrocentric.

Discussion

Pangasius sutchi and *P. larnaudii* have 2n=60, and karyological difference in both species was detected in the arm number: 92 in *P. sutchi* and

Table 1. Distribution of chromosome counts for two species of the family Pangasiidae.

Species	Chromosome counts												No. of cells observed
	52	53	54	55	56	57	58	59	60	61	62	63	
Pangasius sutchi	3		6		9		12		24		6		60
P. larnaudii	2	1	2	1	3	2	11		14		1	1	38

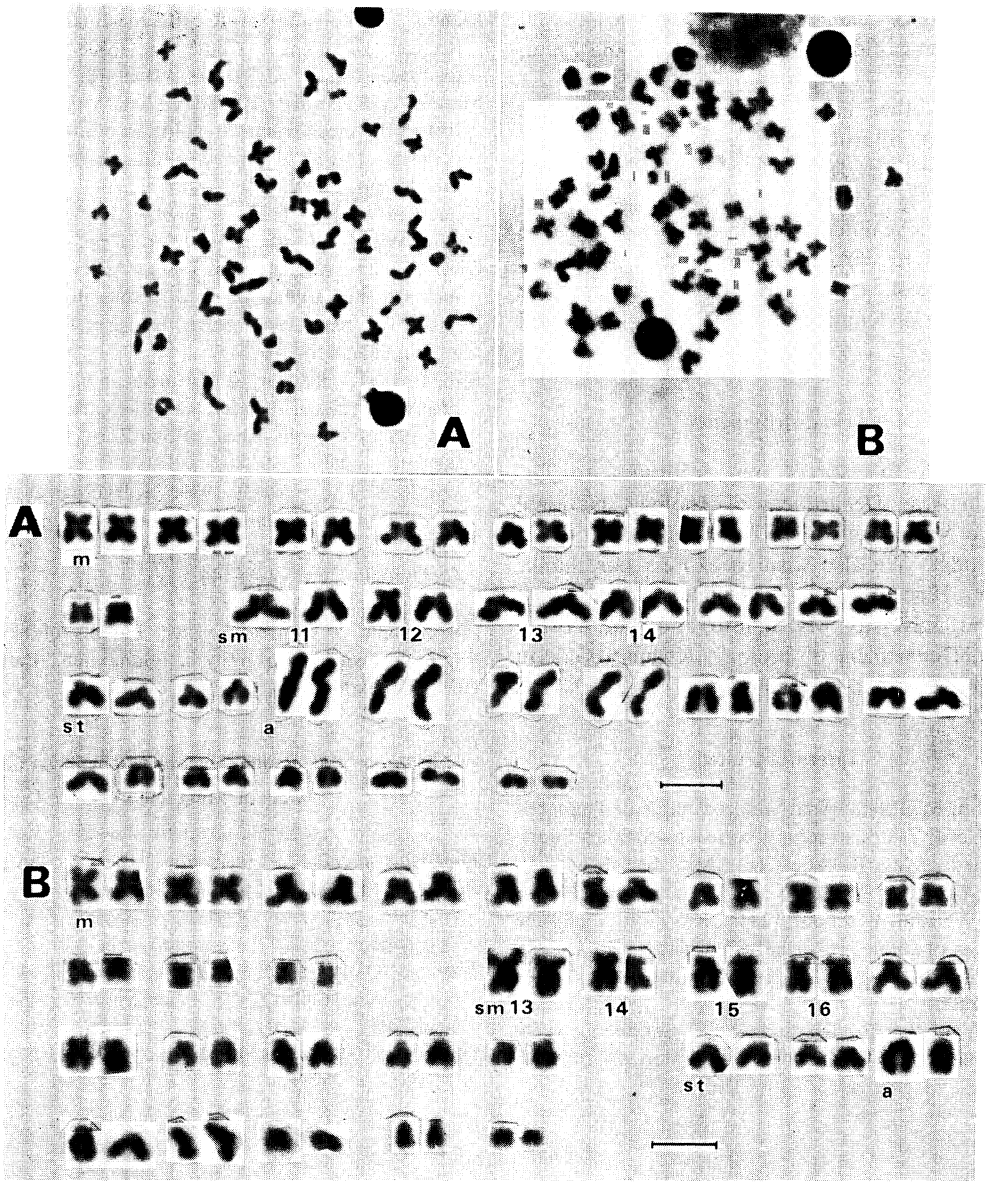

Fig. 1. Photomicrographs of mitotic metaphase chromosomes and karyotypes of *Pangasius*. A, *P. sutchi*; B, *P. larnaudii*. Each scale indicates 5 μm.

104 in *P. larnaudii*. As regards chromosome length, the characteristics commonly shared by karyotypes of two species are as follows, 1) the largest chromosome is submetacentric, 2) the 2nd to 4th largest are submetacentrics, and 3) all metacentrics are small (RL$\leq$5.0). The difference between the karyotype of *P. sutchi* and that of *P. larnaudii* may be caused by pericentric inversion in 12 small chromosomes.

Karyotypes of *P. sutchi* and *P. larnaudii* differ from that of *Pangasius pangasius* (2n=62: 14M, 6SM, 18ST, 24A: NF=82) in the diploid chromosome number and arm number (Manna and Prasad, 1971). Sixty or more in the diploid chromosome number is very high in Eurasian Siluriformes, and has been observed in the Siluridae (2n=60 in *Silurus glanis* and 2n=86 in *Wallago attu*) and the Bagridae (2n=60 in *Mystus*

macropterus, *M. elongatus* and *M. guttata*) as well as in the Pangasiidae (Rab, 1981; Hong and Zhou, 1984).

On the other hand, Chardon (1968) studied osteology of Siluriformes and suggested that the Pangasiidae were derived from the Bagridae and closely related to the Schilbeidae. Karyotypes of the Pangasiidae differ from those of the Schilbeidae in the diploid chromosome number: 2n=60–62 in the Pangasiidae and 2n=58 in the Schilbeidae (Manna and Khuda-Bukhsh, 1978; Rishi and Singh, 1983).

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タイ国産ナマズ目 Pangasiidae 科魚類 2 種の核型

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タイ国産ナマズ目 Pangasiidae 科に属する 2 種，*Pangasius sutchi* と *P. larnaudii* の染色体を観察した．*P. sutchi* の核型は，10 対の中部着糸染色体，6 対の次中部着糸染色体，2 対の次端部着糸染色体，12対の端部着糸染色体よりなる．*P. larnaudii* の核型は 12 対の中部着糸染色体，10 対の次中部着糸染色体，2 対の次端部着糸染色体，6 対の端部着糸色体よりなる．各染色体の相対長の測定結果から，両種の核型のちがいは，12 本の端部着糸染色体の挟動原体逆位によることが推定された．