

Karyotypic Analysis of Four Labrid Fishes from Korea

In - Seok Park, Hyung - Bae Kim* and Young - Don Lee**

Department of Marine Living Resources, Kunsan National University,
Kunsan 573 - 360, Korea

*Marine Biotechnology Research Group, KORDI, Ansan P. O. Box 29,
Ansan 425 - 600, Korea

**Marine Research Institute, Cheju National University, Cheju - do 695 - 810, Korea

Karyotypic analysis was performed for Labridae fishes, *Pseudolabrus japonicus*, *Halichoeres tenuispinis*, *H. poecilopterus* and *Pteragogus flagellifera* from coastal area of Cheju Island in Korea. The chromosome numbers(Karyotypes) were 42(4M+24SM+14ST, A), 48(2M+2SM+44ST, A), 48(2M+46ST, A) and 42(4M+24SM+14ST, A) in *P. japonicus*, *H. tenuispinis*, *H. poecilopterus* and *P. flagellifera*, respectively. Heteromorphic sex chromosome was not found in both sexes of each Labridae fishes. However, large satellites were located on the largest subtelocentrics in *P. japonicus* and *P. flagellifera*.

Introduction

Family Labridae, *Pseudolabrus japonicus*, *Halichoeres tenuispinis*, *H. poecilopterus* and *Pteragogus flagellifera*, are widely distributed in the coastal area of Cheju Island, Korea (Chyung, 1977 ; Lee *et al.*, 1993). These species exhibit sexual dimorphism at spawning season(Fukui *et al.*, 1991 ; Lee *et al.*, 1993 ; Nakamura *et al.*, 1984 ; Okada, 1964).

Previous karyological studies of these four species were reported by several Japanese authors(Arai and Koike, 1980 ; Ojima and Kashiwagi, 1979, 1980).

Karyotypic study is a part of the analysis of species divergence and evolution(Hartley and

Horne, 1984). So the karyotypic analysis of the Family Labridae was useful method to classify these species exhibiting various sexual color and dimorphism at sexual maturation period, and what is more to distinguish sex in each species.

This report presents data from karyotypic analysis of above 4 species of Family Labridae from Korea and compares them with each other.

Materials and Methods

The fishes of Family Labridae, *Pseudolabrus japonicus*, *Halichoeres tenuispinis*, *H. poecilopterus* and *Pteragogus flagellifera* were col-

lected from the coastal area of Hamduck in Cheju - Island between autumn of 1993 and fall of 1994. The specimens were transported to the laboratory and kept in captivity until they were treated or used. Sex was determined by observation of internal sex organs.

Chromosome preparations were obtained using the standard kidney procedure (Kim *et al.*, 1982). An intraperitoneal injection of colchicine was given to each specimen (1~10 $\mu\text{g/g}$ body weight) three to four hours before sacrificing. Kidney tissue was minced in 0.075M KCl. The suspensions were centrifuged, supernatants discarded and cell sediments fixed in two successive changes of fresh methanol - acetic acid solution (3 : 1). Slide were prepared by routine air - drying method and stained with Giemsa solution. At least 20 countable metaphases from each specimen were observed for the determination of chromosome number and for the analysis of karyotype. Well spread chromosomes at metaphases were selected and photographed. Karyotypes were prepared based on Levan *et al.* (1964).

Results

Heteromorphic sex chromosomes were not found in both sexes in Family Labridae examined (Fig. 1).

The diploid chromosome number of *Pseudolabrus japonicus* was 42 with an arm number of 70 and karyotype consisted of 2 pairs of metacentrics, 12 pairs of submetacentrics and 7 pairs of subtelocentrics or acrocentrics (Fig. 1 - a & Fig. 2). One large pair of subtelocentrics with satellites could identified (Fig. 1 - a).

The diploid chromosome number of *Halichoeres tenuispinis* and *H. poecilopterus*, belong to Genus *Halichoeres*, were commonly 48 (Fig. 2). In *H. tenuispinis* an arm number was 54 and

karyotype consisted of one pair of metacentric, one pair of submetacentric and 22 pairs of subtelocentrics or acrocentrics (Fig. 1 - b). In *H. poecilopterus* an arm number was 50 and karyotype consisted of one pair of metacentric and 23 pairs of subtelocentric or acrocentrics (Fig. 1 - c).

The diploid chromosome number of *Pteragogus flagellifera* was 42 with an arm number of 70 and karyotype consisted of 2 pairs of metacentrics, 12 pairs of submetacentrics and 7 pairs of subtelocentrics or acrocentrics (Fig. 1 - d & Fig. 2). One pair of subtelocentrics with satellites could identified (Fig. 1 - d).

Discussion

The chromosome number (karyotype) of 42 (4M + 24SM + 14ST, A) with arm number of 70 reported here for *Pseudolabrus japonicus* is in agreement with that of Arai and Koike (1980) except karyotype complement (20M + 8SM + 14ST, A) but differ from the chromosome number (karyotype) of 48 (2M + 2SM + 44A, T) with arm number of 48 reported by Ojima and Kashiwagi (1979).

The chromosome number (karyotype) of 48 (2M + 2SM + 44ST, A) with arm number of 54 reported here for *Halichoeres tenuispinis* is in agreement with those of Ojima and Kashiwagi (1979, 1980) and Arai and Koike (1980) except some differences in karyotype complement (metacentrics/submetacentrics) and arm number of 50.

The chromosome number (karyotype) of 48 (2M + 46ST, A) with arm number of 50 reported here for *H. poecilopterus* is in agreement with that of Arai and Koike (1980) and similar to that of Ojima and Kashiwagi (1980) with karyotype complement (4M + 2SM + 42ST, A) and arm number of 54.

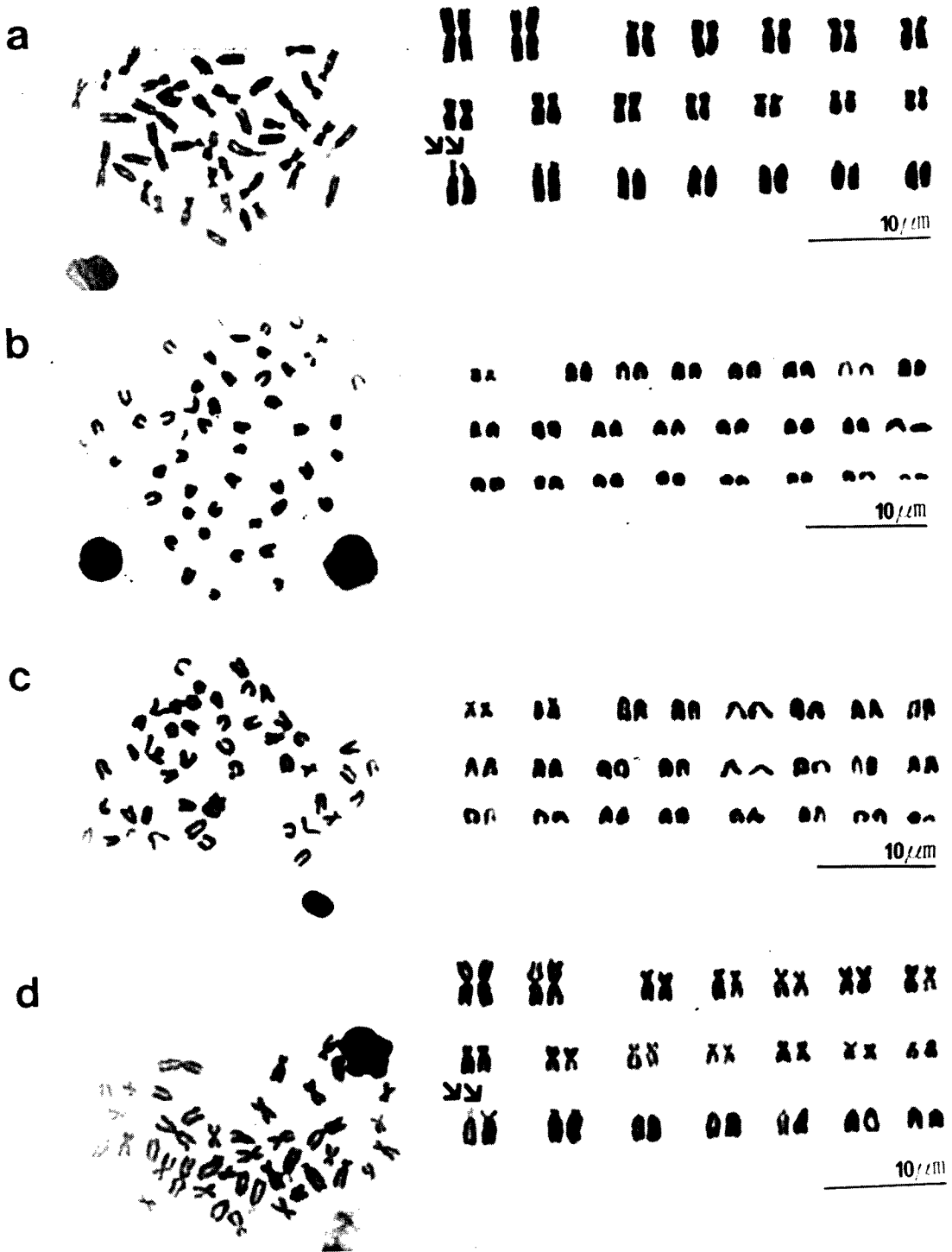


Fig. 1. Metaphase and karyotype of Family Labridae, *Pseudolabrus japonicus*(a), *Halichoeres tenuispinis*(b), *H. poecilopterus*(c) and *Pteragogus flagellifera*(d). Arrows indicate satellited subtelocentric chromosomes.

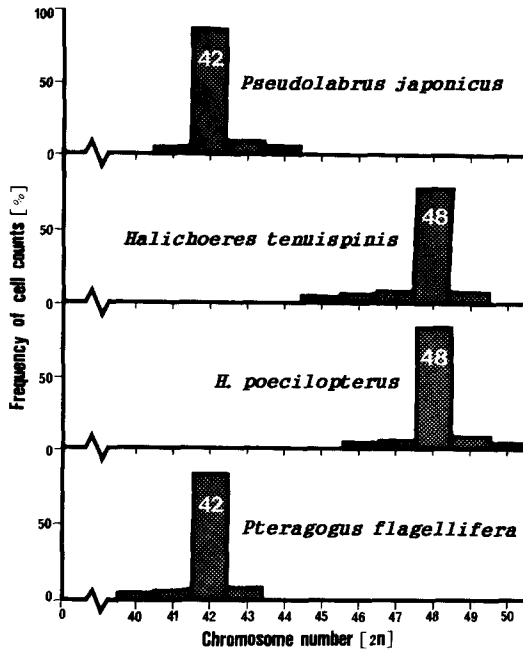


Fig. 2. Chromosome number of Family Labridae, *Pseudolabrus japonicus*, *Halichoeres tenuispinis*, *H. poecilopterus* and *Pteragogus flagellifera*.

The chromosome number(karyotype) of 42 (4M+24SM+14ST, A) with arm number of 70 reported here for *P. flagellifera* is differ from the chromosome number(karyotype) of 44(2M+10SM+32ST, A) with arm number of 56 reported by Arai and Koike(1980).

Two satellite located on the largest subtelocentrics in *P. japonicus* and *P. flagellifera* particullary useful marker(Park *et al.*, 1994) to distinguish these species from other Labridae species. Considering the similarity of karyotype between *P. japonicus* and *P. flagellifera* application of banding techniques to these species will be necessary further.

Because of the absence of heteromorphic sex chromosome in Labridae fishes in this study other additional characteristics will be necessary to determine the sex. The difference of karyotype in Labridae fishes stems from the small pair of metacentrics/submetacentrics, submetacentrics/acrocentrics or telocentrics

those have short arm to long arm ratio on the borderline between one - armed and two - armed chromosomes as defined by Levan *et al.*(1964).

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한국산 놀래기과 어류 4종의 핵형분석

박인석 · 김형배* · 이영돈**

군산대학교 해양자원육성학과

*한국해양연구소 해양생물공학 연구그룹

**제주대학교 해양연구소

제주도 근해산 놀래기과 어류들에서 암·수간 heteromorphic한 성염색체는 발견할 수 없었고 황놀래기, 놀래기, 용치놀래기, 어랭놀래기의 염색체수(핵형)은 각각 42(4M+24SM+14ST, A), 48(2M+2SM+44ST, A), 48(2M+46ST, A), 42(4M+24SM+14ST, A)로 나타났으며 황놀래기, 어랭놀래기인 경우 가장 큰 2개의 subtelocentrics에 satellite가 존재하였다.