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Live specimens of ricefishes and relatives suborder Adrianichthyoidei maintained in Shinshu University: a list with karyotypic data

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Abstract This is a list of live specimens of ricefishes and relatives suborder Adrianichthyoidei maintained in Shinshu University. They are 12 species of *Oryzias* collected from 50 localities and a laboratory stock of *Xenopoecilus sarasinorum*. These fishes have been providing for various fields of studies as materials.

Ricefishes and relatives suborder Adrianichthyoidei are members of a small group of atherinomorph fishes endemic to Asia. Families Oryziidae, Adrianichthyidae and Horaichthyidae with four genera and 19 species are listed in this group. Rosen and Parenti (1981) place all species in the family Adrianichthyidae. Ricefishes or medakas of the genus *Oryzias* are found widespread from India to Japan including the Indo-Australian Archipelago. Adrianichthyids of the genera *Adrianichthys* and *Xenopoecilus* and horaichthyid of the genus *Horaichthys* occur in lakes of the central Sulawesi and along coastal area of the northwestern India, respectively.

In ricefishes, 14 species have been known. The latest records were three species found from lakes in central Sulawesi (Kottelat, 1990a, b). Geographical distribution of *Oryzias* is shown in Fig. 1. They are common in ponds, ditches and paddy fields, while two species, *O. melastigma* and *O. javanicus*, inhabit in brackish water.

The 12 species so far studied can be divided karyotypically into three groups; the monoarmed, the biarmed and the fused chromosome types. We have postulated that karyotypes of the monoarmed chromosome group is to be recognized as basic for *Oryzias* (Uwa *et al.*, 1983; Uwa, 1986). Therefore, the biarmed and the fused chromosome groups are evolved from the monoarmed chromosome group through pericentric inversion and centric fusion, respectively. This division coincides with divisions suggested by allozymic studies (Sakaizumi, 1985a, b) and morphometric data (Uwa and Parenti,1 988).

The monoarmed and biarmed chromosome groups have a disjunct distribution, being found in western and eastern parts of Asia, respectively. Their geographical border seems to lie between the basins of the Salween-Mae Nam Chao Phraya and the Mekong. The fused chromosome group is found in Sulawesi and Timor; a transition zone between Oriental and Australian called Wallacea.

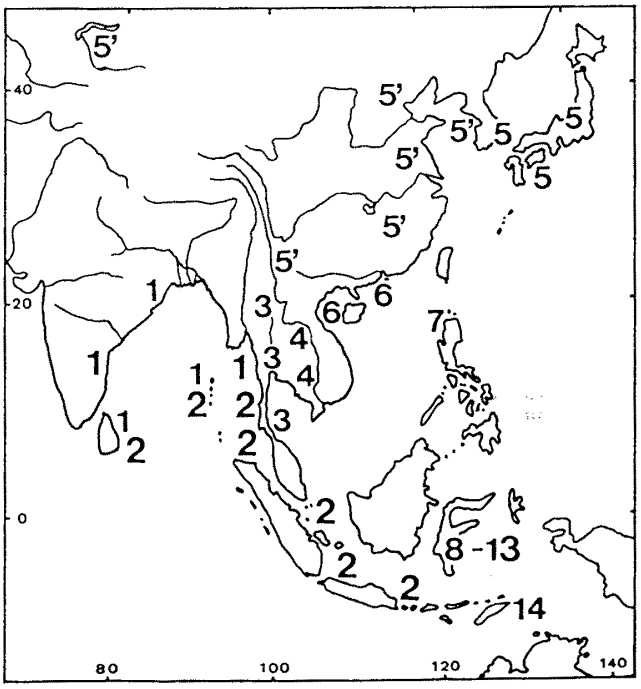

Fig. 1. Geographical distribution of ricefishes genus *Oryzias*. 1) *O. melastigma*, 2) *O. javanicus*, 3) *O. minutillus*, 4) *O. mekongensis*, 5) *O. latipes*, 5') *O. l. sinensis*, 6) *O. curvinotus*, 7) *O. luzonensis*, 8) *O. celebensis*, 9) *O. nigrimas*, 10) *O. matanensis*, 11) *O. marmoratus*, 12) *O. profundicola*, 13) *O. orthognathus*, 14) *O. timorensis*.

Oryzias latipes has been divided allozymically into four genetic groups; the Northern and the Southern Populations in Japan, the East Korean Population and the China-West Korean Population (Sakaizumi & Jeon, 1987). On the bases of morphological and karyotypical differences, Chen *et al.* (1989) divided the China-West Korean Population from others as *O. l. sinensis*. Karyotypic differences between two subspecies are shown in Fig. 2.

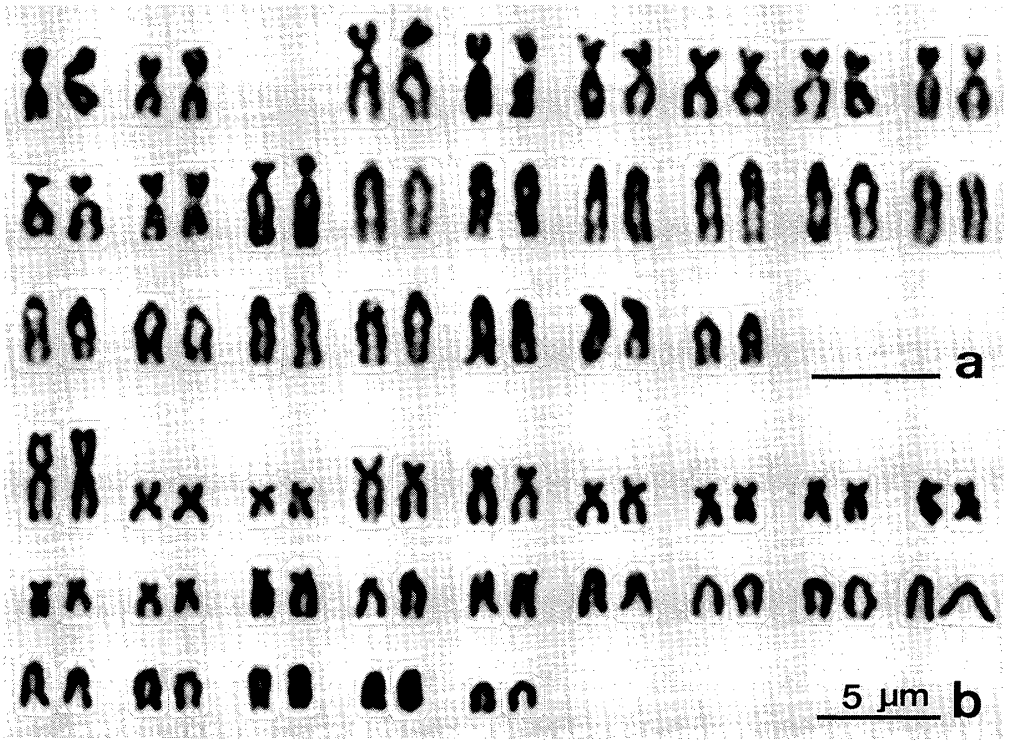

Fig. 2. Karyotypes of two subspecies of *Oryzias latipes*. a) *O. l. latipes* from Suwa, Japan (2n=48, NF=68, Southern Population), b) *O. l. sinensis* from Kunming, China (2n=46, NF=68, China-West Korean Population). Bars represent 5 μm.

I and my colleagues have been collecting live specimens of 12 species of *Oryzias* and a species of *Xenopoecilus*. They are kept at institutions as laboratory stocks. This is a list of live specimens of ricefishes and relatives maintained in Shinshu University as of December 1992. Karyotypical data are added for convenience. Local populations of *Oryzias latipes* from Japan are omitted from this list except Suwa; a locality near Shinshu University. They are maintained systematically in the University of Tokyo and the Tokyo Metropolitan Institute of Medical Science (Shima *et al.*, 1985a, b).

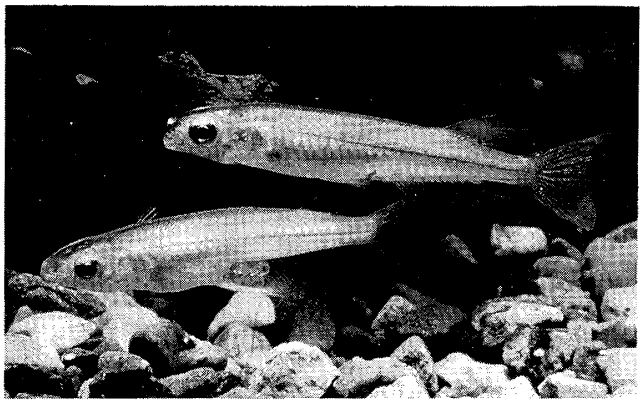

Fig. 3. Photograph of a male and female pair of *Xenopoecilus sarasinorum* maintained in Shinshu University. The female (low fish) carries egg cluster under the belly.

Laboratory stock of *Xenopoecilus sarasinorum* was donated by M. Kottelat in September 1991. This species is endemic to Lake Lindu, central Sulawesi. Kottelat (1990a) described that the female of *X. oophorus* from Lake Poso, central Sulawesi, carries egg cluster under the belly until hatching. The same habits is also observed in *X. sarasinorum* (Fig. 3).

List of live specimens

This list represents locality, name and date of collection, name and date of donation, and karyotypic data with reference in parentheses.

I. *Family Oryziidae, Genus Oryzias Jordan et Snyder*

1. *O. melastigma* (McClelland)

1) Chidambaran, Tamil Nadu, India; O.P. Saxena & T. Iwamatsu, Oct. 1981; Donat. by T. Iwamatsu; 2n=48, NF=48, 48A (Uwa *et al.*, 1983).

2) Bangbane, Rayong, Thailand; H. Uwa, K. Takata & W. Magtoon, July 1988; 2n=48, NF=48, 48A (Uwa & Magtoon, 1988).

2. *O. javanicus* (Bleeker)

1) Pluit, Jakarta, Indonesia; K. Hirata & T. Iwamatsu, 1 may 1983; Donat. by T. Iwamatsu; 2n=48, NF=48, 48A (Uwa, 1986).

2) Tangerang, Jakarta, Indonesia, H. Uwa *et al.*, 12 Oct. 1992.

3) Tamaanroya, Sulawesi, Indonesia; H. Uwa, K. Naruse & B. Soeroto, 9 Oct. 1992.

4) Singapore; K. Naruse, Oct. 1992; Donat. by K. Naruse, Dec. 1992; 2n=48, NF=48, 2ST+46A (Uwa & Iwata, 1981).

3. *O. minutillus* Smith

1) Bangkok, Thailand; H. Uwa & W. Magtoon, 4 April 1984; 2n=34; NF=44, 8M+2SM+24A (Magtoon & Uwa, 1985).

2) Chiang Mai, Thailand; H. Uwa & W. Magtoon, April 1984; 2n=30, NF=44, 12M+2SM+16A (Magtoon & Uwa, 1985).

3) Phuket, Thailand; W. Magtoon, July 1987; Donat. W. Magtoon; 2n=42, NF=42, 42A (Ashida & Uwa, 1987).

4) Songkhla; Uwa *et al.*, 14 July 1988; 2n=42, NF=42, 42A: 5) Chumphon; Uwa *et al.*, 21 Oct. 1989; 2n=42, NF=42, 42A: 6) Bua Yai, Nakhon Ratchasima; Uwa *et al.*, 3 Nov. 1989; 2n=42, NF=42, 42A: 7) Chiang Rai; Uwa *et al.*, 26 Oct. 1989; 2n=32, NF=44, 10M+2SM+20A: 8) Phayakkhaphum Phisai, Maha Sarakhan; N. Nadee & W. Magtoon, 26 July 1990; Donat. by W. Magtoon, Sept. 1990; 2n=42, NF=42, 42A: 9) Pak Chong, Nakhon Ratchasima; W. Magtoon & N. Nadee, 19 May 1990; Donat. by W. Magtoon, Sept. 1990; 2n=28 (30), NF=44, 14M+2SM+ 12A: 10) Chachoengsao; W. Magtoon & Naulsawee, 3 Dec. 1989; Donat. by W. Magtoon, Sept. 1990; 2n=42, NF=44 2SM+40A: 11) Rayong; W. Magtoon, 11 Aug. 1989; Donat. by W. Magtoon, Nov. 1989; 12) Chai Nat; W. Magtoon, 25 Aug. 1990; Donat. by W. Magtoon, Sept. 1990; 13) Saraburi; W. Magtoon & N. Nadee, 19 May 1990; Donat. by W. Magtoon, Sept. 1990; 2n=30, NF=44, 12M+2SM+16A: 14) Ratchabrui; W. Magtoon & Naulsawee, 9 Dec. 1989; Donat. by W. Magtoon, Sept. 1990; 2n=28, NF=44, 14M+2SM+12A: Thailand (Magtoon *et al.*, 1992).

15) Na Di, Prachin Buri; W. Magtoon & N. Nadee, 20 May 1990; Donat. by W. Magtoon, Sept. 1990.

4. *O. mekongensis* Uwa et Magtoon

1) Yang Talat, Kalasin, Thailand; H. Uwa and W. Magtoon, 19 Apr. 1984; 2n=48, NF=58, 2M+8SM+24ST+14A (Uwa & Magtoon, 1986).

2) Kantharalack, Si Sa Ket, Thailand; W. Magtoon, 15 Mar. 1984; Donat. by W. Magtoon, Apr. 1984.

3) Mukdahan, Thailand; N. Nadee & W. Magtoon, 28 May, 1990; Donat. by W. Magtoon, Sept. 1990.

5. *O. latipes* (Temminck & Schlegel)

1) Suwa, Nagano, Japan; Uwa, 1981; (2n=48, NF=68, 4M+16SM+2ST+26A; Uwa & Ojima, 1981; Uwa & Kawai, 1982).

2) Naa-ri, Kyongsangbuk-do, Korea; S.-R. Jeon, 29 Nov. 1986; Donat. by S.-R. Jeon, 1987; 2n=48, NF=68, 4M+16SM+2ST+26A (Uwa & Jeon, 1987).

3) Yunghwa-ri, Chollanam-do, Korea; M. Sakaizumi, H. Uwa & S.-R. Jeon, 17 Aug. 1987.

4) Tangam-ri, Chollanam-do, Korea; M. Sakaizumi, H. Uwa & S.-R. Jeon, 17 Aug. 1987.

5) Pojon-ri, Kyongsangnam-do, Korea; M. Sakaizumi, H. Uwa & S.-R. Jeon, 18 Aug. 1987.

6) Myongsan-ri, Kyongsangnam-do, Korea; S.-R. Jeon, 29 Nov. 1986; Donat. by S.-R. Jeon, 1987.

7) Hwajon-ri, Kyongsangnam-do, Korea; S.-R. Jeon, 29 Nov. 1986; Donat. by S.-R. Jeon, 1987.

5'. *O. latipes sinensis* Chen, Uwa et Chu

1) Shanghai and 2) Beijing, China; Laboratory stock; Donat. by the Univ. Tokyo; 2n=46, NF=70, 6M+18SM+4ST+18A (Uwa, 1986).

3) Kunming and 4) Dali, Yunnan, China; H. Uwa, R.-F. Wang & Y.-R. Chen, Oct. 1986; 2n=46, NF=68, 6M+16SM+4ST+20A (Uwa *et al.*, 1988).

5) Nae-ri, Kyonggi-do, Korea; S.-R. Jeon, 30 Nov. 1986; Donat. by S.-R. Jeon, 1987; 2n=46, NF=68, 6M+16SM+2ST+22A (Uwa & Jeon, 1987).

6) Chodong-ri, Chollabuk-do, Korea; M. Sakaizumi, H. Uwa & S.-R. Jeon, 16 Aug. 1987.

6. *O. curvinotus* (Nichols et Pope)

1) Hong Kong: H. Uwa & D. Dudgeon, 24 Nov. 1986; 2n=48, NF=82, 8M+26SM+10ST+4A (Uwa, 1991).

7. *O. luzonesis* (Herre et Ablan)

1) Solsona, Ilocos Norte, Philippines; H. Uwa & M.J. Formacion, 16 Dec. 1982; 2n=48, NF=96, 48M&SM (Formacion & Uwa, 1985).

8. *O. celebensis* (Weber)

1) Ujung Pandang, Sulawesi, Indonesia; K. Hirata & T. Iwamatsu, 14 Mar. 1979; Donat. by T. Iwamatsu; 2n=36, NF=48, 8M+4SM+24A (Uwa *et al.*, 1981).

2) Enrekang, Sulawesi; H. Uwa, K. Naruse & B. Soeroto, 5 Oct. 1992.

3) Malino, Sulawesi; H. Uwa, K. Naruse & B. Soeroto, 8 Oct. 1992.

9. *O. nigrimas* Kottelat

1) Lake Poso, Sulawesi, Indonesia; M. Kottelat, June 1988; Donat. by M. Kottelat, Mar. 1991; 2n=38, NF=48, 6M+4SM+28A (Uwa *et al.*, 1991).

2) Tentena, Lake Poso, Sulawesi; H. Uwa, K. Naruse & B. Soeroto, 25 Sept. 1992.

3) Pendolo, Lake Poso, Sulawesi; H. Uwa, K. Naruse & B. Soeroto, 27 Sept. 1992.

10. *O. matanensis* (Aurich)

1) Lake Matano, Sulawesi, Indonesia; M. Kottelat, June 1988; Donat. by M. Kottelat, Mar. 1991; 2n=42, NF=48, 2M+4SM+2ST+34A (Uwa *et al.*, 1991).

2) Saroako, Lake Matano, Sulawesi; H. Uwa, K. Naruse & B. Soeroto, 30 Sept. 1992.

11. *O. marmoratus* (Aurich)

1) Lake Towuti, Sulawesi, Indonesia; M. Kottelat, June 1988; Donat. by M. Kottelat, Mar. 1991; 2n=42, NF=48, 2M+4SM+36A (Uwa *et al.*, 1991).

2) Timampuu, Lake Towuti, Sulawesi; H. Uwa, K. Naruse & B. Soeroto, 2 Oct. 1992.

12. *O. profundicola* Kottelat

1) Timampuu, Lake Towuti, Sulawesi, Indonesia; H. Uwa, K. Naruse & B. Soeroto, 3 Oct. 1992.

II. *Family Adrianichthyidae, Genus Xenopoecilus*

1. *X. sarasinorum* (Popta)

1) Lake Lindu; Laboratory stock; Donat. by M. Kottelat, Sept. 1991.

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