

Cyprinid Fishes of the Genera *Onychostoma* and *Scaphiodonichthys* from Upper Laos, with Remarks on the Dispersal of the Genera and Their Allies

Yasuhiko Taki

(Received September 22, 1975)

Abstract Two mountain cyprinid fishes, *Onychostoma gerlachi* and *Scaphiodonichthys acanthopterus*, are described from upper Laos. The Vietnamese *O. macracanthus* is synonymized with *S. acanthopterus*. As a result the range of the genus *Onychostoma* is extended westward to Laos from North Vietnam and China and that of the genus *Scaphiodonichthys* eastward to North and South Vietnam from Burma, Thailand, and Laos. These two genera are closely related to each other and to the Thai-Lao *Scaphognathops*, the Indo-Burmese *Semiplotus*, and the West Indian and West Asian *Scaphiodon*. The distributional patterns of these five genera and related *Varicorhinus* and *Barbus* suggest that they originated from northern Asia. *Onychostoma* has the most northerly distribution and appears most generalized, and *Scaphiodonichthys*, *Scaphognathops*, and *Semiplotus* seem more differentiated. *Scaphiodon* may represent western offshoots derived from ancestral stock common to *Onychostoma*.

Introduction

The genera *Onychostoma* and *Scaphiodonichthys* are mountain stream cyprinids that are characterized primarily by the possession of sharp, horny edge to the lower jaw and no fleshy lower lip. Previous records show isolated distribution of the two genera: *Onychostoma* has been known from upper North Vietnam, highland South Vietnam (*O. macracanthus*), and southern, western, and northwestern China, whereas *Scaphiodonichthys* has been recorded from Burma, northern Thailand, and northern Laos. Among fishes I collected from upper Laos in 1970 were two specimens referable to *O. gerlachi*, which enable me to present a first record of the genus *Onychostoma* west of Vietnam and China and compare it with *Scaphiodonichthys*, as well as investigate relationships and dispersal of these genera and their allied forms.

Onychostoma gerlachi (Peters), Fig. 1

Barbus gerlachi Peters, 1880: 1034, fig. 5 (type locality, Hong Kong).

Onychostoma leptura (non *Gymnostomus lepturus* Boulenger, 1899); Nichols and Pope, 1927: 361 (Hainan); Chevey and Lemasson, 1937: 32, fig. 12 (North Vietnam); Nichols, 1943:

119, fig. 51 (Hainan).

Onychostoma gerlachi; Lin, 1931: 115 (North Kwangtung); Harada, 1943: 28, pl. 9 (Hainan); Nichols, 1943: 113 (no locality).

Varicorhinus gerlachi; Lin, 1933: 203 (Hainan).

Material 2 specimens, 58.5 and 60.5 mm in standard length (SL), collected by the author in a waterfall basin in the Nam Done, torrential hill stream flowing into the Mekong at Luang Prabang, at Ban Deuai near Luang Prabang, Laos, on June 15, 1970, catalogue No. IBRP (Institute for Breeding Research, Tokyo University of Agriculture) 4167. The following specimens, deposited in the Oceanographic Institute of Nhatrang, South Vietnam, were examined for comparison: 1, 123.0 mm SL, North Vietnam, No. 12100; 1, 114.5 mm SL, North Vietnam, No. 12103.

Description The description is based on the two Laotian specimens. Meristic and proportional characters for the larger specimen are presented first, followed by those for the smaller specimen, when values are different.

Dorsal rays iv, 8; anal rays iii, 5; pectoral rays 17; pelvic rays 10; total pored scales in lateral line 48; scales above lateral line to dorsal origin 6.5; scales below lateral line to pelvic origin 4.5, to anal origin 6; predorsal scales 15, 14; scales

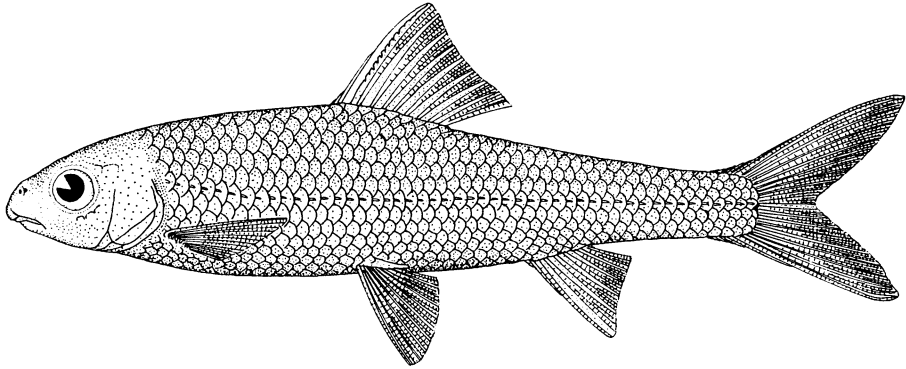


Fig. 1 *Onychostoma gerlachi* from upper Laos, 60.5 mm SL, IBRP 4167.

around caudal peduncle 16.

Proportional measurements in hundredths of standard length: body depth 23.6, 22.6; body width 14.0, 13.7; head length to fleshy rim of opercle 24.3, 23.9; head depth at occiput 17.9; caudal peduncle length 20.0, 20.7; caudal peduncle depth 9.5, 9.7; predorsal length 48.3, 48.0; preanal length 73.7, 72.5; prepelvic length 50.2, 49.6; dorsal fin base 16.4, anal fin base 8.6, 8.7; last simple dorsal ray 20.2, 21.7; last simple anal ray 15.2, 15.7; pectoral fin length 16.7, 18.3; pelvic fin length 16.2, 17.8; caudal fin length from base of middle caudal ray to tip of upper lobe 29.4, 30.1. Proportional measurements in hundredths of head length: snout length 33.3, 33.6; orbit diameter 33.3, 34.6; postorbital length 36.7, 35.7; bony interorbital width 32.7, 32.1; width of lower jaw at mouth corner 28.9, 30.7.

Snout rounded, prominent, with a pendulous rostral fold on front and a lateral fold on each side. Mouth inferior, almost horizontal. Front margin of lower jaw nearly straight, covered by a sharp-edged, horny sheath, without postlabial groove and lip; postlabial groove developed only at each corner of lower jaw. Barbels absent. Eyes with a narrow adipose lid. Pharyngeal teeth triserial, 2.3·5–5.3·2, each tooth with a pointed, slightly recurved tip. Origin of dorsal fin well in advance of insertion of pelvic fins. Last simple dorsal ray osseous, its posterior edge serrate with 12 denticles. Last simple anal ray not osseous, entire. Lateral line complete, slightly downward on anterior part of body and then running along middle of side of trunk and caudal peduncle.

Coloration in formalin a few days after capture: body silvery; back darkened with bluish tint. Dorsal fin pale yellow, with a few small blackish spots. Caudal fin dusky yellow. Other fins hyaline.

Note *O. gerlachi* closely resembles *Gymnostomus lepturus* Boulenger in meristic and proportional characteristics, and there have been confiction and confusion as to their identities, as indicated in the synonymy given above. Their main difference lies in the feature of the last simple dorsal ray, which is osseous and serrate in the former and soft and smooth in the latter.

The Laotian specimens of *O. gerlachi* have lower bodies, larger heads, shorter snouts, and larger eyes compared with examples from other localities. In meristic characters, however, they agree well with known data on the species. Some of the differences in body proportion may be due to the small size and presumable young stage of the Laotian specimens.

The present record of *O. gerlachi* extends the range of the genus *Onychostoma* westward to Laos from North Vietnam and China.

Scaphiodonichthys acanthopterus (Fowler),

Fig. 2

Scaphiodonichthys acanthopterus Fowler, 1934: 119, figs. 74, 75 (original description; type locality, Nam Ruang River at Sop Lao, southern Shan States, Burma; other localities, Keng Tung, Burma, Chiangmai, Thailand).

Scaphiodonichthys burmanicus (non Vinciguerra, 1889–1890); Smith, 1933: 77 (in part) (northern Thailand).

Scaphiodonichthys acanthopterus; Fowler, 1935:

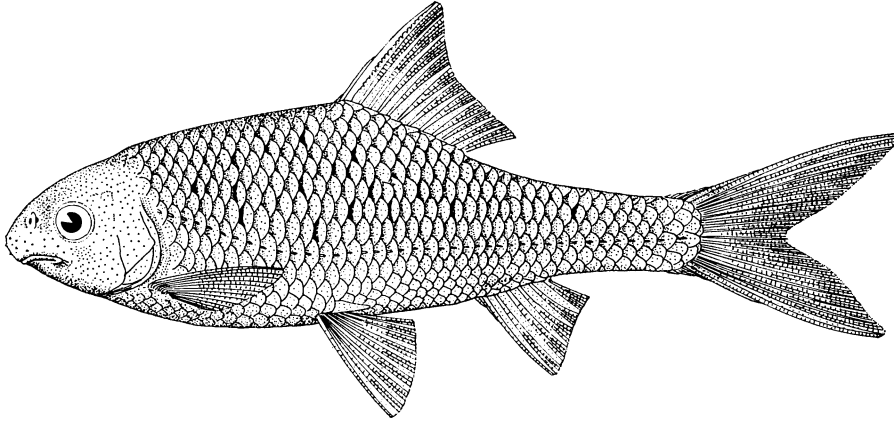


Fig. 2. *Scaphiodonichthys acanthopterus* from upper Laos, 71.0 mm SL, IBRP 4145.

120 (replacement of generic name); Smith, 1945: 207 (northern Thailand); Taki, 1974 a: 114, fig. 139 (Luang Prabang, Laos), 1974 b: 135 (Luang Prabang and Nam Mo, Laos).

Onychostoma macracanthus Pellegrin and Chevey, 1936: 24, fig. 4 (Muong Hum and Lai Chau, North Vietnam, Kon Tum, South Vietnam); Chevey and Lemasson, 1937: 35, pl. 7 (Muong Hum, Lai Chau, and Moc, North Vietnam) (new synonym).

Material Laotian material dealt with in this study includes the following series: 3 specimens, 61.0~71.0 mm SL, collected in the Nam Pat, swift-running hill stream flowing into the Mekong at Luang Prabang, 5 km above its mouth to the Mekong, on June 15, 1970, IBRP 4145; 4, 25.0~58.0 mm SL, taken with the specimens of *O. gerlachi* (IBRP 4167) described above; 5, 36.0~49.5 mm SL, Nam Mo River at Ban Nam Mo, about 110 km NNE of Vientiane, Apr. 22, 1974. The following paratopotypes of *S. acanthopterus* deposited in the Academy of Natural Sciences of Philadelphia (ANSP) were examined for comparison: 6, 114.0~164.0 mm SL, Nam Ruang River at Sop Lao, southern Shan States, Burma, 6 of 14 specimens catalogued ANSP 58065~74, 59047~50.

Description When meristic and morphometric data differ between specimens, ranges for value are given first followed in parentheses by means. Unless otherwise indicated, the meristic characters are from all of the Laotian specimens, 12 in number, and the proportional characters are from the largest 4 specimens (58.0~71.0 mm SL,

3 specimens from IBRP 4145, 1 specimen from IBRP 4152).

Dorsal rays iv, 11~12 (iv, 11.4); anal rays iii, 5; pectoral rays 14~16 (14.7); pelvic rays 9; total pored scales in lateral line 38~43 (40.8); scales above lateral line to dorsal origin 8; scales below lateral line to pelvic origin 3, to anal origin 4~5 (4.1; 5 scales in 1 specimen); predorsal scales (from 11 specimens) 13~14 (13.5); scales around caudal peduncle (from 11 specimens) 14 or 16 (14.4).

Proportional measurements in hundredths of standard length: body depth 30.3~33.0 (31.8); body width 15.4~16.9 (15.9); head length to fleshy rim of opercle 23.6~25.7 (24.8); head depth at occiput 21.0~22.5 (21.8); caudal peduncle length 20.1~20.8; caudal peduncle depth 11.3~12.8 (11.8); predorsal length 50.0~52.3 (51.2); preanal length 69.2~72.4 (70.2); prepelvic length 47.7~49.5 (48.4); dorsal fin base 21.5~22.5 (22.2); anal fin base 10.7~10.9 (10.8); last simple dorsal ray 21.4~23.5 (22.5); last simple anal ray 15.5~17.5 (16.9); pectoral fin length 21.4~22.3 (21.9); pelvic fin length 18.7~19.7 (19.3); caudal fin length from base of middle caudal ray to tip of upper lobe (from 3 specimens) 35.1~36.2 (35.6). Proportional measurements in hundredths of head length: snout length 33.6~36.1 (35.0); orbit diameter 29.9~32.3 (31.1); postorbital length 39.6~43.1 (40.7); bony interorbital width 40.9~42.4 (41.7); width of lower jaw at mouth corner 46.0~50.0 (47.9).

Snout bluntly rounded, beset with numerous horny tubercles on front, with a pendulous rostral

fold; lateral fold absent or vestigial. Mouth very wide, inferior, almost horizontal, not much arched. Front margin of lower jaw covered by a sharp-edged, horny sheath, without postlabial groove and lip; postlabial groove developed only for a short distance at mouth corners. No barbels. Eyes with a narrow adipose lid. Pharyngeals relatively small, narrow; their teeth triserial, 1·3·4-4·3·1, each tooth with a pointed, slightly recurved tip. Origin of dorsal fin slightly or well behind insertion of pelvic fins. Simple dorsal rays well ossified, last (=4th) one strongly serrate with about 20 long, sharp denticles. Last (=3rd) simple anal ray not osseous, smooth. Lateral line complete, greatly decurved, running in lower side of caudal peduncle and terminating in middle of base of caudal fin.

Coloration in life: back and upper surface bluish to greenish silver, lower side silvery. Each scale on back and upper sides with a dark basal crescent, some of the crescents rather intensely black. Opercles golden. Dorsal and caudal fins dusky yellow. Other fins pale yellow, with sparsely scattered melanophores.

Note. Smith (1945) recognized two species in *Scaphiodonichthys*: *S. burmanicus* occurring in the Salwin basin and minor streams in Tenasserim, Burma, and *S. acanthopterus* in the Mekong and the Menam Chao Phya drainages. He differentiated the two forms by the number of dorsal rays and total lateral line scales, viz. 9 to 10 rays and 37 to 38 scales in *S. burmanicus* and 11 to 12 rays and 41 to 42 scales in *S. acanthopterus*. Examination of the paratypes and Laotian examples of *S. acanthopterus*, however, shows that their lateral line scale count ranges from 38 to 43 (39~40 in the paratypes) and overlaps with that for *S. burmanicus*. The two species are therefore distinguishable only by the number of dorsal rays.

Onychostoma macracanthus has been described by Pelegrin and Chevey (1936) and Chevey and Lemasson (1937) from upper North Vietnam and South Vietnamese highland. These authors compared the species with *O. gerlachi*, but not with species of *Scaphiodonichthys*. *O. macracanthus* is quite distinctive from all other members of *Onychostoma*, and in almost perfect agreement with *S. acanthopterus*, in its meristic and morphometric characters and, notably, in the position of

the dorsal fin (originated behind the insertion of pelvic fins) and of the lateral line (running conspicuously in the lower side of trunk and caudal peduncle). It is evident that *O. macracanthus* is synonymous with *S. acanthopterus*. Thus the range of *Scaphiodonichthys* is extended eastward to North and South Vietnam from Burma, Thailand and Laos.

Relationships and dispersal of *Onychostoma*, *Scaphiodonichthys*, and other allied genera

In continental Asia from South and West China to Pakistan and Iran, there are some 20 cyprinid species which are all similar in the mode of modification of the snout-mouth region. In all these fishes the snout is prominent, overhanging the mouth, with a pendulous rostral fold covering the upper lip, and the lower jaw is lipless at least mesially and provided with sharp, horny front edge. They inhabit mostly mountain streams or otherwise more or less rapid-running lowland rivers. They are generally apportioned to several genera, but their close morphological and phylogenetical affinities have been suggested by many authors.

The Chinese forms are particularly so close to each other that they have posed problems on their generic and subgeneric classification. A few species that are placed by Nichols (1943) in the genus *Varicorhinus* should be assigned to *Osteochilus*, *Epalzeorhynchus*, and other genera because of their well-developed and often fringed lower lip. Eliminating them, there remain two groups of species. The first group consists of fishes possessing osseous simple dorsal rays, whereas the second includes those having non-osseous rays. The former is the genus *Onychostoma* in a narrow sense and the latter the genus *Gymnostomus*. Barbels are present or absent in either group. In the Cyprinidae the degree of ossification of simple dorsal rays usually has rather little phylogenetical significance in the categories higher than species, and the two groups should therefore be united under the same genus. Lin (1933) has placed the two in one genus, *Varicorhinus*. In this paper I adopt the name *Onychostoma*, instead of *Varicorhinus*, in order to separate the Chinese species from the African and European *Varicorhinus*, which is related to but seems not congeneric with the Chinese forms,

and tentatively regard the two groups as subgenera of the genus *Onychostoma*: *Onychostoma* and *Gymnostomus*.

Four genera have been proposed for the South-east and West Asian species: *Scaphiodonichthys*, *Scaphognathops*, *Semiplotus*, and *Scaphiodon*. Day (1878) pointed out that the West Indian and West Asian *Scaphiodon* is closely allied to the Indo-Burmese *Semiplotus*. Smith (1945) showed the probable congeneric relationship of *Semiplotus* and the Southeast Asian *Scaphiodonichthys*. Taki (1974 b) discussed on the morphological resemblance between *Scaphiodonichthys* and the Thai-Lao *Scaphognathops*.

Table 1 compares morphological features of these five genera including subgenera and geographical groups, and Fig. 3 shows their geographical distribution. The uniformity of these genera in the nature of the snout and mouth and the intergraded variations in other structural and meristic characters strongly suggest their monophyletic origin. I regard them as constituting a genus-group, and call it *Onychostoma*-group.

The *Onychostoma*-group and other Indian and Southeast Asian cyprinids are not so closely related. Rather, the genus-group as a whole is allied to the so-called *Barbus* of China, and the West Asian, European, and African *Varicorhinus* and *Barbus*. Lin (1933) included the Chinese *Onychostoma* and *Gymnostomus* in the composite genus *Varicorhinus* together with the Chinese *Barbus* and the African *Varicorhinus*. Bănărescu (1972, 1973) stated that the West Asian and European-Mediterranean *Varicorhinus* (or *Capoeta*) and *Barbus* seem phylogenetically close to *Onychostoma* and some Chinese *Barbus*, respectively, and they originated from East Asia and reached West Asia and Europe by a Siberian route. Jubb (1967) showed that some forms of the African *Barbus* such as *B. marequensis* and *B. natalensis*, with wide inferior mouths and horny cutting edge to the lower jaw, are hardly separable from *Varicorhinus*.

Fossil *Barbus* have been found rather abundantly in the Miocene and the lower Pliocene deposits in northeastern China (Laboratory of Lower Vertebrates, China, 1961). Also, fossil *Barbus* close to the recent species are known from Europe since Miocene (Bănărescu, 1973). These fossil records suggest that the ancestral stock of *Barbus* and probably of *Varicorhinus* occurred

from Northeast Asia through Siberia to Europe during the Miocene and the early Pliocene, when warmer climates prevailed in the areas. As the climates became cooler they became extinct in northern Eurasia and some groups may have migrated toward the south.

The suggested close relationships of the *Onychostoma*-group to *Varicorhinus* and then to *Barbus*, the distribution of the ancestral stock of *Barbus* and probably of *Varicorhinus* in northern Eurasia, and the present-day distribution of the *Onychostoma*-group reaching nearly the heart of Asia indicate that the genera in the *Onychostoma*-group have originated from northern Asia derived from *Barbus*-*Varicorhinus* stock.

The absence of the *Onychostoma*-group from the southern face of the Himalayas appears to indicate that the southward migration of the genus-group was interrupted by the Himalayan range, and *Scaphiodon* had dispersal routes from the north independent of those of the remaining four genera. On the other hand, the present-day distribution of the genus-group, mostly occurring on both slopes of mountain ranges (Fig. 3), shows that mountains of low altitude did not function as effective and long-range barriers to their spread. It follows that the southward dispersal of the *Onychostoma*-group, at least in western Asia, is of relatively young history, not earlier than the Pliocene, when the Himalayas became an effective barrier preventing their migration.

There are two alternative possibilities as to the dispersal route of *Scaphiodon* to the West Ghats (mountains running along the west coast of peninsular India): 1) they gained access from Pakistani-Punjab highlands to the West Ghats after the post-Tethys inland seas dried up, or, 2) they spread from northern Southeast Asia to the West Ghats by way of mountain ranges, for example via the Satpura range (mountains once extended continuously from northeast corner of Indian Peninsula to the West Ghats) as Hora (1949) hypothesized for the dispersal of the so-called Malayan element recognized in the freshwater fish-fauna of peninsular India. However, the characteristics of the peninsular forms of *Scaphiodon*, with only a little difference from those of the northern (North Indian and Pakistani) species (Table 1), strongly suggest the northwestern origin of the peninsular *Scaphiodon*.

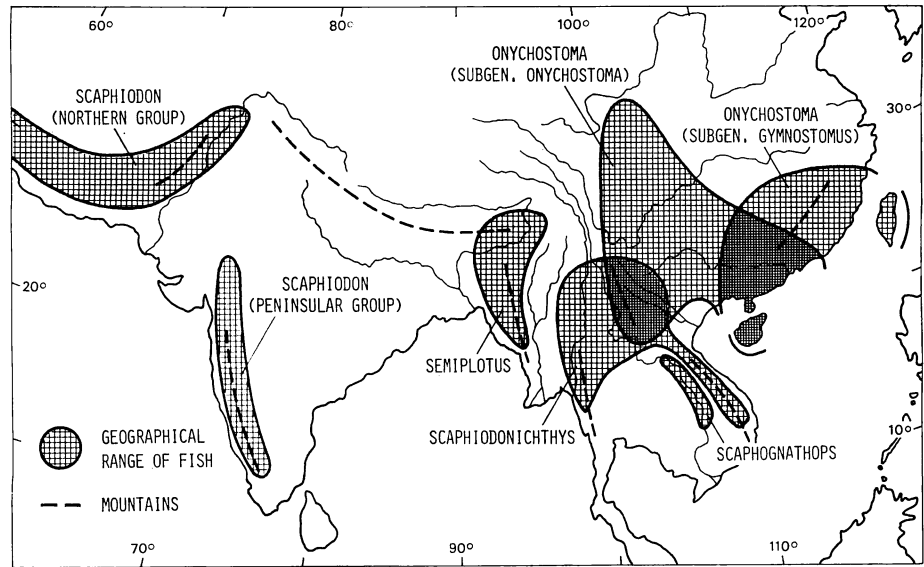


Fig. 3. Approximate ranges of the genera, subgenera, and geographical subgroups belonging to the *Onychostoma*-group. Data on the distribution of the fishes are from the present study and the literature listed in Table 1.

Table 1. Comparison of characters in the genera, subgenera, and geographical subgroups belonging to the *Onychostoma*-group. The arrangement of pharyngeal teeth is given in a one-side formula in order from outer row to inner or main row, irrespective of left or right. Data presented are from the present study, Boulenger (1899), Chevey and Lemasson (1937), Day (1878), Fowler (1934), Harada (1943), Lin (1933), Nichols and Pope (1927), Pellegrin and Chevey (1936), Smith (1931, 1945), Taki (1974a, b), Tchang (1930, 1931, 1933), and Wu (1931).

Genus (Subgenus or geographical group)	Character					
	Last simple dorsal ray	Branched dorsal rays	Branched anal rays	Total lateral line scales	Pharyngeal teeth	Barbels
<i>Onychostoma</i>						
(<i>Gymnotomus</i>)	non-osseous, smooth	8~9	5	45~50	2.4.5, 2.3.5, 1.4.5, or 1.3.4	+ or —
(<i>Onychostoma</i>)	osseous, serrate	7~9	5	44~49	2.3.5, 2.4.4, or 2.3.4	+ or —
<i>Scaphiodonichthys</i>	osseous, serrate	9~12	5	36~44	1.3.4 or 2.3.5	—
<i>Scaphognathops</i>	osseous, serrate	9~15	5~6	27~30	3.5	—
<i>Semiplotus</i>	osseous, serrate or smooth	20~25	6~7	27~34	2.3.4	—
<i>Scaphiodon</i>						
(Northern group)	osseous, serrate	10	7	33~36	2.3.4	+
(Peninsular group)	osseous or non- osseous, smooth	11~12	5~6	39~43	2.3.5	—

Menon (1955) considered *Scaphiodon* to be the only West Asian element in the freshwater fish-fauna of India.

Comparison of the *Onychostoma*-group with

the living forms of *Varicorhinus* and the recent and fossil *Barbus* shows that the fewer dorsal rays and the presence of barbels in *Onychostoma* and *Scaphiodon* may represent retention of

ancestral characters and there are trends within the genus-group toward the increase in number of dorsal rays and decrease in that of lateral line scales and pharyngeal teeth focused in general on the present-day center of distribution, the westward increase in number of anal rays, and the southward degeneration of barbels.

In view of the morphological and geographical evidences now available, it seems that *Onychostoma* is the most generalized or primitive of the *Onychostoma*-group, and *Scaphiodonichthys*, *Scaphognathops*, and *Semiplotus* are more specialized or differentiated. *Scaphiodon* appears to represent western offshoots derived from ancestral stock common to *Onychostoma*. It is difficult to determine whether the non-ossified simple dorsal rays in the southern elements of *Onychostoma* and *Scaphiodon* represents secondary modification or retention of a primitive character in the periphery of the range of the genus-group.

In my previous papers (Taki, 1974 a, b) I reserved the assignment of *Scaphognathops* and *Scaphiodonichthys* to the subfamily Barbinae because of their reduced number of pharyngeal teeth. The undoubted affiliation of the two genera to the *Onychostoma*-group revealed in this study proves that they belong to the subfamily Barbinae.

Comparative material *Onychostoma laticeps*, 1, 103.0 mm SL, North Vietnam, Oceanographic Institute of Nha Trang No. 12104.

Acknowledgments

I wish to thank Drs. James E. Böhlke and William G. Saul, the Academy of Natural Sciences of Philadelphia, for the loan of paratypes of *S. acanthopterus*, and Dr. Tran-Ngoc-Loi, the Oceanographic Institute of Nha Trang, South Vietnam, who made facilities to study at his institute specimens of *O. gerlachi* and *O. laticeps*. I have greatly benefited from the helpful comments of Dr. Fuyuji Takai of my institute on geology and palaeontology of the study area. I also wish to express sincere gratitude to Dr. Norio Kondo of my Institute and Dr. Katsuzo Kuronuma, for their support and suggestions rendered to my study of Southeast Asian fishes.

Literature cited

Bănărescu, P. 1972. The zoogeographical position

- of the East Asian fresh-water fish fauna. Rev. Roumanie Biol., ser. Zool., 17 (5): 315~323.
- Bănărescu, P. 1973. Origin and affinities of the freshwater fish fauna of Europe. Ichthyologia, Beograd, 5 (1): 1~8.
- Boulenger, G. A. 1899. On the reptiles, batrachians, and fishes collected by the late Mr. John Whitehead in the interior of Hainan. Proc. Zool. Soc. London, 1899, pt. 2: 956~962, pls. 66~69.
- Chevey, P. and J. Lemasson. 1937. Contribution a l'etude des poissons des eaux douces tonkinoise. Inst. Rech. Agronom. Indochine, Hanoi, 183 pp., 44 pls.
- Day, F. 1878. The fishes of India; being a natural history of the fishes known to inhabit the seas and fresh waters of India, Burma, and Ceylon. Reprint ed., 1967, Today and Tomorrow's, New Delhi, vol. 1, xx+778 pp., vol. 2, 195 pls.
- Fowler, H. W. 1934. Zoological results of the third de Schauensee Siamese expedition. Part 1. Fishes. Proc. Acad. Nat. Sci. Philadelphia, 86: 67~163, figs. 1~129, pl. 12.
- Fowler, H. W. 1935. Zoological results of the third de Schauensee Siamese expedition. Part 6. Fishes obtained in 1934. Proc. Acad. Nat. Sci. Philadelphia, 87: 89~163, figs. 1~132.
- Harada, I. 1943. The freshwater fish fauna of Hainan (Kainanto tansui gyorui-fu). Kainan Kaigun Gunmu-bu, 114 pp., 28 pls. (in Japanese).
- Hora, S. L. 1949. Dating the period of migration of the so-called Malayan element in the fauna of peninsular India. Proc. Nat. Inst. Sci. India, 15: 1~7.
- Jubb, R. A. 1967. Freshwater fishes of southern Africa. A. A. Balkema, Cape Town/Amsterdam, vii+248 pp., 272 figs.
- Laboratory of Lower Vertebrates, Science Academy of China. 1961. Handbook of vertebrate fossils of China. Sci. Pub. Agency, Peking, iv+94 pp., 81 figs., 17 pls. (in Chinese).
- Lin, S. Y. 1931. Carps of Kwangtung. (not seen).
- Lin, S. Y. 1933. Contribution to a study of Cyprinidae of Kwangtung and adjacent provinces. Lingnan Sci. J., 12: 197~215, fig. 1.
- Menon, A. G. K. 1955. The external relationships of the Indian fresh-water fishes, with special reference to the countries bordering on the Indian Ocean. J. Asiatic Soc., Sci., 21 (1): 31~38, figs. 1~2.
- Nichols, J. T. 1943. The fresh-water fishes of China. Natural history of Central Asia, 9. Amer. Mus. Nat. Hist., xxxvi+322 pp., 143 figs., 10 pls.
- Nichols, J. T. and C. H. Pope. 1927. The fishes of Hainan. Bull. Amer. Mus. Nat. Hist., 54: 321~394, figs. 1~54, pl. 26.

- Pellegrin, J. and P. Chevey. 1936. Cyprinidés nouveaux du Tonkin. Bull. Soc. Zool. France, 61 (1): 18~27, figs. 1~4.
- Peters, W. C. H. 1880. Über eine Sammlung von Fischen, welche Dr. Gerlach in Hongkong gesandt hat. Monatsber. Akad. Wiss. Berlin, 1880: 1029~1037. (not seen).
- Smith, H. M. 1931. Description of new genera and species of Siamese fishes. Proc. U. S. Nat. Mus., 79, art. 7: 1~48, figs. 1~22, 1 pl.
- Smith, H. M. 1933. Contributions to the ichthyology of Siam. II~VI. J. Siam Soc., Nat. Hist. Suppl., 9: 53~87, figs. 1~4, pls. 1~3.
- Smith, H. M. 1945. The fresh-water fishes of Siam, or Thailand. U. S. Nat. Mus. Bull., 188: i~xi, 1~622, figs. 1~107, pls. 1~9.
- Taki, Y. 1974 a. Fishes of the Lao Mekong basin. U. S. Agency for International Development Mission to Laos, vi+232 pp., 191 figs.
- Taki, Y. 1974 b. New species of the genus *Scaphognathops*, Cyprinidae, from the Lao Mekong River system. Japan. J. Ichthyol., 21 (3): 129~136, figs. 1~3.
- Tchang, T. L. 1930. Description de cyprinidés nouveaux de Se-tchuan. Bull. Mus. Nat. Hist. Nat., Paris, 2^e ser., 5: 84~85.
- Tchang, T. L. 1931. Note on some cyprinid fishes from Szechwan. Bull. Fan Mem. Inst. Biol., 2 (11): 225~242, figs. 1~5.
- Tchang, T. L. 1933. The study of Chinese cyprinoid fishes, Part 1. Zool. Sinica, 2, fas. 1: i~vi, 1~247, figs. 1~115, Pls. 1~5.
- Wu, H. W. 1931. Notes on the fishes from the coast of Foochow region and Ming River. Contr.

Biol. Lab. Sci. Soc. China, 7 (1): 1~64, figs. 1~10.

(The Institute for Breeding Research, Tokyo University of Agriculture/Research Institute of Evolutionary Biology. 4-28, Kamiyoga-2, Setagaya, Tokyo 158 Japan)

ラオス北部より採集されたコイ科 *Onychostoma* および *Scaphiodonichthys* 属魚類, ならびに両属とその近縁群の分布 多紀 保彦

北部ラオスから得られたコイ科魚類 *Onychostoma gerlachi* と *Scaphiodonichthys acanthopterus* を記載し, またヴィエトナムから報告されている *O. macracanthus* を *S. acanthopterus* のシノニムと判定した. この結果 *Onychostoma* 属の分布域は東方からラオスに, *Scaphiodonichthys* 属のそれは西方から南北ヴィエトナムにそれぞれ拡大された. この両属と, 同じくアジア産の *Scaphognathops*, *Semiplotus* および *Scaphiodon* は互いに密接な類縁関係を有し, 系統を同じくする1属群 (*Onychostoma* 群) を形成するものと考えられる. *Onychostoma* 群魚類は *Varicorhinus* および *Barbus* 属と近縁性を示し, またその分布はアジア大陸中心部にまで及んでいる. このことは, 本属群の北アジア起源を示唆している. *Onychostoma* はもともと祖先型に近く, *Scaphiodonichthys*, *Scaphognathops* および *Semiplotus* はより分化の進んだグループと思われる. *Scaphiodon* は *Onychostoma* と同祖の西アジアにおける1分派と考えられる.

(158 東京都世田谷区上用賀 2丁目 4-28 東京農業大学育種学研究所 進化生物学研究所)