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A Record of the Sockeye Salmon Run to the Tama River, Honshu, Japan

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In the Far East, the sockeye salmon *Oncorhynchus nerka* (Walbaum) originates in the freshwater from Cape Chaplina in the northern part of the Bering Sea southward around the Kamchatka Peninsula to Hokkaido, northern Japan (Anonymous, 1955; Hikita, 1967). Although the sockeye salmon run was observed occasionally in the eastern part of Hokkaido (Hikita, 1967), the spawning stocks of the anadromous form may extend no further than Etorofu Island of the southern Kuril Islands (Handa, 1916). Through transplantations, many stocks of the non-anadromous form have been established in Japan (Tokui, 1964). However, there has been no record of the sockeye salmon run in the streams of Honshu, central Japan.

This paper reports the catch of an adult sockeye salmon from the Tama River, entering the Pacific coast of Honshu.

Description of the river and the specimen

The Tama River originates in Yamanashi Prefecture and flows southeastwardly over 123 km to its mouth on Tokyo Bay, draining an area of approximately 1,235 km^2 (Fig. 1). A sockeye salmon was captured by a sport fisherman (Mr. Tamotsu Odaka; Hachiohji, Tokyo) in the Kita-asakawa River, a tributary of the Tama River on June 10, 1986. The site of the capture is 10 m upstream of Matsue Bridge and 57 km distant from the river mouth. According to the sport fisherman, it was not clear whether the fish tried to take a bait positively or the fish was hooked casually. The fish seemed to be enfeeble when it was captured. Thereafter the fish was carried to the Tokyo Metropolitan Fisheries Experimental Station (TMFES) and was frozen until processed for examination.

The fish was male with testes of 68 g and exhibiting nuptial coloration, namely the head was olive and the body side was dirty red (Fig. 2).

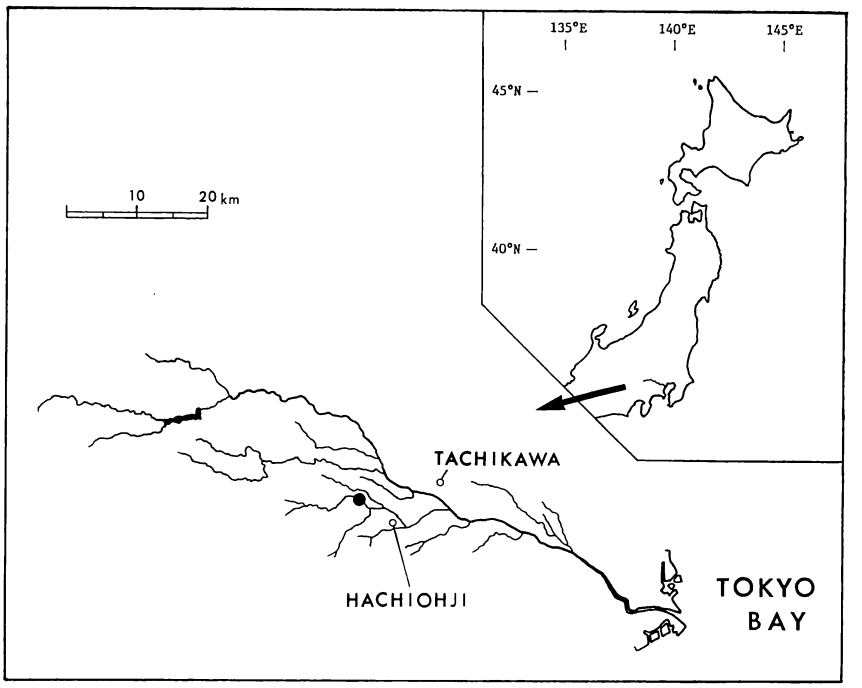

Fig. 1. Map of the Tama River showing the site (solid circle) where the sockeye salmon was captured.

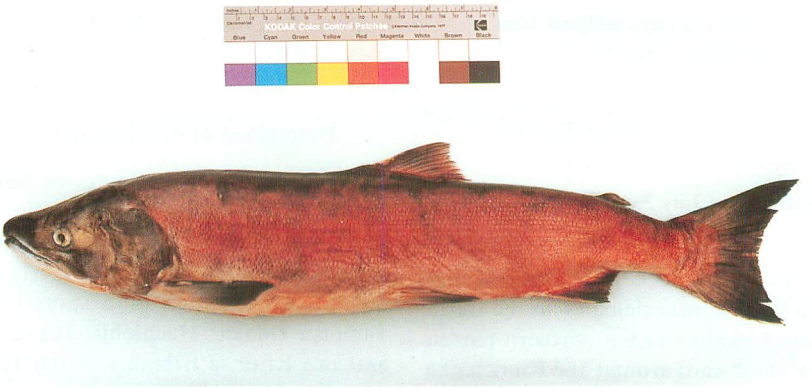

Fig. 2. *Oncorhynchus nerka*, TMFES86-01, male, 496 mm SL, from the Tama River, Honshu, Japan.

The above as well as obvious hooked snout indicated its imminent spawning. The standard length was 496 mm (fork length: 555 mm) and the weight was 1,790 g. The measurements and counts of the specimen are listed in Table 1.

Age determination was made from microprojections of scale impressions on a plastic card. Although the scale showed that the fish spent one year in freshwater, its edge was eroded severely (Fig. 3). Eroded ocean zones are common in the sockeye salmon when they approach spawning (Anas and Murai, 1969). This indicates that the fish had spent a certain period in the river after it entered the river. Although two ocean winter annuli were apparent on the scale, it is highly probable that the erosion had penetrated into a true last ocean winter annulus. This is also supported by the fact that in most cases additional circuli following the last ocean winter annulus hardly developed on the scale of salmonid fishes captured in spring. Based on these facts, this fish may have spent three winters in the ocean.

Table 1. Measurements and counts of the sockeye salmon caught in the Tama River. Measurements are shown in mm.

Character	
Total length	592
Standard length	496
Fork length	555
Body depth	100
Head length	133
Snout length	43
Length of upper jaw	77
Postorbital length of head	73
Interorbital space	46
Eye diameter	20
Depth of caudal peduncle	37
Height of dorsal fin	65
Height of anal fin	51
Dorsal fin rays	13
Anal fin rays	14
Gill rakers on first arch	15+21=36
Branchiostegal rays (left/right)	11/12
Body weight	1,790 g
Sexuality	Male

Remarks

In recent years, sockeye salmon runs occur in some rivers of Hokkaido reflecting transplantations (Hokkaido Salmon Hatchery, 1971). Their scales were characterized by a large freshwater growth zone and therefore this unique characteristic allows us to distinguish them easily from natural populations captured in the North Pacific (Ito, 1972). The scale of the current specimen showed a quite narrow freshwater growth zone.

A number of eggs of salmonid fishes, including the sockeye salmon, have been transferred to the Tama River (Tokyo Metropolitan Fisheries Experimental Station, 1962, 1965). However, none of the anadromous form of salmonid fishes except the chum salmon, *Oncorhynchus keta*, have been recognized in the Tama River. There has been no sign of the habitation of the sockeye salmon as well as its non-migratory form (Baba, 1985; Kato and Nishimura, 1986).

From the above facts, it seems that the current fish derived from natural stocks originated in some

Fig. 3. Photomicrograph of a scale of the sockeye salmon captured in the Tama River. Arrows indicate freshwater and ocean annuli.

area other than Japan.

The sockeye salmon prefers cool circumstances among the fish of the genus *Oncorhynchus* (Takagi, 1983). The current record is extraordinary when considering the southern limit of the natural spawning stocks of the anadromous forms. During the period from January to June in 1986, the surface temperature of the Pacific coast of middle Honshu was 2–5°C lower than that of the average year (Japan Meteorological Agency, 1986). In that year, unusual catches of the sockeye salmon were recorded in May in the waters east of northern Honshu (Fisheries Agency of Japan, 1987). The unusual oceanic condition may be the cause for the current incidence as well as the above. Average water temperature at the lower reaches of the Tama River was 18.3°C in May, 1986.

Twelve dams, including small and large ones, are constructed between the captured site and the river mouth. Most of them are unlikely to be severe barriers for the fish migration as they are either small or equipped with fish ladders. However, one big dam has no fish ladder and thus fish can migrate only when there is flood. Since flood was recorded twice in May in the Tama River, the fish probably ascended the river during these periods.

Acknowledgments

We would like to express our thanks to Mr. Sotoo Ito of the Far Seas Fisheries Research Laboratory, Fisheries Agency of Japan, for valuable advice on scale reading.

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多摩川にそ上したベニザケ

岡崎登志夫・田中米満・長沼　広

東京湾に注ぐ多摩川の支流，北浅川で 1986 年 6 月 10 日，釣人によってベニザケが獲られた．体長 496 mm の成熟した雄で，二次性徴と婚姻色が明瞭であった．鱗の縁辺部が著しく侵食されていることから，当河川をそ上したものとみられた．鱗相から淡水域で 1 回，海洋で 3 回越冬した 5 歳魚と判断された．ベニザケが天然そ上するアジア側の南限は南千島のエトロフ島で，本州の河川にそ上した記録はこれが初めてとみられる．鱗に認められる淡水帯が極めて狭いことから天然魚である可能性が高い．

(岡崎：519–04 三重県度会郡玉城町 水産庁養殖研究所；田中：190–01 東京都西多摩郡羽村町羽中 3–2–44；長沼：125 東京都葛飾区水元　東京都水産試験場)