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ON PIKE FROM SAKHALIN AND *Lucius reichertii* (Dybowski)

BY

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樺太產パイクとヂボルスキーの *Lucius reichertii* とに就て

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Through kindness of Mr. T. Hikita, Mr. F. Handa, and Mr. J. Kajiura, five specimens of pike from Sakhalin have recently been brought into my hand. They were collected near Taraika where the fish is said to frequent the swamps. I have also in my possession another specimen of similar pike, from Siberia, wich Professor E. Eri of the Higher Normal School of Nara has kindly placed at my disposal; this, agreeing almost in every respect with the Sakhalin specimens in question, has been of great use in my present work. At a glance of these specimens, I recalled in mind the form from Dauria, which Pallas first described as a variety of the common pike *Lucius lucius*,[1] and which Dybowski afterwards named *Esox reichertii*.[2] But the description of both these writers being very brief, the form has hitherto been delt with but obscurely. The more closely I examined the specimens, the further my fancy went, and has at last developed itself into the belief that they might be certainly conspecific with this form. So I have been much interested in them, presuming that they might throw light on the discussion whether *Lucius reichertii* may or may not exist as a species distinct from *L. lucius;* toward this, chiefly the present work has been undertaken.

The five specimens from Sakhalin range from 368 mm. to 720 mm. in the length total, while that from Siberia has a total length of 800 mm.; this and the largest of the former specimens are mature male. All were well preserved, especially three from Sakhalin, which, when handed over to me, were still so fresh as almost to represent the living colour.

1) Zoographia Rosso-asiatica III, pp. 336–338.
2) Verh. Zool. Bot. Ver., Wien, 1869, p. 956.

The general structures are so very like those of *L. lucius* that the form, if roughly or carelessly examined, might be included within that species. The body is elongate, and shows in some measure a cylindrical appearance but is somewhat flattened laterally; the greatest depth is a little less than one-sixth the length total. When viewed laterally, the back is nearly straight from the occiput to the anterior origin of the dorsal fin. The belly is gently arched, the highest part being some distance anterior to the ventral fins where the body is of the greatest depth. The caudal peduncle is rather deep, measuring a little less than half the greatest depth of the body (Fig. 1.)

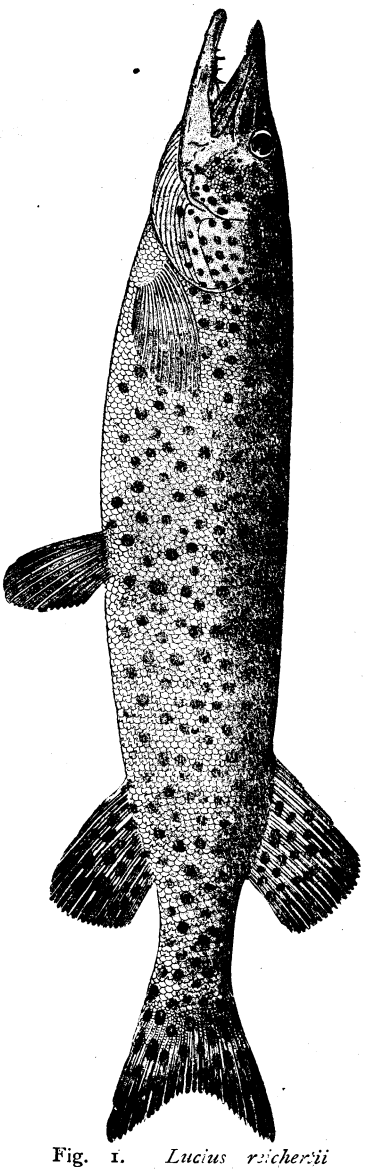

Fig. 1. *Lucius reichertii* (Dybowski), from Sakhalin, × 1/6.

The lenght of the head goes about three and a half in the length total, and well represents the characteristic feature of the Luciidae in having a flattened back and a spatulate snout, the length of which in turn is from 39 % to 41 % of that of the head. When viewed from above, the snout reveals itself as a semiellipse like other pikes; its width is two-thirds the length. The lower jaw projects a little beyond the upper. The eyes lie just in front of the middle of the head close to its upper margin, and their longest diameter is from 9/19 to 11/45 the length of the snout, and from 9/65 to 1/10 that of the head. The interorbital space is twice as wide as the eyes, well agreeing with the description of Dybowski.[1] The maxillary is a little shorter than half the length of the head, extending posteriorly just to the frontal margin of the eyes;

1) l. c., p. 956.

this also tallies with Dybowski's statement.

The teeth are slender, sharply pointed, usually more or less curved crescentwise, the larger ones are of almost canine appearance. There are about 50 teeth on each of the dentariesa, of which those on the anterior one-third of the bone are equally small and arrange themselves in a row, while on the remaining part they are very unequal in size, and form two or three irregular rows. Of the latter teeth several in the outside are prominent and become regularly smaller as they receed backwards, these teeth are visible before dissection. On each intermaxillary the teeth number about 15, forming a regular row, and are equally minute. Each palatine bone has roughly 170 teeth arranged in several rows, which become longer anteriorly and internally; of these ten or more near the antero-internal margin of the bone are especially large. The vomerine teeth are about 130 in number; they become longer anteriorly, and about ten on the anterior end of the bone are very long. The glossohyal has many teeth arranged in several rows on the posterior half.

The dorsal and anal fins are opposite each other in front of the caudal peduncle. The dorsal fin is a little longer than the anal, and originates a little more anteriorly. The rays of the dorsal fin, inclusive of the rudimentary ones in the anterior which are three or four in number, number 19 or 20, while the anal fin rays, also including the rudimentary ones, vary from 16 to 18. As regards these numbers again there can be found an agreement with the description by Dybowski, though they are both of greater number than given by Pallas, who mentions the rays to number 14 in each of the dorsal and anal. A similar difference from Pallas' description exists also in the number of the pectoral fin rays, which are 14 or 15 in the specimens before me as well as in the case of Dybowski and not 12 as Pallas gives. These differences are the only discernible dissimmilarities from Pallas' description; but this, perhaps, is due to the difference in counting and discounting of the rudimentary rays.

The scales of a longitudinal row along the mid-lateral line of the body range from 137 to 149 in number, counted from the scale next to the gill opening to that opposite to the last vertebra. Dybowski describes them to be-

146.[1] These numbers are decidedly greater than in *L. lucius*, in which they are given to be 135 by Cuvier and Valencinnes,[2] 116–130 by Günther,[3] 125–130 by Smitt,[4] and 123 by Jordan and Evermann.[5] The scales of an oblique row running from the anterior end of the dorsal fin anteriorly and ventrally number from 35 to 37. The cheek is covered entirely with scales, of which the number seems not to be quite constant, ranging from 150 to 250. The gill cover has scales only in the dorsal half, the remaining part being quite naked. Their number ranges from 70 to 120. The squamation of the head, thus, places the form very near *L. lusius*, and separates it from other pikes.

The branchiostegal rays are always 13 in number. Dybowski gives them as to be 14[6] which is near the number found in *L. lucius*, in which Cuvier and Günther both state to be 14, Jordan and Evermann, 14–16, and Smitt, 13–15. The vertebrae count 60 in the Siberian specimen and 63 in one of the Sakharin specimens, those of the precaudal region numbering 19 in the former and 21 in the latter.

The parietal bones entirely separate the frontals from the supraoccipital, a marked difference from the respects in the osteology of what we have hitherto known of the pikes which have the frontals joining the supraocipital (Fig. 2). Three specimens, which were all that were

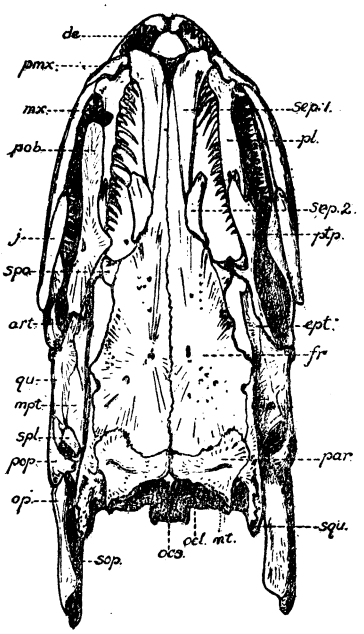

Fig. 2. *Lucius reichertii*. Upper view of the skull. × 2/3. art, articular; de, dentary; ept, mesopterygoid; fr, frontal; j. jugular (supprementary); mpt, metapterygoid; mt, epiotic; mx, maxillary; ocl, exoccipital; ocs, supraoccipital; op, opercle; par, parietal; pmx, intermaxillary; pob, preorbital; pop, preopercle; pt, palatine; ptp, pterygoid; qu, quadrate; sep. 1 & 2, supraethmoid; sop, subopercle: spl, symplectic; spo, sphenotic; squ, pterotic.

1) l. c., p. 957.
2) Histoire naturelle des Poisons, Tome XVIII, 1846, p. 286.
3) Catalogue of the Fishes in the British Museum, Vol. II, 1895, p. 998.
4) Skandinaviens Fiskar, Vol. II, 1895, p. 998.
5) Fishes of North and Middle America, pt. 1, 1896, p. 628.
6) l. c., p. 957.

available for my dissection, showed this same characteristic, though there might be discerned in some measure an individual variation as to the development of the parietals in respect to other bones of the vicinity. The parietals, developing extensively over the epiotics and supraoccipital, form contact with each other along the sagittal line of the head so that in the upper surface of the skull the frontals are quite separated from the supraoccipital. The epiotics, which appear in the upper surface of the skull in *L. lucius*, are in the specimens examined, almost hidden under the parietals and can only be seen in the posterior surface.

The coloration and patterns of the body are very characteristic, no less than the osteology referred to. The back of the body and head is deep gray or grayish blue. The sides shine with silvery lustre, shaded in light green or greenish blue. The belly is pearly white. Closely resembling the spotted muskellunge *L. masquinongy* (Mitchill) of North America, the head and body have many roundish or oval dark spots smaller than eyes, measuring from about 6 mm. to about 13 mm. in diameter in the largest of the Sakhalin specimens examined, a characteristic which makes the form decidedly distinct from *L. lucius* which may have whitish spots on the darker ground colour. As painted out by Dybowski the spots arrange themselves in more or less obliquely transvers lines, which all told for both the head and body, number roughly 30–35. The regularity is, however, present to individual variation; the one given in the text figure 1 is an example which has the extremely irregular arrangement of the spots. Except this respect the characteristic is quite constant, similarly occurring in all graduated sizes of specimens; this is also proved by the reports of the inhabitants in Taraika.

Anatomical characteristics of other internal organs were also examined but no marked point discriminative from other known pikes has been discovered. The dimensions of the specimens examined are as follows.

No. of specimen	Fish from Sakhalin i	ii	iii	iv	v	Fish from Siberia vi
Length total, measured from snout to base of caudal fin	368 mm.	460 mm.	530 mm.	625 mm.	720 mm.	800 mm.
Length of head	107 „	130 „	160 „	180 „	210 „	220 „
Distance from snout to base of ventral fin.	205 „	257 „	305 „	343 „	410 „	460 „
Distance from snout to anterior orgin of anal fin.	285 „	362 „	435 „	500 „	570 „	620 „
Length of snout	43 „	50 „	70 „	70 „	80 „	90 „
Length of maxillary	44 „	62 „	75 „	80 „	100 „	105 „
Length of eye	14 „	18 „	18 „	20 „	22 „	22 „
Interorbital distance	23 „	28 „	37 „	41 „	47 „	47 „
Depth of body	65 „	78 „	90 „	107 „	123 „	135 „
Depth of caudal peduncle	28 „	37 „	40 „	48 „	50 „	43 „
Length of dorsal fin	44 „	55 „	60 „	75 „	70 „	85 „
Length of anal fin	32 „	45 „	45 „	62 „	65 „	70 „
Length of dorsal-fin ray	53 „	65 „	65 „	80 „	72 „	80 „
Length of anal-fin ray	45 „	58 „	70 „	72 „	80 „	75 „
Length of pelvic-fin ray	43 „	60 „	65 „	76 „	63 „	75 „
Length of ventral-fin ray	40 „	57 „	62 „	70 „	78 „	75 „

As shown by the foregoing statement, the agreement of the Sakhalin form with Dybowski's *L. reichertii*, which is, as he declares, very probably identical with Pollas' variety from Dauria of *L. lucius*, is quite satisfactory so that I am greatly inclined to take them as conspecific. This opinion of mine is enforced by the fact that the Sakhalin specimen coincide in almost every

respect with that from Siberia, which locality is, indeed, in the vicinity of those given by Pallas and Dybowski. As to whether in any characteristic the Sakhalin form may exhibit the constant local variation with that of Siberia can not well be ascertained, due to the lack of sufficient specimens available. However, from the form of the river-system of Laka Baikal, which Dybowski describes under a name *L. reichertii* var. *baicalensis*,[1] the Sakahlin form seems to differ distinctly in several points: 1) In the Baikal form the maxillaries, being longer than in that of Sakhalin extends to beneath the centres of the eyes, 2) the scales in the longitudinal row along the mid-lateral line of the body are less numerous, being 130–134, 3) the branchiostegal rays are of a decidedly greater number, being 15 or 16, and 4) the spots of the body and head are described as golden yellow, not black as in the Sakhalin from.

In respect to the relationship of *L. reichertii* to *L. lucius*, the preceding paragraphs come into the conclusion, that there exists between them a marked difference at least as regards the number of the scales of the mid-lateral line of the body, in the osteology, and in the pattern of the head and body. No explanation is needed as to whether the differences are of sufficient value to retain *L. reichertii* distinct from *L. lucius*. Eventhough they may be separated, their intimate relationship is still easily recognised by their similarity as regards the general structure, in the squamation of the head, and in the pattern of the fins. And *L. reichertii* var. *baicalensis* alluded to stands between them as an intermediate form, the intermediation chiefly appearing in the number of the scales of the body, in the branchiostegal rays, and in the pattern of the head and body.

Pallas and Dybowski report them as inhabiting in the river-systems of the Onon and the Ingoda, the upper tributaries of the Amur widely distributed in Transbaikal of Siberia. According to Professor Eri the specimen from Siberia at my disposal is probably from the river-system belonging to the lower part of the Amur of Maritime Province. These habitats taken together with Sakhalin roughly demark the distribution of the species into a latitudinally extended area ranging from Lake Baikal on the west to Sakhalin

1) Verh. Zool. Bot. Ver., Wien, 1874, p. 392.

on the east.

The pike of Sakhalin has passed unnoticed from the earnest researches of Pallas, Middendorff, and Schrenck, but has come under the attention of Boulenger who gives it in his distribution map of pikes.[1] I much regret that I have unfortunately been unable to find the literature or other evidences, by which he has mapped it into Sakhalin. Bartholomew and others[2] overestimate the distribution of the Luciidae in delineating it into Hokkaido and the northern half of Honshu, where no species belonging to the family has yet been found.

1) Cambridge Nat. Hist., Fishes, p. 610.

2) Bartholomew's Physical Atlas, vol. V, 1911, pl. 25.

樺太産パイクとヂボルスキーの *Lucius reichertii* とに就て

佐々木望

摘要

著者は先頃疋田豊治、半田芳男、及梶浦愼行諸氏の勞によりて樺太産パイク五尾を視ることを得たり、右標本は曾てパラースが普通のパイク即ち *L. Lucius* の一變種として記載し、其後ヂボルスキーが *L. reichertii* と命名せる露領オノン地方のパイクと同一種ならんと考査す、著者は別に惠利惠氏の寄贈にかかる黒龍江産のパイク一尾を保存す其特徴は殆んど悉く樺太産パイクに一致す、之れ上の考査を確むる一事項と見做し得可し。抑々パラース及ヂボルスキーのなせる本種の記載は頗る簡單なるを以て從來本種は *L. lucius* と異名同種なるや或は全然別個の種として取扱ふ可きものなるや論說一定せざりき、茲を以て著者は外部の特徴は勿論、解剖上の諸點殊に其頭骨を悉細に檢査するに *L. lucius* より異る重要なる少くとも三つの特徴あることを確む、即ち(一)北米産の *L. masquinongy* に似て頭及胴に數多の明白なる黒き班紋あり、(二)頭骨に於て左右の顱頂骨は頭の中央線に沿ふて相接し前頭骨を上後頭骨より分離せしむ、又上耳骨は頭骨の唯後面に現れ居れり、(三)鱗は胴側中央線に沿ふて凡百三十七乃至百四十九を算す、但し外形の一般の構造、腮蓋の下半に鱗の無きこと、鰭の黒き班紋の數、形等は確に系統上他の既知のパイクよりも *L. lucicus* に近きことを證するに足る、而してかのヂボルスキーの *L. rechsrtii* var. *baicalensis* は上の兩種の中間に立つものと見做し得可し。本種は西はバイカル湖より東は樺太に至る緯度線に沿ふて東西に擴る分布區域を有す、樺太にパイクの産することはパラース、ミツデンドルフ、シユレンクの旅行記及研究誌にも見當らず、ブランジエは樺太をパイク科の分布區域中に包含せるも其論據は不明なり。北海道及其以南にはパイク科に屬するもの未だ知られず、パーソロミエの動物分布圖には北海道及本州の北半をもパイク科分布區域となすも之れ唯誤りたる同著者の憶測に過ぎるや殆んど明かなり。