PALEONTOLOGICAL JOURNAL

1970 No. 1

UDC 568.1:761.1 (575.123

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A PECULIAR REPTILE FROM THE LOWER TRIASSIC OF FERGHANA*

The small reptile *Longisquama insignis* gen et sp. nov., assigned to the new family Longisquamidae (order Pseudosuchia), is described. Its outer integument consists of long, overlapping scales, which along the back are modified into peculiar appendages that apparently served as small parachutes. The structure of the skeleton is characterized by fused clavicles, forming a similarity to the bird furcula.

While collecting fossils of insects in the Lower Triassic river clay deposits of Ferghana, I found an incomplete skeleton of a small reptile, along with which an imprint of the scaly cover of the body and limbs was preserved. Although the skull bones are crushed, it is possible to distinguish two partially preserved temporal fenestrae, as well as a small antorbital fenestra. In addition, there is an opening in the back of the lower jaw. All these features together indicate that this reptile belongs to the order Pseudosuchia. This discovery is described below.

For reviewing the manuscript, I would like to express my sincere gratitude to L. P. Tatarinov.

ORDER PSEUDOSUCHIA

FAMILY LONGISQUAMIDAE SHAROV, FAM. NOV.

Diagnosis. Small reptiles, the body of which did not exceed 50 mm in length. The base of the skull is deep. The eye sockets are large, the sclerotic ring is wide. The teeth are small, conical, and acrodont. No more than seven cervical vertebrae. No cervical ribs. The clavicles are arched and fused at the inner ends. The interclavicle is well developed. Shoulder blades are narrow and long. The shoulder is slightly longer than the forearm. The hand is long, equal in length to the forearm. The belly ribs are absent. The bones are not pneumatic. The body is covered with elongate, overlapping scales; on the forelimbs they form a border behind, and along the back they are modified into very long, peculiar appendages. The scales covering the body are five to seven times longer than their width and bear a longitudinal crest. The dorsal appendages, which are two to three times the length of the head and trunk taken together, have a complex structure. Each appendage is formed by two highly elongated scales, linked at the anterior edge, and at the end, in addition, at the posterior edge and in the middle. The ends of the appendages are expanded and slightly curved back. Each scale from the base to the beginning of the distal extension is divided into three bands, the posterior of which gradually narrows and wedges out. The middle band, slightly convex, contains bead-shaped swellings, superficially resembling the swelling of the pulp caps in the calamus of bird feathers. These swellings can be traced almost to the area where the posterior band is wedged out, and represent, apparently, as in the feathers of birds, the keratinized remains of the dermal papilla that fed the growing scales.

* Original citation: Sharov, A. G. 1970. Svoeobraznaya reptiliya iz nizhnego Triasa Fergany. *Trudy Paleontologicheskii Zhurnal* 1:127–130. Translation © Konstantin Rybakov, 2021.

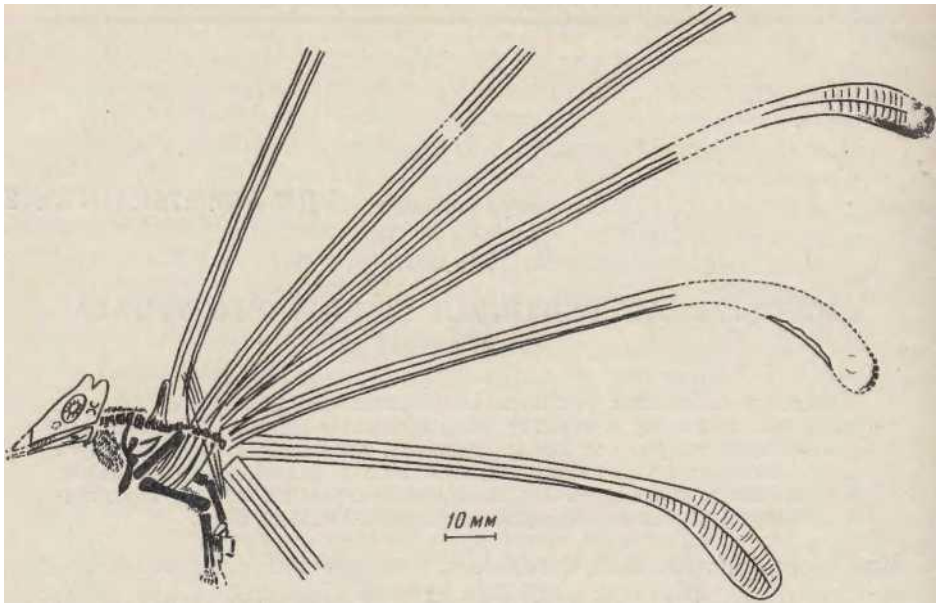

Fig. 1. *Longisquama insignis* sp. nov.; holotype No 2584/4, General view; Madygen tract; Lower Triassic

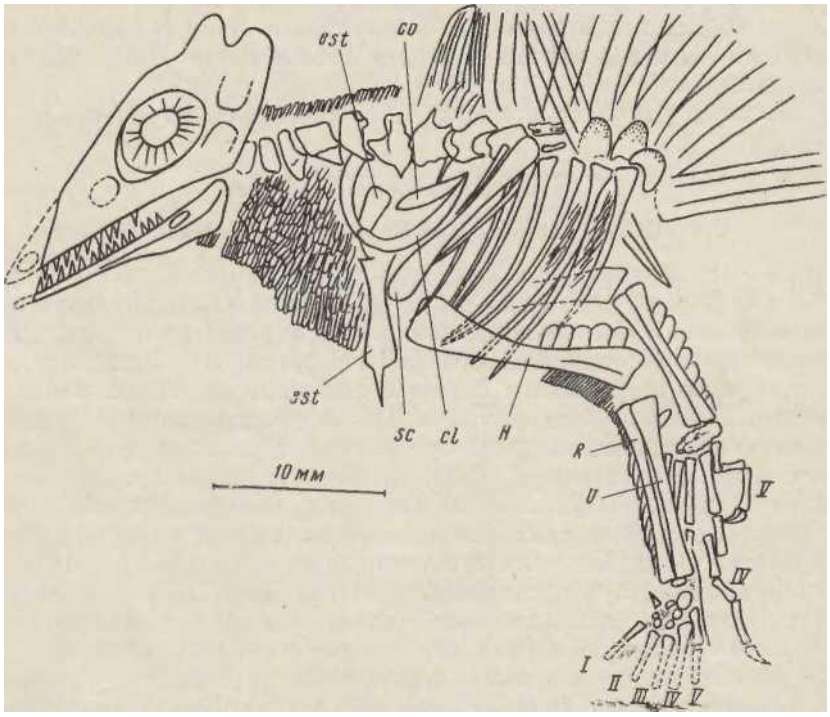

Fig. 2. *Longisquama insignis* sp. nov.; holotype No. PIN 2584/4, skeleton and integument impression; Madygen tract; Lower Triassic. Symbols: cl — clavicle, co — coracoid, est — interclavicle, H — humerus, R — radius, sc — scapula, U — ulna, I–V — fingers I–V

Composition. One genus *Longisquama* gen. nov.

Comparison. It differs from all known pseudosuchians in having of long fan-like appendages along the back and fused clavicles.

Comments. Judging by the relatively short shoulder and forearm, as well as the long hand, representatives of this family led an arboreal lifestyle. Fused clavicles indicate that heavy loads were experienced by the forelimbs. The structure of the dorsal appendages shows that they were a kind of parachutes that somewhat slowed down the fall of the animal when jumping from branch to branch or from a tree to the ground. The air layers between the elongated scales that covered the body, which lay on top of each other, may have played a role in thermal insulation.

Although it is difficult to establish any continuity between the Longisquamidae and the first birds due to the absence of belly ribs and the presence of a short neck with a small number of vertebrae, as well as peculiar dorsal appendages, the scales that covered the body and limbs of the ancestors of birds probably had the same structure as in the Longisquamidae, and as for the fused clavicles, they, in fact, already formed a typical bird furcula in representatives of this family. These features show that the Longisquamidae were quite close to the yet unknown pseudosuchians from which birds originated.

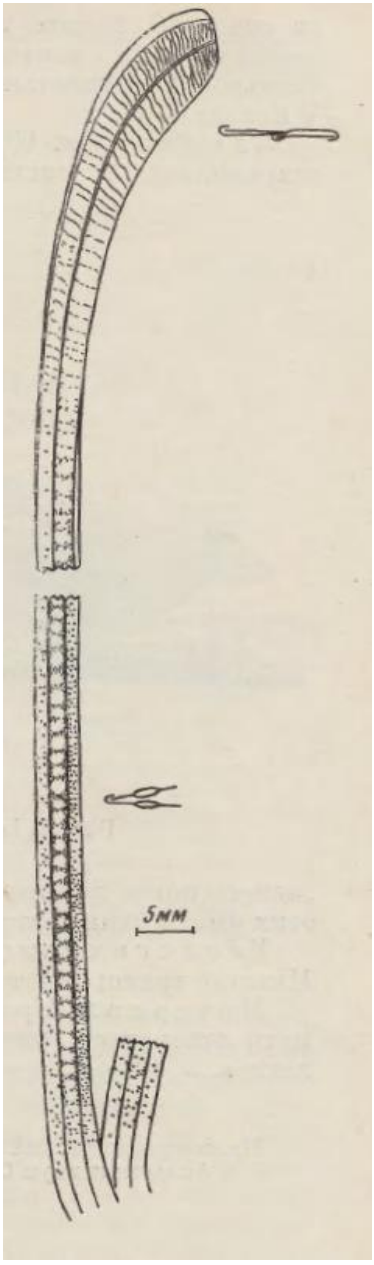

Fig 3. *Longisquama insignis*, sp. nov.; holotype No. 2584/4, view from the surface and in cross-section at the middle and apex of the dorsal appendage; Madygen tract; Lower Triassic

Genus *Longisquama* Sharov, gen. nov.

Genus name from longus *Lat.* — long and squama *Lat.* —scale.

Type species — *L. insignis* sp. nov.; Lower Triassic; Ferghana.

Diagnosis. Skull with two tubercles in the occipital region. There are 12-13 pairs of teeth in the upper jaw and 16-17 pairs of teeth in the lower jaw. The shoulder blades are long, narrow, and slightly expanded at the ends. The radius and ulna are equal in thickness and almost identical in shape.

Species. Type species.

Longisquama insignis Sharov, sp. nov.

Table VIII, figs. 1, 2

Species name from insignis *Lat.* — unusual.

Holotype — PIN, No. 2584/4; incomplete skeleton and counterpart; Kyrgyz SSR, Osh region, Lyaylyak district, Madygen tract, Djailaucho locality; Lower Triassic, Madygen Formation, upper strata.

Description (Fig. 1–4). The metacarpal bones of digits I–IV are equal in length. The metacarpal bone of digit V is half their length. Phalanges I, II and IV of digit IV are equal in length. Phalanx III is 1.5 times shorter than them.

Dimensions, mm. The height of the skull at the middle of the orbits 8, the estimated length of the skull 23, the height of the teeth 0.5—0.8, the length of the

cervical about 10, height of trunk vertebrae 3.5; length: collarbone — 7.5, shoulder blade — 12, coracoid — 5, interclavicle — 9, shoulder — 13, forearm — 11, carpus — 2.5, metacarpals I–IV— 4, finger IV — 13, finger V — 7.

Comments. Unfortunately, the back half of the body and tail were not preserved, so it is impossible to say anything about the structure of the pelvic girdle, limbs, and the overall length of the body. In figure 4, the reconstruction of these parts of the body is given only hypothetically.

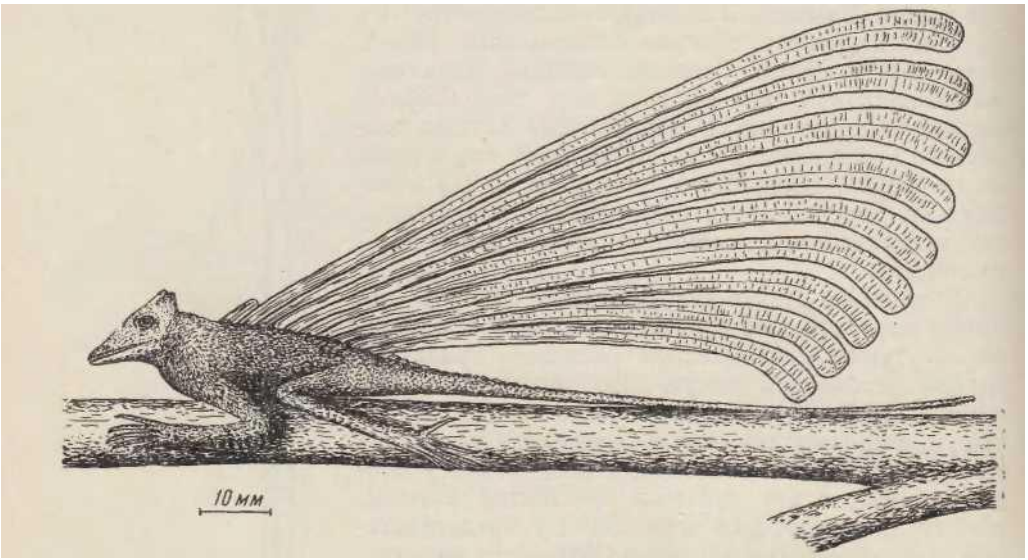

Fig 4. *Longisquama insignis*, sp. nov.; reconstructed

Geological and geographical distribution. Lower Triassic; Ferghana.

Materials. In addition to the holotype, there are five impressions of single and grouped dorsal appendages from the same location.

Paleontological Institute
USSR Academy of Sciences

Paper received
1 IX 1969

Explanation to Table VIII

Fig. 1, 2. *Longisquama insignis*, sp. nov.; 1 — holotype No. 2584/4: 1а — General view (x 0.75); 1б — skeleton and impression of integuments (x 2.2); 1в — impression of integument of elongated scales in the neck (x 6.8); 1г — imprint of a section of one of the dorsal appendages (x 5.3); Madygen tract; Lower Triassic; 2 — specimen No. 2584/5, impression of the dorsal appendage apex (x 4.4); location and age are the same.

TABLE VIII