HISTOLOGICAL CHARACTERISTICS OF THE SKIN OF *SALAMANDRELLA KEYSERLINGII* (CAUDATA, HYNOBIIDAE) FEMALES IN AQUTIC AND TERRESTRIAL PHASES OF SEASONAL CYCLE

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Received 19 September 2018, revised 29 October 2018, accepted 2 November 2018

Morphological features of the dorsal (DS), throat (TS) and tail skins (caudal skin, CS) were examined in the aquatic- and terrestrial-morphotype females of *Salamandrella keyserlingii*. Using histological and statistical methods, the presence of the stratum corneum of the epidermis, the fullness degree of the mucous glands, and the development of the subdermal connective tissue were estimated. The relative areas of the main structural elements (epidermis, strata compactum and spongiosum, connective tissue in the whole, granular and mucous glands) were measured. Regardless of the skin region, the aquatic morphotype females had no cornified epidermis, their mucous glands were empting, and subdermal connective tissue was hypertrophied. In the aquatic-phase females, the area of mucous glands of TS and DS, the area of epidermis and connective tissue of TS were larger than those of the terrestrial-phase ones. In the terrestrial-phase females, the area of epidermis of TS and the area of granular glands of TS and DS were larger in comparison to those of the aquatic-phase females.
Key words: Amphibia, tailed amphibians, integument, morphotype, skin histology, seasonal variation.

DOI: : https://doi.org/10.18500/1814-6090-2018-18-3-4-159-167

Acknowledgements: This work was supported by the Russian Foundation for Basic Research (project no. 16-34-01055).

REFERENCES

Dilmuchamedov M. E. Skin. In: *The Siberian newt: Zoogeography, Systematics, Morphology*. Moscow, Nauka Publ., 1994, pp. 109–115 (in Russian).

Sokolov V. E. Morphological adaptations of the amphibian skin in USSR fauna to the Terrestrial mode of life. *Zoologicheskii Zhurnal*, 1964, vol. 18, no. 9, pp. 1410–1411 (in Russian).

Yartsev V. V. 2014. *Reproductivnaia biologia khvostatykh zemnovodnykh roda Salamandrella* (*Amphibia*: *Caudata*, *Hynobiidae*) [Reproductive biology of salamanders of genus *Salamandrella* (Amphibia: Caudata, Hynobiidae)]. Diss. Cand. Sci. (Biol.). Tomsk, 2014. 253 p. (in Russian).

Yartsev V. V., Evseeva S. S. Histological characteristics of the skin of *Salamandrella keyserlingii* (Caudata, Hynobiidae) males in the aquatic and terrestrial phases of their seasonal cycle. *Current Studies in Herpetology,* 2018, vol. 18, no. 1–2, pp. 54–63 (in Russian). DOI: 10.18500/1814-6090-2018-18-1-2-54-63.

Aoto *T.* A remarkable swelling of male skin of a salamander (*Hynobius retardatus* Dunn) in the breeding season. *J. of the Faculty of Science Hokkaido University*, *Zoology*, 1950, vol. 10, no. 1, pp. 45–53.

Brizzi R., Corti C. Reproductive cycles of the European amphibians: a brief history of studies on the role of exogenous and endogenous factors. *Herpetologia Bonnensis II. Proceedings of the 13th Congress of the Societas Europaea Herpetologica.* Bonn, 2006. pp. 27–30.

Exbrayat J. M. Classical methods of visualization. In: J. M. Exbrayat, ed. *Histochemical and Cytochemical Methods of Visualization*. Boca Raton, London, New York, CRC Press Taylor and Francis Group, 2013. pp. 3–58.

Fox H. Epidermis. In: J. Bereiter-Hahn, A. G. Matoltsy, K. S. Richards, eds. *Biology of the Integument. 2 Vertebrates*. Berlin, Heidelberg, New York, Springer-Verlag, 1986. pp. 78–110. DOI: 10.1007/978-3-662-00989-5

Hasumi M., Iwasawa H. Seasonal changes in body shape and mass in the salamander, *Hynobius nigrescens. J. of Herpetology*, 1990, vol. 24, no. 2, pp. 113–118. DOI: https://doi.org/10.2307/1564217

Hasumi M., Iwasawa H. Wandering behavior and cutaneous changes in winter-dormant male salamanders (*Hynobius nigrescens*). *Herpetologica*, 1992, vol. 48, no. 3, pp. 279–287.

Mosconi G., Yamamoto K., Kikuyama S., Carneva-li O., Mancuso A., Vellano C. Seasonal changes of plasma prolactin concentration in the reproduction of the Crested

newt (*Triturus carnifex* Laur.). *General and Comparative Endocrinology*, 1994, vol. 95, no. 3, pp. 342–349.

Polzonetti-Magni A., Carnevali O., Yamamoto K., Kikuyama S. Growth hormone and prolactin in amphibian reproduction. *Zoological Science*, 1995, vol. 12, no. 6, pp. 683–694.

Toledo R. C., Jared C. Cutaneous adaptations to water balance in amphibians. *Comparative Biochemistry and Physiology*, 1993, vol. 105, no. 4, pp. 593–608. DOI: https://doi.org/10.1016/0300-9629(93)90259-7

Vitt L. J., Caldwell J. P. *Herpetology: An Introductory Biology of Amphibians and Reptiles*. 4rd ed. Amsterdam, Academic Press, 2014. 757 p.

Wells K. D. *The Ecology and Behavior of Amphibians*. Chicago, London, University of Chicago Press, 2007. 1148 p.

Woodley S. K. Hormones and reproductive behavior in amphibians. In: *Hormones and Reproduction of Vertebrates*, Vol. 2. Amphibian. London, Academic Press, 2011, pp. 143–169.

Xiong J., Dai Ch., Li M., Dengi W., Li J. Morphological characteristics of the dorsal skin of two hynobiids and their adaptive role in aquatic and terrestrial habitats. *Asian Herpetological Research*, 2013, vol. 4, no. 1, pp. 62–67.

Cite this article as:

Yartsev V. V., Evseeva S. S. Histological Characteristics of the Skin of *Salamandrella keyserlingii* (Caudata, Hynobiidae) Females in Aqutic and Terrestrial Phases of Seasonal Cycle. *Current Studies in Herpetology*, 2018, vol. 18, iss. 3–4, pp. 159–167 (in Russian). DOI: https://doi.org/10.18500/1814-6090-2018-18-3-4-159-167
