

# Morphology of alimentary system and shell adductor muscles in some species of endemic Baikalian Acroloxidae (Pulmonata, Basommatophora)

A. SHIROKAYA<sup>1</sup>, P. RÖPSTORF<sup>2</sup>

<sup>1</sup> Limnological Institute of the Siberian Branch of Russian Academy of Sciences, Ulan-Batorskaya street 3, Irkutsk 664033 RUSSIA; e-mail: shirokaya@lin.irk.ru

<sup>2</sup> Institute of Geological Sciences, Freie Universität Berlin, Malteser Str. 74-100, 12249 Berlin, GERMANY; e-mail: rpeter@zedat.fu-berlin.de

**ABSTRACT.** Anatomy of alimentary system and shell adductor muscles of ten endemic acroloxid species from Lake Baikal was studied for the first time. Two types of alimentary system have been distinguished in Baikalian limpets. The differences have been found in morphology of odontophore, which are associated with the type of feeding. It is shown that the type of alimentary system found in *Gerstfeldtiancylus* (*Gerstfeldtiancylus*) is similar to that of the majority of non-baikalian acroloxids. A correlation between the apex position, the form of teleoconch slopes, and the morphology of shell adductors is observed. The study of closely related acroloxid species allowed to reveal additional taxonomically important characters, and a key to species identification is given.

along the western and northeastern shores of Lake Baikal at depth from 2 to 20 m. The samples were collected by a group of scuba divers supervised by I.Yu. Parfeevets, during several cruises of the research vessels "G. Wereshchagin", "G. Titov" and "Obruchev". Additionally, we used the material from the collection of Dr. T.Ya. Sitnikova (Limnological Institute SB RAS).

The species were identified using the "comparative method", with the aid of camera lucida [Izzatullaev, Starobogatov, 1984].

Anatomy was studied by hand dissections of both alive and fixed molluscs. Gastropods sampled were fixed in 80% ethyl alcohol. Some of them were fixed in 4% formalin and subsequently transferred into alcohol. Anatomy of the anterior part of the alimentary system was studied on the serial sections obtained by routine microtome technique. After removing the shell the body was dehydrated, embedded in paraffin and sectioned 5 µm thick. The sections were stained with Heidenhain's duple stain [Romeis, 1953]. Further, the sections were photographed by a digital camera connected to a light microscope and figured using photos as templates.

All measurements were made using a MBS-1 stereomicroscope with a scale (precision 0.1 mm). The height of shell adductors was measured from the upper part of the foot sole to the point of adductor connection to shell.

Statistical analysis was made by Excel 7.0 for Windows.

**Abbreviations used in the figures:** a.a.l. – left anterior adductor; a.a.r. – right anterior adductor; a.p. – anal pore; b.c. – buccal "cartilage" (odontophore); b.m. – buccal mass; b.p. – basal plate; cae. – caecum; col. – colostyle; f. – foot; int.1. – first intestinal loop; int.2. – second intestinal loop; l.p. – liver pores; m. – mouth; m.b. – mantle border; o.a. – original or posterior adductor; od. – odontoblasts; oe. – oesophagus; r.m. – radular membrane; r.s. – radular sac; s.g. – salivary gland; sbr.e. – subradular epithelium; spr.e. – supradular epithelium; st. – stomach; t. – tentacle; t.m. – tensor musculature.

Ἰ ἀρίαι-ἀρίεῦ ἰὰ δεξιόεαο: a.a.l. – левый передний аддуктор; a.a.r. – правый передний аддуктор; a.p. –

## Introduction

The present paper continues the study of morphology of Baikalian endemic acroloxids which was started with investigation of protoconch, adult shell, and radula [Shirokaya et al., 2003]. External and inner morphology of non-baikalian acroloxids was studied in detail by Hubendick [1960, 1961, 1962, 1969a, 1969b, 1972]. The data on the anatomy of Baikalian species consist only of information of the radula [Dybowski, 1875; Starobogatov, 1989] and the copulative apparatus [Hubendick, 1969b; Kruglov, Starobogatov, 1991]. It was shown in the first part of our study, that not all the species described by Starobogatov [1989] can be distinguished by their shell and radular morphology. The aim of the present work was to find additional characters for the comparison of closely related acroloxid species. Unfortunately, the anatomy of *P. frolikhae* was not studied due to lack of material. Here we present the results of the study of alimentary system and shell adductor muscles of 10 species of the Baikalian acroloxids.

## Material and methods

The study was based on the collection containing 10 acroloxid species from 14 stations situated mainly