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NEW DESIGN OF THE MANIPULATOR FOR MORPHOLOGICAL ANALYSIS

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Новий дизайн маніпулятора для морфологічного аналізатора. — Андрій Хоменко. — Автором запропоновано нову конструкцію маніпулятора для морфологічного аналізу біологічних зразків. Подібна конструкція є оптимальною для дослідження твердих біологічних зразків, таких як черепашки молюсків та кістки хребетних тварин. Запропонована конструкція маніпулятора дозволяє оперувати зі зразками, та обертати їх під різними кутами відносно до об'єктиву камери або мікроскопу, що значно спрощує процес дослідження морфології та морфометрії дрібних деталей.

Ключові слова: маніпулятор, морфологія, молюски, черепашка.

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New design of the manipulator for morphological analysis. — Andrij Khomenko. — The description of a new design of the manipulator for morphological analysis of biological objects was proposed. This manipulator is good for examining a morphological feature of hard biological objects, such as shells of mollusks or bones of vertebrates. The proposed manipulator allows to rotate biological objects in different angles under a microscope or camera and makes the process of morphometry easier.

Key words: manipulator, morphology, Mollusca, shell.

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Introduction

Photographing is often used for morphological characterization in biological studies since illustrations allow to find out an idea about the form of objects under the study. Some significant for species identification details such as the protoconch [1] or sculpture [2] of shell, are difficult to photograph without immobilization so that it is better to use various holders for it. Similar devices are used in entomology, for example, the manipulator invented by Egorov [3] and used to

manipulate with pinned insects. A similar device was proposed for larva morphometry [4]. Here we propose a new kind of manipulator to examine snail shells.

Material and methods

Construction of the manipulator. Our manipulator has two joints and is composed of a base (fig. 1A) and a moving head (fig. 1B). The moving head is composed of a ring magnet with a metal plate glued and a layer of plasticine to fix an object. The base is composed of a holder for video-tape recorder, a metal plate and a metal ball.

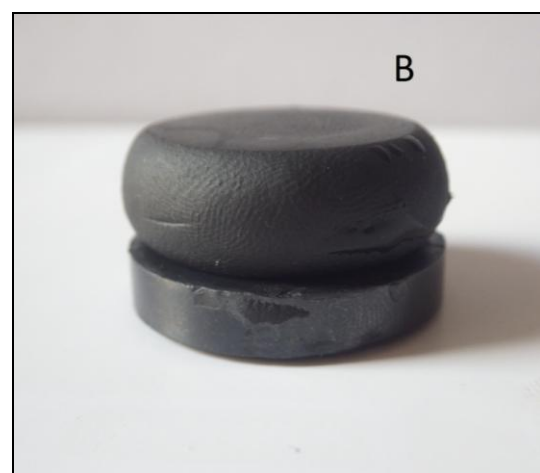
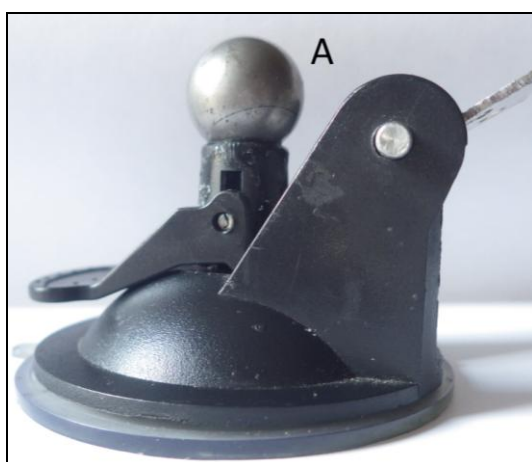


Fig 1. Base (A) and moving head (B) of the manipulator.

The first joint is composed of a nonmetallic foot and a steel ball glued. The moving head is attracted to the metal ball and rotated on the ball surface, what permit to rotate object in different angles.

The second joint has two foots and a metal plate, which can change the angle of inclination. The moving head is attracting to the metal plate, what permits to change angle of object inclination. It makes possible to manipulate with an object under high magnification of a microscope.

Results and discussion

Different joints can be used for different purposes. The ball joint, for example, is better used to take a picture of the object entirely, or to make measurements of the object (fig. 2).

Another joint better suited to take a photo of small details such as the protoconch (fig. 3).

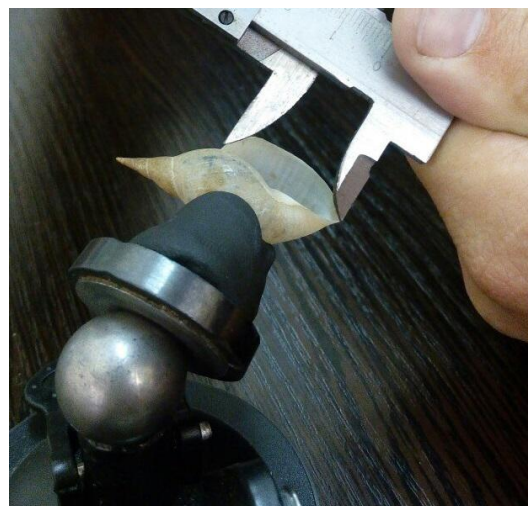


Fig 2. Measuring of the *Lymnaea stagnalis* shell.

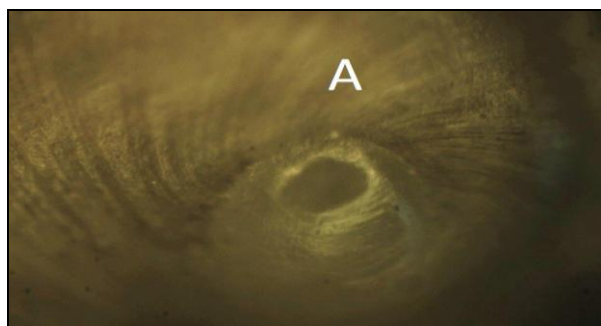
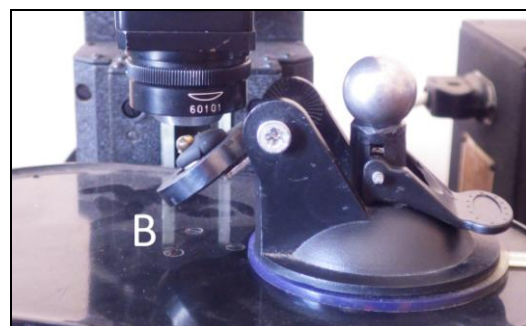


Fig. 3: Photographing of the *Theodoxus fluviatilis* protoconch.



Conclusion

The proposed construction of the manipulator can be used for explore morphological characteristics of solid biological objects, such as mollusk shells or bones of vertebrates. This construction can be used in botany, for ex-

ample for describing seeds or for describing crystals in geology. It was demonstrated that the new device can be used for examining molluscan shell, morphometry, and photographing taxonomically significant details.

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