The Characteristics of General Zoology and Its Learning Methods

Can Zhong
College of Life Sciences, Anhui Normal University, 241000, China

[Abstract] This paper gives an overview of the characteristics of the general zoology curriculum knowledge system, highlights the learning methods of this course and the problems that should be paid attention to, so that the students have a deep understanding of this course and help them systematically master the knowledge of this course.
[Keywords] Zoology; Knowledge System; Learning method

1. Introduction

General zoology is one of the basic backbone courses in the zoology profession. This is a very comprehensive subject, which contains at least seven branches of animal morphology, systemic zoology, animal ecology, evolutionary biology, animal geology, animal physiology and embryology. It is one of the characteristics of this course. Because the knowledge systems of the various branches involved in general zoology are intertwined and complement each other, beginners often cannot grasp the main points, can't figure out the clues, and even after learning the course, they still feel unintelligible and not very clear about it. The reason is that the knowledge system that is mastered is scattered, not systematic, and organized. Therefore, it is necessary to guide the learning methods of this course.

2. The Characteristics of General Zoology

Although the general zoology is complex, its knowledge system still focuses on morphological structure and systematic zoology. Its morphological structure is both organ level, tissue and cell level. Ordinary zoology itself is a basic subject, but at the same time it needs the support of the basic knowledge of several other branches involved. This feature is one of the difficulties in the teaching and learning of this course. On the other hand, with the deepening of the teaching reform, the class of general zoology has been greatly compressed, but the content has not changed. Therefore, improving teaching and learning efficiency is indispensable.[1]

3. The Learning Methods of General Zoology

When studying the course of general zoology, we should first grasp the evolution of this main line of animal distribution throughout the biosphere; its morphological structure is complex and diverse. However, the composition of the animal world, no matter how chaotic at first glance, they follow an evolutionary line, following

Evolution from low to high, from simple to complex, from aquatic to terrestrial evolution Specifically, the evolution of the animal kingdom begins with single-celled animals (protozoa) and evolves into multicellular animals (posterior animals) with tissue differentiation. The irregular radiation in the body structure is symmetrical to the bilateral symmetry; the germ layer evolves from the two germ layers to the three germ layers; the body is never segmented to the segment; the appendages are from nothing, from no segmentation to segmentation (e.g. arthropods) The spine grows from scratch; the nervous system develops from the reticular-like shape to the tubular nerve; the body cavity also develops from the original body cavity to the mixed body cavity, and then evolves into the secondary body cavity; the circulatory system develops from open-tube to closed-tube The mouth develops from the original mouth to the back mouth; the bone also develops from the invertebrate's unmetabolic exoskeleton to the endoskeleton of the vertebrate life; respiratory system Respiratory to the lungs to develop breathing; reproductive methods are also born from the egg, and eventually develop into a viable. There are many examples of animal evolution in all aspects and at various levels. You can summarize many such examples yourself. The original seemingly chaotic animals are organically linked to each other's various organ systems. Systematization and organization make it possible to realize associative memory in the process of learning and memory. If the various systems of individual animal groups are treated in isolation, then the disadvantages of seeing trees and not seeing forests will occur in the study, so that perceptual knowledge cannot rise to rational understanding.

Most of the rules of the generation are met when comparing and summarizing various groups of animals. Therefore, comparison and summarization are important ways to learn common zoology. If the evolutionary laws of various groups of organs and systems in invertebrates are not very clear, it is not easy to see the evolutionary trend between them, and then vertebrates are relatively more regular and easy to generalize.
• In fact, the sub-discipline of vertebrate zoology is a special discussion and comparison of the similarities and differences between the morphological structures of various groups of vertebrates, summarizing the evolutionary laws of the disciplines. It is one of the keys to learning ordinary zoology. For example, it is difficult for beginners to learn the vertebrate skeletal system, because the skeletal system is very complicated, and there are as many as a hundred pieces of bone on the skull of the bony fish, to remember them one by one. It's not an easy task, but as long as we understand the evolutionary relationship of the various skull structures, we grasp the key points of knowledge. Mammals are developed on the basis of reptiles, and reptiles develop from amphibians. The amphibians evolved from the landing of fish. Therefore, the skulls of each group were developed on the basis of their ancestral types. On this evolutionary line, the evolutionary trend of the skull is easy to summarize. The evolutionary relationship between the bones is also easy to find. The circulatory system is also a single cycle of native aquatic vertebrate camp breathing. After evolution to terrestrial vertebrates, due to lung breathing, double circulation occurs. The circulatory double circulation system develops on the basis of amphibians.

And mammals evolved a complete double cycle. Therefore, the evolutionary trend of the vertebrate circulatory system is from single cycle to double cycle, from incomplete double cycle to complete double cycle. Similarly, the evolutionary trend of the vertebrate brain is increasing in volume. New structures such as the cerebral peduncle, pons, cerebellum, neonatal brain, scorpion, and tetrad are present. The cranial nerves are also composed of no amniotic membranes. Pairs of 12 pairs of amniotic animals developed. After such a summary, the evolutionary trend of each animal group in each system can be seen at a glance.

Morphological structure knowledge is one of the key points of general zoology. Due to the wide variety of animal kingdoms and the wide variety of morphological structures, beginners often find it difficult to master the knowledge of this aspect. It is a common problem to remember the knowledge points. The phenomenon of morphological structural characteristics of Zhang Guan Li Dai often occurs. The author often encounters a problem in the teaching process. One of the questions raised by the author is how to remember that so many morphological features are not misplaced. The key to solving this problem is to remember two principles: one is the principle of unity of organisms and the environment, and the other is the principle of unity of structure and function. Any organism is a product of adapting to the environment during the natural selection process. The environmental factors determine the lifestyle and body structure of the organism. In order to adapt to the environment, the animal must have a set of functional systems that adapt to the environment, such as feeding function, motor function, reproductive function stress, and features, etc. These functional systems must be structured to achieve a unified environment and organism. In the case of fish, In the case of fish, for example, the living environment of fish is water, and almost all structural features of the fish are adapted to this. First, the fish body is mostly spindle-shaped to reduce the resistance during swimming. As for other body shapes, it is the result of adapting to a specific environment, such as flat-flat adaptation to benthic life, while fish living in the vicinity of coral reefs that are good at swimming in the gaps are banded or rod-shaped fins are the moving organs of fish. But there is no supporting capacity, because the buoyancy of the fish can make the body suspend in the water. It is only by the swing of the fin that the body can flexibly turn to the internal structure of the fish. The fish also use the sputum as a respiratory organ to adapt the oxygen in the water to the sputum. The circulation system of fish is a single cycle, one atrium and one ventricle. The blood of the venous and venous blood completely separates the muscle system of the fish, and the sarcomere is staggered in the left and right, in order to facilitate the wavy movement of the body during swimming to push the fish forward and take the bird's respiratory system as an example. Birds need to consume a lot of energy when flying in the air, the metabolism is very strong, and birds use double breathing to meet the oxygen supply during metabolism. Birds achieve the dual respiratory function through the special structure of the lungs. The lung structure of birds is different from other In the lungs of terrestrial vertebrates, the respiratory function of the lungs is micro-tracheal rather than alveolar. With the anterior and posterior thoracic airways,

the air flows in one direction in the lungs, and the fresh air is passed through the lungs during both inhalation and exhalation. . The double breathing function of birds is accomplished by the "d-p-v system" by means of two special structures of airbags. Both examples show that the living environment of animals determines the lifestyle of animals, and the lifestyle requires animals. There must be a corresponding functional system, and the specific functional system is completed by a specific structure.

In the process of learning common zoology, some specific methods of helping memory can be used. For example, the chart method, the oral method and the imaginary memory method refer to a method that uses drawing and list to help memory. For example, when learning vertebrate sub-gates, the structural characteristics of each system can be listed in a table for comparison and memory.

Drawing refers to the use of simple schematics to represent complex morphological structures or physiological processes, making complex problems simple and straightforward, so that, for example, the use of boxes or arrows can succinctly express the mammalian circulatory system:

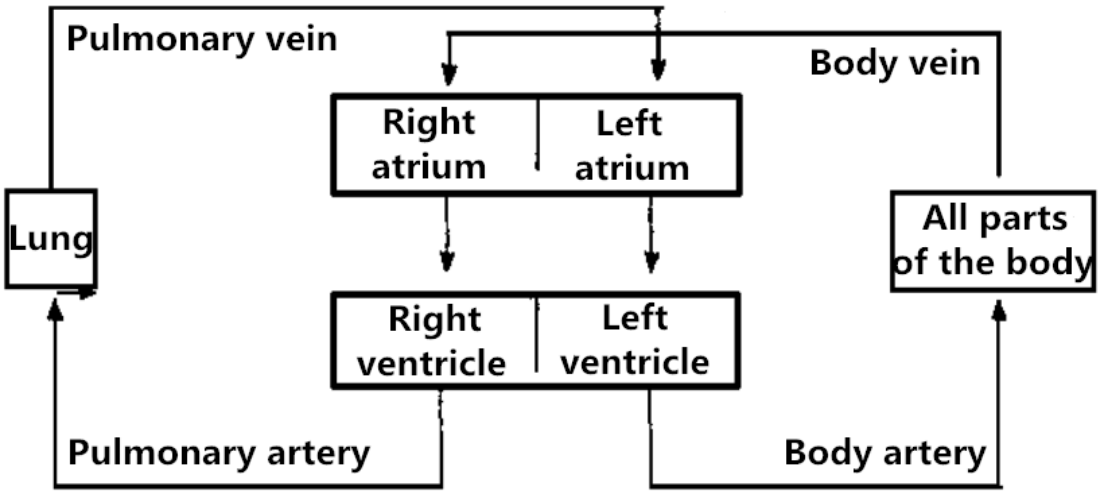


Figure 1. The Mammalian Circulatory System

The oral sputum method is to write the content to be memorized in the form of a mouth, rhyming to the mouth, and enhance the memory. For example, the 12 pairs of cranial nerves of the vertebrate are arranged in a sequence which makes the original memories that are dry and easy to forget clear and easy to remember.

Associative memory method refers to the intrinsic connection of knowledge in the process of memory. In order to understand the amphibious amphibious lung respiration, for example, it should be immediately associated with the amphibians also have internal nostril and double circulation structure, because the inner nostrils The three structures of lung, lung and double circulation should appear at the same time and are indispensable. For example, when learning three ossicles in the middle ear of a mammal, it should be clarified that these three ossicles evolved from which bone

fragments in the fish skull, and in amphibians, reptiles and birds. It is easy to connect this related knowledge to make it systematic and structured to enhance the memory effect by knowing what functions and locations are clear about their ins and outs.

4. Conclusion

The above methods can be combined and used, and the effect will be better. Some students can also summarize some other methods that help them to remember, as long as there is a good way to use memory.

References

[1] Wuhan University, et, al. General Zoology[M]. Beijing: Higher Education Press, 2005.