 DOI: 10.19601/j.cnki.issn1943 - 9903.2019.4.019

Practice Instruction of Innovative and Entrepreneurial Training Program for Aquatic Animal Medicine Students

Huanying PANG, Miao XIE, Ziling WANG, Xiuying YAN, Huiling LIU, Changling LI, Jichang JIAN*

Fisheries College of Guangdong Ocean University, Zhanjiang 524088, China; National Demonstration Center for Experimental Aquaculture Science Education, Zhanjiang 524088, China

Abstract As an important platform for the combination of theory and practice, college students' innovative and entrepreneurial training program has an important impact on improving the comprehensive ability of undergraduates. The major of aquatic animal medicine is a new sea-related major. The continuous development and transformation and upgrading of aquaculture in the new period have put forward newer and higher requirements for the innovative and practical ability and comprehensive quality of aquatic animal medicine graduates. Taking the innovation and entrepreneurship program of college students majoring in aquatic animal medicine as an example, this paper analyzes the significance of the innovation training program for college students, the cultivation of students' scientific research ability, and the problems existing in the application and operation of the program, in order to provide a reference for the innovative education and talent training for students majoring in aquatic animal medicine.

Key words Innovative and entrepreneurial training program, Aquatic Animal Medicine, Practice

1 Introduction

College students' innovative and entrepreneurial training program is a national support program to participate in undergraduate training, is an important part of the implementation of quality project by the Ministry of Education, and is the need of national education for high-level, high-quality innovative talents[1]. Aquatic animal medicine is one of the new majors related to the sea in Guangdong Ocean University. In order to meet the needs of aquatic animal medicine professionals in the field of aquaculture, this major trains applied high-quality professionals with certain basic theoretical knowledge of humanities, social sciences and natural sciences. They should have the basic theory and basic skills of veterinary medicine, understand the advanced technology and cutting-edge research of aquatic animal medicine major. And they can be engaged in aquatic animal disease prevention and control, inspection and quarantine, fishery drug development and production, management, teaching, scientific research in aquaculture, animal and plant inspection and quarantine, biological or chemical medicine and other industries. In recent years, the school has continuously promoted the reform of undergraduate education under the guidance of cultivating aquatic applied talents with innovative spirit, entrepreneurial ability and creative thinking. The quality of personnel training has been steadily improved, and students' practical ability has been well received by employers[5]. Students of this major actively apply for college students' innovative and entrepreneurial training programs, and get a number of different levels of program funds every year. A total of ten programs were approved in 2018, including two at the national level, six at the provincial level and two at the school level. Through the development of the innovative training program, the students published two papers indexed by SCI, five in foreign periodicals and four in Chinese periodicals, and won two first prizes in the National Biology Competition and one second prize in Guangdong Challenge Cup. The students' innovative practice ability has been improved, and the effect is good. Based on the practice of aquatic animal medicine innovation training program, this paper provides theoretical and practical support for the management of college students' innovative and entrepreneurial training program.

2 Practice of innovative and entrepreneurial training program for aquatic animal medical students

2.1 Fostering students' innovative thinking ability through topic selection Topic selection is usually the biggest difficulty in the declaration of innovation programs. Some teachers ask undergraduates to follow graduate students' topics to carry out research. This way lightens the burden of the tutor, but it can not let the students understand how to choose the topic, and why they choose the topic, let alone inspiring the students' innovative thinking. Because the school stipulates that the students applying for college students' innovative and entrepreneurial training programs are limited to the sophomores and juniors, we should first understand the basic knowledge that the students have learned, and choose innovative topics that can be successfully completed through hard work. Taking our group of tutors as an example, before choosing the topic, we fully know the courses and knowledge that students have learned. It is found that the students have learned and mastered the basic skills and knowledge of pathogen culture, isolation and identification, aquaculture, molecular biology and so on. Based on this, it is preliminarily determined that the direction of

Received: February 17, 2019 Accepted: April 8, 2019
Supported by Guangdong Higher Education Teaching Reform Project; Guangdong Ocean University Education and Teaching Reform Project (XJG201806); Guangdong Ocean University Degree and Postgraduate Education Reform Research Project (201709).
* Corresponding author. E-mail: jianjc@gmail.com

the selected topic is the study of aquatic animal pathogen biology. Secondly, the topic should be exploratory. Exploratory topics can stimulate students' interest, and can cultivate students' ability to explore knowledge and solve problems in the process of program development, which is conducive to the cultivation of innovative thinking. Moreover, the topic should be combined with the direction of the teacher's research. On the one hand, tutors can provide strong support for students in experimental conditions, instruments and equipment; on the other hand, undergraduate programs can speed up the progress of tutors' scientific research programs. Third, the topic should be combined with local characteristics. The purpose of selecting topics around the problems in the development of local industry is to highlight the characteristics of the program and increase the passing rate of the program. Finally, it is suggested that students can extend on the basis of the previous research of the instructor, further refine the scientific problems and put forward new questions. Through the exchange and communication with the students in these respects, the students have made clear the general direction of the selected topic. Through consulting the literature, combined with the previous research of the instructor, the following research questions are put forward by the students in the communication and exchange. The scale of shrimp culture in western Guangdong is the largest in the world. In recent years, with the increase of culture density and the deterioration of culture environment, hepatopancreas necrosis of prawn broke out frequently, which brought huge economic losses to shrimp culture industry. The etiology, prevention and control of the disease have been troubling the shrimp culture. It is urgent to find out the pathogen of the disease and put forward the prevention and control measures. Finally, through further condensation, the students determined the exploration of shrimp hepatopancreas necrotic disease pathogen isolation and identification, drug sensitivity test and histopathological research in western Guangdong as topic.

From the above, it can be found that the tutor puts forward the thinking point by specifying the direction of scientific research, and the students put forward the training topic after consulting and discussing. In this process, the ability of students to find and ask questions has been cultivated. After the selection of the topic, we put forward a summary: the selection process of innovative training is similar to other work (such as the choice of entrepreneurial programs). First of all, we should make clear our own ability; secondly, we should choose the topic, which can be aimed at the problems in the industry of the region. Through consulting, we determine the specific problems, and carry out scientific research work based on problems.

2.2 Building the capacity to collate and write information through the writing of declaration form After determining the topic selection, it is necessary to write the declaration form of innovative training program. Writing declarations can cultivate students' ability to collect, collate and write literature. Before writing the declaration, we draw up the following outline for the students. (i) The purpose and significance of the study. First of all, starting from the problems existing in the development of shrimp industry and actual production, it is required to discuss the practical significance of the research of this program. Then, it turns to the theoretical and academic value of the program. The significance of the study should be specific, targeted, and avoid emptiness. (ii) The content of the study. The content of the study needs to be highly summarized. (iii) Research methods and technical route. It is necessary to first draw the technical route, write the specific test method, and pay attention to the accuracy of the description of the research method, operation process and so on. (iv) Feasibility analysis. It is described from the theoretical feasibility, technical feasibility, the support of the basis of previous research, test conditions and platform support, team composition and so on. (v) Schedule and target assessment. It puts forward the appropriate planning schedule, and the target assessment should be in line with the reality. Through the above outline, the students have made clear the basic ideas of writing the declaration. At the same time, the tutor has carried out the literature retrieval instruction to the student, and trains the student on how to search the effective literature, how to collate and summarize, and provide effective support corroboration to the content and the viewpoint in the declaration. After the students complete the first draft, the tutor should point out the problems existing in the writing, let the students revise themselves, and repeat the process until the quality of the declaration meets the requirements. Through the above training, students' ability in the writing ideas, literature and data collection and collation has been cultivated and improved.

2.3 Taking students as the main body and cultivating students' ability to solve problems in the process of carrying out the program Students are the main body of innovative training. In the process of carrying out the program, the tutor mainly plays a guiding role and carries out the process monitoring, fully mobilizes the student's subjective initiative and the enthusiasm, causes the student to carry out the practice to the knowledge learned in the experiment, and enhance the practical ability, such as the daily management during the shrimp culture experiment, the operation of challenge, the collection of blood and organs. These processes are the consolidation and practice of students' professional knowledge (such as "Shrimp and Crab Breeding", "Toxicology", "Anatomy"). In the process of isolation and identification of pathogenic bacteria, drug sensitivity test and histopathological section analysis, it is the promotion of students' knowledge and practical operation on "Aquatic Animal Bacteriology", "Aquatic Animal Inspection and Quarantine", "Pathology". In addition, in view of the various situations and problems in the experiment, the tutor had better only give the direction of solving the problem, cultivate students' self-study and problem-solving ability. Only when the students are still unable to solve the problem, the tutor comes forward to help solve the problem, and summarizes the ideas and methods to solve this kind of problem for the students.

During the program, teachers should emphasize the importance of keeping a good record of the experiment. The instruments, reagents, methods, results and analysis of the test should be recorded in detail, and the phased progress and problems encountered should be reported to the tutor. The tutor should grasp

the progress of the students' subject in time and guide the students to think and improve the experimental methods and results. In a word, in the whole process of the program, it is necessary to give full play to the main role of students, cultivate students' innovative thinking and practical ability.

3 Problems and recommendations

3.1 Fisheries colleges and universities have limited access to scientific research resources The investment in scientific research in fisheries colleges and universities shows a trend of rapid growth, but compared with colleges and universities of science and technology, the overall available scientific research resources are relatively lacking[6]. In addition, there are significant differences in the allocation of scientific research resources in different regions and different levels of fisheries colleges and universities, and the eastern coastal areas have resource advantages over the central and western regions. Scientific research funds, human resources and so on are the premise of strengthening students' innovation and training. In order to solve the problem of relatively scarce scientific research resources in fisheries colleges and universities, it is necessary to make rational use of all scientific research resources to cultivate students' innovative ability. The school can formulate rules for the management of instruments and equipment in the open laboratory[7], and the public platform may be used upon joint application by students and tutors. The college should build a platform for industry-university-research cooperation to improve incubation opportunities for large-scale innovation teams. Teachers should encourage students' academic exchanges with foreign countries and participate in cooperative programs of different colleges and universities.

3.2 Inadequate tutorial system for fisheries majors There is a shortage of students in fisheries colleges and universities, this major is mostly a non-first choice for students or they are transferred from other majors. Some students want to change majors less than a year after admission, and some graduates are not employed in their major. The present situation of major is not conducive to the innovative cultivation of college students. The existing tutor model for college students' innovative and entrepreneurial training is only a temporary contract model, which can not restrain the rights and obligations between its tutor and participating students stably for a long time. Therefore, it is necessary to establish and improve the undergraduate tutorial system, improve the management and incentive mechanism of tutors, and prevent tutors from doing nothing[8].

3.3 Problems in student teams Program members are the key to the implementation of the program. Tutors often encounter the following problems in the process of organizing teams. Students with good grades in theory courses often have poor practical ability; students with strong practical ability may have poor basic skills; students who are good in all aspects may lack teamwork spirit. We suggest that the instructor should first select the program leader when organizing the team. The leader should have the characteristics of good learning, excellent innovation ability, strong practical ability, high EQ, thoughtful consideration and so on. In addition, the student cadres with high level of theoretical knowledge and strong practical ability are also the best candidates for the program leaders. For other participants, we can choose students with strong subjective initiative and complementary relationship with the program leader through the usual classroom performance and classmate evaluation. In the process of team formation, team members with different knowledge backgrounds and abilities need to learn to work together, avoid fighting alone, make team decisions through communication and assistance, and cultivate the concept of the overall situation[9].

4 Conclusions

The practice of innovative and entrepreneurial training program for college students majoring in aquatic animal medicine plays a very important role. At the student level, it improves students' innovative thinking ability, data collation and writing ability, problem-solving ability, cultivates students' sense of unity, lays the foundation for their entrepreneurship, and helps them achieve better value in life[10]. From the school and college level, with the goal of cultivating innovative and entrepreneurial talents needed by the society, it breaks the traditional educational concept, promotes the opening of the public laboratory platform, and speeds up the perfection of the supervision and management mechanism. Finally, it will improve the quality of talent training for aquatic animal medicine major, and reserve strategic talents for the country.

References

[1] WU YR. On the research and practice of college students' innovation and entrepreneurship training [J]. Foreign Languages and Translation, 2014, 15(1): 204 – 205. (in Chinese).

[2] GU ZM, YUAN JF, HUANG D, *et al.* Reform and exploration of undergraduate education system in the field of aquatic animal medicine [J]. Journal of Anhui Agricultural Sciences, 2016, 44(25): 243 – 244, 246. (in Chinese).

[3] LV LQ, SONG ZF, ZHANG QH, *et al.* Discussion on the course system of aquatic animal medicine [J]. Shanghai Agricultural Science and Technology, 2016, 46(1): 15 – 16. (in Chinese).

[4] CAO HP, TAN HX, HE S. Reflection and exploration in the teaching quality promotion of aquatic animal medicine [J]. Science and Technology Consulting Herald, 2014, 11(11): 127 – 128. (in Chinese).

[5] LIU WC, YIN FQ, ZHAO ZH, *et al.* Cultivation on the innovation and practice ability of students majoring in animal science based on the innovation and entrepreneurship training program for college students [J]. Contemporary Animal Husbandry, 2018, 36(21): 45 – 47. (in Chinese).

[6] CHEN XL. The input, output and performance of research of agricultural university [J]. Forum on Science and Technology in China, 2015, 31(6): 142 – 147. (in Chinese).

[7] LIU JL, SUN JF, BI XD, *et al.* Experiment and practice teaching reform of aquatic animal medicine related course system in Tianjin Agricultural University [J]. Education & Teaching Forum, 2015, 7(49): 118 – 119. (in Chinese).

[8] LI HL. Exploration on building research capacity for undergraduates in agriculture and forestry universities with training program of innovation and entrepreneurship [J]. Modem Computer, 2017, 33(22): 13 – 17. (in Chinese).

[9] XIE HY, HAN X, ZHENG X, *et al.* The practice of agricultural colleges and universities interdisciplinary innovation project guidance [J]. Guide of Sci-tech Magazine, 2018, 26(24): 143 – 144. (in Chinese).

[10] LIU JC, MA WY. Analysis on guiding the practice of innovation and entrepreneurship training plan for college medical students [J]. Ability and Wisdom, 2018, 18(24): 121. (in Chinese).