

Construction and Practice of Applied Talents Training System with Innovation and Entrepreneurship in Plant Protection Specialty

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Abstract: The plant protection profession is a practical, applied, and highly operational discipline. In the teaching of plant protection, college students need a lot of practical learning opportunities, in order to find a variety of practical problems in practice, and then use their own knowledge to explain various phenomena, solve various problems, and reflect their professional value. And by continuously learning and applying new knowledge, you can gain confidence in success. Since its establishment, the plant protection profession has established a set of practical teaching system in the long-term teaching practice, and cultivated a large number of excellent plant protection talents under the corresponding social conditions. However, as the speed of urbanization in China continues to accelerate and the structure of the agricultural industry is constantly adjusted, the requirements of the society for the practical ability of plant protection students are constantly improving. The original practice teaching system can no longer meet the needs of cultivating new plant protection talents. Therefore, the innovation of the practical teaching system of plant protection profession is imperative.

1. Introduction

With the transformation of China's economic growth mode and the rapid development of science and technology, the society has put forward new requirements for the quality of talents, and cultivating talents with innovative ability and practical ability has become an inevitable choice for the economic and social development of higher education services. Therefore, actively adapting to social needs and cultivating innovative entrepreneurial talents have become an important task for colleges and universities. As a traditional agricultural science major, the plant protection profession can only continuously improve the quality of personnel training by actively adapting to the needs of social economy and industry development, as well as the development of students' differential development, and constantly exploring new models of talent cultivation according to the time and

conditions. Based on the conditions for running a university and the goal of training talents, this research has carried out in-depth exploration on the innovative system of plant protection professionals. According to the research, the plant protection professional innovative talents refer to high-quality innovative talents who have strong political ideas, dare to shoulder the mission of the times, and solve the problems of China's "three rural issues" and dare to explore and solve scientific, practical and social problems related to plant protection. Based on this, a set of innovative talent training system for plant protection is established, which mainly includes four aspects: plant protection core curriculum, plant protection practice cognition, innovation ability training, and scientific humanistic care system construction.

2. Problems in the Cultivation of Plant Protection Professionals

The plant protection profession is one of the main disciplines of plant production, covering three sub-disciplines of plant pathology, entomology and pesticide science. The training objective is to master the basic theories and expertise of plant protection science such as the diagnosis and identification of plant pests, the law of occurrence and development, prevalence and prediction, and comprehensive management, and the basic capabilities of biological disaster diagnosis, prediction and comprehensive management, strong professional practice ability and innovative entrepreneurship. The training applied senior talents can in scientific research institutes, entry-exit inspection and quarantine departments, the department of agriculture, forestry and gardening technology, biotechnology and environmental protection, food safety, and pesticide companies and other units, engaged in scientific research, development, popularization and application of science and technology, management, etc. Its main professional courses are plant pathology, entomology and phytochemical protection. The teaching materials and hours are basically unified in the general agricultural colleges across the country. Since the 1990s, the state's employment policy for graduates has been adjusted from "unification and unified division" to "two-way choice". Some general agricultural colleges (including the original Laiyang Agricultural College) have added modules according to the foundation in the plant protection profession. The program sets different professional directions, such as plant pathology, pesticides, entomology, and plant quarantine. This kind of reform is conducive to students' choice of employment opportunities in a certain sense.

Since the beginning of the 21st century, as the employment model of college graduates has become more market-oriented and diversified, plant production majors (including plant protection majors) have encountered new problems such as difficulty in enrolling students and difficulties in employment for graduates. The national education administrative department put forward the reform ideas of diluting the profession, broadening the foundation, and strengthening the innovation quality education in the professional setting. Higher agricultural colleges have proposed a large class of enrollment and the strategic thinking of upgrading, transforming and integrating traditional professions with modern biotechnology and information science. The essential reason for the new problems encountered in the field of plant production is that the traditional thinking is "the sense of valuing industry over agriculture". Of course, it is also unreasonable with the setting of such professional courses; the discipline construction is lagging behind and even falling behind modern times. The practice of the development of agricultural industrialization is related.

3. Plant Protection Practice Cognition System Construction

3.1. Establish a Crop Production Practice Curriculum System

Under the guidance of teachers, the students are required to plant important crops such as rice, wheat, cotton and rapeseed, investigate the occurrence of pests and diseases, and obtain practical

opportunities to understand the growth and development of crops and the epidemics of pests and diseases. In the course of crop production practice, the one-year cultivation practice is carried out in class, arranged in the second year of the university, and runs through the entire teaching process of common plant pathology, general entomology, agricultural pathology and agricultural entomology and its experimental courses. The research team set up a high-quality faculty team to establish and explore field teaching methods, such as on-site guidance, appraisal, and invitation to well-known professors for on-site teaching. The curriculum requirements closely follow the national food security issues, pay attention to national agricultural production in real time, and explain the importance of plant protection and agricultural science according to the impact of pest and disease dynamics and meteorological factors on crops, enhance students' sense of responsibility and mission and learn the pride of the plant protection profession.

3.2. Attach Importance to Strengthening the Construction of Experimental Curriculum System

The experimental courses such as common plant pathology experiments, general entomology experiments, agricultural pathology experiments and agricultural entomology experiments are established as independent compulsory courses, which strengthen students' understanding of basic concepts and knowledge difficulties in theoretical course teaching and master the profession. After the theoretical foundation course and its experimental class, the teaching arrangement arranges the basic course of plant protection professional under the field conditions for three weeks, providing students with independent and complete time to practice. The course was conducted in the Dabie Mountains of Hubei Province. The local insects and diseases were investigated, and specimens were collected, produced and identified. The students' continuous experiment and observation ability was cultivated, and the basic theories of the students' plant protection profession were strengthened and consolidated. It also cultivates the ability to work independently and with teamwork.

3.3. Change the Confirmatory Experiment to an Exploratory Experiment

The scientific research activities of college students in plant protection are closely related to professional teaching. The curriculum teaching is the main channel for college students to accept knowledge and master scientific methods, and it can provide theoretical support and application guidance for students' scientific research ability training. During the course of the course, plant protection professional teachers often combine important examples to illustrate important scientific findings, while deepening students' true impressions of scientific research in plant protection while training students' scientific research. Combined with the teaching of the theoretical course, the plant protection profession is equipped with sufficient experimental courses and perfect experimental conditions to ensure that students can complete some basic experiments independently. For example, in the Koch's rule in the teaching of common plant pathology, students need to complete the whole process of collecting disease specimens, separating and purifying pathogenic bacteria, inoculation of disease symptoms and separation and purification of pathogenic bacteria, which deepens students' basic theory of pathology. Cognition, also exercised students' scientific thinking and hands-on ability; Students identify pathogenic fungi through morphological observation and ITS sequencing, covering not only traditional methods of plant pathology but also basic molecular biology techniques. Through these courses and their research activities, students' knowledge structure has been improved, students' scientific research interests have been cultivated, students' horizons and ideas have been broadened, and a solid practical foundation has been laid for them to engage in more research activities in the future.

4. Investigation on Cultivation of Innovative and Entrepreneurial Talents in Plant Protection Major

4.1. Questionnaire Survey

The questionnaire according to the main content of the training mode building: the guiding ideology and basic principle, basic content and implementation approach, this paper design the survey content from the three angles, mainly from the basic information, training objectives and innovation consciousness, education teaching mode, method and content, curriculum and professional Settings, supporting conditions and innovation environment in five aspects, such as in the investigation.

4.2. Mathematical Statistics

In this paper, SPSS20.0 data statistics software was used to code and input the valid data obtained from the questionnaire, and further reliability and validity test, descriptive statistics, t-test, correlation analysis and regression analysis were carried out. The t-test formula used in this paper is as follows:

$$t = \frac{\bar{X} - \mu}{\frac{\sigma_x}{\sqrt{n-1}}} \quad (1)$$

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\sigma_{x_1}^2 + \sigma_{x_2}^2 - 2\gamma\sigma_{x_1}\sigma_{x_2}}{n-1}}} \quad (2)$$

4.3. Results of Questionnaire Survey

Table 1. A survey on the importance of students' innovation ability

	Proportion of population
Very important	18%
Important	22%
Less important	58%
It's not important	2%

Figure 1 shows the survey of the importance of students' innovation ability. The results showed that 18 percent said it was very important, 22 percent said it was moderately important, 58 percent said it was not very important, and 2 percent said it was very unimportant. According to the data analysis, half of the students think it is not important for college students to have innovation ability, which reflects the weak innovation consciousness of college students.

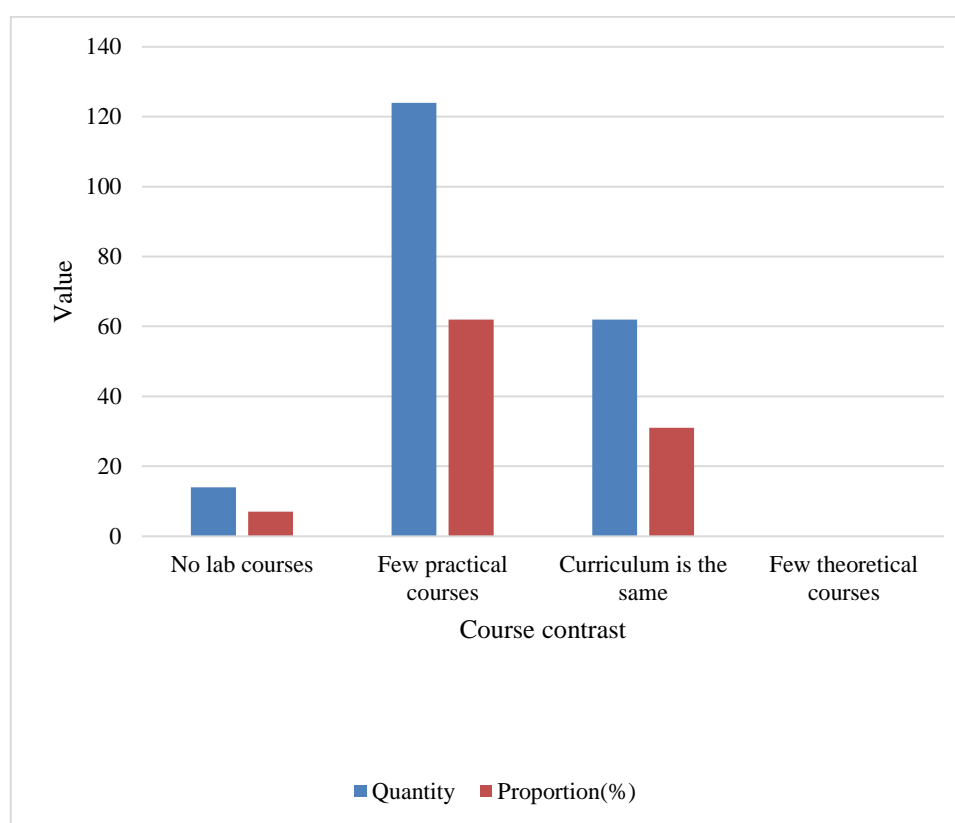


Figure 1. A survey of the curriculum of students' colleges and universities

As shown in Figure 1, a survey was made on the curriculum provision of students' colleges and universities. The results showed that only 7% of the students thought that only practical courses were provided; 62% of the students thought that theoretical courses accounted for a high proportion, while practical courses accounted for a low proportion; 31% of the students thought that theoretical courses accounted for a similar proportion to practical courses; 0% of the students thought that theoretical courses accounted for a low proportion, while practical courses accounted for a high proportion. Through the analysis of the above data, it can be concluded that application-oriented universities have initially realized the combination of theoretical courses and practical courses in curriculum setting, but there is a phenomenon of emphasizing theory and neglecting practice.

5. Application-oriented Talent Training Program for Plant Protection Practice Ability and Innovation Entrepreneurship

5.1. Renew the Concept of Modern Talent Training and Cultivate Applied Talents with Innovative Entrepreneurship

The College of Plant Protection of Agricultural University adheres to the school-running idea of “taking the road of innovation, taking the road of running a school with special characteristics, taking the road of quality education, and taking the road of scientific management”, closely focusing on the overall goal of serving agriculture, rural areas and farmers, and taking market demand as the guide. Establish a concept of modern talent training, relying on localities to build a talent training system that serves local economic and social development. Strengthen quality awareness, characteristic awareness, crisis awareness and competition awareness, and establish an educational philosophy that is consistent with the development of the times, to create innovative

entrepreneurship that not only masters the advanced scientific and cultural knowledge, but also has the ability to develop innovative spirit, practice and entrepreneurship, and to “be a person”, to “do things”, and to “learn” to meet the needs of local economic and cultural construction.

5.2. Innovate Training Mode, Formulate and Implement An Application-oriented Talent Training Program that Highlights Comprehensive Practical Ability and Innovative Entrepreneurship

Improve the quality of personnel training, start from the design quality of training programs, follow the social needs-oriented school-running philosophy, and cultivate the application-oriented talents adapted to local economic and cultural construction, taking into account the long-term development of students and the practical needs of employment. Expand the professional teaching plan into a comprehensive talent training program consisting of three parts: professional teaching plan, quality development plan, and innovation and entrepreneurship training plan, and coordinate the whole process of talent training. Put the quality education and innovation and entrepreneurship education thoughts into all aspects of education and teaching, and strive to build the knowledge, ability and quality structure for students to adapt to the needs of social development and change. Incorporate the second classroom activities into the talent training program, carefully design the extracurricular activities to cultivate innovative and entrepreneurial abilities, focus on cultivating students' awareness of innovation and entrepreneurship, and innovate entrepreneurship, and improve students' comprehensive practical ability.

5.3. Reform the Curriculum System, Design A Curriculum System that Adapts to the Application of Comprehensive Practical Ability and Innovative Entrepreneurship

Change the systemic and completeness of the past excessive pursuit of subject theory knowledge, change the practice of heavy theory and light practice, change the neglect of students' innovative consciousness and practical ability training, and focus on building a "quality-based, competency-based" curriculum structure mode, integrate and optimize teaching content and system. Reform the traditional curriculum, integrate the school orientation and talent training objectives into the curriculum. The curriculum system is constructed according to the basic theory and basic knowledge modules, general skills and professional skills modules, innovative entrepreneurship and ability modules.

5.4. Improve the Teaching Management System and Establish A Quality Monitoring and Guarantee System for the Cultivation of Applied Talents with Innovative Entrepreneurship

Through the improvement of the system, a long-term mechanism to ensure the status of the teaching center and the quality of innovative and entrepreneurial talents will be established. Establishing a self-monitoring and evaluation mechanism for the quality of personnel training is an important means to ensure the quality of personnel training. In accordance with the "people-oriented" management philosophy, the quality education, innovation and entrepreneurship education ideas are integrated into the new concept of talents and quality, in order to meet the needs of local economic and social development. From the aspects of concept renewal, policy measures, rules and regulations, operational mechanism, means and means, we will establish a quality monitoring system from the design of personnel training plan to the quality survey of graduates. Establish a teaching quality monitoring system and operational mechanism involving teachers, students, managers, decision makers, and employers. Realize dynamic monitoring and formative and developmental evaluation of curriculum, teachers and departmental work. Improve the teaching

quality evaluation network and database, realize the scientific, network and three-dimensional teaching quality information collection and processing methods. Establish the construction of the teaching staff, the construction of experimental practice base, professional construction, quality curriculum construction, education and teaching research.

6. Summary

The establishment and improvement of the plant protection professional innovative talent training system has effectively cultivated students' practical innovation ability and improved the quality of plant protection professionals. However, the cultivation of innovative talents is a systematic project, and the Institute of Plant Science and Technology has only established an innovative talent training model for plant protection professionals from a professional perspective. Since the mission of our university is to cultivate college students with high cognition, loyalty and love for the party, the state and the socialist system, the political and ideological moral education of college students is the top priority. In the future teaching practice, we will continue to explore and pursue with higher standards, and make new contributions to the cultivation of agricultural innovation talents in China.

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Data Availability

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Conflict of Interest

The author states that this article has no conflict of interest.

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