

Integration and Design of Ideological and Political Points in Course of Plant Physiology

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Abstract: Plant physiology is one of the fundamental disciplines of life sciences, and is also a compulsory basic course for undergraduate and graduate students of biology-related majors in various colleges and universities, whose content is based on elucidating the laws and nature of plant life activities. Ideological and political education in all courses is a multi-dimensional educational reform that cultivates excellent builders and successors of socialism with Chinese characteristics in the context of the rapid development of higher education in the new era. On the example of plant physiology, we explore the design of ideological and political elements in important chapters based on the construction background of the course, and consider the problems encountered in the ideological and political education in the course, to show the view of education, mission and curriculum in the teaching of professional courses, thus providing reference for the integration of ideological and political education into the course of plant physiology.

Keywords: Plant Physiology; Ideological and Political Education; Ideological and Political Elements Design.

1. Introduction

Plant physiology is the science that studies the laws of plant life activities and their interrelationship with the environment, and reveals the nature of plant life phenomena. It aims to study and investigate the functions and their regulatory mechanisms during plant life activities, including the macro individual or tissue, organ levels, as well as the cellular and molecular levels (Wu Weihua, 2008). The study of plant physiology can be grouped into three areas, including plant growth and morphogenesis, material and energy metabolism, and information transfer and signal transduction, which span almost the entire life cycle of plants. The textbooks of plant physiology have been divided according to science, agriculture, medicine, and teacher, and focused texts are chosen according to different needs. On the example of textbooks applicable to new agriculture and forestry, this paper discusses the classical contents in depth and designs them into ideological and political points in order to improve the depth and quality of teaching in this course.

2. Necessity of Introducing Ideological and Political Education into Plant Physiology Course

At the national conference on ideological and political work in colleges and universities in 2016, General Secretary Xi Jinping proposed to improve the affinity and relevance of ideological and political education in colleges and universities with the channel of classroom teaching, aiming to give correct guidance to college students in their growth and development in a targeted manner, to bring into play the function of classroom education and the responsibility of teachers in educating people, and to cultivate high-quality talents with both political integrity and ability and correct values (Dong Xiaoqing, 2022). Plant physiology is a compulsory course in agriculture and forestry major, with a large number of learners. If the ideological and political points of the course are explored deeply and designed, a good teaching effect will be achieved. It is an important way to

guide the scientific and technological talents in agriculture and forestry to form correct values and consolidate patriotism (Qi Yongzheng et al., 2021).

3. Exploration and Design of Ideological and Political Points in Course of Plant Physiology

3.1. Design of Ideological and Political Points for Environmental Protection in Course of Plant Physiology

An ideological and political point for environmental protection can be designed through integration of the water uptake and transport by the root system in the plant water physiology with the issue of the significance and defects of afforestation. In terms of water uptake, plant transpiration consumes 98-99% of the total water uptake, and the water used for plant metabolism only accounts for 1-2%, so plants can retain very little water. In terms of water transportation, water is always transported from high water potential to low water potential. Except for rainy days, the water potential is always higher in the soil than in the atmosphere, so in areas with low air humidity, plants will always transport water from the soil to the atmosphere. This is a point where students are guided to consider the impact of afforestation on the environment and to analyze the significance of afforestation in soil and water conservation and wind break and sand fixation in a rational, regional and time-bound manner, while maintaining a dialectical and skeptical attitude and accepting the rejection of old knowledge and concepts and the adjustment of old and new policies in the process of scientific development.

The knowledge point of the effect of soil solution on the uptake of mineral elements by roots in the chapter on mineral nutrition of plants can bring out the environmental problem of the inability of plants to grow in saline-alkali land. Although there is no water shortage in saline-alkali land, the concentration of soil solution is too high, which leads to the inability of plant roots to uptake water and even death by

dehydration. Students are instructed to understand the dangers of land salinization and to recognize the global seriousness of the problem and the significance of saline-alkali land management, and are then encouraged to take an interest and participate in related research.

The knowledge point of the importance of photosynthesis in plants can be combined with the scientific assertion that "lucid waters and lush mountains are invaluable assets" made by General Secretary Xi Jinping during his visit to Anji, Huzhou, Zhejiang in 2005. Plants uptake carbon dioxide from the atmosphere during photosynthesis while releasing oxygen, which is important in maintaining the balance of carbon dioxide and oxygen in the atmosphere. China's policy advocates "lucid waters and lush mountains", and its scientific essence is to improve the efficiency of photosynthesis in plants, to obtain more photosynthetic products, and to use ecology itself to improve environmental problems, which conforms to the laws of science, respects the natural environment itself, and meets the needs of national policy. Here students are guided to deeply appreciate the deep meaning of environmental protection contained in this assertion and to understand the profound meaning and intent of the national policy.

3.2. Design of Ideological and Political Points for Patriotic Education in Course of Plant Physiology

An ideological and political point for patriotic education can be tapped in the introduction part on the history of plant physiology in China. Our farming activities can be traced back to 6-7 thousand years ago, and farming production is the starting point of plant physiology research. The long history of agricultural civilization has accumulated a large amount of theoretical and practical knowledge for plant physiology, and many related works have been passed down, indicating that our ancestors have been making explorations and summaries over the past 2,000 years. However, as China was mired in poverty and war in recent times, we missed the golden period of plant physiology development and temporarily lagged behind. In the 21st century, with the growing strength of the country, science and technology have become the strongest competitiveness, and plant physiology has also developed. Although it started late, it is progressing fast. Born in the new era of peace and prosperity, we should take the important mission of scientific and technological development and devote ourselves to the great cause of national scientific and technological revitalization. Here, students' national pride is aroused by the glorious history of our ancestors' research in plant physiology, and their sense of responsibility for national scientific and technological development is stirred up through a review of history, which in turn is sublimated to patriotism.

3.3. Design of Ideological and Political Points for the Pursuit of Scientific Truth in Course of Plant Physiology

The story of Lysenko, the discoverer of vernalization, can be incorporated as a counter-example to the ideological and political point for spirit of doing scientific research. Lysenko exaggerated the role of vernalization and concealed the scientific truth, which brought short-term benefits to himself and eventually caused significant damage to his country, while leaving himself in disrepute. Students are warned that when engaging in scientific research, they must respect

scientific facts, not be superstitious about someone or some doctrines, and treat scientific issues objectively and rationally in order to obtain the truth.

An ideological and political point for fraud prevention can be incorporated into the structural characteristics of chlorophyll in photosynthesis. The core structures of chlorophyll and heme are similar, differing only in the chelate metal elements in the central part. During 2017 to 2018, there were people who took chlorophyll out of context and falsely promoted through the Internet that chlorophyll and hemoglobin can be traced to the same origin, and that the chlorophyll consumed can be converted into hemoglobin in the body, misleading the public to believe that chlorophyll has false functions such as hematopoiesis, liver clearing and blood clearing. At this point, we can bring in students' awareness of counterfeit and fraud prevention, and teach them to distinguish the truth from the falsehood of information in their lives based on their professional knowledge, and not to believe in rumors or join propaganda to mislead others at will.

3.4. Ideological and Political Points for Ethics and Values in Course of Plant Physiology

At the point of the importance of nitrogen in plant mineral nutrition for agricultural development, the story of Fritz Haber, the scientist who pioneered the chemical nitrogen fixation method, can be introduced to educate students about academic ethics with his life experience. In 1909, Fritz Haber made the first successful production of ammonia from air, representing the realization of chemical nitrogen fixation, and the achievement made a great contribution to the development of world agriculture. But in 1915, during World War I, Fritz Haber was invited to be the manager of the German chemical arsenal, responsible for the development of biochemical weapons, which were used in the war and caused nearly a million casualties. Because of this act, he has been condemned by scientists from many countries around the world for many years, although he was awarded the Nobel Prize in Chemistry in 1918. This is where we emphasize to students the importance of academic ethics, and that researchers should adhere to the moral bottom line and abide by ethics in academic research, and by extension, social and academic ethics in their personal style.

An ideological and political point for values education can be incorporated into the knowledge point on the characteristics and development of autotrophic and heterotrophic plants in the chapter on plant photosynthesis. There are autotrophic and heterotrophic plants according to the way they obtain carbon. Autotrophic plants have photosynthetic capacity, supplying nutrients to themselves and exporting nutrients to provide the material and energy basis for the nature. The majority of plants on earth are autotrophic. Heterotrophic plants have no photosynthetic capacity, and they are parasitic on other species. Their life and reproduction are severely limited, and their species cannot develop and grow. Using plants as a metaphor, we teach students that they need to support themselves and acquire sufficient knowledge and skills to survive better, otherwise they will eventually be eliminated by the times, and guide them to form correct values and outlook on life.

4. Analysis of Existing Problems

4.1. Cultivation of Ideological and Political Education Awareness among Teachers of Major Courses

In the previous mode of higher education, the requirements of colleges and universities for teachers of major courses mainly focus on the aspect of major teaching, while the ideological education of college students is largely the responsibility of teachers specializing in political form and student management, so most teachers of major courses lack the ideological and political education awareness in courses. In addition, teachers of major courses often ignore the ideological and political points or do not fully explore the ideological and political elements in the teaching process because they focus excessively on major-related contents (Wu Bo et al., 2022). Therefore, teachers of major courses should first change their concepts and realize the necessity of ideological and political education in major courses. Since there are different fields with their own historical backgrounds and characteristics, teachers of non-major courses cannot cover everything, while teachers of major courses know more about the humanity history of their field, so the hidden benefits can be achieved by skillfully integrating ideological and political points in the teaching process. Therefore, the cooperation among teachers of major courses is necessary in providing targeted ideological and political education to students in various majors (Wan Hua et al., 2020).

4.2. Schools Need to Grasp the Level of Intervention in Teachers' Ideological and Political Education Approach in Their Courses

Colleges and universities have the obligation to supervise the implementation of ideological and political points in course teaching. In the early stage of policy development, they provide training for teachers, organize teachers to exchange experiences and other related work, playing an important role in the implementation and promotion of ideological and political education in courses. However, there are also phenomena of excessive intervention in teachers' teaching methods and overly rigid means of advancement. For example, a technical vocational college in Hunan rigidly requires that teachers and students in a major class of university-industry cooperation discuss current affairs, broadcast industry news, and even simulate campus recruitment together for six minutes before each major course (Chen Qin et al., 2020). This way of implementation seems to respond positively to the policy, but the approach is too rigid, lacking in affinity, with a strong sense of form and insufficient educational effect, without considering the characteristics of major courses and the effect of classroom teaching, which is likely to cause students and teachers to resist. Schools are

encouraged to start with teachers and promote their change of mind by strengthening the training and communication of ideological and political education in courses for teachers of major courses, or by organizing teaching competitions related to ideological and political education in courses and strengthening publicity, so that teachers can realize that ideological and political education in courses and teaching are not in conflict, and that after the clever integration of the two, they can quietly give moral education to students while cultivating their talent, and can further fulfill their duties as teachers.

5. Conclusion

To sum up, it is of far-reaching significance for ideological and political education in the course of plant physiology in the context of new agriculture and forestry. Completing the ideological and political education of college students in conjunction with the ideological and political major courses will help cultivate educated and responsible professionals in this field. The teachers of major courses make use of the strengths of their majors to improve the affinity of their major courses by integrating ideological and political points in these courses, and enhance students' sense of gain by integrating their professional knowledge into ideological and political education. Professional education and ideological and political education complement each other to improve the quality of education for college students (Tang Jingli, 2017).

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