

INNOVATIVE MOMENTS IN TRAINING BACHELOR DEGREE STUDENTS IN "CROP PRODUCTION"

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Abstract: Dynamically developing plant growing continuously sets challenges to the system for training specialists, who have to be able to develop competitive and sustainable agriculture. In the conditions of market economy and various forms of land management, for the development of plant growing are needed managers and executives, who will be able to apply successfully the scientific principles of research, analysis, support and management of cost-effective agricultural production units. The degree programme *Plant Growing* provides preparation of such specialists. Education in *Crop Science and Production* offers such kind of training by application of innovation moments such as practical semester and development of integrated project.

KEY WORDS: STUDENTS, EDUCATION, BACHELOR DEGREE, PRACTICAL SEMESTER, INTEGRATED PROJECT

1. Introduction

Even in modern societies plant growing is of lasting importance. This is so not only because plant growing provides jobs for millions of people and contributes substantially to the gross domestic product in agricultural countries, but also because it has the potential to change the life of a nation. Plant growing has the unique ability to encourage development. (source: World bank, Report on world development, 2008, „Plant growing and development“). Dynamically developing plant growing continuously sets challenges to the system for training specialists, who have to be able to develop competitive and sustainable agriculture.

In the conditions of market economy and various forms of land management, for the development of plant growing are needed managers and executives, who will be able to apply successfully the scientific principles of research, analysis, support and management of cost-effective agricultural production units. The degree programme *Plant Growing* provides preparation of such specialists.

2. Materials and method

The main goal of this training is the preparation of highly qualified specialists in the field of plant growing, who will be able to develop competitive and sustainable agriculture.

The purpose of this publication is to present the innovative moments in the curriculum in the course of study of students from the degree programme *Plant Growing* at the University of Ruse „Angel Kanchev“.

The motives for training students in *Plant Growing* are related to the demands of practice, consistent with the world's leading scientific and educational trends for priority development of efficient agricultural production.

The philosophy of training students in this degree programme is striving for realisation of ideas and strategies such as:

- Continuous learning and skills at the different stages of development of agriculture and readiness for successful adaptation and realisation in a new market reality;
- Learning technologies, methods and tools that meet the global economic situation;
- Training in creative and innovative methods (i.e. technologies, adopting change as an irrevocable command of the knowledge age);
- Continuous acquisition of new knowledge, for applying it on both conventional and high-tech products;
- Developing entrepreneurial spirit, built on adequate levels of creative and professional competence (broad, specific and special).

The demands for opening a professional field 6.1. Plant Growing and Bachelor degree in Plant Growing at the University of

Ruse "Angel Kanchev" are related not only to the above-mentioned global changes in attitudes for agricultural development, but also to the increasing demand for food and the national and regional strategies for development of this vital branch, [1].

First, on a national and regional scale, there exists the problem of the shortage of highly qualified specialists with appropriate agricultural education and adequate theoretical and practical preparation. A tendency for significant growth in average age of those engaged in agriculture can also be seen.

At the same time, analysing the experience of home and foreign universities and the tendencies in the educational system in the field of plant growing internationally, we arrived at the conclusion that it is high time to initiate decisive improvement of practical training of students with the aim to help their fast adaptation in real production conditions. The analysis of curricula shows that the idea for practical training is not new in the world educational system.

In the process of developing the education materials, we have studied the experience of the Agrarian University in Plovdiv, the Thracian University in Stara Zagora, the technical University in Varna, the Forestry technical university in Sofia and the Shumen University "Bishop Konstantin Preslavski" in the training in the Bachelor and master degree programmes, [2].

From the compulsory subjects in the curricula, 19 (about 50%) are studied in all universities. They are mathematics, Botany Part I, Organic Chemistry, Soil Science, General Agriculture Parts I and II, Biochemistry, Microbiology, Agrochemistry, Agrometeorology, Genetics, Physiology of Plants, Entomology, Plant Growing Part I and II, Phytopathology, Agricultural Economics, Perennials Part I and II (horticulture and viticulture).

Five of the universities under survey suggest the subjects Selection and Seed Production, Mechanisation in Plant Growing, Vegetable Growing, Land Reclamation and Irrigation.

Four of the universities have included the subjects Inorganic and Analytical Chemistry, Botany Part II (Systematics), Power Machines, Livestock Breeding Part I, Mechanisation in Plant Growing Part II, Informatics.

The experience of foreign universities offering the degree program „Plant Sciences“ BSc (Instituto Superior de Agronomia with the technical University in Lisbon, Portugal); University College Dublin, Ireland; Harper Adams Agricultural College, Newport, UK; University of Thessaly, Volos, Greece; Cornell University, USA; University of Newcastle, UK, Jowa State University, USA, has been studied too [3].

The University of Newcastle, UK is ranked among the first five larger universities in Great Britain, offering education in

the field of agriculture. [Source: Guidebook, 2013]. The main scientific principles on which the training is based are lectures, lab classes and practical classes. The visits to University and other farms for agricultural production are used to boost the theoretical studies.

Jowa State University, USA, offers its students to choose from 129 subjects, related to plant growing and grouped in five main fields such as agricultural, economic, environmental, philosophical and sociological, from which they can accumulate the necessary credits. Of these, 23 subjects (17%) are practical.

When developing its curriculum, the University of Ruse offers three innovative aspects:

- From the very first semester, the emphasis of student training is put on soil and water resources, which are fundamental for the agricultural science. The subject Soil Physics provides basic information about this vital resource, which is extremely hard to renew. The knowledge about using the soils and water is complementary throughout the whole process of study to semester 7.
- In semester 6 generalist supervised practical training is conducted. The students chose their field of interest and then they are given an assignment for the practical semester. Every student is supervised and monitored by two mentors;
- Developing an integrated course project during the supervised practical training in semester 6. The students do a profound study in their chosen field, participate in laboratory and practical research, which they develop in an individual or group integrated course project. Training is conducted in the experimental facilities at the Institute on Agriculture and Seed Science "Obrazcov Chiflik" – Ruse and/or at "N. Pushkarov" Institute of Soil Science – Sofia, as well as in some elite farms or seed producing houses. The practice semester can be conducted at other institutes with the Agricultural Academy. The aim is through doing research together with professional researchers to consolidate the knowledge of creating and using new sorts of plants and implementing them into advanced production technologies, which will be demonstrated at the diploma thesis defence or during the state exam. The course project will be controlled through colloquiums in weeks 5 and 7 and a defence in week 15 of the semester.

In accordance with the highlighted integrative and interdisciplinary approach of education in the degree programme of *Plant Growing*, education fields are formed, which consist of groups of disciplines such as: - foundation; - agricultural; - livestock breeding; - technical; - economic and computer science; - foreign languages; - educational practice – training in a broad field and graduating.

On developing the curriculum, the competitive environment in the education institutions has been analysed. In Bulgaria all curricula for bachelor degree programmes in *Plant Growing* tend to include practical training, but it is organised after the end of even semesters in the so called "summer practice". There is a shortage of master degree specialists in processing and storage of produce, selection and seed production, land reclamation and irrigation, bio agriculture and plant protection.

In the course of study the students learn purposefully fundamental subjects like: Bio mathematics; Physics of the Soil; Inorganic and Analytical Chemistry; Biology; Botany; Organic Chemistry; Soil Science; Experiment Work; General Agriculture, Foreign Language; Biochemistry, Microbiology. Through individual work in these subjects, students learn to meet the increased requirements for working on their own and being entrepreneurial.

Specialised and profound knowledge is acquired through the subjects Agrochemistry, General Agriculture, Agrometeorology, Energy Equipment in Agriculture, Genetics, Plant Physiology,

Entomology, Livestock Breeding Parts I and II, Mechanisation in Agriculture Parts I and II, Information Technologies in Agriculture, Plant Growing Parts I and II, election and Seed Production, Phytopathology, Fodder Production, Economics of Agriculture, Perennials – Viticulture and Horticulture, Vegetable Production, Using Machinery in Agriculture, Technologies and Systems for Agricultural Production, Land Development, Land Reclamation and Irrigation.

These subjects are complemented by practice in production facilities during the summer period after the second and the fourth semesters for consolidating the knowledge on taxonomy of plants.

Graduating with Bachelor's degree in *Plant Growing* the students have specialised in one of the profiles of plant growing like cereal, leguminous, forage crops, vegetable, industrial crops, medicinal and essential oil crops, perennials and specific crops.

With this Bachelor degree, students can apply for a Master degree programme both at the University of Ruse and in other universities in Bulgaria, offering similar degree programmes. The fundamental knowledge they have acquired will be complemented with a number of specialised subjects in the field of their choice.

Thus prepared, they will be able to:

- apply modern technologies for production in the field of plant growing;
- manage various units, differing in scope and nature of production;
- apply the experience and achievements of specialist in areas related to agriculture;
- apply information technologies in agriculture;

3. Job opportunities

The graduates in professional field Plant Growing and Bachelor degree programme Plant growing can work in the sphere of agriculture in Bulgaria, which is characterised by various forms and scale of production. They will be able to perform the following activities:

- Managing different sizes own, rented or mixed farms with agricultural production.
- Organiser (technologist) of plant production in cooperatives, associations or other forms of cooperation units, which have the same activities.
- Experts in state and/or public institutions, dealing with the problems of plant growing at the level of their competences.

4. Conclusions:

- The University of Ruse "Angel Kanchev" as well as the other universities, teaching students in this degree programme, maintain high quality of education and teaching staff. By developing and implementing a reliable system of quality, cost effective training and research is provided. Identifying and applying good practices is the key to higher achievements, which is the continuous aim of the teaching staff in the University.
- Achieving standards in the quality of education and the qualification of the teaching staff is a guarantee for fulfilling our mission and goals. The approved criteria for responsibility and self-criticism of the academic community guarantee high quality of education and of the teaching staff.

- Managing the quality of education and of the teaching staff is a shared responsibility of administrators, students and lecturers. When building the University policy, concerning the quality of education and of the teaching staff, the opinion of the students is the leading criterion.
- The University of Ruse "Angel Kanchev" has well-developed diverse education and research, advanced facilities and a sufficient number of high quality qualified staff with academic ranks.
- The innovation approach applied in structuring and developing teaching documentation and the continuous analysis of the competitive environment guarantee in real time the fulfilment of the strategy for developing the professional field.
- The University of Ruse "Angel Kanchev", through its Agrarian and Industrial faculty, has full capacity for teaching in the professional field 6.1. Plant Growing from higher education area 6 – Agrarian Sciences and Veterinary Medicine, thus becoming a complex centre for science and research in Northern Bulgaria, completely

meeting the criteria for timeliness, innovation and efficiency.

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