ABOUT THE PLACE, ROLE AND POSSIBILITIES OF THE
DIDACTIC SUBJECTS IN THE ECOLOGICAL PREPARATION OF
THE STUDENTS - FUTURE TEACHERS IN BIOLOGY

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ABSTRACT


On the basis of the analysis of the Governmental educational requirements (standards) for educational contents in the secondary school and of the new educational programs in the subjects Man and Nature for Vth and VIth classes and Biology and Health Education VIIth - Xth classes the necessity and the importance of the didactic preparation of the students - biologists for realization of the aims of the ecological education of the pupils are well-grounded.

The place and the role of the cycle of didactic subjects in the ecological preparation of the students-biologists are revealed. Some defects of the didactic preparation are indicated.

An attempt is made to trace out the basic activities, aims and the expected results that have to be set in the educational programs of the didactic subjects, as well as the forms and the methods for control and assessment of the students' knowledge and skills with the purpose to set a didactic preparation of the students - biologists in conformity with the contemporary requirements, aims and purposes of the pupils' ecological education.

Some possibilities of the classical forms and the contemporary innovative technologies of teaching for optimization of the didactic preparation of the students are marked.

Introduction

A reform begun in 1998 by the acceptation of the Law of Public Education in Bulgaria in the secondary education, which was regulatory provided by a package of documents, such as training plan, standards of training content, training programs and standards for assessment.

The developed according to the Governmental Educational Requirements for secondary education training programs restructures the biological training content in generally obligatory training of the pupils, which until the year 2000 included the training subjects Natural Science - Vth class and Biology VIth - Xth classes. Thus, in this Natural Sciences and Ecology cultural and educational field have been separated the following training subjects with biological content: Man and Nature for Vth and VIth classes and Biology and Health Education VIIth - Xth classes.

The training subject Man and Nature for Vth and VIth classes unites the knowledge in biology, chemistry and physics and „as a whole provides a possibility for building of a complete image in the consciousness of the pupils for animated living and non-animated nature in their unity and diversity“. Biology, ecology, biotechnology (2002). In the subjects Biology and Health Education for VIIth - Xth classes is included a biological training content about the structure, vital processes and development of the biological systems (plants, fungi, animals, including human, cell-molecular and superorganic levels of existence of the animated matter).

The analysis of the structure and content of the training programs for Vth - Xth classes, from point of view of training purposes, reveals that they are strongly oriented in direction to ecological education and upbringing of the pupils. The structured in a new manner training subject is directed to the forming of practical knowledge, skills and relations to: orientation in diversity of the world of organisms; conducting of observation of the non-animated and animated nature; investigation of rare, endangered and wild-living species in Bulgaria; creation of rules for healthy way of life and environment friendly behavior; correct relation to the surrounding environment, reasonable consumption of the natural resources and their restoring; stimulation of the pupils' interests in studying of nature.

According to the purposes of the training programs, the training content is also structured in themes, where-
as besides the strongly expressed ecological and subordinated to ecology character as a whole, in all programs is differentiated an independent informational nucleus with practical application in studying of the nature (non-animated and animated). „Observations, experiments, investigations.“

The problem of ecological preparation of the students - future teachers in biology is permanently actual, but its placing again is provoked by the changes in the structure of the training programs, directed to enhancement of the ecological orientation of the studying and training process in the secondary school in Ecology and Natural Sciences cultural-educational field, parts of which represent the subjects Man and Nature, and Biology and Health Education. There is discordance between the new higher requirements, which they stand to the training and qualification of the teachers in biology, and at this stage the not so good level of their training.

Discussion

The system for ecological training of the students-biologists is a subsystem, integrated part of the complete system of professional training of the future teachers. It represents a systematic and unit process off forming of ecologic and ecology oriented knowledge and habits, development of creative interests of the students aimed to study and investigation of the scientific and didactic aspects of the ecological problems and environment preservation. It is realised by:

- implicit including of knowledge in ecology and environment preservation in the training content of generally obligatory, special and scientific subjects, including psychological-pedagogical and didactic ones, as well in facultative and obligatory chosen subjects;
- individually specified themes of ecologic and ecology oriented content in courses of lectures and practical exercises of special and scientific subjects, regarding the ecological aspects of the relevant specifically scientific problems;
- independent special and scientific subjects in ecology and environment preservation.

The special and scientific training of the students is a basis of their further didactic training. In this sense, „the main feature of the used method consists of didactic processing of the specific theme, which is selected as a subject of training in school“. Abdullina (1990).

An important component of the professional training of the students-biologists for ecological education and upbringing of the pupils represents the cycle of didactic subjects (Methods of Training in biology, Hospice in Biology, Current Pedagogical Practice in Biology and Methods and Technique of the School Experiment in Biology), which provides the scientific-theoretical and the practical training of the students in educational and training work in school.

The analysis of the training programs of the cycle of didactic subjects indicates that too insufficient place and training time is specified for the problem of ecological education and training of the students themselves, respectively, as well of their future pupils. As an example, in the training subject Methods of Training in Biology, only in the theme Upbringing of the Pupils by their Training in Biology, in its part Preservation of Biological Diversity in National and Regional Aspect, there is regarded this topic, furthermore not in the aspect of didactics of the training. Training program of Methods of Training in Biology (2003). This naturally deprives the students of theoretical training relevant to the specific purposes and tasks, forms, methods and manners of ecological education and upbringing of the pupils. By this reason, the students have no motivation and no interests for a future work in this direction.

The insufficient enlightening of these problems in the course of lectures gives as well a reflection to the structure and content of training problems: in hospice and training practices in biology, which use as a basis of their functioning the apparatus of categories formed in the theoretical course in Didactics if training in Biology. The analysis of the training programs reveals that there is not provided specific training hours for observation or preparation and realisation of the methodical units with ecological and ecology oriented training content in the class and extracurricular forms of training in school. Training program of Hospice in Biology (2003), Training program of Current Pedagogical Practice in Biology (2003), Training program of Pregraduation Pedagogical Practice in Biology (2003). By this reason, the activity in this relation is non-planned and has a random and episodic character. As a whole, by their training in theoretical course of didactics and the training practices in the basic schools the students could not accept knowledge and to gain experience for the practical realisation of the various forms and methods of ecological training and upbringing of the pupils. The analysis of the training program in Didactics and Technique of the School Experiment in Biology again indicates that there is a lack of laboratory exercises in ecological aspect, which to prepare practically and theoretically the students in their future work in studying of the problems of ecology and environment preservation, included in the training content of biology in school. Training program in Didactics and Technique of the School Experiment in Biology (2003). Thus, entering into the real training and upbringing process during their pregraduation practice, the students remain without sufficient theoretical and practical experience for organising and conducting of ecological and nature pro-
tecting activities and measures with their pupils.

The purpose of the cycle of didactic subjects is to provide the acquaintance of the students with the content of the current training programs, textbooks and training manuals, with the forms, methods and manners of training in school, including these ones intended for ecological training and upbringing of the pupils. The abovementioned cycle is studied during the last year of training of bachelor-students and by this reason its role is based on the special and scientific training of the students, to form in them a certain system of knowledge, intellectual and practical skills and teaching of ecological and ecology oriented training content for reaching of purposes of the ecological education and upbringing of the pupils.

In the general part of the subject Didactics of Training in Biology, in the lesson named „System of training content in Biology. Content and structure of the training in Biology in secondary school by classes“ is necessary to analyse from didactical point of view the included into the training content from Vth to Xth classes ecological and ecology oriented information, leading ideas and the conception apparatus, as well to find and analyse its place and interrelation with the rest of biological content. Only by underlining of the coordination of various aspects of the ecology and environment preservation problems the students shall develop a complete and correct concept of the complex nature of this problem, reflected in the training content. It is necessary to be separated a special lesson and lecturer’s time for acknowledge of the students with the specific purposes and tasks, class and extracurricular dorms, methods, manners and means of training for ecological education and upbringing of the pupils, as well with the problem of creation of interests and motives in them in studying and preservation of the environment. If these problems, relevant to time, shall be presented in the course of lessons, after tracing of the classical forms, methods, manners and means of training for ecological education and upbringing of the pupils, as well with the problem of creation of interests and motives in them in studying and preservation of the environment. 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The theme „Didactic Categories of the Training ... Situational Methods“ of the subject Methods of Training in Biology is convenient to be used for acquaintance of the students not only with the variety of innovation forms and methods, but also with the rules and technology of their creation, the purpose and the place of application of the sample cases, intellectual cards, games and others in specific methodical units of the ecological and ecology oriented training content in biology.

In the optimal variant, the obligatory theoretical training of the students in the problems of didactics of ecological training and upbringing can be realised by a specially organised special course, facultative training or proposed training program of the special course of training named „Ecological training and upbringing of the pupils of upper classes of the secondary school“, which can be used as a basis, to be expanded and adapted for training in biology in the secondary school. Boycheva (1993).

The enhancement of the ecological orientation and the expansion of the ecological content of the theoretical course „Methods of training in Biology“ shall serve as a basis and shall determine the orientation as well of the rest of didactical subjects towards the problems of ecological education and upbringing of the pupils. As an example, in the process of training in the subject „Hospice in Biology“ the teacher intentionally can orient the training process towards observation and analysis of lessons with ecological content, and during the current pedagogical practice under its rule to organise the training of students in such a manner that they shall can prepare and realise themselves similar lessons. It is necessary to be enriched and modernised the material basis by methodology, by preparation and filming of video lessons of similar content, both in class and in extracurricular forms: facultative trainings, evenings of ecology, and conferences in ecology and environment preservation. The live observations and the analysis of lessons and video lessons shall enriched the knowledge of the students and shall convince them in the practical importance and application in the training process in biology of the various class lessons and extracurricular forms of ecological education and upbringing of the pupils. The adopting of techniques of imitation, as well of copying of elements of the good experience of the basic teachers represents a part of the process of training, they shorter it’s longitude and is a prerequisite for a future creative work of the students.

In the laboratory exercises in Methods and Technique of the School Experiment in Biology could be selected, developed and included themes of exercises with experiments applicable in the training process of biology in school, such as: investigation of nutritional products, soil, waters, air for presence of nitrates, harmful gases or waste products; determining of concentrations oxygen, carbon dioxide, and harmful gases in air samples from different places of the territory of the settlement etc. In this aspect, it is necessary to expand the integrating relations of the university with the Regional Inspection of Environment Preservation...
in order to use in a full extent its material basis and scientific potential for the training of students.

The check of ability of students in mastering of the theory and in application in practice of the various forms and methods of ecological education and upbringing could be realised during the whole period of their training in the cycle of methodical subjects, by its regulated including as an element of the check and assessment in the relevant subjects. This shall motivate the students to work responsively and in direction to their self-education and creativity in mastering of techniques of training of pupils in this field.

The final check and assessment of the quality of mastered knowledge and skills by the students to realise the purposes of the ecological education and upbringing in school shall be realised during their independent work under the guidance of the basic teacher in pregraduation pedagogical practice, by a preliminary set requirement of the training programs and the instructor of practice for obligatory planning, organising and conducting by them of class lessons and extracurricular forms and activities for ecological education and upbringing of the pupils.

In the recent years in the training process of biology in school have been largely introduced and implemented non-traditional forms and methods of work, including for ecological education and upbringing of the pupils, such as brain storm, cases, incidents, intellectual cards, role games etc. There are many publications in this aspect, which can be used as a help of the acting teachers, including in biology. Kostova (2000), Hristova (2001).

In the system of higher education, the contemporary technologies and techniques of training of students still hardly force their way. The indisputibly approved during the time and became classical forms and methods of training in higher schools lessons, seminars and exercises have their place and advantages, but besides them, especially in concern to their training for ecological education and upbringing of the pupils, can be successfully used as well contemporary techniques of training. It is necessary the organisation and including in the training of students of video lessons and such of live execution with applied in them innovation technologies and techniques of ecological training and upbringing of the pupils. The observations and their discussion shall visualise the theory and shall provide a practical training of the students for similar future activity. In the hours of Hospice in Biology can be successfully applied as an example the method of associations. During the hour for discussing of a lesson of ecological nature, the teacher-methodist can set a task before the students (after dividing them preliminary into groups of 2-3 persons) to create intellectual cards with a key word „ecological concept“, around which is structured the training content of the observed methodical unit. In the course of their discussion and comparison shall be reached actualisation of the theoretical knowledge in the theme of lesson course named „Forming of concepts“, shall be checked the knowledge of students and their level of mastering of training content of the textbook and the included in it systems of ecological concepts, as well the interrelations among them. This method stimulates the interests of the students in studying and discussing of the observed ecological themes; it allows them to think about the theory and its application in practice for training of pupils; to fill up the shortages of factual and didactical knowledge of the students.

During the lesson of Methods of Training in Biology, the hours of Hospice in Biology and Current Pedagogical Practice in Biology can find a large application the methods of brain storm and discussion in regarding and discussing of various didactical problems, as an example, in discussing of variants of methodical construction according to preliminary set theme of a lesson with ecological content and the most convenient forms, methods, manners and means of ecological education and upbringing of pupils or discussing of the advantages and disadvantages of the classical and innovative methods of training in forming of ecological culture and conscience in the pupils etc.

As a result of restructuring of the training content and adding of ecological aspect to the subjects of the methodical cycle, it is estimated the student to adopt the following system of knowledge and skills:

- to know the purposes, tasks and apparatus of categories, by the mean of which is practically realised the ecological and ecology oriented content in school in Man and Nature, and Biology and Health Education subjects;
- to know and be fluent in the included in Man and Nature, and Biology and Health Education subjects ecological and ecology oriented content, the system of ecological concepts, as well their place and interrelations with the rest of training content, from factual and didactical point of view;
- to observe and discuss from methodological point of view, as well to compile fragments of lessons or completed methodical units of ecological or ecology oriented character;
- to distinguish, name and apply the apparatus of categories of the methods of training in observed or conducted by themselves forms of training of ecological character;
- to select and apply in the school hours adequate to the training content forms, methods, manners and means purposed to ecological education and upbringing of the pupils;
- to prepare and realise practical activities with the pupils in study and preservation of the environment in laboratory lessons, laboratory practicums, excursions, training and investigator’s laborato-
to organise and include the pupils in practical activities in studying and solving of ecological regional problems, as well in activities in development and realisation of ecological projects on the territory of the settlement;

- to organise and conduct various extracurricular forms of ecological character with the pupils: excursions, expeditions, circles, practicums etc.

**Conclusion**

- The reform in the secondary education and the deriving of its ideas structural and content changes in the biological knowledge in secondary school determine the necessity of enhancement of the ecological nature of the training of the students, future teachers in biology and its optimisation, especially in relation to the cycle of methodical subjects.

- The ecological training of the students and especially by the cycle of methodical subjects is back of the requirements to it set by the training and upbringing process in the secondary school in relation to the ecological education and upbringing of the pupils. In order to set them in accordance was developed a theoretically grounded system for ecological training of the students, by the cycle of methodical subjects, in which are determined: their place, role and possibilities in the ecological training of the students - future teachers in biology, as well the expected results, a system of knowledge and skills; the forms of checking and assessment of the knowledge and skills of the students in didactics of the ecological education and upbringing of the pupils.

- The application into practice of the abovementioned system by classical and innovative forms and methods of training shall provide successful and resulting training of the students for their future work in the ecological education and upbringing of the pupils.

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