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**DEVELOPMENT OF BIOLOGICAL AND ENVIRONMENTAL  
EDUCATION IN KAZAN PEDAGOGICAL INSTITUTE**

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***Abstract***

The article deals with the development of biological and environmental education at the biology departments of the natural-geographical faculty of Kazan State Pedagogical University in the second half of the twentieth century. There is continuity in the formation and development of biological and environmental education in the KSPU. It can be clearly seen from the work of the following departments: anatomy and physiology of humans and animals, botany, zoology.

The article reveals details of the intensive scientific and educational-methodical work of the departments in the scientific directions of the development of plant physiology, geobotany, ecological and morphological features of animals of the Middle Volga region, environmental protection, methods of teaching biology in schools and universities. These scientific areas were led by doctors of biological sciences, professors: D.V. Belikhov, A.P. Petrov, S.S. Ilyin, O. Kurmaev, F.G. Sitdikov.

The article discusses the preparation of teachers of geography and biology. At the natural-geographical faculty of KSPI an important place was occupied by their practical orientation to work in general educational institutions. Scientists and teachers of the departments of the natural-geographical faculty paid great attention to teaching subjects of biological and ecological cycles and assimilating with students the necessary ecological knowledge, mastering practical skills. Therefore, an agrobiological station was built at KSPU for fieldwork of students. It was a stationary base for conducting at a high level of all field practices and practical classes provided by the curriculum in zoology, botany, agriculture, plant physiology, methods of teaching biology, soil geography, genetics.

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**Keywords:** Biological education, environmental education, Kazan, pedagogical university, department, faculty.



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## **1. Introduction**

Biological and environmental education in Russia in the second half of the twentieth century developed at a significant pace in the development of technological progress. Biological knowledge was the basis for the study and scientific understanding of natural phenomena and the surrounding nature as a whole. Graduates of biological and natural-geographical faculties of pedagogical universities should be deeply aware of the presence and necessity of mastering biological knowledge in society and in the life and work of every person. Especially in the conditions of intensive development of industry, agriculture and transport, mankind finds itself in conflict with the environment, which is beginning to threaten its health and livelihood. So, the importance of biological and environmental education for each person, the state and humanity as a whole is increasing. Pedagogical universities pay great attention to the preparation of teachers of biology and ecology for educational institutions. In this paper, the development of biological and environmental education is considered on the example of the Kazan State Pedagogical University (KSPU).

## **2. Problem Statement**

The problem of the paper is to consider the peculiarities of development of biology, biological and environmental education in Kazan State Pedagogical University (Institute) from 1950 to 2000.

## **3. Research Questions**

The questions of the research concern the trends in development of biology, biological and environmental education in the departments of the natural-geographical faculty of Kazan State Pedagogical University

## **4. Purpose of the Study**

The purpose of the study is to dwell on the development of biology, biological and environmental education in KSPU in the second half of the twentieth century; to analyze the development of biology, biological and environmental education in the departments of the natural-geographical faculty: anatomy and physiology of humans and animals, botany, zoology, genetics and methods of teaching biology.

## **5. Research Methods**

The following research were applied: theoretical analysis of biological, environmental, pedagogical and educational literature on the development of biology, biological and environmental education in a pedagogical university; analysis of textbooks and teaching aids for students and teachers of biology of educational institutions; comparative and historical and retrospective methods; the method of systematization and synthesis of published materials.

## **6. Findings**

In the second half of the twentieth century, in Kazan State Pedagogical University (KSPI), considerable attention was paid to the development of biology, biological and environmental (ecological) education. So in the structure of the natural faculty of KSPI there were some changes. The Department of

Human and Animal Physiology was separated from the Department of Zoology by Professor O.D. Kurmaev in 1950. He defended the thesis at Kazan University devoted to the study of the mechanisms of the influence of extracardiac nerves on the heart of warm-blooded animals (dogs) for the degree of Doctor of Biological Sciences. From the day of the establishment of this department, the main research direction was associated with the study of the theme “Mechanism of the nervous and humoral regulation of the heart’s activity”

Scientific work at the Department of Zoology in the 50-60s of the twentieth century was carried out observing the continuity in the previously established areas: the study of the sanitary and biological state of the waters of the Kuibyshev reservoir; development of cognitive activity and independence of students in biology lessons; studying the problems of wildlife conservation in the Middle Volga region, etc. At the Department of Zoology, sanitary and biological studies of the Kuibyshev reservoir, small rivers of Tatarstan and neighboring republics and regions were continued under the guidance of the doctor of biological sciences, professor D.V. Belikhova. During these years, teachers of the department did a great job of promoting biological and ecological knowledge among students and schoolchildren of the city of Kazan and the republic (Gaisin, Gilemkanov, & Habibullin 2014).

Analysis shows that research work on geobotany and plant physiology, which begun in the early 30s of the twentieth century, was continued at the Department of Botany. The head of Department, Professor A.P. Petrov, in the early 50s of the twentieth century, worked on the study of deciduous forests and agrophytocenoses, and since 1957 begun to study the ecological physiology of agricultural plants and the problems of vegetation. A.P. Petrov published works about water metabolism and the state of water in plants due to age and mineral nutrition. During these years, together with A.P. Petrov, R.Kh. Akberdin, L.S. Zhelezkova, A.A. Zalyalov, L.A. Lebedeva, N.N. Popov and others worked on the plant physiological physiology of the department. They made a significant contribution to the development of biology, ecological and biological and ecological education (Morozov & Popov, 2006).

Structural changes took place at the faculties of KSPI, and as a result of the merging of the natural and geographical faculties, a natural-geographical faculty was created with departments of biology, chemistry, geography in 1954. In the 1956-1957 academic year, in each department, new specialties were opened - “Biology and Chemistry”, “Geography and Biology”, “Biology and Fundamentals of Agriculture”. In this academic year, agricultural disciplines were introduced into the curricula of the natural-geographical faculty for the preparation of biology teachers, and in 1959 a well-equipped room for the foundations of agriculture was created at the Department of Botany. The first graduates of multidisciplinary specialties of teachers of biology and chemistry, biology and fundamentals of agriculture, geography and biology took place in 1961.

At the beginning of the 60s of the 20th century, professor S.S. Ilyin begun to work at the Department of Botany, and further development of agro-production areas in KSPI was associated with his name. He gave lectures and conducted practical classes in soil science, agriculture, agrochemistry and the method of experimental work. Under her leadership at the department, teachers began to engage in several scientific areas: ecological and physiological; phytocenotic; agricultural production. S. S. Ilyin developed the theme “the influence of the fertilizer system on the accumulation of root residues and the crop of plants in tilled crop rotation”. Assistant L.A. Lebedeva studied the effect of trace mineral nutrition on the physiology of plant resistance and adverse conditions. Professor S.S. Ilyin paid great attention to working with graduate

students and applicants. Under his leadership, teachers R.V. Urazmetov, B.N. Rezepov, R.Kh. Faizrahmanova defended their candidate theses (Popov, 2006).

In the 60-70-ies of the twentieth century, V.S. Porfirev conducted extensive studies of coniferous-broad-leaved and coniferous forests of the Volga-Kama region and created a phytocenotic classification. In 1964, he was appointed as a head of the department of botany. In the future, the geobotanical direction of research in KSPI was developed by students under supervision of the Doctor of Biological Sciences, professor A.P. Petrova. K.N. Khamitov investigated the deciduous forests of the Southern Urals; R.G. Minibayev studied the weed-field vegetation of the TASSR. I.I. Garanina conducted research on the flora of Raifa; A.F. Yusupova studied the life forms of herbaceous perennial plants in connection with the transition from polycarpic to monocarpic using the example of representatives of the Umbrella family. Mv Rogozhnikova studied the phytoplankton of the Kuibyshev reservoir near the city of Kazan (Morozov & Popov, 2006).

Docent N.N. Popov worked as the head of the department of botany and during these years the research work at the department was conducted in two directions: 1) geobotanical research, 2) study of the nature and economy of Tatarstan, increasing crop yields. An experimental laboratory on plant physiology was established at the Department of Botany, equipped with modern equipment for research work (Popov, 2006).

Since 1970, the transition to new curricula has begun in all major specialties of pedagogical institutes. This transition to the new curricula at the institute was caused by the transition to universal secondary education, changes in the content of secondary education and increased requirements for the training of teachers. The new plans have increased the time for theoretical training, which allowed one to deepen the training of students in the specialty, especially in the psychological-pedagogical cycle.

In the 70s of the twentieth century, the studies on the ecology of land animals were continued by teachers of the zoology department: A.Kh. Garifullina, M.V. Tikhvin, P.K. Pots. In 1973, M.V. Tikhvinskaya defended her thesis, in which the spatial features of the ecology of the water vole in the Volga-Kama region were clarified. For many years, Gorshkov studied the ecology and biocenotic relations of a badger in Tataria and defended his thesis on the results of research in 1975. Professor D.V. Belikhov and Associate Professor L.I. Markuzov conducted intensive studies of zooplankton and found out its role in the sanitary assessment of the river ports of the Kuibyshev reservoir, which allowed them to substantiate practical measures to improve the sanitary condition of the water in the waters of the river ports of this reservoir.

Since 1973 at the Department of Zoology under the guidance of the associate professor. A. Kh. Garifullina carried out research work on the study of the species composition of bees of the Tatar Autonomous Soviet Socialist Republic. The results of these studies are of great importance for further improving the rational use and protection of local bees. The results of the research were summarized in the form of methodological manuals, which contained methodological recommendations on the use and improvement of the breed composition of bees on collective and state farms of the republic and advice on environmental issues.

As the analysis of literary sources shows, in the 60-70-ies of the twentieth century, there was research on the ecological and physiological direction of teachers N.N. Popov, I.I. Garanina, L.A.

Lebedeva, L.S. Zhelezkova, V.P. Sidorov. Studies were conducted about the pre-sowing irradiation of seeds of certain agricultural crops with pulsed concentrated light. Associate professor L.A. Lebedeva studied the role of microelements in increasing plant resistance to adverse conditions (Morozov & Popov, 2006).

From 1977 to 1990, docent A.A. Lebedeva worked as the head of the Department of Botany. During these years, teachers were engaged in scientific research in the following areas: photoenergy - light and the physiological processes associated with it, occurring in plants; the effect of trace elements on the cold resistance of plants; inventory of the fauna and flora of reserves and other protected areas; study of life forms of herbaceous perennial plants in connection with the transition from polycarpic to monocarpic, etc. (Gaisin, Gilemkanov, & Habibullin 2014).

As the analysis of literary sources shows the physiological direction of research by the staff of the Department of Botany lasted until the beginning of the XXI century.

A significant role in the development of biological education in KSPI was played by docent (hereinafter Professor) R.K. Zakiev. From 1976 to 1986 he worked as the dean of the natural-geographical faculty. Over the years, the faculty repeatedly won prizes for teaching and research work at the institute. A lot of work was done to create a new training and production base for the Institute's agrobiological station. In 1974, on the bank of the Volga and near the city of Kazan, in the area of the village of Staroye Pobedilovo on the area of 18 hectares, a new agrobiological station KGPI was created. The location of this territory on the banks of the Volga, the presence of a large forest area with a mixed forest, swampy areas and floodplain meadows made this base almost universal, a base that satisfies the field practices. In the future, the institute's agrobiological station will be renamed as a "comprehensive training and production base" (KUBB KGPI). Unlike conventional agrobiological stations, which provides organization of field practices of biology students in agriculture, plant physiology and biology teaching methods, KUPB involves comprehensive teacher training biology in all subjects of the biological and agricultural cycle and methods of teaching biology (Gaisin, Gilemkanov, & Habibullin 2014).

According to R.K. Zakiyev, in the 20th century, the EABC was a stationary base for conducting at a high level all field practices envisaged by the curriculum on zoology, botany, agriculture, plant physiology, methods of teaching biology, soil geography, genetics. Students from I to IV-year of study were trained on this basis, where field practices were provided. Working there, the students received not only the skills envisaged by the program of a particular subject, but also the skills to create and organize school sites and production bases, school training and production brigades. As is known, field practices are a natural continuation of the educational process at the university. Therefore, in extracurricular time, various events were held with students, these were the holidays "Sabantuy", "Harvest", "Holiday of flowers", etc. (Khusainov, Gaisin, Beketova, Valiev, & Minnebaeva, 2016).

As our analysis shows, in the natural-geographical faculty of KSPI in the 80s of the twentieth century, three target programs were involved: the influence of environmental factors on increasing crop yields; the impact of anthropogenic and man-made factors on the environment; methodological foundations of research with students (Gaisin, Gilemkanov, & Habibullin 2014). The experimental base for the implementation of these programs was the PMU where the field practice of students and the research work of teachers, students and schoolchildren were carried out. And also it was the basis for the scientific and methodological work of students and teachers of biology of the city of Kazan.

From 1990 to 1998, the Department of Botany was headed by associate professor V.P. Sidorov. Subjects of research work were combined into a single topic "The influence of environmental factors on plants." At the core of these studies, the ecological, physiological and geobotanical areas of work of the department were preserved. During these years, the program of ecologization of the educational process was initiated in higher educational institutions, and in this connection, specialized subjects were introduced into the educational process - ecology, bioecology, ecology and environmental protection and other subjects of ecological and biological direction. At the Department of Botany under the direction of N.V. Morozov, the students conducted the research on biotechnology. The department under his leadership creates a research laboratory "Biotechnology". These studies were aimed at solving the following tasks: the development and introduction into the practice of protecting water resources, biological methods of cleaning, neutralization, etc.; development of schemes and water quality management systems; the creation of biological methods based on biotechnological schemes for the preparation (purification and disinfection) of wastewater, etc. (Morozov & Popov, 2006).

According to the results of scientific research, N.V. Morozov prepared and published numerous articles, methodological recommendations, monographs, and an ecological line of research found their solution in the dissertation research of M.F. Fardeeva, K.K. Ibragimova, N.V. Morozov. Consequently, the ecological and biotechnological direction in the 90s of the 20th century "aims to develop research on the disclosure of the main mechanisms occurring in natural ecosystems, purposeful regulation of the restoration of water bodies and land from pollution and depletion, development and creation of specific environmental quality management schemes (Morozov & Popov, 2006).

In the 70s of the twentieth century, at the department of anatomy and physiology of humans and animals of the KSPI, students studied problems of direct and practical importance, namely, the functional state of the cardiovascular system in students under the influence of active recreation in student camps. Under the guidance of the doctor of biological sciences, professor F.G. Sitdikova developed a single problem on the age physiology "Study of the mechanisms of adaptation of the heart to different intensity of physical exertion, age characteristics." This problem was included in the plan of the Coordinating Council of the USSR Academy of Pedagogical Sciences. In 1961, a postgraduate course in physiology was opened at the department, including in 1996 - a doctorate program. Since 1989, KSPI has had a council for the defense of master's theses in specialty 03.00.13 - physiology, which since 2001 has become the council for the defense of doctoral dissertations (Habibullin, 2012).

In 1989, a department of genetics and methods of teaching biology was created on the basis of the natural-geographical faculty of KSPI. R.K. Zakiev conducted "scientific studies of radiation mutagenesis on *Drosophila*, discovered new mechanisms for the distribution of chromosomes in meiosis in *Drosophila* females and males with various genetic lesions. R.K. Zakiev conducted intensive scientific and methodological work and wrote teaching aids on genetics in the Tatar language (Gaisin, Gilemkanov, & Habibullin 2014).

As our analysis shows, the continuity of biological and environmental education has always been observed in the development of biological and environmental education in KSPU (KSPI), as can be seen from the work of the departments of biological specialization of the natural-geographic faculty. Intensive scientific and methodological work was carried out in all the departments, including the problems of plant

physiology, geobotany, ecological and morphological features of animals of the Volga region, mechanisms of nervous and humoral regulation of heart activity, environmental protection, methods of teaching biology in school (Habibullin, 2012). On these issues, many teachers, graduate students and applicants under the guidance of professors D.V. Belikhova, A.P. Petrova, S.S. Ilyin, O. Kurmaeva F.G. Sitdikova defended candidate and doctoral dissertations.

Also an important place in the training of teachers in KSPI belonged to a practical preparation of teachers for work at school, including teachers of biology. The departments of the natural-geographical faculty determined the volumes of necessary biological and ecological knowledge, practical skills required for a school graduate of the pedagogical institute. At the departments of botany, zoology, there were special workshops for the production of visual aids under the guidance of associate professors N.N. Popova, V.F. Timofeev, A.F. Yusupova, L.M. Markuzova, P.K. Gorshkova.

## 7. Conclusion

The main trends in the development of biology, biological and environmental education were identified: ensuring the continuity of the development of biological and environmental education in a pedagogical university; implementation of interdisciplinary connections and modernization of bio-ecological education as an update and improvement of the content, forms and methods of its implementation. Continuity of biological and environmental education has always been observed. It can be clearly seen in the example of the departments of biological profile of the natural-geographical faculty of KSPU. Intensive scientific and methodological work was carried out in all the departments, including the problems of plant physiology, geobotany, ecological and morphological features of animals of the Volga region, the mechanisms of nervous and humoral regulation of heart activity, environmental protection, methods of teaching biology in school.

Scientists and teachers of the departments of the natural-geographical faculty paid great attention to teaching subjects of biological and ecological cycles and assimilated with students the necessary biological and ecological knowledge, mastering the practical skills required for a graduate of the pedagogical institute for further work at school. Therefore, in the late 70s of the twentieth century, an agrobiological station was built at KSPU for conducting field practices and laboratory and practical classes with students from I to IV-years of study, envisaged by the curriculum on zoology, botany, agriculture, plant physiology, genetics, methods of teaching biology soil geography.

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