

ПРИРОДНИЧІ НАУКИ

Біологія і біохімія

УДК 37:8(37.02)

DOI <https://doi.org/10.32782/NSER/2025-1.12>

FIELD PRACTICE IN ZOOLOGY AS AN ELEMENT OF THE TRAINING OF BIOLOGICAL SPECIALISTS

Govorun Oleksandr Volodymyrovych

Candidate of Biologic Sciences,

Associate Professor at the Department of Biology and Biology Teaching Methodology,

Sumy State Pedagogical University named after A.S. Makarenko

ORCID ID: 0000-0002-6626-1241

Scopus author ID: 58862001300

Fieldwork in zoology is an important component of the educational process, providing students with the opportunity to study animals in their natural environment and gain essential practical experience in observing and researching them. This type of practice not only deepens students' understanding of theoretical material but also forms the basis for future scientific inquiries and professional activities in the field of zoology.

Field practice is a critical component of biological education that bridges the gap between theoretical knowledge and practical skills. It allows students to apply academic knowledge in real-life conditions, promotes the development of scientific thinking, observation skills, teamwork, and the ability to analyze biological data. This article explores the significance of zoological field practice in developing professional competencies, focusing on its structure, methods, and expected learning outcomes. Additionally, it highlights challenges that students and educators may encounter during such practices, such as limited resources, weather conditions, and logistical issues, while also offering potential improvements for making field-based education more effective and accessible.

At Sumy State Pedagogical University named after A.S. Makarenko (SSPU), field practice in zoology is an important and integral part of the process of training pedagogical specialists. It is especially relevant for first-year students of the Faculty of Natural Sciences and Geography. The fieldwork takes place annually in May–June at the university's biological station located near the village of Vakalivshchyna (Sumy district). This practice follows the completion of the theoretical zoology course and laboratory classes, providing students with a unique opportunity to consolidate their knowledge through direct observation and hands-on interaction with local fauna. Such training enhances their understanding of species diversity, animal behavior, and ecological relationships, laying the groundwork for more advanced studies in subsequent academic years.

Key words: education, science teaching methodology, research approach, field training in zoology, nature excursions, Sumy State Pedagogical University named after A.S. Makarenko.

Говорун О. В. Практика з зоології як елемент підготовки фахівців-біологів

Польова практика з зоології – це важлива складова частина навчального процесу, яка надає студентам можливість вивчати тварин у їхньому природному середовищі та набувати практичний досвід дослідження й спостереження за ними. Завдяки безпосередньому контакту з об'єктами живої природи, студенти краще засвоюють знання, набуті в аудиторіях, розвивають навички аналізу, ведення польових щоденників, визначення видів, а також опановують методи збору зоологічного матеріалу.

Польова практика є важливою складовою біологічної освіти, яка поєднує теоретичні знання з практичними навичками. У цій статті розглядається значення польової практики з зоології у формуванні професійних компетентностей студентів-біологів. Обговорюються ключові елементи таких практик, включаючи їх структуру, методи та результати навчання, а також виклики та можливості вдосконалення освітнього процесу, заснованого на польових дослідженнях. Серед основних труднощів, що можуть виникати під час практики, варто відзначити несприятливі погодні умови, технічне забезпечення, логістичні обмеження, проте ці чинники також сприяють формуванню гнучкості, відповідальності та вміння працювати в команді.

Польова практика з зоології дозволяє студентам отримати важливий практичний досвід та розвинути навички, необхідні для подальшої наукової та професійної діяльності в галузі зоології та екології. Навчальна практика з зоології для студентів першого курсу природничо-географічного факультету є важливою та невід'ємною складовою процесу підготовки педагогічних фахівців у Сумському державному педагогічному університеті імені А.С. Макаренка. Вона проводиться щороку в травні – червні на базі біологічного стаціонару, що розташований поблизу села Вакалівщина Сумського району, після завершення теоретичного курсу та виконання лабораторних робіт. Саме тут студенти отримують можливість поглибити знання про фауну свого регіону, вивчити різноманіття видів, особливості поведінки тварин і їхні взаємозв'язки з середовищем існування.

Ключові слова: освіта, методика викладання природничих наук, дослідницький підхід, навчально-польова практика з зоології, екскурсії в природу, СумДПУ імені А.С. Макаренка.

Statement of the problem and its relevance.

The training of biologists requires a comprehensive understanding of natural world necessitating the integration of theoretical knowledge with practical application. Zoology, as a branch of biology, relies heavily on field studies to understand animal diversity, behavior, ecology and conservation. Field practice in zoology provides an immersive experience that develops observation, identification, and analytical skills, making it an indispensable part of the curriculum for aspiring biologists.

Field practice in zoology allows students to gain important practical experience and develop skills necessary for further scientific and professional activity in zoology and ecology. Field practice in zoology for first-year students of the Faculty of Natural Sciences and Geography is an important and integral part of the process of training pedagogical specialists at Sumy State University named after A.S. Makarenko (SSPU). It is held in May – June on the basis of the biological hospital of SSPU, located near Vakalivshchyna village (Sumy district) after students have mastered the theoretical course and performed laboratory work.

Field practice is an important element of an educational process as it ensures that students acquire skills and abilities to use special equipment, forms experience in independently conducting scientific research in field conditions. Field practice is the completion of the zoology course. In addition students get acquainted with the ecological side of the subject which is poorly represented in lecture and laboratory cycles and get acquainted with scientific research methods in expedition mode. It provides students with the opportunity to gain practical experience and develop the necessary skills to conduct scientific research in the field.

Analysis of scientific sources and publications.

Analysis of scientific sources allows us to identify modern approaches to organization and field practice conduction, its impact on the professional development of students and its role in the formation of ecological thinking as well.

Researchers note that field practice contributes to a deeper understanding of biodiversity and ecological processes [7]. The articles reveal methods

for collecting, processing and analyzing zoological material which help students develop professional skills and critical thinking. Field practice also contributes to the formation of values for nature conservation [7].



Office processing of material by students during field practice

Emphasis is placed on the use of modern technologies during field research including geographic information systems, mobile applications for species identification, and other innovative tools [1–4, 8]. This allows students to master skills necessary to work in the modern natural environment.

Importance is attached to the use of modern technologies during field research, in particular, geographic information systems, mobile applications for species identification and other innovative tools [1–4, 8]. This allows students to master the skills necessary to work in the conditions of the modern natural environment.

In addition, scientific sources emphasize the interdisciplinary approach in field practices. Involving knowledge from ecology, botany, geography and other related disciplines allows students to better understand the complexity of natural systems [9].

However, some researchers draw attention to the challenges associated with field practices organizing, such as limited funding, access to natural areas and need for highly qualified teachers [4, 5]. Despite these difficulties field practice remains an indispensable

element in the education of biologists as it not only contributes to professional development but also forms the skills of working in a team and solving real problems in the field.

Thus, field practice in zoology is an effective educational tool that combines theoretical basis with practical training forming key competencies of future specialists in biology.



**Students on an invertebrate zoology field trip.
2016 year**

Purpose of the article. The purpose of the article is to analyze the significance and role of zoology field practice in the training of future specialists in the field of biology. The work includes:

- identify the main educational functions of field practice;
- characterize modern approaches to its organization and conduct;
- analyze the practical impact of field research on the formation of students' professional competencies;
- investigate the importance of integrating innovative technologies and an interdisciplinary approach into the field training process.

The work emphasizes the importance of field practice as a means of deeper understanding of biodiversity, ecological processes and the development of environmental awareness in students, and also considers the main challenges associated with its implementation in the educational process.

Presentation of the main research material.

This article explores the role of fieldwork in zoology in students' academic and professional development with a focus on its methodology, outcomes, and challenges.

The Role of Fieldwork in Zoology

Bridging Theory and Practice. Fieldwork in zoology provides students with the opportunity to apply classroom knowledge to real-world settings. By observing animals in their natural environment, students deepen their understanding of concepts

such as species interactions, habitat selection and behavioral ecology.

Skill Development. Species Identification. Fieldwork improves students' ability to identify animals based on morphological and ecological characteristics. *Research Methods.* Students learn how to use field-specific methods such as trapping, transect sampling and ecological surveys. *Data Analysis.* Collecting and analyzing field data helps develop critical thinking and statistical skills.



**Work on defining the collected material.
Field practice 2014**

Integrating Interdisciplinary Knowledge. Fieldwork in zoology integrates knowledge from ecology, anatomy, genetics and environmental sciences to provide a holistic understanding of biological systems.

Developing Professional Competencies. Fieldwork helps to develop soft skills such as teamwork, adaptability and problem-solving that are essential for biologists working in dynamic environments.

Components of fieldwork in zoology

Expeditions and Research. Students can participate in expeditions and research during which they study and document a variety of animal species, their characteristics, habitats and interactions with their environment, etc.

Observation and Identification. Students learn methods of observing animals in their natural environment and learn to identify different species by their characteristics, habits and external features.

Sample collection and processing. Students learn techniques for collecting and processing animal samples in the field for further analysis and research. This may include using different trapping methods, collecting tissue or excrement samples, measuring environmental parameters where animals live, etc.

Study of behavior and ecology. Students study the behavior and ecology of different animal species, including their feeding habits, reproduction, migration, territoriality, etc.

Methods of population assessment and monitoring.

Students learn how to conduct population assessments of different animal species and perform monitoring studies to determine their trends over time and space.

Ecological analysis and conservation. Students study ecological relationships and the impact of human activities on the natural environment, and develop recommendations for the conservation and protection of biodiversity.

Studying animals in the field involves collecting a large amount of material, well-documented facts, which are the basis for further analysis, generalizations, solving practical issues in entomology, parasitology, medicine, soil zoology, theriology, ornithology, veterinary medicine, etc.

The purpose of the educational practice is to consolidate and deepen the knowledge and skills obtained by students during the theoretical course and laboratory classes on the morphology, systematics and ecology of various groups of animals, mastering the methods of collecting and office processing of the collected material, and mastering the skills of organizing independent research work at school by future teachers.



**Students on an ornithological excursion.
Spring 2016**

Stages of the internship

1. Introductory conference. Safety briefing. The internship supervisor introduces students to the rules of conduct in nature and on the territory of the biostation, the daily routine, etc. Notification of the main requirements and tasks of the internship.

2. Familiarization with equipment and literature. During the internship students must familiarize themselves with the equipment necessary for conducting scientific research, methods of collection, quantitative and qualitative accounting of animals, determination of species affiliation, fixation and preservation of material, keeping live animals in laboratory conditions, etc.

3. Excursions. The goal is to familiarize themselves with the methods and techniques of collecting invertebrates, the fauna of various biotopes. During the excursion students must keep field diaries, record their observations and the sequence of determining the collected material.

4. Preparation of a report, individual task, entomological collection.

Based on the entries in the diary a report on the internship is prepared and submitted. An entomological collection is one of the main requirements for reporting on the test for educational practice in invertebrate zoology. When assessing a student's work, two factors are taken into account: scientificity and aesthetic design. The collection must include representatives of 9 insect orders (Odonoptera, Orthoptera, Homoptera, Coleoptera, Neuroptera, Lepidoptera, Hymenoptera, Diptera, Trichoptera). In addition to representatives of these orders, there may be representatives of other, less common in the region, insect orders. The collection may also contain a certain amount of additional visual materials, such as traces of insect life, nests, galls, mollusk shells, etc.

5. Conference on the results of the practice. The conference takes place on the eve or on the day of the test and consists of student reports on the results of independent work on individual tasks. The duration of the reports is regulated by the teacher.

6. Test. After completing the full internship program students take a test on the last day of the internship.

Independent students' work. In addition to thematic excursions the internship program provides for independent research by students on routes specified by the teacher. In the process of independent work students acquire skills in collecting material, processing it, generalizing and analyzing biological patterns. On days of independent work, students conduct field observations and experiments and work with the material collected on the topic.

The teacher gives students tasks for independent work (individual or group) which they perform throughout the internship. This allows students to develop skills in independent research in field and laboratory conditions.

Independent laboratory (chamber) processing of the collected material includes:

- pricking insects and other options for fixing invertebrates, placing insects on mattresses; filling in labels;
- spreading the wings of butterflies, dragonflies, hymenoptera, dipterans, etc.;
- identifying invertebrates and labeling them;
- filling out workbooks;
- observing invertebrates in the laboratory (setting up aquariums, insectariums, etc.);
- making collections, dry and wet preparations.

Individual task. The main task of this section of practice is to develop in students the skills of conducting scientific research. In this regard, the entire nature of the work is built: students receive a topic and, under the guidance of a teacher, go through all stages of research activity: setting a problem, choosing a methodology, conducting observations and experiments, processing the materials obtained, drawing conclusions from them, writing and drafting a report, presenting the results at the final conference [3].

Challenges in organizing fieldwork in zoology

Logistical constraints. Inaccessibility of field sites, financial constraints and lack of resources often make organizing fieldwork difficult.

Environmental factors. Weather conditions, difficult terrain and unpredictable animal behavior can affect the effectiveness of fieldwork.

Student readiness. Different levels of knowledge and physical fitness of students can affect learning outcomes.

Ethical issues. It is important to adhere to ethical principles when working with animals and ecosystems minimizing negative impacts on the environment.

Improving Zoology Fieldwork

To improve the effectiveness of fieldwork, institutions can do next.

Invest in infrastructure. Establish well-equipped field stations and provide the necessary equipment.

Integrate technology. Use tools such as GPS, drones, and remote sensing to improve data collection and analysis.

Foster collaboration. Partnering with research organizations, conservation groups, and local communities can expand learning opportunities.

Encourage interactivity. Implement participatory learning approaches, such as problem-based learning or engaging in citizen science.

Address ethical issues. Emphasize minimizing environmental impacts and adhering to ethical standards during fieldwork.

Conclusions. Overall, biological fieldwork is an important component of the educational process

for students which contributes to their professional development and preparation for future careers in science.

Some key aspects of the fieldwork role in the training of biologists:

1. **Experimental learning.** Fieldwork allows students to gain experience in conducting experiments and observations in real conditions. This helps to understand the principles and methods of scientific research and their application in biology.

2. **Studying biodiversity.** Fieldwork allows students to explore the diversity of living organisms, their relationships and interactions with the environment.

3. **Developing observational skills.** Fieldwork helps develop observational skills, identifying relationships and analyzing data.

4. **Learning to interact with nature.** Working in the field, students learn to interact with diverse ecosystems and understand their vulnerability and conservation needs.

5. **Preparation for professional activity.** Field internships develop skills that are important for biologists in their future careers, such as working with equipment, collecting and analyzing data, working in a team, etc.

6. **Stimulating interest in science.** Fieldwork can stimulate students' interest in scientific activity and research work in biology.

Therefore, field internships are an important element of biologists' education, which contributes to their professional development and preparation for scientific and research activities in biology.

Field internships in zoology are an integral part of the training of biologists, providing them with practical experience and developing critical thinking. Despite the existing challenges, they remain a valuable educational tool that promotes the integration of theory and practice. Continuous improvement of field-based learning through technology and an ethical approach will ensure that students are prepared to address contemporary challenges in biology and nature conservation.

Bibliography:

1. Атемасова Т. А. та ін. Навчально-польова практика із зоології хребетних: навчально-методичний посібник. Харків : ХНУ імені В.Н. Каразіна, 2019. 196 с.
2. Воронова Н. В., Горбань В. В. Зоологія безхребетних тварин: методичні рекомендації до навчальної практики для здобувачів ступеня вищої освіти бакалавра спеціальності «Біологія» освітньо-професійної програми «Біологія». Запоріжжя : ЗНУ, 2019. 49 с
3. Говорун О. В., Пташенчук О. О. Навчальна практика з «Зоології безхребетних». 2-ге вид. перероб і допов.: навчальний посібник для студентів I курсу природничо-географічного факультету. Суми : СумДПУ ім. А.С.Макаренка, 2023. 130 с.
4. Куйбіда В. В., Гаврись Г. Г., Лопатинська В. В. Зоологія хребетних. Практикум: посібник з навчально-польової практики. Київ : Міленіум, 2007. 212 с.
5. Мельниченко Р. К., Янович Л. М. Методичні рекомендації до польової практики з зоології хребетних. Житомир : Вид-во ЖДУ, 2004. 52 с.
6. Навчальна практика з зоології: методичні рекомендації до проходження комплексної практики для студентів спеціальностей 014 Середня освіта (Природничі науки), 091 Біологія ОПП Лабораторна діагностика / Укладчі: М. Г. Білецька, В. С. Теплюк, Л. В. Щепна. Луцьк, 2021. 34 с.

7. Омері І. Д., Маруненко І. М. Організація польової практики для спеціальності 6.010102 Початкова освіта (освітньо-кваліфікаційний рівень «бакалавр»): методичні рекомендації. 5-те вид. перероб. і доп. К. : Київськ. ун-т імені Бориса Грінченка, 2015. 25 с.
8. Потіш Л. А., Фаринець С. І. Навчально-польова практика з зоології: навч. посібник. Ужгород : Вид-во УжНУ Говерла, 2013. 120 с.
9. Тарасова Ю. В., Гарлінська А. М., Оксентюк Я. Р. Методичні рекомендації для проведення навчальнопольової практики з природознавства. Житомир : Вид-во ЖДУ ім. І. Франка, 2017. 30 с.

References:

1. Atemasova, T. A., & et al. (2019). Navchalno-pol'ova praktyka iz zoolohiyi khrebetnykh: Navchal'no-metodychnyy posibnyk [Field training in vertebrate zoology: a teaching and methodological manual]. Kharkiv: KhNU imeni V.N. Karazina, 196 s. [in Ukrainian]
2. Voronova, N. V., & Horban, V. V. (2019). Zoolohiya bezkhrebetnykh tvaryn: Metodychni rekomendatsiyi do navchalnoyi praktyky dlya zdobuvachiv stupenya vyshchoyi osvity baklava spetsial'nosti "Biolohiya" osvitno-profesiynoyi prohramy "Biolohiya" [Zoology of invertebrates: methodological recommendations for educational practice for applicants for a bachelor's degree in the specialty "Biology" of the educational and professional program "Biology"]. Zaporizhzhia: ZNU, 49 s. [in Ukrainian]
3. Hovorun, O. V., & Ptashenchuk, O. O. (2023). Navchalna praktyka z "Zoolohiyi bezkhrebetnykh" (2-he vyd. pererob. i dopov.) [Teaching practice in "Invertebrate Zoology". 2nd ed. revised and supplemented: a textbook for first-year students of the Faculty of Natural Sciences and Geography]. Sumy: SumDPU im. A. S. Makarenka, 130 s. [in Ukrainian]
4. Kuybida, V. V., Havrys, H. H., & Lopatynska, V. V. (2007). Zoolohiya khrebetnykh. Praktykum: Posibnyk z navchalnopolovoyi praktyky [Vertebrate Zoology. Practical: a manual for field practice]. Kyiv: Milenium, 212 s. [in Ukrainian]
5. Melnychenko, R. K., & Yanovych, L. M. (2004). Metodychni rekomendatsiyi do polovoyi praktyky z zoolohiyi khrebetnykh [Methodological recommendations for field practice in vertebrate zoology]. Zhytomyr: Vyd-vo ZhDU, 52 s. [in Ukrainian]
6. Biletska, M. H., Tepluk, V. S., & Shchepna, L. V. (2021). Navchal'na praktyka z zoolohiyi: Metodychni rekomendatsiyi do prokhodzhennya kompleksnoyi praktyky dlya studentiv spetsialnostey 014 Srednya osvita (Pryrodnychni nauky), 091 Biolohiya OPP Laboratorna diahnostyka [Teaching practice in zoology: methodological recommendations for completing comprehensive practice for students of specialties 014 Secondary Education (Natural Sciences), 091 Biology OPP Laboratory Diagnostics]. Lutsk, 34 s. [in Ukrainian]
7. Omeri, I. D., & Marunenko, I. M. (2015). Orhanizatsiya polovoyi praktyky dlya spetsialnosti 6.010102 Pochatkova osvita (osvitno-kvalifikatsiynyy riven "bakalavr") [Organization of field practice for the specialty 6.010102 Primary education (educational and qualification level "bachelor"): methodological recommendations].: Metodychni rekomendatsiyi (5-te vyd. pererob. i dop.). Kyiv: Kyivs'k. un-t imeni Borysa Hrinchenka, 25 s. [in Ukrainian]
8. Potish, L. A., & Farynets, S. I. (2013). Navchalno-polova praktyka z zoolohiyi: Navchalnyy posibnyk [Field training in zoology: a textbook]. Uzhhorod: Vyd-vo UzhNU Hoverla, 120 s. [in Ukrainian]
9. Tarasova, Yu. V., Harlinska, A. M., & Oksentyuk, Ya. R. (2017). Metodychni rekomendatsiyi dlya provedennya navchalnopolovoyi praktyky z pryrodnavstva [Methodological recommendations for conducting field training in natural science]. Zhytomyr: Vyd-vo ZhDU im. I. Franka, 30 s. [in Ukrainian]