TEACHING STRATEGIES USED TO KNOW THE GRASSLAND ECOSYSTEM. CASE STUDY KNOWLEDGE OF THE GRASSLAND ECOSYSTEMS IN MEHEDINTI COUNTY

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Abstract: *The purpose of the paper is to assess the impact of using specific teaching tools to students regarding the role and functions of the grassland ecosystem so that they understand the functioning of this ecosystem without anthropogenic intervention. It is important for students to know the role, structure and functioning of this ecosystem because it is one of the richest resources of semi-natural grassland still existing in Europe. These are classified as grasslands with high natural value and high biodiversity. In the sciences of life or biology, we can say that phenomena are understood by students when they can operate with the knowledge acquired in contexts other than those presented in the lesson. Also, in biology lessons we must also focus on what is useful for the further development and activity of the individual. In order to illustrate and explain the grassland ecosystem so that the students can understand and retain it, a division of methods was used, with an informational-operational, but especially participatory-non-participatory weight. As a case study, the present paper tried to approach the educational process, life, practical activity. The training through the case mediates a confrontation with a real life situation, authentic, taken as a typical representative example for a general state of affairs. The direct results obtained were analyzed by the increased interest of the students in the lesson about the grassland ecosystem due to the multiple attraction systems generated by its functions as landscape, habitat for rare species of animals and plants, present near houses in the form of lawn, etc. We can appreciate that in the future the presentation of lesson topics in attractive interactive forms will both as a teaching method and as content will contribute to increasing the interest of the students towards the school but you have chosen the life sciences.*

Keywords:biology, grasslands, biodiversity, educational process

INTRODUCTION

The main function of the natural ecosystem is its productivity, and it is the producers commitment to fix solar energy and to produce complex organic substances using minerals. The grassland ecosystem provides animal fodder, protects and conserves soil, water resources and represents a habitat for wildlife (SHAKEEL, 2019). Ecosystem properties underlying ecosystem services are highly dependent on biodiversity and functional diversity (presence or abundance of functional groups or features), rather than the number of species (HOOPER, 2005; DIAZ, 2006; Le ROUX, 2008; LAMARQUE, 2011).

Meadows are described as vegetation types subject to drought, consisting mainly of grass and grass-like species that grow where there are less than 10-15 trees per hectare (RISSER, 1988; RETALLACK, 2001). More data shows that grassland ecosystem development on most continents has been a multi-step process (Stromberg, 2011). The grasslands worldwide cover approximately 3500 million ha; more than double the arable land. Meadows are a primary food source for wild herbivores and domestic ruminants and most pastures are in harmony with the environment, with the exception of those used intensively (CARLIER, 2009). The grass survives in these arid conditions due to its deep and elaborate root system that allows it to access moisture hidden deep in the soil (MALYSA, 2018).

At the same time, grasslands are one of the world's major ecosystems, occupying almost a third of the Earth's surface (SUTTIE, 2005; LEMAIRE, 2011). The extensively managed

grasslands are known worldwide for high biodiversity (HABEL, 2013) and together with other pastures, contribute to agricultural production by grazing animals (ERB, 2016). There are thus three types of grasslands: natural, semi-natural and improved grasslands (BULLOCK, 2011; LEMAIRE *et al*., 2011). Natural grasslands are natural areas that were created mainly through processes related to climate, fire and grazing of wild animals (PARR *et al*., 2014) but are also used by pets. Semi-natural grasslands are the product of human management, it is necessary to graze the animals or mow the hay for their maintenance and, in general, they will be restrained by shrubs and trees (QUEIROZ *et al*., 2014; SUTTIE *et al*., 2005; PILGRIM *et al*., 2005; 2010; BENGTSSON, 2019; (PEETERS *et al*., 2014).

The grasslands are extremely sensitive to variability and climate change (BLAIR et al., 2014). These biodiversity have the capacity to store more than one third of global terrestrial carbon stocks, and also support livestock and livestock production (TRUMPER *et al*, 2009). A determining factor of the dynamics of the pastures is the seasonality of the rainfall contribution, being influenced by the quantity and timing of the precipitations in the growing season (HUXMAN *et al*., 2004). Even small increases in winter precipitation have been shown to influence grassland ecosystem functioning in the following spring (FRY *et al*, 2014; SALLY A. POWER *et al*, 2016; GLOSH *et al*, 2009; RAMESH *et al*, 2019). The distribution of grasslands, from a global perspective, is a function of the climatic factors that influence the availability of soil moisture. On a large continental scale, grasslands occupy regions that have an effective intermediate humidity (MASON and ZANNER, 2005).

Meadows have the role of influencing natural biological control; nutrients in river basins and material flows, as well as grasslands improve the quality of animal products (DURU *et al*, 2019). Grazing can alter the spatial heterogeneity of vegetation, influencing ecosystem processes and biodiversity. It also influences plant diversity in many ecosystems and can promote plant diversity by reducing competition pressure between different species of fine-scale plants (MENG LI, XULIN GUO, 2014; OWEN, 2008; LUIS *et al*., 2018; BENGTSSON *et al*., 2014).

The grassland ecosystems must be managed with multipurpose objectives that correspond to the functions assigned to the grasslands: environment, biodiversity, landscape ecology and agricultural production (DAHLBERG, 1979; 1986). More than two thirds of the annual biomass production is allocated to underground structures and the accumulation of organic matter contributes to significant carbon accumulation (KORNER, 2002; Brass. Zootec, 2007; SINNETT, 2006; BRIGGS and COLLINS, 2008).

The term interspecific biodiversity (ecological diversity) groups a variety of living species that populate the biosphere and encompasses the total number of species (plants, animals, fungi and microorganisms), that make up the entire terrestrial and aquatic ecosystems encountered throughout the planet (WILSON and PETER, 1988; SAMFIRA I., *et al*., 2011; SANDIFER *et al*., 2015; CONSTANZA *et al*., 199; BLIGNAUT and MOOLMAN, 2006; CARPENTER *et al*., 2006; TEEB in POLICY, 2011; TEEB Synthesis, 2010; RUDOLF DE GROOT *et al*., 2012; WENHUAI LI *et al*., 2018; SUSAN, 2003).

MATERIAL AND METHODS

Starting from the idea that for humans the chance to be near natural areas, such as grasslands, can improve a person's psyche, it has been observed in many studies that activities in nature have important effects of stress reduction and restoration (EGG and MILES LAKES, 2014). In order to attract students, biology must be linked to everyday life. Some students will naturally be attracted to biology, while others will wonder why they should care; all students should be attracted to biology if we are to show how biological concepts and questions are

relevant to daily life (SOREN, 2019). Thus the purpose of the paper is to present the importance and functioning of the grassland ecosystem to a class of students by comparison between different types of grassland ecosystems investigated. The study of the permanent grassland ecosystems was carried out in the Mehedinţi area, characterized by temperate-continental climate with sub-Mediterranean influences and the very varied relief created conditions for numerous species of rare plants and animals.

For the study of the vegetation of the permanent grassland ecosystems, the double meter method was used to determine the green mass production. The direct method was used.

The characterization of permanent grassland ecosystems from these points of view was presented at the biology classes held with several classes of students in the secondary school cycle.

All these activities were carried out and fixed by lesson of project type both individually and group project according to LAZĂR and CĂPRĂRIN (2008).

When researching a meadow, an area investigation is conducted to familiarize students with the types of plants on the meadow. Explain to the students how to use the tools to identify the plants (field book, field guide, hand lens, magnifying glass, ruler, etc.). Choose a plant and go through the process of identification and classification using an example field guide. Working in groups, students are assigned the task of identifying the selected plants. Each group must have a copy of a field guide (for example, Peterson First Guides: Wildflowers). If possible, each group should also have a digital camera at least some of their time on the field. If there is no digital camera, students should draw the plants they observe and identify them on the ground. For each identified plant, students should write in their journal, the common name and family name of each researched plant. Students are asked to present the characteristics of the plants and to group the species according to family (STUART *et al*., 2010).

The research project is a way of training and self-instruction by which students carry out research using practical objectives and the completion consists of a material product. The material is the result of the activity of design, research and practice realized by the students, being characterized by originality and practical utility. Students can carry out team projects that are based on real problems in the field by collecting and processing data. Groups can work independently under the supervision of a teacher, stimulating teamwork, after taking over their data, conducting discussions in the lab or classroom by analyzing and evaluating field data (RUSDEA *et al*., 2011).

RESULTS AND DISCUSSIONS

Starting from the fact that students must be at the center of the educational process and the teacher facilitates and directs learning by stimulating the students, asking them questions, helping them to accept challenges and disagreements, thinking critically, discussing contradictions and offering creative solutions (STAVREVA *et al*., 2011).

Biological activities that are based on field trips and fieldwork provide students with interactive experiences and learning opportunities from experience, which increase students' interest and also enhance their learning.

Outdoor work gives students the chance to observe nature, the environment and use scientific inquiry to test the ideas and concepts they have learned in class. According to Hart and Nolan, fieldwork has and has always had a positive effect on students' attitude, knowledge and behavior (EILA JERONEN *et al*., 2016).

Children should be encouraged to participate in grassland-based activities to develop positive humanistic and moralistic activities that could influence their motivation to keep the grassland extended (NATALIJA SPUR et al., 2019).

Using the double meter method for the analysis of the vegetal carpet of the studied grasslands we obtained a well known phytocenoses. Analyzing the participation of the botanical families in the composition of the vegetal carpet of all the four grasslands studied around the town of Drobeta Turnu Severin, it can be observed that the dominant species as number of participation are those of other botanical families, but not of fodder importance But as a degree of participation in the composition of the vegetal carpet these species have a lower percentage of participation. The second group of plants as a participation in the composition of the vegetal carpet is represented by grasses, these representing 24% of the total species present but as a share of participation in the composition of the vegetal carpet they have the largest participation. Among the most representative grasses are: *Alopecurus pratensis, Poa pratensis, Festuca pratensis, Lolium perenne, Dactylis glomerata,* all being valuable forage species. Legumes are the third group in number of species that make up the vegetable carpet and are represented by valuable forage species such as: *Trifolium repens, Trifolium pratense, Medicago falcata,* etc. (fig. 1), (TOPORAN, 2016).

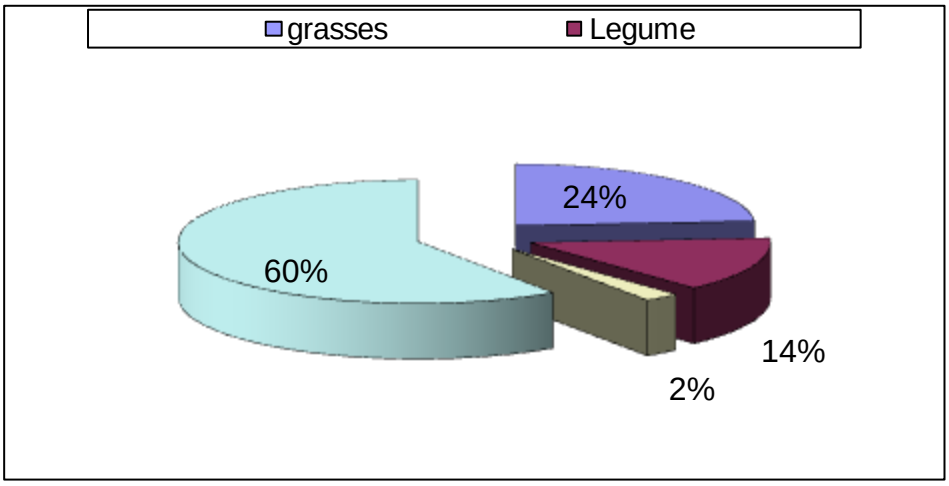

Figure 1. Graphical representation of the groups of species present in the vegetal carpet for the four grasslands studied

Spectrum analysis of bioforms and geo-elements of the studied grasslands. The analysis of these two elements leads to the definition of the origin and the life form of these species of plants. From the analysis of the spectrum of bioforms of the species present in the grasslands can be observed that the dominant bioform is represented by hemicryptophytes, representing 77% of the total species present. Hemicryptophytes are plants with regeneration buds on the surface of the soil or litter, protected from dead plant debris or leaf rosette. Many species from us have winter leaves, being characteristic of the grasslands of the temperate zone (TOPORAN, 2016). Of the hemicryptophyte species present in the meadows which have a good forage value, we should mention: *Alopecurus pratensis, Poa pratensis, Festuca pratensis, Dactylis glomerata, Loliumperene, Trifolium repens*, etc. The second group of bioform by weight are the annual therrophytes, which are also plants with low fodder importance or even lacking fodder value. Geofites represent 7% of the total bioforms and the Cryptophites and biennial terofites only account for 2% of the total bioforms in the studied grasslands. Spectrum analysis of bioforms (fig.2). Geoelement is another determining factor in assessing the

biodiversity of some phytocenoses. The dominant Eurasian geo-element, which represents 64% of the total species, followed by European, which has a percentage of 12%. The other geo-elements present have a weight of less than 10% and are represented by: Central European, Mediterranean with 5%, Cosmopolitan 5%, Pontic, Adventist, Circumpolar, Balkan-Pontic-Caucasian each representing 2% of the total (fig.3), (TOPORAN, 2016).

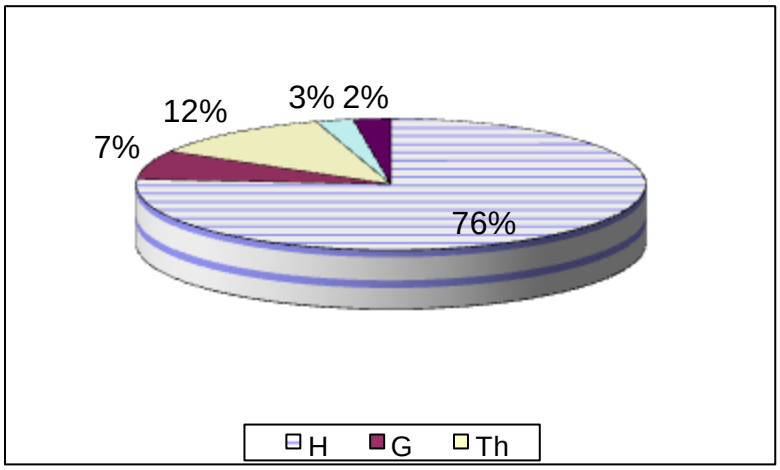

Figure 2. Graphical representation of the bioforms spectrum of the studied grasslands

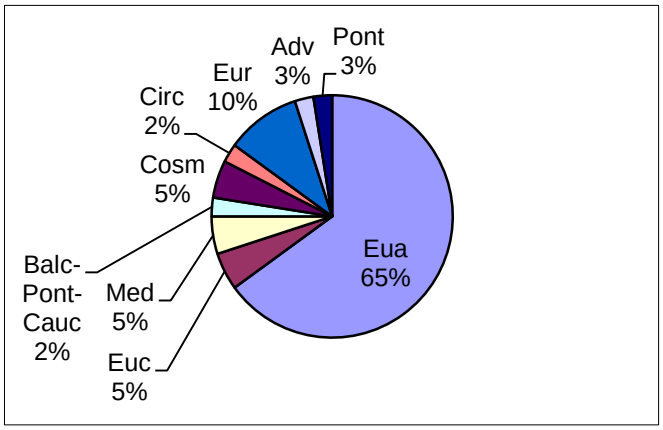

Figure 3. Graphical representation of the spectrum of geo-elements of the species from the studied grasslands

CONCLUSIONS

The scientific conclusions that have been drawn from the studies carried out on these meadows allow us to recommend carrying out minimal maintenance works of the studied meadows in order to have a really valuable meadow from the fodder point of view.

The didactic conclusions led to the idea that in order to successfully learn the science of nature, modern methods are needed for teachers and students to use. According to Palmberg, the ability to identify plant species is very important for understanding biodiversity and environmental issues, not only for understanding certain branches of biology (ecology, genetics, evolution). However, taxonomy is often a forgotten area in school curricula. Biological phenomena, such as climate change, must have an interdisciplinary and integrative approach in order to be thoroughly learned.

Learning some negotiation skills, solving problems and making decisions through discussions on ecological, economic, social and ethical principles is an important objective.

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