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GENERAL CHARACTERISTICS OF AZERBAIJAN FORAGE PLANTS AND THEIR MYCOBIOTA AND MYCOLOGICAL SAFETY PRINCIPLES APPLIED DURING USE

©***Yusifova A.,*** *Ph.D., Azerbaijan State Pedagogical University, Baku, Azerbaijan, anaxanim559@gmail.com*
©***Asadova B.,*** *Ph.D., Azerbaijan State Pedagogical University, Baku, Azerbaijan, basti.mirzoeva1984@gmail.com*
©***Aslanova S.,*** *Ph.D., Azerbaijan State Pedagogical University, Baku, Azerbaijan, aslanova17.02@mail.ru*

ОБЩАЯ ХАРАКТЕРИСТИКА КОРМОВЫХ РАСТЕНИЙ АЗЕРБАЙДЖАНА И ИХ МИКОБИОТЫ И ПРИНЦИПЫ МИКОЛОГИЧЕСКОЙ БЕЗОПАСНОСТИ, ПРИМЕНЯЕМЫЕ ПРИ ИСПОЛЬЗОВАНИИ

©***Юсифова А.,*** *Ph.D., Азербайджанский государственный педагогический университет, г. Баку, Азербайджан, anaxanim559@gmail.com*
©***Асадова Б.,*** *Ph.D., Азербайджанский государственный педагогический университет, г. Баку, Азербайджан, basti.mirzoeva1984@gmail.com*
©***Асланова С.,*** *Ph.D., Азербайджанский государственный педагогический университет, г. Баку, Азербайджан, aslanova17.02@mail.ru*

Abstract. As it is known, all living things constantly exchange food and energy with the environment in order to continue their life activities and participate in the ecological functions they perform in nature, and this situation is ecologically both producers (plants), consumers (animals), and reducers (fungi). and bacteria). Nevertheless, the dependence on the environment of consumers as well as reducers is a more sensitive feature than that of producers, since both of the latter, i.e., fungi and animals, are heterotrophs due to their nutrition, i.e., because they cannot carry out the process of photosynthesis, they depend on organic matter, as well as also, the demand for oxygen is met by another source, primarily plants. Due to the fact that plants play an important role in the provision of food for most living things, their comprehensive study has always been relevant and today it maintains that status in full force. As a result of the analysis of literature data, it is possible to state it in general data below.

Аннотация. Как известно, все живые существа постоянно обмениваются пищей и энергией с окружающей средой, чтобы продолжать свою жизнедеятельность и участвовать в экологических функциях, которые они выполняют в природе, и эта ситуация экологически является как продуцентами (растения), так и потребителями (животные) и редуценты (грибы и бактерии). Тем не менее зависимость от среды консументов, как и редуцентов, является более чувствительным признаком, чем у продуцентов, поскольку и те, и другие, т. е. грибы и животные, являются гетеротрофами в силу своего питания, т. е. потому, что не могут осуществлять В процессе фотосинтеза они зависят от органического вещества, а также потребность в кислороде удовлетворяется из другого источника, в первую очередь растений. В связи с тем, что растения играют важную роль в обеспечении питанием большинства живых существ, их комплексное изучение всегда было актуальным и сегодня сохраняет этот статус в полной силе. В результате анализа литературных данных можно сформулировать это в общих данных ниже.

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Keywords: ecological functions, fungi, photosynthesis.

Ключевые слова: экологические функции, грибы, фотосинтез.

Plants, human health and civilization. People's ideas about plants are the basis of a wide range of their activities and cover, or rather touch, all areas of human life. Because human civilization has depended on the management of plants since its inception and development, and due to the lack of necessary knowledge, this issue failed in several cases (https://kurl.ru/liqJX). Nevertheless, throughout history, plants have been collected, traded, selectively adapted to new habitats, and propagated to obtain individuals with new traits. As a logical result of this, they manipulated plants for various (food, fodder, medical, technical, etc.) purposes, including aesthetic (decorative properties), and this situation continues today. Moreover, modern civilization is based on the appropriate use of biological and physical resources of plants, more efficiently and according to the principles of sustainable development. Because even today, our ideas about the environment are still incomplete, and there are many issues that need to be clarified, which cannot be solved without a comprehensive study of plants. The importance of this situation is now more evident in the conditions of global problems in the world, as well as at the level of modern development of science and technology (https://kurl.ru/vdsei) [1, 2].

Environment and plants. It is known that most of the organisms living on Earth cannot live without atmospheric air, i.e. oxygen, that is, they are aerobic. The role of plants, as well as some microorganisms, is invaluable in meeting the needs of living beings. Thus, only plants and some micro-organisms realize the satisfaction of living things' demand for oxygen and organic matter by converting solar energy into chemical energy. Their role does not end there, and the mentioned group of organisms plays an important role in regulating the chemical and biological state of the climate, soil and water, it is the source of minerals (for example, coal) that we are depleting today, that is, the renewable energy source that is easy to obtain in the future. In addition, plants, as well as photosynthetic bacteria, substances occurring in the biosphere, primarily in the regulation of the carbon cycle, in symbiotic relationship with microorganisms and making inert atmospheric nitrogen usable by all living things, in preventing soil erosion and water pollution, open and in improving the health of closed environments from ecological aspects, etc. that it has an irreplaceable role in solving issues is one of the realities that no one doubts today. It is no coincidence that in modern times, it is accepted that plants are one of the integral components of the "Unified health" strategy. Nevertheless, the negative consequences of human industrial activity, i.e. the increasing anthropogenic burden on the environment, the increasing number of the world population and other consequences of the use of nature, can change the buffer system of natural processes that regulate the global climate in such a way that humanity already feels it today. global climate change is an example. The future development of the earth also depends on the results that people will achieve in a more intelligent and efficient use of plant life [4, 5].

That plants are an interesting object for science and production. İt should be noted that plants differ from other living things due to a number of qualities, and this difference is the basis of scientific and practical interest in them. It would be logical to clarify this point by touching on some of these differences [3, 6-8].

First, only a few phytohormones are required for the transformation of undifferentiated, i.e., somatic cells of plants into adults, and it is possible to regenerate the whole organism from vegetative (leaf and root) organ cells. A similar feature is not found in animals. Secondly, as mentioned, plants are practically the main and only source of organic matter on Earth, primarily

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oxygen. The reason for this is the presence of chloroplasts in plants with the ability to collect solar energy, synthesis of 20 essential amino acids necessary for the formation of proteins, including 9 that are not produced by humans (valine, tryptophan and phenylalanine, leucine, isoleucine, lysine, methionine and threonine). together with microorganisms, living things in atmospheric air, as well as plants themselves, have properties such as fixing nitrogen that they cannot use. The third is that although plants do not have the main organ system found in animals, that is, the nervous system, their physiological characteristics respond to what is happening in the environment. In addition to the immune system, plants have an induction mechanism that provides resistance against diseases caused by pathogens and toxins they synthesize. Fourth, primitive and higher plants form the first link of the food chain in terrestrial and aquatic systems. For this reason, plants occupy a central place in agriculture, together with microorganisms and domestic animals, they are used for human food, for various purposes, such as clothing, building materials, etc. can play the role of a source of raw materials in its preparation. In addition, the application of basic information about plants, such as the study of the nutrient requirements of plants, allows the management of soil fertility, making sure that the possibilities of plants in solving the problems of the modern era still exist, and therefore their research in various aspects is still relevant today. allows recording.

Fifth, although ecological science has progressed considerably in terms of understanding the processes that regulate the dynamics and trophic structure of ecosystems, systematic differences between ecosystems still remain [9], causing controversy to remain. Eliminating them can only be done through a comprehensive study of the plants in the ecosystem. By the way, in the Republic of Azerbaijan, there are still no studies aimed at the study of biodiversity at the ecosystem level.

If we add to what has been said, as a result of plant research, a number of issues that play an important role in the development of modern biology and are based on it today, for example, Mendel's laws that laid the foundation of genetics (experiments on peas), phytochrome phenomenon, transposition of genetic elements (corn), enzymes protein nature, etc. it has been clarified, that is, plants are also used as model organisms, then it allows us to state once again with certainty that plants are interesting and relevant objects of research in any aspect and that it is necessary to conduct research in these directions.

In addition, the study of plants is also related to another point, which is related to the occurrence of the invasion event. Thus, as a result of a number of studies, it is clear that thousands of local species have disappeared due to invasive species [10]. Preventing this is important both for the Rio de Janeiro Convention on Biodiversity and for solving the problems arising from globalization. This issue, that is, the study of plants in the conditions of Azerbaijan, is also important from another point, such as the occupation of a certain part of the territory for 30 years, the ecological terror carried out by the invaders, as well as the fact that most of the water used to irrigate agricultural crops is carried out at the expense of transboundary rivers. allows us to state this with certainty.

Species composition and resources of cultivated and wild fodder plants of Azerbaijan. The increasing number of the world's population and the fact that this is happening on the Earth, which is stable against the background of the reduction of the areas used by people for food purposes, has put humanity in the face of a number of problems. This includes lack of food, energy, raw materials for industry, etc. issues such as If we add to these the global problems of the globalized world (https://kurl.ru/VPFFC), primarily global warming and biodiversity loss [11], then it can be noted that the situation on Earth is not so encouraging. Among the mentioned problems, the problems related to the demand for food and fodder of the Earth's population, as well as other living beings, are of particular importance. Thus, for people to live and function, they must always receive the

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necessary substances due to the satisfaction of their demand for food and energy from the environment. Already today, serious problems are felt in this issue, that is, in providing people with quality food products. It would be appropriate to touch on some facts in this regard. According to the estimates of the UN FAO, 783 million people are currently suffering from hunger, and this number is unlikely to increase. So, according to various forecasts, the population of the Earth is expected to be 9.3 billion in 2050, that is, the population is expected to increase by 1.33 times. In exchange for this increase, it will be necessary to increase the production of agricultural products by about 1.5 times in order to meet the demand for food products of the people living on the Earth. This forecast is based on the crops grown on the Earth's land used by humans for food production today. This includes global warming, urbanization, etc. as a result of the processes, salinization, desertification, etc. if lands that lose their suitability for cultivation are added, then the yield per hectare will need to be increased more. It is known that although the basis of human food is traditionally various products obtained from plants and animals, there are always products obtained with the direct and indirect participation of microorganisms, primarily bacteria and fungi, among the food products used by people, and more and more products from the mentioned sources are also found. the ratio changes in favor of microorganisms. Despite this, plants and animals still remain the main source of human food supply, and for this reason, their research in meeting the human need for food is considered one of the urgent issues of the modern era for the above-mentioned reasons. Today, plants are more important in meeting the needs of people for food products, which is due to their following characteristics:

Plants are biologically more valuable as food [12, 13], as their biochemical composition, more specifically, the proteins contained in them are rich in both replaceable and non-replaceable amino acids, as well as the ability to synthesize vitamins. In addition, plants are rich in mineral elements, vitamins and other biologically active substances, including pharmacological ones, which are important for humans;

In addition to being one of the sources of food for people, plants also indirectly affect people's nutrition by forming the basis of animal feed used by people to buy food products, so forage plants are also important in the formation of quantitative and qualitative indicators of animal products [14].

Plants have a more important function in nature that is vital for all living things, which is related to meeting the oxygen demand of the plants themselves and other living things, which are the source of food for aerobic living beings on Earth, including humans. Thus, the oxygen necessary for the respiration process is produced precisely as a result of the photosynthesis process in plants [15].

All these mentioned clearly confirm how plants play an important role in nature and human life. For this reason, the protection of plants and their effective use is one of the important tasks that require a more precise solution, arising from the realities of today's globalized world. It should be noted that the data on the number of species of living things on the Earth at the moment differ sharply from each other, and this number is recorded from 2 million [16] to 3 trillion. Approaching these figures from the point of view of what is known to science and what is actual in nature, various systems are built [17], and according to those systems, the number of species known to science on Earth is 8.7±1.3 million species, of which 2.2±0.18 million live in the seas, and the rest live on land. Currently, a total of 1.2 million species of these creatures have been catalogued. 86% of living things on earth and 91% of those in the sea are waiting for their description [18]. Nevertheless, the number of species of flowering plants currently known to science is shown to be 369,000 species as of 2023. If we add primitive plants here, the total number of species included in

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the plant world is around 550 thousand [19]. Of these, the number of species registered in Azerbaijan is equal to 5000 [20], which is 9% of the world's flora. Nevertheless, the flora of Azerbaijan has the richest flora in the Caucasus, as 66% of the plants found in the Caucasus are found in Azerbaijan (https://kurl.ru/EHvLu).

The fact that most types of vegetation can be found in a small area makes it possible to note the richness of the flora of Azerbaijan, and for their efficient use, these plants are systematized in another way, as in the world, that is, they also use artificial systematization for plants. Medicinal plants, technical plants, oil plants, dye plants, fodder plants come from such systems. Forage plants, both cultivated and wild, are a major group of plants necessary for the development of livestock. Although it is impossible to give a specific number about the number of species of fodder plants in Azerbaijan, there is no doubt that their number of species is expressed in hundreds. Thus, the number of seeds of annual cereal grasses in the CIS includes up to 1000 species [21].

It should be noted that almost all fodder plants belong to grasses according to their life forms, and they are either annual, biennial, or perennial [25]. In general, forage plants are divided into 4 groups, including cereal grasses, leguminous grasses, sedges and miscellaneous grasses [22].

Agrosystis alba L. (Field wheat), *Beta vulgaris* L. (Sugar beet), *Dactylis glomerata* L. (Shepherd's broom), *Festuca pratensis* Huds, *Helianthus annuus* L. (Sunflower), *Hordeum vulgare* L. (Barley), *Lathyrus sativus* L. (Larch), *Medicago sativa* L. (Clover), *Melilotus officinalis* Desr. (Grass pea), *Sorghum sudanense* Pers (Sudan grass), *Triticum aestivum* L. (soft wheat), *T. durum* Desf (Durum wheat), *Vicia sativa* L. (Forage pea or spring sorghum), *V. villosa* Roth (Autumn sedge), *Zea mays* L. (Maize), etc. such plants can be attributed [21-23].

Most of these plants are cultivated in almost all regions of Azerbaijan, but their cultivated areas, productivity, and feed value are different. For example, in 2022, the cultivated area of grains and legumes will be 985,687 ha, the cultivated area of fodder crops will be 372,745 ha, and the cultivated area of spring and winter wheat will be 547,185 ha. In 2022, the yield of wheat from fodder crops was 31.9 s/ha, the yield of grain corn was 58.6 s/ha, and the yield of legumes was 15.8 s/ha [24, 25].

In general, I should mention that crops such as alfalfa, corn, hard and soft wheat, as well as barley are currently planted all over the country, and most of the feed used in the country is supplied by these crops. For this reason, their resources as a resource are more compared to other plants. For example, in 2022, the yield of sunflower for grain was 23 quintals, and the cultivated area was 11,539 ha, which means 26,539.7 tons of crops per year. For corn and wheat, the amount of the product produced during that year is 178829.6 t and 1745520 t, respectively (https://kurl.ru/TmyaM) [26, 27].

It should be noted that a number of fodder plants grow wild and are not yet cultivated in a cultural way. For example, *Agrostis alba* L. (Field grass), *Cynodon dactylon* (L.) Pers. (Fingergrass), *Malva neglecta* Wailler (Weed aspen), *Phleum pratense* L. (Meadow cattail), *Trifolium pratense* L. (Meadow clover) and etc. plants like this can be an example [25-27]. It is also impossible to give a concrete figure about the resources of these plants, at least for the reason that such a statistical indicator is not found in any source. Just their widespread can be taken as a synonym for having a lot of resources. In this regard, among the wild plants, *A. alba*, *Artemisia vulgaris* L. (Common Wormwood), *C. dactylon*, *M. neglecta*, *T. pratense*, etc. are the most important plants. So, they can be found in almost all areas of the region. Both cultivated and wild forage plants are not only important as fodder, but also actively participate in a number of processes typical of plants in general. For example, leguminous fodder plants take an active part in making the inert form of nitrogen in the soil usable, that is, in fixing atmospheric air. In addition, fodder plants

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improve the physico-chemical properties of cultivated soils, prevent processes such as erosion and salinization, and their use for various purposes (greening, beekeeping, enrichment of pastures, etc.) allows for effective results [22].

Finally, it would be appropriate to touch on one issue that due to the artificial systematization of plants, the same plant falls into different systems. As it is known, some of the species mentioned above as fodder plants also carry other qualities. For example, corn, sunflower, wormwood, three-leaf clover, etc. plants are also medicinal plants [22] and are used in folk medicine as diuretics, pain relievers, etc. It is widely used as a tool with properties [21, 22]. At the same time, due to these properties, these plants have become the subject of various aspects (botanical, pharmacological, mycological, etc.) studies, and this situation is still ongoing.

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