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NON-WOOD FOREST PRODUCTS OF FOODS OF ANIMAL ORIGIN FROM THE REPUBLIC OF MOLDOVA

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Abstract. During the entire period of development, hunting fauna are closely linked to the forest. The animals specific to the national forest are: wild boar, deer, badger, pheasant, deer, the rabbit. For some species (wild boar, pheasant, etc.) their number is regulated by law in order not to cause damage. Depending on the type of forest, the diversity of the kinetic fame is also determined. Vegetation influences through the type and quantity of food, as well as providing places for shelter. In recent times, there has been a trend toward increasing demand and prices for wild meat, due to quality and taste and physiological properties. The protection and protection of the game in the forest environment managed by the Moldsilva Agency is carried out by 1484 employees (engineers, inspectors, foresters, guards) of 24 forestry units. There is a total of 86 hunting funds with an area of 336474 hectares. In the forest fund in the Republic of Moldova, about 6000 hectares are rented for the purpose of hunting management. Due to the increasing demand for these products, knowledge of biological and commercial potential is necessary for efficient use. In order to have a real situation and to determine the importance they are given, a review of the NWFPs animal sector has been carried out over the past 30 years. In order to maintain the sustainability of the research sector, the objectives of the study were to collect, process and disseminate food-based NWFPs data.

Key words: animals, hunting, fauna, forest, non-wood forest products

INTRODUCTION

Forest by nature offers a multitude of non-wood forest products (NWFPs) that are collected from different species of plants and animals, and used since the advent of mankind. During the entire period of development, hunting fauna are closely linked to the forest. In the forest, wild animals find favorable living conditions. Depending on the amount and quality of the food, the diversity and density of the meal is found.

The animals specific to the national forest are: Wild boar, deer, badger, pheasant, deer, rabbit, etc. For some species (wild boar, pheasant) their number is regulated by law to avoid damage. Depending on the type of forest, the diversity of the kinetic fame is also determined. Vegetation influences through the type and quantity of food, as well as providing places for shelter.

The NWFPs value of animal origin is the kinetic fauna, also regarded as a consumable food resource. Animal foods play an important role in the diet of man. In recent times, there has been a

trend toward increasing demand and prices for wild meat, due to quality and taste and physiological properties. NWFPs food of animal origin is an important source of protein, which humans assimilate by consumption of game, snails, fish, insects, etc. In most cases, meat from wild animals has a protein content of 22,3% higher than meat from domestic animals (Dethier M., 1998).

In Europe, the amount of wild meat obtained annually is around 96000 tons. In addition, around 53000 tons of wild meat are imported annually from New Zealand and other countries. In Germany, consumption of meat of deer and wild boar is 36000 tons, of which 20000 tons are imported. The average annual consumption of wild meat is 0,5 kilograms per capita. In the Russian Federation, consumption of wild meat constitutes 130 grams and in Finland 2,5 kilograms per capita (Сафонов В. и др., 2004). In Lithuania, an average of 545000 kg of wild meat was produced annually between 1994-1996, of which 62000 kg was exported (Olmos S. <http://www.fao.org/docrep/x2450e/x2450e07.htm#non>).

The protection and protection of the game in the forest environment managed by the Moldsilva Agency is carried out by 1484 employees (engineers, inspectors, foresters, guards) of 24 forestry units. There is a total of 86 hunting funds with an area of 336474 hectares. In the forest fund in the Republic of Moldova, about 6000 hectares are rented for the purpose of hunting management. In the Russian Federation, they were rented in 2011, around 5,0 million/ha of forest for elder growth (Леса и лесные ресурсы Российской Федерации, 2011), that is, in 2012 it was 9,0 million hectares (Леса и лесные ресурсы Российской Федерации, 2012).

Fishing and hunting are an important source of income for rural populations in the mountain areas of Romania (Otiman P., 2008). In the Republic of Moldova wild animal meat is a crime for the majority of the population, because resources are minimal and the price is less affordable.

Due to the increasing demand for these products, knowledge of biological and commercial potential is necessary for efficient use. In order to have a real situation and to determine the importance they are given, a review of the NWFPs animal sector has been carried out over the past 30 years. In order to maintain the sustainability of the research sector, the objectives of the study were to collect, process and disseminate data on food of animal origin NWFPs.

MATERIAL AND METHOD

The work submitted was drawn up on the basis of the available reports submitted to the Moldsilva Agency by the forest companies under its authority.

The research methods used in the work are:

- *Documentation*, in particular theoretical documentation through literature analysis, and in this respect a number of national and international books, studies, articles have been studied;
- *Statistical methods*, such as classification, synthesis, graphic representation of investigated events and phenomena;
- *Interdisciplinary research method*, based on knowledge from other fields such as technology, statistics, mathematics, computing and law;
- *Benchmarking used*, in comparison of forest-specific and conventional indicators.

RESULTS AND DISCUSSIONS

The apiculture sectors

Plants, especially honey, are the only source of biological feed for bees. An indicator of the stage of development and productivity of apiaries is the degree of utilization of honey resources. The largest amount of honey is obtained from the mixed, fouling forest vegetation.

Bees provide humans with valuable biological products such as honey, pollen, nectar, propolis, silk clover, wax.

Depending on the ecological conditions and species of melliferous plants, honey is harvested several times a year. In the Republic of Moldova, honey is usually harvested 3 times: Once, after the flowering of the spa, the second time, after the flowering of the teat, the third time, once the rest of the plants are flowering.

Honey is also classified according to existing melliferous flora. It can be monofloral or polyfloral, containing a lot of elements and vitamins, being used in food. Honey is characterized by aroma, color,

viscosity and taste properties.

Before the Republic of Moldova declared independence from the forest, it was planned to extract up to 80 tons of honey annually, although the potential of was double. By the beginning of 1990 in the forest fund in the Republic of Moldova, about 5400 bee families are planned to be maintained.

The sale of apiculture products achieves high profit and high plant productivity.

In 1991, the Moldsilva Agency had 3000 bee families, currently only 900 bee families, and the number of bee families in management of forestry companies is continuously decreasing.

According to figure 1, the largest quantities of honey were harvested between 2006 and 2011, varying within the limits of 5,2 to 5,9 tons, except for 2008, where there was less honey (4,2 tons). The drought of 2012 and 2020 had a negative influence on the productivity of bees and on the quantity of honey harvested, respectively 2,8 and 1,6 tons. In the following years (2013-2019), the quantities of honey harvested increased slightly, ranging from 3,7 tons to 4,9 tons.

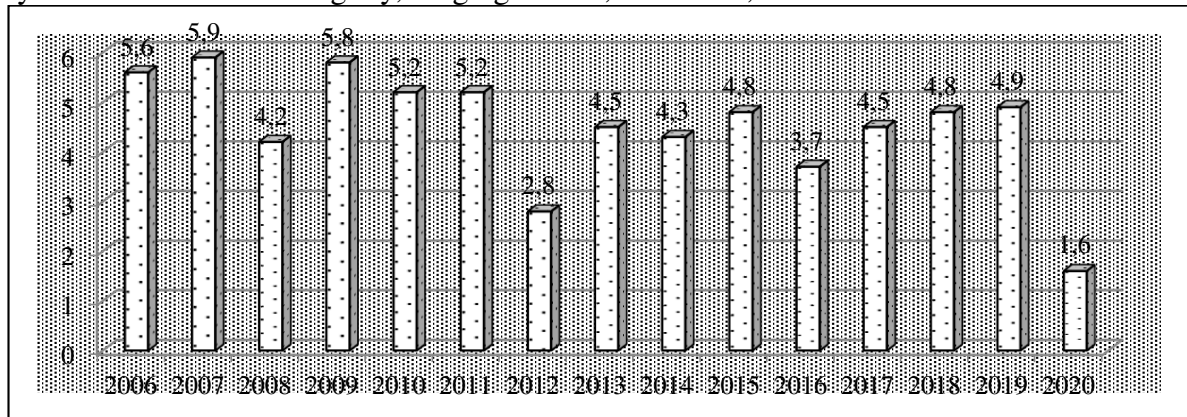


Fig. 1. Dynamics of honey harvesting, tons

Source: developed by the author based on the data of the Moldsilva Agency

Under the national forest background, each forest household/forest detour can manage a bee brood. By developing beekeeping in the forest, foresters could make a significant contribution to the development of the branch and the economy as a whole, by increasing plant productivity and providing quality melliferous products. The author of Novac Gheorghe (2017, 2021) mentions that the forest fund in the Republic of Moldova can feed about 1000000 bee families.

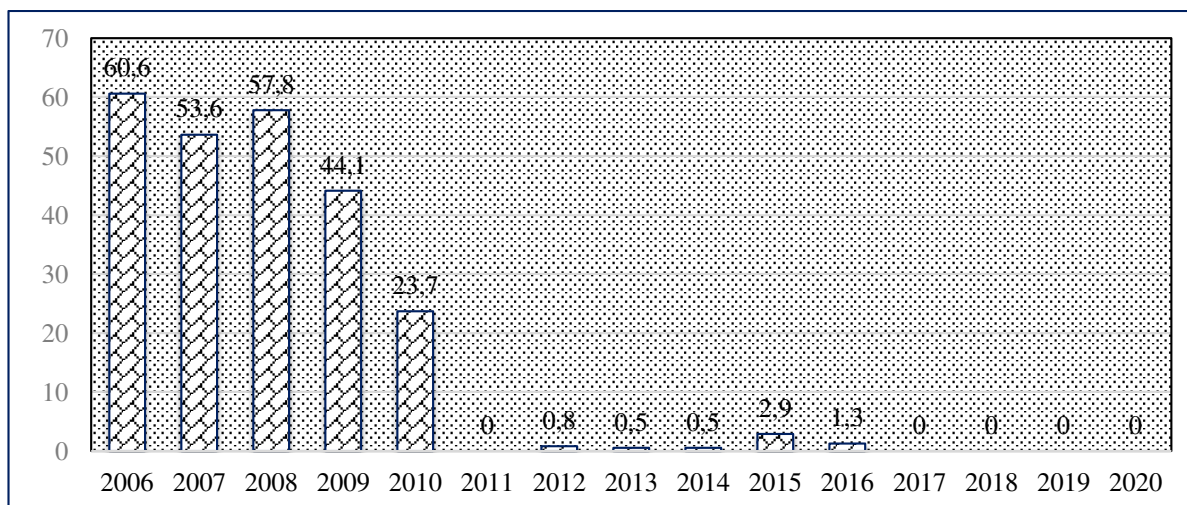


Fig. 2. Collection of vine snails, tons

Source: developed by the author based on the data of the Moldsilva Agency

The edible snails' sector

Edible snails are delicately sold at high prices abroad. This sector is new for the Republic of Moldova, and the Moldsilva Agency started collecting snails (*Helix pomatia* L.) in 2006. The quantity collected by snails was the highest in the years 2006-2010 (figure 2). In 2011, 2017-2020 forest-based

companies did not collect snails due to a lack of collaboration contracts or bad weather conditions. During the period 2012-2016, the quantities of snails collected were small, but show a slight increase from 0,5 to 2,9 tons.

The quantities of snails collected by the Bălți forest companies and in Glodeni were exported to the Baltic countries and Belgium and used for food. The authorization for the collection of snails is issued by the Ministry of Environment, with the opinion of the Academy of Sciences of Moldova.

The reduction in the quantities of snails collected was caused both by the decrease in the snails' population and by changes in the management of the respective forestry companies, which resulted in the loss of contracts with customers abroad.

Due to the particular nutritional qualities of snail meat, worldwide demand is much higher than supply. Auger's growth is an activity that does not require a high energy input. Consumption of wild snails was 320 000 tons in 1980; 405 000 tons in 1990 and 400 000 tons in 2010 (Toader A., 2012).

The fisheries sector

The fisheries sector has a favorable impact on food security, through its potential to provide the population with high-quality nutritious food. In the forest background of the Republic of Moldova, many ponds are registered, with a total area of 1298,4 ha.

According to the data presented in figure 3, the quantities of fish collected from the aquatic basins of the forest fund during the reference period (2006-2020) are subject to very high fluctuations. The most significant quantities of fish were collected in 2011 and 2013, respectively 7,5 tons and 8,4 tons. Since 2014, the quantities of fish harvested have decreased considerably, ranging from 0,7 to 2,3 tons, and in 2020, as a result of severe drought, no kilogram of fish has been extracted.

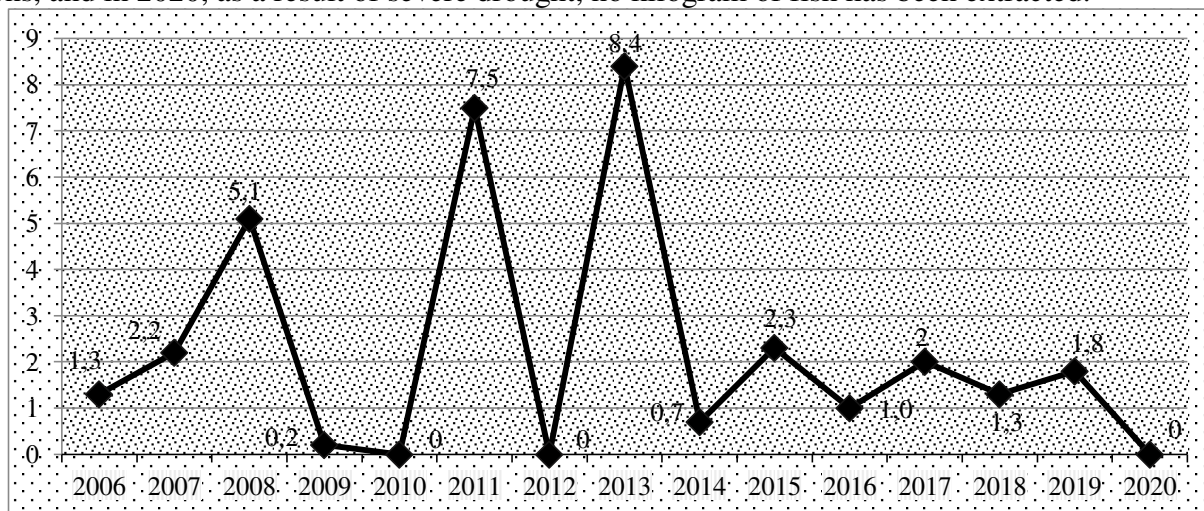


Fig. 3. Quantity of fish collected, tons

Source: developed by the author based on the data of the Moldsilva Agency

Currently, although the role of forest ponds is water-based wildlife provision, the quantities of fish harvested are lower than the potential. This is due to inadequate management of the sector and inadequate maintenance of ponds subordinated to forestry companies. In this context, stringent measures are needed to improve the conditions for the future development of fish farming. By way of reference, we note that by 1990, a quantity of fish, about 15 tons per year, is planned to be extracted from forest waters.

The development of the forestry fisheries sector must be one of the priorities of the Moldsilva Agency, due to the potential to provide quality food at an affordable price compared to other animal resources. The researchers Curcubet G. et al. (2016) stipulate that the climatic conditions in the Republic of Moldova and the genetic potential allow the widespread practice of carp and phytophagous fish polyculture.

In the forest background of the Republic of Moldova, there are many ponds, which can be used to grow fish. They are of bio-ecological, esthetic, relaxing, fire-free importance for fish and bird farming.

The increase in forest water productivity depends on the attitude of each forest company to the problem. Forest waters are a pleasant place for rest and fishing. This requires good health care for forest

water. This work would generate additional revenues for the forest branch and the economy as a whole.

Fish extraction begins in September as the temperature decreases. The water level is reduced and the fish is caught with nets. The fish can be divided by size into three categories: Small, medium and large. The small fish should be released into water.

The hunting sectors

Since human development, the hunting sector has been one of the main sources of food. The ecological conditions in the Republic of Moldova are favorable to the development of the hunting sector, creating favorable conditions for the socio-economic development of hunting funds. The forest fund managed by the Moldsilva Agency comprises 86 hunting funds with an area of 336474 ha. Of which 330562,3 ha are managed by forest entities and 5911,7 ha by tenants. The figures in figure 4 show that during the analysis period (2000-2018), the number of deer (*Cervus elaphus* L.) in the hunting background is decreasing, varying between 310 and 580 pieces.

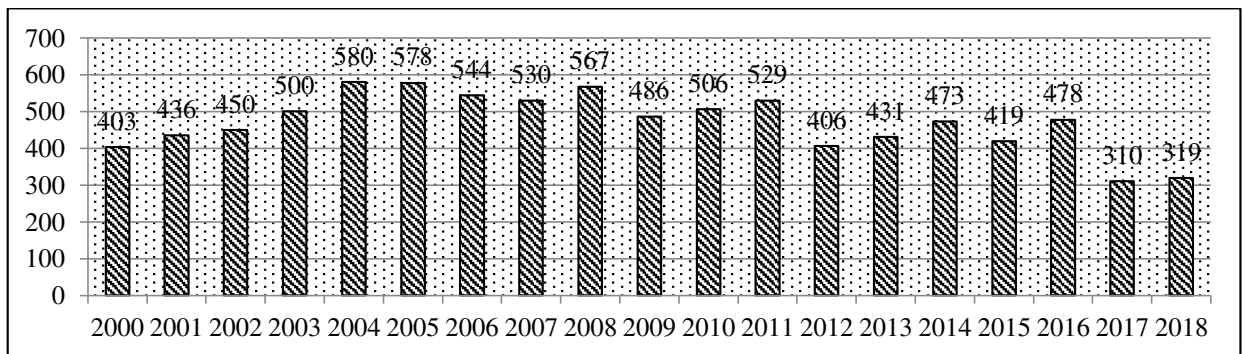


Fig. 4. Trend of the deer population in the kinetic, piece background

Source: developed by the author based on the data of the Moldsilva Agency

The dynamics of the number of deer (*Capreolus capreolus* L.) in the hunting background is shown in figure 5. It is noted that between 2000 and 2009 the number of deer varied between 3404 (in 2009) and 4200 (in 2003, 2005). From 2010 onwards, a gradual increase in the number of deer is recorded every year. In 2009 there were 3404 deer, and in 2018 it reached a herd of 6775 deer, which was an increase of 3371 pieces or 50%. Hunting deer is also prohibited in the Republic of Moldova.

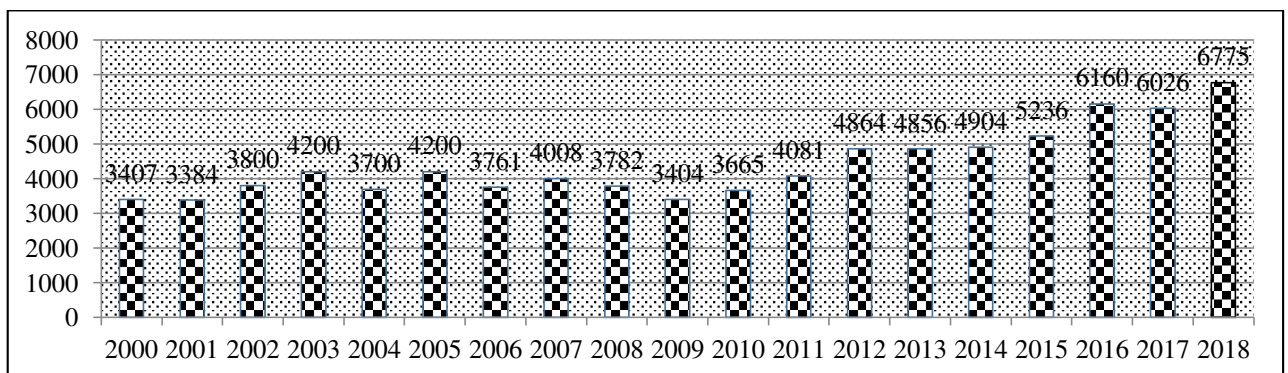


Fig. 5. Record the number of deer in the hunting background, pieces

Source: developed by the author based on the data of the Moldsilva Agency

The figures in figure 6 reflect the annual change in the number of feral pigs (*Sus scrofa* L.) in the hunting background of the Republic of Moldova. The highest number of wild boars (2600 copies) was registered in 2003. Subsequently, there was a decrease in the number of wild boars in the hunting background in the period 2004-2007, and then in the years 2008-2011 again there was a slight, relatively constant increase which varied between 2054 and 2167 pieces. In the following period, from 2012 to 2018 fluctuations in the number of feral pigs ranged from 1695 pieces and 2623 pieces respectively.

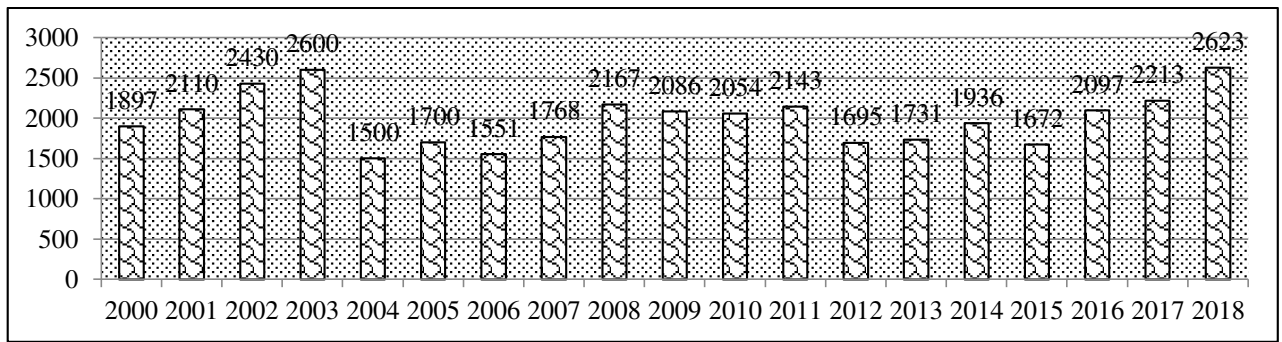


Fig. 6. The dynamics of the number of wild boars in the hunting background, pieces
 Source: developed by the author based on the data of the Moldsilva Agency

Annually, in the Republic of Moldova for each game period, the harvesting limit by game species shall be set by government decision. Wild boar hunting is the most widespread in the forest. In the period 2013-2021, the limit on the number of possible wild boars of game varied from 201 to 455 (Figure 7). The highest quota (455 pieces) was allocated for the period 2013-2014, and the lowest number (201 pieces) for the hunting season 2016-2017. In the last wild game seasons, 314 pieces (2018-2019), 321 pieces (2019-2020) and 299 pieces (2020-2021) were expected to be hunted. An authorization for wild boar hunting in the hunting fund administered by the Moldsilva Agency costs 2500 MDL.

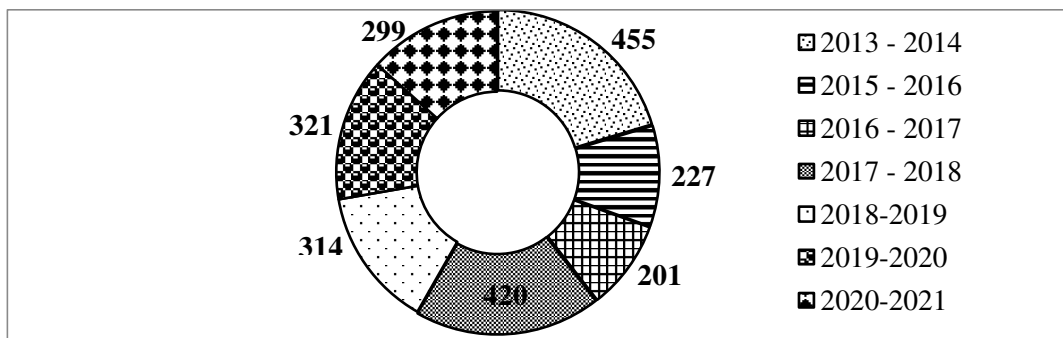


Fig. 7. Collection limit in wild boars during hunting season, pieces
 Source: developed by the author based on the data of the Moldsilva Agency

The main forest game in the Republic of Moldova is the mystery, spread throughout the forest area, populating all geographical areas and forms of relief. The number of wild boars collected varies depending on the hunting authorizations procured. A stronger increase in wild boars was recorded in the years 2012-2014 (Figure 8). Between 2015 and 2016, wild boar hunting was allowed only in the rented hunting funds, with the number of wild boars hunted less than 95 pieces and 54, respectively. In 2017, the hunting is returned to the whole area of the kinetic fund, with 173 samples harvested. All wild boars hunted are subject to veterinary expertise for the exclusion of African swine fever.

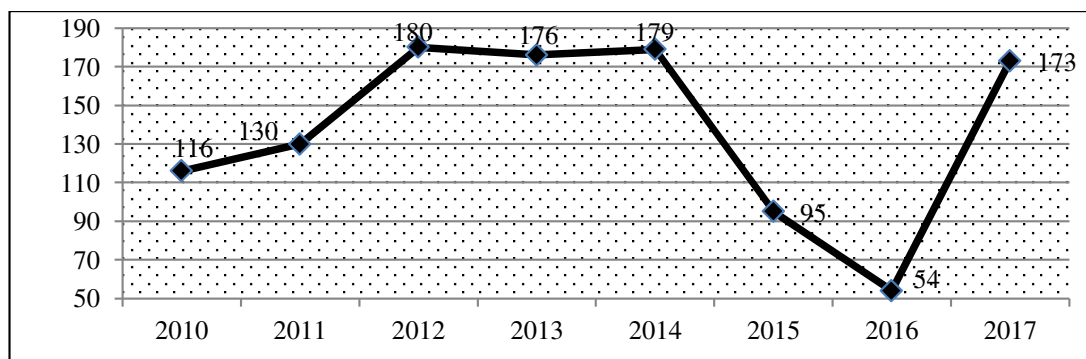


Fig. 8. Number of wild boars collected from the chopped hunting background
 Source: developed by the author based on the data of the Moldsilva Agency

The quantities of game meat currently harvested and marketed are small compared to the period up to 1990, when 45 tons of wild meat is planned to be harvested annually. In this context, Novac Gh. (2018) notes that consumption of wild game meat may become a viable alternative to meat from domestic animals.

Wild fauna was, is and will be a source of food, economic and recreation for people, regardless of the region. Due to the fragmentation of the national forest fund into small forest bodies, it cannot ensure the quantity and quality of food, shelter and game peace as a result of the animals leaving these places. Still, Munteanu M. (2010) notes that some species are suffering the noises they have become accustomed to from their youth and have not caused them any shortcomings. Depending on the diversity of the relief and the requirements of the game species, their distribution in space is different from year to year. A newer problem, which contributes to the reduction of livestock numbers, is poaching, due to access to legal or illegal weapons procurement.

In order to increase the productivity of kinetic fauna, it is necessary to increase the quantity and quality of production obtained from each animal thereafter. The products obtained from wild animals hunted are significantly higher than those produced by domestic animals. In recent times, there has been a trend toward increasing demand and prices for wild meat, due to quality and taste.

CONCLUSION

Research has highlighted the potential of the NWFPs food of animal origin sector in the Republic of Moldova. These are known to the public, and are becoming increasingly important due to current trends in development. Their use by the public shows their effectiveness in raising the quality of life. Given the importance and increasing demand of non-wood forest products, they are of particular, current and future concern, which is increasingly being addressed both at home and abroad. The multifunctional value of NWFPs is important for local communities for sustainable forest development, but not supported by management policies and regulations. Due to the multiple uses of the NWFPs, this study shows that the population has used these products for centuries, for various domestic and economic purposes, and will continue to do so. The spread of NWFPs throughout the Republic of Moldova demonstrates the great potential for providing and solving multiple requirements. Research into the dynamics of the sector concerned has shown that in recent years the quantities harvested have been reduced or not harvested at all (vine snails, fish). This is largely due to the instability of environmental conditions and irrational exploitation with the reduction of the animal population. In the future, it is recommended that the NWFPs sector in the Republic of Moldova should continue to develop and function. Also, the protection and preservation of wildlife with food potential at optimum rates.

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ÎMBUNĂȚĂȚIREA SORTIMENTULUI DE PĂR ÎN REPUBLICA MOLDOVA

IMPROVEMENT OF PEAR ASSORTMENT IN REPUBLIC OF MOLDOVA

OLGA PASAT

Institutul Științifico Practic de Horticultură și Tehnologii Alimentare, Chișinău

Abstract. Îmbunătățirea sortimentului, paralel cu perfecționarea tehnologiei pomicele, se circumscrie ca preocupare permanentă în procesul de dezvoltare și modernizare a pomiculturii, inclusiv și a culturii părului. Drept rezultatul al cercetărilor fondului genetic și biologic au fost evidențiate și recomandate Comisiei de Stat pentru Încercarea Soiurilor de plante mai mult de 300 de soiuri de păr. La Momentul Actual, 25 de soiuri dintre acestea, constituie sortimentul omologat în Republica Moldova, dintre care 19 soiuri au fost introduse din diferite țări al lumii, iar 6 au fost create în Institutul Științifico Practic de Horticultură și Tehnologii Alimentare din Chișinău. Soiurile *Heliodor* și *Butirra di Roma* sunt omologate din a. 2020.

Key words: pear, variety, elite, assortment, breeding.

Cuvinte cheie: păr, soi, elita, sortiment, ameliorarea.

INTRODUCERE

Părul este una dintre cele mai valoroase specii pomicele datorită însușirilor alimentare și terapeutice, iar fructele lui sînt înalt apreciate pentru gustul lor excelent, aroma deosebit de plăcută și constituie un aliment valoros datorită conținutului ridicat de zaharuri ușor asimilabile, vitamine și substanțe minerale. Îmbunătățirea sortimentului se circumscrie ca preocupare permanentă în procesul de dezvoltare și modernizare a pomiculturii, inclusiv și a culturii părului. Potențialul de producție al părului, în condițiile țării noastre, este mai înalt decât al mărului, iar calitatea fructelor este cunoscută și înalt apreciată de consumator.

Pentru completarea și modernizarea sortimentului cultivat, ca sursă importantă servesc soiurile noi valoroase din selecția mondială, introduse în ultimul timp, și un număr mare de hibrizi, obținuți în Institutul Științifico Practic de Horticultură și Tehnologii Alimentare din Chișinău (IȘPHTA). Studiul comparativ al acestui material s-a soldat cu depistarea unor noi soiuri și hibrizi valoroși, cu calități biologice și de producție superioare soiurilor existente, care vor îmbunătăți sortimentul, iar prin urmare, vor contribui la sporirea productivității plantațiilor de păr și, totodată, la îmbunătățirea calității producției.

MATERIAL ȘI METODA

În calitate de obiect de cercetare au servit 325 de soiuri și elite noi din selecția mondială și autohtonă și mai mult de 1200 de hibrizi, obținuți în Institutul Științifico-Practic de Horticultură și Tehnologii Alimentare din Republica Moldova. Cercetările au fost efectuate în STE „Codrul”. Fondul de germoplasmă reprezintă colecții și microculturi de concurs din soiurile și elitele amplasate în 5 livezi. Soiurile în colecție sunt reprezentate prin 3-10 pomi. Ca portaltol a fost folosit păr franc. Omologarea soiurilor și elitelor se efectuează după trecerea lor prin testul de adaptivitate, timp de 3-5 ani de productivitate economică a pomilor în rețeaua Comisiei de Stat pentru Încercarea Soiurilor de plante. Înființarea și îngrijirea plantațiilor se efectuează în conformitate cu îndrumările agrotehnice