Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development
Vol. 18, Issue 4, 2018
PRINT ISSN 2284-7995, E-ISSN 2285-3952

SWOT ANALYSIS OF ROMANIA'S APICULTURE

Mircea Adrian GRIGORAS

University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, 3-5 Manastur Str., Cluj-Napoca 400372, Phone:0264 596 384, Email: mircea.grigoras@usamvcluj.ro

Corresponding author: mircea.grigoras@usamvcluj.ro

Abstract

The paper presents SWOT analysis of beekeeping in Romania using various results in scientific research and author's critical opinion on the past, present and future of this important sector of agriculture. The paper is based on the data from the National Institute of Statistics and on the study of many published articles closely connected with the topic. The results emphasized that Romania has a long tradition in apiculture, favourable conditions for Apis mellifera carpatica, for pickings in a large range of wild and cultivated flora, good pastoral areas, technological solutions for bee growing and breeding, a high number of bee families and apiarists, a high quality honey production and a potential for organic honey. Romania is facing with a small apiary size, a low honey yield, a weak beekeepers organization in associations, a various apiarists' training level, a non sufficient number of honey collecting centres and brands, and with fake honey. The existence of Apimondia, Apiculturits' Association in Romania, Research and Development Institute, the legislative framework, the EU and National programes for beekeeping development are a guarantee that apiculture will continue to develop in the future. The low internal consumption and the increased demand in the EU as well as the numerous rural population could encourage the business in the field of beekeeping for increasing export and trade balance, the income and living standard in the rural areas. But, the increased price of apiary inputs, the low acquisition price of honey, the severe competition in the EU market between producers and exporters, honey imports from China at dumping prices, climate change and bees diseases are threats which could affect beekeeping in Romania. For increasing productivity and competitiveness of beekeeping, apiarists should apply for financial aids offered by the EU and Romanian Government to grow the number of bee families over 150, to intensify pickings in pastoral, to increase honey production and its quality, to extend organic honey production, to diversify production and develop more local brands, to export a higher honey amount at a better price in the EU and assure a high efficiency along the honey chain.

Key words**:** *apiculture, Romania, strengths, weaknesses, opportunities, threats, analysis*

INTRODUCTION

Apiculture is "the science studying bees life, keeping and care in order to obtain and use the apicultural products and to pollinate agricultural crops" [11, 28].

Apiculture supplies honey which is a food of high nutritive and energetic value and also a medicine with an important role in human health. Other bee products (pollen, royal jelly, propolis, wax, venom etc) are successfully used in human disease prophylaxis and treatment. [62, 63].

Beekeeping brings a huge contribution in agriculture assuring pollination of the entomophilous plants increasing crop, fruit, vegetable and grains harvests.

In addition, it contributes to the diversification of activities in the rural space, valorizing the local natural and human resources and offering income alternatives for the local population [3, 12, 17, 24, 30, 50, 72]

Bee colonies have an important role in the maintenance of flora biodiversty and environment protection.

Apiculture has a long tradition in Romania dating more than 2,000 years ago, as proved by historical testimonials [48].

At present, Romania occupies an important place among the honey producers and exporters of the EU, as the number of bee colonies and honey production have continuously increased. [37, 44, 45, 47].

Honey is the most important bee product. This is due to its special composition which consists of carbohydrates (80-85%), water (16-10%), proteins, amino-acids, minerals (Na, Ca, Mg, Cl etc), vitamins (B1, B2, B3,

B5, B6, pantothenic acid and C vitamin), organic acids, pigments, enzymes, aromatic substances, antioxidants. For this reason honey is important to provide energy and stimulate biological processes and metabolism in human body. That is why is could be consumed by everyone: child, adolescent, adult or old people. It stimulates the nervous activity and appetite, gives energy, develops the intestinal flora, combats the stress and the lack of minerals, prevents atherosclerosis, treats the respiratory and gastric diseases, and strengthens the immunity system and it has a high digestibility [21].

Honey provides "310 calories per 100 g, and 1 kg of honey is equivalent with 3 liters milk, 30 bananas, 50 eggs or 12 kg of meat. It is a natural product without additives and preservers and its flavor and taste qualities could be preserved for a long time" [28].

Grace to its economic, social and environment importance, beekeeping will countinue to be developed in many countries.

The countries located in the South part of Europe with favorable climate conditions for apiculture like: Romania, Spain, Hungary, Germany, Italy, Greece, France and Poland are the largest honey producers of the EU [9].

Romania will continue to be an important honey producer and exporter, taking into account its performance achieved so far, but it has to strengthen its efforts to face the new challenges and threats in honey international market and climate change.

For this reason, the paper had the purpose to make a SWOT analysis of apiculture in Romania in order to identify the strengths, weaknesses, opportunities and treats in its future development.

MATERIALS AND METHODS

The study was set up using a large number of information sources such as: books, textbooks and published articles and a critical analysis was made in order to identify the key aspects which could offer a comprehensive image of the strengths, weaknesses, opportunities and treats for Romania's beekeeping.

At the beginning it is presented the evolution of the number of bee colonies and honey production in Romania in order to identify the main trends.

Also, the production function Y= bX +c was used to characterize the relationship between honey production (Y), the dependent variable and the number of bee families, X, the independent variable.

In this purpose, the empirical data have been picked up from the National Institute of Statistics for the period 2007-2017 [36].

Then, the SWOT analysis was carried out in order to establish the key internal and external favourable and non favourable factors elements which could affect beekeeping development in Romania.

The results have been graphically exposed and then interpreted and the schema of SWOT analysis was included in the author's opinion box.

RESULTS AND DISCUSSIONS

The number of bee colonies in Romania had a positive evolution in the studied period. It increased from 998 to 1,602 thousands bee colonies, meaning by 60.5 %.(Fig.1.)

This ascending trend was determined by the stimulation of apiculture by the Romanian authorities and by the European Union in order to meet better the market requirements.

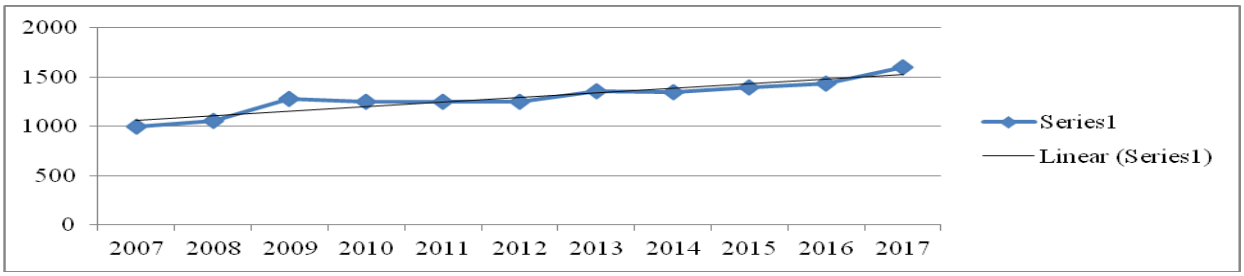

Fig.1.Dynamics of the numbre of bee colonies in Romania in the period 2007-2017 (Thousans)
Source: author's determination based on NIS, 2018 [36]

Honey Production also achieved a positive dynamics in the year 2017 accounting for 30,177 tons by 79.7 % higher than in 2007. The year 2014 and 2016 have been difficult for beekeeping because of the weather disturbances which diminished honey production (Fig.2.).

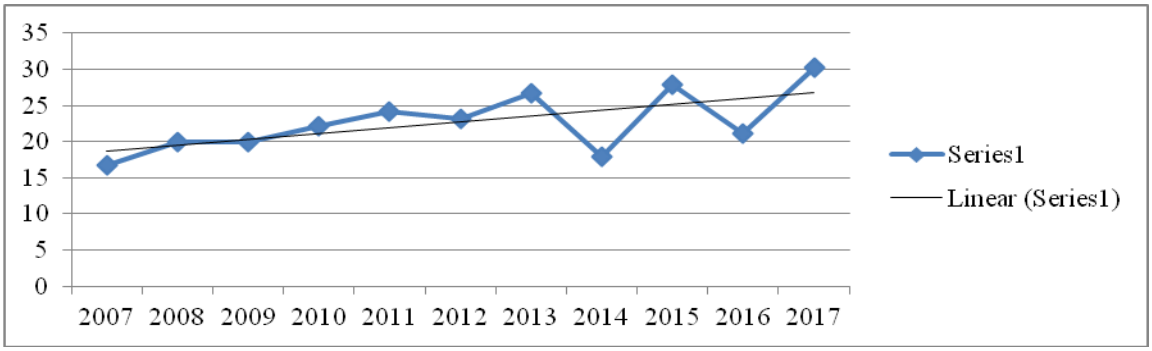

Fig.2. Dynamics of honey production in Romania in the period 2000-2017 (tonnes)
Source: author's determination based on NIS, 2018 [36]

The influence of the number of bee families on honey production. The achieved honey production was deeply influenced by the number of bee families as the correlation between these two indicators was r = 0.705 and the regression function was y = 0.0176x - 0.0687 with a determination coefficient R^2= 0.498, meaning that about 49.8 % of honey production was determined by the number of bee families. Therefore, there are other influence factors such as: climate change, pickings opportunities, the power of the bee family, the apiary management etc (Fig.3).

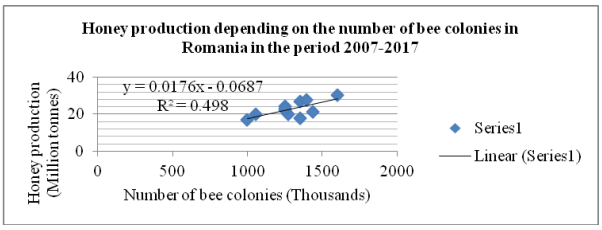

Fig.3. The dependence of honey production on the number of bee families in Romania in the period 2000-2017
Source: author's determination based on NIS, 2018 [36]

Similar results were obtained by [56].
This situation should be analyzed in more details and requires a SWOT Analysis.
SWOT analysis of apiculture. In this study have been identified the strengths, weaknesses, opportunities and threats in the field of beekeeping in Romania, which are presented in the author's opinion box.(Table 1).

(a)Strengths
The favourable geographical position of the country. Romania is situated in the North hemisphere, in South Eastern and Central Europe, in the Carpatho-Danubian-Pontic space, being bordered by the Danube river to the South and the Black Sea to the East. Its relief is like an amphitheater 35 % mountains, 35 % hilly areas and 30 % plains. [61].
The favourable climate for beekeeping. Romania has a temperate continental climate with transition nuances, moderate precipitations ranging between 400-600 mm in the plains and 1,000 mm per year in the mountain areas [61].
The varied entomophilous wild flora. On Romania's territory there are over 3,000 plant species, distributed in various floors by relief zone, in accordance with the features of altitude, climate and soil type. Most of these plants are entomophilous allowing the bee colonies to pick up the nectar and to fulfill their duties to pollinate this flora and contribute to the preservation of the biodiversity.
The large variety of agricultural crops favours beekeeping offering a rich resource of nectar and benefiting of pollination from the bee colonies side.
The areas favourable for nectar pickings in Romania are: "South Plain (acacia, sunflower, lime, meadow flora), Moldovan Plain (lime, sunflower, acacia, grasslands), Western Plain (agricultural crops and acacia), Transylvanian

Plateau (agricultural crops, orchards, meadows), Carpathian Mountains (agricultural crops, orchards, meadows), the Danube Delta (Herbaceous flora with late blooming)" as mentioned by [69].

Table 1. SWOT Analysis of Romania's apiculture

Strengths	**Weaknesses**
The geographical position and climate of Romania	The small average apiary size
The varied entomophilous wild flora and agricultural crops	The small honey production per bee colony
The long tradition in beekeeping	The small honey production per apiary
The existence of the Apis mellifera carpatica race	The non sufficient organization of the beekeepers in associative forms
The scientific results in the bee breeding and beekeeping technologies	The different training level of the beekeepers
The progress in apiary inputs	The non sufficient centres for honey collection
The existence of areas favourable for pastoral beekeeping	The lack of own Romanian honey brands
The continuous growth of the number of bee colonies and beekeepers	The blending of various honey qualities leading to honey fake
The high quality of honey	
The favourable conditions for producing organic honey	
The reasonable invested capital	
Pleasant work in the apiary for beekeeper	
Beekeeping - a healthy activity for humans	
Opportunities	**Threats**
The existence of Apimondia	The increase of the price for apiary inputs (apicultural pavilion, electricity, diesel etc)
The existence of ACA- Association of Romanian Beekeepers	The low acquisition honey price
The existence of the Research and Development Institute for Apiculture	The fake honey
The Law 383/24 Dec. 2013 for the development of apiculture	The imports of low quality honey
The existence of EU Programme for the development of beekeeping	The lower price of the imported honey compared to the average price in the domestic market
The existence of models of beekeepers associations and honey brands	The increased competition among the honey producers and exporters
Training courses for beekeepers	The climate change
A large variety of apiary inputs and input prices in the market	The bees diseases
The EU and Government financial support for beekeeping	The collapse disorder of the bee colonies
The high honey demand on the EU market and especially of organic honey	The plant protection measures which affect pickings and bee colonies health
The low honey consumption on the domestic market	
The existence of a numerous rural population	
Beekeeping is a healthy activity	
Beekeeping could be a good business	
The need of the sustainable development of the rural areas	

Source: the author's opinion box.

A long tradition in beekeeping. Beekeeping is an old activity on the territory of Romania. The first testimonial of beekeeping on the Romanian territory dates back in the 5th century BCh. and belongs to Herodot, the great Greek historian who mentioned that "the Thracians and Dacians, who were ancestors of the Romanian people, were engaged in raising bees from which they obtained honey, wax and other apicultural products" [71].

Also, other historical sources, archaeological discoveries, folk sources have a great importance in attesting the continuity of beekeeping in the Carpatho-Danubian-Pontic space [5].

The existence of the Apis mellifera carpatica race. Apis mellifera carpatica is a Romanian bee race, well adapted to the climate conditions and the large range of specific meliferous flora (meadows, pastures, acacia, lime, rape, sun flower etc) in Romania. Grace to its features: gentle and quiet behaviour, high production potential (over 50 kg.bee colony), taking good care of the bee brood and of the whole colony to survival over the seasons, the race was homologated in 2009 [20, 29, 65].

More than this, Apis mellifera carpatica assures a quiet replacement of the bee queen, it is slightly prone to fuss and has a moderate mood instinct. For its productivity and good behaviour, this race received medals at various Apimondia International Congresses [8].

The scientific results in the bee breeding and beekeeping technologies. Apis mellifera carpatica has been studied by researchers who established breeding programmes destined to "protect and preserve the local genetic and biological material, to improve production performance and behaviuor, to set up standard methods for evaluation and selection of bee colonies, to develop and implement modern techniques of morphometry and molecular, to optimize the methods and technologies for the growing of bee queens and instrumental insemination, to improve bee colonies feeding based on balanced nutritive supplements (biostimulators), to study the structure of entomophilous flora and its needs for pollination, to set up an integrated programme for pastoral beekeeping and indicate the best areas for pickings. Also, new technologies were established for the maintenance and exploitation of the bee colonies, for the conditioning of honey, for obtaining bee queens and bee families with a good resistance to diseases, for the sustainable management of the apiaries both in conventional and organic apiculture" [15, 16, 39, 40, 41, 60, 64]**.**

The progress in apiary inputs has allowed a large range of equipments and specific tools to improve the beekeepers activity and bee colony productivity (mobile apicultural pavilions, honey extractors etc).

The existence of areas favourable for pastoral beekeeping as an alternative to stationary growing favours pickings and productivity of the bee colonies. Pastoral beekeeping has the advantage that the bee colonies are brought in the middle of nature where the plants are full of nectar. In this way, the bees do not lose their time and are successful in collecting the nectar and filling the honeycombs. Most of good areas for pastoral are known by beekeepers, but it depends on technical endowment to practice this [46].

The continuous growth of the number of bee colonies. The number of bee colonies has continuously increased in Romania due to the interest of beekeepers to have more hives and bee colonies and to increase their honey production, income and profit from this activity. In 2017, there were 1,602,453 and their number will continue to grow [36, 52, 56]

The increasing number of beekeepers. The interest for apiculture as a supplementary income source has attracted many people from the rural areas but also from the cities. In this way, the number of beekeepers increased and in 2017 it was over 46,000 in Romania [36].

The high quality of the Romanian honey is assured by the large opportunities for pickings, by the low quantity of chemicals used in agriculture, by the rigorous control of honey at acquisition and export. Honey quality depends of the flora and area where the pickings were made. According to the legislation in force, honey quality could be recognized by the specific signs: DOP with controlled origin or IGP with geographic protected indication. Honey traceability is checked the by inspection and certification private bodies, accredited by RENAR and recognized by MARD. The specificity of honey could be recognized by pollen analysis which allows the identification of the type of flora where nectar was picked up and the

geographical area, also by sensorial analysis of honey and by using physical-chemical methods [59].

Romanian honey is highly appreciated by its quality in the EU market, a reason as more honey amounts to be required for export [49, 57].

The favourable conditions for producing organic honey. Organic honey could be successfully produced in Romania, where the amount of fertilizers and pesticides is the lowest in the EU. It is a niche for the Romanian beekeepers for obtaining a high quality honey for export in order to get a higher price than on the internal market. Of about 20,000 tones honey annual production, approximately 4,000 tons are exported, meaning about 20 %. This honey is certified.

In 2011, there were 912 beekeepers in conversion and ecologically certified, owning 97,997 bee colonies [4, 66].

In the North West Region of Romania, it was found that organic apiculture is not attractive yet compared to conventional beekeeping due to the high production cost, high risks and difficulties in production sale, and expensive inspections [38].

The reasonable invested capital in beekeeping is a reason to attract more and more investors.

A young beekeeper could start with Lei 600 to buy a complete wood hive (painted, frames, podium, feeder, etc.) for about Lei 200-250 and the bee colony for about Lei 400-500. But an apiary requires at least 50-100 bee families to be profitable. Therefore Lei 600 should be multiplied by the number of bee families needed to get some profit!

Not to forget that there are some additional expenses destined to buy: the beekeeper's protection suit (Lei 150), leather gloves (Lei 25), a smoker (Lei 60), a pollen collector (Lei 30), a honey centrifuge (Lei 1,200), a 300 liter bottle (stainless steel) to store honey (Lei 900), a honey matrix of 100 liters capacity (Lei 500) and for pastoral transport a bee hives trailer (Lei 4,000), all these summing about Lei 6,865, without taking into account the expenses with the hives and bee families.

To get about Lei 2,000/month income, a beekeeper must own about 70 hives for having a decent living standard with his family. All these figures are in 2015 prices [26].

Beekeeping - a healthy and pleasant activity as long as the beekeeper enters everyday in the apiary, check the hives and bee families, and run many other activities in clean air, in the middle of nature.

(b)Weaknesses

The small average apiary size and honey yield. In Romania, apiaries are small due to the reduced number of bee families as most of beekeepers have not the necessary financial capital to set up and develop a big bee farm or are part time beekeepers and in this case their time is limited to develop beekeeping at a larger scale. In general, Romanian apiaries are semi-subsistence farms whose size varies between 50 and 100 bee families.

In the year 2004, the apiary size in Romania was below 50 bee families. That time, it was considered that an apiary of about 50 bee families should also improve its performance in honey production by increasing the number of bee families [42, 43].

In 2009, in a field survey run in 21 counties, it was found an average apiary size of 24,6 bees families. Over 80 % of the apiaries had below 50 bees families. Honey yield was 24.9 kg/bee family in the case of the farms having 0 – 50 families. In case of the apiaries with the size 50-100, the yield was 31.1 kg/bee family and in case of the apiaries with over 100 bee families, average production accounted for 39 kg/bee family [12, 70].

In 2011, in a sample of 37 apiaries situated in Ialomitza County, it was found that "more than a half of apiaries have between 50 and 100 bee families with in average 65.24 bee families/apiary. Regarding honey yield, about 40.54 % apiaries obtained 11-20 kg/bee family and just 5.4% apiaries registered 50-60 kg/bee family" [51].

In 2011, in a sample of 16 beekeepers from Teleorman county, it was found that "42.62% beekeepers had between 81-90 bee families/apiary and 14.10 % had between 51-60 bee families/apiary. About 37 % of the apiaries achieved 21-25 kg honey per bee family, 31.25 % carried out 16-20 kg/apiary and 12.5 % recorded 26-30 kg honey per bee

family and 18.75 % apiaries produced over 30 kg honey per bee family" [53].

In 2011, in a sample of 20 beekeepers in Calarasi County, "the average apiary size was 72.3 bee families and the average honey yield was 16.71 kg. About 65 % of honey was achieved by the apiaries whose size belonged to 50-100 bee families category and 16.59 % in the largest ones with over 100 bee families" [54].

In South Muntenia region, in a sample of 140 apiarists, it was found that "in the apiaries with over 100 bee families the apiary size was in average 119.72 bee families, in the apiaries with 50-100 bee families, the apiary size was 79.11 bee families and in the apiaries with less than 50 bee families the average apiary size was 40 bee families. A high correlation coefficient was found between apiary size and honey production" [55].

Another study found a similar status of enterprise, enterprise age, profitability, owners' socio-demographic features and apiary size in Romania and France [58].

The non sufficient organization of the beekeepers in associative forms. Except the Association of Romania Beekeepers which operates at the country level, at the county level there are just a few associative forms and the number of beekeepers does not include all of them.

In Romania there are 30 apicultural associations and federations of which by county: Buzau 5, Constanta 4, Mures 3, Prahova 2, Valcea 2, Mehedinti 2, Alba 1, Arad 1, Bihor 1, Caras-Severin 1, Dolj 1, Gorj 1, Iasi 1, Maramures 1, Satu Mare 1, Timis 1 and Vaslui 1 [31].

The different training level of the beekeepers. Even thou the number of beekeepers is continuously increasing, the structure of apiculturists by training level reflects that just about 40 % of their number are experienced beekeepers. All the others either are part time for getting an supplementary income or dilettantes practicing beekeeping as a hobby. To increase apiary size and honey production it requires as more apiculturists to be "certified" as practitioners.

The non sufficient centres for honey collection. In Romania, honey is collected by 20 acquires and 15 commercial societies as mentioned by Ministry of Agriculture. Their number is not enough and more than this the acquisition price is below beekeepers expectations not always covering their production cost [18].

The lack of own Romanian honey brands. Brand creation and certification in Romania is still at its beginning. In order to penetrate in the external market, more honey brands should be created in order to protect it of fake honey.

The blending of various honey qualities leading to honey fake. In order to increase their income, a few beekeepers produce fake honey, using industrial glucose, obtained from maize starch or potatoes, or to add in natural honey maize syrup, gelatine, egg white and methanol obtained from sugar beet or fruit. Also, a few beekeepers nourish their bee families with inverted sugar, glucose and maize syrup [2].

In the EU, despite that there are quality standards for honey, 20% of the samples collected at the frontiers of the EU and at the importers' seats do not respect these standards, including sugar syrup in honey. For eliminating this aspect in honey market, the EU has established new measures to improve testing procedures and to intensify inspections at import. Traceability of honey products must be identified writing on the label the origin of the product and the fake honey producers to be severely sanctioned [10, 68].

(c)Opportunities

The existence of Apimondia or International Federation of Apiculturists Associations is a proof that Romania has a long tradition in beekeeping. One of its presidents was Prof. Dr. Veceslav Harnaj who extended the relationships between apiculturists and associations at international level [7].

The existence of ACA - Association of Romanian Beekeepers created in 1958 as a professional body which is destined to sustain the interests of its members at the level of various institutions in the country [1].

The existence of the Research and Development Institute for Apiculture which

is dealing with the development of the scientific research in Romania for helping the beekeeping sector with solutions destined to increase honey production and its quality, to develop the obtaining and use of bee products as natural sources destined to supplement human diet and as a therapeutic mean in various diseases. It has its own brands for a large range of products (nutritive supplements for human use, apicultural biologic material, bio stimulators, medicines, apicultural tools, textbooks, brochures etc.

The ICDA has its own shops to sell apicultural products, also organizes meetings with the apiarists, the national Honey Fair, and provide books, practical guides etc to the beneficiaries [27].

The legislative framework which regulates the development of apiculture in Romania is The Law 383/24 Dec. 2013.

The existence of EU Programme for the development of beekeeping. Beekeeping is an import sector of the EU agriculture. Honey production is more and more required on the EU market to satisfy better consumer and industry requirements and also on other external markets. For this reason, taking into account the diversity of production conditions, beekeeping practices and yields, The EU Commission has set up a *Programme for the development of beekeeping for the period 2017-2019*. By means of this Programme, the national apicultural programmes are enhanced to improve the general conditions of honey and other products production and marketing in the EU [34].

The existence of models of beekeepers associations and of models of Romanian honey brands is an incentive to create new associative forms and brands and to strengthen beekeeping along the product chain.

The training courses delivered to apiculturists have a positive impact on their knowledge and skills and help them to be good managers of apiaries and marketers of their products. They are mainly organized by National Apiculturists Association By means of ICDA-National Institute for Research and Development in Apiculture SA and its authorized branches in the territory. The qualification courses in the profession of "Apiculturist" are accredited by National Authority for Qualification [19].

A large variety of inputs and input prices for apiaries are provided by National Institute for Research and Development in Apiculture SA by means of the Honey Fairs organized annually at its seat and at the level of ACA's branches in the territories.

The EU and Government financial support for beekeeping is offered to apiculturists by means of The National Programme for Apiculture 2017-2019. The financial aid is provided 50 % from the EU and 50 % from the Government for buying: medicines to treat varrooa and nosema diseases, pollen and propolis collectors, pollen dryer, honey heater, bee queens, bee families, boxes to replace the used boxes in pastoral, for purchasing honey centrifugal extractor, wax smelter etc. The beneficiaries could be apiarists and individual or family enterprises, and also cooperatives [35].

The increased honey demand on the EU market is an incentive for all the apiculturists from the EU, including from Romania to produce more honey and of higher quality. With 268,000 tons of honey in 2015, the EU is the 2nd honey producer in the world. However, the EU market is not self-sufficient, which is a reason to import. The extra-EU imports accounted for 194,375 tons in 2015, 75,142 tons coming from China (38.6 %) [25].

The low honey consumption on the domestic market is another incentive to develop honey exports of Romania and in this way to bring foreign currency in the country. The average honey consumption is about 0.5 kg honey/inhabitant/year, because of honey price which is higher in comparison with the price of the refined sugar. In other countries, honey consumption is 1.62 kg /capita in Greece, 1.19 kg/capita in Austria, 1.17 kg/capita in Slovenia and 0.63 kg/capita in Greece [50].

The existence of a numerous rural population could be an advantage to develop business in apiculture and get additional income. In Romania, about 44 % of the

population lives in the rural space compared to 25% the EU average [32].

Beekeeping could be a good and healthy business. Romania is an important honey producer of the EU coming on the 4th position. About 50-60 % of honey production is exported mainly in Germany, Italy, France, Poland, Austria, Spain, United Kingdom and Israel. Romanian honey is of high quality, but being exported in bulk, wholesale price is lower than the production costs. For a beginner, the European and Government funds could be accessed based on eligible projects. The financial aid for the period 2017-2019 for apiculture is Lei Thousand 97,626, of which 50 % from the EU and 50 % from the Government. The funds are equally distributed in each year 2017, 2018 and 2019 [6].

The need of the sustainable development of the rural areas

Sustainable rural development aims to improve life quality by improvement and innovation focused on the resources, environment and social equity among generations. The villages and communes should be developed from an economic point of view, preserving the local culture and traditions, social relationships and the beauty of the localities. Within bioeconomy, apiculture could be a chance for the inhabitants of the rural areas giving them an opportunity to earn an additional income from a business with honey and other products and to increase their living standard. As mentioned above, this is stimulated by the Programme for supporting apiculture and financially sustained by the EU and Romanian Government. The projects in apiculture could encourage the local initiative and valorise the resources of the rural space [13, 23].

(d)Threats

The increase of the price for apiary inputs is a challenge and also a threat for apiculturists, whose income depends on honey production and quality, and, more than this, on the climate conditions with a deep impact on pickings. An apiarist should assure corresponding inputs at the level of requirements to develop a good deal. The most expensive inputs are: apicultural pavilion, honey extractor, electricity, diesel etc

The low acquisition price offered by wholesalers and processors both on the internal and external market is also a threat, because the apiarist work along the year should be reimbursed. If the production costs are not covered by income, or if the income is equal to production expenses, the apiarist has nothing to earn.

The fake honey in the internal and external market disadvantages the serious apiculturists who provide honey of high quality. The EU measures to protect honey quality and apiarists' income and profit are welcome.

The imports of low quality honey at "dumping prices" like the one from China is not in the benefit of the local honey producers, as in supermarkets these products are sold at lower prices than the high quality honey. Under the condition that domestic consumption is very low, the question arising is: "Why to import honey?"

The increased competition among the honey producers and exporters. Romania is in a continuous competition with other important honey producers in the EU like Spain, Hungary, Germany, Greece, France, Poland, Austria and also with Ukraine. For this reason, it is important to increase the number of bee families, honey production and quality to preserve the actual beneficiaries and extend its market at international level.

The climate change is another threat because during the last decade Romania's apiculture was facing with extreme phenomena: either with huge rains in the period of trees blooming and pickings for bee families or droughts during summer season affecting the wild flora and agricultural crops. In 2007, 2012, 2014, 2016, bee families, honey production and apiarists' income were deeply affected due to climate change. As agricultural crops, orchards and meadows will continue to be affected by climate change in the future, important measures and actions are required to adapt to this situation [67].

The bees diseases. Bee families health is very important for its development and honey production. For this reason, they should be known, prevented and treated. They could be

caused by bacteria, viruses, fungi, parasites, and also by physiological disturbances**,** anomalies and intoxications.

Prevention is more important than treatments, but if it is the case, treatments should be applied immediately in accordance with the pathogenic agents [22].

The use of insecticides and other chemicals in agriculture affects pickings, honey production and bee colonies health. The use of intensive agriculture based on pesticides, insecticides and neonicotonoides, on communication means based on waves, medicines could determine real disasters regarding bee colonies, more exactly what is named: "*Colony Collapse Disorder*", which means practically the disappearance of bees. For this reason, the 45th Apimondia Congress run under the slogan: "***No Bees, No Life!",*** meaning that if bees will die, life will disappear as vegetables and fruit are the result of pollination. For this reason, it is important to preserve the genetic fund of the Romanian bee and avoid the intensive use of chemicals in agriculture [14, 33].

CONCLUSIONS

Apiculture in Romania has good conditions to continue its development taking into account the good race Apis mellifera carpatica well adapted to the variety of flora and pickings in stationary and pastoral, efficient solutions and modern technologies for bee raising and breeding.

The high number of beekeepers and bee families is a guarantee to increase production in the future under the conditions to improve apiary size over 150 bee families.

Also, beekeepers should be aware of the advantages of being members in an association which could protect their interests and help them with advice to increase efficiency along honey market chain.

The development of beekeeping depends on the measure in which the funding coming from the EU and Romanian Government would be efficiently used to grow production and export so that Romania to maintain its position among the top producers and exporters of honey of the EU.

Imports of honey should be reduced or eliminated, as well as fake honey should be identified and the producers and traders punished according to the legislation in force.

REFERENCES

[1]ACA Association of Romanian Beekeepers, http://www.aca.org.ro/, Retrieved November 2, 2018.

[2]Adam, M., 2018, Authentic bee honey/Fake honey. How could we distinguish them? (Miere de albine autentică / miere de albine falsificată. Cum le deosebim), https://www.jurnalistii.ro/miere-de-albine-autentica-miere-de-albine-falsificata-cum-le-deosebim/, Retrieved on November 5th, 2018.

[3]Akdemir, S., V. Karnova, O. Yurdakul and O. Kaftanoğlu, 1993, Economical structure of beekeeping in Adana. Journal of Agricultural Faculty of Cukurova University. 1(1): 17-28

[4]Apicultura ecologica (Organic apiculture), 2018, ACA, Association of Romanian Beekeepers, www.aca.org.ro, Retrieved on November 2nd, 2018.

[5]Apiculture in Romania (Apicultura in Romania), 2018, Wikipedia, https://ro.wikipedia.org/wiki/Apicultura_%C3%AEn_Rom%C3%A2nia, Retrieved on November 2nd, 2018.

[6]Apiculture a profitable business (Apicultura o afacere profitabila), 2017, Jurnalul de afaceri, https://jurnaluldeafaceri.ro/apicultura-o-afacere-profitabila/, Retrieved on November 5, 2018.

[7]Apimondia, 2018, Wikipedfia, https://ro.wikipedia.org/wiki/Apimondia, Retrieved November 2, 2018.

[8]Apis melliferra carpatica, 2018, The Institute dor Research and Development for Apiculture (Institutul de Cercetare-Dezvoltare pentru Apicultura), http://www.icdapicultura.ro/cercetare-dezvoltare/genetica-si-ameliorarea-albinelor/albina-carpatina-apis-mellifera-carpatica/, Retrieved on November 2nd, 2018.

[9]Beekeeping and honey, European Commission, 2018, https://ec.europa.eu/agriculture/honey_en, Retrieved on November 2nd, 2018.

[10]Bees protection and the combat of fake honey in Europe (Protejarea albinelor și combaterea importurilor de miere contrafăcută în Europa), 2018, Actualities. The European Parliament (Actualitate Parlamentul European), http://www.europarl.europa.eu/news/ro/headlines/economy/20180122STO92210/protejarea-albinelor-si-combaterea-importurilor-de-miere-contrafacuta-in-europa, Retrieved November 2, 2018.

[11]Bodescu, D., 2006, Contributions to the work rate-setting in beekeeping. Scientific Papers Horticulture, www.univagro-iasi.ro/Horti/Lucr_St_2006, Retrieved on November 2nd, 2018.

[12]Bodescu, D., Stefan, G., Olariu Paveliuc, C., 2009, The Comparative Profitability of Romanian Apiarian Exploitations on Size Categories, Bulletin UASVM Horticulture, 66(2): 514.

[13]Bogdan, M., 2018, The sustainable rural development, seen by specialists' eyes (Dezvoltarea rurală durabilă, văzută prin ochii specialiştilor), The Village World (Lumea satului), https://www.lumeasatului.ro/articole-revista/ 4686-dezvoltarea-rurala-durabila-vazuta-prin-ochii-specialistilor.html, Retrieved on November 4, 2018.
[14]Caragea, C, 2018, About bees' death and Romanian apiculture (Despre moartea albinelor si apicultura romaneasca), ACC Media channel, https://acc.ro/emisiuni/dialoguri-pentru-sanatate/despre-moartea-albinelor-si-apicultura-romaneasca/, Retrieved on November 2, 2018.
[15]Cauia, E., Siceanu, A., Patruica, S., Bura, M., Sapcaliu, A., Magdic, M., 2010, The Standardization of the Honeybee Colonies Evaluation Methodology, with Application in Honeybee Breeding Programs, in Romanian Conditions, Scientific Papers: Animal Science and Biotechnologies, 2010, 43 (2): 174-178.
[16]Cauia, E., Siceanu, A., Sapcaliu, A., Magdic, M., Chirila, A., Cauia, D., 2009, The evlauation of honeybee colonies using a data base with application in honey bee breeding programmes, Proceedings of Apimondia Congress, Technology-Quality. pp.1-8, https://www.apimondia.com/congresses/2009/TechnologyQuality/Symposia/The%20evaluation%20of%20honeybee%20colonies%20by%20using%20a%20data%20base%20software%20with%20application%20in%20honeybee%20breeding%20programs%20-%20CAUIA%20Eliza.pdf, Retrieved on November 2nd, 2018.
[17]Çiçek, A., 1993, A research on the problems, economical importance and conditions of apiculture in Tokat Province. Gaziosmanpaşa University. Journal of Agricultural Faculty. 10: 150-160.
[18]Commercial societies, Table with acquires and/or honey processors (Tabel cu achizitori si/sau procesatori de miere), 2018, MARD, http://www.madr.ro/programul-national-apicol/lista-forme-asociative/societati-comerciale.html, Retrieved on November 5th, 2018.
[19]Courses of qualification (Cursuri de calificare), 2018, Asociatia Crescatorilor de Albine din Romania, http://www.aca.org.ro/cursuri-de-calificare.html, Retrieved on November 5, 2018
[20]Drăgănescu, C., 2006, Minimization or the interdiction of import of races- a need -the local bee is the best (Minimizarea sau interzicerea importului de rase, o necesitate - albina locală este cea mai bună), Romania apicola no. 8/2006.
[21]Frank, R., 2013, Honey. Food and medicine (Mierea-aliment si medicament), MAST Publishing House, 26-102.
[22]Galatanu, D., 2013, Bees diseases (Bolile albinelor), Gazeta de agricultura, https://www.gazetadeagricultura.info/animale/albine/14928-bolile-albinelor.html, Retrieved on November 5, 2018
[23]Grigoras, M.A., Popescu Agatha, Holeab, C., Chedea, V., Merce, E., Bridging the innovation gap and the management of interdisciplinary project for sustainable development, XXXVII Annual Meeting of European Society for New Methods in Agricultural Research, ESNA, pp.10-14.
[24]Habibullah, M., 1995, An economic analysis of technical efficiency in Beekeeping in Malaysia: Frontier production function approach. The Indian Journal of Economics. 75(298): 407-420.
[25]Honey market presentation, EU Commission, 2018, https://ec.europa.eu/agriculture/sites/agriculture/files/honey/market-presentation-honey_en.pdf, Retrieved Nov.2, 2018.
[26]How much costs to start a business with bees. Avices of a young apiarist for the ones who would like to make profit from beekeeping (Cât te costă să începi o afacere cu albine: Sfaturile unui tânăr apicultor pentru cei care vor să facă profit din creșterea albinelor), 2015, Agrointeligenta, https://agrointel.ro/29389/cresterea-albinelor-pentru-incepatori-profit-din-apicultura/, Retrieved on November 2nd, 2018.
[27]ICDA Institute for Research-Development for Apiculture, 2018, http://www.icdapicultura.ro/, Retrieved Nov 2, 2018.
[28]Importance of apiculture (Importanta apiculturii, Afaceri apicultura), https://www.afacere-apicultura.ro/importanta-apiculturii/, Retrieved on November 2nd, 2018.
[29]Iordache, P, 2015, Why only Apis mellifera carpatica in Romania (De ce doar Apis mellifera carpatica in Romania), Lumea Satului, 18 May 2015, https://www.lumeasatului.ro/.../2256-de-ce-doar-apis-mellifera-carp, Retrieved on November 2nd, 2018.
[30]Levi, E., 2001, Improved Practices and Technology for Beekeeping in the Republic of Armenia for the Beekeepers of Armenia. USAID and DAI-ASAME Project Report. 3 (2001). http://www.armeniaag.org/market_studies/pdfs/beekeeping.pdf, Retrieved on Nov.2, 2018.
[31]MARD, Apicultural associations and federation (Asociatii si federatii apicole), 2018, http://www.madr.ro/programul-national-apicol/lista-forme-asociative/asociatii-si-federatii-apicole.html, Retrieved on November 2nd, 2018
[32]Mihai, A., About 44 % of Romania's population lives in the rural areas. The EU average is 25 % (Circa 44 % din populatia Romaniei traieste in mediul rural. Media UE este 25 %), https://www.zf.ro/eveniment/circa-44-din-populatia-romaniei-traieste-in-mediul-rural-media-uniunii-europene-este-de-25-14918560, Retrieved November 2, 2018.
[33]Mustatea, A., 2014, The genetic fund of the Romanian bee should be protected)Fondul genetic al albinei romanesti trebuie protejat, https://www.agrimedia.ro/articole/fondul-genetic-al-albinei-romanesti-trebuie-protejat, Retrieved on November 2, 2018.
[34]National Apiculture Programmes, EU, 2018, https://ec.europa.eu/agriculture/honey/programmes_ro, Retrieved Nov 2, 2018.
[35]National Programme for Apiculture 2017-2019 (Programul National Apicol, 2017-2019, Ghidul

solicitantului "Sprijin financiar comunitar si national acprdat sectorului apicol" 2017), 2017, http://www.apia.org.ro/files/pages_files/Ghidul_PNA_2017_editia_II.pdf, Retrieved November 2, 2018

[36]National Institute of Statistics, NIS, 2018, www.insse.ro, Retrieved on November 5, 2018

[37]Pîrvuțoiu, I., Popescu Agatha, 2011, Analysis of Romania's Honey Market, Scientific Papers: Animal Science and Biotechnologies, 2011, 44 (2):500-503.

[38]Pocol, C.B., Pop, A.A., 2012, Types of Beekeeping Practiced in the North West Region of Romania - Advantages and Disadvantages, Bulletin UASVM Horticulture, 69(2)/2012, 239-243.

[39]Popescu Agatha, Siceanu, A., 2003, Economic efficiency of various queen bees maintenance systems, Journal of Central European Agriculture, Vol. 4 (2):140-144.

[40]Popescu Agatha, Guresoaie, I., 2003, A high performance integrated beekeeping technology, Journal of Central European Agriculture, Vol. 4 (2):153-160.

[41]Popescu Agatha, Radoi, C., 2003, Economic evaluation of a breeding programme for setting up two high performance bee lines, Journal of Central European Agriculture, Vol. 4 (2):161-166.

[42]Popescu Agatha, 2005a, Research concerning the increase of profitability in Beekeeping by creating commercial apiaries, Bulletin UASVM Cluj-Napoca, Romania, Series Zootehnics and Biotechnologies and Veterinary Medicine, 61:188-192

[43]Popescu Agatha, 2005b, Research on the possibility to increase profitability in an apiary of 50 bee families, Bulletin UASVM Cluj-Napoca, Romania, Series Zootehnics and Biotechnologies and Veterinary Medicine, Vol.61:404-407.

[44]Popescu, A., 2006a, Aspects and trends in the world honey market, Scientific Papers the 35thInternational Scientific Session of Communication, Series, D, Vol. 1, Animal Science, 2006, 245-250

[45]Popescu, A., 2006b, Aspects and trends of honey market in Europe, Scientific Papers the 35th International Scientific Session of Communication, Series, D., Vol. 1, Animal Science, 2006, 251-256

[46]Popescu, A., Chirila, A., 2006, Research regarding the relationship between apiary size and profitability in pastoral apiculture, Proceedings of International Symposium on Apiculture Tulcea, 8- 9 September 2006, p. 101-108

[47]Popescu Agatha, 2010, Considerations on Romania's position in the European and World Honey Trade, Scientific Papers, Series D, Vol. LIII, Animal Science, 2010, 183-188

[48]Popescu Agatha, 2010, Home and Foreign Trade, Dominor Rawex Coms Publishing House, Bucharest, 280-283.

[49]Popescu Agatha, 2010, Study upon the Economic Efficiency of Romania's Honey Foreign Trade, Scientific Papers Series D, Zootehnics, Faculty of Animal Science Bucharest, Vol. LIII: 176-182.

[50]Popescu Agatha, 2012a, Research on Beekeepers Income Estimation based on Honey Production. Bulletin of UASVM Cluj-Napoca, Romania, Animal Science and Biotechnology, Vol.69(1-2):185-191.

[51]Popescu Agatha, 2012b, Research Regarding Apiaries Structure and its Relationship with Honey Production, Bulletin USAMV, Animal Science and Biotechnology, 69(1-2)/2012:332-334

[52]Popescu Agatha, 2013a, Study concerning Romania's honey market trends, Sientific Papers Series (Animal Science Lucrări Ştiinţifice-Seria Zootehnie), Vol. 59, 153-158, http://www.uaiasi.ro/zootehnie/Pdf/Pdf_Vol_59/Agatha_Popescu2.pdf, Retrieved on November 2nd, 2018.

[53]Popescu Agatha, 2013b, Research concerning apiary size, honey yield and beekeepers' income in Teleorman County, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 13 (1):293-299.

[54]Popescu Agatha, 2013c, Research Concerning the Actual Statement of Apiculture in Călăraşi County, Scientific Papers: Animal Science and Biotechnologies, 2013, 46 (1):397-403.

[55]Popescu Agatha, 2016, The effect of Honey Production on Beekeepers' Income. A Study Case in South Muntenia Development Region of Romania, Proceedings of 28th IBIMA Conference Vision 2020: Innovation Management, Development Sustainability, and Competitive Economic Growth, Sevilla, Spain, November 9-10, 2016, 919-934.

[56]Popescu Agatha, 2017a, Bee honey production in Romania, 2007-2015 and 2016-2020 forecast, Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development Vol. 17, Issue 1, 2017:339-350

[57]Popescu Agatha, 2017b, The Intra-Industry Trade in Agro-Food Products - The Case of Romania, Conference Proceedings of 29th IBIMA International Conference, Vienna, May 4-5, 2017, 1261-1278.

[58]Popovici, 1., Marghitas, L., Iliea, M., 2015, Beekeeping enterprises in two European countries; Similarities and differences, Annals of Oradea University, Fascicula: Ecotoxicology, Animal Science and Food Industry Technologies, Vol. XIV/A, 2015, 373-378.

[59]Recognition of the quality of the Romanian honey at the European level (Recunoasterea calitatii mierii romanesti la nivel european), 2015, MADR, http://www.madr.ro/docs/agricultura/programul-national-apicol/2015/recunoasterea-calitatii-mierii-romanesti-nivel-european-update2015.pdf, Retrieved on November 2nd, 2018.

[60]Research-Development (Cercetare-dezvoltare), Institute of Research-Development for Apiculture (Institutul de Cercetare-Dezvoltare pentru Apicultura), http://www.icdapicultura.ro/cercetare-dezvoltare/ Retrieved on November 2nd, 2018.

[61]Romania, Wikipedia, https://en.wikipedia.org/wiki/Romania, Retrieved on November 2nd, 2018.

[62]Sforcin, J.M., Bankova, V., Kuropatnicki, A., 2017, Medical Benefits of Honeybee Products, Evid Based Complement Alternat Med.,

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5440786/, Retrieved on November 2nd, 2018.
[63]Siceanu, A., Sapcaliu, A., Radoi, I., Condur, D., Cauia, E., Pavel, C., 2008, The apiphytotherapy with Proactivator in the veterinary dermatology and surgery Scientific Papers Animal Science and Biotechnologies, Vol.41, 2, 339-344.
[64]Siceanu, A., Cauia, E., Cebotari, V., 2009, A few aspects regarding the high quality bee queens selection and breeding for improving the productivity of the apiaries (Cateva aspecte privind selectia si cresterea matcilor de calitate pentru imbunatatirea productivitatii stupinelor), Part II, Romania apicola, no. 7/2009, p. 4-8.
[65]Siceanu A., Căuia E., 2015, The bee - am unique patrimony for biodiversity (Albina – un patrimoniu unic pentru biodiversitate), România apicolă nr 1, 2015, p. 2-3
[66]Siceanu A, Aldescu, T., Mateescu, C., 2010, Organic Beekeeping in Romania, https://www.apimondia.com/symposia/2010/bulgaria/ORGANIC%20BEEKEEPING%20IN%20ROMANIA%20-%20Adrian%20Siceanu.pdf, Retrieved on Oct 20, 2018.
[67]Sima, M., Popovici, E.-A., Balteanu, D., Micu, D.M., Kucsicsa, G., Dragota, C., Grigorescu, I., 2015, A farmer-based analysis of climate change adaptation options of agriculture in the Bărăgan Plain, Romania, Earth Perpectives, 2:5. https://link.springer.com/article/10.1186/s40322-015-0031-6, Retrieved on November 2, 2018.
[68]Simionescu, A., 2012, Attention to the fake honey (Atentie la mierea contrafacuta), Evenimentul zilei, Retrieved November 2nd, 2018.
[69]Some information and trends in Romanian beekeeping, 2018, http://www.agropuzzle2.bioagro.ro/fisiere/Information%20and%20trends%20in%20Romania%20beekeeping.pdf, Retrieved on November 2nd, 2018.
[70]Ştefan, G., Bodescu, D., Ungureanu, G., 2009, Economic efficiency of beekeeping to dimension classes. Agricultural Management/Lucrari Stiintifice Seria I, Management Agricol, Vol/11, 1.
[71]Tudor, I., 2011, Bees and beekeeping. The beginners' guide (Albinele si albinaritul. Ghidul incepatorului). Gramen Publishing House, 298
[72]Veer Sain, Nain, J., 2017, Economics and Importance of Beekeeping, Department of Agricultural Economics, Haryana Agricultural University, India, https://biomedres.us/pdfs/BJSTR.MS.ID.000561.pdf, Retrieved on Nov.2, 2018.