Scientific Papers. Series D. Animal Science. Vol. LXI, Number 1, 2018
ISSN 2285-5750; ISSN CD-ROM 2285-5769; ISSN Online 2393-2260; ISSN-L 2285-5750

FROM CONVENTIONAL TO ORGANIC AGRICULTURE – ROMANIAN PAST AND FUTURE PERSPECTIVES –

Dana TĂPĂLOAGĂ, Paul-Rodian TĂPĂLOAGĂ, Lucian-Ionel ILIE, Mara GEORGESCU, Dragoș GEORGESCU, Georgeta DINIȚĂ

University of Agronomic Sciences and Veterinary Medicine of Bucharest, 59 Mărăști Blvd, 011464, Bucharest, Romania, Phone: +4021.318.22.66, Fax: +4021.318.28.88

Corresponding author email: drtapaloaga@yahoo.com

Abstract

Organic farming is a sector of great perspective for Romania, due to the fact that it enjoys appropriate conditions for the development of such a system of agriculture, fertile soils and low level of pollution of the countryside, by comparison with the economically developed countries, where super intensive agricultural technologies are used extensively, based largely on chemical fertilizers and pesticides. According to some data from the Ministry of Agriculture and Rural Development, organic products market in Romania is in the full process of development and diversification. The aim of the present study was to analyse and interpret statistical data on the main crops, the evolution of cultivated areas, environment and ecological operators, the main genetically modified plants and the evolution of the areas cultivated with genetically modified organisms in the period 2008-2016 in Romania. Based on the statistical data of the plant sector, for the period 2010-2016, it is now taking shape that ecological agriculture was not a stable sector in Romania, having a constant evolution, in the years of study 2014-2016. Romania has great opportunities for promotion and development of organic agriculture due to the utilised agricultural area of 14.8 million ha and of the soils of unpolluted groundwater.

Key words*: organic farming, genetically modified organisms, certified operators.*

INTRODUCTION

The studies, research and the forecasts show that there is a need for higher production plant and animal both for food humanity in the following centuries (Tăpăloagă, 2017). These productions can be done only by applying technologies well investigated and regulated, based on scientific findings, but with respect to the issues of ethics. Green products have undergone significant development in the past two decades (Ilie, 2018). Care of the nature, the delicacy of natural balance, the multiplicity of diseases with which it faced more often, food without taste, industrial, all of which have led to the formation of a current of the stronger, current who wishes to restore a respect for nature and its protection. The genetically modified organisms may represent a solution to ensure the safety of the food supply, humanity, at the opposite pole being green products on food safety and consumer protection.

MATERIALS AND METHODS

On the basis of the major considerations in the field of organic agriculture, the present work proposed by the theme of study, the pursuit of the two planes, respectively the pros and cons of eco-friendly products and genetically modified organisms, using the technique of analysis and interpretation of official statistics provided by the recognized bodies and institutions (INFOMG, Eurostat, FiBL, FAO, MARD etc.) as well as the information in the magazines, articles, specialized sites, relating to the current situation in the country.

To achieve the aim and objectives of the work, the study was conducted and oriented in different periods of time, following several approaches and objectives at national level, as follows:

- the query, analysis and interpretation of statistical data on the main crops, the evolution of cultivated areas, environment and ecological operators in Romania, in the period 2010-2016;
- the query, analysis and interpretation of statistical data on the main genetically modified plants and the evolution of the areas cultivated with genetically modified organisms in the period 2008-2016 in Romania.

The statistical information on ecological agriculture, processed and presented in this

work has been extracted from the European statistics.

RESULTS AND DISCUSSIONS

The statistical data in Romania shows that, in the range of 2010 - 2016, the main ecological crops were represented by: cereals, meadows and permanent pastures, plants grown for industrial purposes, green plants, crops of orchards and vineyards, dry pulses and protein crops for the production of grain, vegetables, leafy and tuberculiferes (Table 1).

The most spectacular extensions of the cultivated areas (in percentage terms) in the period 2010 -2016, there have been permanent crops to orchards and vineyards (over 250%), followed by the permanent crops of pastures and meadows with 140% and vegetables with about 65%. It should be noted that the only culture where there has been a drop (-200%) of the area cultivated was represented by dry pulses and protein crops for the production of grain tank.

It has been on the rise, and the remaining green area of agricultural land set aside, from 580 ha in 2010, to 356 ha in 2015 (reduction of the surface being this time a positive indicator). Even if we found that, in the range of 2010 - 2016, in general it has recorded an increase of the cultivated areas for all major ecological crops, according to data provided by the MARD, in 2015 the organic cultivated area at national level (245,924 ha) decreased by more than 55,000 hectares in total (Figure 1), as compared to the maximum level recorded in 2013 (301,148 ha).

As regards the number of producers certified in the system of organic agriculture in Romania, has been an ascendant trend during the period 2010-2012, when it has recorded an increase of 123% people in 2012, compared with 2010 (over 350%), after which the evolution was descending throughout the period 2013-2015, amounting to 12,231 certified agricultural producers at the end of the year 2015 (Figure 2).

From the point of view of the counties which worked over 10,000 hectares of land in the organic system in the year 2014, in the top of the first 10 counties, Tulcea County is remarked with the highest agricultural area cultivated, recorded at 49,458 hectares, on the place of the two being Timis County with 19,455 hectares, and in the third place, Suceava with 16,567 hectares, followed, that the major organic areas Galati (14,731 ha), White (14,686 ha), Iasi (13,557 ha), Ialomita (13,205 ha), Bistrita (13,065 ha), Brasov (12,192 ha) and Cluj (12,015 hectares). At the opposite pole, the Valcea County (70 ha) and the Gorj County (91 ha) were the counties with the lowest areas cultivated in green.

By the analysis of the statistical data, in the plant field that is now taking shape, organic farming has not been a stable sector in Romania, with a production progeny, constant in the past few years (Tăpăloagă, 2017).

Special practices for organic farming - subsidies granted by the Ministry of Agriculture during 2017 in Romania, comprise six special packages: agricultural crops on arable land, including fodder - 293 euros/ha/year, vegetables - 500 euros/ha/year, orchards - 620 euros/ha/year, vine - 530 euros/ha/year, herbs and aromatic - 365 euros/ha/year, permanent meadows - 111 euros/ha/year.

The farmers must comply with the special practices for organic agriculture, to implement the commitments by consulting services relating to the identification of the agricultural parcels, to deposit at the time of payment applications.

However, in Romania, although the trend of the consumer by organic products begins to gain ever more land, according to the studies carried out, the consumption of organic products in our country is still very low, less than 2% of the total of foods while in Western Europe media is 3-5%. According to the Association of operators of Organic Agriculture "Bio Romania", approximately 80% of the annual bio products arrive on export, the value of their being of about 200 million euros, these being exported, particularly in Germany, Austria and Belgium (http://www.europabio.org).

The genetically modified organisms have been introduced in Romania in 1998, several varieties of genetically modified soya being cultivated. As regards the Romanian legislation in the field of GMOs, this is the result of the hurried harmonization of the national rules with European Directives.

Table 1. Dynamics of certified operators and cultivated in organic agriculture in Romania (http://www.madr.ro/agricultura-ecologica)

Indicator	2010	2011	2012	2013	2014	2015	2016
Number of certified operators in organic farming	3155	9703	15544	15194	14470	12231	10562
Total area of organic farming (ha)	182706	229946	288261	301148	289251.79	245923.9	226309
Cereals (ha)	72297.8	79167	105149	109105	102531.47	81439.5	75198.31
Dry pulses and protein crops (ha)	5560.22	3147.36	2764.04	2397.34	2314.43	1834.352	2203.781
Tuberous and root plants total (ha)	504.36	1074.98	1124.92	740.75	626.99	667.554	707.026
Industrial plants (ha)	47815.1	47879.7	44788.7	51770.8	54145.17	52583.11	53396.86
Plants harvested green (ha)	10325.4	4788.49	11082.9	13184.1	13493.53	13636.48	14280.55
Other crops on arable land (ha)	579.61	851.44	27.77	263.95	29.87	356.22	258.47
Vegetables (ha)	734.32	914.08	896.32	1067.67	1928.36	1210.08	1175.334
Permanent crops (ha) orchards, vineyards	3093.04	4166.62	7781.33	9400.31	9438.53	11117.26	12019.81
Permanent crops (ha) grasslands and pastures	31579.1	78197.5	105836	103702	95684.78	75853.57	57611.65
Fallow land (ha)	10216.8	9758.55	8810.73	9516.33	9058.66	7225.852	9457.2

Romania is member of most laws in this field - over 25 to the number - governing GMOs in a complicated manner which leaves room for interpretation. Many of these laws have not been the subject of public debate. A more serious aspect and linked to the legislation of the GMO is its implementation.

A concrete example is the way in which Romania has implemented a ban on the genetic modified soya cultivation (Gonciarov, 2014). The National Register of GMOs in 2006 shows that there are numerous cases of missing data. In Romania the legislation allows the cultivation of MON810 hybrid, resistant to the European corn borer. The condition is to obtain an opinion from the Ministry of Agriculture and the observance of a minimum distance of 200 meters from the neighboring conventional crops. Romania has the longest history in the cultivation of genetically modified organisms (GMOs) in European geographic location.

In Romania, the cultivation of genetically modified soya was banned in 2007, when it became EU member state, in the sense that the genetically modified crops aligned with what is allowed in the European space, and at present it is legal to the cultivation of a variety of genetically modified maize.

First commercial crops of genetically modified plants (GM) were introduced in Romania in 1998 (europabio.org).

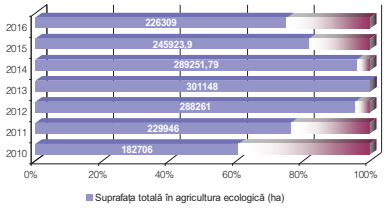

Figure 1. Dynamics of Romanian organic farming areas during 2010-2015 (sources: processed data, after MARD)

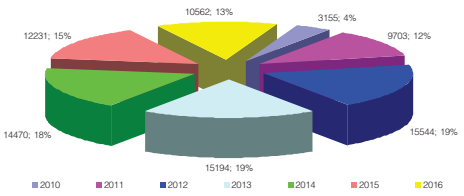

Figure 2. Dynamics of certified operators of Romanian farming during 2010-2015 (sources: processed data, after MARD)

Romania was the first member grower of genetically modified plants in Europe. In the period 1998 to 2007, Romania had the largest crops of genetically modified plants in Europe. It is genetically modified soya what belonged to Monsanto Company and official figures show that in the year 2004 have been grown 5,523 ha with soybean GM, in 2005, 87,600 hectares were cultivated with soybean GM and in 2006 have been grown 137,275 hectares (http://www.ecolife.ro/articole/stiin). Yet, at the same year (2007), Romania has approved tacitly the cultivation for a variety of GM maize with the name of the M0N810

(belonging to Monsanto Company). There have never been carried out evaluation studies in Romania of genetically modified maize in order to see which the effects on the environment or to health are. This genetically modified maize contains (by techniques of genetic engineering) gene from a bacterium from the ground (*Thuringiensis bacillus*) which produce a toxin acting as a pesticide giving the maize resistant to the worm shrilly maize. In Romania maize crops have become a tradition, holding a valuable heritage of traditional varieties of maize. Over 2.5 million hectares cultivated annually with unaltered genetically modified maize are exposed to contamination with genetically modified maize in the future.The evolution of the number of maize growers (companies / farmers) during the post accession shows that they have scaut from 58 in 2008, to 5 in the year 2014. In 2015 the only one authorised grower was a research resort. The evolution of the cultivated with genetically modified maize M0N810 areas between 2007 - 2014, was one swinging drawbar, so, after the top of the year 2008, when Romania is growing approximately 6000 ha, this has been in continuous decrease in the period 2008 to 2012, and then to register again an increase in the years 2013 and 2014 (over 700 ha), and at the level of 2015 it was noted that the cultivated area was of 2.5 ha. A map of the counties which worked the GM corn in 2008 (6,130 ha), shows that there were outlined 4 large areas in the country, concentrates in 17 counties, in the top of the cultivator counties being Calarasi county (2,278 ha), Braila (1,512 ha), Timis (867 ha) and Arad (318 ha) (www.madr.ro/culturi-de-camp).

Progress is favorable, so that at the level of the year 2014, the cultivated area has dropped to 770 ha in total, being cultivated only in 4 counties: Timis, Calarași, Arad and Neamt, the trend being maintained in the following period, therefore, in the year 2015 it was recorded an area of 2.5 ha, only in Neamt county, and the grower was a research resort, not a farmer (Figure 3). Scientists have said with much conviction that there is an imminent risk that the genetically modified crops cultivated on a large scale, to contaminate organic crops on large area. The campaign „Area without genetically modified organisms" started in Romania in 2006. It is a concept developed at world level by many non-governmental organizations, local authorities and institutions. What means areas without genetically modified organisms? The concept of "Area without genetically modified organisms" refers to a public statement which shows the position of the various decision-makers in the society with regard to the use of GMOs for cultivation, either for consumption (http://asociatia.bio.)

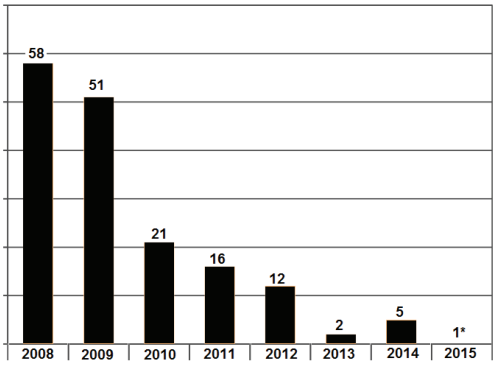

Figure 3. Situation of MON810 Romanian operators (https://infomg.ro/web/ro)

By declaring a zone without GMOs, they may not be prohibited de facto, this statement is a democraticall way to put pressure on the authorities at the central level, for a ban on the use of the genetically modified organisms in agriculture (cultivation) and in the food chain (the placing on the market of genetically modified organisms for human and animal consumption). Although local authorities benefit from local autonomy, they may not prohibit legal cultivation or consumption of genetically modified organisms due to the fact that the European legislation does not permit the implementation of statutory audits of such decisions. Also, the concept of zones without GMOs, promote sustainable agriculture, respecting the precautionary principle covered by the Protocol biosecurity levels of Cartagena, environment and health of consumers.

In Romania there are at present 72 local authorities (Bistrita Nasaud, Cluj, Sibiu, Brasov and Valcea County) and 24 restaurants (in Bucharest) who have declared public areas without GMOs, which have signed a declaration of intention, these statements do not have the force of law but represents the

positions taken by which it is requested the government to prohibit the journal cultivation and use of genetically modified products in Romania. An important role in the establishment of new areas without GMOs is played by the local action groups (lags) which represent a local partnership with the members from different sectors of the socio-economic: local mayors, non governmental organizations and the private sector (www.infomg.ro /web).
The inclusion in the strategy of sustainable development, by declaring a micro regions as Area without genetically modified organisms direct and indirect benefits of the area under the administration of Local Action Group, at the same time as the solution for sustainable agriculture for our generation and future generations. The quality of the products is always a proof for the food safety, meanwhile the health of the population (Ilie, 2017).

CONCLUSIONS

Organic farming should be regarded as an integral part of a sustainable way of agricultural production, and at the same time as a viable alternative to traditional agriculture, by the fact that focuses on the use of resources and the recycling of the unconventional restituind soil nutrients. The specific production techniques used in organic farming systems to which shall be added to the yields something less than in conventional systems are that the price of production to be something higher. As such, whether in developed countries they are accessible to the majority of the population and, in the least developed countries, where it is still important quantitatively appearance of food, green products are accessible to the segment of consumers with financial possibilities over the average population.
With the further development of ecological agriculture it is noted the increasing quality of its existence, and at present the specific activities of organic farming is a professional concern with well determined concrete boundaries and rules.
In the analysis of the statistical data of the plant sector, for the period 2010-2016, it is now taking shape that ecological agriculture was not a stable sector in Romania, having a constant evolution, in the years of study 2014-2016.
Romania has great opportunities for promotion and development of organic agriculture due to the utilised agricultural area of 14.8 million ha and of the soils of unpolluted groundwater.
The market of organic products has developed quickly, noting the annual rate of growth of level shall be worth about 20 billion euros which represents, forecast, a market share of 1.5% of the food market as a whole. The data on the share of the surface of the organic matter in the total utilised agricultural area, provided by the statistics (crops and the production of statistics on the use of land) shows that the indicator result, is one of the "sustainable development", whereas the total eco-area and the number of ecological operators continues to rise in both in Europe and worldwide.
In the past two decades, the genetically modified organisms have been one of the most controversial fields of science and the genetic engineering applied in agriculture is based on a simple understanding of the biological systems. Genetically modified is still not equivalent to genetically improved, the impact of the genetically modified organisms may be both positive and negative, both on humanity, as well as the environment. The genetic modification constitutes an attempt of humanity, science to develop products better, more resistant in time and against harmful factors, a look to the future and evolution, in order to improve the status of the social and economic problems. In order to feed the whole planet, about 9 billion people, the world population estimated by the UNO for the year 2050, the manner in which mankind farming should change and biotechnology may represent one of the mechanisms for this change, generating a higher production with a lower power consumption of resources, fertilizer, herbicides and pesticides. In Romania, the statistical data shows that, in the period 2007-2016, development in the cultivated with genetically modified maize MON810 areas, was one swinging drawbar, and after the peak in the year 2009, when there were grown about 6000 hectares, in 2015 it was registered 1 single grower with 2.5 hectares. The problem raised by the genetic engineering is particularly important, especially in the case of Romania, whose eco-tourism potential is based in particular on the conservation of

biodiversity of the country. In addition, the Romanian Government sustains the organic farming, by granting subsidies to farmers and organic farming and that based on the GMOs are incompatible.Supporters of biotechnologies and genetic engineering claim that genetically modified organisms "there are not more risky than conventional technologies to increase the plants' while the challengers claim a real ecologist movement. The quality of the products is a conclusive argument for the health of the mankind and in the category of "quality" may be included the green products, classified as "premium".

REFERENCES

Gonciarov Magdalena., Neagu Iuliana, Tăpăloagă Dana, 2014. Principles and standards of organic agriculture, Journal of Biotechnology, vol.185, S76, ISSN 0168-1656.

Ilie L.I., Tăpăloagă Dana. 2018. Conceptul de agricultură ecologică şi standardul IFOAM. Editura Ex Terra Aurum, Bucureşti, ISBN 978-606-8817-72-9.

Ilie L.I., and col. 2017. Assessment of the quality and safety of raw milk obtained in organic farming. Current Opinion in Biotechnology, Journal of Biotechnology, Volume 256, Supplement, S67-S68. doi.org/10.1016/j.jbiotec.2017.06.1029.

Ilie L., I. 2017. Organic agriculture - the guarantee of food safety and population health - Scientific Works. Series C. Veterinary Medicine, Vol. LXIII (2). PRINT ISSN 1222-5304, ISSN-L: 2065-1295, ISSN CD: 2343-9394, ISSN online 2067-3663, Bucharest.

Tăpăloagă Dana, Tăpălpagă P-R, 2017. Study regarding animal organic farming in Romania - current status and trends, Scientific Papers. Series D. Animal Science. Vol. LX, ISSN 2285-5750; ISSN CD-ROM 2285-5769; ISSN Online 2393-2260; ISSN-L 2285-5750.

http://www.madr.ro/culturi-de-camp.html.

https://infomg.ro/web.

http://www.europabio.org.

http://asociatia.bio.

http://www.ecolife.ro/articole.