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Executive Director's Allocution

*Bioterra University's „**Bulletin Of Scientific Information**" being at the XXIV consecutive edition, it is a genuine information and introduction platform of the very recent and valuable agricultural and connected sciences (food industry, agro-tourism, ecology, agricultural economics a.s.o.)*

This say I welcome our bulletin's co-workers, prestigious academic names of whose papers are in the selection done by our bulletin scientific board.

*Because the limited editorial space we were forced to select for this edition only a part of the valuable papers presented at the Scientific Symposium of international participation „**Rural Development of Agriculture by Agro-tourism, consumer and environment protection in compliance with the national and international legislation** " organized in our University in the period 18-20 October 2012 at Focsani.*

Many thanks to our co-workers from prestigious universities and institutions from all over the world, who accepted the invitation to participate at the international conference, co-workers with whom we have a close collaboration and mutual support concerning the development and ongoing of some joint research project of general interest.

I do wish to the Bulletin many and consistent editions.

Prof. Floarea Nicolae, PhD
Executive Director of the Bioterra University of Bucharest

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BULLETIN OF SCIENTIFIC INFORMATION

ANNUAL GLOBAL DYNAMICS OF CHERRY CULTURE PRODUCTION PERFORMANCE IN THE FRAMEWORK OF AN INTEGRATED FOOD CHAIN MANAGEMENT

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Abstract: *After the recent overcome of the 7 billion inhabitans limit of our planet and after the very recent World Conference for Sustainable Development, also known as RIO + 20 (20-22 of June, 2012, 19) the complex issue of the food safety comes back with intensity in the economic, social, and ecologic present of the civil society.*
The Ministry of Environment and Climate Change, Mrs. Rovana Plumb had on June 21st2012 a workshop with Mrs. Marta Szigeti Bonifert, the Executive Director of the Regional Environment Centre for Central and Eastern Europe (REC). They were raised several issues regarding the development of cooperation between the Ministry of Environment and Forests and REC, an international organization that has the mission to support the environmental issues management. The discutions focused on two main topics of Romania – REC collaboration: green economy and ecological education.
„Concerning the green economy it was agreed the priority of development in the next period of a similar pattern with the Great Britain's, the European leader in this field. A course of action will consist in the strenghtened collaboration with the General Directorship for Climate, Environment, Regional Development and Agriculture of European Commision, so that to be identified financial instruments to promote some projects" (source: http://www.postdoctorat.ro/Documente/2012-06-22_comunicate_ministruconferintarioplus .pdf).

Key words: *cherry, international trade, cherry production*

Introduction

The basic ideea of this scientific paper was sugested by a recent PhD thesis presented at the oldest worldwide university, irrespctively the one from Bologna, by Giaime Berti (1), where it is approached the modern concept of territorial capital.
So, the valuation of food and ambient potential from different ecozones with diversity in eco-pedological favorability, must permanently connected through an integrated management.
Essentially, the soil can be capitalized through performant management and efficient marketing only if it is inteligently correlated to all the other main form of territorial capital, as like the human capital, cultural capital, social capital, economic capital, financial capital, lanscape capital.
In this framework we consider that the

dinamics of the annual world cherry productions, depending on the national performance dynamics of the first 20 countries from the ranking of Food and Agricultural Organization – F.A.O. (18), must be approached as a very usefull data base for a sustainable development of the favourable ecozones for cherry culture worldwide, only in the framework of an integrated managemetn of the territorial capital.

Materials and methods

The research of this scientific paper are a part of the PhD thesis of the first author (Mihaela Rusu, 11) connected to the modern concept dimension of territorial capital (Van der Ploeg, 13).
Out of the F.A.O. official statistics they were taken the annual productions published for the period 2006-2009 for the cherry productions of the first 20 countries from the point of view of two main features, irrespectivelly value in thousand dollars and production in thousand tones.

Results and discussions

The obtained results are synoptical presented in the Tables 1 and 2 and Diagramms 1, 2, 3, and 4, where they are emfasized the following:
a) World multiannual production of the first 20 cherry producers countries was in average of 59,593 t, rangind between 53,086 t (year 2006) and 64,863 t (year 2009).
b) World multiannual production of the cherry production (in dollars) for the period 2006-2009 was of 36,388, ranging between 32,415 (year 2006) and 39,606 (year 2009).
c) Eventhough it benefits of a real potential of global performance for cherry productions, unfortunetly our country is not in any rank shown in the Tables 1 and 2, that ask for an approach of this inapropriate situation for Romanian potential in the technical – inovative framework promoted by the modern concept of territorial concept. (according to the ideas emfasized at the begining of the scientific work).

Conclusions

World cherry production of the first 20 countries in the period 2006-2009 was of 4,767,424 t, worth 2,911,050 dollars. So that it constantly exists an increase in the retail market at the national and international level based on the specific nutrient intake in the diet of people.
In the context of the new global and periodic crises, the economic-financial and food topics are fundamental fields that need inteligent solutions for a sustainable development.
Therefore, in this context, the national cherry production, with a multiannual average of 59,593 t for the period 2006-2009 and an average income of 36,388 dollars for the ranking of the first 20 countries, are economic and bioeconomic sustainbale and long term profitable investments by the integrated management of the territorial capital.

Table 1:
World ranking of the first 20 cherry producers countries depending on quantities and values

World cherry production in the years 2006 and 2007							
Position	Producer countries	2006		Position	Producer countries	2007	
		Production (thousand t)	Value (thousand dollars)			Production (thousand t)	Value (thousand dollars)
1	Poland	194,928	119,027	1	Russian Federation	250,000	152,655
2	Russian Federation	122,000	74,495	2	Turkey	180,917	110,471
3	Turkey	121,499	74,189	3	Ukraine	134,600	82,189
4	United States	119,658	73,065	4	United States	114,850	70,129
5	Ukraine	95,600	58,375	5	Poland	107,651	65,734
6	Serbia	80,510	49,161	6	Serbia	99,893	60,996
7	Iran	68,000	41,522	7	Iran	87,000	53,124
8	Hungary	60,177	36,745	8	Hungary	42,571	25,994
9	Belarus	46,889	28,631	9	Belarus	30,060	18,355
10	Germany	37,143	22,680	10	Germany	28,756	17,559
11	Uzbekistan	21,382	13,056	11	Uzbekistan	22,000	13,433
12	Azerbaijan	18,029	11,008	12	Azerbaijan	17,100	10,441
13	Republic of Moldova	15,141	9,245	13	Republic of Moldova	14,193	8,666
14	Denmark	14,000	8,548	14	Albania	13,000	7,938
15	Albania	13,600	8,304	15	Denmark	13,000	7,938
16	Czech Republic	10,955	6,689	16	Czech Republic	8,723	5,326
17	Italy	6,800	4,152	17	Macedonia	7,034	4,295
18	Macedonia	6,037	3,686	18	Italy	7,000	4,274
19	Austria	4,866	2,971	19	Croatia	6,614	4,038
20	Croatia	4,514	2,756	20	Austria	5,813	3,549

Table 2:
World ranking of the first 20 producer countries of cherry depending on quantity and value

World cherry production in the years 2008 and 2009							
Position	Producer countries	2008		Position	Producer countries	2009	
		Production (thousand t)	Value (thousand dollars)			Production (thousand t)	Value (thousand dollars)
1	Poland	201,681	123,150	1	Turkey	192,705	117,669
2	Turkey	185,435	113,230	2	Poland	189,220	115,541
3	Russian Federation	157,000	95,867	3	Russian Federation	170,000	103,805
4	Ukraine	129,200	78,892	4	United States	160,118	97,771
5	Iran	106,461	65,007	5	Iran	109,546	66,891
6	United States	97,250	59,382	6	Serbia	105,353	64,330
7	Serbia	89,746	54,800	7	Hungary	78,752	48,087
8	Hungary	68,155	41,616	8	Ukraine	70,000	42,743
9	Belarus	44,599	27,233	9	Belarus	54,686	33,392
10	Uzbechistan	25,000	15,265	10	Germany	30,236	18,462
11	Azerbaijan	18,530	11,314	11	Uzbechistan	27,000	16,486
12	Republic of Moldova	15,393	9,399	12	Republic of Moldova	21,000	12,823
13	Germany	14,911	9,104	13	Azerbaijan	20,703	12,641
14	Albania	14,083	8,599	14	Albania	15,379	9,390
15	Denmark	13,837	8,449	15	Denmark	12,746	7,782
16	Macedonia	8,832	5,393	16	Macedonia	8,684	5,302
17	Czech Republic	7,530	4,597	17	Czech Republic	8,630	5,269
18	Italy	7,500	4,579	18	Italy	8,000	4,884
19	Croatia	6,665	4,069	19	Canada	7,518	4,590
20	Canada	5,860	3578	20	Croatia	6,977	4,260

Diagramm 1
World ranking on countries concerning the cherry production in 2006
(in thousand tones and thousand USD)

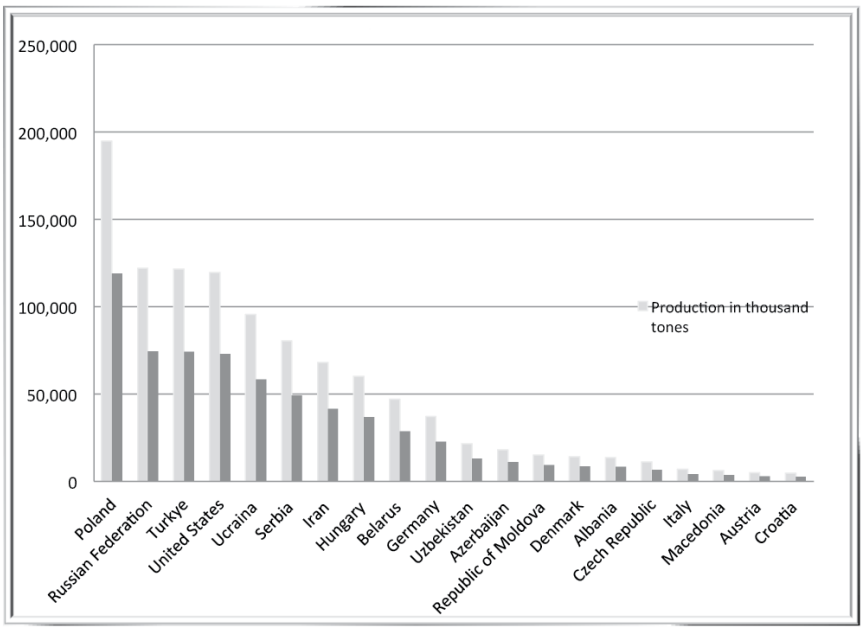


Diagramm 2
World countries ranking concerning the cherry production in 2007
(in thousand tones and thousand USD)

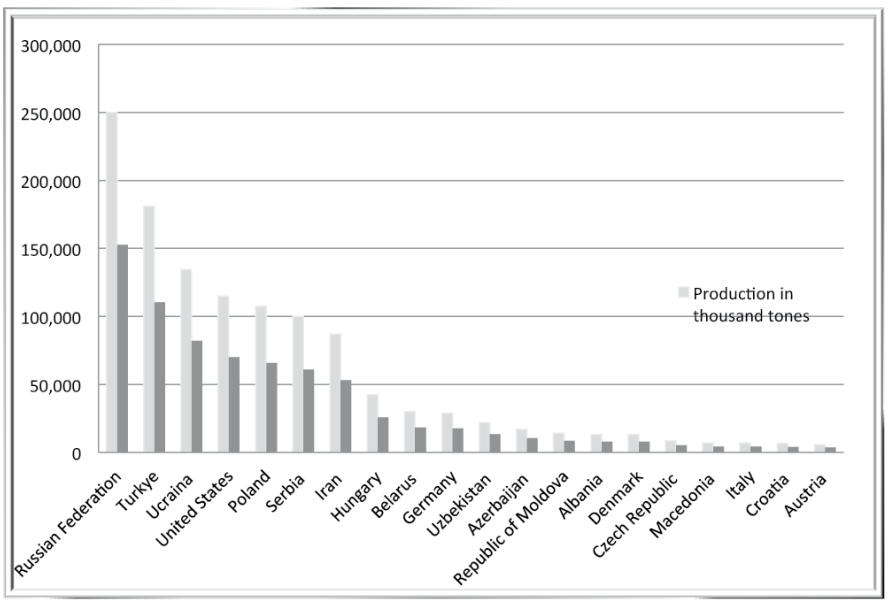


Diagramm 3

World countries ranking for cherry production in 2008 (in thousand tones and thousand USD)

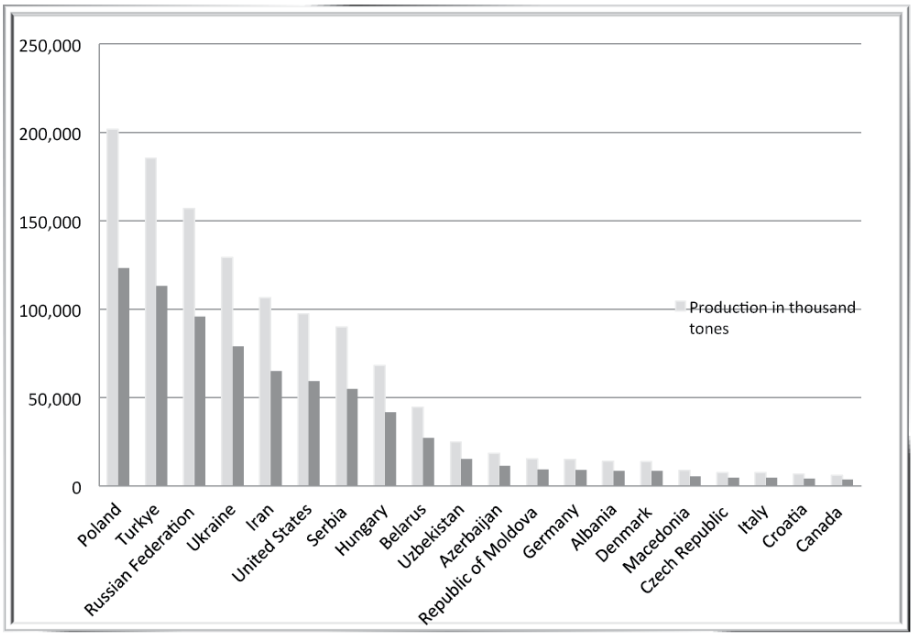
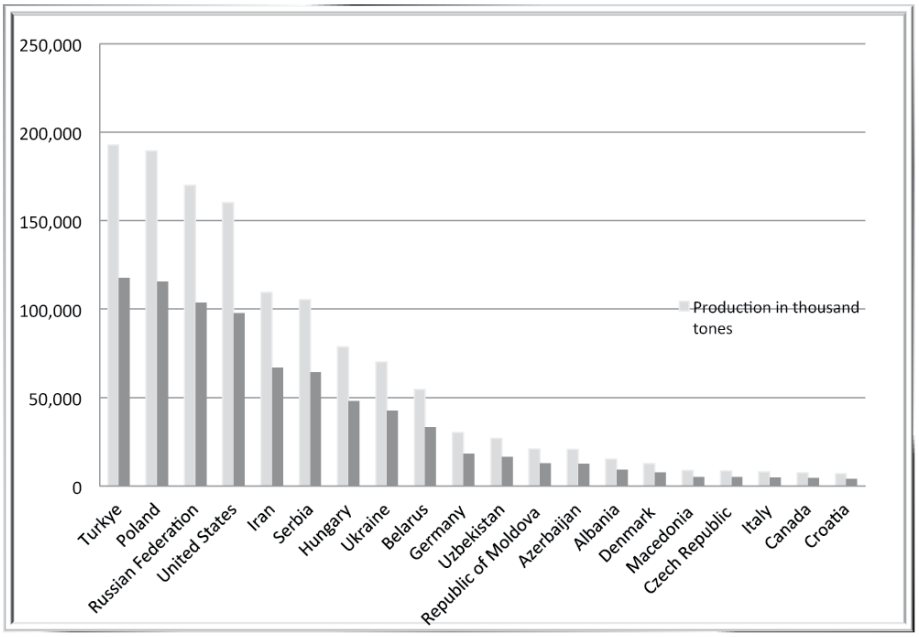


Diagramm 4

World countries ranking for cherry production in 2009 (in thousand tones and thousand USD)



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ASSESSMENT OF OVERGRAZING ON DEGRADATION OF SLOPING SOIL

Bondi, G. [1], *Peruzzi, E.* [2], *Macci, C.* [2], *Doni, S.* [2], *Masciandaro, G.* [2] *and Pistoia, A.* [1]
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Abstract: *Overgrazing, particularly on slopes, can cause significant alterations in soil quality, determining a greater vulnerability to soil erosion. The aim of this work was to assess the influence of horse overgrazing on sloping (20%) soil properties. Chemical and biochemical parameters have been determined in order to evaluate soil quality.*
A significant decrease in nutrients was observed after one year. The trend of enzyme activities highlighted a reduction of metabolic processes. However, after one year of resting land, an improvement of soil quality could be noticed by the restoration of the initial level of enzymatic activities.

Key words: *degradation, soil, italian territory, β-glucosidase activity*

Introduction

The Italian territory because of its morphological characteristics is vulnerable to erosion and hydrogeological disruption. Many factors contribute, interact and accelerate the degradation process of semi-arid grasslands. For example, the impact of management strategies on bearing capacity and grassland degradation is not adequately understood at present. This is due to the fact that depending on climatic conditions, soil type and vegetation structure contradicting results have been obtained (Schneider et al, 2008).
Due to these external agents of interference, the soil may undergo a degradation process which causes a regression from a high quality level to low quality one, reaching the total loss of the soil's biological potential and its resilience. In some cases, grazing intensity had an impact on ecosystem performance (Schneider et al, 2008). The over-utilization of pasture (overgrazing), particularly on sloping soil, besides the loss of vegetation and changes in floristic composition, can cause significant alterations in the physical, chemical and biological soil characteristics, thus determining a greater vulnerability to soil erosion.
A rational management of agro-silvo-pastoral systems is therefore important in hilly and mountainous lands with rocky soils and steep slopes, such as the Mediterranean areas.
The aim of this work was to assess the influence of horse overgrazing on the soil properties which, on the bases of its morphological and climatic characteristics (high slopes, intense rainfall), could be more subjected to degradation processes.

Materials and methods

The research was carried out in Pugnano, San Giuliano Terme municipality, located in central-west of Italy. This is an area characterized by a sub-mountain environment, with a slope of 20%. The high average declivity of choosing area make it prone to substantial erosion. In this area, a plot characterized by spontaneous grassing, balanced by the botanical point of view and never subjected to agronomic interventions was fenced.

Top soil samples (0-15 cm) were collected randomly from the plot, after one year of continuous grazing horse with high animal density (T1), and after one year of resting land (T2). In the same time, as control, samples were taken on a undisturbed plot nearby and never subjected to grazing. On the samples, analyses focused on chemical and biochemical parameters were carried out.

The analyzed chemical parameters were the following: Total Organic Carbon (TOC) was evaluated by an elemental analyzer RC-412 MULTIPHASE CARBON, and Total Nitrogen (TN) was assessed by an elemental analyzer FP-528 PROTEIN/NITROGEN DETERMINATOR.

The biochemical parameters were the following:

- The Dehydrogenase anzyme activity was evaluated by Garcia et al., 1993 method.
- The β-glucosidase anzyme activity was evaluated by Garcia et al., 1993 method.
- The Urease anzyme activity was evaluated by Nannipieri et al., 1980 method.

The reported results are the means of determination made on three replicates.

Results and discussions

The organic matter content, expressed as Total Organic Carbon (TOC%) and Total Nitrogen (TN%) (Fig.1, 2), decreased in the soil interested by grazing with respect to the control soil. The high animal density caused the complete removal of grass soil coverage (roots, leaves, small branches, etc.), which has been eaten by horses, and the compaction of soil due to trampling activity. The absence of a vegetation cover may have prevented the restoration of soil organic matter content; the role of plants on the C sequestration by means of root exudates and plants remains has been, in fact, extensively discussed in a wide variety of soil ecosystems (Garcia et al., 1997; Pistoia et al., 2010)

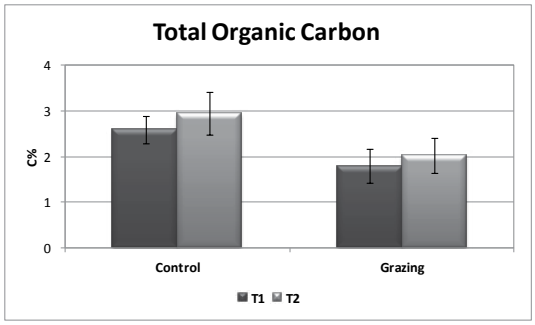

Figure 1:Trand of Total Organic Carbon (TOC %)

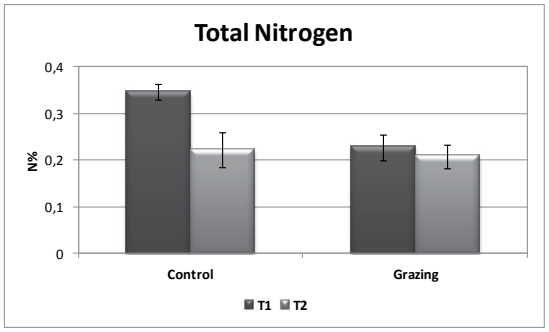

Figure 2: Trand of Total Nitrogen (TN %)

After one year of resting period in grazed soil the values of these chemical parameters did not change significantly, suggesting the inability of the soil to recover the initial level of its organic matter.

Enzymes are biological catalysts of essential processes in the life of microorganisms, and their measurement may be useful when studying the level of bioactivity in a soil (Nannipieri et al., 1990). Soil microbial activity is commonly expressed by dehydrogenase activity (DH-ase) as suggested by Garcia et al. (1993). This enzyme has been proposed as a valid biomarker of soil quality under different agronomic practices and climate (Ceccanti et al., 1994).

In the present study, dehydrogense activity decreased in the grazing soil with respect to control. Soil compaction and nutrient removal, being the two more evident disturbances caused by overgrazing, can be the reason of this trend. Many studies have found that soil compaction may cause oxygen deficiency which then affect the activities of enzymes such as dehydrogenase (Jordan et al. 2003). Moreover, it is well known that soil dehydrogenase activity is correlated to organic matter content (Nannipieri et al. 1990).

Furthermore, plant roots have many important functions in the stimulation of the microbial metabolism, providing a carbon source for microorganism activity and oxygen transfer from air to the soil (Yu et al., 2006).

At T2, after one year without disturbance, the value of dehydrogenase activity in grazing soil increased, even though at lower value than the control soil, thus demonstrating the tendency to recover the soil functionality.

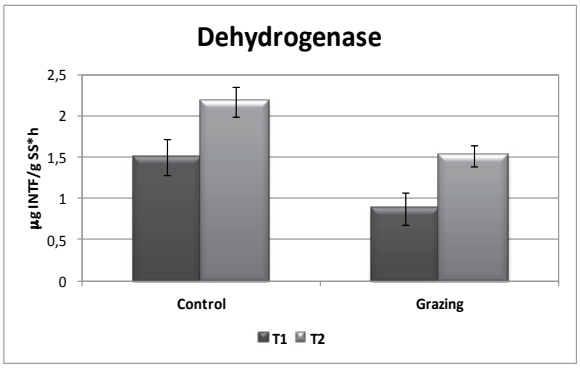

Figure 3: Trand of dehydrogenase enzyme activity

Together with dehydrogenase activity, other enzymatic activities, which indicate the potential of a soil to carry out reactions of vital importance for the cycling of elements were studied. β-glucosidase and urease enzymes, important indicators of the activation of carbon and nitrogen cycles, respectively (Fig.4, 5), followed the trend of dehydrogenase; a decrease in these activities were well evident in grazing soil with respect to control.

These results are in agreement with Bastida et al. (2006) where, higher values of hydrolases involved in the N (urease) and C (b-glucosidase) cycles, were found in presence of a vegetation cover. Garcia et al. (2005) suggested that the rhizosphere induces the synthesis of such enzymes. Moreover, the scarcity of C and N inputs in the grazing soil may be responsible for the lower values of β-glucosidase and urease activities. This is in agreement with Hayano and Tubaki (1985), who indicated that lower C inputs decrease enzyme synthesis. However, after one year of resting land, an improvement of soil fertility was noticed by the increase in these hydrolytic enzyme activity.

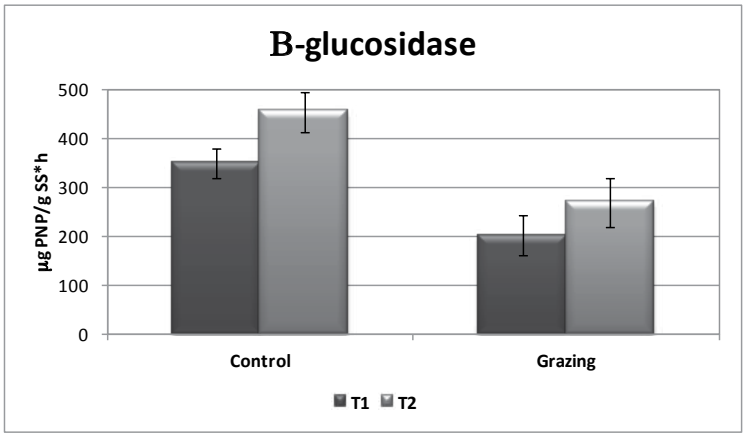

Figure 4: Trand of β-glucosidase enzyme activity

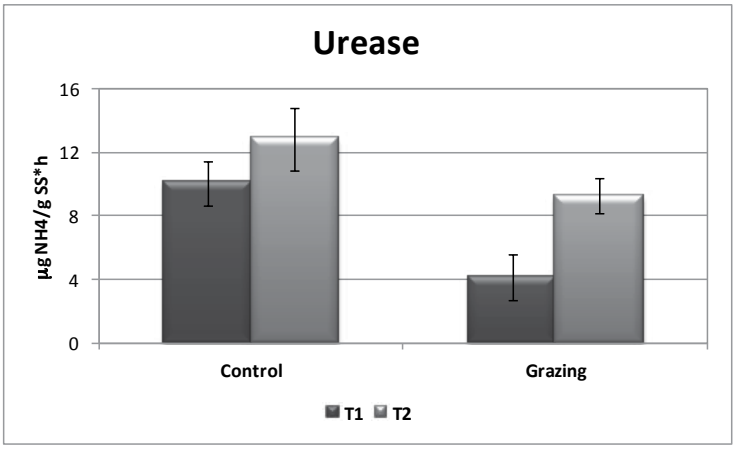

Figure 5: Trand of urease enzyme acivity

Conclusions

The problem of soil degradation by overgrazing is a significant environmental issue.

The tested parameters have been able to reflect the evolution of soil chemical and biochemical properties. The results showed that the soil damage is closely related to the content of organic matter and enzyme activities. The horse grazing was responsible of the loss of soil C and N content with respect to the control soil through compaction by animal trampling and plant coverage removal. Due to these degradative processes, a reduction in enzyme activities associated to the nutrient cycles were shown. After one year of resting land, an improvement of soil chemical and biochemical properties was observed, even though partially reaching the initial soil conditions. A rational management adopting a grazing round to protect the soil characteristics, can solve some problems linked to the disturbance of overgrazing.

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EVALUATION OF THE SUSTAINABILITY OF DAIRY GOAT SYSTEMS IN TUSCANY

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Abstract: *The sustainability of animal production systems should be understood as a complex concept, multidisciplinary, dynamic and temporal, and has been recommended by FAO to detect the most relevant properties and the tendency of changes of these systems. Studies have emphasized the reduction in the number of sustainability indicators and the importance of using other indicators rather than technical and economic ones. Another important point is to integrate these indicators into a single index, which is capable of reflecting the evolution of the system and its sustainability.*
The production of goat milk in Tuscany is based on the use of natural pastures and has been stimulated by the value of cheese, however, there is no tradition of production as in other European countries and these systems have been developed and deployed to other marginally productive systems and agrotourism.
The objective of this study is to evaluate some aspects of sustainable production of goat milk in Tuscany, taking into account indicators such as: socioeconomic, animal welfare, human development, participation in cooperatives, the presence or no certification, and conservation of natural resources and environmental conservation in order to integrate all of them into a global sustainably index (Sg).

Key words: *dairy goat systems, goat milk, Tuscany region*

Introduction

The animal production systems have to be sustainable for continue functioning for future generations and, therefore, should be accessed for that. Sustainability is a complex subject, temporal and comprises a multi-dimensional approach which depends heavily on the researcher maturity and understanding. Its assessment should be based on a matrix of sustainability attributes as productivity, stability, resilience, reliability, adaptability and equality and indicators related to productive, economic, social, cultural, institutional, political and ecological aspects. They should be used to detect most relevant proprieties in the animal production systems and their tendency to change (Massera et al., 2009; Nahed-Toral J.et al. 2006, Peacock and Sherman, 2010). However, these indicators should be analyzed in an integrated way for the calculation of a single sustainability index what can facilitates the use of complex information by non-experts (Castoldi and Bechini, 2010).

Materials and methods

Population and population growth are major determinants of the demand for food and livestock products. However, there is an increasing of the consumers' conscience about the importance of health aspects, environmental issues and ethical issues and the European programs recognize the importance of livestock to reach such demands.

Regarding to heath aspects related to the consumers, they are focusing not only on the traditional nutritive value of the food but also on the increase of some nutrients and on nutracuetics properties.

Tsiplakou et al. (2010) have shown that organic milk production system of goat and sheep have a higher nutritional value than conventional systems and Silanikove et al. (2010) emphasized the importance of milk goat for use as a nutritional source for infants and children and as a medicinal food.

In relation to environmental issues, goats have been blamed, wrongly, as a responsible for devastating areas considered non-degraded and responsible for overgrazing, soil degradation and deforastation. Overgrazing cause changes in the structure of vegetation associated with decreased coverage of shrubs and herbaceous species increased (Arevalo et al., 2011). However, many studies show that livestock can improve soil, vegetation and biodiversity of fauna and flora. And the trampling can stimulate grass tillering, improve seed germination and break-up hard soil crusts when animals are properly managed (Steinfeld et al., 2006). Goats managed extensively with a correct stocking rate, have been seen as architects of the vegetation producing heterogeneity and the establishment of natural vegetation mosaics, therefore, could help increase the diversity of habitats (Malta, J. et al., 2010). In terms of ethical issues, a major one is for the better animal welfare.

The Tuscany region has a tradition based primarily on sheep cheeses (Tuscany pecorino) with DOP, with a strong consumer market. However, goat production systems in Tuscany have been stimulated by the use of natural pastures and for increasing typical production and value (as a gourmet food), the preservation of the native germplasm, for its social and environmental role, by protecting rural land and promoting biodiversity.

Most recently, a zootechnical overview has been performed on the Italian native goat population named "Garfagnina" which is registered on the Tuscan regional repertory of genetic resources at a risk if extinction (Martini, M. et al. 2010). The most of garfagnina flocks are located in the hills and mountains of the northwestern Tuscan Apennine area, generally managed by family farm and regarding to feeding systems, are semi-extensive and represent one of the main sources of income for the majority of breeders (Corrias, F. et al., 2012).

Results and discussions

In the world there are about 750 million goats due to their ability to provide high quality food under diverse climatic conditions and resilience to extreme and capricious environments (Silanikove et al. 2010). The majority of goats in the world are kept in extensive and semi-intensive systems in many cases using management techniques that have not changed much for many generations. The goats can be seen on marginal rangelands that cannot be cultivated or used for other agricultural purposes.

Intensive systems can also be found in Europe and United States (Peacock and Sherman, 2010).

The goat extensive production systems depend mostly on the rainfall for adequate forage, these flocks are generally low producing in terms of milk and offspring but well adapted to the climatic conditions and relatively tolerant of local diseases (Degen, A.A. 2006).

In Tuscany, the most of dairy goat production systems are semi-extensive, out of winter when they are housed; the animals are in the pasture during day-time and receive concentrate at the barn. There is a great variation in production performance among breeds (Haenlein, G., 2007) and feeding systems, and therefore an enormous potential of genetic improvement because of the relatively high heritability of this traits.

The study of the sustainability of the goat production systems in Tuscany can help to elucidate the main strength and weakness of these systems in order to support government for specific policies. The research was taken place at the Tuscany region, central Italy, between parallels 43° and 11 ° N and meridians 25 and 11 W, which has an area of approximately 22,993 Km2.

Hills make up nearly two-thirds (66.5%) of the region's total area, and mountains of which the highest are the Apennines, a further 25%. Plains occupy 8.4% of the total area, mostly around the valley of the River Arno.The climate is fairly mild in the coastal areas, and is harsher and rainy in the interior, with considerable fluctuations in temperature between winter and summer, giving the region a soil-building active freeze-thaw cycle.

Conclusions

30 farms were selected related to dairy goat systems: 14 traditional production systems, 13 organic farms, 2 biodynamic production system and 01 social system. The information was obtained through collection of primary data from a structured questionnaire with direct interviews with the producers. The interview questionnaire included 100 questions relative to a general description of farm characteristics and overall management practices, and included information about: farm location and land use, flock size and structure, feeding management, reproduction and breeding strategies, labor force, production, health, economic, strength and weakness points of the farm, presence or absence of certification and succession of the farm.

Based on Castoldi and Bechini (2010) the indicators should describe a large variety of sustainability aspects and its values are first converted into a sustainability score (Si; 0–1) applying continuous non-linear sustainability functions that use thresholds defining what is sustainable, unsustainable, or intermediate.

They obtained 15 values of Si per each field, which they aggregated into Sg using indicator-specific weights provided by different stakeholders. This procedure permits not only the single indicators evaluation, but also to combine indicators for an assessment of systems at field level.

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PROTECTION AND RESTORATION OF NATURAL ENVIRONMENTS THROUGH SUSTAINABLE AGRICULTURE APPROACHES

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Abstract: *Intensive agriculture has resulted in the loss of biodiversity and the specialized flora and fauna associated with natural environments, particularly wetlands. Landscape change has been another environmental development speeded up by the common agriculture policy, as a consequence of the intensification of agriculture. The destruction of hedgerows, stone walls and ditches and the drainage of wetlands has contributed to the loss and fragmentation of valuable habitats. Intensification in certain areas has led to an excessive use of water resources and to increased soil erosion. In this work techniques employed to restore these environments through sustainable agriculture approaches are reviewed.*

Key words: *natural habitats, sustainable agriculture, conversion, protection, restoration*

Introduction

Conversion of natural habitats into agricultural and industrial landscapes, and ultimately into degraded land, is the major impact of humans on the natural environment, posing a great threat to biodiversity (Dobson et al., 1997). Intensive agriculture has resulted in the loss of biodiversity and specialized flora and fauna associated with natural environments, particularly wetlands. Landscape change has been another environmental development speeded up by the common agriculture policy, as a consequence of the intensification of agriculture (Walker et al., 2004).

The emerging discipline of restoration ecology provides a powerful suite of tools for speeding up the recovery of degraded lands. In doing so, restoration ecology provides a crucial complement to the establishment of nature reserves as a way of increasing land for the preservation of biodiversity (Dobson et al., 1997). The destruction of hedgerows, stone walls and ditches and the drainage of wetlands has contributed to the loss of valuable habitats.

Intensification in certain areas has led to an excessive use of water resources and to increased soil erosion. An integrated understanding of how human population growth and changes in agricultural practice interact with natural recovery processes and restoration ecology provides some hope for the future of the environment (Dobson et al., 1997).

Over the past 50 years, large areas of agricultural land have been drained and put into intensive agricultural production. Increasing attention is now being paid to the issue of restoring wetland areas and promoting

environmental benefits. Collective action is important for wetland restoration, both because of the physical interactions among landholders and because of the cost saving and enhanced environmental benefit that can be achieved at a larger scale (Hodge and McNally, 2000). Policy needs to be geared towards facilitating co-operation among farmers if environmental schemes are to be effective in enabling wetland restoration.

Materials and methods

This co-operation might have a formal responsibility to further nature conservation but could take a more proactive role in promoting wetland restoration. Farmers have good information on local water management options and are well placed to co-ordinate actions for restoration. Agri-environment policy could be redirected in order to promote collective action for wetland restoration. Restoration leads also to an improvement in terms of landscape and therefore an indirect benefit to agritourism including recreational activities such as hunting, fishing and wildlife viewing (Boody et al., 2005; Wilson et al., 2006).

In this review we describe how developments in restoration ecology and phytoremediation can be integrated with a sustainable agriculture and can speed up the recovery of natural ecosystems from local and more widespread anthropogenic changes.

» Problems related with intensification of agriculture

The industrial agriculture system consumes fossil fuel, water, and topsoil at unsustainable rates. It contributes to numerous forms of environmental degradation, including increasing of green house gasses emissions, groundwater pollution, soil depletion, diminishing biodiversity, and fish die-offs (Horrigan et al., 2002).

Meat production contributes disproportionately to these problems, in part because feeding grain to livestock to produce meat instead of feeding it directly to humans involves a large energy loss, making animal agriculture more resource intensive than other forms of food production.

The proliferation of factory-style animal agriculture creates environmental and public health concerns, including pollution from the high concentration of animal wastes and the extensive use of antibiotics, which may compromise their effectiveness in medical use. At the consumption end, animal fat is implicated in many of the chronic degenerative diseases that afflict industrial and newly industrializing societies, particularly cardiovascular disease and some cancers. In terms of human health, both affluent and poor countries could benefit from policies that more equitably distribute high-protein foods.

The pesticides used heavily in industrial agriculture are associated with elevated cancer risks for workers and consumers and are coming under greater scrutiny for their links to endocrine disruption and reproductive dysfunction.

» Sustainable agriculture

The environmental and human health problems described above could be reduced and the systems could be made more sustainable. Sustainable agriculture embraces several variants of nonconventional agriculture that are often called organic, alternative, regenerative, ecological or low-input. However, just because a farm is organic or alternative does not mean that it is sustainable (Reganold, 2008).

For a farm to be sustainable, it must produce adequate amounts of high-quality food, protect its resources and be both environmentally safe and profitable . Instead of depending on purchased materials such as fertilizers, a sustainable farm relies as much as possible on beneficial natural processes and renewable resources drawn from the farm itself.

Sustainable agriculture addresses many serious problems afflicting every country and world food production: high energy costs, groundwater contamination, soil erosion, loss of productivity, depletion of fossil resources, low farm incomes and risks to human health and wildlife habitats . It is not so much a specific farming strategy as it is a system-level approach to understanding the complex interactions within agricultural ecologies.

To understand the rationale for sustainable agriculture, one must grasp the critical importance of soil . Soil is not just another instrument of crop production, like pesticides, fertilizers or tractors. Rather it is a complex, living, fragile medium that must be protected and nurtured to ensure its long-term productivity and stability. Sustainable agriculture does not represent a return to pre-industrial revolution methods; rather it combines traditional conservation minded farming techniques with modern technologies. Sustainable systems use modern equipment, certified seed, soil and water conservation practices and the latest innovations in feeding and handling livestock . Emphasis is placed on rotating crops, building up soil, diversifying crops and livestock and controlling pests naturally.

Results and discussions

» What ecological restoration?

Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. It is an intentional activity that initiates or accelerates ecosystem recovery with respect to its health (functional processes), integrity (species composition and community structure), and sustainability (resistance to disturbance and resilience) (Clewell et al., 2005).

» Why wetland protection and conservation through sustainable agriculture approaches

Wetlands are among the world's most productive environments. They are cradles of biological diversity, providing the water and primary productivity upon which countless species of plants and animals depend for survival. They support high concentrations of birds, mammals, reptiles, amphibians, fish and invertebrate species. Wetlands are also important storehouses of plant genetic material.

The multiple roles of wetland ecosystems and their value to humanity have been increasingly understood and documented in recent years. This has led to large expenditures to restore lost or degraded hydrological and biological functions of wetlands. Overall, the main elements of threat to wetland can be summarized as follows (Ugolini e Romagnoli, 2002; Merli, 2012):

1) Reclamation and conversion to agricultural land;
2) Urbanization;
3) Increased insulation, reduction in size and fragmentation;
4) Alteration of hydrological regimes
    a) Drainage

b) Extraction and utilization of water and surface water
c) Correction and canalization of rivers
d) Presence of barrages and dams

5) Silting and progress of dynamic succession;
6) Lack of management;
7) Pollution;
8) Alien species;
9) Anthropogenic noise;
10) Climate change.

Particularly, the detrimental effects of intensive agricultural practices on soil quality include, erosion, desertification, salinization, compaction and pollution. The resultant impacts on water resources include pollution due to nutrient and pesticide leaching and intrusion of seawater into aquifers.
Scenarios indicate higher temperatures and greater evapotranspiration altering the hydrologic regime such that freshwater wetlands are potentially vulnerable in Bulgaria, Czech Republic, and Russia, and that coastal wetlands are at risk in Estonia (Kracauer Hartig et al., 1997). Since wetland losses may increase as a result of climate-change-induced impacts to agriculture, precautionary management options become important, such as establishing buffer areas, promoting sustainable uses of wetlands, and restoration of farmed or mined wetland areas.
The conservation and good management of wetlands can provide a substantial range of environmental benefits (Merli, 2012) including:

- Improving water quality through the removal of nutrients (especially N and P) and other pollutants;
- Providing a water supply for livestock;
- Reducing flood risk downstream;
- Helping to maintain river levels during dry times of the year;
- Providing summer grazing when forage production on better drained land may be limited by droughtiness;
- Contributing to wildlife conservation and biodiversity by providing specialised habitats for increasingly rare species of plants and animals;
- Forming important elements of the landscape, contributing to the overall character and amenity value of the countryside;
- Providing an educational resource for schools and other groups;
- Providing alternative sources of income such as biofuel (e.g. willow coppice);
- Preserving the paleoenvironmental record (e.g. pollen and archaeological remains preserved in peat deposits, which provide a record of past landscapes and human activities).

Being important sources and sink for CO2, water vapour, methane and other traces of gases, wetlands make an important contribution to the atmospheric cycles on global, regional and local scale (Wang et al., 1996). In particular the gas exchange of specialized vegetation contributes considerably to the carbon and water cycles of their wetlands habitats (Bush J., Loesch R, 1999).
In order to select the appropriate sustainable strategies for preventing those impacts, research should focus on development of an accurate soil and water quality monitoring system at multiple scales based on specific functional interest and evaluation (Zalidis et al., 2002). This to provide information about the status of the soil resources, correlate soil quality with management and aid with the development of sustainable management practices.

Increasingly research suggests also that the level of internal regulation of function in agroecosystems is largely dependent on the level of plant and animal biodiversity present (Altieri, 1999). In agroecosystems, biodiversity performs a variety of ecological services beyond the production of food, including recycling of nutrients, regulation of microclimate and local hydrological processes, suppression of undesirable organisms and detoxification of noxious chemicals.

It is argued that because biodiversity mediated renewal processes and ecological services are largely biological, their persistence depends upon the maintenance of biological integrity and diversity in agroecosystems (Altieri, 1999). So sustainable agroecosystem management and design can enhance functional biodiversity in crop fields.

Boody et al. (2005) found that environmental and economic benefits can be attained through changes in agricultural land management without increasing public costs. The magnitude of these benefits depends on the magnitude of changes to agricultural practices.

In this case, policy transitions that emphasize functions of agriculture in addition to food production are crucial for creating change (e.g. agritourism, fishing, increased carbon sequestration).

An example of preservation is represented by buffer strips that can greatly improve the water quality of nearby agricultural streams by reducing nutrient leaching in groundwater and surface water runoff, even though they comprise little of the total catchment area (Vought et al., 1995).

Hence, vegetated buffer zones located along streams and in the upland portions of the catchment can minimize erosion or trap sediments in surface runoff and thereby decrease phosphorus loading in surface water. For example, a buffer strip 10 m wide can reduce the phosphorus load, typically bound to sediment, by as much as 95% (Vought et al., 1995).

Moreover, both natural and constructed riparian forests and wetlands may create conditions favorable for nitrogen transformation/removal by soil microbial processes such as denitrification, with as much as 100% of the nitrate being removed in these zones. In addition to nutrient removal, buffer strips will increase the diversity of flora and fauna in the otherwise monocultural landscape. The vegetation along the stream will also stabilize the stream banks and improve habitat for both fish and invertebrates within the stream.

A conceptual framework for the wise use of wetlands and the maintenance of their ecological character, and the application of the guidelines in the Ramsar toolkit of Wise Use Handbooks (fourth edition) as strategies and interventions in the framework (Source: Finlayson et al., 2011).

Conclusions

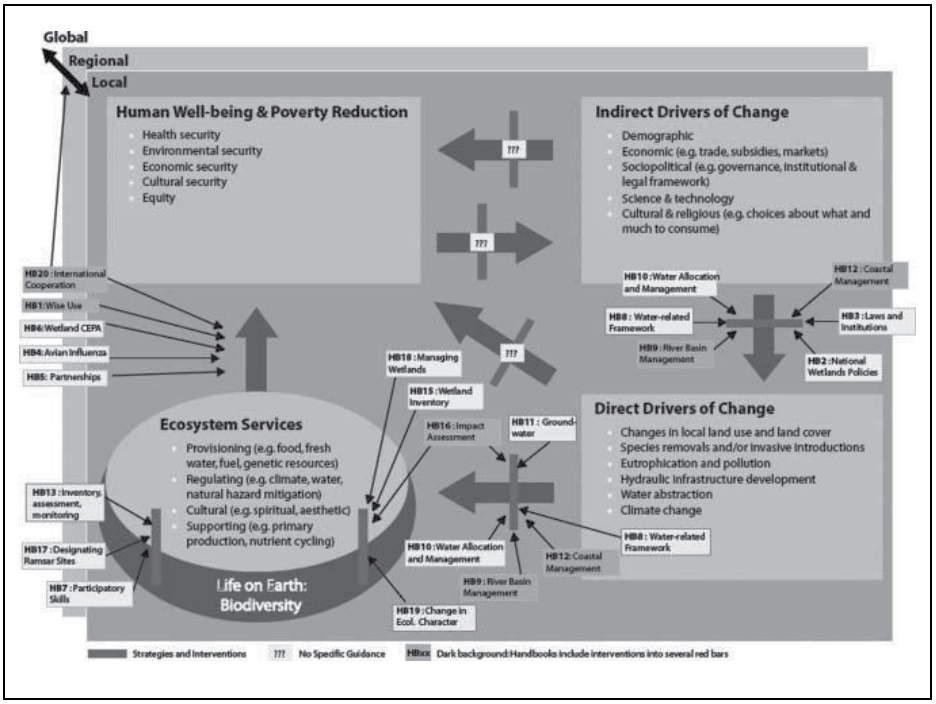
In according to Lal et al. (2009) demands on soil resources during the twenty-first century and beyond include:

» (1) increasing agronomic production to meet the food needs of additional 3.5 billion people that will reside in developing countries along with likely shift in food habits from plant-based to animal-based diet;

» (2) producing ligno-cellulosic biomass through establishment of energy plantations on agriculturally surplus/marginal soils or other specifically identified lands;

» (3) converting degraded/desertified soils to restorative land use for enhancing biodiversity and improving the environment;
» (4) sequestering carbon in terrestrial (soil and trees) and aquatic ecosystems to off-set industrial emissions and stabilize the atmospheric abundance of CO2 and other greenhouse gases;
» (5) developing farming/cropping systems which improve water use efficiency and minimize risks of water pollution, contamination and eutrophication;
» (6) creating reserves for species preservation, recreation and enhancing aesthetic value of soil resources.

Realization of these multifarious soil functions necessitate establishment of inter-disciplinary approach (Hübl et al., 2005) with close linkages between soil scientists and chemists, physicists, geologists, hydrologists, climatologists, biologists, system engineers, computer scientists and information technologists, economists, social scientists and molecular geneticists dealing with human, animal and microbial processes. While advancing the study of basic principles and processes, soil scientists must also reach out to other disciplines to address the global issues of the twenty first century and beyond (Lal et al., 2009).



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AFLATOXIN CONTENT IN ORGANIC MAIZE AND SORGHUM FOR ANIMAL FEED

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Abstract: *Recent years the livestock production has been interested by health problems, related to toxicological effects due to mycotoxin infections. Some factors as moisture and tannin content of grain, corn borer attack and climatic conditions, which influence aflatoxin content in maize, red and white sorghum organic grains production, were studied.*
Controls were carried out during vegetative period and after the physiological grain maturity. Aflatoxin contamination was generally very low, because environmental conditions were not favorable to fungal and its metabolite development. Aflatoxin prevention, based on suitable cultivation techniques as early harvesting and immediate drying of the grain in post-harvest, represent also in organic agriculture practices, the most effective systems against such infections

Key words: *maize, sorghum, aflatoxin, organic farming*

Introduction

Food security is the main purpose of organic cattle farming and organic agriculture.
The legal framework related to organic production prevides drastic reduction of external inputs such as synthetic fertilizers, pesticides and GMO. These productive systems guarantee food safety but don't give the same sanitary safeguards about some natural toxic factors, such as those derived by the presence of mycotoxins. In fact, it has been suggested that organic foods are more contamined than conventional food, because prohibition on using GMO maize varieties corn borer (Ostrinia nubilati) resistant, and the lack of treatments against this insect, can encourage the growth of fungi responsible of this contamination (Kouba 2003, Magkoset. Al. , 2003).
Moreover, the lack of a balanced fertilization, difficult to reach in organic cultivations, can create a greater vegetative stress promoting the fungus attack. In the livestock sector mycotoxin problem has a double aspect: one directly related to animal health and the other indirectly because livestock productions are vehicle between the contaminated vegetable foodstuff and human health (Bertocchi et al., 2004). In recent years in livestock production, a great burden of health problems related to toxicological effects, probably due to mycotoxins infection was observed. Mycotoxins bring different health problems in relation on the animal species and its different ability to metabolize and to detoxify the toxin (Bottalico, 2002; Dixon, 2008).
Cattle, pigs and poultry are most susceptible to the aflatoxin B1. Symptoms frequently observed, just after 1 or 2 days, include ingestion difficulty and reduced growth

rate, these phenomena are collected by dose, length of exposure, species, breed and diet or nutritional status. (Piva, 2004).

Acute or chronic toxicity depend on the amount toxin ingested and on the exposure time. Mycotoxins have different effects on the various organs; the most affected ones are the liver and kidneys where cause hemorrhagic necrosis. The immune system, is interested and it is possible observe poisoning forms, which inhibit the ability of defense from fungal, bacterial, viral and parasitic diseases (De Liguoro, 2006; Furlan, 2006).

These problems are more accentuated in organic livestock for the lack of adequate therapies, because the legislation doesn't provide the use of traditional medicinal products.

Therefore it is very important to study the various aspects of this problem because mycotoxins contamination of grains and oilseeds cause in the world health people risks, in addition greater economic losses, worsening of performance and greater animal mortality.

We have studied as aflatoxin attacks the animal feed, especially on organic maize, white and red sorghum seeds. The attachment fungal mechanism is understudied and there is also an incomplete knowledge about the resistence of white sorghum fungal attack.

Materials and methods

Trial was conducted in an organic farm near Pisa (central Italy) where were grown three different crops: maize, white and red sorghum. Experimental began from August to November 2007. Samples of three different grain crops were collected in pre and post mature period, to verify how excessive permanence in the field can influence development of aflatoxins. During the last experimental phase was necessary to protect white sorghum ears from the attack of birds with special nets. Maize hybrid PR32B10 (FAO maturity class of 600), was sow in May in an experimental plot of about 1.4 ha. This crop was irrigated nine time (4000 m3/ha total) between mid-June and mid-September. Red and white sorghum varieties (respectively "Velox" and "Favorite") were seeded in late May into two plots of 2 ha each about, in dry cultivation.

The threshing of cereals has been carried out between 3 and 17 October with the exception of three representative zones about of 60 m2 each, which were used as a control. Sampling was carried out in two different phases: pre-threshing and post-threshing. In pre-threshing, 30 spikes were randomly taken for each cereal. During the post-threshing, 10 ears were randomly collected from the three plots left in the field. Ears were shelled by hand and immediately dried in a stove to eliminate totally the moisture to block the fungal development; the presence of European corn borer (% of ears attacked), only for maize, has been evaluated.

Moreover, during the last sampling (2/11) have been separated healthy, broken or deteriorated caryopsis to evaluate the effect of the grain integrity on the level of aflatoxins contamination (Battimani P, 2004). Chemical characteristics on the different kind of grains, according to Weende method, proposed by ASPA (Martillotti F. et al., 1987) were determined. The presence of aflatoxin was determined by fluorometer system IAC (Immuno Affinity Column) (BR Malone et al., 2000) which allows an high accuracy but does not permit to valuate four types of aflatoxins (B1, B2, G1, G2).

Tannins determination according to Folin-Ciocalteau method was evaluated, using as standard tannic acid. Total polyphenols

extraction was carried out with acidified methanol (1% HCl v /v) while tannic polyphenols were estimated separately by precipitation with methylcellulose (Martillotti et al., 1987). Climatic trend (temperature, humidity) of the experimental period, in relation to the optimal thermo-hygrometric parameters for Aspergillus and its metabolites growth was evaluated.

Results and discussions

The chemical characteristics of the three cereals are included in standard parameters. Sorghum varieties show an highest content of protein respect to maize that instead shows a greater content of ether extract. The tannic level was higher in red sorghum "bird resistant" (Table. 1).

The moisture content presents values that regularly decrease with the physiological maturation at harvest the grain moisture doesn't reach optimal levels for the development of aflatoxins (Figure 1). When the crops are not collected at right time show different responses to fungal attack. Maize remains all the period in the range of moisture suitable for the development of Aspergillus, while the white and red sorghum rapidly reach levels of moisture not at risk.

When caryopses reach an optimal moisture for fungus growth (16 - 20°) the risk of infection is high (Verderio, 2001) this condition appears when maize is not collected during physiological maturity. In all samples analyzed aflatoxins level was very low, in fact it is necessary to collected in post maturity to have a possibility infection. Tests on red sorghum have given results equal to 0 (Table 2), confirming the capacity of this plant to resist to fungal attacks.

The high content of tannins in tegument determine a tipical resistant to parasitic plants and to insects that can predispose fungus attack. White sorghum, poorer in tannins, showed positive values for half of samples analyzed, however, these values were always below the legal limit for use in beef cattle feed (20ppb) (J.Ball, 1998).

In a single case (sample14/09) has been exceeded the legal limit for use in dairy cattle feed (5 ppb) (Table 2); also other four samples were positive, but included in legal limits. (Whitlow L., 2010). In maize the values of aflatoxins were very low; this crop was positive only for two samples but lower than legal limits.

Analysis carried out on maize grains sample (2/11), on broken and entire grains, showed total absence of aflatoxins. These results seem in contrast with other studies, where the breaking of the grain is one of the factors which facilitates mycotoxins development.

Table 1:
Chemical composition of threshing grains

	Maize	Sorghum white	Sorghum red
DM %	79.30	79.31	84.13
Crude Protein % DM	9.57	11.65	11.78
Ether Extract % DM	3.95	2.45	2.64
Crude Fiber % DM	2.14	2.68	2.59
N-free Extract % DM	82.80	81.66	81.87
Ash % SS	1.54	1.56	1.12
Tannins % SS	0,06	0,09	1.30

Table 2:
Content of aflatoxin in grain samples

Date	Maize	White Sorghum	Red Sorghum
31/08/07	0	0	0
07/09/07	0.53	4.3	0
14/09/07	0	15	0
21/09/07	0	0	0
28/09/07	0.32	0	0
05/10/07	0	1.3	0
12/10/07	0	0	0
19/10/07	0	0	0
26/10/07	0	0	0
02/11/07	0	**2.4**	0
30/11/07	0	0.21	0

Figure 1:
Trend of the moisture content in the grains

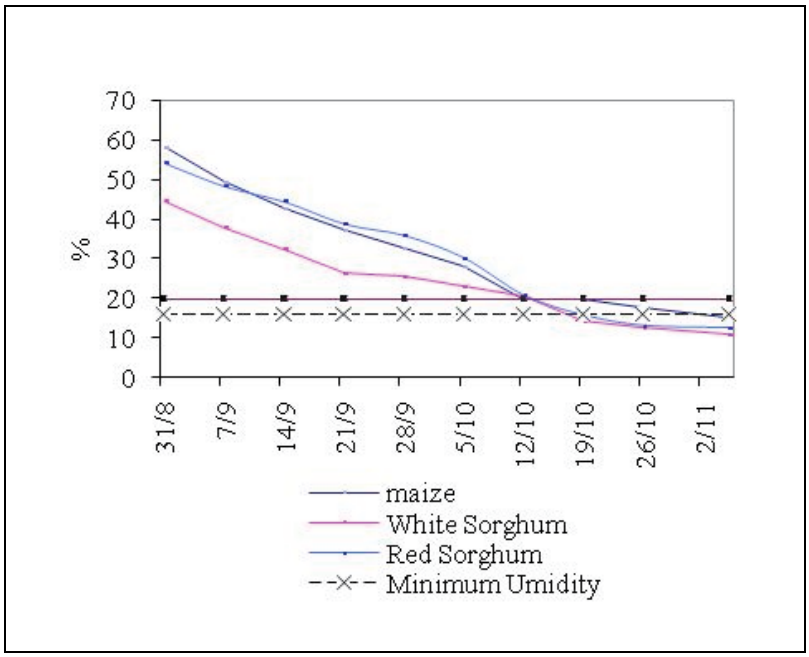


Figure 2:
Percentage of maize ears attacked by borer (Ostrinia nubilalis)

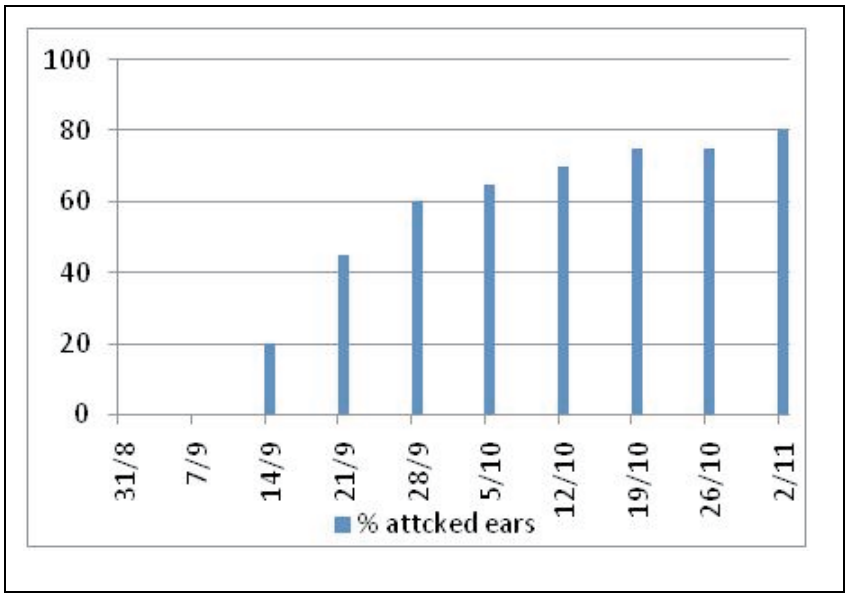


Figure 3:
Mean and maximum T (^{0}C) measured during the trial

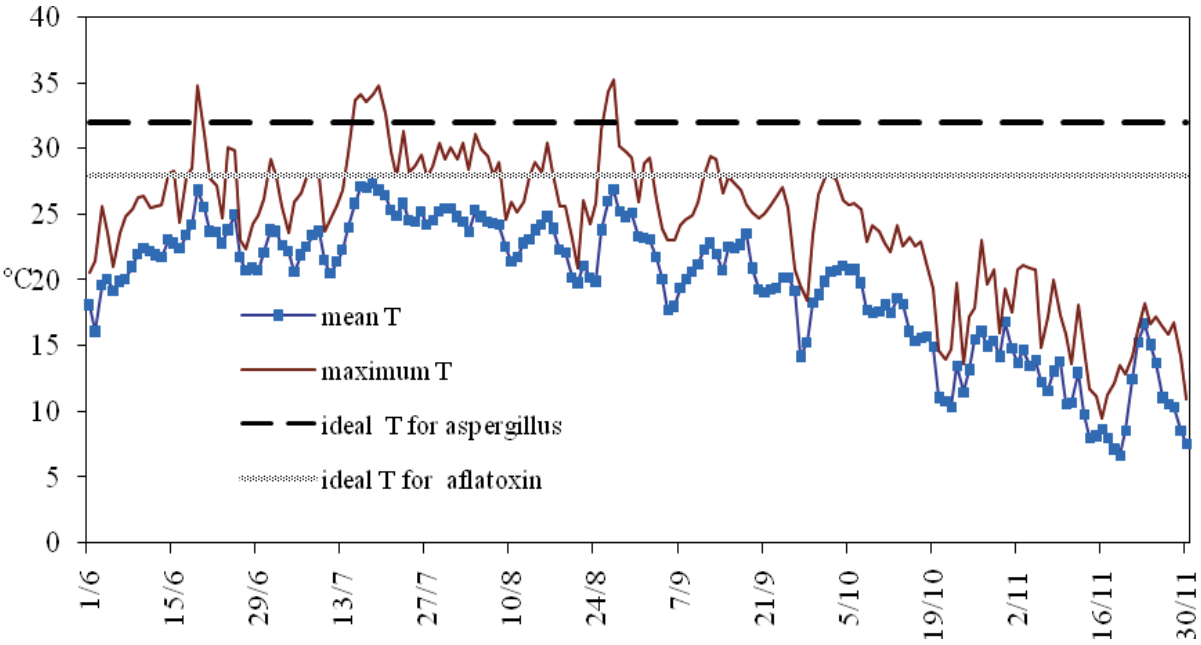
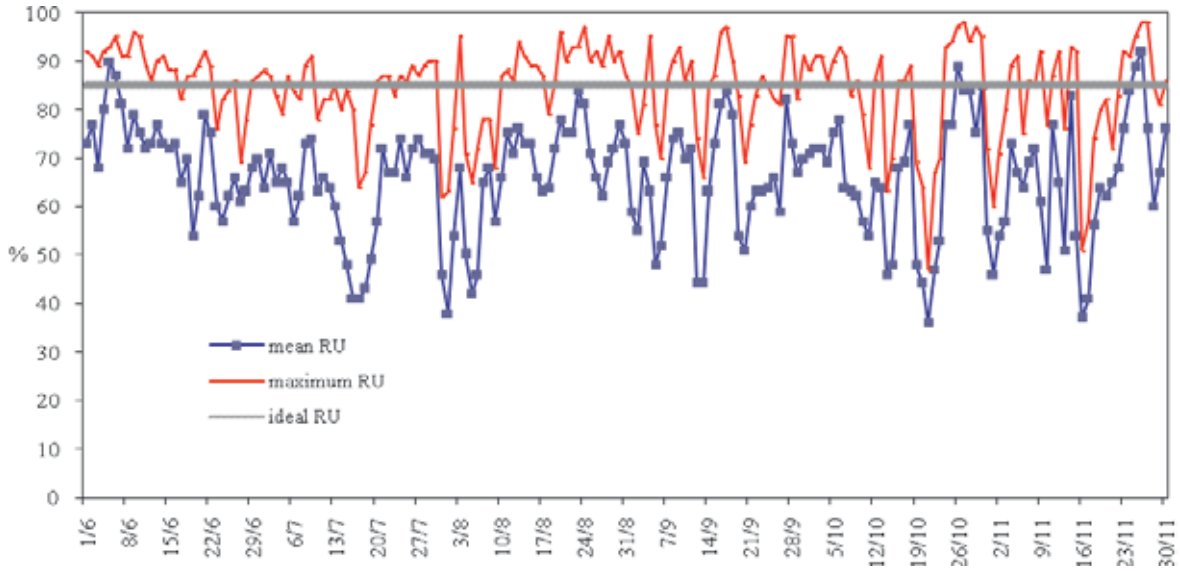


Figure 4:
Environmental Relative Umidity (Mean and Maximum) measured during the trial



There are not relationship between grain deterioration and aflatoxins development.
This result as is visible in Figure 2, where the attack of the borer, since mid-September, increases progressively up to 80% of contamined ears.
The low fungal attack is probably due to the particular climatic conditions relating to the experimental period. In June, July and August, in fact, seasonal averages temperatures were below, with maximum values only sporadically higher than 320C, that is considered the optimal temperature for fungal development (Figure 3).
These temperatures were not sufficient to start secondary metabolic processes, that lead to production of aflatoxins. Only for a short period, between July and August, has been exceeded the ideal temperature for its development (28°C). Highest values of aflatoxins, especially in sorghum, were obtained on mid-September when the temperature has exceeded the safety limit for fungal and its metabolite development. Also, the average relative humidity was always maintained below 85%, critical value necessary for the development of aflatoxins and Aspergillus. (Figure 4).

Conclusions

In conclusion, aflatoxin contamination was generally very low, only sporadically positive values in white sorghum and maize grains were detected, while red sorghum samples, was all negative. Even the checks in late harvest, have done ever recorded values above the limits of the law, both in sorghum and in maize.
In maize the harvesting after physiological maturity, has coincided with a relative humidity of the grain ideal for fungal development and with a strong attack of the borer. This is probably due by specific weather conditions recorded during the trial, which did not permit the growth of fungus and secondary metabolite. The temperature and relative humidity are directly or indirectly predisposing factors for the development of mycotoxins because bring vegetative stress (Reyneri et al, 2004).
According to "Food safety and quality as affected by organic farming" presented at the XXII Conference of FAO for Europe " our tests show that organic cereal spring-summer crops are considered unjustly at risk.
Optimal solution to the problem of mycotoxin contamination, even on organic farms, is the prevention, with technical operations that prevent mold growth and toxins development through the choice of suitable varieties, appropriate cultivation soil, crop rotation, fertilization and seeding balanced.
The collection of grain at the appropriate time and its immediate drying, represent the most effective system of control in addition to corn borer control. Borer Biological control could also be increased with Bacillus thuringiensis kurstaki and also with the introduction of a wasp parasitoid oofago (Trichogramma maidis). It is clear that mycotoxins will be of increasing importance for all those involved in feed manufacturing farming and food production.

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THE EVOLUTION OF SHEEP MILK PRODUCTION ON NATIONAL AND WORLD PLAN DURING TO 1995-2007 PERIOD

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Abstract: *In Romania the present trend in sheep exploitation is for milk production and the need to increase this production, regardless of race and her direction of exploitation, is a priority due to its biological and economic features. Thus, because of its content rich in almost all nutrients and essential amino acids in particular, various enzymes, vitamins and mineral salts and refreshing effect and antitox, sheep's milk is one of the most complete and necessary food for human nutrition and lambs. As regards human consumption, it is known that sheep milk was used alone or in the form prepared since ancient times, in many countries are putting the foundations of a genuine traditions processing.*

Key words: *evolution, sheep milk, milk production*

Introduction

The worldwide production of sheep's milk trend is to maintain the current level or a slight increase over its 2007 level, due to the increasing needs of the population for these nutritious sorts of cheese with a special flavor provided from this type of milk. In Romania the production of sheep's milk is only 8.2% of the total milk, being insignificant compared to that of cows (91.3%), having however an upward trend evolution in the last decade. The current share of livestock and productions of this species in Europe is far from the real possibilities of Romania, the only parameter which is optimal from this point of view being the milk production.

Materials and methods

Of the total world production of milk, which is 671.3 million tons, the sheep milk represents only 1.36%, being thus totally insignificant compared to that obtained from the cows, respectively 83.49% (table 1).

Table 1:
The quantity and percentage of the main types of milk in the world - thousand tonnes (source: FAO website, 2009)

Specification	Total milk	Cow milk	Buffalo milk	Goat milk	Sheep milk	Camel milk
World Milk	671,307	560,487	85,397	14,801	9,146	1,476
Percentage (%)	100	83.49	12.72	2.21	1.36	0.22

In the present social-economic situation already exists at the international level, according to FAO data, the requirements for sheep milk are slightly increased over the past decade. Thus the production of sheep's milk worldwide is 9,146 thousand tonnes in 2007 (table 2), wich is bigger with 15.1% compared to that obtained in 1995 and bigger with 4.9% than in 2006. Increases of sheep milk production are registered on all continents, but particularly on the Asian and African continents (28.1% and respectively16.6%). In the first place on the sheep milk production is Asia with 4,580 thousand tonnes, or about 50% of total world production, followed by Europe and Africa. Also from table 1 data we can remark a slight decrease of sheep milk production in Europe and European Union.

Table 2:
The evolution of sheep milk production worldwide - thousand tonnes
(source: FAO website, 2009)

Specificare	**1995**	**2000**	**2007**	**Differences (±%) 2007/1995**
Total world	**7,946**	**8,046**	**9,146**	**+15.1**
Africa	1,468	1,578	1,711	+16.6
N+C America	-	-	-	-
South America	34	35	36	+5.9
Asia	3,576	3,531	4,580	+28.1
Europe	2,869	2,902	2,820	-1.7
Oceania	-	-	-	-
European Union	2,643	2,727	2,630	-0.5

An economic importance is given less to the sheep milk in Canada, USA, Argentina, England, the countries of northern Europe, Australia and New Zealand, because these countries have favorable environmental conditions to develop bovine herds. In the countries of Oceania and North America continents started only lately sporadic milking the sheep. In consequence, for Oceania and North America there are not data for sheep milk production. In these continents sheep are breeding only for meat or wool production or for both of them.

Analyzing data from table 3, where is presented the situation of sheep milk production in high producing countries it notes that a world leader in this direction is China, with 1,125 thousand tonnes, followed by Turkey and Greece, and the highest increase is recorded in Spain (54.5%). A pronounced decreasing in sheep milk production is found in Italy and Turkey.

The research in the field of sheep milk production, reveals that only 195.4 million head sheep are milked annually worldwide (FAO, 2009), of which 107.1 million are milked in Asia, 56.5 million in Africa, 30.4 million in Europe (24 million EU), and only 1.4 million in South America (table 4). According to data provided by FAO, the average milk yield per head of sheep

Table 3:
The evolution of sheep milk production in the main producing countries - thousand tones
(source: website FAO, 2009)

Specification	1995	2000	2007	**Differences (±%) 2007/1995**
Sudan	388	462	480	**+23.7**
Algeria	192	180	205	**+6.8**
Iran	450	555	534	**+18.7**
Somalia	440	445	468	**+6.4**
Syria	454	446	610	**+34.4**
China	964	847	1,125	**+16.7**
France	224	254	254	**+13.4**
Greece	721	743	750	**+4.0**
Italy	784	742	560	**-28.6**
Spain	233	392	360	**+54.5**
Turkey	934	774	790	**-15.4**

Table 4:
The evolution of sheep's milk yield (kg) and the number of sheep milked worldwide - thousand heads
(source: website FAO, 2009)

Specification	**1995**	**2000**	**2007**
Total world	**44** **177,094**	**42** **188,703**	**47** **195,361**
Africa	30 48,621	30 52,300	30 56,532
N+C America	-	-	-
South America	25 1,329	25 1,364	26 1,376
Asia	38 92,328	34 103,244	43 107,055
Europe	82 34,815	91 31,795	93 30,398
Oceania	-	-	-
European Union	92 28,587	105 25,872	109 24,091
Developed countries	82 34,815	91 31,795	93 30,398
Developing countries	35 142,279	32 156,908	35 164,963

in the world are located in 2007 at 47 kg, which confirm the evidence that sheep milk in the world is produced unfortunately by unimproved breeds generally, with reduced individual average yields.

From the table 4 may be noted that, while in developed countries the average milk yield has increased in the last decade, due to continue selection for this character, in developing countries that remained almost at the same level. It also may be observed that while the number of sheep milked decreased in developed countries (12.3%), for diminish the costs of exploitation and increase the sheep farm profitability in developing countries it increased by 15.9%.

The highest average yields of sheep's milk in the world are recorded in Switzerland (350 kg), Austria (372 kg), Malta (227 kg), France (197 kg), Portugal (168 kg) and Spain (150 kg) and the lowest in Oman (12 kg), Guinea (20 kg), Ethiopia (25 kg), China and Moldova (28 kg) and Indonesia (30 kg). It is expected (in all countries with tradition in sheep breeding) as the average milk production per head of sheep to grow by improving various local races, using the infusion crosses with specialized breeds and selection for this character, along with improving the quantity and quality of the sheep feed.

In perspective, the worldwide production of sheep's milk trend is to maintain the current level or a slight increase over its 2007 level, due to the increasing needs of the population for these nutritious sorts of cheese with a special flavor provided from this type of milk.

Regarding the sheep milk production in Romania, milking all breeds of sheep applies since the ancient times in our country, sheep's milk as the main raw material which gave rise to traditional types of cheese. However, the production of sheep's milk is only 8.2% (485 thousand tonnes) of the total nationally milk production, being insignificant compared to that of cows (91.8%), having however an upward trend evolution in the analyzed period (higher with 19.2%), as the data presented in table 5.

Table 5:
The evolution of sheep milk production in Romania during 1995-2007
(source: website FAO, 2009)

Specification	1995	2000	2007	**Differences (±%) 2007/1995**
Total production (thousand tonnes)	407	321	485	**+19,2**
Average milk yield -kg/head-	52	56	90	**+73,1**
Number of sheep milked (thousand heads)	7,827	5,773	5,450	**-30,4**

Of those presented, it appears that the total nationally production of sheep's milk is currently located at a good level, from this point of view instead of 7 in the world and 3 in place on Europe, which is due to the good average milk yield, which is 90 kg/head of sheep, and on the other hand, to the numbers of sheep milked, respectively 5.45 million heads.

Given the potential for mixed exploitation of local breeds of sheep, the favorable geo-climatic conditions of sheep breeding and fodder resources available, along with economic integration of Romania into the European Union proper and in terms of agriculture in the near future, we believe that the current share of livestock and production of this species in the European context is far from the real possibilities, which required a new reconsideration of this economic sector to enhance competitiveness of our country on the border (table 6).

To achieve the aforesaid goal, the need for Romania is a situation of economic parameters in share values from Europe around 10-15%, so that milk production is the only parameter which is optimal from this point of view and although this may be increased to a level much higher (about 20%).

Table 6:
Romania share in Europe on the sheep livestock and yields in 2007
(source: website FAO and Eurostat, 2009)

Specification	MU	Europe	**Romania**	Share (%)
Sheep livestock	thousand heads	135,643	**7,678**	5.7
Meat production	thousand tonnes	1,296	**57**	4.4
Wool production	thousand tonnes	252	**18**	7.1
Milk production	thousand tonnes	2,820	**485**	17.2

Results and discussions

In countries with tradition of raising sheep is necessary, regardless of the direction of exploitation, to give a major importance of improving the breeds milk production in order to achieve high quantities of cheese from sheep's milk for domestic consumption or export recovery, so that the economic use of sheep to be justified for our country, to value the sheep.

It is appropriate therefore that the total production of sheep's milk in Romania to be enhanced in particular by increasing the average milk yield, in relation to the productive capacity of each breed, either by the infusion crossbreeding of local breeds with specialized breeds, either by improving the selection level of each breed and the conditions of feeding and maintenance.

Conclusions

» In perspective, the worldwide production of sheep's milk trend is to maintain the current level or a slight increase over its 2007 level, due to the increasing needs of the population for these nutritious sorts of cheese with a special flavor provided from this type of milk.

» It is expected (in all countries with tradition in sheep breeding) as the average milk production per head of sheep to grow by improving various local races, using the infusion crosses with specialized breeds and selection for this character, along with improving the quantity and quality of sheep feed and maintenance.

» In Romania the sheep milk production is currently located at a good level, being placed on the 3 in Europe and 7 in the world, which is due to consumer tradition, to satisfactory milk yields and to the numbers of sheep milked.

» The current share of livestock and productions of this species in the European context is far from the real possibilities of Romania, the only parameter which is optimal from this point of view being the milk production.

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VOCATIONAL EDUCATION AND NUTRITIONAL EDUCATION-BIOCHEMISTRY AND MICROBIOLOGY STUDENTS

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Abstract: *Through the completion of the curriculum, vocational education provides preparing students for their future profession, the essence of professional education in the formation of a professional cultural horizon through information, formation of capacities, skills and practical skills useful for their future trades. Nutritional education materializes education of students from universities and food specialties, with the foundation biochemical and microbiological sciences, educational sciences, psychology and achieved by completing four information-formative stages, namely, cognitive stage, awareness stage of the need and the importance of knowing biochemistry and microbiology food, axiological stage and praxiological stage.*
Modern teaching concentrates on the student, making it interactive topic, co-participants and co-own training and the discussion centered on fundamental concepts, the divalent scientific concepts and controversies on their future professions adequate scientific advice, results obtained by manage students by teachers reflecting their training and intellectual, vocational education and nutritional education.

Key words: *education, vocational education, nutritional education, biochemistry, microbiology*

Introduction

„Education is the subject of pedagogy, with Latin etymology respectively, educo-education (educere)" to grow, to grow, to guide, to educate" educa-growing, cultivation, guidanceand education. It is human social phenomenon that provides theoretical and practical procurement based on accumulation obtained by mankind over social-historical evolution, forming the personality and professionalism ofsocial utility of the young generation."(Ciobanu Iancu Mariana, 2009).
Education aims to initiate the culture the younger generation. Initiation into culture and the acquisition of culture (critical judgment, reflection, appreciation, distinction), the discovery of spirituality and the analysis of them, helps students and ennobling spirit, to form an axiological consciousness necessary for stock availability and aspirations and valorization. Education for modern social life involves requirements accumulate cultural values as a vital necessity for the individual and society for the advancement of the living: "Education is ultimately an act of culture, lifting the individual from the state of state nature of culture" (Salade D. 1995).
The current teaching practices, academic institution facilitates human development process in accordance with existing social and educational ideals A major purpose of the education system is the formation of a general culture of all students. In educational sense, this concept means a system of information, knowledge, skills, abilities and skills assimilated and formed

the educational action that would allow the individual to develop a vision of the world in all its complexity and meet the conditions and requirements of existence and their social integration. This would be his instrument level, coupled with operational one, which involves using the mentioned procurement for solving theoretical and practical problems by creating solutions through their materialization in a field of activity in which students are trained to become components of culture their work. Thus, literacy is the fund that is grafted expertise or professional culture.

Education is a social policy instrument designed to provide training, social inclusion and a culture of student standard. He is presented as a complex development process free, full and harmonious development of human personality and creative self as an educational ideal that projection summarizes socio-cultural and pedagogical dimensions In college students are communicated concepts, data, and value-date scientific information praxiological mainly social and moral usage, to form their harmonious, helping them to prepare not only a profession, but also for everyday life in the community. Makes the educational success of the social and professional success of individuals.

Students Faculties specific food, such as those from Control and food expertise, Food Engineering, Food Engineering and Management Public and Agrotourism initial training is that, on the one hand specialization gain professional skills that will sustain them to employment in the labor market, on the other hand will be informed and trained for their future lives everyday, individual, personal, family, social. At the foundation of professional education and food education contributes fundamental disciplines, such as the biochemical engineering specialist in the field, such as microbiology.

Materials and methods

1. Vocational education and nutritional students-conceptualization

Human society generates a lot of roles and professions, vocational education will ensure student preparation for their exercise.

Professional education core consists of:

1. formation of professional cultural horizon through information, which is the unity of scientific and technological knowledge; Hubert R. believes that professional horizon is due to intellectual culture, for all professions, intellectual culture is necessary substrate professional culture, not only through knowledge Useful posed, but also spiritual qualities posed, the interdependence of intellectual and professional culture meets professional mobility the man being forced not only to continuously improve the profession they practice but possibly it can move easily from one profession to another;
2. development of capacities, skills and practical skills to conduct a productive activity;
3. familiarize students with the profession and training interests to it.

Material essence, the new curriculum includes curricula, differentiated universities, faculties and specializations, and three educational levels in accordance with the Bologna process, sheets of disciplines, curricula, course materials and tutorials and other amteriale auxiliary designed in such a way as to form students for their future profession, to ensure the possibility of forming an active and creative personalities, capable of options and decisions. In higher education, the goals pursued are enriching and deepening expertise and general knowledge, competence axiological, intellectual capacity, moral and civic training profile, outlining some practical dimensions of knowledge.

Axiological autonomy and competence are necessary for understanding, incorporating and using the achievements of science and technology. Science education must be connected to an axiological system, taking into account not only the transmission of knowledge, but its axiological connotations, Biochemistry, the science that studies the chemical and physical processes and chemical in living organisms, the basic substrate of life phenomena, contributes to food education and vocational education to students through both course completion and practical works completion.

Also, General Microbiology and Microbiology of food materials have a very important role in food education and training of young people through courses and practical work of studying human useful microorganisms in food, agriculture, farms and households, but also those which negatively influences the body, it fell ill, many human diseases are caused by microorganisms digestive.

which signifies and highlights its valences.

Nutritional education is a component of health education and vocational education students materialize from food specialties. Which substantiates food science education are: Biochemistry, Microbiology, Science education, psychology and so on (Fig 1)

2. Processuality nutrition education.

In Teaching biological sciences, biochemistry, microbiology, nutrition education processuality four information-formative stages, successive, interrelated and interdependent (Fig. 2):

1. provide students with the concepts of biochemistry and microbiology food on their teaching by the teacher-stage cognitive theory, the role of knowledge of the biochemistry and microbiology of foods;

2. stage of awareness of the need and importance of biochemistry and microbiology food knowledge for teachers of students from specialties food profile as well as their daily lives, in order to avoid illness, for appropriate use of information

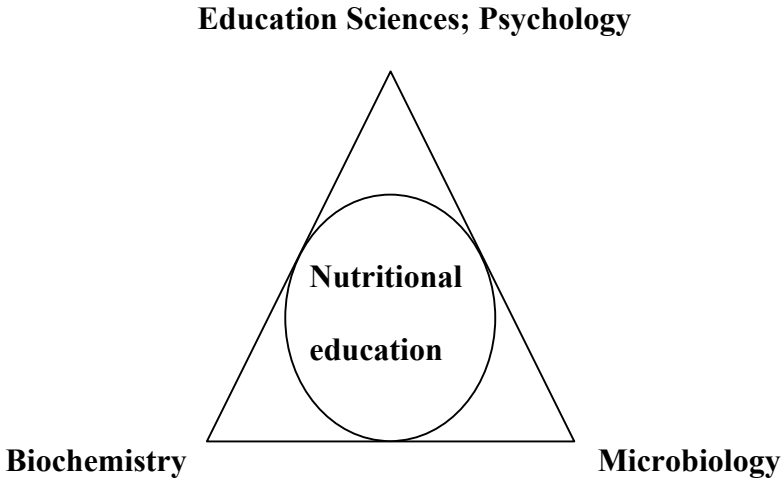

Fig.1 Scheme which based nutritional education

for personal, others, the environment environment in a constructive way, positive; 3. phase formation of attitudes and professional values and health food; involves affective-emotional training of students, direct them to positive affective information beneficial use of biochemistry and microbiology of food, which is an affective-emotional stage, the role axiological , an essential step for practice;

4. skills training and vocational food habits and health behaviors Food, practical action capacity in the profession and daily life related to catering, family, individual, willingness to act with a sense of professional responsibility and sanogenetic-conative element, volitional, the leading role in decisions favorable to the profession of food and family in everyday life, personal and social function-stage praxiological, pragmatic.

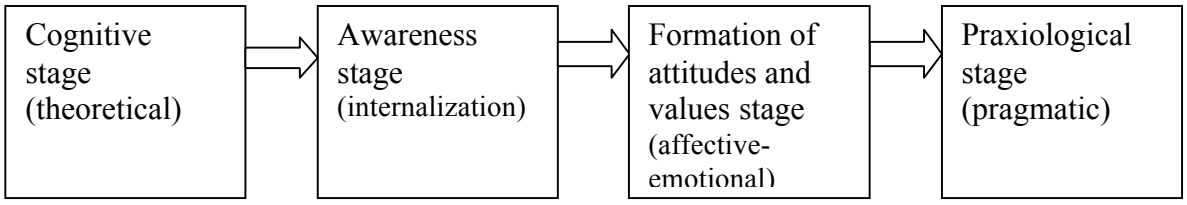

Fig. 2 Flow diagram of process steps nutritional education

Table 1.
Bidirectional communication mechanism through dialogue heuristic teaching

Broadcaster		***Receiver***
Teacher: ➢ issue didactic message.	→ Transmission channel	***The student:*** ➢ received message; ➢ deposit information; ➢ process.
Teacher: ➢ receive feedback; ➢ corrects; ➢ fills; ➢ improves communication methods; ➢ develop improved message.	← feedback II →	***The student:*** ➢ states answers required by the teacher; ➢ improved the teacher receives the message, ask questions.

Those steps lead to the formation of sanitary culture, which can be considered as a component of general culture.

Integration of a form and scale appropriate theoretical knowledge, their application and practices associated with them, is undoubtedly the main lever in changing the quality of education and school education, because it is highlighting the invaluable contribution to building knowledge and practice of personal expression. (CERGHIT I., 2002).

In processuality recommended nutritional education official use interactive methods, practical and applied, heuristic and problematize such as debates, discussions, brainstorming, clustering, practical work, laboratory experiments, etc. aquarium equipment. and timely preparation of necessary materials, modern electronics and / or practical work required of classical biochemistry and microbiology.

„Sometimes, the experiment is identical to the method practical work, learning method especially practical knowledge, sharing the work using the same techniques, the same teaching materials. But the latter does not require the development of conclusions and arguments for or against an assumption, the discovery of new biological concepts can be the chance, to chance." (Ciobanu Mariana, 2008)

3. Student-subject interactive, co-participants and co-own training

Changing vision of modern teaching students simply defined as an object of education as passive receiver or viewer of university life. Concentrates on contemporary education students, making it interactive topic, co-participants and co-own training.

Results and discussions

In the process of education in Biochemistry and Microbiology, in the nutritional faculties of the University Bioterra, the students have been co-opted into a heuristic approach, the discussion centered on the fundamental concepts, divalent and scientific concepts, controversies on scientific advice appropriate to the future of their profession, the results obtained by the students managers of teachers reflecting their professional and intellectual formation vocational education and training.

1. Vocational education and food by discussing with students of biochemistry and microbiology bread.

From „our daily bread every day", students trained teachers can address notions of biochemistry and microbiology integrated, making discussions and correlations between these disciplines within the concept of food, bread", known almost 8000 years. The study basic ingredients, especially flour and yeast. Grains are known to be protected from caryopses wall that has a high content of cellulose, $(C_6H_{10}O_5)_n$ and that for it to be digested, caryopses must first be broken or crushed, resulting flour. Each type of flour corresponds a special showing mineral content: wheat flour type 0 is white, smooth, easy grinding, low nutrients, generally used to achieve cakes, flour is flour milled 00 may industry recommended fine white bread, wheat flour 000 is coarser, with a high content of nutrients that are made bread. Bread contains mostly carbohydrates, proteins, minerals and vitamins are very useful in human nutrition. Students learn that it is healthier to eat bread than white bread because the nutrient content is higher and also by lower starch content and increased gluten contributes to better growth, development and functioning of the human

body to avoid fattening, obesity contrasted with white bread, which in excess causes such ill effects.

Yeast used in bread industry of the species Saccharomyces cerevisiae, which carries out alcoholic fermentation, enzymatic sequence of biochemical reactions by which carbohydrates are degraded to ethyl alcohol (C2H5OH) and CO2.

In this approach the food related microorganisms bread, students must meet a number of microorganisms that cause disease in bread, to recognize and avoid eating a sick loaves, which can sicken, and specialty student teacher from control and Food expertise not give favorable food marketing such dangerous to consumers' health.

Most often grow on bread mold Aspergillus glaucus, mold class Deuteromycetes (Imperfect Fungi), which has conidii green or yellow-green. Food education to ensure hygiene, avoid mucegăirii her bread, students will learn that the shell molds grow first, then enter inside the mold spores are destroyed during normal cooking, storing bread is made while the humidity relative air should not exceed 80%, should not crack peel, bread not kept in small spaces, unventilated properly. Bread molds occur when: use lower quality wheat flour, which is determined by its organoleptic examination, the bread after baking is high humidity in the middle, very necessary uninfected flour, water, as determined also by organoleptic examination, using fundamental senses of digestive viscera, not maintained in perfect hygienic equipment used to make bread, and storage areas. Also, students of food typical to recognize the disease extent'' bread, which is produced by keeping bread fresh one two days, and sometimes even after several hours. In biochemistry practical work in the organoleptic examination, students observe and discuss the signs of the disease, which manifests the breaking of bread, the core being mucilaginous, stretches very thin as spider thread, with the development of the disease is increasing odor, similar of the decay, the core becomes gray or yellow brown and can form small holes, then caverns. ''Extent of disease'' is bacterial in nature and is caused by bacteria of the genus Bacillus, such as those of the species Bacillus subtilis, Bacillus mesentericus, bacteria form spores highly resistant to heat, which is why the disease occurs in summer. Flour should not be infected and also is important and how cooling and storage of baked bread, the optimum temperature for bacterial growth is 35-40 ° C and some moisture.

2. Discussion and knowledge bivalent concepts of biochemistry and microbiology of food.

Learned values fall within a horizon of individual and social necessities, manifested by attitudes and patterns of behavior, including work: "Any theory or practical attitude is dependent on the individual's basic position before the world, a conception of the world and life, a philosophy" (Narly C., 1996). Students must be educated, informed and trained faculties permalink purposes of the concepts of biochemistry and food microbiology with their lives and understand bivalent concepts. For example, proteins are important food for body, plastic part, mainly construction, but for some human bodies certain food proteins become harmful as food allergens to be avoided. In food allergy the immune system response to a food protein as if it would be harmful, aggressive body.

The biochemistry of food should always correlated with body health, achieving beyond the education of young people for their future employment in the labor market and health education through nutritional education.

Thus, students learn that diets rich in fat, is responsible'' for many modern diseases, and on the other hand, science has shown that a diet free from fat leads to deficiencies in the body and guided by the teacher talks about fat divalent .

Further discussions with the students focus on scientific results, which showed that unsaturated fatty acids are numerous in foods of plant origin actively participates in metabolic processes for which are better used by the body subcategory polyunsaturated fatty acids or fatty acids essential, such as linoleic acid-C18H32O2, linolenic acid-C18H30O2 and arachidonic acid-C20H32O2 are vital, without them leading to ulcers, central nervous system disorders, renal hemorrhage, stopping growth. There are scientific discussion on the use of butter or margarine. Butter contains a small amount of essential fatty acid linoleic and a large amount of cholesterol that increases the concentration of fat in the blood, causing arteriosclerosis and myocardial infarction, in turn, margarine contains a higher amount of linoleic acid. However, it is recommended total elimination diet and replacing butter with margarine, eating healthy is not unilateral.

Be learned by students in our food that not all foods using metabolites (vitamins, essential amino acids,etc.),Others have even pollutants commonly found in agriculture. Good to know the students as vitamin C, important body is found in large amounts in apples, on the one hand, and, on the other apple varieties have antivitamina C, the varieties of spinach, watercress or tomato have oxalic acid, a potent and demineralized sick man should avoid certain foods knowingly, to protect complications or exacerbations.

Discussion and cognoscibilitatea by students of food microbiology bivalent concepts such as concept ‘’epiphytic microflora'', also contributes to professional education and the education of their food. „Knowledge of specific microflora is necessary for every farmer and landowner who wants to effectively use resources of their own fruit and vegetable farms or farms. As some microorganisms can cause damage, they should be killed or inhibited, others whose human activity is beneficial (eg yeasts that ferment grape fruit), on the contrary, must be encouraged to develop properly.'' (Balauca Nicolae, Atudosiei Livia Nicole, 2004)

3. Discussion of other food scientific advice

Other students can conduct discussions around other scientific recommendations such as those related to balanced nutrition, water consumption, the correct application of information assimilated by students. The most popular recommendation for a balanced diet: “Eat food varied with three balanced meals and two snacks per day - including five servings of fruits and vegetables, and you have enough vitamins from food.

It recommends plenty of water - the primary metabolic food. For example, vitamin PP, to act metabolic needs plenty of water, and its deficiency can lead to disease. It is important to know that a glass of water in the morning and one evening prolong life by 5-10 years.

To understand and evaluate scientific advice on food safety, a person will need not only some basic information about the chemical composition of food, but will also be able to apply this information in practice, when choosing a product for consumption.

Extracurricular, students can talk to teachers about their professional education and training, scientific advice about other food supply and their education about their training needs so as to prepare them for the profession and for life to happen to high quality standards that to allow integration into

the labor market, social and professional life, and also to gain a beneficial food education health. The results obtained by the students can be presented and discussed at scientific meetings such extracurricular scientific sessions, conferences and symposiums.

Conclusions

By completing academic curriculum, vocational education prepares students for their future profession, professional education core consisting in forming a professional cultural horizon through information, training capacities, skills and practical skills to conduct a productive activity, familiarize students with the profession and vocational interests to it.

Food education is a component of health education and vocational education materializes students from universities and food specialties, with the foundation sciences Biochemistry, Microbiology, Science education, psychology and four information-formative stages, successive inter-stage in her processuality cognitive (theoretical) stage of awareness of the need and importance of biochemistry and microbiology food knowledge, affective-emotional stage, the role axiological and practical step-function phase praxiological.

Modern teaching concentrates on the student, making it interactive topic, co-participants and co-own training, learning the Biochemistry and Microbiology general, students are recruited in a heuristic approach, the discussion centered on the fundamental concepts, such as example, the concept of bread, the scientific concepts and controversies divalent-consumption of butter or margarine, proteins and protein supply plastic harmful role-food allergens to be avoided on appropriate scientific advice their future professions as about the proper application of information assimilated by balanced nutrition, water consumption, the results obtained by students managers teachers reflecting their training and intellectual, vocational education and nutritional education.

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PORCINE CARCASS QUALITY EVOLUTION AT ROMSUINTEST S.A. PERIS COMPANY AFTER THE IMPLEMENTATION OF "EUROP" SYSTEM IN ROMANIA

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Abstract: *Pork production became very competitive in the conditions when the consumer is interest about a food safety with a quality product at a low price by comparison with other foodstuff having a high percent of protein.*

The paper wish to emphasize the quality evolution of the carcass at a pig unit on a short term (2006 - 2008) with the aim to comply to the meat market requests in the condition of implementation of the EUROP System in Romania.

At a carcass weight of 80 kg, the determined muscle tissue percent with FOM device increased from 51.94% to 57.56%. Framing the EUROP System shown a larger proportion in the superior class E + U (97.86) out of which class E 82.18%, at the level of 2008.

Key words: *Europ system, Fat-o-Meat'er (FOM), porcine carcass, Peris*

Introduction

In the last period of time they have been made significant progress concerning the pig carcass composition due to the consumers'requests for pork with a high percent of muscle tissue.

Pork production became extremely competitive in the condition the consumer is interested about a food safety with a quality product at a low price by comparison with other foodstuffs with a high protein content. The pork provides in the human nutrition "complete proteins" that contain all essential amino acids and in optimum proportion, therefore it is necessary the existence of carcass with a high content of lean meat and a small proportion of fat.

The changes were possible as a consequence o a intense breading work of pigs populations with the target to reduce the layer of bacon from the carcass and, in the same time, by a differentiated payment depending on the lean meat content (muscle tissue).

European Union enacted the EUROP system through the Council Regulation CEE No. 3220/13.11.1984 concerning classification of porcine carcass after the unitary scale of the community (with the alteration made through the Orders No. 3530/86 and 3513/93). In Romania the legislation is represented by Government Decision No. 267/2004 and Orders No. 259/2004, No.457/2004, No.548/2004.

The objectives for the implementation of the carcass classification system are: existence of an unitary system of carcass valuation; producer payment; determination of the carcass commercial value on the sacrifice flow; a price reporting base; implementation

some regulation measures of the market and external trade.
This work aims to emphasize the evolution of the carcass quality at a pigs breading unit on a short period of time (2006-2008) in order to comply to the meat market requests, in the condition of EUROP System in Romania.

Materials and methods

The research was performed at the Abattoir Romsuintest Peris Research and Development Department, on the commercial hybrid PERHIB 2 formed if combination F1 x LSP-2000 and F1 x Pietrain. The findings of the muscle tissue percent were done with a FOM device. FOM device is used in the configuration presented further (Figure No.1).
The measurements on the carcass are performed at the last rib level, between the third and the fourth (figure No. 2). For the statistical processing there were used the classic methods. The measurements were done on check tests in the framework of the years 2006-2008. Based on the muscle tissue percent they were classified in the class of EUROP system so:
- E class percent >55%;
- U class percent between 50-55%;
- R class between 45-50%;
- O class between 40-45%;
- P class below 40%.

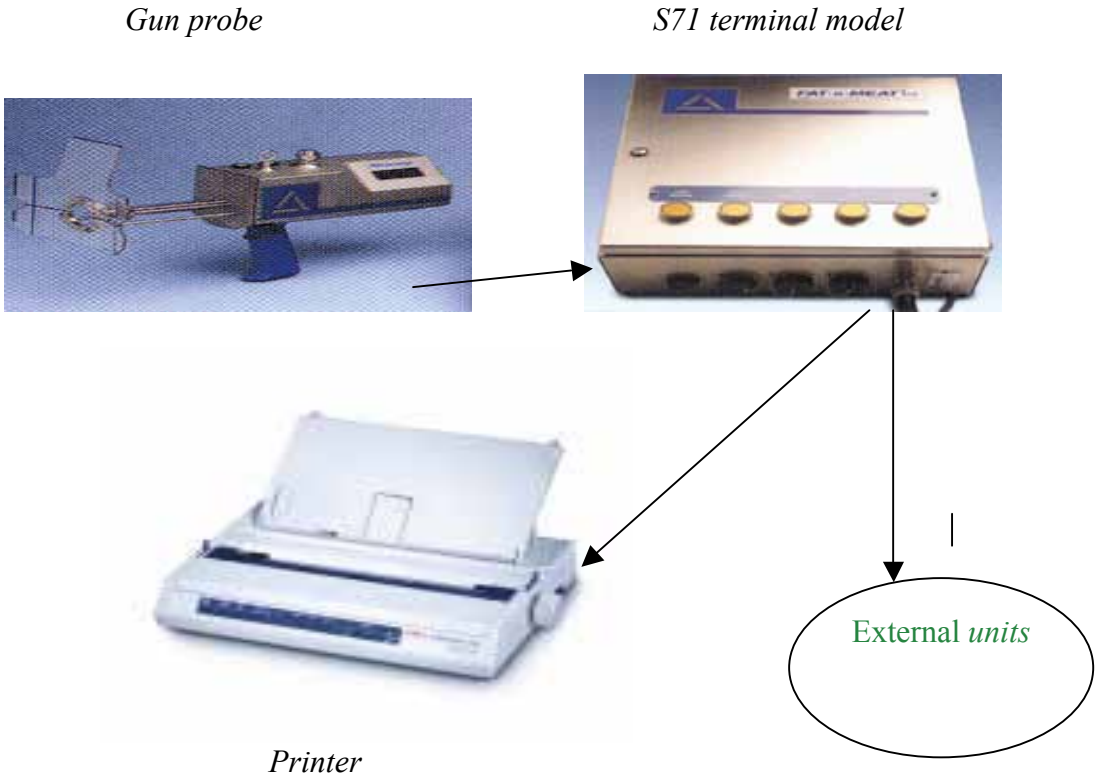

Figure No. 1 - Fat-o-Meat'er (component parts)

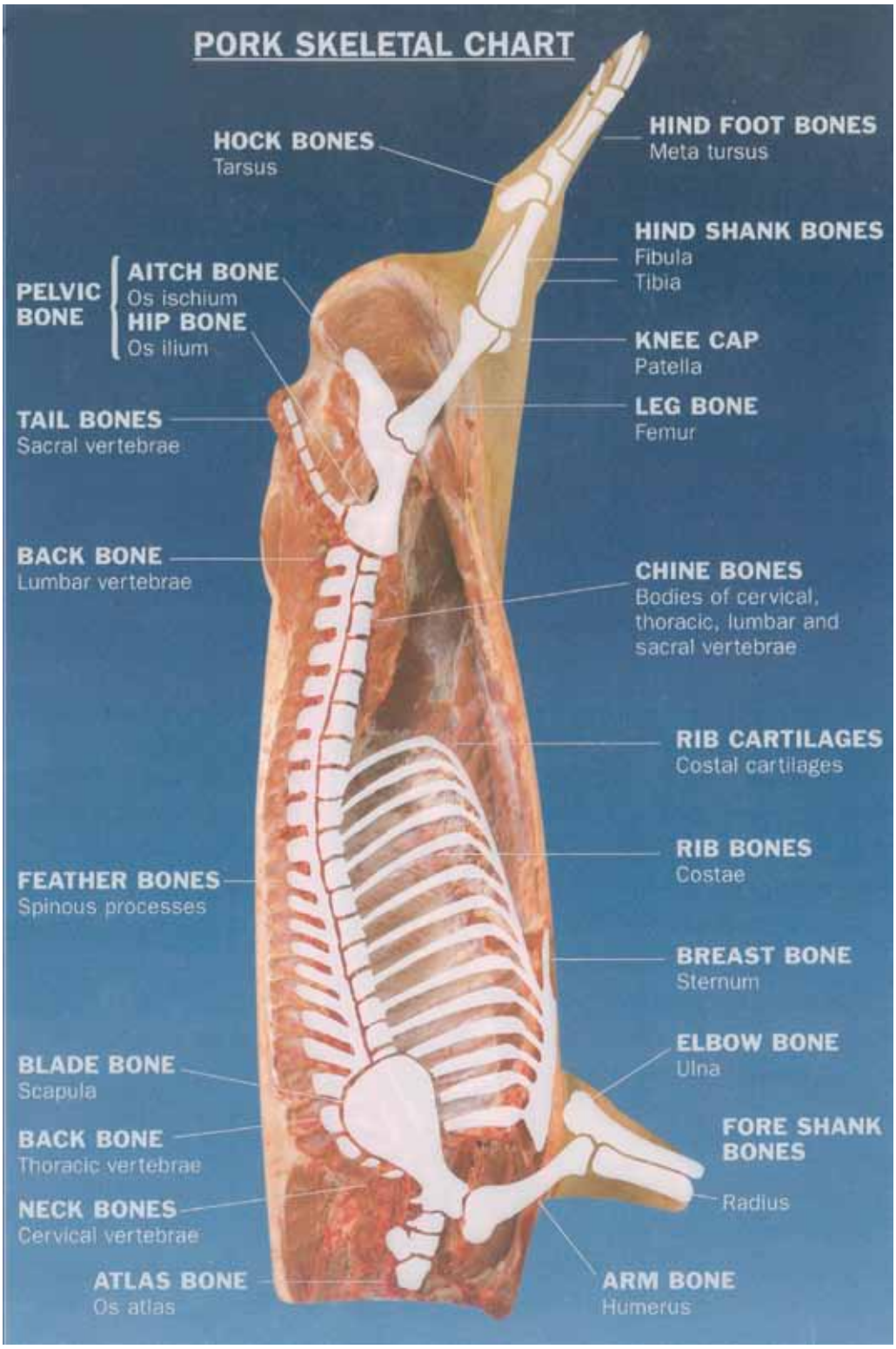

Figure No. 2 – Measurement position with the Fat-o-Meat'er

Results and discussions

Implementation in the year2006 of the EUROP porcine carcass classification system at the abattoir ROMSUINTEST PERIS forced the breading of specimen with a high content of lean meat. In this sens they were use at the breading only boars corresponding to the target, from the breed LSP-2000 and Pietrain.

In the period 2006-2008, at a carcass weight of 80 kg, the muscle tissue percent increased from 51.94 % to 57.56 % (table No. 1).

Framing in the EUROP system classes shown a larger proportion of the E and U class those with more than 50% muscle tissue, of 80% in 2006 and of 97.86 in 2008. Noteworthy is the increase in the proportion of the E class from 22.28 % in 2006 to 82.18% in 2008 (Table No. 2).

The trend n the future is to get some high weight carcasses asked also by the processing industry. Out of the sacrificed groups in 2008 they were studied the carcasses with a weight bigger than 88.79 kg at the same level with those sacrificed in EU. In these conditions the muscle tissue percent was of 56.89% with a 89% proportion of those from the classes E and U (Table No. 3).

These results showed the good trend in the porcine production for sacrificing from the hybrid PERHIB.

Table No. 1:
Evolution of muscle tissue percent at the porcine carcass

Period	N	Carcass weight		Percent of muscle tissue	
		X	Sd	X	Sd
2006	561	80.38	2.54	51.94	3.89
2007	1214	80.00	2.51	53.73	2.94
2008	797	79.37	2.56	57.56	4.79

Table No. 2:
Framing of the pork carcass in the classes E and U from the EUROP System in the period 2006 – 2008

Period	Studied carcasses		E class		U class		Total E + U	
	n	%	n	%	n	%	n	%
2006	561	100	125	22.28	328	58.47	453	80.74
2007	1214	100	503	41.43	635	52.31	1138	93.73
2008	797	100	655	82.18	125	15.68	780	97.86

Table No. 3:
Achieved performances by the high weight porcine carcasses classified in the EUROP System

	UM	X	Sd
Number of carcasses		246	-
Greutatea carcaselor	kg	88.79	2.33
Procent tesut muscle	%	56.85	5.53
Procent clasa „E”	%	65.85	-
Procent clasa „U”	%	23.58	-

Conclusions

The necessity to get porcine with a high percent of pork in the carcass forced the implementation of the EUROP system in the classification and differentiated payment, as well as the use o a genetic material that allows the obtaining of results in a short period of time.

The obtained results at ROMSUINTEST PERIS Company after the enactment of the EUROP system shows that at a carcass weight of 80 kg the increase of muscle tissue percent was from 51.94 % in 2006 at 57.56 % in 2008.

These results show the species multiple possibilities for fast adaptation at the consumers and meat market requests.

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PROSPESCTS FOR SUSTAINABLE DEVELOPMENT OF RURAL AGROTOURISM IN w AREA

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Abstract: *Designed as a necessity for reconciliation between man and nature, as a new king of development that support on long term the human progress, the sustainable development express the need for harmonization interests of the present generation with the future generation. The sustainable development, in order to answer to the present needs without prejudice the development ability of the future generations, is tightly bound with the environment issue, of its maintenance in normal parameters so as to keep along the time the sights and splendors..*

Key words: *agro tourism, sustainable development, climate changes*

Introduction

The sustainable development of the mountain agro tourism suppose the preservation of the natural and anthropogenic touristic resources in order to use them in the future, increasing livind standards for local communities, and better knowledge and awareness by the local community and visitors of the preservation idea.

The process of sustainable development planning manifest in the following plans: economic, by increasing of the exploitation degree and capitalization of resources; ecologic by avoiding the environment degradation, by increasing the labor places, practicing of some traditional skills, attracting people to make agro-tourism as a measure of physical and psychical regeneration, strengthening of local community cultural identity, reduce costs for health of the urban population who make tourism.

Materials and methods

» *Development and promotion of toustic activities* at the level of Romanian mountain rural must take into consideration the existence if some contributing factors:
- A rich still not capitalized touristic potential;
- Existence of some road communication routes that can be upgraded and developed;
- Unique landscape;
- Attraction of hunting and fishing;
- Architectural monuments and memorial buildings;
- Cultural events of national, zonal or local significance;
- Hospitality of mountain villages inhabitants;
- Existence of traditions and crafts.

» *The objective include:*
- Development of agro tourism by qualitative increasing of touristic service in order to attract more visitors,
- Development of agro touristic potential not enough exploited,

- Development if sustainable touristic initiatives,
- Improvement of environment conditions in the touristic areas,
- Improvement of touristic areas' image,
- Development and modernizing of transport infrastructure,
- Highlighting by specific action of the natural and cultural heritage;
- Promoting the tourism for recreation and sport.

» *Recovery of the Romanian mountain village originality* and of its geographic „personality", it is significant for the recovery and vitalizing of the local activity, objective that can be achieved through a complex of factors and measures that could be generated by the implementation of a good strategy, adapted to the mountain specificity, judicial and financial consequently supported;
- Reactivation of handicrafts and development of facilities in a diversify range in order to provide an occupational balance for job retaining;
- Stimulation of some alternative or parallel activities in order to get additional income (rural tourism, agro tourism);
- Promote and stimulate local economies of food and non food products processing;
- Management of production and processing structures by the agency of pattern guides;
- Management of association manner in a diversified range: micro-production households, micro-production households, vocational associations, etc;
- Building of local "public - private" institutional and partnership structures;
- Promoted legislation to enclose real issues of the rural area, including the social protection.

Results and discussions

One of the mountain agro tourism development trends is the coming back to the nature, to the healthy, harmonious environment. It is exhibits in all the countries where the actual post-industrial civilization created the need to escape from the urban environment, polluted and stressfull. Especially the tourists from the countries with advanced economy look to escape from their place, from the urban overcrowds and to find places where they can find the genuine nature, not damaged by the modern civilizations' "conquests".
Romania has great possibilities to develop the agro tourism in the mountain rural area. The geographic configuration of the country is a real natural potential, and the great variety of values of culture, history, folklore, ethnography, traditions – complete the anthropoid potential, designing the features of a rich rural touristic treasure, still not enough capitalized.
The actual agro touristic phenomenon is developing. This touristic motion towards the rural mountain is carrying money from an environment to another, from a sector to another, the impact expressing both at the micro and macroeconomic level.
The agro-tourism allows the capitalization of peasant's housing capabilities, adequately designed for receiving guests, providing services for catering, and for other complementary activities, directly dependent on the economic specific economic of the farm, as well as the leisure activities, initiation in different traditional occupations, riding, fishing, course of therapy, etc. Consequently, the agro tourism is a touristic activity designed to bring complementary incomes to the farmers by the maximum capitalization of their own resources from

the agricultural activities, anyway being their main source of income.

The agro tourism is a kind of rural tourism that uses for accommodation and catering only touristic and agro touristic guest houses, enjoying a not polluted and scenic environment, the natural touristic attractions, and the cultural historical values, traditions and habits of the rural area, the farmer's hospitality.

The agro touristic pensions are touristic structure, having an accommodation capability up to 8 rooms, running in the peasants houses or in independent buildings that provides the accommodation and the possibility to attend to household or crafts activities.

In the agro touristic pensions, the tourists are offered meals prepared from natural products, mainly from own household or from local authorized producers , and the hosts mange themselves for receiving the tourists, and for their program along the stay in the pension.

In the agro touristic pensions it develops at least an agricultural activity, livestock breading, plant crops or it is developed at least a craft with a workshop where are made different handicraft items. Those activities must develop continuously or, depending on specific or seasonality must have repeatability character.

Location of the agro touristic pension must be done in places away from pollution an any other form that can affect the health of safety of the tourists.

The endowments form rooms and rest rooms designed for the tourists will be only for tourists. Inside them they are not allowed the personal stuff of the locator (clothing and footwear, trinkets or other objects that could hinder the tourists). When the rooms for cooking and catering are also designed for other consumers from outside, and the number of seats is higher than those of stay, but not less than 40 seats, those rooms are classified as catering facilities, according to the law.

The rural mountain area, by its specific components satisfy a wide range of motivations: rest and recreation, knowledge, culture, sport, cure of clean air or spa, hunting and fishing, giving to the agro tourism a wide range of comprehension for the holiday. Thus the mountain agro tourism is a mean of full recovery of the rural environment with its agriculture, forestry, touristic, human and technical economic potential.

Agro tourism has some features to distinguish them from traditional tourism:

- Specific landscape offer, rich and varied, depending on the season;
- The touristic consumption occurs in rural environment where are essential: the quality of pension and hosting services at the farmers, knowledge of the natural, human and cultural environment, as well as the originality of the touristic products;
- The touristic offer is genuine, differentiated, multiple in its diversity, organized and managed by farmers, hence the village peoples;
- Quality and naturalness of the food products, give a special value of organic comfort;
- It is a complementary activity for the farming and its alternative or substitution;
- Offers to the tourists with low incomes a possibility for rest, leisure holydays or weekends in the picturesque rural landscape with cultural educational values and a specific hospitality;
- can be practiced in winter, combined with specific sports (skiing, sledding, etc.);
- Not require huge investments for tourism infrastructure and superstructure facilities or other specialized equipment;

- Avoids large tourist overcrowds from seaside and mountain resorts;
- It is a "diffuse" tourism by its versatile offer specific with a wide dissemination;
- It isn't compatible with mass tourism.

Rural tourism in general, and especially the mountain agro tourism are regarded as promising options for future because so can be achieved an economic development of the localities with a main agricultural and forestry specific, with favorable consequence for drawing or keeping the population in the rural area, for improvement of the agricultural activities in the disfavored area, for confinement of the social isolation effects, especially for the inhabitans of mountain villages or settlements.

Conclusions

Main direction for capitalization of the rural potential are:
• Re-stabilizing households and the entire agricultural policy
• Stimulating non-agricultural activities complementary, especially by creating new business agricultural and services units by capitalization of the touristic and agricultural potential;
• Selecting specific Romanian ethnographic locations areas to finance development projects for rural tourism;
• Elaboration of studies and projects of local rural development, especially as project for sports, leisure and cultural entertainment, touristic programs, in order to offer to the tourists in the rural area a large range of occupations and attractions.
Capitalization of the Romanian mountain village resources can be done by the agency of different fairs, festivals, competitions coming to complete a favorable image of the village. However the main and the most significant way to capitalize these resources remain the agro tourism.
If the classic definition of the tourism it shows as "an activity with a recreational and/or sportive character consisting in crossing on foot or by different means of transport of some spectacular or interesting regions from some peculiar point of view", the agro tourism is therefore a tourism in rural areas, along the peasant household as an economic factor of local development, resulting from customer services to meet their needs.

This activity with extensive coverage is based on three interrelated elements:
• Attraction to natural beauty, ethnography, novelty, charm and life to country specific events;
• Accommodation and meals, even if they are not at hotel standards must be quality and hospitality offered;
• Transportation, access to rural areas is vital to ensure a continuous flow of tourists.

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PROMOTING THE TRADITIONAL GASTRONOMY FROM VRANCEA LAND

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Abstract: *The traditional gastronomy products from Vrancea Land are obtained from area specific rough materials, using traditional recipes, inherited for ages, which are used traditional and modern utensil.*
The obtained products obey the international and international law concerning the consumer protection and environment protection, therefore they are used not only for self consumption but they are also implemented in the package tour leading this way to the agro tourism development in the Vrancea Land. We invite you in Vrancea Land to enjoy the flavor of the traditional cuisine that emphasize so well the region placed at the confluence of Eastern and Western influences.

Key words: *traditional gastronomy, ecologic rough materials, agro tourism, sustainability, consumer protection*

Introduction

Romania has a real touristic potential which offers to the visitors many natural richness and beauties, „a heritage of traditions, customs, living history", cordial and hospitable inhabitants who welcome you with abundant meals. The interference of oriental and occidental influences make the Romanian cuisine a unique gastronomic space in the world with sometimes astonishing dishes, original without any doubt.
The result of these intertwining is the outline of a manifold cuisine where they meet simple dishes from the peasants table, as well as exquisite dishes, very attractive and tasty.

Materials and methods

The target of this paper is the study of the gastronomy role in the agro tourism development and promotion of traditional gastronomy from Vrancea Land keeping an eye on the consumer's requests satisfaction.
A travel in Vrancea is not only an opportunity for contemplation of the beauty and diversity spectacular scenery, a trip to a genuine spiritual universe, but also a meeting with the traditional cuisine surprisingly varied and rich in flavors and colors, that manage to satisfy even the most exigent requests
Refined and also the less initiated connoisseurs are invited to come in order

to know it better and to taste the dishes and enjoy the outstanding wines offered by the Odobeşti, Panciu, and Coteşti vineyards, well known in Europe, America and Asia thanks to their quality.

Results and discussions

Being placed at the road junction, the gastronomy in Vrancea Land has refined itself keeping the specific and tradition inherited in the cuisine art. The traditional celebrations and rustic festivities are an opportunity for joy and fun, and also for the gastronomic festivals, with tastefully decorated tables with delicious dishes. But the only way we can know about a region, and assess the tradition and the dishes it is to taste a good meal.

Being good Christians, the Vrancea people obey all the fast days along the year. Depending on season they cook bean sour soup with wax cherries, called in the region as „muşmuşe", that make the soup more sour, stimulating the desire, fast day roll of cabbage with rice and spices, mushrooms cooked with garlic, baked beans with pickles. On holydays they know to party and have abundant meals. Prominently is the lamb steak, kell, pork sausages, stew, "cartaboş", and also desserts as sponge cake, "poale-n brâu" cheese pie, and the flat cakes with plenty of nuts.

If you halt on Vrancea region, you'll meet hardworking honest and hospitable people, who will accommodate you in the large house and put on the table all the culinary goodies: sour soups with borsch, cabbage juice, sour grape or wax cherries, and cleared with cream and eggs, different cheese with hot polenta, dishes of meat and vegetables, spiced with dill, parsley, lovage, thyme, pepper, garlic that invites you with their flavor, sprinkled sparingly with natural wines from own production.

And you cannot stand up from the table without tasting the donuts dusted with a lot of sugar, dumplings with plums and cheese pies.

The traditional gastronomy from Vrancea contains delicious food Vrancea people are proud of:

- smoked ewe-cheese and ewe-cheese dolls;
- Soveja pressed cheese;
- smoked trout in fir-tree branches;
- local wines.

» Smoked ewe-cheese and ewe-cheese dolls from Negrileşti

Negrileşti locality, placed in Vrancea Mountain is recognized in the entire region because here the villagers produce from ages, using traditional methods, smoked ewe-cheese and ewe-cheese dolls (Picture No. 1).

The ewe-cheese moulds are round, with solar themes that can be found in the European Folk Art; the rectangular mould form Vrancea (the ewe-cheese dolls), have human silhouettes and faces, being therefore unique in time and space. Small pieces of art, the moulds from Vrancea are "the most astonishing human image from the entire Romanian Folk Art"

Proud of wood carving art for moulds and for ewe-cheese dolls manufacture, the local craftsmen try to preserve the inherited tradition and to transfer from generation to generation.

» Soveja Cheddar

Soveja "carved" Cheddar is obtained using a traditional recipe, inherited from ages and known only by the locals. The ewe-cheese obtained from caw milk is pressed in maple wood carved moulds with symbols of which signification is from the paleochristian time: ram's horn symbolizes

fertility, braided rope suggests continuity, the Sun is God, wolf teeth from the ewe-cheese edge remember about the durability of fir tree leaves. During the "rest time" in moulds so called "păpușare", the symbols are printed on ewe-cheese coils. The ewe-cheese „păpușare" can be smoked with cold smoke of fir-tree sawdust and branches that give to the Pressed cheese a special flavor, unmistakable (Picture No. 2).
Fruit of Romanian folk art passed down from generation to generation, the ewe-cheese moulds so-called "păpuşare" are sometimes hanged at at home beam as a decorative element.

» Smoked trout in fir-tree branches
The ancient trout preparation methods in fir-tree branches are still preserved in the mountain region of Vrancea County, more exactly in Lepşa locality. The fresh fish is primarily processed: the scales are removed; it is eviscerated, wash and put made over salt for about 12 hours (it is salted depending of costumers taste). It is smoked with beech smoke, in a special made oven for about 24 hours; the method is known as hot smoke smoking (Picture No. 3).
After smoking, it is packed in a small fir-tree branches basket, known as "hârzob", that will give it the fir taste (Picture No. 4). The fish is served with lemon and wine from Vrancea vineyards. The "hârzob" can be kept a few days in cold places, in a ventilated room in order to preserve the fish quality.
The people from Vrancea are the only people who smoke the trout with different wood essences: fir, beech, mulberry, and plum. The smoke from beech gives to the fish a sweetish taste, while the cherry tree smoke or even pine cones used in other regions, give to the fish a bitter taste.

» Sheep ewe-cheese with polenta
The villagers from Vizantea-Livezi locality invite you to taste the traditional sheep ewe-cheese with hot polenta. (Picture No. 5).
Grass pastures from this less polluted area give a special flavor to the sheep milk, and the cheese is much appreciated.

Conclusions

The disappearance of the peasantry drives us away every day, more and more from traditional Romanian cuisine sources. Today, when the humanity evolves rapidly, only the traditional cuisine still bound us to the original rhythms of the nature. The products specific to the region as: Panciu sparkling wine, wines of Odobești, Panciu and Cotești, Smoked trout in fir-tree branches, Smoked ewe-cheese in carved wood moulds (ewe-cheese dolls) are a brand for Vrancea Land making it well known on national level, and they also can become a brand in European Union. If you reach those places do not hesitate to discover the taste of some traditional dishes, liberally sprinkled with lovely natural white or red wines, in a pleasant atmosphere. And you cannot resist to this invitation because the tastes and flavors harmony we try make you eat much more you want to.

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Picture No. 1 - Ewe-cheese dolls from Negrileşti

Picture No. 2 – Soveja pressed cheese

Picture No. 3 – Smoked trout

Picture No. 4 - Smoked trout in "hârzob"

Picture No. 5 – Ewe-cheese with hot polenta

POTENTIAL OF SWEET CHERRY INTERNATIONAL TRADE CONNECTED TO THE ANNUAL PRODUCTION WORLD DYNAMICS

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Abstract: *„A sustainable society is the one that designs the economic and social system in such a manner the natural resources and life support system are maintained", emphasized the eco-economics American expert Lester R. Brown. In Foreign Policy Magazine, he describes how,,... the new food geopolitics already begun in 2011 to contribute to revolutions in different countries (13)" In the last period of time increased very much the concern for natural resources preservation and protection. European Commission has as a major interest the establishment of agro-ecologic indicators. Also, it is asked to the member states the use of good agro-environment practice as additional measures after paying respect to the good agricultural practices.*
Therefore, the start idea in this scientific paper is the PhD thesis of the main author, that presents the development of an expert system of the fields and orchards management, integrated system that quantify the resources of climate, soil, and those of infrastructure, specific to the orchard fields in general, and for the cherry and sweet cherry orchard in particular.

Key words: *sweet cherry, international trade, sweet cherry production.*

Introduction

In the annual rankings issued by the Food and Agricultural Organization – F.A.O., 34, concerning the food production dynamics for the first 20 countries from the annual world ranking, sweet cherry has a distinct place.
By the competitive implementation of the advanced management, an especially of the efficient marketing, it can be accomplished and approved for our country, in the following years, a national trading brand in the field of sweet cherry production and capitalization, where we had and still have a well known tradition (Mihaela Rusu, 22, 24).
They are well recommendations for sweet cherry human consumption based on the favorable content of nutrients (Budan, 6, 7).
In the actual context of the economic/ financial crisis, we appreciate they must studied, known, and capitalized the advantages of the competitive production of natural food resources from oarchards ecosystems, grounded on eco-pedological favorabilities of the sweet cherry culture areas (Voiculescu, 28, 30, 31, Cepoiu, 9, 10).

Materials and methods

These research are part of the PhD thesis „Research concerning the design of an expert system for sustainable management of the sweet cherry and sour cherry in

ROMANIA", displayed at the University of Agricultural Sciences and Veterinary Medicine Bucharest (Mihaela Rusu, 23).
Out of the FAO official statistics for the period 2066-2009, they were extracted the annual ranking of the first 20 countries that produce and trade sweet cherry.
We mention that for ROMANIA, the sweet cherry varieties cultivated and capitalized in the period 2006-2009 were mainly the following: Van, Rubin, Stella.

Results and discussions

The obtained results are synoptically displayed in the Tables 1 and 2, and in the Diagrams 1, 2, 3, and 4. It is found that in the ranking of the first 20 countries producing and trading sweet cherry at national and international level, ROMANIA is constantly in the first 5-9 countries, which has several eco-economic and bio-economic connotations.
Thus, out country had the fifth place in the world in 2006 both in term of production (in thousand tones – 104,791) and value (in thousand dollars – 133,217), and in the year 2009 it was among the first 10 in the world, more exactly on the 8th place, both concerning the production (in thousand tones 69,000) and the value (in thousand dollars – 86,286).

Conclusions

1. In the annual world dynamics of the sweet cherry production, ROMANIA was constantly in the period 2006-2009 in the first 10 places, having in 2006 the outstanding performance of getting the 5th place in the world both for production level (in thousand tones – 104,791), and value (in thousand dollars – 133,217).
2. In the condition of the economic-finance globalized crisis and of the occurrence of obvious food insecurity sequences it is justified the recommendation of further development in our country of the sweet cherry production for which there is a scientific proved favorability.
3. By the natural climatic variations of some groups of countries in the annual rankings of the first 20 contries for the world sweet cherry production there are favorable conditions of bio-productive potential along the months of the year, so that in combination with the biodiversity of the sweet cherry cultivated varieties, to be accomplished the consumers'requests based on the marketing mix principles.

Table 1:
World ranking of the first 20 countries producers of sweet cherry depending on the quantity and value

World sweet cherry productions in 2006 and 2007							
Position	**Producer countries**	**2006**		**Position**	**Producer countries**	**2007**	
		Production (thousand tones)	**Value (thousand dollars)**			**Production (thousand tones)**	**Value (thousand dollars)**
1	Turkey	310,254	394,417	1	Turkey	398,141	506,145
2	United States	266,349	338,602	2	United States	281,862	358,323
3	Iran	225,000	286,036	3	Iran	200,000	254,254
4	Italy	110,910	140,996	4	Italy	106,189	134,995
5	**ROMANIA**	**104,791**	**133,217**	5	Russian Federation	100,000	127,127
6	Spain	91,672	116,540	6	Spain	75,738	96,283
7	France	68,122	86,601	7	Sirya	75,034	95,388
8	Sirya	62,966	80,046	8	Ukraine	68,200	86,700
9	Uzbekistan	53,605	68,146	**9**	**ROMANIA**	**65,163**	**82,839**
10	Russian Federation	50,000	63,563	10	Greece	60,700	77,166
11	Ukraine	48,900	62,165	11	Uzbekistan	55,000	69,920
12	Greece	43,700	55,554	12	France	47,557	60,457
13	Chile	41,000	52,122	13	Chile	45,000	57,207
14	Poland	38,364	48,771	14	Germany	34,452	43,797
15	Germany	31,637	40,219	15	Austria	33,890	43,083
16	Austria	27,243	34,633	16	Lebanon	30,000	38,138
17	Lebanon	23,400	29,747	17	Serbia	28,546	36,289
18	Serbia	23,302	29,623	18	China	22,000	27,967
19	Japan	20,800	26,442	19	Poland	20,186	25,661
20	Bulgaria	20,504	26,066	20	Bulgaria	18,427	23,425

Table 2:
World ranking of the first 20 sweet cherry producer countries depending on the quantity and value

World sweet cherry productions in 2008 and 2009							
Position	**Producer countries**	**Producer countries**		**Position**	**Producer countries**	**Producer countries**	
		2008				**2009**	
		Production (thousand tones)	**Value (thousand dollars)**			**Production (thousand tones)**	**Value (thousand dollars)**
1	Turkey	338,361	430,148	1	Turkey	417,694	531,002
2	United States	225,073	286,129	2	United States	390,000	495,796
3	Iran	198,768	252,688	3	Iran	225,000	286,036
4	Italy	134,407	170,867	4	Italy	116,200	147,721
5	Ukraine	74,700	94,964	5	Spain	96,400	122,550
6	Spain	72,466	92,124	6	Syria	78,289	99,526
7	**ROMANIA**	**67,664**	**86,019**	7	Russian Federation	69,000	87,717
8	Russian Federation	63,000	80,090	**8**	**ROMANIA**	**67,874**	**86,286**
9	Uzbekistan	61,000	77,547	9	Uzbekistan	67,000	85,175
10	Syria	48,300	61,402	10	Chile	56,000	71,191
11	Chile	46,000	58,478	11	France	53,577	68,110
12	Greece	42,000	53,393	12	Ukraine	53,000	67,377
13	Poland	40,818	51,890	13	Poland	50,505	64,205
14	France	40,356	51,303	14	Greece	48,051	61,085
15	Lebanon	31,000	39,409	15	Germany	39,463	50,168
16	Serbia	29,551	37,567	16	Lebanon	34,662	44,064
17	Austria	26,790	34,057	17	Austria	30,276	38,489
18	Germany	25,166	31,992	18	Serbia	29,228	37,156
19	China	25,000	31,781	19	China	27,000	34,324
20	Japan	17,000	21,611	20	Japan	18,000	22,882

Diagram 1:
Countries' World Ranking of sweet cherry production on 2006
(in thousand tones and thousand USD)

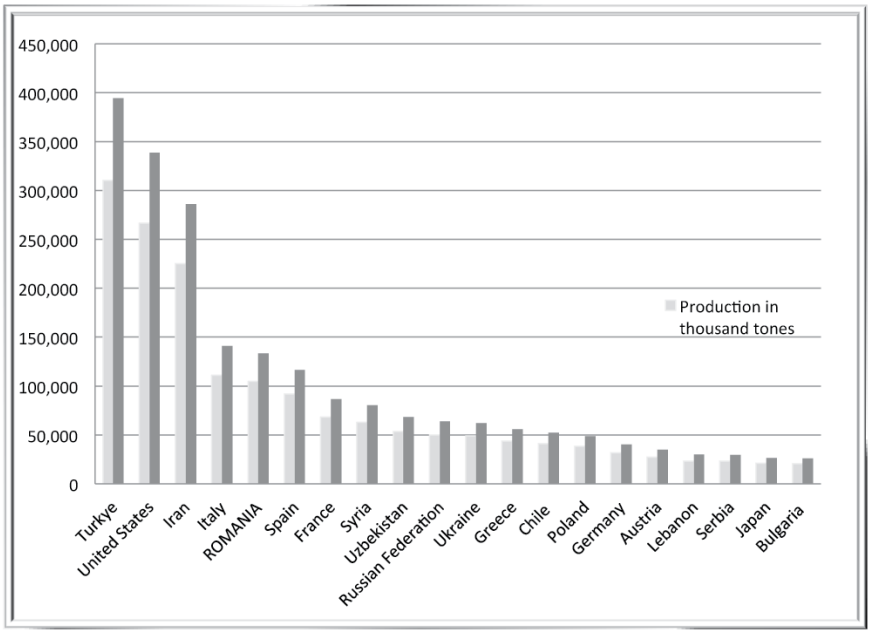


Diagram 2:
Countries' World Ranking of sweet cherry production on 2007
(in thousand tones and thousand USD)

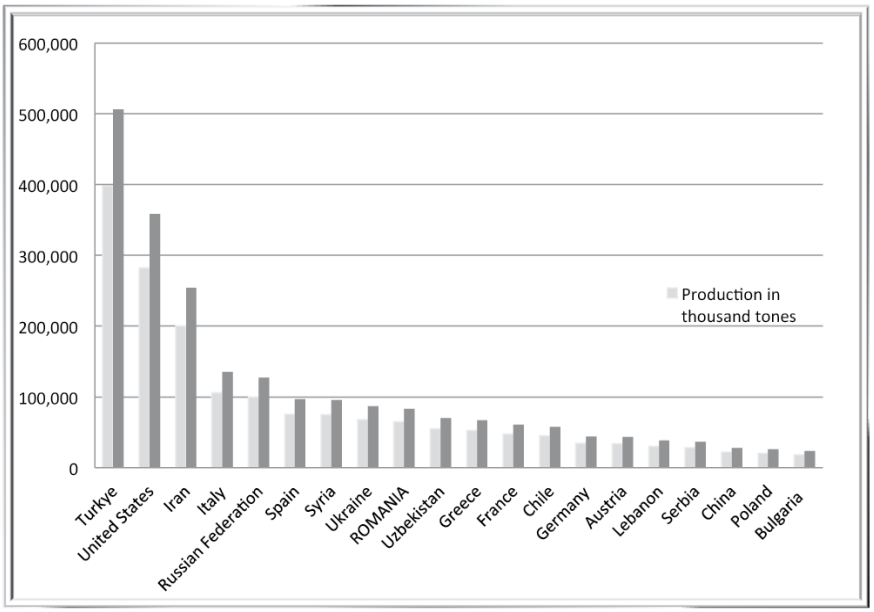


Diagram 3:
Countries' World Ranking of sweet cherry production on 2008
(in thousand tones and thousand USD)

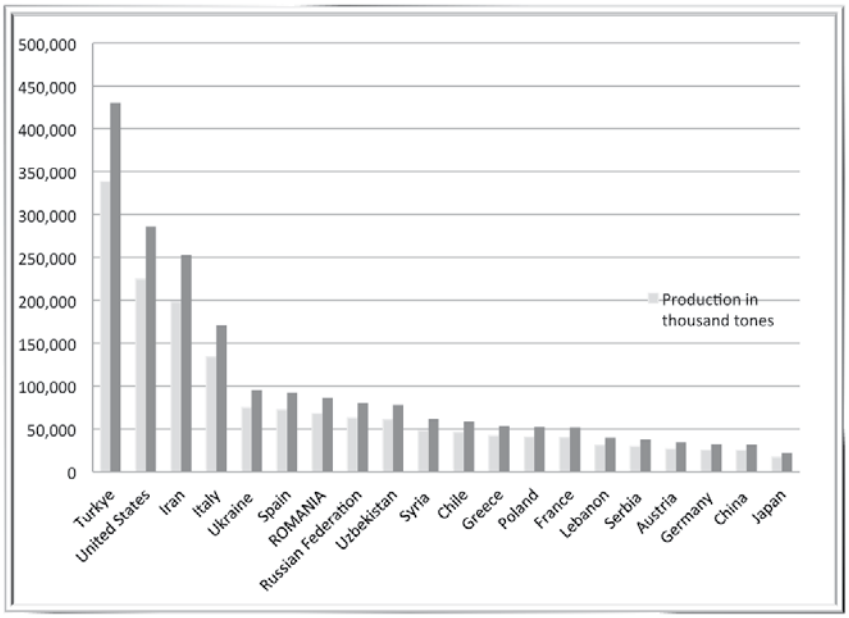
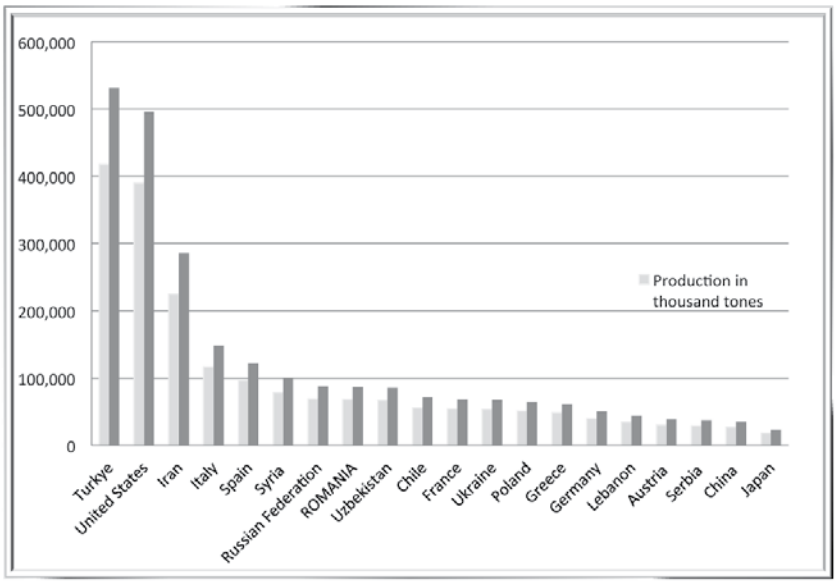


Diagram 4:
Countries' World Ranking of sweet cherry production on 2009
(in thousand tones and thousand USD)



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CONTRIBUTIONS TO ESTABLISHING THE NUTRIENT REQUIREMENT IN ORCHARDS

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Abstract: *Research was performed at the didactic farm S.C. Frasinu S.A. Buzău, in the period 2006-2011. They were implemented methods of biologic inspection and initiation on the experimental fields. These studies are together with many phyto metric, physiologic, agrochemical measurements, and static determinations.*

Key words: *fruits species, nutrients, fertilization, productivity.*

Introduction

Mineral nutrition and consumption of minerals at fruit tree species show some essential differentiations due to polycarp character of these species, root system peculiarities, and intensive character of the implemented technologies in forced conditions, repeated and prolonged, with implications on the evolution of soil properties and environmental preservation.
From the phonologic point of view the fruit trees have in the vegetation period growth and fructification phenophases taking place simultaneously. For instance the vegetative growth, flowering and flowers fertilization, fruit formation, fruit bud differentiation, etc., each one involves a consumption of different substances.
Fertilization in pomiculture mainly involves the use of organic fertilizers from farms and supplementary addition of mineral fertilizers. In the modern pomiculture when the available organic fertilizers are correctly used, the mineral fertilization is less important.
The level of soil fertility must be periodically tested by soil analysis and a nutrients assessment (inputs, outputs, losses). The most representative indicators of fertilizer application on fruit tree are:
- Basic physicochemical characteristics that determine the status of soil fertility;
- root system development and its ability to absorb nutrients;
- plantation age and production potential; vegetal condition expressed by the number and length of annual shoots or annual branches.

Materials and methods

Research in the field of mineral nutrition in intensive orchards was performed in the years 2006-2011 at the didactic farm S.C. FRASINU S.A. Buzău. The experiments established in the field by the co-workers of the Agricultural Sciences Chair of the Faculty of Agro Touristic Management Buzău: Manolache Constantin, Atudosei Nicole Livia, Sava Nina, included alternative options with different rootstock and homologated varieties, with different doses

of fertilizers before the planting in the young orchard and productive orchards, using different planting distances, top growing and cutting systems.

The orchards fertilization assessment was performed grounded on the study of phyto metric and plants mineral nutrition parameters, of the biologic and useful productivity. They were used different assessment methods of the soils fertility degree and for establishment of the fertilizers doses: soil agrochemical analysis; foliar analysis; experimental method; morphophysiological and physiological method; nutrient balance method.

Sampling of soil, roots, leaves, twigs, branches and fruit for analysis, as well as their chemical composition assessment where performed by currently used methods of chemical analysis laboratories in the country.

Results and discussions

The fruit trees extract form the soil variable amounts of macro and microelements.

The consumption is very different depending of species, variety, rootstock, age, cultivation system, crop level, and other factors. According to the obtained results at the Agricultural Sciences Chair in the years 2006-2011, the global nutrient consumption (including fruits, leaves, branches, buds, flowers, roots) calculated per ton of fresh fruit is shown in the Table 1.

The analysis of obtained data shows the trees extract form the soil mineral elements placing them in the growing and fruiting organs, in different amounts and ratios according to their physiological requirements. Each species has a specific consumption and mineral composition, determined by genetic characteristics of the variety and rootstock. It appears that for a ton of fruit at pomaceous it is used 1.5- 2.6 times les nitrogen, phosphorus and potassium than to the drupaceous species. Nutrient consumption is highest in shrubs trees.

Among the fruit trees species, the largest amounts of nutrients are extracted from the soil by cherry, followed by peach, apricot and plum. Fruits chemical analysis shows the drupaceous species have the fruit richer in nutrients than the pomaceous species because they extract larger nutrient amounts from the soil. This will be taken into account when drawing up the fertilization plan.

Nutrients consumption. This increases annually with the tree's trunk and roots. In the youth period, when prevails the vegetative growing process the trees react positive to Nitrogen and Potassium forming macro and micro-structures of the crown and start faster the fructification. During the fructification period of the trees the nutrients consumption vary depending on species, variety, rootstock, trees age, agrotechnics and orchard productivity, culture and soil maintenance system.

Accumulation, structure, and balance sheet of extracted nutrients from the soil in the growing period of apple trees is relatively uniform:

- 65-75 % of the nutrients are fixed in the wood of the tree;
- 25-30 % goes back in the soil with the fallen leaves;
- 4-5 % is removed from the plantation by cutting.

In the growing and fructification period of the trees, out of the amount of elements extracted from the soil 6-10% are removed from plantation by harvested fruits and cutting. Once with the leaves falling 30-35% of nitrogen, phosphorus, and potassium go back in the soil and the rest of nutrient

(50-59%) snap into wood trees. During the fructification period the snapped nutrients in the plantation form 20-25%, leaves – 48-52%, elimination of nitrogen, phosphorus, and potassium after cutting and fruit harvesting – 30-35% of the total amount of nutrients annual extracted from soil.

The amounts of nutrients extracted from soil and snapped in wood and harvest shows the fertilizers requirements to avoid the progressive soil depletion. Besides these nutrients amounts extracted by the trees they occur significant losses by soil erosion and water looses from precipitations. In order to maintain the fertility status and the orchard productivity, it is necessary the fertilization. As long as the trees become older and yields are higher, the consumption of nutrients and fertilizers should be increased.

The fertilization system contains principles and measures relating to dosing of fertilizers, order of application for organic and mineral fertilizers, technological measures, time and methods of fertilizers application.

The type and dose of fertilizers is different depending on the culture system, land fertility, rainfall regime, orchard productivity, etc.

Level of trees providing with nutrients from soil is determined both by agrochemical method and the experimental method by foliar diagnosis. Based on data obtained it is established the dose and ration of mineral fertilizers for some certain conditions.

Fertilization supply. The application in-depth of phosphorus and potassium is necessary and justified on all kind of soils poorly stocked with mobile phosphorus and potassium. To the settlement of nutrients doses following to be incorporated into the soil it is considered the soil volume from 0-60 cm depth for fruit trees, and 0-40 depth for fruit shrubs, layering, and tree school (Table 2).

In the layering with a period of exploitation of 3-4 years, in the strawberry plantations and trees school, the organic fertilizers doses of phosphorus and potassium are computed after agrochemical parameters and the nutrients balance for entire exploitation period.

In the orchards for fruits, in the seeds orchards, in the orchards for graft branches, in the the blackberry and raspberry plantations, and in the layering having 8-12 years of exploitation the doses of organic fertilizers, of phosphorus and potassium it is rational to be computed by the method of assessment of a certain supply level of soil nutrients considered satisfactory for that kind of soil that provides the plants requests along 3-4 years. The fertilizers doses are settled according to the analytical values of the soil content in N, P, K and their raising with the necessary number of mg. per 100 g soil.

Nutrients use coefficient of organic and artificial fertilizers vary in wide rang depending on dose, soil, cultivated species (Table 3).

Improvement of the supply level with P and K needs large quantities of fertilizers because a large part of them are fastening by the soil colloids. According to the computations for each mg of P_2O_5 / 100 g. of soil it will be given a dose of 500-550 kg/ha superphosphate, and in order to increase the K_2O concentration with one mg./100 g of soil it will be given a doses of 300-350 kg/ha potassium salt 28-32%. The fulfilling of necessary supply levels with assimilable nutrients, especially on poor and eroded soils, it will be possible to be achieved by provision fertilization at once with the works of turning the soil. Local provision fertilization is performed before the planting, along the rows, with special machine incorporating phosphorus and potassium fertilizers in different depths.

In order to provide in the planting year good nutrition conditions, they are given locally fertilizers. At each hole they are given 10-15 kg of manure well fermented, 25-30g. P2O5, and mixed with the soil used for planting.

NPK maintenance fertilization. Provision fertilization before the planting, usually provides a high nutritional level for trees along 4-5 years until the beginning of fructification.

Fertilizers with nitrogen in the young orchards are given in the case of small growth of the sprouts and leaves. The nitrogen doses are settled depending on the soil and leaves agrochemical analysis. It will be follow the nitrogen supply state is at least 20-30ppm. Considering the obtained data, the regional recommendations and own observations about the plantation general state, the practitioner establish the fertilization dose.

They will be given 45-60 kg/ha of Nitrogen. The fertilizers are brought into the soil in the springtime, before the beginning of vegetation, in parallel stripes with the trees rows at a distance of 0.8-1.0 m from the trunk, at the depth of 10-12 cm. in the fruiting orchards the fertilizers must be regularly used. The used doses must balance the quantities of nutrients exported from the soil year after year once with the harvest of fruits and other organs of the plants. The fertilizers doses are settled depending on the soil content in N, P2O5, K2O, and forecasted production.

On the soils with an average and good fertility it is used the doses determination method after agrochemical parameters and the nutrients balance. For the calculation of fertilizers doses (D) it is proposed the following relation where they are taken into consideration the quantity of elements extracted from the soil and affixed in the annual growth and harvest (Table 1), correction coefficient of that element (Table 5), and the restitution in the soil coefficient of the element by leaves and other plant organs.

$D = R \times Cspt \times I \times 0,5 - M \times Ka$ kg/ha

where:

R is the planned harvest (t/ha);

Cspt = nutrients specific consumption (N, P, K) per ton of fresh fruits, inclusive what it is extracted by leaves and annual growths (kg);

I - doses correction parameter related to soil content in nutrient (N, P, K), according to the chemical analysis;

0.5 – nutrient restitution element (N, P, K) in the soil by fallen leaves and other plant organs;

M – nutrient quantity of (N, P, K) brought into the soil in the last 1-4 years (kg/ha);

Ka – action coefficient of that element (N, P, K) in the following years for which it is done the computation, experimentally determined.

In the fruiting orchards for each estimated ton of fruits, depending of species, they are given the following fertilizers doses (Table 6). Soil Nitrogen supply is checked every year, and for Phosphorus once every three years. Soil fertilization in the biologic pomiculture consisted in a basic fertilization in the fall and fertilizations during the vegetative period.

In the fall can be impelemented the following alternatives:

- manure 20-40 t/ha, every 2-3 years;
- sheep manure 10-15 t/ha, every 2-3 years;
- bio-dynamic compost 5-15 t/ha, every 2-3 years;
- poultry litter 2-4 t/ha;
- green fertilizers every 2 years.

In the springtime, depending of species, culture system, age, fruits quantity in the tree, they are necessary 40 - 60 kg/ha nitrogen as: manure, compost etc.

The perennial characteristic of the fruit tree species determined the formation in time

of an ecosystem where the plant influences its living environment and this determin the necessary adaptations for the plant to keep the physiologic balance of growth – differentiation – fructification. Therefore it results an ecosystem characterized by specific relations concerning the substances exchange with the environment. Only based on knowledge of a natural fruit-growing potential and of their elements compensation relations, they can be elaborated eco-pedological technologies to promote the obtaining of high fruit production and low costs in the conditions of maintaining and even increasing of soil natural fertility.

From the technological point of view it is proposed to group the specific factors that interfere with the mineral nutrition at the fruit-growing species and their productivity in three classes (Table 7).

Researches in the field of mineral nutrition at the fruit tree species show the elaboration of technology in one orchard or another it is necessary to be taken into account the specific of local eco-pedological conditions. If the culture system, planting distance, soil maintenance system, and irrigation have an ecologic basis, soil fertilization and works used improve the ecosystem productivity and doubtless the fruit harvest.

Table1:
Quantity of nutrients annual extracted from the soil by fruit trees and bushes to form 1000 kg of fruits (kg/ha)

Species	N	P_2O_5	K_2O
Apple tree	2.9-3.2	0.8-1.0	4.5-4.8
Pear tree	3.0-3.4	0.9-1.2	4.9-5.2
Quince tree	2.4-2.7	0.8-0.9	3.2-3.7
Plum tree	5.5-6.0	1.5-1.7	6.0-6.3
Cherry tree	6.0-6.3	1.7-2.1	8.1-8.3
Apricot tree	5.0-5.2	2.1-2.3	5.9-6.2
Peach tree	5.7-6.0	1.6-1.8	8.0-8.1
Blackberry	9.0-9.3	3.5-3.7	5.1-5.3
Raspberry tree	6.5-6.9	2.5-2.6	4.5-4.8

Table 2:
Mass of soil arable layer that has to be enriched (t/ha)

Soil texture	Apparent density (g/cm)	Depth (cm)	
		0 - 40	0 - 60
Argillaceous	1.18-1.25	4700 - 4840	7050 - 7260
Loamy	1.28-1.33	5100 - 5300	7650 - 7950
Sandy	1.38-1.42	5500 - 5700	8250 - 8550

Table 3:
Use coefficient of N, P, K from manure and mineral fertilizers (%)

Kind of fertilizer	N	P_2O_5	K_2O
Manure	20 - 25	30 - 35	65 - 70
Chemical fertilizer	40 - 70	12 - 40	55 - 65

Table 4:
Correction coefficient of fertilizers doses after the nutrients balance in relation with the soil chemical analysis (according to many authors)

Soil supply status according to the agrochemical parameters	Species		
	Strawberry	Pomaceous Drupaceous	Blackberry, Raspberry
Nitrogen fertilizers			
Poor	1.2	1.3	1.3-1.5
Middle	1.0	1.1	1.3
Good	0.9	1.0	1.2
High	0.8	0.9	1.0
Very high	0.7	0.8	0.8-0.9
Phosphorus fertilizers			
Poor	1.7-2.0	2.0-2.3	2.3-2.6
Middle	1.5-1.7	1.7-2.0	2.0-2.3
Good	1.2-1.5	1.2-1.5	1.3-1.6
High	0.6-0.8	0.8-1.0	1.1-1.3
Very high	0.2-0.3	0.4-0.6	0.6-0.8
Potassium fertilizers			
Poor	1.5-1.7	1.7-2.0	2.0-2.3
Middle	1.2-1.3	1.3-1.5	1.6-1.8
Good	0.7-0.8	1.0	1.2-1.3
High	0.4-0.6	0.6-0.8	1.0
Very high	0	0.2-0.4	0.4-0.6

Table 5:
Using coefficient of the nutrients from fertilizers

Action year of the element	Organic fertilizers			Chemical fertilizers		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O
1	0.10-0.15	0.10-0.15	0.10	0.20	0.15	0.20
2	0.15	0.10	0.10	0.10	0.10	0.15
3	0.05-0.10	0.10	0.05	0.05	0.05-0.08	0.10
4	0	0	0	0	0.05	0.05-0.08

Table 6:
Average quantity of fertilizers for each ton of fruits (kg)

Species	N	P_2O_5	K_2O
Pomaceous	1.8-2.1	0.8-1.2	2.7-3.1
Drupaceous	3.4-3.7	1.6-2.0	4.0-4.9
Fruit bushes	4.1-4.3	1.5-1.6	3.8-4.2

Table 7:
Orchards productivity classes

Productivity	Determinant factors of productivity
Very high and high productivity	Optimum and moderate eco-pedological conditions, technology eco-pedological differentiated, assortment of very high and high productions and of superior quality, without soil restrictions or with small restrictions.
Intermediate productivity	Moderate eco-pedological conditions, partial differentiate eco-pedological technology, assortment of moderate and low productions and intermediate quality with soil restrictions or possible to be improved restrictions.
Low and very low productivity	Critical eco-pedological conditions, technology not differentiated eco-pedological (standard), assortment of low and inferior productions, with soil restriction not improvable or hard to be improved.

Conclusions

The consumption of mineral at fruit trees is influenced not only by their polycarp nature but also by the culture system, assortment and implemented technologies. The technologic elements being directly involved are the planting distance, soil maintenance system, irrigation and soil labors.

For fruiting orchards correspond better the fertilizers doses establishment methods by agrochemical parameters and nutrients balance. Among these methods, simpler and with satisfactory results can be the method based on the returning in the orchards of those element pulled out once with the harvest of fruits and other parts of plants, corrected according to the agrochemical parameters.

Considering all these displayed elements about the fruit trees and shrubs, they must be adapted at the real conditions from each orchard. The high cost of fertilizers, the difficulty to use them, the risk of water, soil, and fruits pollution are reason to use them carefully. Therefore they are used moderate doses, based on agrochemical parameters and the nutrients balance, fragmented on phenophases and as little as possible chemical fertilizers to get fruits polluted as lees as possible.

The organic fertilizers (manure, compost and other plant debris), green fertilizers are a safe alternative to promote a sustainable pomiculture.

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DEGREE INCREASE MANAGEMENT OF ALCOHOL IN WINES. A NEW CHALLENGE FOR THE SELECTED OENOLOGIC YEAST STRAINS APPROACH OPPORTUNITY TO THE VINIFICATION IN WHITE, PINK AND RED

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Abstract: *The increase in the degree of alcohol in wines is a concern for several reasons. On the one hand, in strong concentrations, ethanol can affect the aromatic properties of wines due to its interaction with certain aroma molecules. On the other hand, the current market is in tune with consumers' health concerns and prevention policies and is thus more interested in easy-to-drink wines with moderate alcohol levels.*
Therefore, there is a strong demand for wines with lower alcohol levels. One attractive option consists of utilizing yeast starters that produce less alcohol for the same amount of sugar consumed. The objective of this paper is to expose advances in research in this filed.

Key words: *selected easts, Saccharomyces cerevisiae, wine*

Introduction

During the alcoholic fermentation process, the easts transform 1 mol of sugar in 2 mol of ethanol and 2 mol of CO2, by transformation through biochemical pathpath of glycolysis (Embden-Meyerhoff), according to the reaction: C6H12O6 ---> 2C2H5OH + 2CO2. A significant part of sugar is used to form biomass and other secondary fermentation products (e.g. glycerol, organic acids, esters, and superior alcohols), therefore diminishing the efficiency of sugars conversion into alcohol, that reach values form 92 to 93 %.
The ethanol production during the oenological fermentation is of 0.47 g/ 1 g of sugar, meaning it is necessary an amount of sugars of 16.8 g to get an alcoholic degree.
The possibility to select starter easts strains from oenological strains that produce less ethanol is limited by the fact the east Saccharomyces cerevisiae shows a limited diversity regarding the conversion of sugars into alcohol. A comparative study concerning the ethanol production capability during the alcoholic fermentation, performed on 60 commercial easts strains, in laboratory conditions, shown the sugar necessary to produce one alcohol degree can vary depending on strain from 16.5 to 17 g. With such a small range we can aspect small variation of the alcoholic degree, lower than 0.5% vol.
Because the target is to decrease 1 – 2° the ethanol level, the obtaining of starter easts strains producing lower levels of alcohol is grounded on the metabolic alterations that redirect a part of sugars towards secondary

products, other than the ethanol. Should not be overlooked the obtaining of a loss of one alcoholic degree, a larger sugar amount (16.8 g for one alcoholic degree) must be redirected towards other metabolites. As a consequence, the choice of these metabolites is crucial, so their aggregation does not affect wine's sensorial characteristics. More than that, the east properties (ex. their growing and fermentation capability) must be preserved.

Having in view these major limitations/ conditionings, the growth of east strains generation low ethanol levels is a challenge for scientific research, being an active area for more than 10 years.

Materials and methods

» Strategy of easts ethanol production diminishing by metabolic engineering

Metabolic engineering strategies are strong approaching tools for the issue of remodeling the east strains metabolism. Based on the existing enzymatic reaction alteration of implementation of new reactions, these approaches can be useful for the diversion of sugars or the glycolysis intermediates from the favorite trajectory which is the path of glycolysis. In this respect, more strategies were highlighted.

a) Glucose oxidation path. Malherbe D.F. and others (2003) emphasized the glucose oxidase coming from Aspergillus niger in S. cerevisiae. By the action of this enzyme able to oxidize the sugars in gluconolactone and H2O2, it results a diminished production of ethanol thanks to the low quantity of sugars entering in the glycolytic line (Embden-Meyerhoff path). The main disadvantage of this strategy is connected to the chemical conversion of gluconolactone in gluconic acid, a compound having peculiar predisposition for combination with SO2. More than that, glucose's oxidation reaction needs oxygen, that even in very small amounts can determine the formation of oxidation compounds during the alcoholic fermentation.

b) Path of pyruvic acid transformation in lactic acid. Another approach developed by INRA Montpellier grounded on the pyruvate drift at the end of glycolytic path towards the lactic acid formation, to the detriment of the alcoholic path by facilitating the course of a bacterial lactic dehydrogenation (Dequin S. and Barre P., 1994).

The lactic acid is a compound of interest because lacks odors, but it has acidify properties. High production of this compound made in stages by the east metabolism, could compensate the lack of acidity, often observed in wines with a high alcohol.

In the east cell, the lactic acid plays an acceptor part of the ethanol equivalent electron. The metabolism drift towards the production of this organic acid allows a concomitant diminishing of the alcohol production without affecting the oxidation reduction balance at the cell level. Despite all these, this approach is limited by the lactic acid quantity that can be accepted in wine. Taking into account the superior accepted limit of lactic acid from wine is of 10 g/l, the alcoholic concentration reduction possible in this context is bellow 0,5°. On the other hand this strategy is still highly relevant for solving correction problems of wines acidity (Dequin S. and others, 1999).

c) Path reflects the intracellular bacterial NADH oxidase. Soon it is also considered a strategy based on the highlighting inside the yeast cell of a bacterial NADH oxidase. This path based on the reduction of intracellular level of the NADH cofactor concentration

that is essential for fermentative alcoholic dehydrogenation (at the transition from acetaldehyde in ethanol).

Indeed, by this strategy can be drastically reduced the ethanol production but it generates an alarming concentration of acetaldehyde that can interrupt the growth and development of yeast cells. These effects can be limited by a slight modulation of oxygen quantity needed for the development of the NADH oxidase activity.

Also, the oxidation compounds production is strongly is favored by the flow restriction towards the formation of ADH and presence of oxygen (Heux S. and others, 2006 a; Heux S. and others, 2006 b).

d) Path of glycolytic flow deflection towards the glycerol production. Another strategy of great potential is based on carbon flow diversion from the composition of sugars towards the glycerol production which is the most abundant byproduct of the alcoholic fermentation after ethanol and CO2. Without having their own odorant potential, can contribute to the lubricity sensation of the wine in the mouth and, in quantities over 25 g/l, to its viscosity.

The synthesis increase of the enzyme glycerol - 3 - phosphate dehydrogenase by the insertion of genes GDP1 or GDP2 that codes for these two isomorphs of this enzyme allows the efficient decrease of ethanol production up to 15-20%, what is the most significant decrease obtained so far (Michnick S. and others, 1997; Remize F. and others, 1999).

This decrease results both from carbons deflection by glycerol and the low availability of NADH, especially used for glycerol production. This metabolic deflection however brings significant changes in the production levels of other metabolites, including some that affect the sensorial profile of wine as like the acetate and acetoin. Acetate production can be reduced by the elimination of ALD gene for a dehydrogenation of aldehyde (Remize F. and others, 2000; Cambon B. and others, 2006).

Very recently, scientific efforts have focused on reducing the production of acetoin, a compound accumulated a few grams per liter in the yeast strain cells which produce high levels of glycerol (from 15 up to 20 g/l), noting that its threshold of olfactory perception is at the level of 150 mg / l. Acetoin produced by yeast is naturally fully converted in 2, 3 – butanediol. In the yeast cells producing excessively glycerol, this reaction, catalyzed by butanediol dehydrogenase is limited, leading to a strong accumulation of acetoin. Increased synthesis of this enzyme, as well as the intracellular insertion of a mutant form addicted to NADPH can strongly reduce the accumulation of acetoin (Eshani M. and others, Brevet FR 07/03279) by enhancing its conversion în 2, 3 – butanediol which is a neutral compound sensory from point of view.

Glucoses, Glycerol, Glycolysis, Pyruvate, Butanediol, Acetoin, Acetaldehyde, Ethanol, Acetate

This strategy based of the sugar deflection towards formation of glycerol and 2, 3 butanediol, allows a 15-20% reduction of the resulted ethanol quantity that can be modulated depending on the glycerol overproduction level. The assessed impact for the ethanol level is of 1.5 – 2°.

The developing research tries to assess the alterations impact of these changes on fragrances compounds of fermentation and on the yeast cell metabolism in a whole.

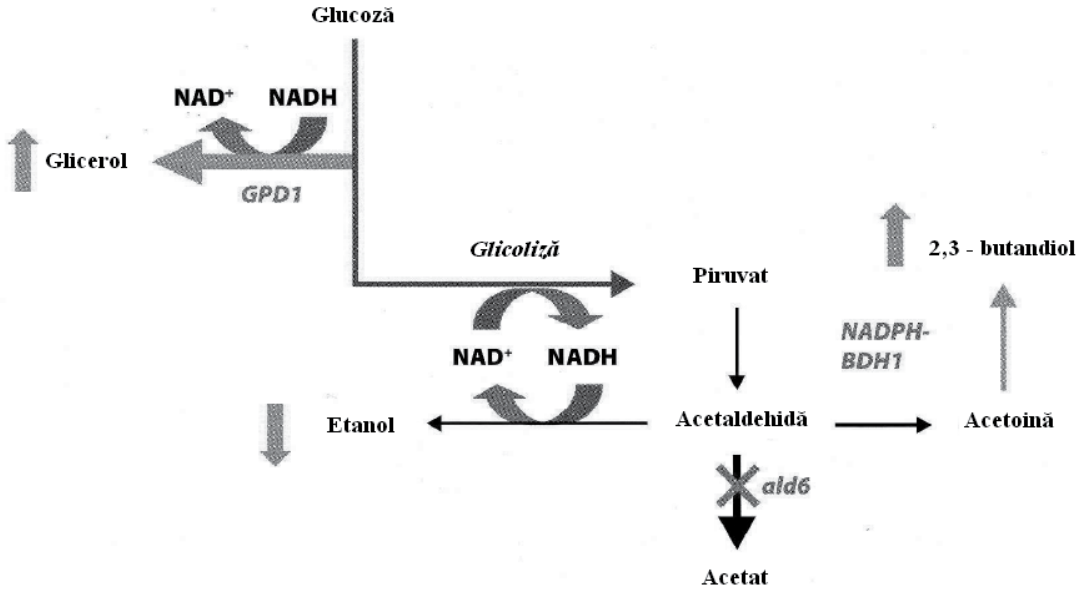

Fig. 1 – Strategy to reduce the production of ethanol based on sugar deviation towards formation of glycerol and 2, 3 – butanediol

Results and discussions

They were conducted many studies and experimental research over the past 10 years in order to develop yeast strains that produce less alcohol. Tested approaches were based mostly on metabolic engineering, allowing metabolic remodeling in a certain direction based on known pathpaths and involved genes. Although some of these approaches have proved relevant in reducing ethanol production, they showed a number of difficulties. Strategies based on oxygenation during the fermentation process, no matter they are controlled, should be avoided because it causes accumulation of oxidative metabolites.

A major difficulty is the management of secondary effects, especially the accumulation of unwanted byproducts connected to the flows deflection.

By the different studied strategies, one very promising is the deflection of Carbon atoms from the sugars composition towards the glycerol formation because the associated secondary effects are controlled and managed. For the yeast strain used in this case, in the cells which were introduced modification to existing genes, the approach supposes the own cloning. In certain countries this strategy enjoys a special status. For instance in Japan the own cloning it isn't considered is not considered to be an approach involving genetic modification (Akada R., 2002).

Up to now, the use of genetically modified yeast strains (GM) is not fully assumed, which encouraged classical genetic approaches that are less controversial. Cultivation techniques based on cross spores led to improvement of

many existing features. These approaches were used in the selection of hybrids that produce excess glycerol (Eustace R. and Thornton J.R, 1987; Prior B.A and others, 1999; Prior B. and others, 2000). Despite the noted disadvantages, these techniques are limited by the excess production achieved in the case of glycerol. The hybrids producing between 12 and 15 g/l glycerol were obtained on synthetic environments, and the formation by these hybrids of glycerol in grape must is lower, being of about 9 g/l, which does not entail a significant reduction of alcohol degree.

An alternative to the metabolic engineering approach is the mutant selection by direct evolution. Based on yeast strains selection, most often obtained by maintaining of a strain over several generations in selection conditions that pushing the adaptation, these approaches have been successful in recent years by improving some metabolic and fermentative characteristics of those yeast strains.

Such innovations are also expected in the choice purpose. For instance, reorientation of a part of the carbon atoms from the sugar composition towards the pentozo-phosphate path can be anticipated. This path, playing a vital role in the yeast cell for the generation of NADPH, and precursors for biosynthesis, is an alternative for the glycolysis for sugars degradation. As some of the carbon atoms of the sugar are eliminated in this path as CO2, an increase in metabolic path - pentozo-phosphate based on metabolic engineering approaches of a targeted and controlled development, are now studied in the research laboratories as a part of PNRA VDQA project named „ High quality wines with low alcohol", coordinated by Escudier J. L. from INRA Pech Rouge France.

Conclusions

Whatever method is used, it is essential to analyze the global effects of metabolic reorientation at the level of viable yeast cell. It is required a waiting time period for the use of post-genomics tools (transcriptomics, proteomics, and fluxomics...) with the purpose of a more accurate understanding of the effects of modifications and to identify phenotypes obtained by selection or evolutionary adaptation.

One of the limitations of current scientific approaches to improve the biochemical pathways of metabolism of sugars consists in the limited understanding of the metabolic network in its entirety, and also of involved mechanisms in the possible interconnections of paths that compose this complex network. In its turn, the systems biology, an emerging discipline that aims to analyze the metabolic network as a whole, will generate this kind of knowledge so essential to develop strategies to improve the network approach in order to increase their degree of applicability in this research area.

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Rural Development of Agriculture by Agro-tourism, consumer and environment protection in compliance with the national and international legislation

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