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Product Quality and Sustainability of Organic Sheep and Goat Production in Mediterranean Countries

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Edited by

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Product Quality and Sustainability of Organic Sheep and Goat Production in Mediterranean Countries

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Executive Summary

The overall aim of this exploratory workshop was to update the existing knowledge on husbandry practices, product quality and safety in organic systems of sheep and goat production. To date, there has been little previous work undertaken on both the production and product quality of organic dairy sheep and goat systems. Hence, the workshop addressed an important theme considering that the EU policy is to expand and to improve the overall competitiveness of organic livestock production systems. The later is important because organic livestock production systems differ significantly between different regions and different member states of the EU. For example, the implementation of the organic principles and common organic standards concerning livestock production remains a huge challenge.

Fifteen delegates from 7 countries attended the workshop, which lasted two days. During the course of the workshop there have been plenary papers that focused specifically on the quality and safety of organic products from sheep and goat systems as well as on issues related to the sustainability of this sector of livestock production. The plenary papers were presented by invited experts' and by members of the host team. Moreover, there were two working group sessions in order to enable the exchange of valuable information on the latest advances in research and technology in the organic sector as well as to explore the potential of future collaborative actions between participants.

The future of the sheep and goat production in the European Union

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Abstract

The small ruminant production in the European Union has a steady tendency to decrease, especially for the sheep sector, showing a troubled period for this sector. The reasons of this tendency are analysed, either with internal or external factors. The strategic danger ways would be to face the lack of workers without finding internal solutions to reduce the high labour pressure of those systems. On the other hand, the success ways are in the optimum use of the new consumers' demand for high quality and traditional products, thanks to the very good environmental and traditional image of this sector. In any case, a better collective representation in Brussels will always be favourable to a new development of this sector, which is not very powerful in Europe compared to other animal productions.
Key words: Sheep – Goat – Small ruminants – Animal production - European Union - FADN

Resume

La production de petits ruminants dans l'Union Européenne a une tendance régulière à la baisse, spécialement pour le secteur ovin, laissant apparaître une période perturbée pour ce secteur. Les raisons de cette tendance sont analysées autant en ce qui concerne les facteurs internes qu'externes. Les voies stratégiques de danger seraient l'association du manque de travailleurs et de l'absence de solutions internes pour la réduction de la forte pression de travail de ces systèmes. D'un autre coté, les voies de succès résident dans l'utilisation optimum de la nouvelle demande des consommateurs pour des produits traditionnels et de haute qualité, ceci grâce à la très bonne image environnementale et traditionnelle de ce secteur. Dans tous les cas, une meilleure représentation collective à Bruxelles sera toujours favorable à un nouveau développement de ce secteur qui n'est pas très puissant en Europe comparé aux autres productions animales.
Mots clés: Ovins - Caprins – Petits ruminants - Production animale -Union Européenne - RICA

Introduction

Small ruminants in Europe are facing a crucial situation in being highly dependant on the CAP without having the power to significantly put pressure on the European deciders and the international market (especially the lamb one). As a matter of fact, apart from the British Isles and the Mediterranean countries, and in a smaller extend Romania and Bulgaria; this sector is very diverse within Europe and not really significant at national level. On the other hand, small ruminants' farms have lots of originalities, which can be precious to successfully go through the mutation that they face. After presenting the production evolution, we will try to do a strategic analysis to identify which could be the main success and danger ways for the future.

Small ruminants production and evolution in the EU

Sheep

The EU sheep flock has been dramatically decreasing for the last decade, during which it lost about 1/3 of its number of head. Spain and United Kingdom are the two main leaders of the national flocks with respectively 17 & 16 million head in 2006

(Eurostat). Italy, France and Greece follow with less than half of the two leaders (about 6 million head). Ireland, ranking sixth for the size of the sheep flock, has the highest number of sheep per inhabitant (about one sheep per inhabitant).

Even though the Central European Countries, which joined the E.U. in 2002, were not significant at European level, the new members Bulgaria and Romania are important actors.

Goat

For the goat sector, Greece and Spain are the leaders with respectively about 5 and 3 million head in 2005 (Eurostat), but those two countries tend to have a decreasing flock. Italy and France, with over 1 million head are stable. Only the Netherlands, with only 0.3 million head, has a clear tendency to rapidly increase its flock. The goats are replacing some dairy cow units, which have too high environment and investments constraints. These important flock differences are not fully related to the production, as the technical productivities are different according to the system intensification according to the countries. For example, thanks to a very high milk yield per females, France produces 1/3 of the European goat milk with only 12% of the heads (Table 1).

Table 1: compared goat productivities for the main European countries (Source: Eurostat 2005 & FAO 2006 for milk)

(% of E.U.)	GREECE	SPAIN	FRANCE	ITALY
% females	40	23	12	9
% milk	28	27	34	1
Meat/female (head)	1,1	0,74	0,89	0,38
Milk/female (liters)	138	231	558	22

We can notice that the FAO data may not be realistic for Italy. As a matter of fact the small ruminant sector is hard to fully control. It is well known that an important part of the production is directly sold to consumers without public control, like lambs during the Muslim feasts and self consumption which could represent about 15% of the national production according to the Office de l'Elevage in France.

Sheep or Goat? Milk or Meat?

When analysing the small ruminants in Europe it is often hard to separate the sheep and goat sector and the meat and milk sector. We can say that the main small ruminant systems really specialised are:

- Some meat sheep farms in France and Spain
- the goat milk system in France (the kids are considered as by-products)

On the other hand, we find the following associations:

- milk sheep and goat in Greece and in some Spanish areas
- milk and meat sheep in Spain
- milk and meat goat systems in Mediterranean countries
- meat sheep and beef in UK and Ireland

Even though these diverse associations are frequent, we can try to analyse the small ruminants sector in European Union, to determine what could be the main success and danger ways.

High quality but weak profitability

Main strengths

The small ruminants generally have an excellent environmental image for the consumers because:

- the stocking rates are most often lower than the bovines systems as the sheep and goat farms are most often concentrated in less favoured areas
- as the sheep and goat manure is dry, their farms don't need an important equipment to recycle the slurry
- lamb and kids fattening are most often based on suckling and grazing and the zero-grazing units are generally small
- no hormone scandal are linked to these species

The small ruminants' farms need only a reasonable investment, close to the beef cattle farms and lower than the dairy cow farms (Table 2).

Table 2: compared depreciations costs (Source: FADN 2004)

(€/year.farm)	GREECE	SPAIN	FRANCE	ITALY	UK
Sheep, goats	2100	2500	12400	5600	11300
Specialist dairying	4600	4400	13100	10200	12100
Cattle	3600	3500	11600	9600	12600

Moreover, the sheep and goat products have an important number of quality signs (Denominacion de origen Ternasco de Aragon, AOC Roquefort, IGP Scottish lamb etc. This is due to the very strong links with traditions and regional cultures, which is not so important for the other animal productions.

Main weaknesses

Unfortunately, the small ruminants systems have some weaknesses that they must face to develop their production.

The income per worker unit for sheep and goat farms is generally one of the lowest or the farm incomes in Europe even if it is close to the beef cattle farm one (Table 3).

Table 3: compared income per Familial Worker Unit (Source: FADN 2005)

(in €)	GREECE	SPAIN	FRANCE	ITALY	UK
Sheep & goat	12700	28600	10700	20900	14300
Dairy	18200	20600	14900	21600	18300
Cattle & dairy	13400	26700	14800	19400	11900

In addition to this low average income, this income is highly dependant from the subsidies (Table 4).

Table 4: compared subsidies impacts on income per Familial Worker Unit (Source: FADN 2005)

(% subsidies & taxes on family income)	GREECE	SPAIN	FRANCE	ITALY	UK
Sheep & goat	39	34	99	18	174
Dairy	17	6	25	5	19
Cattle & dairy	50	50	80	13	162

We also can notice that UK and France are generally more dependant on subsidies than Greece, Spain and still more than Italy.

The economical situation of the small ruminants' farms is comparable to the beef cattle ones. But the labour pressure on the small ruminants' farms is still an important weakness as:

- sheep and goat need much more attention than bovine animals as they are more sensible to predators and diseases

- they also need more handling time (identifications, birth season, insemination) as they are more numerous than bovine and much less automated than pigs or poultry
- situated in remote and extensive areas, the shepherds are not easy to be found.

Fencing and equipments can reduce this pressure, but lots of farms are at the moment suffering from this important labour pressure. This pressure can come from the numerous small ruminant farms with only one worker.

Threaten by the CAP evolution but encouraged by some consuming demands
The global environment also has an important effect on the small ruminant farms in European Union.

Main threats
Small ruminants systems face lots of threats at the moment.
- The vegetarian consumption develops in the same time that some lobbies put a pressure to forbid animal transportations and slaughtering. For example, the last three horse slaughtering houses have closed this year in the USA. As the lamb has a nice image of peaceful and soft animal, it could suffer from somewhat like a "pet image" which is not favourable for increasing the consumption. This element could be favourable to the development of the milk production.
- The decoupling of the CAP subsidies is putting this low profitable sector in competition with other more profitable ones. Consequently, where it is possible, some farms may leave the sheep for beef (like in the French Central Mountains or in Scotland for example).
- The two enlargements of the EU to Central European Countries have created a move back of numerous Central European shepherds to their own countries (particularly from Spain and British Isles). Therefore, sheep & goat farmers have now more problems to find workers than before the enlargements. The shepherds must now be recruited in Eastern European countries.
- Sheep and goat being in dry areas and mainly fed with grass and straw, the droughts have important effects on the farms (like in Spain for the last years).
- The Blue Tongue disease in the Mediterranean countries causes lots of losses. This disease, associated to the Scrapie which is close to the BSE, could cause major troubles in this sector in case they are not controlled by the profession and caught by the medias.
- The developments of the predators like bears, wolves and even vultures in Spain (MINEFI DGTPE 2007)

Main opportunities
Within the different small ruminant systems, the dairy ones seem to have a better income than the meat ones. It can come from a better profitability of the milk production or from a better added value coming from the cheese making. The lamb production can draw an important advantage from the "religious" consumption (Muslims, Christian and Jews). For example, nearly 10% of the annual French lambs are estimated to be sold during the Aïd feasts. Moreover, the development of the high quality consumption (labels, organic products can be a good opportunity for the environmentally free systems of sheep and goat.

Recently, the direct selling has developed in animal sectors and small ruminants in particular due to a new preference for some consumers to know where their food comes from. It has developed for example in the lamb sector after the BSE crisis, but these systems are more often "niche" chains. In addition, Northern European consumers seem to appreciate the lambs fed with concentrates produced in France

and Mediterranean countries (Table 5). This could be a market opportunity for the lamb producers in Southern countries.

Table 5: preferences for lamb consumption according to the European regions (Sañudo & Alfonso 1999)

(preferences: 1 the best – 12 the worst)	Milk lamb (SP Lechazo, GR)	Concentrates lamb (SP Ternasco, FR, IT, GR)	Grass lamb (IC male, IC female, Welsh, ENG, FR, IT)
Mediterranean consumers	2,6	1,3,4,5	7,8,9,10, 11,12
Northern consumers	10,11	1,2,4,8	3,5,6,7,9, 12

Danger and success ways

If we cross those different strengths, weaknesses, opportunities and threats, we can try to conclude with what seem to be the most important "danger" and "success" ways for the small ruminant sector in European Union. The main danger can come from the association of:

- the labour demand still high in most of the sheep and goat farms
- the free time and income level being much more important for the farmers' children who want to settle on the farms
- the important lack of workers in such remote and extensive farms
- the decoupling which allow the farmers to switch more easily to less labour demanding productions

This move already exists and is, for a great part, at the origin of the general decreasing of sheep and goat heads and farms in the EU. On the other hand, the main success way can come from a good use of

- an excellent environmental image
- a good range of high quality and traditional products
- a new demand of the consumers to meet the producers and discover the countryside
- a steady "religious" demand

Many small ruminant farms are drawing advantages of those strengths and opportunities and the more sustainable ones are those, which have a large enough dimension to allow a reasonable income for two or three persons. In the next future, a farm with only one person, unfortunately frequent in this sector, will rarely be sustainable, as it does not allow free time.

In any case, this professional sector being very diverse and scattered would draw a great advantage in working more collectively: sheep and goat farmers but also small ruminant and beef farmers who have similar issues. Even if it is not easy to work in international group as the professional profiles are really diverse among European countries (DE RANCOURT & CHATELLIER 2000), a better presence at European level would be really profitable as orientations are more and more decided in Brussels or in the WTO.

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Advantages and disadvantages of organic dairy sheep and goat production systems in the Mediterranean region

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Background

Organic systems of livestock production have developed to meet the concerns of society for good health and welfare required by farm animals that yield milk and meat as well as the need for safer and healthier products. Since the commencement of organic systems, a large volume of information has been published on husbandry practices, health and welfare of animals and the economic viability of such systems of production. However, organic production involves many disciplines that must be integrated and there are major differences, particularly in the way that the organic livestock sector is run between different countries (Surdrum, 2001; Hermansen, 2003; Arsenos et al. 2004).

Although the idea of organic production has existed from the begging of the last century and has been applied with great success in Northern European countries, for at least two decades, in the Mediterranean region it has only recently become the focus of significant attention from governmental and private organisations, consumers and farmers. Regardless of the absence of a long-established consumer market for organic products the idea of conversion of existing production systems to organic ones has proven useful and financially rewarding (Arsenos et al. 2004). Hence, a comprehensive understanding of the advantages and disadvantages of different sheep and goat systems across Europe is a prerequisite for integrating the knowledge and skills required to provide a high quality health management under organic standards. Therefore, evaluating the importance of local breeds, breeding for disease resistance, applying preventive veterinary medicine with early disease diagnosis and using alternative medical treatments becomes a challenging task, since all these features must be effectively combined. The aim of this paper is to discuss the advantages and disadvantages of organic dairy sheep and goat production systems in the Mediterranean region.

The challenge of organic production

The intensity of livestock production as well as the quality of produced meat and milk has recently attracted consumer concern, which is manifested through purchasing attitudes. Today, although there are differences in organic systems, imposed by the geographical differences amongst Mediterranean Countries, organic meat and milk quality is a contentious issue as a consequence of the absence of a common definition and certain standards. Sheep and goat production systems, with emphasis on milk, are of major importance to southern European countries. Also, most countries in the Mediterranean region are characterised with relatively high annual per-capita consumption of milk and meat products from small ruminants.

The notion is that organic production will bring greater efficiency to small sheep and goat enterprises and will have a positive impact on rural communities in mountain and sub-mountainous regions of the Mediterranean. Moreover, organic systems are supposed to have the potential to dominate the small ruminant sector, because the principles of organic farming are already present in the semi-extensive systems that prevail sheep and goat production in most Countries of the Mediterranean region (Arsenos et al. 2003, 2004). In Greece, for example, there are now about 24,560 certified organic producers. The majority of them, about 20,792 are involved in crop production and the remaining 1,759 in organic livestock production. Greece, has

180,198.3 hectares of organic farmland and there are 941,652 animals under organic status. Those animals are as follows: 22,546 cattle, 212,294 pigs, 564,971 sheep and goats, 134,552 poultry, 85 bubals and also 7,196 bee colonies (Greek Ministry of Rural Development and Food, 2007). As in most Mediterranean Countries, sheep and goat production in Greece has always been an important sector of livestock production and agriculture in general. There are now eight private organic certification organisations in Greece that have played a very important role in the development of the organic sector in Greece since the commencement of their activities. They have been very effective in defining standards for production, processing and direct marketing. In addition, they have helped to raise consumers' awareness and confidence in organic foods and in so doing contributed to the overall development of the organic sector.

The Mediterranean Countries are spread in a region with varied geoclimatic conditions in a relatively small territory. Mountain areas dominate the majority of the land in most Countries. The growing of the organic sheep and goat systems in Mediterranean Countries will strengthen the competitiveness of agriculture (both organic and conventional) and will promote the sustainable development of rural areas. First, it is encouraging for young people to take over livestock holdings from those retiring, second, such systems support bio-diversity and conservation of endangered local breeds of sheep and goats, and third, such systems contribute to the reduction of nitrate pollution. However, issues such as organic animal transport, animal handling facilities and methods (including loading and unloading), design and construction and infrastructure of slaughterhouses, and slaughtering procedures should be addressed in detail (Arsenos et al. 2004).

Sheep and goat systems, in Mediterranean countries, are characterised by overriding priority for milk production and by the traditional preferences for lamb meat from light lambs and kids. Among the animals used in organic farms, there are obvious differences in appearance, size and production levels. The question that arises is how indigenous breeds or their crosses differ in efficiency of production under organic systems. For example, some of the local sheep and goat breeds in different countries are considerably small in size and have very low milk yields whereas there are also breeds larger in size and with much higher milk yield. However, the existence of various breeds and types of local sheep and goats could be considered as one of the advantages of the organic livestock sector in Mediterranean Countries. The morphological and genetic characteristics of those animals make them more suitable for organic systems. In the Mediterranean countries, mixed flocks of sheep and goats are common practice and there is also a wide range in flock size. Moreover, those animals are adapted to the prevailing climate and food supply. Production objectives vary between farms within and between different areas, but as mentioned above the main objective is milk production, with meat production being of less importance (Arsenos et al. 2003, 2004).

Organic livestock products: from stable to table

Organic farming is widely perceived to be a "good thing" and the increasing numbers of those choosing to purchase organic foods represents a way of registering their positive support to organic systems of animal production. It should also be noted here that food safety and quality are of great importance to consumer’s interest (Kouba, 2003). During the last decade the demand for organic products has risen sharply across Europe revealing public concern about food safety and quality, environmental effects of intensive agriculture and animal welfare (Sundrum, 2001; Hermansen, 2003). The typical characteristic of the industry in processing and trading of organic products is small firms with very few large companies. Deficiencies are encountered in packaging, standardisation and conformity with quality criteria.

Moreover, the involvement of various intermediates adds to costs without offering the corresponding services and unreasonable discrepancies between producer and consumer prices.

At farm level there is need for accurate identification of animals as well as identification of the origin of feed and food ingredients, which will ensure traceability. Traceability is crucial for food safety and the protection of consumers, especially in cases when certain products are found to be faulty and hence their withdrawal will be facilitated. On the other hand, the identification will enable the application of effective husbandry practices, including feeding, breeding and health management. Identification is now obligatory amongst EU countries and is is particularly important for sheep and goats browsing in mountainous areas where day-to-day monitoring is more difficult.

Marketing of organic products is gradually and systematically growing and developing. Marketing organisations have appeared recently and are growing in size. The determining factor regarding the trade of organic products includes the geographical proximity to urban areas and market practices, i.e. directs selling of organic products on farms, local markets or contracts with supermarkets. Further investigation is needed to assess input of organic livestock enterprises in agricultural production and to measure their cost-effectiveness. Data of animal health and production records need to be collected through the adoption of practical systems of inspection that can be incorporated into monitoring and problem-solving models (Hermansen, 2003; Hovi et al. 2003). There is a need to develop a Mediterranean national network using modern communication technologies as well as regular meetings between all those involved in organic livestock production. The latter can be best achieved by cooperative efforts among state and private organisations, organic farmers, veterinary and agricultural practitioners and research institutes and Universities.

As mention earlier, organic sheep and goat production has shown a remarkable concentration on dairy products especially. The challenge for these enterprises will be to move towards the production of high value-added products with standard quality. Such steps will require technology and labour skills. We believe that unprofessional employees and hence low cost labour are not a guarantee for economic efficiency or the effective marketing of organic products. Current production levels do not cover the demand for organic products and hence the number of organic livestock enterprises will gradually increase. However, the plans for development of organic livestock production should be the result of market needs at local, national and international level and prices of organic products should be in line with the country's economy. The latter is important considering that the competitiveness of Greek products and their shares in international markets have room for improvement.

In conclusion, current practices have shown that organic livestock production is gradually developing in Mediterranean Countries and are likely to have a promising future if economic efficiency is achieved. However, there are still various problems to be overcome. With good cooperation between state and private organisations, effective management programs at farm level, continuous education of the farmer and dissemination of research results, organic livestock production systems can be both functional and profitable. The development of organic sheep and goat systems will be greatly influenced by market needs, at local, national and international level, and also by the quality and the price of organic products, which should be in line with consumer's needs.

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Varieties of organic products from dairy sheep and goats production systems in the Mediterranean region.

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The Mediterranean area of the UE comprises many countries, but for the present work we have considered only the four larger countries: Spain, France, Italy and Greece.

Picture 1. Mediterranean area

In all the four countries the destined areas to the organic productions are wide. In table 1, we have reported the extension of the areas fully converted to organic method.

Table 1. General Data. 2005 Organic crop area (fully converted) in ha (Eurostat, 2007).

Country	Ha
Spain	430.900
France	468.476
Italy	708.043
Greece	206.205

In all the four countries the sheep and goats breeding is also very important. In table 2, data (heads of sheep and goats) for every country are shown. Spain is the most important for sheep and Greece for goats.

Table 2. 2005 Total sheep and goats (Eurostat, 2007).

Country	Sheep	Goats
Spain	19.660.060	2.527.300
France	8.804.570	1.299.370
Italy	6.991.140	917.850
Greece	9.066.370	4.822.000

In table 3, the number of the sheep and goats farms are shown. In this case, Greece is first for both sheep and goats.

Table 3. Number of holdings of sheep and goats (Eurostat, 2007).

Country	Sheep	Goats
Spain	85.250	38.650
France	72.890	21.990
Italy	74.880	30.960
Greece	127.940	117.170

In table 4, the consistencies of organic sheep and goats (and between brackets the percentage on the total of the animals raised) are shown. Italy has the highest percentage of sheep and goats, and Greece follows. In the others two countries the percentage is considerably lower.

Table 4. 2005 Organic sheep and goats (Eurostat, 2007).

Country	Sheep	Goats
Spain	137.831 (0,70%)	18.473 (0,73%)
France	139.514 (1,58%)	22.189 (1,71)
Italy	738.737 (10,57%)	86.537 (8,90%)
Greece	218.293 (2,41%)	298.336 (6,19%)

If these percentages are compared with those shown in the first SAFO workshop on the organic share of total productions (table 5), it seems that the authors underestimated the productions of organic sheep and the goats in Italy and Greece.

Table 5. Organic share of total productions in 2001 (Hamm and Gronefeld, 2003).

Country	Sheep and goats
Spain	2,1
France	1,4
Italy	0,0
Greece	1,1

Some problems, concerning to the possibility to find out data on organic sheep and goats, must be highlighted. In the EUROSTAT databank we can find only data on sheep and goats meat, nothing on sheep and goats milk production, indeed in this data bank milk data are general for all dairy productions. May be, because the sheep and goats milk production is so important only for a part of Europe. Concerning the meat productions (table 6) we can say that the greater producer is Spain and the last one Italy.

Table 6. 2006 Sheep and goats meat productions in kg (Eurostat, 2007).

Country	Sheep and goats
Spain	238.250.000
France	129.149.000
Italy	65.981.000
Greece	114.407.000
EU (15 members)	1.018.131.000

About consumptions, France is the 1st and Italy always the last country (table 7).

Table 7. 2004 Sheep and goats meat apparent consumption in kg (Eurostat, 2007).

Country	Sheep and goats

Spain	219.400.000
France	259.300.000
Italy	86.000.000
Greece	133.160.000

The greater part of sheep and goat meat is sold fresh or chilled, only a small part of the ovine meat is sold frozen (table 8). Data about frozen meat goats are not reported.

Table 8. 2005 Sheep and goats meat sold production in kg (Eurostat, 2007).

Country	Sheep		Goats
	Fresh or chilled	Frozen	Fresh, chilled or frozen
Spain	119.584.000	11.590.000	5.180.000
France	252.066.800	13.793.194	3.694.257
Italy	36.640.000	61.000	1.110.000
Greece	1.768.329	-	2.695.951
EU (25 members)	680.032.835	49.416.907	-

A list of the main organic products from sheep and goats is reported below.

Organic Products: Milk

- Fresh milk: only from goats
- UHT milk: only from goats
- Fresh cheese (from raw or pasteurized milk): sheep an goats
- Seasoned cheese (from raw or pasteurized milk): sheep and goats
- Possible problems are:

a) UHT and pasteurisation could give a negative 'organic' image.

b) Since it is possible the use of the traditional transformation methods, many types of traditional cheeses are produced, but also new products are developed.

Organic Products: Meat

- Meat from lambs or kids of different ages and consumed in different seasons. About this, there are differences between dairy or meat breeds and in the different regions (local traditions)
- From adults meat, in some regions, are made some traditional dishes (e.g. near to Florence)
- The adults meat is consumed fresh or transformed (e.g. goat ham)
- There is a problem about the 'official' slaughtering in some regions and therefore on organic labelling, because the farmers slaughter the lambs and sell the meat directly in the farm bypassing official channels

Organic Products: Wool, fibres and leather

- Wool from specialized sheep breeds is processed in organic factories for organic dresses.
- Wool from others sheep breeds is used for others craftsmanship products.
- Fibres from specialized goat breeds are produced: e.g. organic cashmere.
- We produce also organic leather, but, may be, this product has not a real 'organic' image.

Concerning information on organic production areas in the different countries, it is possible to find data only for France and Spain.

Spain

Sheep: Andalucía 74%, Cataluña 7%, Extremadura 5%, Baleares 5%, Castilla la Mancha 3%.

- Goats: Andalucía 72%, Cataluña 9%, Castilla la Mancha 5%, Galicia 3%, Murcia 3%. (Garcia Romero, 2007)

France

- Sheep (only Mediterranean regions): Prov. Alpes-Côte d'Azur 12%, Languedoc Roussilon 9%, Corse 0,5%
- Goats (Mediterranean regions): Prov. Alpes-Côte d'Azur 8,8%, Languedoc Roussilon 8,2%, Corse 1%. (Agence Bio, 2006)

However in Italy and in Greece the sheep and goats are diffused in all the regions. Also concerning information on organic productions in the different countries, we can find data only for France e Spain.

Spain

- The wool animals are more diffused (212.190 wool heads / 238.297 total heads) and the meat production is more important than milk production. (Garcia Romero, 2007)

France

- Considering to all the country, the meat production (119.528 heads) is more important than milk production (19.986 heads). (Agence Bio, 2006)

For Italy and Greece, on the contrary, the milk production is more important. We have to consider that in many regions 'cheese' means only sheep (or goat) cheese.

Breeds used in the different countries

We use either specialized breeds or rustic local breeds. But:

- Sheep are a few adaptable species, so many rustic local breeds outlived to 'green revolution' in '60;
- Goats are linked to traditional and 'low input' productions, so also in this case many rustic local breeds outlived to 'green revolution' in '60.

Is it the sheep and goats sector 'in crisis'?

Watching the data extracted from Eurostat, it does not seem that this field would be in crisis. Some countries have had bending moments, but in general growth is enough constant (tables 9 and 10).

Table 9. Organic sheep (Eurostat, 2007).

Country	2001	2002	2003	2004	2005
Spain				143.866	137.831
France	100.319	109.144	115.315	127.974	139.514
Italy		608.687	436.186	499.987	738.737
Greece		56.374	108.996	133.619	218.293

Table 10. Organic goats (Eurostat, 2007).

Country	2001	2002	2003	2004	2005
Spain				17.488	18.473
France	17.940	20.014	19.408	19.754	22.189
Italy		59.764	101.211	56.815	86.537
Greece		66.472	187.079	215.291	298.336

'Quality Labels' (not organic), and 'natural image' (mainly of goats) can limit (or help) the organic productions market.
In some cases these labels are compatible and help the image of the organic product, while in other cases they appear in competition.

Some examples:
Spain
- 'Cordero Segureño'
- 'Queso Manchego'

France
- 'Label rouge', natural image of goats' products.

Italy
- 'Integrated agriculture' labels, PDO and PGI labels, natural image of sheep and goats products.

Greece
- PDO and PGI labels, natural image of sheep and goats products.

SPAIN: SHEEP and GOATS 'Case studies'
A list of organic producers of Albacete was listed in tables 11, 12 and 13. Generally they are producers of lambs and 'Queso Manchego', but there are also many breeders of diary goats (Molina Casanova, 2007).

Table 11. Meat sheep

Nombre	Dirección	C.P.	Municipio
MARINA LOPEZ MEGIAS	PINILLA	02500	CHINCHILLA-TOBARRA
HEREDEROS DE D. PEDRO RODENAS CORCOLES, C.B. (Carmen Rodenas)	CTRA. MURCIA Nº 11	02400	HELLIN

Table 12. Dairy sheep

Nombre	Dirección	C.P.	Municipio
FRANCISCO MARTINEZ MARIN	PERDIDA, 20	02610	EL BONILLO
JOSÉ LUIS			LETUR

Table 13. Dairy goats

Nombre	Dirección	C.P.	Municipio
MARINA LOPEZ MEGIAS	PINILLA	02500	CHINCHILLA-TOBARRA
CARMEN ROMERO HONRUBIA	CAMINO SAN ANTON, 6	02434	LETUR
MARIA ISABEL ESPINOSA ROMERA	AZUCENA, 7	02434	LETUR
MARIA DEL CARMEN ALVAREZ LOPEZ	CRTA. CALASPARRA, 17	02434	LETUR
Mª DOLORES GOMEZ ANDREU	CRUZ BLANCA, 2	02434	LETUR
JUAN JOSÉ CERDAN	(QUESOS CERRÓN)		FUNTEÁLAMO

FRANCE: SHEEP 'Case studies'

Roquefort cheese and Lacaune breed

Roquefort is certainly one of the most famous cheeses in the world. The legend says that a shepherd, to follow a young girl, left is lunch (bread and curds of milk sheep) in a cave to keep it cool. After few days, he found the bread and curds covered by mould, but he was very hungry and tried to eat this one. He found it delicious. Organic Roqueforts are produced, in the South of France mainly by two companies: 'Papillion' and 'Societé'. The organic Roquefort represent only the 1% of the 21.000 tons of the all Roquefort produced (Marvejouls, 2003). The Lacaune sheep breed produces Roquefort. This breed with 1.29 million ewes is at the first position among French sheep breeds. It is divided into two main branches with different specialisations and utilisations: milk production and suckling lamb production (65 and 35%, respectively of the females). However, females in the milk sector have long been used for the renewal of females in the meat sector and some of them have been subjected to terminal crossing with meat breeds.

Sheep production in mountains area. Organic lamb in ALPES DE HAUTE PROVENCE

The farm of Arlette Martin produces this forage and is located at 10 km from the slaughtering house of Sisteron. The flock consists on 180 heads and the total land is about 100 ha. Before the 1995 the production was 'Label Rouge', and after 1997 became organic. To sell the lambs at one right price, the farmer with other 3 colleagues constituted a 'SARL', a commercial label (Bio-Bédigue) and opened butchery at the town of Gap (40.000 citizens) (Bacha, 2003).

FRANCE GOATS 'Case studies'

One of the problems of this production is that the goats have a 'natural' image also without the organic label. But the consumers like the organic fresh cheese of goats.

Goats in PROVENCE-ALPES-CÔTE D'AZUR area

In PROVENCE-ALPES-CÔTE D'AZUR we utilize the 'controlled goats grazing' to avoid the danger of fire and to defend the forest. This is one of the targets of the organic farm of Stéphane Serrée at Garélout (250 ha of hills with wood). The flock of 70 heads produces 18.000 l of milk (mean 400 l/heads with 2,6% of fat) (Rivry-Fournier, 2006).

A rustic breed: Massif Central breed

This rustic breed is reared in Massif Central area. Estelle Petit reared this breed in her farm and produces fresh organic cheese of goat. In 2004, the flock was of about 50 heads with a production of about 650 kg of milk for lactation.

Estelle produces the 'Chabrirou de Velay'. She use 2,5 l of milk to made a cheese of about 350 g. This production is typical of the Haute-Loire region (Rivière, 2005).

ITALY: SHEEP and GOATS 'Case studies'

In 2005, huge project of integrated research on organic animal husbandry was initiated in Italy. This research combines, for the first time in Italy, various disciplines in order to affront existing problems in the animal organic sector. The research will be conducted on 19 farms, located across Southern, Central and Northern Italy, in order to fully represent the climatic environments of the Italian peninsula. The topics investigated range from a complete substitution of soy in animal feed to avoid GMOs, to the reduction of micotoxins contamination risks, to pasture improvement and to the use of animal breeds more adapted to organic production (Martini, 2006). In the table 14 we reported a synthesis of the farms descriptions, and in the table 15 a synthesis about the products from these farms.

Table 14. Data from Italian 'EQUIZOOBIO' project: description of the organic farms (Piasentier and Mele, 2007)

FARM location (Region)	EMILIA ROMAGNA	TOSCANA	LAZIO	PUGLIA	SARDEGNA	SICILIA
Adult heads n°	95	384	1000	152,0	1140	764
Breeds and crossbreeds	Sarda (basis) x Appenninica, Delle Langhe, Suffolck, Comisana	Massese	Sarda	Leccese x Comisana (purebreeds and crossbreeds)	Sarda	Comisana
Average of milk production l (without suckling)	9.000	19.391	130.000	2850,0	170.000	80.000
Days of production (without suckling)	120	210	180	95,0	188	200
Fat%	6,78	7,23	6,53	6,8	6,56	6,91
Protein %	5,78	6,41	5,85	5,6	5,12	6,16
SCC	1.599.000	895.431	1259	1,32*106	977.000	1.270.000

Table 15. Data from Italian 'EQUIZOOBIO' project: products from the organic farms (Piasentier and Mele, 2007)

FARM location	EMILIA ROMAGNA	TOSCANA	LAZIO	PUGLIA	SARDEGNA	SICILIA
Where the milk is transformed	In the farm	In the farm	In the farm	In the farm	60% Farm 40% sold to local dairy factory	In the farm
Products	Pecorino and fresh ricotta cheeses	Pecorino and fresh ricotta cheeses, fresh cheese	Pecorino 'romano' and ricotta cheeses, fresh cheese, yogurt	Seasoned cheese, fresh ricotta cheese	Seasoned cheese, smocked and salted ricotta cheese	Piacentino Ennese cheese, Pecorino Siciliano cheese, Pecorino with pepper cheese, fresh and sated ricotta cheese
Trading	In the farm	In the farm, local markets, groups of consumers, restaurants and groceries	In the farm and in a restaurant	In the farm (meat an dairy)	In the farm, meat in the Sardinia market and cheese in EU market	Meat and cheese in the West-Sicily market

ITALY: GOATS 'Case studies'

We report a study about two organic goats farms in Tuscany. The goats are reared, usually, in flocks of 60-200 heads. The main productive activity is the milk production, transformed in cheese directly in the farm, because the fresh milk, although it is an optimal food, it is not usually consumed, at least in Tuscany. Except for some small and high quality cheese productions (as in this two cases), in Tuscany there is a little demand for goat cheeses because of the lack of tradition in comparison with the North of Italy and the other European countries.

Table 16. Two organic goat farms in Tuscany: characteristics (Vallauri, 2005)

Name (province)	Podere le Fornaci (FI)	S. Margherita (SI)
Organic Control Body	ICEA	ICEA
Breeds and crossbreeds	Saanen	Girgentana x Alpine
Kind of ownership	Rental	Ownership
Year of starting	2000	1994
Altitude m	300	350
Total land area ha	30	80
Pastures ha	20	20
Crops ha	6	20
Wood ha	3	40
Adult heads n°	100	120
Average of milk production kg (180 days)	500	350
Kg milk for 1 kg of cheese	5	5
Trading	In the farm	In the farm

Table 17. Two organic goat farms in Tuscany: products (Vallauri, 2005)

Name (province)	Fresh crude milk €/l	Cheese			
		Kind of Coagulation	Fresh €/kg	Semi-seasoned €/kg	Seasoned €/kg
Podere le Fornaci (FI)	2	Acid or Natural curdling	14	19	23-25
S. Margherita (SI)	2,5	Acid	28	28	28

GREECE: SHEEP and GOATS 'Case studies'

BioAgros (www.bioagros.gr), sells, with the label 'Evergreen', organic sheep and goats dairy products. The aim of the company is to bridge the gap between the 'home-made' Greek and Mediterranean diet and the European consumer.

FETA CHEESE: Feta, the most famous Greek cheese, is a Product With Designation Of Origin (PDO) & Geographical Indication (PGI). Evergreen Organic's range includes both the traditional blend of sheep (70%) and goat (30%) milk from Western Greece. We also have a wholly sheep milk version (100%) from Western Greece and Lesbos island. Feta is a brine-matured cheese, lightly sour and rich in aroma and taste that can be served as a side dish or with wines and fruits.

TZATZIKI and FETA CREAM SALAD: Tzatziki is a salad made of yoghurt and cut cucumber, olive oil, garlic and parsley. It is probably the most famous Greek dip and can be is used as a

side dish or as a salad. Feta Cream Salad is feta cheese smashed and blended with green spicy peppers, olive oil and pepper. It is also used as a dip in sandwiches and toasts as well as a side salad. Both products are usually packed in containers of 250 or 330 grams however this is flexible and depends upon customers' needs.

Kourellas S.A. (www.kourellas.gr), activity involves milk processing and production of cheese products, salads and yogurt, foodstuffs production and the development of agricultural economy with progressive applications. Main products are feta cheese, kefalograviera cheese, kaseri cheese, goat cheese, cheese with garlic and pepper, cheese with olive and chili, mpatzios cheese, manouri cheese and the local cheese with protected designation of origin (PDO) 'anevato' are transported to Greece and Europe. In 1996, Kourellas S.A. is the first company that starts the production of organic dairy products with the commercial signature 'BIOPAN' and with 'Naturland's' German specifications, since there were no regulations concerning the animal organic products. Today the company collaborates with 90 selected and self-conscious organic agricultural-farming households and cultivates 20 km^2 of organic land in order to produce organic feedstuff for sheep and goats. In total, 250 tons of organic cheese and 600 tons of conventional cheese are produced. 80% of these are exported to EU.

CONCLUSIONS

There are big varieties of organic products from dairy sheep and goats production systems in the Mediterranean area. These productions are important for the economy of the organic farms in the South of Europe. But we have to improve the research activity in this field considered the 'poor cousin' of the ruminants' meat and dairy production.

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Alternative strategies for the control of parasites in organic sheep and goat production systems in the Mediterranean region

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Because the mode of breeding of small ruminants throughout Europe is generally based on outdoor grazing, it has been recognised for long that the presence of endoparasites, in particular helminths, represents a major challenge for production in sheep and goats. The pathological importance of these helminth infections is primarily related to the major production losses, in quantity or quality, induced by the direct action of worms. Moreover, depending on the dysbalance between the host and the parasite populations, these parasitic infections can also induce clinical signs or even provoke mortalities, particularly in lambs and kids or in cases of combination between malnutrition and parasitism.

In conventional systems of production, the usual mode of control of these helminths relies mostly on an intensive, repeated use of chemical anthelmintics (AHs), at strategic times depending on the epidemiology of parasites. The rules of Organic Farming not only strongly favour outdoor breeding in ruminants but also recommend to emphasize non chemical methods of prevention of diseases, restricting the number of treatments per year. This implies that other strategies have to be evaluated and implemented in order to avoid or, at least, to severely reduce the use of chemical drugs.

Three general basic concepts can be applied to prevent parasite infections and/or to maintain the intensity of infection under a threshold compatible with production and the farm economy. These approaches concern either the free-living stages present in the environment or the host parasitic stages:

- To avoid or to reduce the contact between the host and the infective stages of parasites.
- To reinforce the host response against the parasites in order to limit the negative effects of parasitism on animal health and production**.**
- To kill the parasites within the host and consequently reduce the contamination of environment with parasitic eggs.

Among the different helminths which infect the small ruminants (nematode, cestode and trematode), most of the results on non chemical methods of control have been acquired on nematode infections, in particular those of the gastrointestinal tract. This is due to the fact that nematodes are worldwide and also because resistances to AHs are nowadays a major issue in nematode populations in conventionally reared small ruminants whereas this is less the case for flukes and cestodes. The results on GI nematodes will be used as an example to illustrate the 3 concepts previously described.

1. Non chemical methods targeting the free living stages of parasites.

Grazing management

In conventional systems, it has been known for long that an efficient pasture management, aiming at a low pasture infectivity, can strongly complement the control of GI nematodes relying on strategic AH use (Michel 1985, Barger 1999). These strategies of pasture managements have been classified in 3 categories: preventive, evasive or by dilution of the risk on pastures which is related with the third-stage infective larvae. The latter method (dilution) includes mixed grazing between different host species.

In OF, these solutions based on the management of pastures should be the cornerstone of the prevention of the parasitic risks. The use of treatments to cure animals should only be considered as a complement to a rational use of pastures. Methods aiming at assessing the diagnosis of parasitism in farms based on the analysis of management systems are currently evaluated. Taking into account that the optimal mode of management for parasites have first to be compatible with the objectives related to animal nutrition and forage production

Biological control with nematophagous fungi

This method of control mainly refers to studies dedicated to Duddingtonia flagrans. This fungus has been selected among more than 200 fungi species with nematophagous ability. Two main properties of Duddingtonia flagrans explain this choice. First, the ability to kill the nematode larvae. Second, the ability of the spores to survive passage through the digestive tract after ingestion by animals, enabling the viability and activity of fungi (by producing traps) against the larvae in faeces. Several studies both in controlled and field conditions in sheep or goats have illustrated the effectiveness of daily spore distribution to significantly reduce the larvae in faeces and consequently the pasture contamination (Larsen 1999). However, some variability in efficiency has been observed between studies and also some limits still exist before potential commercialisation, in particular the need to develop an effective mode of long term delivery of the spores.

2. Improving the resistance and the resilience of the infected host

To date, **vaccines** against nematodes are not available. The current researches are mainly dedicated to a molecular approach. However, major technological barriers still exist before the design and commercialisation of a recombinant vaccine.

The **genetic selection of hosts**, resistant to parasites represent a second option to limit the nematode populations (selection for resistance) or their pathological consequences (selection for resilience) (Stear et al, 2007). Such programmes of within breed selection for resistance to GI nematodes exist for some highly productive breeds have bee relatively successful in particular in Australia, NZ and UK. However, they have also identified some potential hurdles in the concept. On the other hand, a limited amount of data has been collected on the value of genes from the local breeds in different European areas as promoted by the OF rules.

The last option to improve the host response to parasitism is represented by the possibility to **manipulate the host nutrition,** in particular by targeting the nutritional resources representing a limiting factor in animal diet (Coop and Kyriazakis, 1999). Strategic supplementations to young animals and/or in females around parturition have proven to be effective. However, further studies remain needed to evaluate more precisely the pathophysiological disorders associated with the parasite infections in order to better adapt the supplementation to cover the additional requirements in infected hosts.

3 Targeting the worm populations in the host

Plant anthelmintics.

According to OF rules, this should preferentially be achieved by using aromatherapy, phytotherapy, homeopathy or plant preparations rather than by chemical treatments. Plant preparations have represented the traditional way to treat human and animals for several centuries. They still remain largely used in most parts of the world. The interest in their potential use is currently expanding, but scientifically-based studies to confirm the claimed efficacy of such plant preparations are usually lacking. Moreover, the regulation in their use in regard of the key questions of residues or human safety will have to be addressed.

Nutraceuticals

This refers to forage or fodders which are use firstly for their properties on animal health rather than for their nutritional values. Amongst those, tannin-rich plants have attracted most attention for their effect on GI nematodes in ruminants. However, some favourable data have also been acquired with plants whose tannin content is low, like chicory. In both cases, negative effects on parasite biology and positive consequences on host resilience have been reported. However, some variations have been reported depending on the plant species, the parasite species and/or stage and the host. Therefore, before relevant implementation in organic farming systems, more research is required to better understand the mechanisms of action, in particular, to determine what are the active plant components and whether they act through direct antiparasitic effect or indirectly by increasing host resistance (Hoste et al, 2006).

Conclusions A “basket of options”, with pros and cons identified, can contribute to control nematodes in small ruminants. They have to be evaluated and adapted according to the epidemiology of parasites present in the different parts of Europe. It seems obvious that in respect of OF rules, the grazing management strategies should be the core of the control schemes. However, it is also clear from previous experience, that the only way to achieve a sustainable control, compatible with OF rules, will have to rely on an integrated approach, combining several solutions

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Quality of milk and dairy products from organic sheep and goat production systems

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Organic food is defined as the food produced under the principles of organic agriculture. Primary targets of organically operated animal husbandry include animal welfare, environmental protection and food quality. Food quality is a multi-dimensional parameter that encompasses elements such as safety, nutritional value and balance, and organoleptic characteristics. The current communication attempts to summarize the scarce available literature on the quality of milk and dairy products from organic sheep and goat production systems.

Studies comparing the nutritional composition between organically and conventionally produced ovine or caprine milk and dairy products

The chemical composition of ovine and caprine milk can be influenced by many different and interrelated factors such as breed, age, stage of lactation, milking frequency and udder health status. Farming and feeding systems also are important determinants of small ruminant milk composition (grazing, indoor systems, and various combinations and levels of intensification therein) (Morand-Fehr et. al., 2007). Therefore if valid comparisons are to be made regarding differences in milk composition between organically and conventionally reared ewes and goats, well designed experiments that account for as many of the above variables as possible (both in the study design and in the data analysis) need to be carried out. Also, the results of such studies cannot be easily generalized as differences exist among and within countries with respect to the farming and feeding systems applied in both conventionally and organically managed systems.

In a review of the literature regarding comparisons of organically and conventionally produced foods (Woese et al., 1997), the authors concluded that “in the whole, no major differences have been established between milk from conventional and alternative/organic production in respect of its content of desirable ingredients”. In additional studies on conventional and organic bovine milk and dairy products (Toledo et al., 2002; Bergamo et al., 2003; Ellis et al., 2006) only small differences or no differences in the concentrations of milk constituents have been reported (protein, lactose, fatty acid composition, monounsaturated fatty acids, polyunsaturated and ω-3 fatty acids, urea, conjugated linoleic acid (CLA), linolenic acid, α-tocopherol).

Only a few studies on organically produced ewe’s and goat’s milk have been published. Pirisi et al. (2002) compared the composition and cheese-making properties of organically and conventionally produced Sarda ewe’s milk. The milk composition (pH, concentration of total solids, fat, protein, whey proteins and urea) was found similar in the two groups except for the casein content which was slightly higher in the conventionally produced milk, an observation that was attributed to the lower individual milk yield in the conventional system. No differences were noted in total solids lost in whey or in cheese yield. Zervas et al. (2000) compared the milk yield and milk characteristics of two different groups of organically fed lactating dairy ewes (fed grass hay and barley grain or alfalfa hay and maize grain) and a conventional group (fed conventionally produced grass hay and concentrates). The authors reported a lower milk yield in both groups of organically fed ewes compared to the conventional group, but no differences were observed in the gross composition of the milk (protein, fat, non-fat solids).

Vamvakas (2004) reported no significant differences in either the annual milk production per ewe or in the percentage of total protein, fat, lactose, or total solids non-fat (TSNF) between organically reared and conventionally reared ewes in the region of Grevena, Greece. Only the average SCC was found to be higher in organically managed ewes, a finding that the author attributed to the lack of application of conventional treatments for therapeutical purposes in

organically managed ewes. In the same study, the author compared the milk composition and yield between conventionally and organically reared goats in the same part of the country. Again, most of the milk constituents were not found to be significantly different between the two systems (annual milk production per goat, percentage of total protein, fat, SCC). The statistically significant differences reported in the average lactose and TSNF values were rather small (0.08 % and 0.15% higher in organic goat milk for lactose and TSNF, respectively).

Moroni et al. (2002) examined the prevalence of intrammamary infections and the milk production and quality of two organically operated dairy goat farms in Italy and found small but significant differences both in milk yield, and in the percentage of total protein and fat. Interestingly, the higher producing farm was hand-milked, had a higher average SCC and a greater incidence of intrammamary infections by coagulase-negative staphylococci. No mention was made regarding potential differences in the feeding of goats, but nevertheless, this study helps to demonstrate that farm management practices, even within the frame of organic farming, can lead to qualitative and quantitative differences in the milk.

Pollutants, pesticides and antimicrobial residues.
No study on persistent bioaccumulative toxic pollutants (BTPs), analogous to the one conducted on bovine milk (Schaum et al., 2003) has been conducted for small ruminant milk. The published studies regarding the antibiotic residue status of ovine and caprine milk by Mantis et al. (1996) and Yamaki et al. (2006) have dealt with conventional systems of production.

Malmauret et al. (2002) examined the lead and cadmium content of a small number of samples of retail organic and conventional milk of unspecified animal origin (11 each) in France. Only a few samples of each type had detectable levels of contaminants and in both cases the levels were within the allowable range. Ghidini et al. (2005) as well as Lund (1991) and Skaug (1999) have compared organically and conventionally produced bovine milk and milk products in terms of heavy metals, pesticides and aflatoxin content, but to my knowledge there is no available literature comparing the levels of residues and contaminants in the milk between organically and conventionally managed sheep and goat production systems.

Prevalence and antimicrobial resistance of pathogenic isolates from organic and conventional dairy facilities
Another issue of concern with regards to the safety of food of animal origin is the antimicrobial resistance of pathogenic bacteria that are often isolated from raw animal origin food. Studies on the antibiotic resistance of pathogens isolated from organically vs. conventionally produced milk are restricted to isolates from cows and / or bovine milk and the reported results for different pathogens have so far failed to document a strong case in favor of the organic farms (Bennedsgaard, et al., 2006; Fossler et al., 2004; Ray et al., 2006; Roesch et al., 2006; Sato et al., 2004).

Performance of assays for detecting antibiotic residues in milk from lactating ewes and goats
Irrespective of farming system (organically operated or conventional), mastitis is a frequent disease of small ruminants with Staphylococcus spp. being the most prevalent pathogens responsible for intrammamary infections (Conteras et al., 2007). The proposed doubling of the withdrawal period for organically raised ruminants is an obvious measure to minimize the occurrence or levels of antimicrobial residues in organically produced milk. The screening of the treated animal's milk -after the recommended withdrawal period has elapsed- using rapid antibiotic residue screening assays (test kits) may be a way to ensure that no violative residue levels enter the milk supply. Given that the use of such screening assays on milk from individual cows (as opposed to their application on tanker truck commingled milk) has revealed several problems (frequent false positive results) (Cullor, 1992; van Eenennaam, et al., 1993; Halbert et al., 1996; Andrew et al., 1997; Angelidis et al., 1999; Kang et al., 2005), the application of these

tests for checking the residue status of ovine and caprine milk should be conducted with caution and only after they undergo a thorough field-validation.

Traceability of organic milk

Because the price of organically produced milk and milk products is higher than that of their conventionally produced counterparts, there is always the risk of fraudulent mislabeling of conventionally produced milk as organic. Consumers of organic milk should be protected against this type of ethical and financial fraud and analytical methodologies that could objectively monitor organic commitments and which therefore go beyond "paper" traceability (inspection by independent monitoring bodies) would be very useful in that respect. Thus, research should also focus on the development of reliable indices and analytical methods that will be directed towards discriminating organic from conventional milk. An example of a plant biomarker that has shown promising results towards the traceability of small ruminant diet is the carotenoid pigment lutein which is present at high levels in green herbage (Prache et al., 2005). Priolo et al., (2003) have investigated the application of analysis of the reflectance spectrum of ovine milk for tracing grass feeding in ewes.

Concluding remarks

Organic production systems are not always well-defined and can differ widely between countries or even within the same country. Hence, the direct comparison of organically produced dairy products with their respective conventional ones is rather difficult. Such comparisons may be easier in terms of food safety, but in this case the differences (other than those relating to veterinary drug and certain synthetic chemical residues) are not expected to be of any meaningful magnitude. BTPs -although at low levels- are so widespread in the environment that the possibility that reliance on organic agriculture should be of any benefit for the consumer is rather vague. Nonetheless, most studies that have aimed at comparing organically produced foods with those of conventional agriculture have focused on compositional comparisons of major food elements. In the case of animal milk, because the number of factors that can influence its chemical composition are numerous (breed, feed, lactation stage and others), dynamic and interrelated, it is very difficult – if at all possible – to obtain an unambiguous picture upon comparing the two systems.

Another important aspect that we should bear in mind when comparing conventionally vs. organically produced food is the notion of biological vs. statistical significance, as small and statistically significant differences in chemical composition between products maybe of little -if any- biological relevance. Based on a very limited number of peer reviewed, English-written published studies and published review articles, organically produced bovine milk has so far shown to be of comparable quality with its conventional counterpart (Sundrum 2001; Bourn and Prescott, 2002; Rosati and Aumaitre, 2002; Williams, 2002; Kouba, 2003). With respect to the quality of organically and conventionally produced milk from sheep and goats, the limited available data point towards comparable compositional quality. No data are available regarding the prevalence and antimicrobial resistance of pathogenic bacteria, or the presence and levels of residues of veterinary drugs in milk from organic vs. conventional small ruminant production systems.

Organic animal farming is a way to protect the environment and enhance animal well-being. This, in fact may be the highest merit or "quality" of organically produced animal origin products. Organic foods are not functional foods, must not be expected to be, and must not be confused as such.

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Native breeds sustainability in Organic sheep and goat production in Mediterranean countries- country Malta.

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The Mediterranean basin is home to a number of Native breeds of sheep and goat, which are being sidelined by the introduction of other breeds which might be more economically viable. But do we want to be part of this genetic loss? However the interest in Organic animal husbandry can be the factor which would act on a dual role of saving and promoting native breeds and be the buffer needed to have sustainable sheep and goat production. The Potential is available, however for this to materialize a set of priorities have to be addressed. The setting up of research study with a set of priorities is needed namely: In addressing production methodologies and the quality of dairy products, which are produced. Research to increase and promote the breeding of native breeds. Also there is need to identify new products which could be marketed from Organic Sheep and Goats (eg labeling, promotional material etc.). The need to explore the potential of research collaboration between the participants from various Mediterranean countries should be a priority since alone this potential can be lost. This should include exchanges between researchers and farmers, since together a more concentrated effort towards obtaining our results would materialize.

The History of Sheep/Goats in Malta
From archaeological records covering for the Neolithic period on the Maltese Islands it has yielded remains of prehistoric art depicting various species of domesticated animals, including oxen, sheep, goats and pig. In addition to the skeletal remains from various sites.

- Domesticated animals in Malta dates back to circa 5200 B.C. At the Skorba temples with its Early - Late Neolithic phases
- cattle bones seemed to be more frequent deposits of the earlier phases,
- Though overall the commonest bones recovered belonged to goats and sheep [Gandert, 1966].
- The reason for the change in animal husbandry is related to grazing patterns of the various species.
- Goats and sheep, unlike cattle, graze very close to the ground thus requiring poorer grazing grounds.

Sheep history
- A relief on a slab at Tarxien Temples dated to the Late Neolithic Period depicts an image of a ram.
- Having robust spiral-curved erected horns with three tufts of hair between them, and appears to resemble wild-horned sheep, particularly the Mouflon [Ovis musimon].
- An approximately similar depiction of a ram was found in the form of a utensil handle at Mgarr Temple.
- Another model from Tarxien Temples interpreted as depicting a sheep does not carry horns.
- The Moufflon is found on Sardinia and Corsica, and is thought to be one of the two ancestors for all modern sheep breeds.
- The horns of an adult ram measure 70-80 c, while the ewe has either short horns or none at all.
- Skeletal remains from Xemxija were attributed to an animal approximating the modern Mediterranean sheep.
- The present breed of Maltese sheep are not remarkable for the fineness of their fleece, but are more generally reared as milking animals.

Goat History

- Relief's on two slabs at Tarxien Temples dated to the Late Neolithic depict 26 images of goats with horns which curve backwards in an arc similar to those found in the Ibex [Capra ibex] or the Persian Wild Goat [Capra aegagrus].
- The ibex is a widely distributed species with several different geographical races. The only places where the ibex is presently found in Europe are the Alps and the Iberian Peninsula.
- The Persian Wild Goat presently inhabits various Mediterranean Islands besides various eastern lands.
- The present Persian Wild Goat is genetically similar with the present domestic goat and interbreeding can occur.
- The Neolithic skeletal remains from Xemxija were not identified separately from those of sheep.
- At Skorba, five goat skull remains from the North Room suggested relatively bulky horns.
- The Maltese breed of goat is the hardiest, tamest and best milking goats known.
- The Maltese goat bears a striking resemblance to the Theban or Egyptian goat from which it probably originated.
- It is generally beardless and frequently hornless, has spreading and slightly pendulous ears, though shorter and narrower, has a convex profile, has very often a pair of lappets on the throat, and is often of a reddish color, with long hair and very large udders.

Present day:

The Maltese Sheep

- A small population of typical Maltese sheep still exists in parts of the country.
- In the early 1980's Malta experienced an influx of tourists from North African countries, mainly Libya. This led to a situation where Maltese farmers started to import north-African sheep as they had became more economically viable. This resulted in a decline in the local sheep population.
- A small population still exists locally, yet it is important to analyze and monitor the remaining population to investigate if the species is in danger of extinction.
- A genetic improvement project is being implemented to safeguard the Maltese breeds of goat and sheep.
- The demand for the Maltese goat throughout the Mediterranean region is high due to its resilience and high milk yields.
- Malta is also promoting the local Nubian breed of sheep.

Comisana breed

- Found on the island of Malta, this rare breed was the original seed stock used in the development of the Comisana breed found in Sicily. They are reared for milk, meat and wool production.

Characteristics:

- Head - mostly masked reddish, yellow or black with long neck and semi lop ears.
- Rams' head is slightly broader.
- Muzzles - have no wool.
- Long body - long slim body with long silky coat mostly white fleece and may have any patches at any place, the patches will be of the same color of the head.
- Fleece- head and feet and scrotal are not covered.
- Tail- long tail covered with long fleece.

Awassi breed

- The Maltese sheep has a white body and a black head, similar to the Maltese goat.
- The origin of the Maltese breed is from the Awassi breed.
- With flocks of about 50 - 80 heads.
- Milk production is about 320L with a high fat (4.5%) and protein (3.9%) contents:

- Prolificacy is about 150% and lambing occurs during the whole year, with a concentration during the month of November

The Maltese Goat

- Typically black and famed for its high yield of milk.
- A decline in Maltese goats resulted when Sir Temi Zammit discovered Brucellosis in the goat's milk. This was accompanied by the misconception that only goat's milk contained the disease pushing Maltese farmers to look at other animals as a source of milk.
- The goats that one can find in Malta are mainly Syrian. These are typically red in color and are the most widely found variety in Malta.
- Although no pure-breed Maltese goats remain in Malta, one cannot exclude that some of the local goats may be closely related to the pure Maltese breed, there are thirteen (13) goats that represent the last of that unique Maltese species.
- The Maltese goat has a white body with long hair, black head and large dropping ears.
- This breed does not have horns. This breed came from the Middle East. It is usually raised in small flocks of about 40 - 60 heads.
- Kidding occurs during the whole year, with a concentration during the months of November and February.
- Milk production is about 350L with a high fat (3.8%) and protein (3.3%) contents.
- Prolificacy is also high (180%)

Management

Reproduction

- Natural reproductive method is usually used.
- Hormone synchronization and artificial insemination is also being carried out.
- The final aim is to introduce the technique embryo transfer in the nearby future.

Nutrition

- Combination of forage plants and usually concentrates in the form of pellets.
- Grazing sometimes takes place but is not practiced by all the farmers.
- Forage plants used are: (i) Hedisarium conorarium; (i) Vicia sativa; and (iii) Medicargo rigidula.
- The concentrate pellets are Barley, maize, cotton sieve cakes, minerals and vitamins, containing 15.5% Proteins, 11.5mJ Energy and 3.5% Fiber.
- The goats are usually given 0.8 kg during the early pregnancy,
- 1.0 kg or more during the milking phase and late lactation and 2.0kg per 5 liters of milk.
- The males are not given maize due to problems with the urinate systems but are given crushed barley.

Housing

- An open yard system is common used in Malta.

Genetic selection programs: Aim: To re-introduce the Maltese breeds in Malta.

- Methods: The method used involves the buying from local farmers of those breeds of animals that resemble the Maltese goat.
- The animals are selected from their phenotype characteristics that are the color (white body with black head), long ears and lack of horns.
- Animals are also to be imported from nearby countries where this breed is found, this is due to the low number of Maltese goats in our country.
- A work involving molecular biology is being carried out in order to help in the selection programme.
- The principle of this method is to find a genetic marker which could be RNA or DNA or even a particular sequence of the DNA.
- This sequence is labeled usually with a phosphorus isotope and now this probe can to use to select the animals of this breed. The main techniques to be used in this project are the PCR, VNTR and RFLP methods.