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### Session 30. Management and processing for high quality forages

**Date:** 26 August '09; 08:30 - 12:30 hours  
**Chairperson:** Bailoni (IT)

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### Session 32. Animal fibre science

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**Chairperson:** Renieri (IT)
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**Session 49a. Sheep and goat organic farming and product marketing**

Date: 27 August '09; 08:30 - 10:15 hours  
Chairperson: Gauly (DE)

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**Session 49b. Free communications on sheep and goat feeding and breeding**

Date: 27 August '09; 10:45 - 12:30 hours  
Chairperson: Gauly (DE)
The performance and meat quality of Bonsmara steers raised in a feedlot or on organic pastures
Groeneveld, J.B., Esterhuizen, A., Hugo, A. and Strydom, P.E., University of the Free State, Centre for Sustainable Agriculture and Rural Development, P.O. Box 29353, DANHOF, 9310, South Africa; groenel. scf@ufs.ac.za

The effects of production system on growth performance, yield and economics and the effects of feeding regime, pre-slaughter treatment and electrical stimulation on meat quality were evaluated. Sixty steers were divided into three treatment groups, viz. feedlot, organic pasture and conventional pasture feeding. The feedlot and conventional pastures treatments received the same finishing diet whilst the organic treatment received a diet with approved organic components. Initial weight, final live weight, warm carcass weight, cold carcass weight, warm and cold dressing percentage, average daily gain (ADG), pH at one and 24 h post mortem, intramuscular fat content of the loin and subcutaneous back fat thickness were measured. Feedlot cattle had significantly ($P<0.0001$) higher final weights, warm and cold carcass weights and dressing percentages, ADG, intramuscular fat content and back fat thickness measurements than organic and conventional pasture treatment groups. Pre-slaughter resting for a week prior to slaughter at the abattoir had no effect on meat tenderness but electric stimulation showed a significant ($P<0.0001$) positive response. Growth and carcass results were used to calculate price and feed margin for the different production systems. Feedlot cattle showed a higher profit than conventional and organic groups, mainly due to the faster and more efficient growth. The organic group showed higher profit than the conventional group as a result of the premium being paid for organic produced meat.

Comparison of mycotoxins residues in animal products produced organically and conventionally
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Mycotoxins are secondary toxic metabolites which are produced by several genera of Aspergillus, Fusarium and Penicillium occurring in foods and feeds. The contamination of mycotoxins in foodstuffs and feedstuffs is a significant problem in worldwide. Diseases caused by exposure to foods or feeds contaminated with mycotoxins are known as mycotoxicosis. In animals, toxicity is generally revealed as decrease performance. In addition, they have variety biological effects in animals such as liver, kidney toxicity and estrogenic properties. Mycotoxins and their derivates may detect in edible animal products such as meat, milk, eggs. The rate of their transfer from feeds to animal products is quite variable. The relationship between the amount of mycotoxins ingested and quantity of their metabolites in products is depending the metabolize pathways, the chemical structure of mycotoxins and the animal species exposed. Their presence in animal products has a potential health risk in human because of their synergetic properties and diversity toxic effects. Mycotoxins have been reported in variety of feedstuffs produced organically and conventionally. In addition, their residues in edible animal products produced organically are considerable. Therefore, there is a profound discussion for organic and conventional products with regarding to mycotoxin contents. This paper considers comparing mycotoxins residues in animal products produced organically and conventionally and also possible strategies promising with regard to reducing their presence in animal products for both production systems.
Viability of organic dairy farms located in northwest of Spain in different subsidy reduction scenarios
García, A., Pereira, J., Acero, R. and Gómez, G., University of Cordoba, Animal Production, Edificio Producción Animal, 14071, Spain; palgamaa@uco.es

Spanish organic dairy farms will be affected in the short term by lower subsidies. It is essential to ensure their future to analyse the viability of organic dairy farms in different subsidy reduction scenarios. The area of study includes three Spanish regions (Asturias, Cantabria and Galicia) that concentrate the 60% of the organic dairy farms registered in Spain. The sample of farms was obtained using a stratified sampling by regions and comprised 42% of the official census. The pay-back was determined for each farm, which establishes the level of milk production required to reach the fixed costs, with a unitary margin which is the difference between the weighted income per production unit and the average variable cost. A simulation analysis was developed to determine the economic results in three subsidy reduction scenarios. Scenario I represents the real situation in 2007. The level of production necessary to reach a balance between cost and income is 234,000 l, while the real production is 25% higher, with a mean unitary margin of 0.36 €/l. In all farms the pay-back is exceeded by the real production, so the economic profit is positive in all farms. Scenario II simulates the effect of the cessation of subsidies to compensate for loss of rent, which accounts 7.5% of total incomes. The cessation of subsidies reduces the unitary margin around 10%, reaching 0.321 €/l, and increases the pay-back to 205,418 l. In this scenario, the net result would be negative in 14% of farms. Scenario III simulates the cessation of all subsidies to farms (agri-environment and loss of rent), which accounts 13.6% of total incomes. The cessation of all subsidies reduces the unitary margin to 0.285 €/l, which represents a reduction of 20% compared to the initial situation. Consequently, the pay-back raised to 237,527 l. In these conditions, only 42% of farms continue to produce benefits. These results show the high dependence of the organic dairy sector to European financial model.

Characterization of the organic beekeeping in Spain: preliminary results
Pereira, J.1, García, A.1, Acero, R.1, Santos, M.V.R.2 and Gómez, G.1, 1University of Cordoba, Animal Production, Edificio Producción Animal, Campus Rabanales, 14071, Spain, 2University Federal Rural of Pernambuco, Campus Pernambuco, 52171-900, Brazil; palgamaa@uco.es

Spain has a great potential for honey production, due to its rich flora and the climate allows the activity of bees most of the year, so the organic bee farm census has been increasing year after year. The aim of this study was to characterise the organic bee farms located in Spain from a survey including 45 farms (25% of official census). The results show that the organic honey is produced in family farms (60% of the workforce), which generate 2.25 annual work unit per farm on average. The farms have an average size of 358 hives, but with high variability. 25% of farms are small (less than 150 hives) while another 25% are large (over 594 hives). The farms have an average productivity of 3,800 kg per year (10 kg per hive) and 56% of beekeepers have their main source of income in beekeeping. Beekeepers that have their main source of income in beekeeping follow a transhumant production system, while the remaining 44% develop a multifunctional system with cattle or ovine in extensive farms. The average unitary cost amounts to 9.28 €/kg honey and is formed mainly by labour cost (54.62%), amortizations (13.94%), supplies (13.33%) and taxes (7.76%). The average income per kg of honey is 10.54 € and is sufficient to generate profits in the activity. Incomers are comprised of: sale of honey (41.32%), sale of pollen (36.9%) and subsidies (21.78%). The honey is sold through two channels: the conventional channel, which is predominant and accounts for 74% of production at low price (2.5 €/kg) and the organic channel, which absorbs only 26.1% of production at high price (7.25/kg).
Competitiveness of organic dairy farms in northwest of Spain; subsidy reductions

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It is essential to ensure the future of Spanish organic dairy farms to identify those aspects that differentiate competitive and non-competitive farms in a subsidy reduction scenario. The area of study includes three Spanish regions (Asturias, Cantabria and Galicia) that concentrate the 60% of the organic dairy farms registered in Spain. The sample of farms was obtained using a stratified sampling by regions and comprised 42% of the census. The farms were classified according to their economic profits (positive or negative) in a scenario without subsidies and an ANOVA test was used to identify the principal differences between both groups. The results show that competitive farms are larger than non-competitive farms ($P<0.05$), in both livestock (64.3 vs 39.1 animals) and surface (60.0 vs 39.3 ha), although land ownership is the main strategic difference due to determine the production system. 92.2% of the land in the competitive farms is owned by the farmer, and they apply improvements in pasture and cultivated 90% of the land in order to feed livestock, which reduces dependence on external food. While the non-competitive farms only the 39% of the land is owned by the farmer and it is atomised into many parcels of small size. This makes more difficult the development of crops and improved pastures, thus decreasing the stocking rate and increases the use of external food ($P<0.05$, 0.21 vs 0.48 kg/l milk). Consequently, the management of the herd in non-competitive farms is intensified and the feeding cost is duplicated ($P<0.05$, 491 vs 816 kg/cow), while the productivity is 22% lower than in competitive farms ($P<0.05$, 6,403 vs 4,990). The lowest productivity is also due to poor management of the replacement (replacement rate 24.4 vs 15.8%) and an increased incidence of intensive diseases. Furthermore, the non-competitive farms are equipped with a lower technological level. The lack of technology increases the workforce by 53% compared to competitive farm ($P<0.05$, 27.8 vs 18.1 cows/UWM).

Management of beef and dairy herd replacement

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Cattle herd replacement management should be revisited because of the combined evolutions of animal type, size, and level of production, and of the evolutions of the economic and environmental context. This presentation will deal with both dairy and beef productions. In these two cases, the strategy of herd replacement has to be considered not only at the animal scale (rearing strategies and optimal lifespan duration), but also at the herd and farm levels according to the various objectives assigned to sustainable livestock systems. During this presentation, an update of the main effects of heifers rearing strategies on subsequent performances will be given, with focuses on the effects of feeding strategies on puberty attainment, fertility of heifers, production and reproduction performances when adults, calving difficulties, longevity of the animals and carcass characteristics at slaughter. Interactions with breed maturity will be highlighted. In the second part, considerations on the sustainability of the different ways of production will be developed, taking into account the various dimensions of sustainability. A special grazier role is generally assigned to heifers, which are used to make the most of the least productive pastures. Consequently they have a positive environmental impacts which could vary with breed and age. Short- and/or long-time perspectives will be included. This presentation will mainly focus on some common production systems, such as intensive Holstein dairy production or Charolais beef herd production. However, attention will be paid on some alternative production systems (i.e. organic farming for example) or on some other systems that are greatly influenced by the characteristics of their land (mountains or Mediterranean herds for example).
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Temperature and pH of silages processed in micro-silos and obtained from different substrata
Santos, M.V.F.1, Pereyra, J.2, Martinez, G.2, Garcia, A.2, Gómez, G.2 and Ferreira, R.L.C.1, 1University Federal Rural of Pernambuco, Campus Pernambuco, 52171-900, Brazil, 2University of Cordoba, Animal Production, Edificio Producción Animal, Campus Rabanales, 14071, Spain; pa2pemuji@uco.es

The research was carried out at Rabanales farm from the University of Cordoba and it aimed to characterize different products ensiled in micro-silos covered with plastic. Evaluated products and their respective proportions were described as follows: MSI - maize without inoculum; MCI - maize (99.9%) + inoculum (0.1%); PSI - wheat straw (40%) + brewery yeast (60%); and PCI - wheat straw (39.9%) + yeast (59.3%) + inoculum (0.1%) + urea (0.7%). The inoculum was manufactured by a private company and the growing media was the rumen liquor. The micro-silos were kept outside, without soil contact. Evaluation was performed in January 2009, 90 days after ensiling. The following averages and standard deviations were obtained: 540.5±107.93 kg of weight, 0.73±0.02 m height, 0.82±0.01 m length, 1.37±0.05 m width, and 649.75±151.10 kg/m³ bulk density, respectively. Six temperatures were taken in each experimental unit using a digital sound. The pH reading were performed using a pH meter in the aqueous extract. A 4 x 2 factorial arrangement was used in a complete randomized design with four products and two layers in the micro-silo (superior and inferior), with three replicates. Averages were compared using the Tukey test (P<0.05). Significant effects were observed for temperature and pH (P<0.05) regarding the product, but no interaction was observed between product and layer. The product PSI showed the lowest temperature (6.68 °C), statistically different from the other products (P<0.05). No differences were observed between MSI (9.56 °C) and MCI (10.35 °C), however, MSI was different from PCI (11.88 °C). The highest pH was observed for the micro-silo with PCI (6.23) and the lowest for MSI (3.82), being these two different from each other. No significant differences were observed (P>0.05) between MCI (4.28) and PSI (4.43).

Session 30

Stability of fatty acids in grass and maize silages after exposure to air during the feed out period
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Lipids in the forages are extensively hydrolyzed in the silo with a concomitant increase in the level of free FA (FFA). After opening of the silo, exposure of the FFA to air and light with a simultaneous increase in pH and microbial growth could induce oxidation. The present study investigated the stability of FA in grass and maize silages exposed to air for 0, 12 and 24 h. Eight maize silages were selected with varying dry matter (DM) contents, being very wet, wet, normal and dry. In addition, eight grass silages were chosen on the basis of ammonia (NH₃) concentration and pH level. Grass and maize silages were sampled 8-10 weeks after ensiling and transported anaerobically to the lab in cooled plastic bags. After mixing, each sample was divided into three subsamples and exposed to air for 0, 12 or 24 h. Thereafter concentrations of individual FA were quantified by gas chromatography (GC). Exposure to air up to 24 h significantly lowered (P<0.01) the contents of linolenic acid (C18:3), linoleic acid (C18:2), oleic acid (C18:1) and total FA in maize silages. In grass silages, a 24 h exposure to air decreased (P<0.05) the mean concentrations of C18:3, C18:2 and total FA (P<0.01). In both grass and maize silages a decline in the concentrations of major unsaturated FA (UFA) was associated with a concomitant increase (P<0.01) in the proportion (g/g total FA) of palmitic acid (C16:0). The relative decrease in total FA after 24 h exposure to air was higher in maize silages with a high moisture content and decreased progressively with increasing DM contents. In contrast, pH and NH₃ levels of grass silages had no effect (P>0.05) on the stability of FA during the feed out period. The present study demonstrated that extended exposure of silages to air during feeding increased the proportion (g/g total FA) of C16:0 and lowered the concentration of poly unsaturated FA (PUFA).
Main aspects to promote organic goat production in mountains areas of Andalusia, Spain

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Organic goat production is poorly developed in Spain. In Andalusia (southern Spain) there is an important number of grazing dairy goat farms located in mountains areas, which are very close to the organic model. During 2006 and 2007, 13 grazing goats farms (4 of which certified as organic) was monthly monitoring. Information about different aspects of the production system was generated. This information was used for researchers, technicians and farmers to make a diagnosis about the proximity to the organic model of dairy goat systems in mountainous areas. This diagnosis was made using the SWOT (Strengths, Weaknesses, Opportunities, and Threats) method. Later, weaknesses and threats were ordered by priority, using the structural method. As results, both, weaknesses and threats, were classified into four groups: power, conflict, independent and exit. The first two groups are the most important because they affect most of the others. The main difficulties for the transformation to organic model are: the little feed self-sufficiency of farm; the scarcity of organic feed in the market; the lack of training of technicians and farmers in grazing management; the difficulties for marketing of organic products (milk and meat); the delay in the payment of economical aids; the limited demand of organic goat products by consumers. Some of the proposals for the transformation to organic model are: to improve the management of grazing; to minimize the consumption of concentrate, although this implies a slight decrease in milk produced; to promote partnership between stock farmers and farmers to obtain food for the animals; to promote also partnership between stock farmers and handmade cheese factories to improve the commercialization of organic products.

Economic profitability of organic dairy goat farms in south of Spain: preliminary results

Angón, E.1, Perea, J.1, Santos, M.V.R.2, García, A.1 and Acero, R.1, 1University of Cordoba, Animal Production, Edificio Produccion Animal, Campus Rabanales, 14071, Spain, 2University Federal Rural of Pernambuco, Campus Pernambuco, 52171-900, Brazil; pa2pemyj@uco.es

The aim of this study was to evaluate the economic profitability of organic dairy goat farms located in south of Spain. The area of study includes two Spanish regions (Andalucia, and Castilla la Mancha) that concentrate the 44% of the organic dairy goat farms registered in Spain. The sample of farms comprised 15 organic dairy farms (100% of the official census in these regions). The farms generate an average income of 49,348 € which comes from three main groups: the sale of milk (54.87%), sales of kids (17.71%) and subsidies (21.32%). The milk is sold through two channels: conventional or organic. Only 13% of the milk marketed by the organic channel (0.95 €/l), whereas the conventional channel absorbs 87% at a lower price (0.49 €/l). The costs amounting to 46,910 €, and include food (30.7%), labor costs (30.4%) and amortizations (9.86%), which representing over 70% of total costs. The remaining costs were distributed as follows: financing costs (0.17%), insurance premiums (0.14%), independent professional services (1.68%), supplies (1.73%), grazing leases (6.28%), taxes (4.64%) and other costs (4.24%). The costs can be grouped into fixed (62%) or variable (38%), and as farm size increases the variable costs gain more weight. The high labor cost reflects the lack of technology of many farms, which is replaced by workforce (145.7 goats/WU). The high outlay involved in the repair and maintenance (6.26%) compared to depreciation reiterated in sectorial technologic deficit. The amortization comes as follows: 51% animals, 25% machinery, 20% facilities and 4% constructions. The unitary cost is 0.87 €/l while the unitary income reached 1.1 €/l, so is sufficient to generate profits. The average level of production necessary to reach a balance between incomes and costs is 41,370 l, while the real production reach 54,300 l, so profits are generated.
Technical characterisation of organic dairy goat farms in south of Spain: preliminary results

Angón, E., García, A., Perea, J. and Acero, R., University of Cordoba, Animal Production, Edificio Produccion Animal, Campus Rabanales, 14071, Spain. pa2penuj@uco.es

The aim of this study was to characterise organic dairy goat farms through structural, technical and productive aspects located in south of Spain. The area of study includes two Spanish regions (Andalucía, and Castilla la Mancha) that concentrate the 44% of the organic dairy goat farms registered in Spain. The sample of farms comprised 15 organic dairy farms (100% of the official census in these regions). The production of organic dairy goat farms is developed in farms following a semi-extensive production system and located in economically and demographically depressed areas of the south. The farms are small-medium size, about 200 goats of mean in an average area of 253.8 ha. The breeds used are native biotypes with high rusticity and adaptation to the environment, emphasizing the Murciano-Granadina (33%), Malagueña (22%) and Florida (20%). The feed is based on the use of forage resources from farm, the average stocking rate is 0.2 LU/ha, and the concentrate is used only for goats in production. The average consumption of concentrate per animal is 277 kg. It carries out management with lots and two seasons, one in February-March and another in September-October. With the male effect and food control to achieve adequate results in most of the farms (fertility rate 1.26, replacement rate 10.4%). The average productivity per goat is 321 l, the rate of commercial kids amounts to 1.3 and the mortality rate is 8.8%, lower than those obtained in conventional intensified. The average investment per farm is 387,00 € (without taking into account the land investment), although it is generally outdated and inadequate to production system. The lack of technology is replace with workforce, thereby reducing the number of goats per worker to 145.7 goats/WU.

Sociological approach to organic dairy goat farms in south of Spain: preliminary results

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The new Common Agricultural Policy increases the importance of denominated non-productive functions, like the role of farms in environmental conservation or in the rural development. The aim of this study was to analyze the organic dairy goat farms located in south of Spain through a sociological perspective. The area of study includes two Spanish regions (Andalucía, and Castilla la Mancha) that concentrate the 44% of the organic dairy goat farms registered in Spain. The sample of farms comprised 15 organic dairy farms (100% of the census). The farms are located in economically and demographically depressed and rugged areas of south peninsular. The goat activity is the only or main source of income for 91% of farmers, which indicates the little significant economic activities in these areas. The farms are highly specialized and are family (99% of the workforce), which generate a mean of 1.25 stable jobs and an average of 3.8 people are economically dependent of each farm. Under these conditions, the farm can be considered an engine of development: set rural people in unfavorable areas and ensure the sustenance of the family unit. The farmers are young (42.94 years) with 14.42 years of experience, which often come from farming families of great roots and goat tradition. Likewise, the 80% of the farmers have basic studies or training, and 10% university studies. This profile supports the continued of the farm in the medium term and allows the farmer faces the future sectorial challenges. The level of association is low: 85% of farmers belong to any Sanitary Defense Association, while only 30% belong to any association racial or any kind of cooperative. Finally note that the woman has an active role in 46% of farms. The formation of women exceeds that of their spouses and generally develop an active role in management of the farm. It also develops supplementary works in milking and raising kids.