

## A NEW APPROACH TO LAMB PRODUCTION AND MARKETING IN GREECE

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### *Introduction*

The results and conclusions presented in this paper and the following short communications were obtained within a 3 year programme, supported by the European Commission, entitled "The Improvement of the Quality and Marketability of Sheep Meat Produced in the Less Favoured Areas (LFA) of the Community.

### *Current structure of sheep production in Greece*

Before assessing the possibilities for new approaches to lamb production and marketing it is necessary to understand the constraints imposed by the structure of sheep farming enterprises in Greece, by the overriding priority for milk production and by the traditional consumer preferences for lamb meat.

There are approximately 10 million dairy sheep in Greece (Table 1, Ministry of Agriculture, 1994). The wide range in flock size and associated differences in management strategies has a significant influence on the options for change. There are many different local indigenous breeds ranging in size from small to medium by European standards. Crossbreeding is widely practiced both within the available indigenous breeds and, to increase milking potential, to the indigenous Chios breed or to the imported East Friesland breed (Zygogiannis, 1977, Katsaounis and Zygogiannis, 1986, Zervas et al, 1988).

The milking period begins at lamb weaning (42 days) and ends, mainly in response to climatic conditions, in July or August. Hence the annual milk yield, within the breed and nutritional regime, depends largely on the date of lambing and therefore, the primary target for most farms is to achieve flock lambing before the end of December. The indigenous breeds have an early onset of seasonal oestrus and, under natural conditions, lambing may commence in October. In general the potential lambing period is considered to extend from October to May and, since it is normal practice to allow continuous access of the rams, many farms have a much extended breeding season. There is little available evidence to indicate the proportion of lambing by month over

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the wide range of breed types and management standards in commercial farms. Table 2 shows the distribution of births between October and the end of January taken from commercial farm records (Kouimtziis et al, 1994).

Table 1. - NUMBER AND PERCENTAGE OF FARMS AND OF BREEDING EWES ACCORDING TO FLOCK SIZE

| Flock size<br>(breeding ewes) | Number of farms<br>(X 1000) | Percentage of total | Percentage of total<br>ewes |
|-------------------------------|-----------------------------|---------------------|-----------------------------|
| 1-50                          | 165                         | 74.7                | 21.2                        |
| 51-100                        | 27                          | 12.3                | 20.9                        |
| 101-200                       | 21                          | 9.6                 | 31.9                        |
| over 200                      | 7                           | 3.2                 | 25.9                        |
| Total                         | 220                         | 100                 | 8.5 million                 |

Table 2. - PERCENTAGE OF EWES LAMBING IN SUCCESSIVE MONTHLY PERIODS IN COMMERCIAL FARM FLOCKS

| Period of birth | "Earliest" farm | "Latest" farm | Mean |
|-----------------|-----------------|---------------|------|
| October         | 50              | 0             | 18   |
| November        | 50              | 55            | 56   |
| December        | 0               | 14            | 11   |
| January         | 0               | 10            | 5    |
| Later/barren    | 0               | 21            | 10   |

The above data shows that the peak lambing period over all flocks sampled was in November and suggests that the proportion of lambs born beyond mid December may be as low as of 15 % of the total.

Greece has the highest per capita consumption of lamb in Europe (c 10 kg/annum). The greater part of this consumption (70%) is provided by suckled lambs, weaned as early as possible to provide a long milking period. The usual weaning age is from 5 to 7 weeks at a liveweight of below 16 kg and a carcass weight (including head and internal organs) 6 to 10 kg. Suckled lamb carcasses of this type are favoured during the Christmas and Easter periods when there is high demand. At present only a small proportion of home produced lamb (around 15 %) is retained beyond weaning and killed at a higher carcass weight. Farm prices are variable and depend on the local method of marketing and the relative supply and demand at the time of marketing. Some 15 % of total lamb meat consumption is supplied by importation partly in the form of frozen New Zealand lamb. Table 3 shows approximate retail prices (1993-1994) according to source and weight of lamb and time of year. In recent years there was a supply of lambs from E. Europe and, recently, the early summer market has been targeted by "quality-certified" light lambs from UK hill flocks.

Table 3. - RETAIL PRICES OF LAMB (1993-1994)

| Carcass type          | Small (6-10 kg) | Large (12-18 kg) | Imported (12-14 kg) |
|-----------------------|-----------------|------------------|---------------------|
| Percent of total      | 70              | 15               | 15                  |
| Retail price (Dra/kg) |                 |                  |                     |
| November-December     | 1500            | -                | 600                 |
| January-March         | 1200            | -                | 600                 |
| Easter                | 1800            | 1600             | 600                 |
| Summer (June/July)    | -               | 1900             | 600                 |

### *The research project*

Greek farm management objectives, especially in the maximisation of the main product, milk, create significant constraints on the development of more profitable methods of lamb production. These constraints are emphasised by the traditional meat marketing systems and the associated consumer expectations.

Finishing of carcasses larger than traditional could provide an opportunity to increase the returns to the farmer not only in terms of product value, but also in relation to current CAP subsidy regulations (EEC, 1989).

Information on growth rates or on carcass composition at heavier slaughter weights was scarce. The objectives of the 3 year project were to provide basic information on the ability of different-sized indigenous breeds to produce larger than traditional carcasses, the relative time needed over which such carcasses could be marketed and, most importantly, the acceptance of the product to the retail trade and consumer. These objectives were described as Project Questions, listed in Table 4.

Table 4.- PROJECT QUESTIONS

1. Can the indigenous dairy breeds produce "acceptable" carcasses at a heavier weights than is traditional?
2. In what time scale, post weaning, could such larger carcasses be produced under non-limiting nutritional conditions?
3. Can different feeding and management strategies extend the finishing period?
4. Can the management strategies include a viable "green" alternative to existing systems of land use (e. g. cotton or tobacco monocultures)?
5. If these options are biologically positive, what is the potential market of the product in Greece and how can the market be further developed?

In the absence of an established consumer market for larger carcasses the definition of "acceptable" was based on the EU classification system and accepted between Fat Class 2 and 3 with low or medium fat cover. This assumption will be examined in relation to consumer surveys.

Three pure breeds were selected to represent the range in size and mature liveweight amongst the indigenous breeds (Table 5).

Table 5.- DESCRIPTION OF BREEDS

| Breed name      | Location          | Estimated mature weight (MW) (kg) male | Estimated mature weight (MW)(kg) female |
|-----------------|-------------------|--|---|
| Karagouniko (K) | low-ground/arable | 81                                     | 62                                      |
| Serres (S)      | upland            | 71                                     | 55                                      |
| Boutsko (B)     | mountain          | 56                                     | 43                                      |

*Research programme*

Table 6.- TASKS OF THE 3 YEAR-PHASE RESEARCH PROGRAMME

| Task               | Phase 1           | Phase 2        | Phase 3                     |
|--------------------|-------------------|----------------|-----------------------------|
| Biological         | Basic information | Indoor feeding | Utilisation of sown pasture |
| Economic/Marketing | Basic information | Surveys        | Test panels                 |

The results of phase 1 are represented in detail in this paper together with the brief conclusions from phase 2 and 3, and the overall assesment of the project (Detailed results of phase 2 and 3 are presented in the following short communications.

In the first phase, the studies were designed to answer the first 2 basic questions in order to provide a wide reference set of data on lamb growth and development, at this time this essential information was not available for the indigenous dairy breeds of Greece. Inrelation to the market objectives, contacts with various representatives of the meat industry were initiated in order to design a subsequent, more positive, approach to the development of new market strategies.

*Phase 1. (a) animal study*

At the outset of the project the existing information on the potential MW of the breeds was not based on firm evidence. The values shown in Table 5 were obtained during the project from well-managed breeding flocks of each breed and the liveweights from all flock ewes were adjusted for age effects and for variation in individual body condition (Zygogiannis, et al 1993). The original estimates were considerably lower, e. g. 55,60 and 38 kg, respectively, for K, S and B females. A total of 40 lambs (20 male and 20 female) of each breed were purchased at weaning in mid-December (age c. 42 days) from three of the main breeding flocks. They were transferred to the research unit, housed in single pens and individually fed ad libitum on a concentrate ration together with 50 g of unchopped alfalfa hay daily. The concentrate feed contained 11.3 MJ/KG DM of metabolisable energy and 192 g/kg DM crude protein (Table 7). All lambs were weighed and individual concentrate refusals were measured weekly.

Table 7.- THE CHEMICAL COMPOSITION OF THE FEEDS (G/KG DM)

|                                 | Concentrate | Alfalfa Hay |
|---------------------------------|-------------|-------------|
| Metabolisable Energy (MJ/kg DM) | 11,3        | 8,3         |
| Crude Protein                   | 192         | 182         |
| Acid Hydrolysed Ether Extract   | 28          | -           |
| Ash                             | 74          | 93          |
| Neutral Detergent Fibre         | 246         | 398         |
| Acid Detergent Fibre            | 106         | 312         |

Four lambs from each breed and sex were slaughtered on transfer and further groups of 4 lambs were slaughtered at fixed proportions of estimated MW for the breed and sex up to a final group when mature weight was reached. Slaughter weights were based on the early unsupported estimates. The slaughter point at weaning represented 22 % of MW and the final point was equivalent to 88 % MW. Intermediate points were at 31, 45 and 62 % of MW.

At slaughter all body components were weighed and recorded and the LHS of each carcass was jointed and dissected into bone (B), lean (L), sub-cutaneous fat (SCF), intermuscular fat (IMF) and internal fat (IF). The RHS was used for chemical analysis to establish a relationship between the two methods of estimation the proportions of the body components.

### Results

The average daily liveweight gain and daily intake of concentrate for both sexes and the three breeds are shown in Table 8.

Table 8. - AVERAGE DAILY LIVELWEIGHT GAIN (DLWG) AND FOOD CONSUMPTION (FC), FOR MALE AND FEMALE LAMBS OF THE K, S AND B BREEDS FED AT UNRESTRICTED LEVELS

| Breed       | Daily liveweight gain (g/day) | Daily liveweight gain (g/day) | Fod consumption (g/day) | Food consumption (g/day) |
|-------------|-------------------------------|-------------------------------|-------------------------|--------------------------|
|             | Male                          | Female                        | Male                    | Female                   |
| Karagouniko | 276                           | 198                           | 1109                    | 864                      |
| Serres      | 251                           | 188                           | 1008                    | 826                      |
| Boutsko     | 169                           | 127                           | 658                     | 563                      |

The differences amongst the breeds in DLWG and FC were significant, as were the differences between sexes within breed, but the order of difference was closely related to the estimated breed and sex MW.

From the results of dissection, it was found that, as expected, the proportions of lean tissue, bone and fat in the carcasses changed consistently with degree of maturity at slaughter. The proportions of lean and bone declined and that of the fat, both external and intermuscular, increased with increasing maturity. The results for male lambs,

which would represent the major source of lambs for slaughter, when killed at 45% of estimated MW, are represented in Table 9.

Table 9.- LIVEWEIGHT (LW) (KG), CARCASS WEIGHT (CW) (KG), KILLING OUT % (KO%) THE PROPORTIONS OF LEAN (L), BONE (B), EXTERNAL FAT (EF) AND TOTAL FAT (TF) EXPRESSED AS % OF CW AND THE NUMBER OF DAYS TO REACH SLAUGHTER WEIGHT. MALE LAMBS KILLED AT APPROXIMATELY 45% OF MW

| Breed | LW   | CW   | KO% | L    | B    | EF   | TF   | Days |
|-------|------|------|-----|------|------|------|------|------|
| K     | 35,1 | 16.8 | 48  | 52.9 | 18.1 | 14.8 | 24.2 | 66   |
| S     | 30.2 | 14.3 | 47  | 54.6 | 17.4 | 14.2 | 23.6 | 62   |
| B     | 25.5 | 12.1 | 47  | 50.7 | 17.4 | 15.4 | 26.3 | 76   |

The proportions of carcass components were not significantly different amongst breeds although over all slaughter points there was a tendency for B lambs to have slightly higher fat content.

#### *Phase 1. (b) market study*

In conjunction with the biological studies in the first year, a market survey was carried out in order to begin quantify the potential market opportunities for the products, such as larger carcasses with higher proportion of edible meat and better presentation to the consumer in the form of more convenient and attractive cuts.

#### *Objectives of the survey*

1. To obtain factual information on the acceptability of lamb meat in the traditional market and to access the opportunities for change in the retail presentation of improved lamb products.
2. To provide background knowledge and technical information leading to the design of further consumer research to assist in the development and encouragement of new market strategies.

#### *Methods*

A series of informative discussions were held with key representatives of the meat industry, including abattoirs, wholesalers, importers, local markets, traditional butchers and supermarkets. On the basis of these discussions, a formal questionnaire was designed to provide information on consumer attitudes to various characteristics of lamb meat and its presentation. The questionnaire covered aspects of consumer preference to factors such as the size of carcass, origin (home produced or imported), amount of fat, freshness, colour and occasions on which they would eat lamb, the market channel they preferred, the prices they were prepared to pay for different qualities (including frozen imports) and for comments on their conceptions to health aspects.

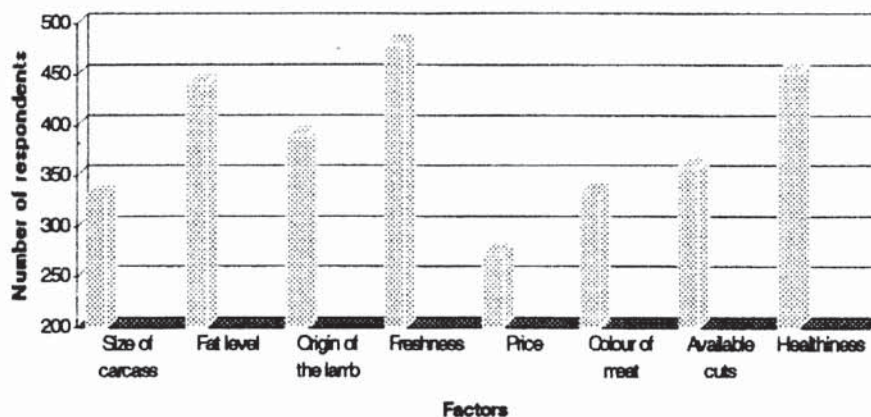
Personal interviews were held with 522 consumers, selected at random, covering a range of age, sex, place of residence and social backgrounds.

### Results

Almost half the respondents normally consumed lamb at home only on special occasions such as Christmas and Easter. The majority of lambs purchased for these special feast days were whole carcasses in the range of 6 to 10 kg although more than a third said they were likely to purchase lambs over 10 kg. At other times of year, lamb purchases were more likely to be from carcasses with a weight over 10 kg. The main objection to heavier carcasses was that they were regarded as over fat (Table 10) (Yannakopoulos et al, 1994).

The most consistent and important factors affecting the consumers decisions in their purchase of lamb meat were freshness and fat level, both seen as affecting the purchasers health. The price of lamb, relative to the content of edible meat was an important factor to 52,3% of consumers, the colour of the meat influenced 63,8% and the origin of the lamb 74.7%.

Table 10.- IMPORTANT FACTORS THAT INFLUENCE THE CONSUMER'S BUYING DECISION



Around 63,2% of the consumers interviewed considered that the size of the carcass was an important consideration. Finally, some 68,8% of respondents agreed that the availability of special cuts, as distinct from part carcasses, would influence their decision to purchase lamb.

The results of the survey indicated that the main marketing channel for lamb, especially whole lamb carcasses was the traditional retail butchers, including the open markets, which account for over 70% of retail trade. At present the supermarkets account for only 6% of this trade, although they sell a much higher proportion of the frozen, jointed imports.

*Phase 2. (a) biological*

The results of Phase 1 had confirmed that the growth and development characteristics of the small indigenous breeds of Greek dairy sheep can be described within the general scaling rules relative to their individual mature size (Taylor, 1980). Carcasses acceptable to the European market and regulations could be obtained at significantly higher weights than are traditional in the Greek market. When fed under an unrestricted nutritional regime from weaning the three breeds reached 45 % of estimated mature weight between 60 and 70 days post-weaning. Under this system, the carcasses with mean weights of 16.8, 14.3 and 12.2 kg, respectively, for the K, S and B breeds, were overfat by EU standards. Further studies were needed to investigate the possibility of extending the marketing period and reducing the degree of fatness at similar weights by different management strategies which would make use of locally available resources.

The relevant results of these studies will be presented in the associated short communications, but a brief description will be given here in order to present the final conclusion from the full project.

The first trial investigated the effect of indoor feeding of individually penned, male lambs from weaning. There were at three levels of concentrate (80%, 50% and 25% of previous established ad libitum level), together with an ad libitum offering of alfalfa hay. Lambs were slaughtered at three fixed liveweights, one of which corresponded to approximately 42% of breed mature weight. The number of days taken to reach this proportion of MW increased as concentrate level was reduced. On current feed costing there were no significant differences in feed costs per kg liveweight gain. From chemical analysis and from visual scoring of the carcasses they had higher proportions of lean and lower proportions of fat than when killed at 45 % MW under the ad libitum system. It was concluded that an indoor feed system for weaned lambs using different combinations of local feed resources could allow for a spread of finishing into periods where demand was in excess of supply and create a viable alternative to slaughter as light lambs at weaning.

The second trial extended this concept of local feed supply to the use of irrigated, sown pasture, with the objective of defining an environmentally friendly system of land use as an alternative to current cropping systems. Male lambs of the same breeds, age and date of weaning were group fed at three concentrate levels (lower than in the previous year) with ad libitum hay. After 63 days of feeding, when the ryegrass/clover pasture was judged ready for grazing in late February, the lambs were turned out to pasture as a single flock and supplementary feeding ended. The lambs were slaughtered at heavier liveweight than previously (48 and 54% of respective breed mature weight). Despite the heavier liveweights, these carcasses appeared from chemical analysis and visual appraisal to have an acceptable conformation and proportion of external fat. Lambs reached target weight after between 50 and 90 days on pasture, depending on breed and previous nutritional treatment. All lambs were slaughtered by June and non-experimental replacement lambs continued to graze together with nonexperimental breeding ewes until November. It was concluded that a pasture phase could be incorporated within an extended period finishing system to provide grazing for at least



two batches of lambs and provide further grazing until late November for the ewe flock.

### *Marketing*

The initial study confirmed the traditional demand of Greek consumers for small carcasses, mainly between Christmas and Easter. This consumer preference was created by traditional farm practice, based on milk production, in which a high proportion of lambs are born in the period November to December and these are marketed after a short suckling period. The consumer questionnaire response was not inflexible. It appeared that, whilst being reluctant to purchase larger carcasses, this response was conditioned by a definite rejection of "overfat" carcasses and the relative absence in the market of specific cuts or joints of meat. The retail discussions identified two distinct consumer groups; domestic and catering trade.

The viability of a system producing larger carcasses depends on the consumers evaluation of the product. The two main constraints on the value of the lamb are the timing of production, which already tends to coincide with periods of peak demand and the price premia per kilogram received by very light carcasses. Any proposal to alter the existing production system must rest on demonstrating that higher returns per lamb can be achieved by increasing the weight of saleable lamb meat without incurring off-setting reductions in the value per kilogram. The overall farm income is also compensated by the entitlement to ewe premium by virtue of the heavier lambs.

Acceptability of heavier carcass can be improved by presentation in the form of specialised cuts trimmed of fat, standardisation of product and a regular supply over the potential finishing period from December to late July.

### *Conclusions and recommendations*

The project has shown that both biologically and economically it is possible to enhance the viability of dairy farms in Greece by adopting new systems and diets for finishing lambs at greater weights over an extended marketing period. Given the farm structure and retail traditions the way forward may not be easy. Some of the larger farms could adopt the new approach within their own resources. In smaller farms especially those with less than 100 breeding ewes a new system might require either a co-operative approach or the use of an independent feed-lot contractor. The immediate way forward depends on direct contractual co-operation between producers and specific retail outlets.

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