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Dairy sheep production systems in central-north Spain: Effect of flock size

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Abstract. The information of this work was obtained from 80 surveys carried out to dairy sheep farmers in the province of León (central-north of Spain) in November 2006, with the aim of know the influence of the following limiting factors: flock size, land use and human resources. From the total sample of farms interviewed, 24 are in the group of < 350 ewes; 34 in the group of 350 to 650 ewes; and 22 in the higher sized group with > 650 ewes. On average, sheep farmer age was 46 years-old and 87.5% of the farms are involved in cooperative systems. The sheep farmers with succession are more frequent in the medium (8) and highest sized groups (8) that in the smallest (1) one. 35% of the farms have a zero grazing management systems. Average surface available is 43.2 ha of non irrigated land (3.76 ha/parcel) and 29.7 ha of irrigable land (3.91 ha/parcel). From the total sample, 11 are on non-irrigated land, 20 are on irrigable, 44 are on both surface types and 5 do not possess territory at all.

Keywords. Dairy sheep – Flock size – Land use – Central-north Spain.

Systèmes de production d'ovins laitiers dans le centre-nord de l'Espagne : Effet de la taille du troupeau

Résumé. *Ce travail présente les résultats de 80 enquêtes réalisées auprès d'éleveurs d'ovins laitiers de la province de León, au centre-nord de l'Espagne, en novembre 2006, afin de connaître les données qui concernent la taille du troupeau, l´utilisation du territoire et les ressources humaines. Parmi les exploitations enquêtées, 24 appartiennent au groupe des troupeaux de moins de 350 brebis, 34 au groupe de 350-650 brebis et 22 au groupe de plus de 650 brebis. L'âge moyen des éleveurs est de 46 ans et 87,5% des exploitations appartiennent aux systèmes coopératifs. Les exploitations avec succession sont davantage dans les groupes des troupeaux de taille moyenne (8) et élevée (8) que dans le groupe des troupeaux à faible effectif (1). 35% des exploitations sont pratiquement de zéro pâturage. La surface moyenne des exploitations est de 43,2 ha de terres non irriguées (3,76 ha/parcelle) et 29,7 ha de terres irrigables (3,91 ha/parcelle). Parmi les 80 exploitations, 11 n'ont que du terrain non irrigué, 20 que de la surface irrigable, 44 ont les deux types de surfaces et 5 exploitations sont hors sol.*

Mots-clés. *Ovins laitiers – Taille du troupeau – Utilisation du territoire – Centre-nord de l'Espagne.*

I – Introduction

The increase in dairy sheep flock size in Spain has facilitated increasing sheep's milk production (35% in the period 1992-2003; MAPA, 2007), despite the decrease in the number of farms (25% in the period 1992-2003; MAPA, 2007) and the maintenance of the census of sheep under milking (3.4 millions). Especially in the main producing region (Castilla-León), there has also been a massive change of local breeds by highly specialised foreign breeds, primarily Assaf breed. This change has led to major modifications in the traditional management systems, which together to a lack of skilled labour has led to a decrease of pastoral systems and an increase in the more intensive ones (Rancourt *et al*., 2006). The flock size could influence changes in other aspects of management and production system because some technical advances are possible when the flock has a minimum size.

The aim of this work is to know the differences due to the flock size in the land use, human factor and other constraints of dairy sheep production systems in the province of León (Centre-North of Spain).

II – Material and methods

Data was obtained from 80 surveys (around 28% of total dairy sheep farms in the province of León) carried out to dairy sheep farmers in the province of León (Centre-North of Spain) in November 2006. The total sample of farms interviewed was grouped according to frequency flock size distribution: 24 are in the group of small size (< 350 ewes), 34 in the group of medium size (350 to 650 ewes) and 22 in the group of high size (> 650 ewes). Whenever is required, the MIXED statistical procedure of SAS program (SAS, 1999) was used to make analysis of variance.

III – Results and discussion

The characteristics of the farms according to their size are indicated in Table 1. It was clear the importance acquired by the cooperative system in the sheep milk, surpassing 75% of farms which are integrated into these structures. By increasing the flock size is evidenced an increase of farm owners which have succession in their activity. Whereas in the groups of small and medium size 12% of the farmers exceeded the age of 61 years, in the largest flocks none of the farmers exceeded the age of 55 years.

Table 1. Characteristics of farms parameters (mean ± s.e.) of dairy sheep production systems

	Flock size		
	<350	**350-650**	**>650**
Nº of farms	24	34	22
Ewes/flock	282 ± 8.2	484 ± 13.1	840 ±2 5.5
Assaf breed (% of farms)	91.7	85.3	90.9
Belonging to cooperative (% of farms)	75.0	97.1	86.4
With succession (% of farm owners)	4.2	23.5	36.4
Age of farmer (years)	46.7 ± 1.98	46.7 ± 1.43	45.4 ± 1.53
Non irrigated farms (% of farms)	25.0	11.8	4.6
Irrigated farms (% of farms)	12.5	29.4	31.8
Irrigated and non irrigated farms (% of farms)	54.2	55.9	54.5
Without land (% of farms)	8.3	2.9	9.1
Zero grazing (% of farms)	37.5	41.2	22.7
Non irrigated			
Nº of parcels	16.9 ± 6.17	13.1 ± 6.01	7.6 ± 2.24
Total area (ha)	40.7 ±11.4	35.9 ± 11.5	25.2 ± 6.6
As owner (ha)	9.7 ± 4.5	8.4 ± 5.3	5.8 ± 2.1
Irrigated			
Nº of parcels	7.6 ± 3.06	10.9 ± 2.56	7.1 ± 1.43
Total area (ha)	12.7^{b} ± 3.31	17.2^{b} ± 2.77	40.5^{a} ± 9.72
As owner (ha)	4.8^{b} ± 1.95	4.7^{b} ± 1.25	14.4^{a} ± 4.50
Grazing area (% of total area)	38.5 ± 8.91	47.9 ± 7.87	43.8 ± 9.95
Stocking rate (ewes/ha)	11.3^{c} ± 2.22	32.9^{a} ± 8.70	20.2^{a} ± 4.27

^{a,b,c} *Means with different superscripts in the same line are significantly different (P< 0.05) for flock size effect.*

According with Ugarte *et al*. (2001) there is an important population of dairy sheep from more productive foreign breeds, in our data more than 85% of farms have Assaf breed.

More than half of the farms surveyed possess both surfaces, non-irrigated and irrigated. At the moment the number of farms without land is less than 10%. However, it is relatively high the number of farms that do not at all grazing, with extreme values from 23% and 41% of farms, for

the highest and medium size, respectively. The difficulty to improve grazing systems lies in the impossibility to perform fences fields in most cases as consequence of communal property or high land fragmentation.

For the total farm (80), 11 are on non-irrigated land (6, 4 and 1 farms of the small, medium and high groups, respectively), 20 are on irrigable, 44 are on both surface types and 5 don't possess territory. The mean value of farm land is 43.2 ha of non-irrigated land (3.76 ha/parcel) and 29.7 ha of irrigable land (3.91 ha/parcel). The non-irrigated area diminishes to increase the flock size but differences between groups of size were not statistically significant ($P > 0.05$), while the irrigated surface on each farm was significantly higher ($P < 0.05$) on farms larger than in the other two groups, among whom the differences were not statistically significant.

The average area devoted to the grazing presented no statistically significant differences ($P > 0.05$) between the groups of flock size considered, with values below the 50% of the farm land in all cases. These values can be explained by the land use in the sheep farm areas at the province of León, so that, although agricultural production is used in the feeding of sheep, in non-irrigated areas an important part of land is used for cereal production (barley, oats, etc.) and in irrigated areas the most important crop in recent years is the corn for grain or for silage fodder production.

It is to highlight the high average value of stocking rate (11 to 32 sheep/ha), which presents statistically significant differences between the three groups of flock size considered, with the higher value in the group of average size and lower in the group of smaller flock size. The high value of the stocking rate can be explained because feeding must be provided indoors and only grazing on improved pastures and crops produced on irrigated land close to the farm should be considered. These aspects imply an important vulnerability of the economic profitability in function of the market prices of feed.

Foreign breeds introgression (Assaf breed) which was not followed by technical advice, specially in the small flock size farms, involves that the smaller flock size farmers have tried to manage foreign breeds in the same way as indigenous breed. While traditional dairy sheep productions in the central-north of Spain have been closely related to indigenous breeds (Churra and Castellana) farmed under extensive conditions, the foreign Assaf breed are farmed under more intensified livestock systems in an attempt to increase yields, which could explain the changes in land use and the proportion of zero grazing farms. The traditional sheep grazing systems have played an important ecological role using natural resources which is clearly in decline at this moment and in last few years agricultural subsidies aimed at maintaining livestock activity and rural population are set per sheep without considering the breed or the production system (Ugarte *et al.*, 2001).

IV – Conclusions

It is possible to deduce the importance of the flock size upon the future of farms with an older farm owners and more extensive conditions in small flock size group which involves harder working conditions in this type of farm.

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