

ANALYSIS OF REARING TECHNOLOGY USED BY SHEEP BREEDERS IN SLOVENIA

A. Cividini, D. Kompan

University of Ljubljana, Biotechnical Faculty, Department of Animal Science, SI 1230 Domžale, Slovenia

Corresponding author: angela.cividini@bf.uni-lj.si

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Abstract: In Slovenia low and medium production systems are prevalent in sheep breeding. The rearing technology depends on a large number of factors. The main factors affecting the choice of rearing technology are sheep breed, local conditions, season of mating and weaning time. In the present study the rearing technology in sheep breeding was analysed. This analysis included the results of 293 questionnaires from sheep breeders of autochthonous Jezersko-Solčava and Improved Jezersko-Solčava breed. Data were subjected to the frequency analysis, using the FREQ procedure of the SAS Statistical Software (1990). The population size in the flocks of these breeders was mostly from 5 to 50 animals (73.3%). The lambing system is year-round (80%) and seasonal (7.5%). The wanted litter size of 47% of breeders is just one live born lamb. Breeders weaned their lambs at 60-90 days of age or even later. Lambs stayed with their mothers almost till the end of lactation (16-20 weeks) or till the sale to the market when they weighted 30-35 kg. Early spring and summer born lambs stayed with their mothers on the pastures with no supplement. Winter born lambs stayed with their mothers in the stable, fed by hay and supplement (cereals or commercial concentrate). The rearing technology used by Slovenian sheep breeders is sustainable and gives the opportunity for conservation of autochthonous breeds in the original environment.

Key words: survey, sheep farming, rearing technology, lambing system, autochthonous Jezersko-Solčava, Improved Jezersko-Solčava

Introduction

Sheep breeding in Slovenia is characterized by low input production systems, which are present in 3/4 of all farms and some 3/5 of the total animal population. Sheep production is generally characterized by small flock-size. Thus, sheep breeding can be ranked among the very sustainable production (*Šalehar et al., 2003*). Sustainability of sheep production has been strengthened by well adapted local breeds. In Slovenia lamb meat production is still low and contributes

less than 1% of gross agricultural production (Zagorc et al., 2010). Most of lamb meat is produced outside of abattoirs and sold on local market. The price of lambs in Slovenia is lower compared to the other EU countries. In years 2006-2008 the price of lambs was 30% lower than the average price in EU (Zagorc et al., 2010). In Slovenia two lamb production systems are characteristic depending on time of weaning and slaughter weight of lambs. Early weaning and slaughtering of suckling lambs is characteristic for dairy breeds. Those lambs are traditionally sold as suckles for slaughtering mainly to Italy (Cividini et al., 2001). Weaning lambs after 60 days of age and slaughtering lambs at 25 to 35 kg of live weight is characteristic for meat breeds. For lamb meat production mainly autochthonous Jezersko-Solčava (JS) sheep breed and Improved Jezersko-Solčava with Romanov (JSR) are used. The JS sheep is one of four autochthonous sheep breeds in Slovenia. The breed has been developed over the centuries as a result of local conditions. Its eminence is year-round lambing. The main characteristics of the JS sheep breed have been described elsewhere (Feldman et al., 2005). From 1982 the local JS breed was crossbred with Romanov to improve the fertility and increase the litter size. Today the JS and JSR sheep breeds are the most numerous sheep breed populations in Slovenia. Both populations are mainly suited for lamb production in the Alpine and pre-alpine region where they stay on Alpine pastures in summer. Despite year-round lambing the fertility traits of recorded JS and JSR flocks have been decreased in recent years (Kastelic and Kompan, 2007). One possible explanation for the reduction of production in JS and JSR flocks was thought in the differences in rearing technologies (Cividini et al., 2009; Petrović et al., 2009). We prepared a survey to determine current rearing technologies used by sheep breeders in Slovenia.

Materials and Methods

We conducted a survey of the sheep flocks structures and breeding management practices as traditional in Slovenia. The breeds surveyed were local Jezersko-Solčava (JS) and Improved Jezersko-Solčava (JSR). A sample of 293 farmers was individually interviewed regarding their flock structure, farm structure and rearing technology. The statistical analysis of 293 surveys was conducted with *FREQ* procedure by SAS/STAT statistical package. We analysed the results of survey and compared the results of rearing technologies between JS and JSR flocks. There was 36% (106) of JS flocks and 64% (187) of JSR flocks included into the survey. The survey was extended and included 10 sections of questions on six pages. Therefore, we individually interviewed the farmers when being on annual meetings of the sheep breeding association.

First five sections of the questionnaire included the general breeder, breed and farm and production system information. The last five sections of the questionnaire gathered the information about rearing technology, marketing, environmental adaptation of the breed and politics. We included factors (political,

environmental) affecting future lamb production and factors that may have changed flock sizes. However, we want to get a general idea of how the breed production stands by taking a cross section of views from breeders.

Results and Discussion

Farmer and flock structure. According to information obtained on the age structure of farmers we evaluated the increasing trend of aging sheep farmer's population. There was 34% of farmers from 51 to 60 years old and 29% from 41 to 50 years old. Farmers older than 60 years were 27% and only 11% of farmers younger than 40 years. Only a third of the farmers were included in Breeding Selection Program (recorded flocks to control the origin and production) but all of them were the members of local Breed society. Most abundant was conventional farming (39%), 26% of farmers had organic farming and 34% of farmers was engaged in rearing sheep just as hobby. The production system was mainly aimed at the production of meat (95%), which stands to a reason that both investigated breeds were meat breeds. The remaining 5% of farmers are concentrating on the combined production of meat and wool. Farms are spread throughout Slovenia. The flock size identified by the survey is presented in Table 1.

Table 1. Flock size in Jezersko-Solčava (JS) and Improved Jezersko-Solčava (JSR) flocks

Number of ewes	Flocks (%)	
	JS	JSR
5-10	12.3	12.3
11-20	20.8	26.2
21-30	17.9	23
31-50	15.1	16.6
51-100	13.2	11.2
>100	6.6	4.3

Flock size of JS and JSR flocks was generally small. There was 51% of JS and 61.5% of JSR flocks counting not more than 30 ewes. Just 6.6% of JS and 4.3% of JSR flocks counted over 100 ewes. The results of the flock structure determined small-holder conditions.

Rearing technology. In sheep breeding, there are lots of factors that have impact on choosing one of the rearing technologies. Most important factors are mating/lambing system, time of weaning and the genotype of the ewes. A lambing system denotes when lambing will occur (what season or months), how often a ewe will lamb, and how and where lambing will occur (shed vs. pasture). There is no one "best" lambing system or way to raise sheep. Breeders need to match the lambing system to their goals and objectives, resources, and market demand. The genotype of the ewe directed the farmer in the specific technology of farming. Thus, for example the choice of breed which allows year-round lambing

can increase the production of lamb per ewe per year. Lambing system used by Slovenian breeders are shown in Table 2.

Table 2. Lambing system used by Slovenian sheep breeders of JS and JSR flocks

Breed	Lambing system							
	Seasonal		Year-round		No answer		Total	
	n	%	n	%	n	%	n	%
Jezerko-Solčava (JS)	9	8.5	82	77.4	15	14.2	106	100
Improved Jezerko-Solčava (JSR)	13	7.0	152	81.3	22	11.8	187	100
Total	22	7.5	234	79.9	37	12.6	293	100

Seasonal lambing system (spring lambing) is when rams are kept with the flock only in month when sexual activity of the ewes and the ram is the highest. Year-round lambing system is when rams are kept with the ewes on a continuous basis through the whole year and can include winter and fall lambing system. Nearly 80% of the breeders use year-round lambing system and 7.5% of the breeders keep their ram with the flock only in seasonal months. Lambing distribution of recorded JS and JSR flocks in Slovenia confirmed our results (*Kranjc, 2009*). In recorded JS and JSR flocks there was equally lambing distribution through the year with the highest percentage of lambing occurred in winter (December, January, and February). The majority of mating occurred in summer time, but lot of mating was also observed in early fall (*Kranjc, 2009*).

Farmers stated that winter lambing systems have several advantages. Lambs born early in the year are usually gone by the time summer comes. Historically, the breeders sold the lambs at the first half of the year, especially during the Easter period. When lambing occurs in winter the breeders can usually carry more ewes on their pastures or on the Alpine pastures, since ewe feed requirements are only maintenance. Early-born lambs stayed with their mothers and are then fattened with hay and cereals and are weaned at 60-90 days (55.4%) of age or after 90 days of age (42.8%). They usually grow faster than those born later in the year, but their cost of gain is usually higher. Farmers that reared JS breed stated that they are usually favoured in a fall lambing system. Fall lambing has several advantages over the winter and spring systems. Late-gestation and lactation coincide with fall forage growth. Weather conditions are usually ideal for pasture lambing in lowland. There are fewer problems with parasites and predator animals. Lambs can usually be sold when prices are the highest. However, fall lambing is a challenge because conception rates are much lower than with spring breeding. From an industry standpoint, if more lambs were born in the fall, the supply of lamb would be more even distributed, resulting in more stable prices and steadier demand. Lambs born in fall were used for next grazing season on poor high mountain pastures over 1500 m above sea level in the Alps. Thus, the mating needs to occur from April to June.

Spring lambing coincides with the natural breeding and lambing seasons and takes optimal advantage of the spring flush of grass. On the other hand, for most of the winter, ewes can be maintained on a maintenance diet of relatively inexpensive hay or silage. The primary benefit to spring lambing is reduced production costs: lower feed costs, less labour, and overhead. However, spring lambing requires better pasture management than early lambing, since lambs are usually fed or finished on grass. Lambs from all lambing systems stayed with their mothers are weaned at 60-90 days of age and slaughtered at 30-35 kg.

In many cases, the crucial factors to focus on specific rearing technology are the basic conditions for farming in hard environment, such as available feed, forage conditions, period of grazing and winter feeding period (*Zagožen, 1982*). The JS and JSR breed with appropriate rearing technology enabled free choice of lambing system and can improve period between parity (*Zagožen, 1982*). *Kranjc (2009)* reported about impact between month of lambing (lambing system) and period between parities for JS and JSR ewes. When lambing occurred in winter the period between parities was the longest. With using late summer and fall lambing system the period between parities was shorter (*Kranjc, 2009*).

Although, the year-round lambing system is dominated the farmers didn't want to increase the litter size. Wanted litter size is present in Table 3.

Table 3. Wanted litter size by Slovenian sheep breeders of JS and JSR flocks

Breed	Wanted litter size							
	Singles		Twins		No answer		Total	
	n	%	n	%	n	%	n	%
Jezerško-Solčava (JS)	64	60.4	34	32.1	8	7.5	106	100
Improved Jezerško-Solčava (JSR)	74	39.6	92	49.2	21	11.2	187	100
Total	138	47.1	126	43.0	29	9.9	293	100

Nearly half of the farmers (47.1%) rather have singles than twins or triplets and 43% of all farmers rather have twins than singles. JS farmers preferred to select ewes with one liveborn lamb per litter (60.4%). Only 32.1% of JS farmers preferred twins or triplets per litter. They stated that ewes having singles request less labour, the growth of singles is faster and there is less losses. For JSR farmers higher litter size was wanted. However, *Kranjc (2009)* found that the period between parities decreased with decreasing the litter size.

Conclusion

Sheep breeding in Slovenia is characterized by low input production systems with small-holder conditions. Rearing technologies used by breeders have some specificity attributed to a lambing system and weaning time and are adapted to local breeds. The farmers do not aware to improve the litter size. Sheep breeding can be ranked among the very sustainable production.

Analiza tehnologije odgoja koju koriste odgajivači ovaca u Sloveniji

A. Cividini, D. Kompan

Rezime

Frekvencijskoj analizi za utvrđivanje trenutne tehnologije gajenja ovaca autohtonih Jezersko-Solčavske i poboljšane Jezersko-Solčavske rasa bilo je podvrgnuto 293 ispitanika-odgajivača. Prema informacijama dobijenim iz istraživanja ocenili smo trend povećanja starosti odgajivača ovaca. Rezultati o strukturi stada govore o preovladavanju sitnih gazdinstava. Dominira (80%) celogodišnji sistem jagnjenja koji može da poboljša plodnost rase. Jedno živorođeno jagnje je poželjno kod odgajivača JS dok su kod JSR odgajivača poželjni kako jedinci tako i blizanci. Jagnjad tradicionalno ostaju uz majku u štali ili na paši i kolju se sa 30-35 kg žive vage. Tehnologija gajenja slovenačkih odgajivača ovaca je održiva i pruža mogućnost za konzervaciju autohtonih rasa u u lokalnoj sredini.

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