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Goat production development in the Republic of Croatia

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SUMMARY – The aim of this study was to analyse the present situation and possibilities of goat production in the Republic of Croatia. The history of goat production in the Croatian area of the former Yugoslavia, where 80% of former Yugoslavian goats were kept, is also presented. This is compared with the actual goat production in Croatia, which has changed after becoming independent. This study describes the topology of goat operations, production systems and climate conditions in the Adriatic region of Croatia. Management of the flock and the feeding systems of goats are also described. 85% of goats are of the local Balkan type and the rest are crossbred with Saanen and German brown goats. Due to raising demands and needs of the milk industry for goat milk, the northern part of Croatia is starting to expand intensive goat production on family farms. A model of cooperative production includes around 200 goat breeders. This trend is accompanied with stimulation measures for intensifying small ruminant production undertaken by the Croatian Ministry of Agriculture and Forestry. Due to all the action carried out by the Ministry in the last two years the interest of breeders in improving and intensifying production has rapidly increased. FAO has also been included in the work of the Ministry with its advisory work and also by giving financial means with which to improve private family farms throughout Croatia.

Key words: Balkan goat, intensification model.

RESUME – "Développement de la production caprine en Croatie". Le but de cette étude est d'analyser la situation présente et les possibilités de production caprine en Croatie. L'historique de la production de chèvres dans la partie croate de l'ex-Yougoslavie qui regroupait 80% de la production totale est également présenté. Ces données ont été comparées avec la production présente en Croatie, qui a changé après l'indépendance de ce pays. L'étude décrit la topologie de l'élevage de chèvres, le système de production et aussi les conditions climatiques méditerranéennes en Croatie. La gestion des troupeaux et le système de nutrition des chèvres sont également indiqués. 85% sont des chèvres de type balkanique et le reste représente les croisements avec la Saanne et la chèvre brune allemande. En raison de la croissance de la demande industrielle pour le lait de chèvre, dans la partie nord de la Croatie a commencé l'extension d'élevages intensifs de chèvres dans des fermes familiales. La production en coopérative regroupe environ 200 éleveurs. Cette orientation est accompagnée par des mesures stimulantes pour l'intensification de la production de petits ruminants, mesures entreprises par le Ministère de l'Agriculture. Grâce à toutes les actions du Ministère ces dernières années, l'intérêt des éleveurs pour l'amélioration de la production n'a cessé d'augmenter. Aux côtés du Ministère, la FAO a été aussi partie prenante surtout par les conseils prodigués et aussi par le financement des besoins pour l'aménagement des fermes d'élevage privées en Croatie.

Mots-clés : Chèvre balkanique, modèle d'intensification.

Introduction

After the Second World War, in 1953, the Government passed a law that banned extensive grazing for goats. This law has permitted breeding only purebred goats (especially Saanen) that were not allowed to graze. Since purebred Saanen were not available, the law meant banning the local Balkan goat. As a result, only 150,000 goats were left. From 1953 to 1976, practically nothing was done for the improvement of goat breeding. However, after this period the interest for this field has increased, mostly out of economic interest in kid exports to Italy and the Arabian countries (Libya, Kuwait and others). A development programme was designed but it was very slowly implemented. Therefore not much has been done for the improvement of the local Balkan goat. With the change in the political system in Croatia (1990), where 80% of former Yugoslavian goats were kept, that attitude has changed. Greater attention is given to the private sector in the form of more acceptable loans and other forms of financial help.

After the independency declaring in 1990, Croatia suffered the Yugoslavian military aggression. In

the time of Patriotic War (1991-1994) goat population decreased by more than 40%. According to the data of statistical analysis, the total number of goats decreased from 150,000 to 82,000 in that period.

The Balkan goat will be the base for intensification in goat production. Therefore, in this paper we present characteristics of the Balkan goat, which has a part of 85% in the total number of goats. The rest are crossbreds with Saanen goat.

Materials and methods

Characteristics of the domestic Balkan goat such as the average measures of the grown-up goat, kid development and milk production are shown. Pasture production system, hydrologic conditions and production system are also described. All data were collected from the private breeders from the areas with greatest numbers of Balkan goats (Middle Dalmatia).

In the last 10 years, a model of goat production intensification (improvement) through the cooperative relationships between private breeders and milk industry "Vindija"-Varaždin has been made. Using the Alpine brown goat, with the aim of higher milk production, this model achieved significant results. One of the reasons is a closer connection between producers and industry, which has high demands on goat milk due to high level of production of goat cheese that is deficient on the Croatian market.

Finally, stimulation measures are shown, which are given by the Croatian Ministry of Agriculture and Forestry in the aim of improving goat production.

Results and discussion

Goat production until the Patriotic War had been based on the low producing domestic autochthonous Balkan goat.

The local Balkan goat is an indigenous black, brown and black brindled goat. The average measures of grown up goat are given in Table 1. The local goat is relatively small, that is shown by small body width and depth and low weight. Live weight is only 36.8 kg. Buck height is about 70 cm and weight 40-60 kg. Late maturity of the local Balkan goat is shown in Table 2. These data are pointing to low birth weights and low body weights at 6 months. At that age live weight of females is 24.47 kg and 26.30 kg for males on average.

Table 1. Body measures of the local Balkan goat (Rako *et al.*, 1984)

		% wither height
Wither height (cm)	63.8	100
Chest depth (cm)	29.8	46.7
Chest width (cm)	17.7	25.4
Pelvis width (cm)	20.6	32.3
Body length (cm)	68.6	107.5
Weight (kg)	36.8	-

Table 2. Kid development (Rako *et al.*, 1984)

	Birth weight (kg)	2 months old (kg)	4 months old (kg)	6 months old (kg)
Female	2.72	8.84	17.53	24.47
Male	3.05	9.47	20.14	26.30

Milk production of a better part of the herd during the lactation period of the Balkan goat in the best seasons and in better climate conditions is up to 120 l of milk. Average milk production of this type is very low, as shown in Table 3.

Table 3. Milk production of the local Balkan goat (n=24), (Rako *et al.*, 1984)

Average milk production (l)	72.08
Average daily production (l)	0.45
Average amount of milk fat (%)	3.52
Lactation period (days)	151

Pasture in the Mediterranean region

The whole Adriatic region that is under the influence of the Mediterranean comprises the mountain region that spreads from the north with Velebit Mountain to Monte Negro that is itself a mountainous region all the way to the coast. The whole area is a typical Karstic formation. Karstic grasslands have mostly shallow sceleroid and sceleral soils. In general, the soil feed value for plants is very low in these washed out soils.

Hydrologic conditions

As in all Karstic zones, this area is poor in permanent water resources. These soils are unable to retain water that quickly passes through to deeper layers forming small Karstic springs.

Climate

The mean value of yearly temperature in the Mediterranean Karstic region is 14°C. The coldest temperatures are recorded in January and February, and the hottest in July and August. The influence of wind, especially bora and southern winds, is stronger on the islands. A limiting factor in the growth of vegetation is this very strong and cold wind, called bora.

Rain and dew are the most important sources of water. The highest precipitations are in October, November and December, in autumn; while the lowest are in summer (July and August). A similar situation appears on the islands.

Production systems

In the Adriatic region, which is under the influence of the Mediterranean climate, the local Balkan goat population is almost completely owned by private breeders. Today, in this location there are about 1250 goat breeders and around 23% of them has herds with up to 25 goats, 48% with up to 50 goats, 20% with 51-100 goats and 9% of the breeders have more than 100 goats in a herd. Many families near big cities own one goat and have another source of primary activity.

Considering the acreage owned, it must be pointed out that there are about 3-5 ha on average, but, to date, the largest parts are the pastures that are not distributed yet. However, those pastures are now used by private breeders for grazing their herds.

The Balkan goat is an indigenous low productive goat that matures late and it is ready for reproduction at the age of 1.5 years. Mating of goats in these parts is regularly done seasonally, from the end of September to November. Heat lasts 1-2 days, rarely longer than 3-5 days. The kidding season starts at the earliest at the beginning of February all the way until April. On average, 97% of does kid. Later kidding dates (March, April) are better for the offspring, since they can get used to green pasture sooner. As a rule, goats are not mated in spring.

Mating is natural and it is not controlled. The choice of males for mating is done by exchange between the breeders without any special control of their origin. That is why very often mating between related goats occurs which is a disadvantage for the offspring. More conscientious breeders try to mate their goats with better quality males. There has been an improvement in the last ten years, since the selection centres try to provide better quality purebred males of the German brown type that is bred in the continental part of the Republic.

Over the last 15 years it has been accepted that imported brown Alpine goats should be used for purebred husbandry in the milk industry.

This model is accomplished by the milk industry "Vindija"-Varazdin which started in 1984 and successfully achieved organized production of goat milk through their cooperation with private family farms. The results of this project are displayed in Table 4.

Table 4. The number of goats and amount of purchased milk in period 1985-1999

Year	Number of goats	Purchased milk (l)	Number of breeders
1985	300	46,425	6
1990	800	203,638	25
1993	1909	555,575	62
1995	4500	1,095,753	140
1997	7200	2,488,631	220
1999 (till September)	7800	2,431,210	235

Planned amount of purchased goat milk for the year 2000 was 3 million litres. At this moment there are 235 private family farms in cooperative relations which are producing milk for the milk industry "Vindija". The average number of animals per flock on a family farm is around 40 (Alpine breed) goats and 2 males. Family farm has on average 3 ha of fields. The breed composition is 95% brown Alpine goat and approximately 5% of Saanen goat. Average data of milk fat content during the year is 3.62% in March, 3.16% in July and 4.51% in December. Results of milk production and milk fat content are shown in Table 5.

Table 5. Results of milk production and amount of milk fat for Alpine and Saanen breeds

Breed	Year	Milk production in lactation		
		Duration of lactation	Milk production (l)	Milk fat (%)
Alpina breed	1987	231	345	3.08
	1992	267	530	3.43
	1998	257	623	3.43
Saanen breed	1987	240	293	3.38
	1992	283	586	3.28
	1998	229	532	3.22

The amount of produced milk is not the only factor that has an influence on the farm profitability. Breeding of kids for reproduction is also important, which is under the control of the selection service of Croatia. All family farms are under the control of selection and feeding management.

According to the data in the last 7 years, 3291 Alpine goats had 1.39 live born and 1.31 weaned kids per goat. Goats of Saanen breed (of 391 kidded) had in average 1.45 live born and 1.35 weaned kids.

Through the organized cooperation with private family farms "Vindija" has around 7000 purebred

goats. This model will be spreading in the Slavonija (northeast region of Croatia). Also, a similar model is used in the breeding of purebred milking sheep (Friesian sheep). At this moment, "Vindija" has in cooperation around 900 sheep of East Friesian breed. The average flock size is around 33 sheep with 2 rams.

The breeding programme for goats in Croatia is developing in two ways: (i) Breeding of quality purebred milking breeds on family farms. The farmers are also breeders of young animals which will be used in reproduction for needs of new breeders; and (ii) crossing of domestic goats with quality breeds until F₂ generation or into assimilate crossing, which depends on the possibilities of breeders.

In the last 15 years, through the mentioned model that "Vindija" has, the continental part of Croatia is developing intensive breeding of quality breeds of milking goats. Now, this model is expanding in the eastern (Slavonija) and Mediterranean parts of Croatia.

Goat feeding is carried out on the principles of milk production which are similar to those found for milking cows. As the flock size is around 40 goats which are mainly kept indoors, it is an important fact that nutrition management has to match all nutrient requirements of animals in all phases of their production as it is: first conception, pregnancy, kidding, lactation and new-born rearing. Farmers may have all instructions about feeding through the contacts with the experts at the Service who are carrying out their cooperation, or with experts at the County Advisory Service.

It can be concluded that this model has a strong influence on intensive and wide spreading of the brown goat breed.

Stimulation measures

After the breakdown of a socialistic sector (1990) and the Patriotic War until 1994 and in the interest of intensifying the cattle breeding production on private farms, the Ministry of Agriculture and Forestry of Croatia has organized the following:

(i) National advisory service financed from the funds of the budget of the Republic and organized in all districts with 192 highly qualified agricultural experts in total. The basic task of the service is advisory assistance and education of breeders with the aim of improving agricultural and cattle breeding production of private family farms in Croatia.

(ii) Granting credits through the Ministry of Agriculture of Croatia. Very favourable credits are given for up to five years. The maximum interests is 6% with two years of grace period.

(iii) Associations of private breeders are organized according to the branches of activities representing as legal persons the interest of breeders towards the Republic.

(iv) Selection of progeny breeding (calves, heifers, tags and kids of both sexes) through the organized selection service of Croatia, which at the same time introduces production and parent records for small ruminants and others. The award per tag and kid bred is achieved irretrievably in the amount of 350-500 kn and it is meant to be used for reconstruction of the breeder's own herd and other breeders buying the progeny for expanding and reconstructing their herd, respectively.

(v) The organized selection service has about 163 highly skilled professionals and control assistants carrying out the introduction of production and parent records on the field and at the same time participate in accepting and organizing the realization of the credits for private family husbandries throughout Croatia.

FAO has also been included in the work of the Ministry with its advisory work on organizing agricultural and cattle breeding production and by giving financial aid for education of experts in order to improve the private family farms throughout Croatia.

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