Evaluation of the reproductive and productive performance of an alternating genetic cross between two local sheep breeds, Ouled Djellal and D'man

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Summary

The aim of this study was to evaluate the effect of alternating crossbreeding on sheep reproductive performance and productivity. Two indigenous Algerian sheep breeds were used: Ouled Djellal (OD), known for exceptional meat production qualities, and D'man (D), known for exceptional reproductive qualities. In total, 288 ewes (all genotypes) were used, including 130 purebred OD ewes making up the basic flock of the first generation (G1), 71 crossbred ewes (50% OD blood and 50% D blood) of the second generation (G2), and 87 crossbred ewes (75% OD blood and 25% D blood) of the third generation (G3). The ram effect method was used to synchronize heats in a natural batch approach. Our results show an improvement in the fecundity (fertility × prolificacy) of ewes in the first, second and third generations compared with the standard value (95%) for purebred OD ewes (G1: 97.69 ± 66.43%; G2: 122.54 ± 53.98%; G3: 114.94 ± 58.13%). There also was an improvement in numerical and weight productivity at weaning (90 days old) compared to previously reported values for OD ewes reared in Algeria. For numerical productivity, the values were 83.85 ± 62.01% at G1, 121.13 ± 53.23% at G2, and 100 ± 54.98% at G3 (versus 73% reported in the literature); for weight productivity, the values were 15.29 ± 9.41 kg at G1, 24.56 ± 9.01 kg at G2, and 17.15 ± 7.67 kg at G3 (versus 10.55 kg reported in the literature). In conclusion, the D breed, which has exceptional reproductive potential, could be used in crossbreeding to increase the productivity of sheep farming systems operating under local conditions in areas favorable for meat production. It also could be used to create a synthetic breed by crossing it alternatively with the local OD sheep breed.

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■ INTRODUCTION

The sheep flock plays a crucial role in Algeria's agricultural economy, impacting production systems, employment, and the environment. With the number of heads estimated at 30.9 million in 2020 (FAOSTAT, 2022), the flock accounts for over 64% of the total red meat production in the country (ONS, 2021).

Sheep farming in Algeria is essentially extensive or semi-intensive, and extends across the country's different climatic zones, from the Mediterranean coast to the oases of the Sahara. Over 80% of livestock are concentrated in the steppe and the semi-arid, cereal-growing high plains.

This pedoclimatic diversity provides Algeria with a wide range of indigenous breeds that are well adapted to local conditions. Eight Algerian sheep breeds are registered, including three main breeds (Ouled Djellal, Hamra, and Rembi) and five secondary breeds (D'man, Barbarine, Berber, Targui-Sidaou and Tazegzawt). Each of

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these breeds has its own characteristics, such as hardiness, prolificacy, meat production, milk production, and so on (Chellig, 1992).

However, the numerical productivity of sheep farming in Algeria remains low, stagnating at around 0.6-0.8 weaned lambs per breeding ewe per year (Benyounes et al., 2013). Reasons for this low productivity include the low reproductive performance of ewes and the poor growth and survival rates of lambs. It is also due to the extensive flock management practiced in rangeland areas, shortages of specific breeding stock, and a lack of expertise in breeding techniques.

Our work aims to enhance the genetic diversity of local Algerian breeds by promoting the appearance of economically valuable traits in crossbred animals (heterosis effect). Our main purpose is to check whether an alternating crossbreeding with the D'man (D) breed could improve the productivity of the Ouled Djellal (OD) breed.

Our study evaluates the reproductive performance and productivity of three (3) consecutive generations (G1, G2, and G3) of the new breed being developed through the alternating crossing of OD and D sheep.

Several considerations justified the choice of these two breeds for this type of crossbreeding. The first is the complementarity of the two breeds. The OD breed, highly appreciated by breeders, presents exceptional meat production qualities (ADG = 200g/d) but low numerical productivity (70%). Meanwhile, the D breed has exceptional reproductive performance (prolificacy of 185 to 200%) but poor growth qualities (ADG = 150 g/d) (Chellig, 1992). Moreover, the polygenic determinism of D breed prolificacy (Davis et al., 2006) raises the possibility of creating synthetic breeds with specific prolificacy levels desired by breeders. Finally, this type of alternating crossbreeding, used for the first time in Algeria, was adopted in our study to create a continuous heterosis effect favoring productivity and reproductive performance.

■ MATERIALS AND METHODS

Trial location and study setting

The experiment was carried out on the Baba Ali experimental farm of the Technical Institute of Breeding (ITELV, Algeria), located at 36° 48' N latitude and 2° 59' E longitude, 20 km southwest of Algiers, Algeria.

Animals, diets and management

Animals

The study involved a total of 288 ewes (all genotypes), including 130 purebred OD ewes forming the basic flock of the first generation (G1), 71 crossbred ewes used in G2, and 87 crossbred ewes used in G3 (Table I). For each generation, these ewes were alternately mated with purebred D and OD rams (Table I). The rams were born on the Baba Ali farm and showed no general or specific pathology of their genital or other systems.

Management

We used the 'ram effect' mating method in our study. It consists of strictly isolating rams from ewes (physical, visual, olfactory, and auditory separation) for more than one month, followed by the presence of rams achieved through the simple release of a single ram per batch of treated ewes (Castonguay, 2018; Adaouri et al., 2022). Ewes were managed under an annual lambing system with three lambings per generation. During mating, the ewes were divided into four homogeneous groups of 8 to 15 ewes. Each group was placed in a closed barn adapted to the age and number of animals. One (1) ram was introduced into each batch, staying for 21 days, then reintroduced 12 days after mating for any return to heat, staying for 17 days. A portable ultrasound scanner was used to diagnose pregnancy at 45 days of gestation.

All animals involved in this experiment were treated for external and internal parasites and vaccinated against enterotoxemia at the beginning of the trial. Ewes were monitored daily. Any abortion or mortality of pregnant or sick ewes was recorded on a monitoring form.

Crossbreeding scheme

The crossbreeding scheme between two breeds of sheep (D and OD) that was adopted and implemented is shown in Figure 1.

Feed

The ewes were fed mainly oat hay, distributed ad libitum, with a refusal rate of between 10 and 20%. This was supplemented with a concentrate, the amount depending on the physiological state of the animals. The diet was 500 g/animal/day of concentrate during the flushing period, 300 grams of concentrate/animal/day during the first three months of gestation, 400 and 500 g/animal/day during the

Table I: Number of ewes and rams used, their average age, weight, and body score per generation /// *Nombre de brebis et de béliers utilisés, leur âge moyen, leur poids et leur note corporelle par generation*

Generation	G1	G2	G3
Ewes			
Genetic type of ewes	OD (100% pure OD breed)	Crossbred (50% OD and 50% D)	Crossbred (75% OD and 25% D)
Number of ewes	130 (46 + 58 + 26)*	71 (16 + 22 + 33)*	87 (35 + 19 + 33)*
Average age (years)	3.95 ±1.49	2.9 ±0.5	2.87 ±1.12
Average weight (kg)	52.62 ±9.74	42.43 ±8.64	48.57 ±10.67
Average Body score	2.93 ±0.5	2.93 ±0.45	2.66 ±0.52
Rams			
Genetic type of rams	D	OD	D
Number of rams	11**	10	14**
Average age (years)	4.91 ±1.64	4.1 ±1.17	4.09 ±0.2
Average weight (kg)	59.18 ±11.51	62.32 ±4.51	83.92 ±4.20
Average Body Condition Score	3.02 ±0.18	3.1 ±0.33	3.03 ±0.2

*: Number of ewes in each generation used for three consecutive breeding cycles; **: 2 rams were used in both G1 and G3; G1: generation 1; G2: generation 2; G3: generation 3; OD: Ouled Djellal; D: D'man /// * *: Nombre de brebis de chaque génération utilisées pendant trois cycles de reproduction consécutifs ;* ** *: 2 béliers ont été utilisés à la fois en G1 et G3 ; G1 : génération 1 ; G2 : génération 2 ; G3 : génération 3 ; OD : Ouled Djellal ; D : D'man*

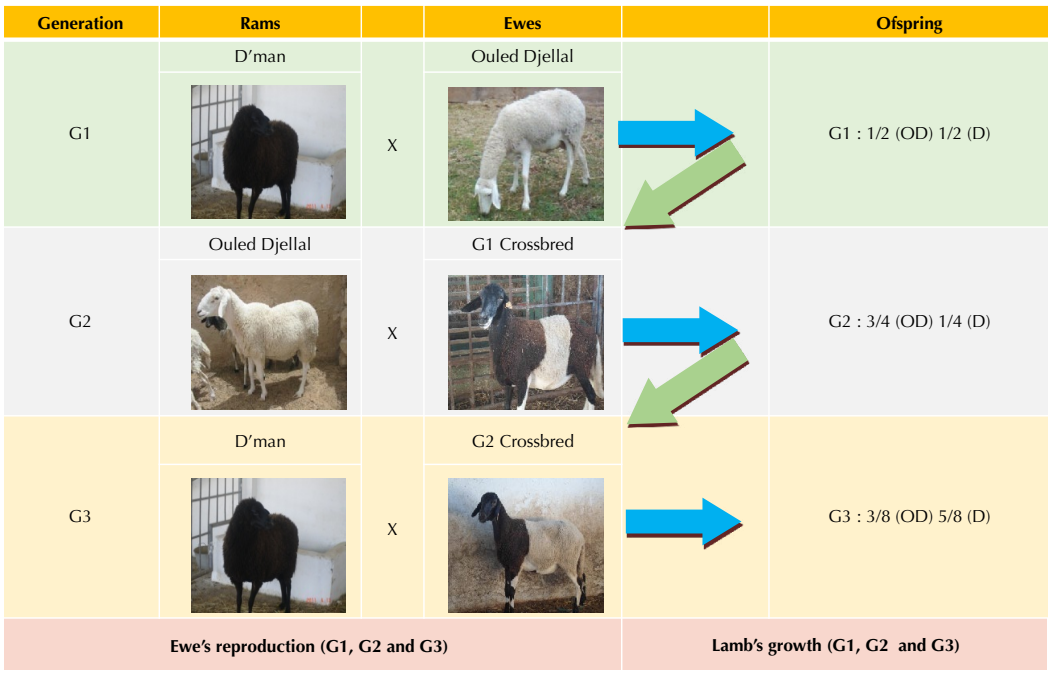

Figure 1: The alternating crossbreeding scheme adopted /// *Schéma de croisement alternatif pris en compte*

fourth and fifth months of gestation (with steaming), and 600 g/animal/day during the three months of lactation. The daily ration was distributed in two meals (9 a.m. and 4 p.m.). The concentrate was composed of corn, soya, wheat bran, oats, and mineral and vitamin supplements (A, D3, E). The results of the nutrient analysis of the concentrate and hay used are presented in Table II.

Four weeks before and during the mating period (throughout the control period), the D and OD rams used in our experiment for the three generations (G1, G2, and G3) were fed 600 g of concentrate/animal/day and oat hay as a basic ration, distributed ad libitum.

Outside the mating period, the rams were maintained on free access to oat hay. Water was provided ad libitum for all categories of animals.

Traits recorded

The numbers of ewes mated, ewes that lambed, lambs born, lambs born alive, and lambs weaned were recorded, and reproduction parameters were calculated. The traits studied were fertility (number of ewes pregnant per 100 ewes exposed) (0 infertile ewe and 1 fertile ewe). Fecundity was the ratio of lambs born to the number of ewes exposed (0 lamb born, 1 single lamb born, 2 lambs born and 3 lambs born). Litter size at birth (LSB) was the number of lambs born per ewe that lambed (one, two or three lambs). Litter weight at birth (LWB) was the sum of the birth weights of all lambs born per ewe. Litter size at weaning (LSW) was the number of lambs present at 90 days per ewe that lambed (one, two or three lambs). Litter weight at weaning (LWW) was calculated by adding the adjusted 90-day weights of all lambs per ewe that lambed. Numerical productivity (NP) was calculated as the ratio of lambs weaned at 90 days per ewes mated. Productivity at 90 days (WP) was calculated by adding the adjusted 90-day weights of all lambs per ewes exposed.

Statistical analysis

The reproductive performance and productivity data of the 288 ewes from the three generations of crossbreeding, collected between 2013 and 2021, were subjected to an analysis of variance (means and standard deviations) using R software (version 4.2.2, 2022). The ANOVA test was applied using the package agricolae in R Studio, and the significance level was 0.05. Only the generation factor was considered. Other environmental factors were not included in our statistical model.

■ RESULTS AND DISCUSSION

The results obtained in our study are presented in Table III.

Reproductive traits are characteristics with low heritability (between 0 and 0.4) (Wiener and Rouvier, 2009) and are strongly influenced by

Table II: Chemical composition of the concentrate and hay feed used in the experiment /// *Composition chimique de l'aliment concentré et du foin utilisés dans l'expérimentation*

Period	Type of food	DM (%)	A (%)	OM (%)	CC (%)	CF (%)	CP (%)
G1	Oat hay	86.47	11.32	88.68	37.25	1.23	6.42
	Concentrate	88.73	7.28	92.72	4.33	2.15	9.70
G2	Oat hay	87.99	10.37	89.63	35.78	1.28	6.55
	Concentrate	87.78	7.86	92.14	4.65	2.50	9.95
G3	Oat hay	88.51	8.85	88.79	36.88	1.22	6.62
	Concentrate	88.60	4.47	95.52	4.75	3.88	10

DM: Dry Matter; A: Ash; OM: Organic Matter; CC: Crude Cellulose; CF: Crude Fat; CP: Crude Protein /// *DM : Matière sèche ; A : Cendres ; OM : Matière organique ; CC : Cellulose brute ; CF : Matières grasses brutes ; CP : Protéines brutes*

environmental factors (feed, health, housing and herd management). However, crossbreeding is known to be able to improve reproductive traits through two phenomena: the association of complementary traits, by enabling complementary aptitudes contributed by each breed to be brought together in the same animals, and the phenomenon of heterosis, which is expressed mainly in fertility and prolificacy, but also in growth rates.

Over the three breeding cycles, G2 (G1 ewes x OD rams) and G3 (G2 ewes x D rams) crossbred ewes recorded an average fertility of 95.77 ± 20.26 and 90.80 ± 29.06%, respectively. These values were significantly higher ($p < 0.01$) than the fertility (79.23 ± 40.72%) recorded for G1 ewes (OD ewes mated with D rams). The improvement for G2 ewes thus was 20.9%, and for G3 ewes 14.6%.

The fertility values obtained in our study at G2 and G3 were higher than the average of the 37 values reported in the literature for OD purebreds (Belkhirat and Bradai, 2021), while the average recorded at G1 is slightly lower but remains within the OD breed standard (70–90%) (Chellig, 1992).

Compared with the D breed, the fertility observed in our study at G2 was higher than the values recorded by Boubekeur et al. (2019; 95.2%), while the fertility recorded at G3 is slightly lower.

We recorded a significant improvement ($p < 0.05$) in fecundity (fertility x prolificacy) of 25.4% and 17.7% for G2 and G3 crossbred females, respectively, compared with G1 ewes.

This improvement was higher than the average of the 37 values reported in the literature for OD purebreds raised under Algerian conditions (91.2 ± 19.9%; Belkhirat and Bradai, 2021) and the standard value for the OD breed (95%; Chellig, 1992).

Compared to the pure D breed, the fecundity recorded at G2 and G3 was well below the standard for the D breed under Algerian conditions (227%; Chellig, 1992) and (179%; Boubekeur et al., 2019)).

The prolificacy at birth recorded was statistically similar ($p > 0.05$) between the crossbred ewes of G2 and G3 and the OD purebred ewes used in G1. The results recorded for the three generations were higher than the average (1.14 ± 0.11 lambs/ewe) of the 37 values reported in the literature for OD purebred ewes (Belkhirat and Bradai, 2021). This could be due to the genes for high prolificacy transmitted by the D rams to crossbred ewes, depending on whether or not the rams used carried these genes. Ben Jemaa et al. (2019) reported that the high prolificacy of the D breed is due to the segregation of a prolificacy major gene (FecL), while Davis et al. (2006) reported that this trait has a polygenic hereditary determinism.

The litter distribution obtained for G1, G2, and G3 was 79.61, 73.53, and 74.68% for single litters, 17.48, 25, and 24.05% for double litters, and 2.91, 1.47, and 1.27% for triple litters, respectively.

Compared with purebred D ewes, the LSB values recorded for the three generations are lower than those reported by Boubekeur et al. (2019), with an average of 1.88 lambs/ewe.

The LWB recorded in our trial was significantly different ($p < 0.01$) between lambs from the three generations, averaging 4.74 ± 1.52, 4.61 ± 1.18, and 4.28 ± 1.47 kg for lambs from G1, G2, and G3 ewes, respectively. These values were higher than those reported in the literature by Abdelhadi et al. (2013) for the OD breed (4.25 kg).

The NP values at weaning of crossbred ewes recorded at G2 and G3 were significantly higher ($p < 0.001$) than at G1. They were 121.13% and 100%, respectively (versus 83.85% at G1), an improvement of 44.5% and 19.3%. These results obtained at G1, G2, and G3 are very interesting compared with the values reported in the literature for the OD sheep breed raised under Algerian conditions.

Chellig (1992) reported a NP rate of 75% for traditional breeding. Triki (2003) recorded average NP rates over three breeding cycles of 71, 58, 69 and 58% for ewes that were fed, respectively, ammonia-treated straw, urea-treated straw, alfalfa hay and oat hay, and were kept in an integral sheepfold with heat synchronization. Similarly, Dekhili (2010) reported a rate of 80% on extensively managed ewes.

With regard to the D breed, known for its exceptional prolificacy (185 to 200%; Chellig, 1992), high productivity rates were reported by El Fadili (2005; 130%).

In our study, the recorded WP (at 90 days) of the crossbred flock improved significantly ($p < 0.001$) at G2 and G3 compared with G1. The value at G1 was 15.29 ± 9.41 kg per ewe, while it stood at 24.56 ± 9.01 at G2 and 17.15 ± 7.67 at G3, an improvement of 60.6% and 12.2%, respectively.

The productivity performance recorded for the three generations studied were higher than those of OD purebred ewes reported by Triki (2003), with a productivity of 7.48, 6.68 and 10.72 kg over three breeding cycles, respectively, for ewes fed on untreated straw, urea-treated straw, and ammonia-treated straw, and kept in an integral sheepfold with heat synchronization. The productivity realized was superior to that recorded by Dekhili (2010; 12.8 kg) for the OD breed managed under extensive grazing systems in the Sétif region.

Table III: Reproductive traits and productivity performance of the three consecutive generations (G1, G2, and G3) of D'man and Ouled Djellal (D x OD) crossbred ewes /// *Performances de reproduction et de productivité de trois générations consécutives (G1, G2 et G3) de brebis croisées D'man et Ouled Djellal (D x OD)*

Generation	n	Fertility (%)	Fecundity (%)	LSB (lamb)	LWB (kg)	LSW (lamb)	LWW (kg)	NP (%)	WP (kg)
p		**	*	ns	**	*	***	***	***
G1	130	79.23	97.69	1.23	4.74	1.06	19.74	83.85	15.29
		± 40.72	± 66.43	± 0.49	± 1.52	± 0.50	± 5.09	± 62.01	± 9.41
G2	71	95.77	122.54	1.28	4.61	1.26	25.64	121.13	24.56
		± 20.26	± 53.98	± 0.48	± 1.18	± 0.48	± 7.52	± 53.23	± 9.01
G3	87	90.80	114.94	1.25	4.28	1.10	19.24	100	17.15
		± 29.06	± 58.13	± 0.46	± 1.47	± 0.47	± 5.05	± 54.98	± 7.67

G_1: Offspring from OD ewes mated with D rams; G_2: Resulting from crossbred ewes (½ D et ½ OD) mated with OD rams; G_3: Resulting from crossbred ewes (¼ D et ¾ OD) mated with D rams; LSB: Litter size at birth (prolificacy at birth); LWB: Litter weight at birth; LSW: Litter size at weaning; LWW: Litter weight at weaning; NP: Numerical productivity; WP: Weight productivity; ns : $p > 0.05$; * : $p < 0.05$; ** : $p < 0.01$; *** : $p < 0.001$ /// *G1 : Résultats de brebis OD accouplées avec des béliers D ; G2 : Résultats de brebis croisées (½ D et ½ OD) accouplées avec des béliers OD ; G3 : Résultats de brebis croisées (¼ D et ¾ OD) accouplées avec des béliers D ; LSB : Taille de la portée à la naissance (prolificité à la naissance) ; LWB : Poids de la portée à la naissance ; LSW : Taille de la portée au sevrage ; LWW : Poids de la portée au sevrage ; NP : Productivité numérique ; WP : Productivité pondérale ; ns : p>0. 05 ; * : p <0.05 ; ** : p <0.01 ; *** : p <0.001*

However, this parameter remains higher in the D breed due to its high prolificacy. Boubekeur et al. (2019) reported a productivity of 28 kg per ewe.

WP at weaning is a so-called composite trait, strongly influenced by other variables such as fertility, prolificacy and litter size, and weight at weaning. In our crossbreeding study, the significantly high productivity observed in G2 crossbred females (24.56 kg) results from the high fertility and prolificacy of crossbred ewes, the fast growth of their crossbred lambs due to their dams' high milk production (1.67 kg/d), and high viability of lambs obtained at 90 days of age. An average weaning weight of 20.27 kg and a weaning rate of 100% were recorded for lambs from G2 crossbred dams, compared with 16.84 kg and only 87.9% for lambs from G1 OD dams.

In our trial, the heterosis effect did not appear at G1, as it is a rare phenomenon, but it has been reported by some authors, notably Ricordeau et al. (1992).

In fact, crossbred ewes from G2 (50% OD blood and 50% D blood) and G3 (75% OD blood and 25% D blood) achieved overall reproductive performances significantly ($p < 0.05$) higher than those of the OD ewes mated with D rams used at G1; the only exception was for LWB.

With the exception of the D breed, the reproductive performances recorded for the crossbred ewes, particularly at G2, were better than those of other native breeds reported in the literature, including the OD breed raised under Algerian conditions. This could be explained by the positive effect of D genes on the prolificacy of crossbred ewes through the action of these genes on the ovulation rate (Boujenane and Kansari, 2005), the positive effect of purebred OD genes on fast lamb growth, and the significant heterosis effect obtained at G2 following the use of alternating crossbreeding for most reproductive parameters: fertility (+9.14%), NP (+19.34%) and WP (+27.42%).

The highest productivity performances were recorded for G2 ewes. In fact, the latter (with 50% D genes for crossbred females) recorded the highest performance for most of the parameters studied, likely due to the effect of the high prolificacy genes of the D'man breed and the fact that the G2 crossbred ewes were mated with OD males. The reduced performance in the third generation (G3) may have been due to the use of the OD breed as the ram breed (OD ram × G2 cross female). El Fadili (2005) reported that productivity improves with increasing the proportion of D'man breed genes in the cross up to 50%, after which this productivity decreases. The same author emphasized that the use of rams would be the best route for diffusing D'man breed genes. Hight and Jury (1970) reported a decrease in the majority of reproductive performances across three generations, with the third generation approaching the parent breed with the lowest performance. Moreover, the difference in productivity performance can be explained not only in terms of the dam's genotype, but also by that of the ram.

However, it is important to note that the reproductive and productive performance of G2 and G3 could be better than the performance obtained in our trial, using reciprocal crossing. It also should be noted that we based our analysis on the results of three breeding cycles per generation, with the average age of the reproductive females used in G2 and G3 being only 2 years old, while the reproductive ewes of G1 were 4 years old.

Augas et al. (2010) highlighted that variations in reproductive parameters were a function of ewe parity and age (age class and parity affect significantly reproductive traits). Benjelloun et al. (2021) reported that fertility and prolificacy increase with age, peaking at 4 to 6 years of age and then decreasing, with higher performances obtained by multiparous ewes in comparison with primiparous ones.

■ CONCLUSION

While the OD breed is characterized by a large body size capable of multiple gestations but low prolificacy, the D breed is known as being light in weight but prolific. These two breeds therefore complement each other in terms of zootechnical traits and can be crossed.

Results obtained on their alternating genetic crossbreeding show an improvement in fecundity, NP and WP of the ewes for the three generations (particularly G2) compared to the OD breed standard.

In light of the encouraging results obtained on reproductive and productive performances, we can conclude that the D breed, with its exceptional reproductive characteristics, could be crossbred with the OD breed to increase the productivity of the sheep production under Algerian environmental conditions.

It would be interesting to continue the study by considering other variation factors that could affect this performance, such as ewe age, parity, body condition score, etc., and by analyzing the zootechnical performances of the fourth generation.

Implementing an alternating sheep crossbreeding program is an important strategy for improving flock characteristics, but it requires careful planning and careful management to avoid potential problems such as losing breed purity, inbreeding, and management of genetic variability. A thoughtful, well-planned approach is essential to achieve the desired objectives and guarantee economic viability.

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Conflicts of interest

The authors declare that there is no conflict of interest.

Declaration of author contributions

KS was a doctoral student. The study was planned and prepared by MA, ST, KS, ML, AH, AB and LS. Data collection was carried out by MA, KS, ML, AH, AB and LS. Data analysis was carried out by KS under the supervision of MA. The manuscript was prepared by KS and revised by MA and ST. All authors have read and approved the final manuscript.

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Résumé

Sebkhi K., Adaouri M., Triki S., Lebied M., Houari A., Bourada A., Sebbagh L. Évaluation des performances reproductives et productives d'un croisement génétique alternatif entre deux races ovines locales, Ouled Djellal et D'man

L'objectif de cette étude était d'évaluer l'effet du croisement alternatif sur les performances reproductives et la productivité des ovins. Deux races ovines indigènes algériennes ont été utilisées : Ouled Djellal (OD), connue pour ses qualités exceptionnelles de production de viande, et D'man (D), connue pour ses qualités exceptionnelles de reproduction. Au total, 288 brebis (tous génotypes confondus) ont été utilisées, dont 130 brebis OD de race pure constituant le troupeau de base de la première génération (G1), 71 brebis croisées (50 % de sang OD et 50 % de sang D) de la deuxième génération (G2), et 87 brebis croisées (75 % de sang OD et 25 % de sang D) de la troisième génération (G3). L'effet bélier a été utilisé pour synchroniser les chaleurs en lutte naturelle en lot. Nos résultats montrent une amélioration de la fécondité (fertilité × prolificité) des brebis des première, deuxième et troisième générations par rapport à la valeur standard (95 %) des brebis de race pure OD (G1 : 97,69 ± 66,43 % ; G2 : 122,54 ± 53,98 % ; G3 : 114,94 ± 58,13 %). Il y a également eu une amélioration de la productivité numérique et pondérale au sevrage (90 jours) par rapport aux valeurs précédemment rapportées pour les brebis OD élevées en Algérie. Pour la productivité numérique, les valeurs étaient de 83,85 ± 62,01 % à G1, 121,13 ± 53,23 % à G2, et 100 ± 54,98% à G3 (contre 73 % rapportés dans la littérature) ; pour la productivité pondérale, les valeurs étaient de 15,29 ± 9,41 kg à G1, 24,56 ± 9,01 kg à G2, et 17,15 ± 7,67 kg à G3 (contre 10,55 kg rapportés dans la littérature). En conclusion, la race D, qui présente un potentiel reproductif exceptionnel, pourrait être utilisée en croisement pour augmenter la productivité des systèmes d'élevage ovin fonctionnant dans les conditions locales dans les zones favorables à la production de viande. Elle pourrait également être utilisée pour créer une race synthétique en la croisant alternativement avec la race ovine locale OD.

Mots-clés : Ovin, amélioration génétique, race indigène, aptitude pour la viande, performance de reproduction, Algérie

Resumen

Sebkhi K., Adaouri M., Triki S., Lebied M., Houari A., Bourada A., Sebbagh L. Evaluación del rendimiento reproductivo y productivo de un cruce genético alterno entre dos razas ovinas locales, Ouled Djellal y D'man

El objetivo de este estudio es evaluar el efecto de alternar los cruces entre razas en el rendimiento reproductivo y la productividad de los ovinos. Se utilizaron dos razas ovinas indígenas argelinas: Ouled Djellal (OD), conocida por sus cualidades excepcionales de producción cárnica, y D'man (D), conocida por sus cualidades reproductivas excepcionales. En total, se utilizaron 288 ovejas (considerando todos los genotipos), entre las cuales 130 ovejas OD de raza pura que constituyen el rebaño de base de la primera generación (G1), 71 ovejas cruzadas (50 % de sangre OD y 50 % de sangre D) de la segunda generación (G2) y 87 ovejas cruzadas (75 % de sangre OD y 25 % de sangre D) de la tercera generación (G3). El efecto carnero se utilizó para sincronizar el celo en monta natural por lotes. Nuestros resultados muestran una mejora de la fecundidad (fertilidad × prolificidad) de las ovejas de las generaciones primera, segunda y tercera respecto al valor estándar (95 %) de las ovejas de raza pura OD (G1: 97,69 ± 66,43 %; G2: 122,54 ± 53,98 %; G3: 114,94 ± 58,13 %). También ha habido una mejora de la productividad numérica y ponderal en el destete (90 días) respecto a los valores anteriormente obtenidos de las ovejas OD criadas en Argelia. Para la productividad numérica, los valores fueron del 83,85 ± 62,01 % en G1, 121,13 ± 53,23 % en G2 y 100 ± 54,98% en G3 (frente al 73 % recogido en la literatura); para la productividad ponderal, los valores fueron de 15,29 ± 9,41 kg en G1, 24,56 ± 9,01 kg en G2 y 17,15 ± 7,67 kg en G3 (frente a los 10,55 kg recogidos en la literatura). En conclusión, la raza D, que presenta un potencial reproductivo excepcional, podría utilizarse en cruces para aumentar la productividad de los sistemas de cría ovina en las condiciones locales en las zonas favorables a la producción de carne. También podría utilizarse para crear una raza sintética, cruzándola alternativamente con la raza ovina local OD.

Palabras clave : Ovinos, mejoramiento genético, razas indígenas, aptitud cárnica, reproductividad, Argelia