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Improvement of ewes' performance by combining native rangeland resources and subterranean clover in the South of France

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SUMMARY – The steppe-like rangeland of Crau (France 43.8°N, 5.0°E, altitude 0 to 100 m a.s.l.) shows a late growth in spring. Therefore the feed resources of Mérinos d'Arles ewes consists mainly of poor value standing hay (7% CP and 75% NDF on DM basis) from autumn up to mid April. This feeding regimen hampers body condition (BC) recovery up to the mating season, beginning in May. The Subterranean clover (Sc) (*Trifolium subterraneum*, cv Clare) sown on plots of fallow, has the potential in terms of nutritive value (20% CP and 37% NDF on DM basis) to efficiently integrate the grazing resources in the period ranging from late February to May. In 1994 and 1995, ewes grazing Sc in this period exhibited an average liveweight gain (LWG) and a BC recovery higher than the counterparts grazing the rangeland (7.9 and 9.3 kg vs 4.6 and 3.3 kg; 1.3 and 1.4 BC units vs 0.4 and 0.2 BC units) ($P < 0.05$ except 1994 liveweight). Grazing in succession Sc from late February early March to mid April, and then the rangeland up to May enabled the ewes to exhibit LWG and BC recovery similar to those achieved by the ewes grazing exclusively Sc. It is concluded that this system, tested for 3 years (1994, 1995, 1996), is advisable to improve the sheep performance under the extensive farming conditions of Crau.

Key words: Sheep, extensive mediterranean pasture, Subterranean clover, liveweight, body, condition.

RESUME – *"Amélioration des performances des brebis en associant les ressources du parcours spontané et un trèfle souterrain, dans le sud de la France". En Crau (43,8°N, 5,0°E, altitude 0 à 100 m) la végétation steppique est tardive. De l'automne à la mi-avril la ressource alimentaire des troupeaux Mérinos d'Arles, essentiellement constituée de reports sur pied desséchés, est pauvre (7% MAT et 75% NDF dans la MS) et impropre à améliorer l'état des brebis pour la mise au bélier en mai. Sur des parcelles de friche ou de jachère, le trèfle souterrain (*Trifolium subterraneum, *cv Clare) a révélé une valeur nutritive élevée (20% MAT et 37% NDF dans la MS) permettant une intégration efficace dans le calendrier de pâturage entre la fin de février et mai. En 1994 et 1995, les gains de poids et d'état corporel des brebis pâturant du trèfle souterrain de mars à mai ont été supérieurs à ceux des brebis restées sur la steppe (en moyenne 7,9 et 9,3 kg vs 4,6 et 3,3 kg ; 1,3 et 1,4 point vs 0,4 et 0,2 point) ($P < 0,05$ sauf en 1994 pour le poids). Un pâturage successif du trèfle souterrain jusqu'à mi-avril et de la steppe par la suite jusqu'en mai a permis des gains de poids et d'état corporel similaires à ceux obtenus avec les brebis consommant exclusivement du trèfle souterrain. Ce système, expérimenté pendant 3 ans (1994, 1995, 1996), a donc prouvé sa capacité à améliorer les performances des troupeaux ovins extensifs de la Crau.*

Mots-clés : *Mouton, pâturages extensifs méditerranéens, trèfle souterrain, poids vif, état corporel.*

Introduction

In Crau (French Mediterranean area: 43.8°N, 5.0°E, altitude 0 to 100 m a.s.l.) large transhumant flocks of Mérinos d'Arles sheep are raised for meat production. Back from high altitude Alps pastures, the ewes lamb mainly in early autumn (Pluvinage and Molénat, 1993). After weaning (mid winter) they graze on the steppe-like rangeland up to the end of spring (100 to 120 days in total), and thereafter the flocks are sheperded again to the mountain pastures in summer.

During winter and early spring the quality of the herbage on offer in the rangeland is rather poor: crude protein (CP) and neutral-detergent fibre (NDF) contents are about 70 g and 750 g/kg DM (Adama, 1994), and the degradability *in sacco,* an estimate of the digestibility, is 71% (Lapeyronie *et al.,* 1995). Supplementary feeding is the only liable way for allowing the ewes to restore their body condition before mid spring mating. Within this pastoral system, the use of fallow to grow buffer pasture is regarded as an interesting solution to improve ewes' feeding. Subterranean clover (*Trifolium subterraneum*, cv Clare), named also Subclover, proved to grow early in the spring season, yielding 1.5 t DM/ha in March and 4.0 t in May (Adama, 1994). The CP and NDF contents of this fodder resource were respectively 200 g and 370 g/kg DM (Adama, 1994).

The aim of this work was to assess in a three-year study the feeding interest of this species grazed as sole fodder resource or in succession with the rangeland in order to evaluate the scope for a mixed subclover-rangeland grazing system.

Material and methods

A three-year study was carried out. In the first two years, three homogeneous groups of 18 (1994) or 20 (1995) ewes each were randomly alloted to the following treatments: (i) St: grazing Steppe rangeland from early March to late May; (ii) Sc: grazing Subclover from early March to late May; and (iii) Sc + St: grazing Subclover until mid April and then Steppe rangeland up to late May.

In the third year (1996), only St and Sc + St treatments were compared using two groups of 50 ewes each.

Bi-monthly measurements of the grass on offer and of that remaining after grazing (cutting five 1-m^2 samples) assessed consumption rates ranging 55-65% for the rangeland and 70-80% for Subclover. Liveweight and body condition (Russell *et al.,* 1969*)* of the ewes were measured three times (years 1994 and 1995) or four times (1996). Differences in liveweight and body condition were analysed using Student t test.

Results and discussion

Liveweight gains along the 3 months period for St treatment differed from year to year: 4.6 kg, 3.3 kg and 1.2 kg on average (Fig. 1). For Sc group, the corresponding figures were 7.9 and 9.3 kg while Sc + St treatment allowed 6.0, 6.6 and 5.3 kg gains. At the end of May St group liveweight was therefore significantly lower than the other ones.

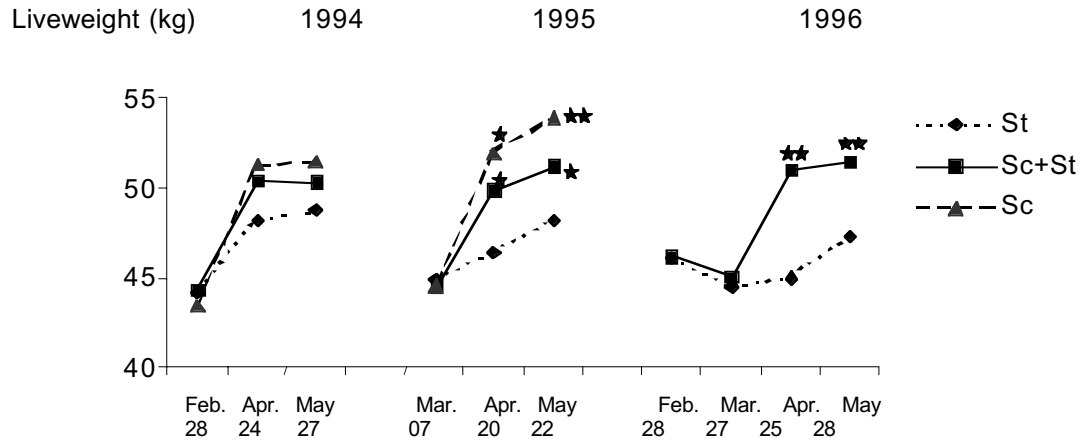

Fig. 1. Effect of the type of grazing on the average liveweight of the ewes.
Significant differences vs treatment St: *p < 0.05; **p < 0.01.

Body condition (BC) showed similar patterns of evolution (Fig. 2). The average increases (3 months periods) were 0.4, 0.2 and –0.1 BC units respectively in 1994, 1995, 1996 for rangeland grazing, but reached 0.8, 1.0 and 1.1 for the treatment combining both resources and even more for Subclover, 1.3 and 1.4 BC units.

The major part of the observed differences was already established at the end of April. From mid April onwards, the rangeland vegetation grows fast and improves its nutritive value as pointed out by Adama (1994): about 9% CP on DM in mid May. The diet in May on the Steppe rangeland shows that protein content and *in sacco* degradability increased (Lapeyronie *et al.,* 1995), thus reflecting on ewes' performance.

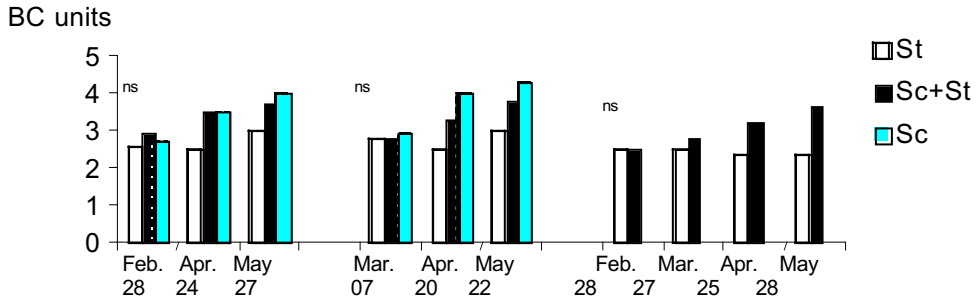

Fig. 2. Effect of the type of grazing on the average body condition of the ewes. Significant differences vs treatment St: ns = non significant ($p > 0.05$). For the other differences: $p < 0.01$.

Combining a Steppe-like Mediterranean rangeland with a buffer forage crop such as Subterranean clover resulted in a significant improvement of ewes' liveweight and body condition during the pre-mating period, with less variability between years.

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