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in

Baumont R. (ed.), Carrère P. (ed.), Jouven M. (ed.), Lombardi G. (ed.), López-Francos A. (ed.), Martin B. (ed.), Peeters A. (ed.), Porqueddu C. (ed.).
Forage resources and ecosystem services provided by Mountain and Mediterranean grasslands and rangelands

Zaragoza : CIHEAM / INRA / FAO / VetAgro Sup Clermont-Ferrand / Montpellier SupAgro
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 109

2014
pages 193-196

Dairy cow's pastures quality in Jura Mountains and Comté cheese area: maintenance with draught horses

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Abstract. In PDO Comté cheese area, especially in the Jura Mountains, grass from pastures is the main feed of dairy cows during the grazing season. To maintain the high nutritive value of grass, farmers have to cut grass refusals after the exit of cows from the paddock. An alternative is to use horses to eat these grass refusals, thanks to complementary feeding behaviours between these 2 herbivorous species. Thus, some farmers associate draught horses to dairy cattle on pastures. The aim of our study is to analyse the farmers' practices about grazing management when they associate horses and dairy cows on the same pastures. A survey was performed in 14 mixed (draught horses + dairy cattle) farms producing PDO Comté cheese. The results highlighted three types of associations between horses and lactating cows on pastures: (i) successive grazing, (ii) simultaneous grazing, (iii) winter grazing of horses. Moreover, three managements of grass refusals by cows were identified: (i) horses only, (ii) mowing only, (iii) both horses and mowing. In view of these 14 farms, the use of horse grazing to manage grass refusals could depend on the type of horse grazing, the equine stocking rate and the value of horses/cows ratio.

Keywords. Dairy cows – Grazing – Draught Horses – Mountain pastures.

Qualité des pâtures des vaches laitières présentes en zone AOP Comté dans le massif du Jura: Entretien des parcelles par les chevaux de trait

Résumé. *Dans le massif du Jura, en zone AOP Comté, l'herbe pâturée est la principale ressource alimentaire des vaches laitières durant la saison de pâturage. Pour maintenir la valeur nutritive des pâtures, les éleveurs doivent éliminer régulièrement les refus des vaches laitières. Une solution alternative à la gestion mécanique de ces refus est l'utilisation des chevaux, grâce à la complémentarité alimentaire entre ces deux espèces. Ainsi, certains éleveurs associent les deux espèces sur les pâtures. Notre étude avait pour objectif d'étudier les pratiques des éleveurs concernant la gestion du pâturage lorsqu'ils associent des chevaux de trait et des vaches laitières sur les mêmes parcelles. L'enquête menée dans 14 exploitations (chevaux de trait + vaches laitières) a mis en évidence trois types d'associations de chevaux et de vaches au pâturage: (i) le pâturage alternatif, (ii) le pâturage simultané, (iii) le pâturage hivernal des chevaux. De plus, trois gestions différentes des refus ont été identifiées: (i) l'utilisation que des chevaux, (ii) la fauche des refus, (iii) la fauche en plus du pâturage par les chevaux. Au vu de ces 14 élevages, le choix des chevaux dans la gestion des refus des vaches dépendrait des modalités de pâturage des chevaux, du chargement équin et du ratio chevaux/vache sur les pâtures.*

Mots-clés. *Vaches laitières – Pâturage – Chevaux de trait – Montagne.*

I – Introduction

In the Jura Mountains (located in Franche Comté region), the Protected Designation of Origin (PDO) Comté cheese production is based on grazing farming systems and grass has to be the main component of the dairy cows diet. Thus, it is essential to manage the quantity and quality

of grass. To maintain a high nutritive value of pastures during grazing period, farmers have to remove grass refusals of dairy cows. Some farmers replace mechanical mowing of grass refusals by associating draught horses and dairy cows grazing as the feeding behaviours of both species are complementary (Menard *et al.*, 2002; Orth, 2011). The aim of this study is to analyse the farmers' practices about grazing management when they associate draught horses and dairy cows on the same pastures.

II – Materials and methods

Some surveys have been carried out in 14 farms located in the Jura Mountains (from 700 meters to 1000 meters above the sea level) and producing PDO Comté cheese. The farms were chosen because they had both dairy cattle and draught horses (at least 3 mares). The questionnaire focused on grazing management on cows' paddocks, especially concerning the use of horses to remove grass refusals after cow grazing on each paddock. The horses/cow ratio (expressed in percentage) was calculated as the number of equine Livestock Unit (LU) divided by the number of LU of lactating cows * 100. The equine stocking rate on cows' pastures (expressed in LU/ha) was calculated as the number of LU per hectare of paddocks grazed by lactating cows. One lactating cow is equal to 1.00 LU, one suckling mare (2 years old at least) is equal to 0.93 LU and one growing horse is equal to 0.74 or 0.90 LU, depending on its age from 1 to 2 years old (INRA, 2012). As regard as the few numbers of farms, qualitative analyses were performed.

III – Results and discussion

1. Farms characteristics

The total area of farms was on average 101 ± 8 ha (means ± standard of error of the mean); n = 14 farms; ranged from 54 to 160 ha). Grasslands represented 96% of this total area. One farm had 15 ha of crops and one farm cultivated 1 ha of forage maize. Permanent grasslands represented 94% of the grassland area. Lactating cows grazed from April to November. Horses pastured during the grazing period and also in winter, except in 3 farms. The herds' size was on average 81 ± 7 cattle LU and 10 ± 2 horses LU (means ± SEM; n = 14 farms). On average, farms had 12 horses per 100 head of cattle (19 horses per 100 lactating cows). The global stocking rate was 0.94 ± 0.03 LU/ha (means ± SEM; n = 14 farms; ranged from 0.68 to 1.20 LU/ha). The milk production was on average 7.345 kilogrammes per cow per year. The milk productivity per grasslands hectare was on average 3.296 kilogrammes per hectare. These farms had a grazing system which was more or less extensive. These global characteristics were representative of the dairy systems located in the Jura Mountains (Cassez *et al.*, 2012).

2. Grazing management of cows' pastures

In all farms, horses grazed at least once the paddocks which were grazed by lactating cows. Three modes of association between cows and horses on pastures can be described. The first mode (in 6/14 farms) consisted in a simultaneous grazing: cows and horses grazed together in the same paddocks. The second mode (in 8/14) was a successive grazing, with cows first and then horses. The third mode (in 8/14) was a winter grazing of horses: horses grazed alone during winter on the paddocks used by cows during the grazing period. In this last mode, farmers wanted to keep horses near the stable, so they used dairy cows' paddocks. These modes of horses – cows association were also observed in Auvergne (Bigot *et al.,* 2013). They can be combined on the same farm (Table 1).

Table 1. Six groups of farms having the same mode of horses/cattle association on cows' pastures

Groups of farmers	I	II	III	IV	V	VI
Association of horses and cows on the cows' pastures	Simultaneous grazing	Simultaneous and winter grazing	Simultaneous then successive grazing	Successive grazing	Successive and winter grazing	Winter grazing
Number of farms	1	3	2	3	3	2

The equine stocking rates on the cows' pastures were lower in the simultaneous grazing (0.18 ± 0.04 LU/ha; means ± SEM; n = 6 farms) than in the successive grazing (0.51 ± 0.18 LU/ha; means ± SEM; n = 8 farms). In addition, the horses/cow ratios were lower in the simultaneous grazing (9% ± 1%; means ± SEM; n = 6 farms) than in the successive grazing (28% ± 7%; means ± SEM; n = 8 farms). These results suggested that when the equine stocking rate and the horses/cow ratio were higher, farmers chose a successive rather than a simultaneous grazing mode. As milk production is the major production of these farms, farmers preferred to keep pasture first for lactating cows. Farmers revealed that they managed the grazing of horses in order to maintain the quality of the cows' pastures which was essential for the feeding of cows. An experimental study showed that the animal performances could vary with the horses/cattle ratio and the annual pasture productivity (Martin-Rosset and Trillaud-Geyl, 2011). Thus, the horses/cow ratio and the equine stocking rate seemed to determine the mode of horses-cows association on pastures. Further study would be necessary to evaluate the horses/cow ratio and equine stocking rate thresholds in the different horses-cows associations in order to avoid degradation of animal performances and pastures quality.

3. Use of draught horses in the management of grass refusals

In relation with the previous global grazing management, two ways to remove grass refusals on the paddocks after being grazed by dairy cows can be observed: the grass refusals were either (i) consumed by horses or (ii) mechanically mowed. The first modality can be observed in most of the farms (11/14). However, three groups of farmers were identified.

The first group of farmers (7/14) didn't use the mechanical mowing to remove grass refusals. According to these farmers, the horses-cows association on paddocks was sufficient to remove grass refusals or avoid their occurrence. In these farms, draught horses grazed with or after lactating cows on paddocks, several times during the grazing period.

The second group of farmers (4/14) removed the grass refusals using the horses and the mechanical mowing. In these farms, horses grazed either a part of area grazed by cows or all the pastures with or after cows only during a short period at spring or autumn. Thus, these farmers used horses to remove only a part of grass refusals.

The third group of farmers (3/14) preferred to use the mechanical mowing in order to remove grass refusals. In this group, horses grazed alone only during winter or after cows grazing during a short period at autumn. These farmers considered that horse grazing was not sufficient to remove grass refusals.

The modes of horse grazing (number of times, period of grazing) rather than the mode of horses-cows association on the cows' pastures seemed to influence the efficiency of horses grazing to remove grass refusals or avoid their occurrence.

The grassland area, the global LU and the global stocking rate were not different between the three groups of farms (Table 2). However, the horses/cow ratio on pastures tended to be lower in the groups II and III than the group I (Table 2). A survey performed in Auvergne highlighted that when the horses/cattle ratio was low (around 10%), the mixed grazing had no influence on the forage estimate compared to only cattle grazing (Bigot *et al.,* 2010). Thus, the horses/cow ratio could determine the success of the removal of grasses refused by cows using horses grazing. Moreover, the equine stocking rate on cows' pastures tended to be lower in the groups II and III than the group I (Table 2). Thus, the stocking rate and the number of times where horses grazed the cows' pastures could be also the key factor in the maintenance of cows' pastures with draught horses.

Table 2. Main features of the 3 groups of famers, depending on the type of management of grasses refused by cows (means +/- SEM†)

Group of farms	**I**	**II**	**III**
Management of grasses refused by cows	**Horse grazing**	**Horse and mowing**	**Mowing**
Number of farms	7	4	3
Grassland area (ha††)	89 ± 11	108 ± 20	113 ± 21
Global livestock unit	80 ± 7	102 ± 16	100 ± 15
Global stocking rate (LU/ha†††)	0.9 ± 0.1	1.0 ± 0.1	0.91 ± 0.05
Equine stocking rate on cows' pastures (LU/ha†††)	0.55 ± 0.23	0.22 ± 0.07	0.18 ± 0.03
Horse/cow ratio on cows' pastures (%)	31 ± 10	8 ± 2	12 ± 4

† SEM: Standard Error of the Mean; †† ha: hectare; ††† LU/ha: Livestock Unit/hectare.

IV – Conclusions

In the Jura Mountains, herds of draught horses were involved in cows' pastures management in dairy farming systems in similar ratio than in Auvergne (Bigot *et al.,* 2013). It appeared that the horse grazing could be an alternative solution to remove grasses refused by cattle if the grazing pressure of horses was sufficient. Further studies would be performed to evaluate the best conditions of mixed grazing on the maintenance of cows' pastures (biodiversity, productivity) and to assess the economic and environmental advantages of horse grazing to remove grass refusals.

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