



Winter housing conditions of cows of the Hérens breed do not influence fighting but modulate spacing behaviour on alpine pastures

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ABSTRACT

Cows of the Hérens breed are typically kept in small herds and three types of winter housing conditions feature in practical application: tie-barns with minimal winter outdoor exercise, this being taken singly or in pairs ("minimal exercise"), tie-barns with daily exercise as a complete herd ("herd exercise"), and loose housing ("loose housing"). During the summer grazing period, cows from different farms are grouped into bigger herds on alpine pastures. In this study we investigated whether winter housing conditions have an effect on the fighting and spacing behaviour of the cows at the beginning of the alpine pasture period.

The study was carried out on five alpine pastures in Switzerland, where we observed a total of 218 horned cows of the Hérens breed from 16 herds altogether. During the first two days of the alpine pasture period, we recorded fighting behaviour. For the next three days, we measured distances between pairs of focal cows to quantify spacing behaviour.

Winter housing conditions did not significantly influence fighting rate ($p=0.21$) nor the probability that a cow would fight at all ($p=0.12$), but both parameters decreased with time after grouping of the cows on the alpine pastures ($p<0.001$). Cows with minimal and herd exercise stayed closer to members of their own herd compared to members of another herd, whereas this distance was comparable in cows from loose housing.

In conclusion, winter housing conditions did not influence fighting behaviour on alpine pastures in cows of the Hérens breed, but modulated their spacing behaviour in the first week after grouping.

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1. Introduction

Hérens cows, a traditional Swiss alpine breed (Canton of Valais) are housed most commonly in small herds of about seven cows in tie-barns. In winter, the majority of those cows are allowed only the minimum outdoor exercise of 30 days required by Article 40 of the *Swiss Animal Welfare Ordinance* (2008). These cows are usually exercised singly or in pairs. In a few tie-barns, however, cows have daily exercise as a complete herd and can thus continuously maintain social contact with all other herd

members. Finally, some herds are kept in loose housing systems. This type of housing is still rare due to the tradition of tethering and the fact that cows of this breed are typically not dehorned. Every year, during the month of June, cows are grouped into bigger herds of 100 cows or more to graze on communal alpine pastures for the summer. Grouping cows of the Hérens breed immediately leads to intense fighting, but serious injuries rarely occur (*Swiss Federation of Livestock Farming of the Hérens Breed*). Fighting abilities and the achievement of high dominance ranks are prestigious for the cow owners. As a consequence, fighting ability represents a major breeding objective and is increasingly replacing the traditional production of meat and milk with this dual-purpose breed. In fact, Hérens cows tend to display a more aggressive response to unfamiliar animals in

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Table 1

Number of cows observed as focal cows on the different alpine pastures for both fighting and spacing behaviour given their winter housing conditions. Each column per alpine pasture represents one herd from one farm.

	Winter housing conditions				
	Minimal exercise		Herd exercise	Loose housing	
Alpine pasture 1: total 80 cows present,136 dyads observed					
# fighting behaviour	4	6	7	–	
# spacing behaviour	4	6	7	–	
Alpine pasture 2: total 83 cows present, 153 dyads observed					
# fighting behaviour	7		9	2	
# spacing behaviour	7		9	2	
Alpine pasture 3: total 97 cows present, 2926 dyads observed for the fights and 2485 for the distances					
# fighting behaviour	40		–	34	3
# spacing behaviour	40		–	31	0
Alpine pasture 4: total 103 cows present, 4278 dyads observed for the fights and 1176 for the distance					
# fighting behaviour	52		–	19	17
# spacing behaviour	26		–	23	0
Alpine pasture 5: total 98 cows present, 78 dyads observed					
# fighting behaviour	2		7	4	–
# spacing behaviour	2		7	4	–

intra-breed encounters between pairs compared to Brown Swiss cows (Plusquellec and Bouissou, 2001). Even animals from the same herd will start to fight if they are separated for only a few days (Castro et al., 2011). Some farmers are concerned that any winter housing system allowing for herd-based exercise will impair the fighting ability of their cows when the spring arrives, but this claim has never been quantified. Therefore, we investigated the influence of winter housing conditions on the fighting ability of the cows when grouped on communal alpine pastures.

After grouping, cows establish new relationships with unfamiliar animals. This process usually leads to higher frequencies of agonistic interactions, may result in social stress (Brakel and Leis, 1975; Mench et al., 1990), persists until the dominance hierarchy has stabilised (Kondo and Hurnik, 1990) and is modulated by previous experience. Bouissou (1975) compared the behaviour of heifers grouped for the first time with their behaviour at later groupings. With increasing experience, heifers established their relationships of dominance more quickly and the proportion of relationships established after a fight decreased from 60% to 35%. Similarly, the experience specific to the winter housing conditions could influence the fighting behaviour of Hérens cows.

Sub-grouping can be observed on communal pastures, where cows were found to be closer to peers from their own herd than to those from another herd (Takeda et al., 2000). Finally, heifers reared together from birth showed close spatial association and exchanged more positive interactions (Bouissou and Hövels, 1976a,b). In the Hérens cows, familiarity between individuals may vary according to the type of winter housing condition and may thus influence spacing behaviour when cows are grouped.

In the present study, we took advantage of the fact that cows of the Hérens breed are typically kept under three different housing conditions during winter and are grouped on alpine pastures for the summer. We investigated the effect of winter housing conditions (tied cows with minimal outdoor exercise, either singly or in pairs, tied cows with daily exercise as a herd, cows from loose housing) on fighting ability and spacing behaviour when cows

were grouped and how these aspects developed over time. Individual fighting ability was measured by the fighting rate, the probability that a cow would fight at all, the proportion of fights won and the probability of a cow winning or losing all her fights. Because Hérens cows generally have a strong tendency to fight with unfamiliar animals particularly if they originate from other farms, we expected that winter housing conditions as such would not influence the fighting ability of the cows. With respect to distances between pairs, we hypothesised that cows of the same farm would maintain smaller distances among themselves than towards cows from other farms and that this effect would be more pronounced for those winter housing conditions in which the complete herds would meet regularly (cows in loose housing or with daily exercise as a herd).

2. Materials and methods

2.1. Animals, winter housing conditions and experimental design

The study was conducted on five alpine pastures at altitudes of 1700–2000 m in the canton of Valais (Switzerland) in early summer (June 2008 and 2009). We observed a total of 218 horned cows of the Hérens breed from 16 herds as focal cows and assigned them to three types according to their winter housing conditions (Table 1): (1) 111 tied cows (6 herds) with outdoor exercise, either singly or in pairs, on at least 30 days during the winter feeding period (“minimal exercise”), (2) 27 tied cows (4 herds) that had daily outdoor exercise during the winter feeding period together with other members of their herd (“herd exercise”) and (3) 80 cows (6 herds) that were kept in loose housing systems during the winter feeding period (“loose housing”). Since the month of May, i.e. after the winter feeding period, cows from all three types of winter housing conditions had daily contact with the members of their herd on pasture, i.e. cows with minimal exercise had daily contact to the herd members since May of a given year, whereas cows used to herd exercise or from loose housing had daily contact with the members of their herd during the whole of

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