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The social behaviour of East Friesian dairy sheep in larger groups

Dedicated to Prof. Dr. Dr. h. c. mult. Horst Kräußlich on the occasion of his 75th birthday

Summary

East Friesian dairy sheep are on the one hand loners and individualists. In practice, however, it has become increasingly common to keep animals of this breed in larger herds too. The social behaviour was examined as well as the marching and milking order of three herds with 24, 35 and 39 lactating ewes.
In all three herds a marked social ranking could be proven. The social rank was correlated with both the age and the weight of the animal. A significant relationship was found in two of the three herds between rank and milk yield. As well as this, it was proven that East Friesian dairy sheep have quite a marked marching and milking order. Each animal constantly takes on more-or-less the same position in the order.
The close bond of this breed with human beings seems to be a result of intensive contact with the animals. No reason was found to prevent the East Friesian dairy sheep being kept in groups of around 40 animals. This can be done on condition that the animals have adequate room and access to the resources satisfying their needs.

Key Words: sheep, social behaviour, marching order, milking order, animal husbandry, intervening

Zusammenfassung

Titel der Arbeit: **Das Sozialverhalten Ostfriesischer Milchschafe in größeren Gruppen**
Ostfriesische Milchschafe gelten teilweise als Einzelgänger und Individualisten. In der Praxis ist es jedoch zunehmend üblich geworden, Tiere dieser Rasse auch in größeren Herden zu halten. Untersucht wurden das Sozialverhalten, Marsch- und Melkordnung von drei Herden mit 24, 35 und 39 laktierenden Muttertieren.
In allen drei Herden ließ sich eine eindeutige soziale Rangordnung nachweisen. Der soziale Rang war sowohl mit dem Alter als auch mit dem Gewicht der Tiere korreliert. Zwischen Rang und Milchleistung wurde in zwei der drei Herden eine deutliche Beziehung gefunden. Daneben konnte nachgewiesen werden, dass Ostfriesische Milchschafe eine recht eindeutige Marsch- und auch Melkordnung haben. Jedes Tier nimmt stets annähernd denselben Platz in der Ordnung ein.
Die enge Bindung dieser Rasse an den Menschen scheint eine Folge des intensiven Umgangs mit den Tieren zu sein. Es konnte kein Hinweis darauf gefunden werden, dass Ostfriesische Milchschafe nicht in Gruppen von annähernd 40 Tieren gehalten werden können. Voraussetzung ist ein genügendes Platzangebot sowie ein ausreichender Zugang zu den Ressourcen zur Bedürfnisbefriedigung.

Schlüsselwörter: Schaf, Sozialverhalten, Marschordnung, Melkordnung, Haltung, Schlichten

1. Introduction

The East Friesian dairy sheep is a breed which can be found in sixteenth century literature (UBBEN, 1530). It was always well-known for being very fertile (GNAPHEUS, 1553) and for having a particularly high milk yield (CREMNER, 1932; SCHWINTZER, 1985). For this reason they have been being kept, since the beginning of the 20th century, not only in the area from which they originate (East Friesian), but also in areas far away from where they were originally bred, above all in the Ruhr valley (ZEEB, 1932; SCHWINTZER, 1985).

In the first half of the past century, the number of stock being kept increased greatly. The East Friesian dairy sheep was known as "the small man's cow" (ZEEB, 1932). Above all, during and following the two World Wars, during the economy crisis and in the "Third Reich", when a distinctive striving for autarky dominated, the ownership of these animals became widespread (KORN et al., 1986). As the milk served a self-sufficiency purpose, the number of animals being kept was always very low (ZEEB, 1932; HERBERG, 1997).
East Friesian dairy sheep have an annual milk yield of ca. 600 kg with 5.5 - 6.0 % fat (the sheep breeders association, Baden-Württemberg, 1997). The breed are well-known in three aspects: they are early mature, fertile and fast growing. Furthermore, it is known to be good at forming bonds with humans. In contrast to other sheep, it seeks contact to human beings and is known to be a loner. This estimation culminates in a statement from SCHWINTZER (1983): "The dairy sheep is - in contrast to other breeds - not an animal with herding instincts, but rather a loner, which needs and thus seeks mankind's caring hand. In its absence, it will suffer. It can easily be kept as an individual animal, not, however in large groups."
The East Friesian dairy sheep does indeed vary significantly in its behaviour to that of the other breeds. It was, however, never clarified whether or not this was a result of habituation, that is through the constant contact which they have with human beings. The other possibility is that, that particular reaction of the East Friesian dairy sheep has arisen from the selection of desired characteristics and is thus genetically established. Modification or mutation, that is the question in this instance. Those supporting the theory that they are lone animals, give no biological reason why keeping them in larger groups is impossible. There are probably ways which makes keeping this breed in larger herds possible (JATSCH, 1985).
Since the beginning of the 80's, in connection with greater ecological awareness, the number of East Friesian dairy sheep in Germany has risen significantly (VDL, 1988). New to this development, was the fact that larger herds were being kept now, with 40 and more individuals. A situation such as this affects, above all, the social behaviour of the animals. In the following piece of work, the social structure of larger groups of East Friesian dairy sheep shall be analysed. In the examination, the marching and the milking order were taken into consideration. In this respect, it deals with a behavioural area which could be influenced by social behaviour.

2. Animals, Material and Method

Observation took place on the following three East Friesian dairy sheep farms. All three were full-time farmers .

A. Sulzhof: This is a farm with herd-book animals, which lies in the Northern Rhineland hills. The farm contains, amongst other animals, 50 ewes which were kept in sub-groups (separated depending on the lambing date). For the following examination, a group of 24 lactating animals were studied. The age of these ewes lay between one and six years. At the start of the period of observation, the animals had already been being kept together as a closed unit for the past two months.
The experimental herd were kept in a deep litter barn. The surface area of the pen was

38.5 m². An automatic drinker, a salt lick, and several feeding racks were installed. The feeding racks allowed all animals to feed at the same time. In the adjoining area of the sheep house there was a milking parlour with 12 milking points.
First of all, pelleted concentrate was fed in the morning, then soaked sugar-beet chips. Following this, the feeding racks were all filled with lucerne-hay. Occasionally, the sheep were additionally given a bucket of whey.
An hour later, the milking began for the first twelve animals. When the gates were opened, the animals ran, without being driven, into the milking area. In the milking parlour, they received grain, alternatively barley, wheat, and oats. Whilst the first group of twelve animals were being milked, the other twelve were kept shut into a separate part of the pen. After the second group had been milked, the dividing gate was opened so that the animals had access to the whole of the pen again. The evening routine on the farm was similar to that in the morning. No sugar-beet chips was fed in the evening, however.
Observation of the animals' behaviour took place on the farm from the beginning of March to the beginning of April 1997. The periods of observation took place on five days of the week and lasted from 0700 - 1130 h and from 1530 - 2000 h. The total length of observation time was 171 hours.

B. Reinfelderhof: This farm was located in the swabian mountains. The total number of sheep stock was roughly 70 animals, but only the experimental herd of 39 ewes were being milked. At the beginning of the period of observation, the animals had already been living together as a herd for about a month. The age of these ewes lay between one and nine years. The trial herd was housed in part of an open stall which had been used in the past for cattle. The pen had a surface area of 107 m². The animals had straw bedding. During milking, the pen was divided into separate folds. On the long side of the pen there was a feeding trough. It was long enough to allow room for all the animals. It was not, however, filled in its whole length with fodder. The fittings within the animals` housing were complemented by an automatic drinker.
When the weather allowed it, the sheep were let out at night onto the meadow. Before the morning milking, they were first brought into the cote and fed with grass silage and hay. After having driven all the animals into a separate part of the fold, this was then penned off. The milking parlour was located in immediate vicinity to the pen. The animals received concentrate in the milking parlour.
After milking, the animals returned to the empty section of the pen and the next group entered the milking parlour. When the milking was finished, the fittings sub-dividing the pen were removed. The morning and evening routine was the same.
The data were gathered from the beginning of May to mid June 1997 on this farm. Because of the routine on the farm it was not possible to maintain equal periods of time. There was a morning and an evening period of observation here too. Observation took place on six days of the week. The total length of the period of observation was 152 hours.

C. Naafbachtalschäferei: This farm was located in Bergisches Land. As well as the ram and lambs there were 36 ewes. The experimental herd enclosed 35 of these female sheep with an age of one to six years. The herd had already existed in this way for

roughly five months. In the morning and the evening prior to milking the animals were in a run with 195 m² surface area. In this run they had access to water, a mineral salt lick and three feeding troughs. There was not enough room at the feeding troughs for all the sheep at the same time.
In the morning and in the evening the animals were lured from the meadow. They ran voluntarily towards the milking parlour. Once all the animals were in the area in front of the milking parlour, the entrance was penned off. The sheep were milked in two groups, each of which contained 18 animals. They received concentrate within the milking parlour. When the milking was finished, the whole group received sugar-beet out on the paddock.
The period of examination on this farm stretched from mid July 1997 until the drying off of the animals at the beginning of September. The sheep were observed on every day of the examination period for several hours, both in the morning and in the evening. The total length of time in which the animals were observed was 111 hours.

Recording of the data: Before the start of the observation, the sheep were marked with numbered, plastic collars. In order to establish the social ranking, all kinds of dominant behaviour were recorded by hand. Results of fights, driving other animals away and avoiding other animals were used as indicators in establishing the social ranking. Furthermore, the marching order from the meadow into the cote and the order in which they entered the milking parlour were recorded.
Evaluation of the data: With the help of the acquired data, the rank index of each animal was determined. It was calculated using the method developed by SAMBRAUS (1975). According to this method, the rank index of a sheep is acquired by dividing the number of animals beneath it by the number of clarified social ranking relationships. The rank index acquired in this way lies between 0.0 and 1.0.
The milking order was determined by noting the order in which the sheep entered the milking parlour. All animals entered the milking parlour voluntarily. On the farm at Sulzhof, data were collected 43 times during milking, at Reinfelderhof 74 times and at Naafbachtal Schäferei 82 times. The average milking position of each animal was determined by adding all positions taken by one animal and dividing it by the number of times being milked.
The marching order was the order in which the animals arrived in the area in front of the milking parlour, after having walked a certain distance. This order could only be determined on the two farms with regular outdoor grazing (Sulzhof and Naafbachtalschäferei). The marching order must not necessarily correspond to the following milking order. After having reached the area in front of the milking parlour, whilst waiting, the order could change.
The age and the weight of the animals as well as the milk yield were recorded on every farm. These values were available on Sulzhof farm, which was a herd-book farm. On Reinfelderhof farm, the exact age of the sheep was known. Their weight was established with the aid of an animal weigher. The milk yield could be established by milking by hand on one occasion into a measuring beaker. It was established in the same way on Naafbachtalschäferei farm. A shepherd established the dental age of the sheep on this farm as well as their weight through estimination.

Statistical methods: With the aid of PEARSON's (PRECHT and KRAFT, 1993) correlation calculations, correlations between all recorded parameters were determined:

$$S_{xy} = \frac{1}{n-1} \cdot \sum_{i=1}^{n} \left(x_i - \bar{x}\right) \cdot \left(y_i - \bar{y}\right)$$

The correlation co-efficient r was split up into three groups: 0.3 and under; 0.3 to 0.6; as well as 0.6 to 0.9 i.e 1.0. According to these three groups for r, weak, medium and strong correlations shall be spoken of.

3. Results

3.1 Social behaviour

During the period of observation, there was an abundance of social clashes with rank significance in all three herds. Thus, an essential part of the social rank relationships could be established in this way. In a herd of n animals, $\frac{n(n-1)}{2}$ different rank relationships are imaginable. Within the individual herds, a significant amount of them could be determined (Table 1). A certain amount of clashes remained contradictory. Here, both individuals involved won clashes in the course of time, none of which, however, twice as often as the other. The corresponding rank relationships were counted as unresolved. Most of the clashes occurred during feeding time, at the drinker and at the beginning of the rest periods. There was no change in the rank order in any of the three herds during the whole length of the observation period.

Table 1
Known Rank Indices in the three Herds observed (Geklärte Rangindices in den drei beobachteten Herden)

Farm Betrieb	Number of Animals Anzahl Tiere (n)	Number of possible Rank Relationships Anzahl möglicher Rangverhältnisse $\frac{n(n-1)}{2}$	known geklärt n	 %	contradictory widersprüchlich n	 %
Sulzhof	24	276	251	90.94	24	8.69
Reinfelderhof	39	741	547	73.82	171	23.08
Naafbachtal-schäferei	35	595	466	78.32	116	19.50

Animals with a lower social ranking moved much more carefully and with greater awareness than animals with a higher social ranking in all three herds. Usually they avoided other members of the herd, keeping a distance of 2 m. Often, when close contact had occurred, (e.g. due to a narrowing) the subdominant animals stood still or changed direction. In most cases, the higher ranked animal did not usually even make a threat.

Whether or not the subdominant animal avoided others, did however depend on the situation. At the feeding trough, whilst lying down or during herd fleeing, the lower

rank animals became careless.
Occasionally, group fights developed, having been triggered off by one fighting pair. In this case, several animals clubbed together against a few or one single member of the herd. On the Sulzhof farm, a clash was observed in which nine sheep were involved.
Within two of the flocks (Sulzhof and Reinfelderhof), herd members were observed taking on an intervening function. They pushed in between opponents and thus ended a clash. The "intervenors" tended to be animals in the upper third of the rank order (n=8) compared to the lower third (n=4). Nine of the intervening animals took up a medium rank position.
In all three herds, the age played a highly significant role in deciding the social ranking (Table 2; $p<0.01$). The relationship of ranking to weight was similar, though only significant for the Sulzhof herd ($p<0.05$). The relationship between social ranking and the milk yield varied. Whereas a medium correlation of high significance could be established in the Sulzhof herd, there was no significant correlation ($p>0.05$) for the herd at the Reinfelderhof farm. In the third herd, (Naafbachtalschäferei) there was a medium correlation between social ranking and milk yield which was significant ($p<0.05$).

Table 2
Correlation between Social Rank, Age, Weight and Milk Yield in the three Dairy Sheep Herds (Korrelationen zwischen sozialem Rang und Alter, Gewicht sowie Milchleistung in den drei Milchschafherden

Farm	Rank and Age		Rank and Weight		Rank and Milk Yield	
Bestand	Rang und Alter		Rang und Gewicht		Rang und Milchleistung	
	r	p	r	p	r	p
Sulzhof	0.611	0.002	0.436	0.033	0.542	0.006
Reinfelderhof	0.584	0.000	0.785	0.000	0.121	0.462
Naafbachtal-schäferei	0.479	0.004	0.583	0.000	0.336	0.048

3.2 Marching and milking order

If the sequence of the marching order was arbitrary, then all animals, seen as a whole would have to have a medium position with a high standard deviation. A medium position means the following for both herds:

Farm	Number of animals	theoretical medium position in the marching order
Sulzhof	24	$(1 + 24) : 2 = 12.5$
Naafbachtalschäferei	35	$(1 + 35) : 2 = 18.0$

For most of the animals the medium marching order position varies significantly from the value expected from a coincidental marching sequence. As to be expected, there are, however, several animals in each herd which have a medium marching order position corresponding, to a large extent, to the theoretical medium value. However,

the standard deviation is significantly less than that expected from an arbitrary sequence for all animals in all three herds (Tables 3 and 4).This means that all animals, more-or-less faithfully, repeatedly took up the same position in the marching order.

Table 3
Average Milking and Marching Order Values of the individual Animals in the Herd at Sulzhof Farm (Durchschnittliche Melk- und Marschordnungswerte der Einzeltiere in der Sulzhofherde)

Sheep No. / Schaf-Nr.	Milking Position / Melkplatz Ø	s +/-	Marching Position / Marschplatz Ø	s+/-
1	6.93	5.48	8.37	4.94
2	19.30	4.38	20.02	4.92
3	16.49	5.27	15.35	5.34
4	10.74	4.05	8.69	3.88
5	15.21	4.27	16.67	4.51
6	17.88	4.04	19.42	3.92
7	7.65	3.03	6.61	2.85
8	15.21	4.74	16.51	6.07
9	8.67	5,25	8.42	5.30
10	10.95	6.00	12.49	6.45
11	5.54	3.01	5.63	4.18
12	4.84	3.92	6.93	4.94
13	3.75	3,23	4.88	3.53
14	8.35	4.63	8.16	4.41
15	17.26	3.87	17.28	2.73
16	11.44	4.76	9.12	5.80
17	10.07	4.79	11.51	4.53
18	21.98	2.96	17.93	4.09
19	16.19	4.04	16.91	4.08
20	7.47	5.41	8.70	5.68
21	17.16	3.70	17.58	3.34
22	8.44	3,43	6.86	3.24
23	21.23	2.68	21.77	2.22
25	17.97	6.46	17.56	5.38
mean standard Deviation / Mittlere Standardabw.		**4.32**		**4.43**

Both of these two herds were similar, as were the herds from the Reinfelderhof farm in their milking order (Table 5). The mean standard deviations are less on the whole. For the two herds with the marching and milking order, their values are almost identical.
There was no significant relationship neither between the marching order and the social ranking, nor between the marching order and the milk yield (Table 6). For the herd at Sulzhof farm, there was a mean significant correlation ($p<0.05$) between marching order and age. This means that the younger members of the herd lead the herd on. The older the animal, the more likely they have a position further down in the marching order. On the farm at Naafbachtalschäferei, there was a significant relationship between the marching order and bodyweight ($p<0.05$). When the position in the marching order was greater, the weight of the animal was greater.
There was only a significant negative medium correlation (Table 7; $p<0.05$) between

Table 4
Average Milking and Marching Order Values of the individual Animals in the Herd at Naafbachtalschäferei Farm (Durchschnittliche Melk- und Marschordnungswerte der Einzeltiere in der Naafbachtalschäfereiherde)

Sheep No. / Schaf Nr.	Milking Position / Melkplatz		Marching Position / Marschplatz	
	Ø	s +/-	Ø	s +/-
1	26.93	6.52	26.67	6.79
2	21.96	7.30	20.02	7.78
3	19.42	7.35	18.15	6.56
4	16.93	7.74	16.22	6.94
5	14.94	10.22	16.13	11.32
6	10.61	9.05	8.25	6.87
7	24.51	8.33	25.72	7.23
8	14.61	7.79	15.42	8.40
9	5.33	5.32	4.52	4.44
10	23.79	4.70	26.76	5.71
11	11.93	6.38	11.21	6.88
12	19.78	8.55	21.23	10.15
13	22.92	8.66	24.72	8.60
14	10.37	9.54	8.90	8.79
15	10.11	10.10	19.02	10.12
16	27.05	5.60	27.55	7.25
17	15.60	6.18	17.29	8.04
18	23.46	8.88	24.09	8.98
19	28.76	3.78	30.28	4.53
20	15.10	10.03	15.68	11.56
21	25.04	7.99	27.95	8.40
22	15.70	10.25	14.13	9.45
23	10.92	7.32	10.38	6.16
24	9.78	6.98	9.64	7.54
25	16.00	8.08	12.91	6.33
26	19.68	7.76	20.91	8.06
27	5.17	2.99	3.21	2.32
28	13.32	10.98	10.70	9.03
29	18.28	8.57	16.21	7.19
30	17.02	8.20	18.39	8.23
31	30.61	7.08	27.09	6.96
32	12.69	8.40	13.16	8.32
33	15.65	7.88	17.42	8.05
34	24.46	8.80	23.26	8.71
35	20.01	6.00	22.40	6.89
mean standard Deviation / Mittlere Standardabw.		7.69		7.67

the milking order and the milk yield and this was only valid for the herd at Sulzhof farm. This means that animals with a higher milk yield appeared earlier in the milking parlour.

Between the marching and the milking order there was a very high correlation and of

high significance ($r = 0.959$ and $r = 0.969$; both with $p<0.001$).

Table 5
Average Milking Order Values of the individual Animals in the Herd at Reinfelderhof Farm (Durchschnittliche Melkordnungswerte der Einzeltiere in der Reinfelderhofherde)

Sheep No. Schaf Nr.	Milking Position Melkplatz Ø	s +/-
1	28.64	6.74
2	5.64	4.83
3	9.37	10.47
4	24.60	6.99
5	11.89	7.16
6	20.82	8.16
7	8.19	10.14
8	19.37	8.56
9	21.87	10.85
10	27.85	7.34
11	14.95	11.00
12	12.84	9.98
13	19.43	5.60
14	23.23	6.71
15	31.76	7.53
16	12.11	6.72
17	19.70	9.02
18	8.10	6.14
19	2108	7.89
20	22.18	8.57
21	23.12	5.86
22	12.45	5.53
23	37.81	3.14
24	10.60	7.42
25	27.04	7.31
26	26.85	11.41
27	9.22	5.79
28	17.47	9.26
29	16.90	7.11
30	11.23	9.19
31	24.87	6.79
32	21.31	7.32
33	19.42	13.31
34	15.04	6.87
35	31.22	6.78
36	21.65	7.86
42	34.79	3.63
43	32.72	6.02
44	27.50	8.04
mean standard Deviation Mittlere Standardabweichung		7.67

Table 6
Relationship between Marching Order and other Parameters (Beziehungen zwischen Marschordnung und anderen Parametern)

	Marching order and Marschordnung und							
Farm	Rank		Age		Weight		Milk Yield	
Bestand	Rang		Alter		Gewicht		Milchleistung	
	r	p	r	p	r	p	r	p
Sulzhof	0.142	0.510	0.409	0.047	-0.204	0.340	-0.368	0.077
Naafbachtal-schäferei	0.106	0.546	0.246	0.154	0.376	0.026	0.104	0.554

Table 7
Relationships between Milking Order and other Parameters (Beziehungen zwischen Melkordnung und anderen Parametern)

	Milking order and Melkordnung und							
Farm	Rank		Age		Weight		Milk Yield	
Bestand	Rang		Alter		Gewicht		Milchleistung	
	r	p	r	p	r	p	r	p
Sulzhof	0.012	0.954	0.285	0.178	-0.217	0.308	-0.480	0.018
Reinfelderhof	-0.010	0.950	0.008	0.961	-0.227	0.164	-0.028	0.864
Naafbachtal-schäferei	0.058	0.740	0.168	0.334	0.300	0.080	0.134	0.444

4. Discussion

Most of the situations dealing with social ranking were not fights, rather than that, situations displaying threatening and avoiding behaviour. This is typical for established rank orders, as it is their very purpose to avoid fighting situations. In only one of the herds, fights repeatedly took place. This was traced back to the high density of the herd (1.6 m / animal), which often forced the animals to reduce the distances used to avoid others. The existence of social ranking is also a requirement for sheep, which ensures life in a herd is a low aggression environment (SQUIRES and DAWS, 1975; ECCLES and SHACKLETON, 1986). This almost aggression-free behaviour amongst sheep is seen as a result of the particularly long domestification time (GRUB and JEWELL, 1966). The sheep was the first farm animal to be domesticated (BOESSNECK, 1985).

The existing relationships of dominance were not respected in all situations. Subdominant dairy sheep obviously ignored the rank order when the resource was especially desirable for them: food (especially concentrate), water and a place to lie. In particular, hunger can lead to increased aggressiveness amongst sheep (SCOTT, 1948; ARNOLD and MALLER, 1974).

It should be noted, that sheep are small compared to cattle or horses and on top of that, East Friesian dairy sheep are hornless. Physical attacks by animals of a higher rank are hardly painful for these woolly animals. The high percentage in contradictory results, in comparison to those of larger species of animals can be interpreted in this way (WAGNON, 1965; SAMBRAUS, 1970; REINHARDT, 1973). The observations done by, amongst others, DOVE (1974) and SQUIRES (1975) contradict the results to hand. According to them, the higher ranked animals always have access to food and water. As well as the effect of the breed, the number of feeding places could be significant here.

Meaningful results can only be obtained when more than 25% of the rank relationships have been determined (BEILHARZ and ZEEB, 1982). This minimum percentage has been well exceeded in the examination to hand. There were large individual differences. For many sheep more than 90%, for some 100%, of the rank relationships to other members of the herd were known. There was, however, one sheep (at Reinfelderhof farm) for which only 50% of the dominance relationships were determined. The minimum level required by BEILHARZ and ZEEB has, however, even in this individual case, been well exceeded.

For the high correlation between social rank and weight, the weight is seen as the cause, and the rank as the result. The fighting power of an animal increases with increasing bodyweight and thus increasing amount of muscles. It is less probable that the higher ranked animals acquire better access to the food and thus gain in weight.

In all three of the herds there was an obvious connection between social ranking and the age of the animals. For sheep, there are no results available for the significance of age. It should be remembered that young sheep which enter an established herd, are, lighter, have to find their way in an until now unknown territory and have to cope with many new herd members. At first they take on low positions in the rank order. In analogy with cattle, it can be expected that the social ranking shall stay reasonably constant (SAMBRAUS and OSTERKORN, 1974) and thus the rank position of newcomers later barely alters.

The results show that the twice daily marching order was not coincidence. Each member of the herd keeps, as far as possible, a certain place in the marching order. Here , the social ranking is unimportant, and even the milk yield, which could be the cause of a stronger desire to be milked does not appear to have an influence. In one of the herds, the weight of the animals is significant, in another, the age. The latter is a reminder of the leader function of the older, experienced animals amongst others. For these herds, the results of DONALDSON et al. (1967) could be confirmed, which revealed that the lower ranked animals took up the first positions in the ranking order.

It could be proven that the milking order, from one milking to the next, was quite constant. Thus, KESZTHELYI and MAROS 's (1992) results were confirmed, who verified, with a herd made up of many different breeds, a significant repetition of the milking order occurred. The factors defining the milking order, are to a great extent unknown. Only on the farm at Sulzhof, did the results show that lower ranked animals appeared earlier in the area in front of the milking parlour. As these are not high ranked, older or heavier animals, this phenomenon remains unresolved. It is imaginable that the concentrate they receive in the milking parlour is enough of an

incentive to encourage them to appear there as early as possible.
A phenomenon of particular interest is "intervening". In this way, aggressive behaviour is nipped in the bud and this aids the maintenance of a peaceful atmosphere within the cote. Intervening has only been seen amongst goats up until now (KEIL and SAMBRAUS, 1998).

5. Final analysis

East Friesian dairy sheep have a distinct social ranking in herds of up to at least 40 animals. This rank order depends on recognition of individuals and thus, is presumably not the case in larger herds of several hundred sheep. The social rank order in connection with the "intervenors" has a calming effect on this breed. However, as far as the way in which the animals are kept, it should be taken care that even the lower ranked members of the herd are able to satisfy their needs in every functional sphere. This means a sufficient number of places at the feeding trough easy access to the drinkers and a not too high density among the herd should exist.
It is imaginable that East Friesian dairy sheep kept as individuals and those in smaller groups may have a slightly higher milk yield than those in larger groups. This is however not the result of increased social stress and a lack of bonding with human beings. East Friesian dairy sheep kept as individual animals are often better tended and receive larger amounts of concentrate. In larger groups, when concentrate was offered more often, the highly ranked animals would succeed in acquiring a larger unequal proportion. This potential imbalance can be regulated during lactation by providing them with concentrate in the milking parlour according to their milk yield.

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Buchbesprechung

Rinder - natürlich heilen

WOLFGANG BECVAR

196 Seiten, 60 z.T. farbige Abbildungen, Verlag Eugen Ulmer, Stuttgart, Österreichischer Agrarverlag Leopoldsdorf, ISBN (G) 3-8001-3542-6, (A) 3-7040-1735-3, 2000, DM 49,80; öS 364,00; sFr 46,00

Naturheilverfahren stellen ein altes Kulturgut des Menschen dar. Das gilt auch für die Tiermedizin, wenngleich die Gewichte zwischen dem Einsatz natürlicher Heilmethoden und der Schulmedizin mit der Intensivierung der landwirtschaftlichen Produktion und der Entwicklung der Veterinärmedizin, sich zunehmend zu Gunsten letzterer verschoben haben. Das gegenwärtig, vor allem im sogenannten „Biologischen Landbau", verstärkt wieder Naturheilverfahren als Ergänzung nicht als Ersatz schulmedizinischer Therapien gefragt sind, hat mannigfache Gründe. Auch wächst das Literaturangebot auf diesem Gebiet und die Zahl der Tierärzte die neben der Schulmedizin bei bestimmten Erkrankungen Naturheilverfahren in ihre Therapien einbeziehen. Das Fehlen anwendungsorientierter Grundkurse für Tierärzte und interessierte Landwirte bewog den Autor mit vorliegendem Buch diesem Bedürfnis zu entsprechen. So versteht sich dieses Buch als Hilfe für den Einstieg in diese Behandlungsmethoden im Sinne von Ergänzung für schulmedizinische Methoden. Während der erste Buchteil sich vordringlich mit den Naturheilverfahren im einzelnen beschäftigt, werden im zweiten Buchteil die wichtigsten Organ- und Stoffwechselerkrankungen und eine Auswahl seuchenhafte Infektionskrankheiten der Rinder besprochen.
Der erste Buchteil beginnt mit einigen Abschnitten naturphilosophischer Betrachtungen, gefolgt von der Beschreibung der Naturheilverfahren im Einzelnen. Genannt seien Phytotherapie, Homöopathie, Bach-Blütentherapie, Massage, Reiki, Wickel, Umschlag und weitere. Der zweite Buchteil widmet sich ausgewählt wichtigen Krankheiten des Rindes. Ausgehend von der erfolgsbestimmenden Krankheitsdiagnose werden für die einzelnen Erkrankungen Hintergründe, Ursachen, Leitsymptome, mögliche Therapien und prophylaktische Maßnahmen diskutiert. Das besprochene Krankheitsspektrum ordnet sich nach den Organsystemen Haut, Muskulatur, Atmungs-, Verdauungsapparat, Harn- und Geschlechtsapparat, Nervensystem und Auge. Es folgen Systemische Allgemeinerkrankungen infektiöser Natur, Parasiten parasitäre Erkrankungen sowie Organ- und Stoffwechselkrankheiten. Dieses allgemeinverständliche Buch enthält eine Fülle konkreter Behandlungsempfehlungen. Sicherlich vorzugsweise für den bäuerlichen Betrieb, die Behandlung von kranken Einzeltieren, möglicherweise auch zur therapeutischen und prophylaktischen Erfassung von Herden. Ein empfehlenswertes Buch für Tierärzte und interessierte Landwirte, die bereit sind sich von alten Denkmodellen zu verabschieden und neue Erfahrungen zuzulassen.

ERNST RITTER, Dummerstorf

Schafe und Ziegen - natürlich heilen

WOLFGANG BECVAR

174 Seiten, 64 z.T. farbige Abbildungen, Verlag Eugen Ulmer, Stuttgart, Österreichischer Agrarverlag Leopoldsdorf, ISBN (G) 3-8001-3224-9, (A) 3-7040-1736-1, 2000, DM 49,80; öS 364,00; sFr 46,00

Mit gleichem Ziel wie bei obigem Titel hat der Autor dieses Buch über die Behandlung von Schafen und Ziegen auch mit gleicher Grundgliederung vorgelegt. Abweichend gliedert sich der zweite Buchteil über die Krankheiten der Schafe in Viruserkrankungen, bakterielle Erkrankungen, Rikettsien und Mykoplasmen, parasitäre Erkrankungen, Organ-, Stoffwechsel- und Mangelkrankheiten, Vergiftungen und Erkrankung der Klauen. Für die Ziegen kommen hinzu die Ziegen-Arthritis-Enzephalitis und ein Abschnitt über akute Euterentzündung. Durch die zwei nach Tierarten getrennt vorgelegten Titel, gestaltet sich der Bucherwerb für den speziellen Nutzer besonders preiswert. In gleicher kompetenter Weise vermittelt auch dieses Buch eine Fülle wertvoller Hinweise und Anleitungen zur Selbsthilfe sowie Eigenverantwortlichkeit und hält für den Nutzer konkrete Behandlungsempfehlungen bereit.

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