

ASSESSMENT OF LEVEL OF FEAR SUSCEPTIBILITY DURING MACHINE MILKING IN DAIRY SHEEP OF DIFFERENT AGES AND TEMPERAMENT

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Abstract

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Assessment of level of fear susceptibility during machine milking in dairy sheep of different ages and temperament was made. In Agricultural Institute – Shumen were raised and examined 118 dairy sheep at first lactation (2 years age), 103 dairy sheep at second lactation (3 years age) and 95 dairy sheep at third lactation (4 years age) of Bulgarian Dairy Sheep Synthetic Population. The assessment of level of fear susceptibility and temperament during machine milking was done by a method, worked out and used in Agricultural Institute – Stara Zagora for 22 years using some parameters by which Complex Score (CS) has been formed. It was established that sheep at first lactation showed lower level of fear susceptibility to positioning teat cups compared to those at second and third lactation ($P < 0.001$). The values of the parameters which formed the Complex Score (CS) and the parameters of the CS were higher in sheep at second and third lactation compared to those at first lactation ($P < 0.05$) which showed that growing up sheep became calm and got used to milking parlor conditions. Higher level of fear, problems in entering and taking place in milking parlor and some anxiety towards the teat cups were examined at first lactation. The differences in the behavior between the separate Complex Score temperament measurements during machine milking were significantly high in $P < 0.001$ of all ages. Taking care during the time of sheep adaptation to the machine milking as well as the time of the routine realization of this operation during the completely milking period was distinguished for its important technological meaning and related to some improvement of the machine milking organization.

Key words: temperament, fear susceptibility, age, machine milking, dairy sheep

Introduction

Some development of suitable area and forming of some positive reflexes during the milking was needed for the normal functioning of the milk-producing reflex. The study of the individual differences in behavior during milking in parlor milking might help to explain the sources of variation of the fear susceptibility and the temperament, and their contact with the technology and milking organization.

The main characteristics of the temperament were often defined by the way the animals have coped with

some challenging situations or with the level of their fear susceptibility. The fear susceptibility has been defined as a characteristic of the temperament showing the common sensibility of the person and his ability to react to different threatening situations (Boissy, 1995). The temperament might be defined as a characteristic of person who has showed a constant model of emotions and behavior (Pervin, 1997).

Methods for studying the fear susceptibility towards humans were worked out more intensively in the last ten years (Beliaev, 1973; Kilgour, 1975; Romeyer and Bouissou, 1992, Dimitrov, 1993; Murphy, 1999; Pajor

et al., 2008). It was considered that the main motivation in the behavior of the animals and their contact with the man (and the machine) was the fear, which motivated them to avoid the man. The lack of evasion has enabled some contact with man and was a sign for the lack of fear. The active evasion from human showed a fear reaction against him (Hemsworth, et al., 1987; Dimitrov et al., 1999; Vierin et al., 2002; Peeva, 2006).

In Bulgaria have been studied numbers of breeds for fear susceptibility by the method of Beliaev and the modification done by Lankin (Lankin et al., 1988; Hinkovski et al., 1989; Peeva, 2006; Dimitrov et al., 2008). There was a lack of researches in dairy animals during machine milking and especially in sheep of different ages.

The purpose of the present study was the assessment of the level of fear susceptibility during machine milking in dairy sheep of different ages and temperament.

Material and Methods

In Agricultural Institute – Shumen were raised and examined 118 dairy sheep at first lactation (2 years age), 103 dairy sheep at second lactation (3 years age) and 95 dairy sheep at third lactation (4 years age) of Bulgarian Dairy Sheep Synthetic Population.

The assessment of fear reactions and the temperament determination in parlor milking was based on three parameters: 1) Voluntary and persistency in taking place in parlor milking; 2) Feeding activity towards neighbors; 3) Reaction towards the teatcups. The method was described in details and published from Dimitrov et al., 1993; Dimitrov et al., 1996; Dimitrov et al., 2003. There were four serial calculations of all reactions of morning milking, there was an estimation of working out the reflexes, and the stability of some of them already worked out. Every reaction has been estimated with point exponent based on strong, mean and weak appearance for each parameter for more precisely differentiation of the strength of reaction. The most favorable reaction was estimated with 4, the worst – with 1 and the mean – with 3 or 4 points. For example, the maximum complex score of a sheep estimated with 4 in the three behavior parameters during four serial trials would have been 48, [$3 \cdot 4 \cdot 4 = 48$]. A complex individ-

ual (score) assessment with values between 12 and 48 for each animal has been developed on the base of the estimations for each reaction. The temperament was defined depending on the values of the complex score as follows: From 12 to 24 – nervous; From 24 to 36 – Mixed; From 36 to 48 – Calm. This was the method by which the investigations were carried out about an estimation of the temperament of all (135) dairy sheep at first lactation (2 years old) using the way of the machine milking in parlor milking Alfa Laval 2x24.

The obtained data have been statistically worked by ANOVA, the mean values have been calculated and the average mistake of all the three parameters for temperament defining in parlor milking and of the complex score too. A significance at $P < 0.05$ was observed.

Results and Discussion

The level of fear susceptibility during machine milking was estimated in dairy sheep of different ages by methods of defining the temperament, worked up and used in the Agricultural Institute- Stara Zagora for 22 years. Using this method, the behavior reactions of sheep were compared at Ist lactation (2 years old), IInd lactation (3 years old) and IIIrd lactation (4 years old).

In Table 1 are shown mean values of machine milking behavioral parameters in dairy sheep of different ages (Ist lactation, at age of 2 years and IInd lactation, at age of 3 years). Tests in milking show the behavior activity and motivation of animals according their feeding activity, fear reaction to familiar person (milkman), stranger and the machine (teat cups), and also the behavior built on the base of social relationships between the sheep in the flock.

An examination of 118 dairy sheep at first and 103 dairy sheep at second lactation was observed. The parameters “Voluntary and persistency in taking place in the milking parlor” (in brief “Persistency”) and “Feeding activity to forage offered by hand of a stranger” (in brief “Activity”) were presented with close values in animals at first and second lactation without being established statistical significance between them. The parameter “Persistency” and “Activity” was almost the same in animals of these two ages. This was an indication that the age did not influence enough on the

Table 1
Mean values of machine milking behavioral parameters in dairy sheep of different ages
(I-st lactation, at age of 2 years and II-nd lactation, at age of 3 years)

Parameters	I-st lactation (2 years age)			II-nd lactation (3 years age)			Td
	n	$\bar{x}\pm Sx$	CV%	n	$\bar{x}\pm Sx$	CV%	
Persistency	472	2.87±0.05	36	412	2.88±0.04	30	NS
Activity	472	2.64±0.06	46	412	2.60±0.06	48	NS
Teatcups	472	2.84±0.06	48	412	3.39±0.05	33	P<0.001
Complex Score, CS	118	33.4±1.0	31	103	35.5±0.9	24	NS

Persistency - Voluntary and persistency in taking place in the milking parlour;

Activity - Feeding activity to forage offered by hand of a stranger; Teatcups - Reaction to positioning teatcups;

CS - Complex Score; NS - No significance

way the sheep enter in parlor milking and on the fear to stranger. There were not many differences in the Complex Score (CS) too. Significant differences at $P<0.001$ between the measured values at first and second lactation – respectively 2.84 and 3.39 were established in the „Reaction to positioning teat cups” (in brief „Milking”) parameter and confirmed our statement that the sheep at first lactation showed lower level of fear susceptibility to positioning teat cups and that the sheep adaptation of different ages to milking was different. It is necessary to be taken an additional care from the milkman side of the constant adaptation to the milking and the machine.

In Table 2 are presented mean values of machine milking behavioral parameters in dairy sheep of different ages (Ist lactation, at age of 2 years and IIIrd lactation, at age of 4 years). An examination of 118 dairy sheep at first and 103 dairy sheep at third lactation was observed. The parameter “Activity” is presented with close values in animals at first and third lactation, respectively 2.64±0.06 and 2.61±0.06 without being established statistical significance between them. Very important moment is higher percent of variation using the parameter “Activity” of both ages – 46% at first lactation and 48% at third one. The level of feeding activity to stranger in animals of both ages is almost the same. Therefore, the age did not influence on the way the sheep were afraid of stranger feeding them in parlor milking. The differences in the parameter “Persistency” are clear but not significant in sheep at first lactation 2.87±0.05 and at third lactation - 2.97±0.04. The age did not influence enough on the way the sheep take

place in parlor milking. The parameter “Milking” is with the highest significant difference between animals of both ages - 2.84±0.06 at first lactation and 3.5±0.05 at third lactation and the established differences are at $P<0.001$. Very important moment is the high percent of variation in sheep at first lactation – 48%. This fact as well as the high significant differences between the values of “Milking” parameter of both ages confirm the tendency that sheep at first lactation show lower level of fear susceptibility towards the teat cups and that the sheep adaptation of different ages towards milking is different. The necessity of care by the milkman side for getting the sheep accustomed to the milking, machine, milkman and environment was confirmed too. The values of CS indicate mathematical proof of differences between both ages – 33.4±1.0 at first lactation and 36.3±0.9 at third lactation at $P<0.05$. There are no significant differences at all studied parameters between sheep at second and third lactation. This is an indication that growing up sheep became calm and got used to the parlor milking conditions.

Values of parameters comprising the CS and of the CS itself are higher in sheep at second and third lactation compared with those at first lactation, which is a confirmation of the already mentioned tendencies. There is a higher level of fear in sheep at first lactation, problems in entering and taking place in parlor milking and some anxiety in positioning teat cups.

Table 3 shows the mean values of the Complex Score (CS) temperament measurements during machine milking in dairy sheep of different ages (Ist, IInd and IIIrd lactation resp. at age of 2, 3 and 4 years).

Table 2
Mean values of machine milking behavioral parameters in dairy sheep different ages
(I-st lactation, at age of 2 years and III-rd lactation, at age of 4 years)

Parameters	I-st lactation (2 years age)			III-rd lactation (4 years age)			Td
	n	$\bar{x} \pm Sx$	CV%	n	$\bar{x} \pm Sx$	CV%	
Persistency	472	2.87±0.05	36	380	2.97±0.04	29	NS
Activity	472	2.64±0.06	46	380	2.61±0.06	48	NS
Teatcups	472	2.84±0.06	48	380	3.5±0.05	28	P<0.001
Complex Score, CS	118	33.4±1.0	31	95	36.3±0.9	25	P<0.05

Persistency - Voluntary and persistency in taking place in the milking parlour;

Activity - Feeding activity to forage offered by hand of a stranger; Teatcups - Reaction to positioning teatcups;

CS - Complex Score; NS - No significance

Table 3
Mean values of the Complex Score temperament measurements during machine milking in dairy sheep of different ages (I-st, II-nd and III-rd lactation resp. at age of 2, 3 and 4 years)

Age/Lactation	CS - Calm/C/			CS - Medium/M/			CS - Nervous/N/			Td
	n	$\bar{x} \pm Sx$	CV%	n	$\bar{x} \pm Sx$	CV%	n	$\bar{x} \pm Sx$	CV%	
I-st lactation	58	42.1±0.4	7	36	30.5±0.5	10	24	16.6±0.9	26	C/N;C/M;M/N - P<0.001
II-nd lactation	50	42.4±0.5	8	39	32.4±0.5	10	14	19.4±1.3	25	C/N;C/M;M/N - P<0.001
III-rd lactation	52	43.2±0.5	8	26	32.5±0.5	8	17	21.1±0.7	14	C/N;C/M;M/N - P<0.001

C - Calm temperament; M - Medium temperament;

N - Nervous temperament; CS - Complex Score

Distribution of the separate temperament measurements of ages as follows:

At first lactation: Calm (C) – 58 sheep (49%); Medium (M) – 36 sheep (30 %); Nervous (N) – 24 sheep (21%);

At second lactation: Calm (C) – 50 sheep (48%); Medium (M) – 39 sheep (38%); Nervous (N) – 14 sheep (14%);

At third lactation: Calm (C) – 52 sheep (55%); Medium (M) – 26 sheep (27%); Nervous (N) – 17 sheep (18%).

The behavior differences during milking between the separate temperaments presented by the Complex Score (CS) are significantly high at P<0.001 of all ages. Animals of C - temperament have received mean CS values in sheep at first lactation (42.1±0.4) and in those at third lactation (43.2±0.5) and were close in comparatively low variation (7 – 8%). This is the reason the sheep of this temperament to receive almost the same behavioral estimation and characteristics during milking regardless of the age. The tendency in sheep of M - temperament is similar. Animals of this temperament have received mean CS between 30.5±0.5 in sheep at first lactation and 32.5±0.5 in those at third lactation of comparatively low variation (8 - 10%).

There is a little difference in sheep estimation of N – temperament. They have received mean CS between 16.6±0.9 in sheep at first lactation and 21.1±0.7 in those at third lactation of comparatively higher variation (C = 26 % and C = 14%). The lower CS in sheep at first lactation and the higher parameter variation confirm the tendency that sheep at first lactation are definitely more cowardly. Taking care during the time of getting used the sheep to the machine milking as well as the time of the routine realization of this operation during the whole milking period is distinguished for its important technological meaning and is related with an improvement of the machine milking organization.

Conclusions

Sheep at first lactation showed lower level of fear susceptibility towards the teat cups compared to those at second and third lactation (P<0.001). It is necessary to be taken an additional care from the milkman side of positioning the teat cups.

Not only the parameters' values forming the Complex Score (CS) but also the parameters of the CS were higher in sheep at second and third lactation compared to those at first lactation ($P < 0.05$) which was an indication that growing up sheep became calm and got used to the parlor milking conditions. Higher level of fear, problems in entering and taking place in parlor milking and some anxiety towards the teat cups were examined in sheep at first lactation.

The contrasts in the behavior during the milking between the separate types of temperament being reflected by CS are significantly high at $P < 0.001$ for all ages.

Taking care during the time of getting used the sheep to the machine milking as well as the time of the routine realization of this operation during the whole milking period is distinguished for its important technological meaning and is related with an improvement of the machine milking organization.

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