Behaviour of calves in the first weeks of life

Zachowanie się cieląt w pierwszych tygodniach życia

Wojciech NEJA*

University of Technology and Life Science, Faculty of Animal Breeding and Biology, Department of Cattle Breeding, ul. Mazowiecka 28, 85–084 Bydgoszcz, Kujawsko-Pomorskie, Poland, Tel: + 48523749708, e-mail: *nejaw@utp.edu.pl,

ABSTRACT

Behavioural observations were conducted on 20 calves (10 bull calves and 10 heifer calves). The first series of observations was made in the first 4 days of life, and the second after a month (within 30 to 33 days of calving). Time from birth to first unassisted standing (standing on all extended legs) ranged from 16 minutes (heifers) to 158 minutes (bulls) for normal calving. Calves born from normal parturitions stood up after an average of 81 minutes and those born from difficult parturitions after 302 minutes. Calves that required assistance at calving showed shorter standing and longer lying time. In the first 4 days of life and after a month, both male and female calves were more often in left lateral recumbency when resting. Heifer calves more often visited the feeder while bull calves more often consumed concentrates, water and hay.

Keywords: calves, behavior, welfare

STRESZCZENIE

Obserwacjami etologicznymi objęto 20 cieląt (10 byczków i 10 cieliczek). Pierwszą serię obserwacji przeprowadzono w pierwszych 4 dobach życia cieląt, drugą serię po miesiącu (od 30 do 33 doby od wycielenia). Czas od urodzenia do pierwszego samodzielnego wstania cielęcia (wszystkie nogi wyprostowane) wynosił w przypadku porodów normalnych od 16 minut (jałówka) do 158 minut (buhajek). Cielęta pochodzące z normalnych porodów średnio wstawały po 81 minutach, natomiast cielęta z porodów trudnych po 302 minutach, ponadto cielęta wymagające pomocy przy porodzie krócej stały i dłużej leżały. W pierwszych czterech dniach życia oraz po miesiącu cielęta, niezależnie od płci podczas leżenia częściej odpoczywały na lewej stronie ciała. Jałówki częściej podchodziły do odpajalni, natomiast buhajki w porównaniu z jałówkami częściej pobierały paszę treściwą, wodę oraz siano.

Słowa kluczowe: cielęta, zachowanie, dobrostan

STRESZCZENIE SZCZEGÓŁOWE

Obserwacjami etologicznymi objęto 20 cieląt (10 byczków i 10 cieliczek). Pierwszą serię obserwacji przeprowadzono w pierwszych 4 dobach życia cieląt, drugą serię po miesiącu (od 30 do 33 doby od wycielenia). W pierwszej serii notowano czas od urodzenia do samodzielnego wstania cielęcia, czas leżenia na prawym i lewym boku oraz czas stania i ruchu. W drugim okresie (30-33 doba) obserwowano czas leżenia na prawym i lewym boku, czas stania i ruchu, częstotliwość podchodzenia do odpajalni, pobierania preparatu mlekozastępczego, wody, siana oraz paszy treściwej. Obserwacje wykonano w odstępach 15 minutowych, natomiast moment pierwszego wstania po wycieleniu cielęcia notowano zaraz po jego zauważeniu. Ponadto określono rodzaj każdego porodów jako: łatwy – odbywający się bez pomocy człowieka oraz ciężki – wymagający interwencji obsługi. czas od urodzenia do pierwszego samodzielnego wstania cielęcia (wszystkie nogi wyprostowane) wynosił w przypadku porodów normalnych od 16 minut (jałówka) do 158 minut (buhajek). Nie stwierdzono potwierdzonego statystycznie wpływu płci na czas od urodzenia do samodzielnego wstania. Wykazano natomiast potwierdzone statystycznie różnice spowodowane trudnością porodu. U wszystkich cieląt pochodzących z normalnych porodów średni czas od urodzenia do samodzielnego wstania wyniósł 81 minut. Cielęta z porodów trudnych wstawały średnio po 302 minutach, ponadto krócej stały i dłużej leżały w porównaniu z cielętami normalnie się rodzącymi. Średnio cielęta w ciągu pierwszych czterech dób życia w pozycji leżącej spędziły po około 1060 min. Nie wykazano potwierdzonych statystycznie różnic spowodowanych płcią i kolejną dobą. Po pierwszym miesiącu życia zarówno u buhajków jak i jałówek czas stania i ruchu był ponad dwukrotnie dłuższy w porównaniu z wynikami uzyskanymi w czasie pierwszej serii obserwacji (1–4 doba). Obserwowane cielęta w pierwszych czterech dobach życia oraz w wieku 1 miesiąca, niezależnie od płci podczas leżenia częściej odpoczywały na lewej stronie ciała. Buhajki w porównaniu z jałówkami częściej pobierały paszę, wodę oraz siano, natomiast jałówki częściej podchodziły do odpajalni.

INTRODUCTION

Cattle husbandry and breeding requires breeders to use housing systems that differ from natural conditions in which wild species live. At the same time, recent years have seen increased human awareness and willingness to provide farm animals with appropriate housing conditions that will not upset the genetically determined behavioural traits of different species. This is evidenced by continuing research on the behaviour of domestic animals and a search for ways to improve their welfare (Arave and Albright, 1981; Flower and Weary, 2001; Györkös at all, 1999; Langbein and Raasch, 2000; Raasch at all, 2000; Weary and Chua, 2000). In the case of domestic livestock, calves should be treated with special care because welfare disturbances early in life may have an effect on the future profitability of production.

According to Stefanowska-Will (1985), the living activity of calves depends mainly on the housing method and not on their age. Time from parturition to first standing

attempt and first successful standing may range from several to several dozen minutes and is shorter in calves that remained with their mothers after birth compared to weaned calves (Jezierski, 1987; Nowicki and Zwolińska-Barczak, 1983; Stefanowska-Will, 1985; Tumanowicz at all, 2009; Weary and Chua, 2000). At the same time, calves that remain with their mothers after calving are more active as expressed by longer standing and walking time. Jezierski (1987) holds that calving difficulty has a significant effect on the time of first standing and total standing time in calves. The same author reports that standing up was twice as long in calves born from difficult parturitions (requiring handler or veterinary assistance) compared to calves born from easy parturitions (with little or no handler assistance).

Total lying time of healthy calves ranges from 16 to 18 h a day, in 30 to 40 periods (Chmielnik at all, 1988; Stefanowska–Will, 1985). According to Walczak (2005), a limited number of postural changes may indicate poorer well-being due to restricted pen area, and total lying time of calves decreases with age from over 70% of the day in the first week of life to 35% of the day at one month of age.

During the first weeks of life, the main food of calves is liquid feed (colostrum, milk, milk replacers), which is increasingly often fed from milk feeding stations. The deprivation of the natural sucking reflex to calves during bucket feeding without a nipple causes them to lick available pen accessories and suck other calves (in group pens) [Jezierski, 1987; Nowicki and Zwolińska-Barczak, 1983).

The aim of the study was to analyse basic forms of bevahiour in Polish Black-and-White Holstein-Friesian calves in the first days of life and after one month of age.

MATERIAL AND METHODS

Calf behaviour was investigated in a farm located in the Kujawsko-Pomorskie province from August to October 2009. Behavioural observations were conducted on 20 calves (10 bull calves and 10 heifer calves). The first series of observations was made in the first 4 days of life, and the second after a month (within 30 to 33 days of calving). Immediately after calving, calves were moved from the calving pen to pens located in the same building. Calves stayed in the pens until 10-14 days of age. During this period, animals received colostrum and milk replacer twice daily from nipple buckets. At 10-14 days of age, calves were moved to an open group pen (30-40 animals) with automatic milk feeding station. In the group pens, calves were allowed 7 l of milk replacer per day, *ad libitum* hay and pelleted concentrate supplemented with maize grain.

In the first series of observations, time from birth to unassisted standing, time of right and left lateral recumbency, and standing and walking time were recorded. In the second period (days 30-33), time of right and left lateral recumbency, standing and lying time, frequency of visits to the milk feeding station, and frequency of milk replacer, water, hay and concentrate intake were recorded. The observations were made at 15-minute intervals, while the first standing of a calf after birth was recorded

just after it was noticed. In addition, each calving was classified as either easy (without human assistance) or difficult (requiring human assistance).

The source material was analysed statistically using STATISTICA 8 package (2008).

RESULTS AND DISCUSSION

Analysis of the results shown in Table 1 indicates that the time from birth to first unassisted standing (standing on all extended legs) ranged from 16 minutes in heifers to 158 minutes in bulls born from normal parturitions. Sex had no effect on the time from birth to successful standing. However, there were statistically significant differences caused by calving difficulty. In all calves born from normal parturitions, the time from birth to unassisted standing averaged 81 minutes. Calves born from difficult parturitions stood after an average of 302 minutes, and also had shorter standing and longer standing time compared to calves born from normal parturitions. These results confirm that the level of calving difficulty is positively correlated with the time from birth to first standing (Jezierski, 1987; Stefanowska-Will, 1985; Tumanowicz at all, 2009).

Nowicki i Zwolińska-Barczak (1983) report that the first successful standing attempt is observed between 15 and 50 minutes of life. Our study showed that 4 bull calves and one heifer calf stood up in the first hour of life. In the second hour, the first successful standing attempt was observed in 6 heifer calves and 4 bull calves. According to Jezierski (1987), female calves stand up earlier than male calves, and unweaned calves make first standing attempts earlier than weaned calves, i.e. within 23 and 41 minutes of calving. In our study, all calves were moved after calving to individual pens, which could shift their first standing attempts to the second and third hour after parturition.

When analysing the behaviour of calves born from normal parturitions during 6 hours after calving, it was found that compared to bull calves, heifer calves spent more time lying (by 12 minutes) and less time standing (by 12 minutes). During the 6 hours after calving, bull calves stood an average of 103 minutes, which is consistent with the findings of Jezierski (1987), and heifers calves stood 92 minutes on average.

During the first four days of life, calves were in a lying position for about 1060 minutes on average (Tab. 2). There were no statistically significant differences caused by sex and subsequent day. After the first month of age, standing and walking time in both males and females was over twice that found in the first series of observations (days 1–4). Average lying time of heifer and bull calves between 30 and 33 days of age was 557 and 510 minutes, respectively. Heifers spent from 528 min (day 31) to 583 min (day 32) lying, and in bull calves lying time ranged from 487 min (day 33) to 547 min (day 32).

When analysing the results shown in Table 3, it was found that regardless of sex, calves in the first four days of life and after one month of age were more often in left

lateral recumbency when resting. During the first days of life, heifers spent more time lying on the left side (by 25 min) than on the right side, whereas bull calves spent 64 min more in left lateral recumbency. After one month of age, the differences increased to 44 min in heifers and decreased to 40 min in bull calves.

In addition to standing, walking and lying, the activity of calves also included feeding behaviour such as milk replacer intake, visiting the automatic milk feeding station, hay intake, water intake and intake of pelleted concentrate with maize grain (Tab. 4). In the analysed farm, the dose of milk replacer per feeding was limited, just as the minimum interval between one intake of milk replacer and the next intake, which was programmed to be 120 min at the automatic milk feeding station. Heifer calves visited the milk feeding station more often than bull calves (8 times vs. 7 times on average). Also the frequency of milk replacer intake was greater in females than in males (5.5 vs. 5.3 times per day, respectively). Calves aged 4-6 weeks need 4 to 7 l of water per day, it is important that they have constant access to water and liquid feed. Our study showed that calves of both sexes used the waterers from 1.43 to 1.68 times per day. The frequency of concentrate and hay intake was 7 and 9 times per day in heifers and over 8 and almost 10 times per day in bull calves, respectively. According to Jezierski (1987), between 30 and 60 days of age, calves kept in a group pen consume feed for 16% of the day on average.

CONCLUSIONS

It is concluded that calving difficulty caused differences in the time from calving to first unassisted standing. All calves from easy parturitions stood up within 16 (heifers) and 158 min (bulls) of birth. Calves from normal parturitions stood up after 81 min and those from difficult parturitions after 302 min on average. In addition, calves that required assistance at birth had shorter standing and longer lying time. Calves spent about 26% of the day standing and walking during the first four days of life and from 61% of the day (heifers) to over 64% (bulls) after one month of age. At the first and second series of observations, calves showed a preference for left lateral recumbency. Bulls consumed feed, water and hay more frequently than heifers, which visited the milk feeding station more often than bulls.

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Table 1. Behaviour of male and female calves during 6 h after calving
Tabela 1. Zachowanie się cieląt obu płci w czasie 6 godzin po porodzie

Sex Płeć	Calving ease Rodzaj porodu	Time from birth to successful standing (min.) Czas od urodzenia do samodzielnego wstania (min.)	Time spent standing during 6 hours after birth (min.) Czas stania cielęcia w ciągu 6 godzin od urodzenia (min.)	Time spent lying during 6 hours after birth (min.) Czas leżenia cielęcia w ciągu 6 godzin od urodzenia (min.)
Heifers Jałówki	easy - łatwy	138	30	330
	easy - łatwy	106	75	285
	easy - łatwy	91	120	240
	easy - łatwy	90	105	255
	easy - łatwy	65	120	240
	easy - łatwy	76	120	240
	easy - łatwy	98	45	315
	easy - łatwy	16	120	240
	difficult - trudny	377	0	360
	difficult - trudny	313	30	330
Total mean for heifer calves Średnia ogółem dla jałówek		137,0	76,5	283,5
Mean for heifer calves born from easy parturitions Średnia dla jałówek z porodów łatwych		85	91,87	268,12
Bulls Buhajki	easy - łatwy	88	120	240
	easy - łatwy	158	90	270
	easy - łatwy	104	120	240
	easy - łatwy	88	90	270
	easy - łatwy	48	105	255
	easy - łatwy	23	90	270
	easy - łatwy	116	90	270
	easy - łatwy	30	90	270
	easy - łatwy	46	135	225
	difficult - trudny	218	135	225
Total mean for bull calves Średnia ogółem dla buhajków		91,9	106,5	253,5

Mean for bull calves born from easy parturitions Średnia dla buhajków z porodów łatwych	77,88	103,33	256,66
Mean for all calves born from easy parturitions Średnia dla wszystkich cieląt z porodów łatwych	81,24^{A}	97,94	262,05
Mean for all calves born from difficult parturitions Średnia dla wszystkich cieląt z porodów trudnych	302,67^{A}	55,00	305,00

Menans marked with the same letters in columns, differ significantly: A, B, C – at P< 0.01
W obrębie kolumn średnie oznaczone tymi samymi literami różnią się istotnie: A, B, C – przy P< 0,01

Table 2. Mean time spent lying and standing by male and female calves within the first four days of age and after one month of age
Tabela 2. Średni czas leżenia i stania cieląt obu płci w pierwszych czterech dniach życia i po miesiącu

	Heifers - Jałówki		Bulls - Buhajki	
Day Doba	Standing and walking (min.) Stanie i ruch	Laying (min.) Leżenie	Standing and walking (min.) Stanie i ruch	Laying (min.) Leżenie
1	367,50^{A}	1072,50^{A}	381,00^{A}	1059,00^{A}
2	394,50^{B}	1045,50^{B}	384,00^{B}	1056,00^{B}
3	375,00^{C}	1065,00^{C}	378,00^{C}	1062,00^{C}
4	376,50^{D}	1063,50^{D}	379,50^{D}	1060,50^{D}
Mean-Średnia	378,37^{E}	1061,63^{E}	380,62^{E}	1059,38^{E}
30	897,00^{A}	543,00^{A}	943,50^{A}	496,50^{A}
31	912,00^{B}	528,00^{B}	928,50^{B}	511,50^{B}
32	856,50^{C}	583,50^{C}	892,50^{C}	547,50^{C}
33	864,00^{D}	576,00^{D}	952,50^{D}	487,50^{D}
Mean-Średnia	882,38^{E}	557,62^{E}	929,25^{E}	510,75^{E}

Menans marked with the same letters in columns, differ significantly: A, B, C … – at P< 0.01P < 0,01
W obrębie kolumn średnie oznaczone tymi samymi literami różnią się istotnie: A, B, C … – przy P< 0,01

Table 3. Mean time spent lying on the left or right side
Tabela 3. Średni czas leżenia cieląt na lewej lub prawej stronie ciała

Sex Płeć	Days 1–4 Doby 1–4				Days 30–33 Doby 30–33			
	Left lateral recumbency Leżenie na boku lewym		Right lateral recumbency Leżenie na boku prawym		Left lateral recumbency Leżenie na boku lewym		Right lateral recumbency Leżenie na boku prawym	
	min.	%	min.	%	min.	%	min.	%
Heifers Jałówki	543,00^{A}	51,15	518,63^{B}	48,85	300,75^{A}	53,93	256,87^{B}	46,07
Bulls Buhajki	562,02^{C}	53,05	497,36^{D}	46,95	275,25^{C}	53,90	235,50^{D}	46,10

Menans marked with the same letters in type line, differ significantly: A, B, C … – at P< 0.01P < 0,01
W obrębie wierszy średnie oznaczone tymi samymi literami różnią się istotnie: A, B, C … – przy P< 0,01

Table 4. Ethogram of feeding behaviour of heifer and bull calves at one month of age
Tabela 4. Etogram behawioru pokarmowego jałówek i buhajków po pierwszym miesiącu życia

Activity Czynności	Heifers Jałówki	Bulls Buhajki
Visits to the milk feeding station Podchodzenie do odpajalni	8,10^{A}	7,03^{A}
Milk replacer intake Pobieranie preparatu mlekozastępczego	5,50^{B}	5,38^{B}
Water intake Pobieranie wody	1,43^{C}	1,68^{C}
Concentrate intake Pobieranie paszy treściwej	7,05^{D}	8,28^{D}
Hay intake Pobieranie siana	9,05^{E}	9,83^{E}

Menans marked with the same letters in type line, differ significantly: A, B, C … – at P< 0.01P < 0,01
W obrębie wierszy średnie oznaczone tymi samymi literami różnią się istotnie: A, B, C … – przy P< 0,01