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ENVIRONMENTAL AND HEALTH PARAMETERS OF BEEF AND MILK CATTLE MEASURED WITH THE USE OF SURVEYS

PARAMETRY ŚRODOWISKOWE I ZDROWOTNE BYDŁA OPASOWEGO I MLECZNEGO W BADANIACH ANKIETOWYCH

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ABSTRACT

The objective of the study was to determine parameters related to cattle's health and the environment in which they live in cowsheds oriented at beef and milk production. The study included 70 cattle breeders from the *pilskie* county, *Wielkopolskie* province. Twenty of the surveyed farmers produced milk, 31 beef, and 19 produced both. The majority of the surveyed farmers worked on family run farms: taking up the area of up to 50 ha and the with up to 50 animals. Approximately 70% of the surveyed farmers kept their animals tethered. Only more or less 40% declared they owned a designated isolation area. Automatic drinkers were, unsurprisingly, present mostly at farms where either milk or both milk and beef were produced (over 60%). Deworming was significantly more frequent on farms producing only beef (68.97%). Measurements of the intensity of harmful gases, airflow speed, humidity, and lighting intensity were conducted in only few cowsheds (up to 9% of the analysed). The results of our study point to greater need of education among farmers, and improving environmental conditions in which cattle are maintained.

Keywords: beef production, environmental conditions, farmers, health parameters, milk production.

STRESZCZENIE

Celem badań było scharakteryzowanie parametrów związanych ze środowiskiem i zdrowiem bydła w oborach nastawionych na użytkowanie opasowe i mleczne. Badaniami objęto 70 hodowców bydła, z powiatu pilskiego województwo Wielkopolskie, 20 ankietowanych zajmowało się produkcją mleka, 31 hodowców bydła mięsnego, natomiast 19 rolników prowadziło zarówno opas, jak i produkcję mleka. Większość ankietowanych to rolnicy prowadzący gospodarstwa indywidualne

o powierzchni do 50 ha i wielkości stada do 50 sztuk. Około 70% ankietowanych hodowców utrzymywało zwierzęta na uwięzi. Tylko około 40% ankietowanych hodowców deklarowało posiadanie izolatki. Najczęściej w poidła automatyczne wyposażone były obory producentów mleka oraz producentów mleka i opasów (ponad 60%), co wynikało ze specyfiki produkcji. Zabieg odrobaczania istotnie częściej przeprowadzany był przez producentów opasów (68,97%). W niewielu oborach (do 9% analizowanych) przeprowadzane były pomiary: natężenia szkodliwych gazów oraz pomiary prędkości ruchu powietrza, wilgotności i natężenia oświetlenia. Przeprowadzone badania wskazują na konieczność większej edukacji rolników i podniesienia jakości warunków środowiskowych, w jakich przebywało bydło.

Słowa kluczowe: hodowcy bydła mięsnego, warunki środowiskowe, rolnicy, parametry zdrowotne, hodowcy bydła mlecznego.

DETAILED ABSTRACT

Celem badań było scharakteryzowanie parametrów związanych ze środowiskiem i zdrowiem bydła w oborach nastawionych na użytkowanie opasowe i mleczne. Badaniami objęto 70 polskich hodowców bydła, głównie z powiatu pilskiego, województwo Wielkopolskie, 20 ankietowanych zajmowało się produkcją mleka, 31 hodowlą bydła mięsnego, natomiast 19 rolników prowadziło zarówno opas, jak i produkcję mleka. Wszyscy ankietowani to rolnicy indywidualni. Ankietowanie przeprowadzono w okresie od 30 czerwca 2010 roku do 31 listopada 2010 roku. Celem badań było przedstawienie charakterystyki warunków środowiskowych i problemów ze zdrowiem bydła w zależności od rodzaju produkcji.

Ankieta składała się z 72 lub 77 pytań zależnie od profilu produkcji. 72 pytania kierowane były tylko do hodowców bydła mięsnego, natomiast 77 pytań obejmowało producentów mleka oraz rolników zajmujących się jednocześnie produkcją mleka i opasów. Wyniki przeprowadzonych ankiet poddano analizie statystycznej. Dla wybranych cech o charakterze jakościowym obliczono liczebności oraz ich procentowe udziały w zależności od grupy. Istotności różnic między frekwencjami analizowano przy użyciu testu $\chi 2$ Pearsona. W przypadku wystąpienia zbliżonych udziałów procentowych w grupach ze względu na typ produkcji podobne grupy łączono. Oceny istotności różnic między grupami w zakresie wieku, po zweryfikowaniu założeń o zgodności z rozkładem normalnym oraz homogeniczność wariancji w grupach, wykorzystano analizę wariancji wraz z testem NIR. Analizy statystyczne wykonano w programie Statistica 9.0 (StatSoft, 2010)
Wśród hodowców bydła mięsnego oraz producentów mleka i opasów przeważały gospodarstwa małe do 25 ha, większość producentów mleka posiadała gospodarstwa w przedziale 25-50 ha ($p<0.05$) Większa powierzchnia gospodarstw w grupie producentów mleka powodowana jest specjalizacją produkcji, celem pozyskania odpowiedniej ilości pasz dla bydła. Wielkości stad różniły się w zależności od typu produkcji. Wśród gospodarstw produkujących mleko oraz mleko i opasy istotnie częściej występowały gospodarstwa posiadające powyżej 50 sztuk (odpowiednio 45% oraz 42%) w stosunku do gospodarstw utrzymujących bydło na opasy (nieco ponad 19%), przy czym w każdej z trzech badanych grup wielkość stada wynosiła najczęściej do 50 sztuk. Jest to powiązane z ekonomiką gospodarstw, gdyż są to gospodarstwa indywidualne i przy większej obsadzie zwierząt, konieczne byłoby zatrudnianie osoby z poza gospodarstwa. Około 70%

ankietowanych hodowców utrzymywało zwierzęta na uwięzi, co prawdopodobnie wskazuje, iż większość obór to obiekty stare, nie modernizowane, oraz iż nakłady inwestycyjne na budownictwo inwentarskie są niewielkie. Odnotowano istotne różnice w sposobie pojenia między różnymi typami produkcji. Najwięcej poideł automatycznych zaobserwowano u producentów mleka i producentów mleka i opasów (ponad 60%), co było spowodowane specyfiką produkcji ($p<0.05$). Tylko 38% ankietowanych hodowców deklarowało posiadanie izolatki, co świadczy o tym, iż większość indywidualnych gospodarstw nie spełnia jeszcze wszystkich wymagań unijnych odnośnie dobrostanu zwierząt. Zabieg odrobaczania najczęściej stosowany był przez hodowców bydła mięsnego (68,97%), prawdopodobna przyczyna to fakt dużej rotacji zwierząt w tych stadach i częste zakupy sztuk z obcych gospodarstw. W niewielu oborach przeprowadzane były pomiary: natężenia szkodliwych gazów oraz pomiary prędkości ruchu powietrza, wilgotności i natężenia oświetlenia. Pomiary takie wymagają odpowiednich przyrządów, co wiąże się z dodatkowymi kosztami. Brak kontroli mikroklimatu w oborze może przyczyniać się do niższej produkcyjności zwierząt i pogorszeniu ich stanu zdrowia, co za tym idzie dobrostanu.
Problemy ze zdrowiem istotnie częściej deklarowane są przez hodowców utrzymujących bydło mleczne oraz mleczne i opasowe w porównaniu do utrzymania opasów. Bydło opasowe przebywa w oborze krótko, rotacja stada jest duża i wpływ niekorzystnych warunków nie kumuluje się. Większość badanych respondentów utrzymująca bydło opasowe wykazywała przyrosty dobowe rzędu 700-900 g. Badania wskazują na konieczność poprawy warunków utrzymania oraz zapewnienie większego dobrostanu zwierząt.

INTRODUCTION

Constant improvement of production traits is currently observed in cattle breeding, particular progress has been made over the past several decades in milk yield (PZHiPBM, 2010). Cattle types bred at present, in order to realise their full genetic potential, must be kept in good, or even very comfortable, conditions in terms of feeding, maintenance, and care. The effects of various factors on production have been examined by a number of researchers (Dufour, et al., 2011; Ruud, et al., 2010; Stygar and Makulska, 2010; Svensson and Hultgren, 2008). Due to numerous requirements, the research was conducted both on adult cattle as well as calves, which are the most sensible to any environmental defects, and demand more care. As concluded by Vasseur et al. (2010a), 6 areas of calf management that needed improvement were detected: calving management and care of newborn, colostrums management, painful procedures, calf feeding, weaning, and calf housing. Improper maintenance conditions may, in extreme cases, create some genetic loads causing diseases and deterioration of general health. Optimum management conditions are primarily in the interest of farmers, as exposing animals to adverse environmental conditions results in lower production, and hence decrease in profits. As reported by Vasseur et al. (2010b), voluntary improvements in animal welfare can be facilitated by using appropriate tools to educate producers and help them change their attitudes toward calf management and animal welfare. There is a growing interest in ensuring that animals can experience positive welfare, and this may be necessary to consider in future surveys Winnicki, et al. (2007).

The objective of the survey was to determine parameters related to cattle health and the environment provided for them in cowsheds used for beef and milk production.

MATERIALS AND METHODS

The study included 70 cattle breeders, mainly from the *pilski* county, *Wielkopolskie* province, Poland. All of the surveyed farmers work on their own family run farms. None of them declined to participate in the survey. The survey was conducted between 30 June 2010 and 31 November 2010. The on-farm survey included a face-to-face interview with the farm manager, using a standard questionnaire. We developed a questionnaire, which consisted of multiple-choice and semi closed questions. The entire interview was completed in about an hour. The survey comprised 72 questions – for beef cattle breeders, or 77 questions – for farmers producing both milk, and milk and beef. Amongst the surveyed farmers there were 20 who only produced milk, 31 who only produced beef, and 19 who produced both. In the survey we asked about animal maintenance conditions, feeding procedures, hygiene, and health.

The results of the survey were analysed statistically. For selected qualitative traits, we calculated frequencies and percentages in the examined group. The significance of differences between the frequencies were analysed using the Pearson's or maximum likelihood chi-square tests. When similar percentages occurred between groups in terms of their production type, these groups were merged. To assess significance of differences between groups in terms of age, the analysis of variance combined with a NIR test were used, with prior verification of assumptions concerning conformity with requirements for normal distribution and homogeneity of variance within groups. Statistical analyses were performed with the use of Statistica 9.0 software (StatSoft, 2010)

RESULTS AND DISCUSSION

The average age of surveyed farmers depended on the type of their production. The group who produced milk and beef was older – the average age was 49.42 years, single-profile producers were younger: milk producers were 43.05 years of age, and beef producers 43.29. Running two different types of production requires more knowledge and experience, as well as more investment.

We noted statistically significant differences in the distribution of farm sizes between different types of production. Those farmers who produced beef, or beef and milk, usually owned farms of up to 25 ha – there were 28 such farms in total, whereas those who produced milk usually owned farms of 25 to 50 ha (11 farms) ($p<0.05$) (Table 1). According to Fiedorowicz (2007), the average farm size in Poland in the year 2005 was 8.33 ha, with nearly 56.4% of farms having the size of up to 5 ha of farming land, and only 9.4% were larger than 15 ha. As reported in the national farming census of 2008 (GUS, 2009), as many as 29.5% family run farms covered the area of no more than 1 ha. Only 1% of farms were larger than 50 ha. We established significant differences in herd size distribution between different production types. Eighty one percent of beef producers maintained herds of up to 50 animals, and 19% herds of 50-100 animals. Among the milk producers, as well as milk and beef producers, the smallest herds consisted of 55% and 58% respectively, average herds of 40% and 31%, and over 100-animal herds of 5% and 11% ($p<0.05$). Seremak-Bulge (2008) reports that in 2005 farms with up to 50 animals constituted approximately 75% of all farms, with the highest percentage of farms keeping 10-29 animals (35%). In the light of these results, the surveyed farms were mainly classified as belonging to the average group, both in terms of their area as well as the number of animals.

One of the most important issues related to animal welfare are the methods of cow management. Wenz et al. (2007) reported that more than 50% of cows were kept in free stalls, 27% in tie stalls (stanchion), 14% in multiple-animal area, and 6% on pastures.The majority of breeders kept their cows tethered (regardless of the farm type). Approximately 10-16% of farmers, depending on the group, keep their cattle in mixed systems. Winnicki et al. (2005) informed in their research conducted in 2007 that the tie stall system was the one most commonly used for milk cattle. Among the examined farms, 98.2% used tie stalls in the cowsheds, whereas free stalls were noted in over 10%, although only on farms producing more than 100 thousand litres of milk per year.

An important aspect of animal welfare is ensuring proper feeding with adjustment for age and the breeding system. The recommended Total Mixed Ration (TMR) feeding was more frequently used by milk, as well as milk and beef producers, at the level of almost 30%, as compared to beef producers (nearly 10%) ($p<0.05$). Mineral and vitamin additives were used by the majority of breeders (Table 1). As the research showed, the reasons why TMR feeding was used rarely were (i) the fact that few cowsheds were adapted to allow entry of a diet feeder, and (ii) additional costs. Without this system daily gains in animals are often relatively lower and unsatisfactory, and, in the case of milk producers, may cause various diseases, such as metabolic diseases, or diseases related to reproduction and limbs.

Among milk producers (milk, as well as milk and beef producing farms), 60% of farms were equipped with automatic drinkers. Mixed drinking (partly from buckets and partly from automatic drinkers) took place on farms owned by 15% of the surveyed breeders, mainly beef producers. Sixteen farmers poured water into a trough, and 7 used buckets (Table 1). The observed differences were statistically significant, and had a key impact on the conditions in which the cows lived. In other research, conducted by Mulica and Hutnik (2008), it was shown that individual drinkers were used in 15.5% of herds, buckets in 8% of herds, and a feeding rack in as many as 75.9% of herds.

One of the important issues related to cattle breeding are calf management practices. Immediate separation of the calf from the dam is usually recommended to decrease risk of exposure to environmental pathogens (Windsor and Whittington, 2010). On the other hand, separation from the dam was identified by the European Food Safety Authority (EFSA, 2006) as a main risk to calf welfare because of maternal care. The research by Vasseur, et al. (2010a) showed that the majority of producers kept their calves individually and many used inappropriate housing systems (crate, tie stall, or even attached animals to a wall). We determined that approximately 60% of cowsheds does not have a designated isolation area at all (Table 1). The majority of the surveyed farms did not meet “C scope” welfare requirements at the time of the study (“C scope” will become obligatory for Polish breeders as of 2013).

Annual disinfection, disinsection, and deratisation were conducted at 77% of farms keeping beef cattle, 70% keeping milk cattle, and approximately 56% keeping mixed cattle (milk and beef) (Table 1). Deworming was used mainly by milk, and beef producers – approximately 60%. Approximately 70% of milk and beef cattle breeders did not use deworming. The differences between the analysed groups in terms of deworming frequency proved to be statistically significant ($p<0.05$) (Table 1).

As indicated by the conducted research, very few of the surveyed farmers control environmental conditions in which their animals are kept. Only 5 breeders measured content of harmful gases, such as carbon dioxide, ammonia, and

hydrogen sulphide, in their cowsheds. Lighting intensity was measured in only 6 cowsheds. Also 6 farms examined airflow speed in the cowsheds, and in 5 humidity was measured (Table 1). Traczykowski and Rzepczyk (2004), examining environmental conditions at 96 family run farms, established that the buildings in which animals were kept very often failed to provide optimum conditions for animal management. The most frequent negligence were poor ventilation and inappropriate lighting. Winnicki, et al. (2005), who assessed airflow speed in different management systems, found the permissible values were exceeded practically all year long. Marciniak, et al. (2005) examined microclimate in 5 free stall cowsheds, and concluded that only in one of them the ammonia content in the air was at an acceptable level. Traczykowski and Rzepczyk (2004) established that breeding and economic results were unsatisfactory due to improper microclimatic effects.

Inappropriate environmental conditions translate not only into animal welfare but also into production results, and consequently the profits made by the breeder (Yeates and Main, 2008). Health problems in herds were reported significantly more rarely by beef cattle producers (almost 37%) as compared to farms producing milk (70%) or both milk and beef (almost 58%) ($p<0.05$) (Table 2).

Health problems were related to the type of business profile. Among the 36 farms reporting health problems in their herds, metabolic diseases were found in 20, limb injuries in 11, and reproduction problems in 14.

Metabolic diseases occurred most often in beef cattle (90%). Significantly lower percentage of limb injuries was seen in beef cattle (slightly more than 9%) as compared to the other types, where it equalled 40%. Reproduction problems are amounted to just over 50% in the milk and milk and beef herds (Table 1). It probably results from the fact that beef cattle stays in the cowshed for a relatively short period, so the influence of adverse conditions does not accumulate, but possible feeding errors become apparent. Empel (2007) believes that udder, reproduction, and hoof diseases are the most frequent health problems faced by milk cows. Kruczyńska (2010) informs that both European and American data indicates that ketosis and hypocalcaemia are present in possibly even 60% of cows after calving, acidosis in 20%, and endometritis in 50-60%. Differences between examined groups proved to be highly significant statistically.

Table 1 Characteristics of surveyed farms depending on the type of their production
Tabela 1 Charakterystyka badanych gospodarstw w zależności od typu produkcji

Farms maintaining cattle: Gospodarstwa utrzymujące bydło:	**Milk Mleczne % (N)**	**Milk and beef Mleczne i opasy % (N)**	**Beef Opasy % (N)**	**Total Łącznie % (N)**	
	28.57(20)	27.14(19)	44.29(31)	100.00(70)	
Farm size- Wielkość gospodarstwa					
Up to – Do 25 ha	25.00(5)	***47.37(9)***	***61.29(19)***	47.14(33)	NS
25-50 ha	55.00(11)	***31.58(6)***	***32.26(10)***	38.57(27)	
50-100 ha	20.00(4)	***15.79(3)***	***3.23(1)***	11.43(8)	
Over – Powyżej 100 ha	- (0)	***5.26(1)***	***3.23(1)***	2.86(2)	
Up to - Do 25 ha	25.00(5)	***56.00(28)***			P<0.05
25-50 ha	55.00(11)	***32.00(16)***			
50-100 ha	20.00(4)	***8.00(4)***			

Farms maintaining cattle: Gospodarstwa utrzymujące bydło:	**Milk Mleczne % (N)**	**Milk and beef Mleczne i opasy % (N)**	**Beef Opasy % (N)**	**Total Łącznie % (N)**	
Over - Powyżej100 ha	- (0)	***4.00(2)***			
Herd size Wielkość stada					
Up to 50 animals – Do 50 zwierząt	***55.00(11)***	***57.89(11)***	80.65(25)	67.14(47)	NS
50-100 animals – 50-100 zwierząt	***40.00(8)***	***31.58(6)***	19.35(6)	28.57(20)	
Over 100 – Ponad 100	***5.00(1)***	***10.53(2)***	- (0)	4.29(3)	
Up to 50 animals Do 50 zwierząt		***56.41(22)***	80.65(25)		P<0.05
50-100 animals – 50-100 zwierząt		***35.90(14)***	19.35(6)		
Over 100 – Ponad 100		***7.69(3)***	- (0)		
Management system System utrzymania					
Multiple - Wolnostanowiskowy	20.00(4)	15.79(3)	16.13(5)	17.14(12)	NS
Tie stalls - Uwięziowy	70.00(14)	68.42(13)	70.97(22)	70.00(49)	
Free and tie stalls - Mieszany	10.00(2)	15.79(3)	12.90(4)	12.86(9)	
Farms using TMR feeding Gospodarstwa stosujące żywienie TMR	30.00(6)	31.58(6)	9.68(3)	21.43(15)	NS
		30.77(12)	9.68(3)	21.43(15)	P<0.05
Drinking method Sposoby pojenia					
Automatic drinkers Poidła automatyczne	60.00(12)	63.16(12)	25.81(8)	45.71(32)	P<0.05
Bucket - Z wiadra	10.00(2)	- (0)	16.13(5)	10.00(7)	
Drinker/bucket - Poidło/wiadro	15.00(3)	5.26(1)	35.48(11)	21.43(15)	
Other - Inne	15.00(3)	31.58(6)	22.58(7)	22.86(16)	
Farms with isolation area Gospodarstwa posiadające izolatkę	42.11(8)	42.11(8)	36.67(11)	39.71(27)	NS
Disinfection, disinsection, deratisation Dezynfekcja, dezynsekcja, deratyzacja					NS
Annually – Raz na rok	70.00(14)	55.56(10)	77.42(24)	69.57(48)	
Twice a year – Dwa razy w roku	20.00(4)	33.33(6)	19.35(6)	23.19(16)	
None - Brak	10.00(2)	11.11(2)	3.23(1)	7.25(5)	
Deworming - Odrobaczanie	55.00(11)	31.58(6)	68.97(20)	54.41(37)	P<0.05
Farms measuring:- Gospodarstwa dokonujące pomiarów:					
Gas content- Stężenie gazów	5.00(1)	16.67(3)	3.57(1)	7.58(5)	NS
Lighting - Oświetlenie	5.00(1)	15.79(3)	6.45(2)	8.57(6)	NS
Airflow – Ruch powietrza	10.00(2)	15.79(3)	3.23(1)	8.57(6)	NS
Humidity- Wilgotność	5.00(1)	15.79(3)	3.23(1)	7.14(5)	NS
farms indicating	***70.00(14)***	***57.89(11)***	36.67(11)	52.17 (36)	NS

Farms maintaining cattle: Gospodarstwa utrzymujące bydło:	**Milk Mleczne % (N)**	**Milk and beef Mleczne i opasy % (N)**	**Beef Opasy % (N)**	**Total Łącznie % (N)**	
Health problems - Gospodarstwa sygnalizujące problemy zdrowotne		***64.10(25)***	36.67(11)		P<0.05
Including – w tym:					
Metabolic diseases Choroby metaboliczne (N=36)	42.86(6)	36.36(4)	90.91(10)	55.56(20)	P<0.05
Limb injuries Urazy kończyn(N=36)	***42.86(6)***	***36.36(4)***	9.09(1)	30.56(11)	NS
		40.00(10)	9.09(1)		P<0.05
Reproduction problems – Problemy z rozrodem (N=36)	57.14(8)	54.55(6)	-	38.89(14)	P<0.01

In milk herds, in order to preserve healthy cows and retain high hygienic level of milk, it is necessary to provide udder care. Among the surveyed breeders, nine used in their herds both predipping as well as dipping. Merely two breeders used predipping disinfection; 8 breeders used dipping alone. Nearly half of the surveyed breeders fail to use predipping or dipping at all (Table 2). The probable reason are the high costs of special preparations needed for these procedures, accompanied by insignificant economic gain for the breeder. Wenz, et al. (2007) observed in their research that 95% of farmers used postdip in winter months. As reported by Huijps, et al. (2010) in a herd with an average udder health situation, the most cost-efficient measures are rinsing clusters of clinical mastitis, using separate cloth, keeping cows standing, and wearing milkers' gloves. Management measures with the highest efficacy are not necessarily the ones with the highest cost-efficiency.

Table 2 Cow udder disinfection depending on the farm type
Tabela 2 Dezynfekcja wymienia krów w zależności od typu gospodarstwa

Milk cattle Bydło mleczne	**Milk Mleczne % (N)**	**Milk and beef Mleczne i opasy % (N)**	**Total Łącznie % (N)**	**Istotność Significance**
Predipping	5.26% (1)	5.56% (1)	5.41% (2)	NS
Dipping	21.05% (4)	22.22% (4)	21.62% (8)	
Both - Oba	21.05% (4)	27.78% (5)	24.32% (9)	
Not used – Nie stosuje	52.63% (10)	44.44% (8)	48.65% (18)	

Good gains in beef cattle may indicate that their management is done in an appropriate manner. Six of the surveyed breeders reported daily gains in beef animals of up to 700 grams. Fifty six percent of beef cattle obtained daily gains of 700-900 grams. Approximately 30% of the surveyed breeders reported daily gains of beef cattle of over 900 grams (Table 3). Average daily gains in assessed heifers bred in Poland were 968 grams, and in bull calves 1060 grams (PZHiPBM , 2010). Despite the fact that the half of the surveyed breeders obtained lower gains than the average value measured in Poland, 86% of the surveyed beef cattle breeders decided their daily gains were at a satisfactory level.

Table 3 Assessment of daily gains in beef cattle depending on the farm type
Tabela 3 Ocena przyrostów doborowych opasów w zależności od typu gospodarstwa

Gains Przyrosty	**Milk and beef Mleczne i opasy % (N)**	**Beef Opasy % (N)**	**Total Łącznie % (N)**	**Istotność Significance**
Up to - Do700 g	15.79% (3)	9.68% (3)	12.00% (6)	NS
700-900 g	57.89% (11)	54.84%	56.00% (28)	
Over – Powyżej 900 g	26.32% (5)	35.48% (11)	32.00% (16)	
Satisfactory gains Zadowalające przyrosty	84.21% (16)	87.10% (27)	86.00% (43)	NS

CONCLUSIONS

The majority of beef producers, and beef and milk producers owned farms of up to 25 ha, most of the milk producers' farms had the area of 25-50 ha. Larger area of these farms is due to the nature of their production, as it allows the breeders to obtain the suitable amount of fodder for their cattle. Herd sizes in each of the three examined groups was usually up to 50 animals, which may be connected with the farms' economics, since these are family run farms, and with more animals, it would be necessary to employ outsiders. The majority of the surveyed farmers keep their animals tethered. Most of the cowsheds are old, built before 1970, and have not been modernized, with only small investments in the building infrastructure. The highest number of automatic drinkers was observed at farms owned by milk, or milk and beef producers (more than 60%), which is due to the nature of their production. Only 38% of the surveyed breeders declared they owned a specially designated isolation area. Deworming was most often used by beef producers (68.97%), because of high animal rotation and frequent purchase of animals from other farms. Few farmers measured intensity of harmful gases, airflow speed, humidity, and lighting intensity in their cowsheds. This is related to limited access to special equipment as well as incurring additional costs. It may result in lower performance of animals, and deterioration of their health. The results of our study point to greater need of education among farmers, and improving environmental conditions in which cattle are maintained.

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