

Study on the temperament of cows of the Aberdeen Angus cattle breed

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Abstract: The present study examined the temperament of 699 cows of the Aberdeen Angus cattle breed, reared in 14 farms in Bulgaria. It was carried out within the period 2017–2020. The animals subject to the study were between two and eight years old. The temperament was visually evaluated following a scoring system from 1 to 5. The assessment method involved the behavioural reaction of the cows upon manipulation, passing through a chute and fixation into a cattle crush. The temperament of cows reared in two different systems – intensive and semi-intensive farming was compared. The temperament of the Aberdeen Angus cows had an average rate of 2.74 ± 0.04 . The cows which had frequent contact with people had a calmer temperament. The manner of rearing ($P < 0.001$) as well as the age group ($P < 0.001$) had a significant influence on the parameter examined. The young animals were calmer and got accustomed to working in a crush more easily when they were reared together with cows of different ages.

Keywords: behaviour; rearing; manipulation; beef cattle

In beef cattle farming, the temperament of the animals is evaluated in view of the cattle well-being, the humane treatment and safe work with them (Haskell et al. 2014). A large group of authors prove that the breed influences the intra-herd interactions between the individuals or upon the performance of manipulations on them (Vetters et al. 2013). There has also been a negative connection proved regarding the animals with restless temperament and their productivity qualities pointing to slower growth and lower quality of the meat (Francisco et al. 2015). The lower growth in beef cattle as a result of restless temperament, aggression and difficult manipulation leads to lower economic results and lower efficiency with reference to the rearing of such animals (Sebastian et al. 2011). The signs

of increased excitability are individual traits connected to reaction to stress, immune response to pathogen organisms and increased concentration of stress hormones (Curley et al. 2008). Frequent displays and reasons for stress in temperamental cattle also lead to deteriorated feed use and worsening of the reproduction qualities (Llonch et al. 2016). Apart from the negatively affected production and reproduction qualities, the animals inclining to stress also experience health problems which subsequently harm their well-being and agricultural longevity (Kasimanickam et al. 2014). More effective methods for temperament assessment are sought in recent decades. The right temperament assessment and its inclusion in the selection programs contribute to its control, in terms of its

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negative influence on the important farming parameters and the display of stress (Chang et al. 2020). The prognostication of the temperament and its assessment will aid the selection of calmer animals, tolerating a certain rearing technology with lower stress levels (Valente et al. 2017). During my study, I set the aim to observe the temperament of Aberdeen Angus cows reared in different farms in Bulgaria.

MATERIAL AND METHODS

Subject to study was the temperament of 699 Aberdeen Angus cows, reared in 14 farms in Bulgaria. The research was carried out within the period 2017–2020. The animals were between two and eight years old. The cows examined had a minimum first-calf age of above 24 months. The temperament of cows reared in two different ways was compared. One of the manners of rearing involved frequent contact with people. The animals had contact with people and handling machines on a daily basis. Throughout the most part of the year, namely seven months, the cows were reared on the farm. During the rest of the year they were out to pasture in close proximity to the farm, and their contact with people and handling machines was daily. The other way of rearing involved infrequent contact. The animals spent only the cold winter months on the farm – from December to March. During the rest of the year, they were out to pasture and had very rare contact with both people and machines. The manipulations throughout the year were a lot more upon intensive farming with frequent contact, while upon semi-intensive farming system the manipulations were restricted to the minimum with only the obligatory ones being included. During the study, the main parameter indicated as a difference between the two manners of rearing was the presence or the lack of constant human contact with the animals throughout the year. 383 cows from seven farms reared under the manner involving constant contact with people and 316 cows from seven farms under infrequent contact with people were evaluated. The average number of animals reared on each farm was 50. The temperament was assessed once a year throughout the study. The assessment was performed outside the suckling period when there were no calves with the cows to eliminate

the effect of maternal instinct. The temperament analysis was performed via scoring from 1 to 5 following the 'ICAR' beef farming standardized methods for the parameter assessment and the approved breeding programs for the breed in the country. The temperament assessment was performed on the basis of visual observation of the animals upon their manipulation. This included passing and orientating through a chute, entering a crush, reaction upon fixating, and behaviour during manipulation and exiting the crush. The scale following which the parameter was evaluated are characterised with the following significance: 1 – phlegmatic behaviour with marked tranquillity and slow movements; 2 – excitable behaviour with faster movements and mild restlessness; 3 – averagely excitable behaviour with quick movements and average restlessness; 4 – strongly excitable behaviour with quick, sudden movements and high restlessness; 5 – extreme excitability with unpredictable movements and sudden dashes in different directions as well as uncontrollable behaviour and restlessness. The data were processed via analysis of variance and the linear model had the following statistical expression:

$$Y_{ijk} = \mu + A_i + T_j + e_{ij(k)} \quad (1)$$

where:

Y_{ijk} – observation vector;

μ – total average constant;

A_i, T_j – age group fixed effects (7), cows at the age of 2–8 years; manner of rearing (2) respectively with constant and infrequent human contact;

e – residuals.

The statistical processing was performed via SPSS v21 (IBM Corp., Armonk, NY, USA).

RESULTS AND DISCUSSION

The temperament of the Aberdeen Angus cows examined during my study was given a mark of 2.74 ± 0.04 . The differences in the display of the parameter are reasonable both in the different age groups and in the two different manners of rearing observed. According to Lees et al. (2020), temperamental cattle are more susceptible to stress factors mostly upon the performance of routine procedures and work with them. Studies similar to mine are carried out by a range of other authors

Parham et al. (2021), who also confirms that the temperament of beef cattle may be reliably evaluated by visual assessment of the behaviour in a chute or by combining this method with others which detect the behaviour not only during a manipulation. My observations clearly show that during the first two lactation periods, when the animals are respectively two and three years old, their temperament has higher scores than that of the cows which are evaluated at the age of seven and eight years (Figure 1). The highest temperament score was given to the first-calf cows while the lowest to the cows during their sixth and seventh lactation. Hanna et al. (2019) got results similar to mine and have also ascertained age differences in the cattle behaviour. The Aberdeen cows during the first lactation are not yet accustomed to passing through a chute or being fixated in a crush. For them, this process leads to increased restlessness. The cattle temperament is an important aspect of behavioural genetics determining several behavioural characteristics – alertness, bravery, curiosity, activeness, sociability and aggressiveness (Zahariev and Nikolov 2005; Nikolov 2009). Parham et al. (2019), are of the opinion that the young animals, especially first-calf cows and cows during the first lactation, may consider the chute and the crush to be a new environment and therefore, require time for acclustoming which will be achieved after repetition of the procedures. Having the above-mentioned in mind, the authors recommend that the first-calf cows with bad temperament ascertained following the method should not be culled straight away, and so does my study. Nevertheless, Haskell et al. (2014) have established a steady tendency towards

repetition of the temperament displayed at a young age during the following lactation, too. A higher variation in the parameter scoring within the age group is reported at the age of six years, and a lower one at the age of two years. The tendency observed is towards lowering the temperament score of the older cows. The first-calf cows are evaluated with an approximately 39% higher score when compared to the cows which are eight years old. After the fourth and until the sixth year there are practically no differences in the temperament. Eight-year-old cows are evaluated with approximately 20% lower rates of the parameter when compared to the six-year-old ones.

My results suggested that the cows of the Aberdeen cattle breed are more docile and safer upon being manipulated after they attain the age of four years. The lower stress levels in the Aberdeen Angus cattle breed are related to its higher resilience to diseases, stable immunity, lower treatment expenses and improved humane treatment (Hine et al. 2019). After that age they are easier to work with, have built lasting habits for passing through a chute and being fixated in a crush.

The herds observed in my study were comprised of cows of different ages. During manipulations, the older cows helped the younger ones to orientate through the chute. This, however, does not ease the performance of the necessary procedures and the contact with people in the crush as well as the vacating after the end of the manipulations. A wider variation of the parameter within the age group is reported with reference to the younger cows (Table 1). In most of the farms observed by me where the first-calf cows are being accus-

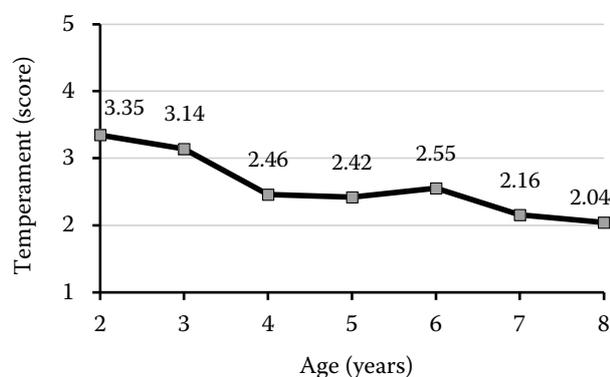


Figure 1. Temperament assessment of Aberdeen Angus cows aged between two and eight years (basic statistics) Temperament score 1–5 indicate phlegmatic (1) to extremely excitable (5) cows

Table 1. Temperament of Aberdeen Angus cows within the age group

Age group (years)	n	Temperament score (%)				
		1	2	3	4	5
2	121	2	21	32	29	16
3	163	7	21	33	28	11
4	148	16	41	26	13	4
5	79	22	33	31	10	4
6	94	19	38	19	15	9
7	70	29	40	20	10	1
8	24	29	54	5	8	4

Temperament score 1–5 indicate phlegmatic (1) to extremely excitable (5) cows

tomed to walking through a chute and a crush even purposelessly, the animals get used to manipulations faster than those cows which have not been accustomed.

Each regrouping, transportation, excessive density or change of environment of the cattle before manipulations leads to additional stress (Burdick et al. 2011). As a whole, the young two- and three-year-old cows have a moderately to strongly excitable temperament but others are aggressive and have dangerous behaviour upon contact with people. Therefore, the use of secure and stable crushes for maximum fixation should be provided so that harming of the animals and incidents with the handlers can be avoided. Stemming from the accustoming of the young cows to being manipulated and the change of their temperament with the age, Kilgour et al. (2006) suggest a more effective selection which involves the elimination of the strongly temperamental cows with unstable behaviour instead of the selection of only the calm animals. Bruno et al. (2018) recommend the grouping of the animals with a similar temperament. The older cows at their sixth and seventh lactation which are assessed have already built behavioural reactions regarding fixation in a crush. They are calm upon the performance of activities in a crush.

In the study carried out by me, it was observed that there is a different rate of temperament display when two different ways of cows rearing are compared (Figure 2). The cows reared under the first

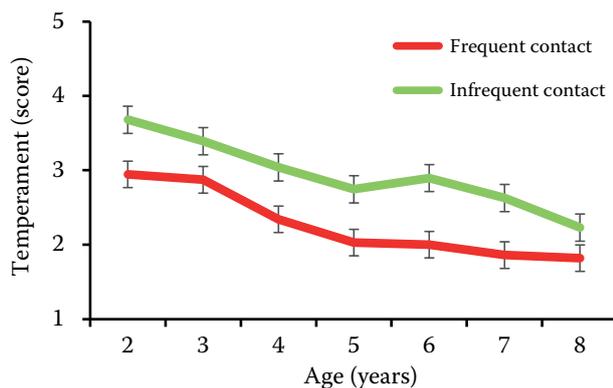


Figure 2. Temperament assessment of Aberdeen Angus cows aged between two and eight years reared differently, basic statistics

Two years old, $n = 121$; three years old, $n = 163$; four years old, $n = 148$; five years old, $n = 79$; six years old, $n = 94$; seven years old, $n = 70$; eight years old, $n = 24$

Temperament score 1–5 indicate phlegmatic (1) to extremely excitable (5) cows

rearing technology spend most of the year on the farm. The animals had contact with people and with handling machines regularly – on a daily basis. Most of the studies on the topic prove that frequent human contact decreases agitation and contributes to the building of a calmer temperament and safer work with the animals (Curley et al. 2006; Park et al. 2020). The animals subjected to my study reared under this method have a temperament with an average score of 2.263 ± 0.061 .

The cows reared under the second method spend about eight months, from April to November, on the pastures. This method of rearing does not provide frequent contact with people and machines. Therefore, during my study, they were evaluated with higher temperament scores – 2.949 ± 0.063 on average. Fernandez-Novo et al. (2020) recommend that the temperament of the beef cattle herds which do not have regular procedures performed in a crush should be considered along with the individual cow's acclimatization ability. The results of the study clearly show that the method of rearing in which the Aberdeen Angus cows have constant contact with caregiving personnel and walk through a crush more frequently provides the development of calmer behaviour. Reared in this manner, the cows have more stable behaviour and a calmer temperament upon manipulation requiring fixation. The cows accustomed to frequent contact with people and machines present the opportunity for more effective rearing in terms of lower economic losses due to the use of few-

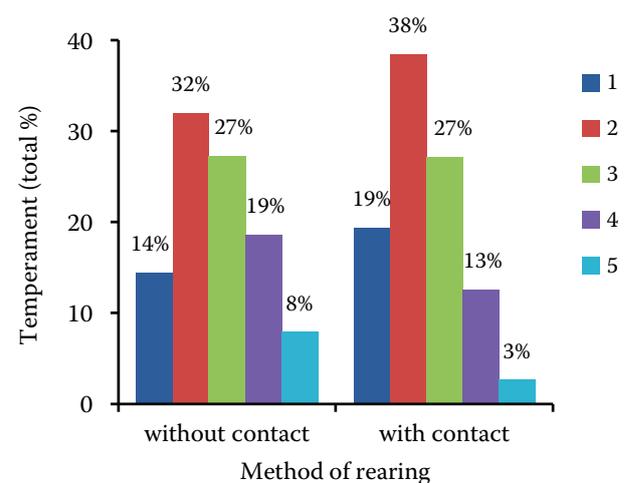


Figure 3. Evaluation of the temperament of Aberdeen Angus cows reared in different ways

1–5 indicate temperament score from phlegmatic (1) to extremely excitable (5)

er caregivers. Furthermore, they require to care for a shorter period, and the necessary safety and humane treatment are ensured. These cows are calmer upon automatization of the processes in the farms. The Aberdeen cows temperament studied differs considerably with reference to both methods of rearing and in each age group (Figure 3). The cows which have frequent human contact and are reared in the farm or close to it during most of the year have lower values of the parameter. There is a similar tendency towards a distinct decrease in the scores with the age increase regarding both methods of rearing. Valente et al. (2017) noted that the restless temperament indicated in the heifers was related to their more difficult service under pasture rearing. Within the first three lactation periods, it was the more mature cows reared in both methods that displayed calmer temperament than that of the younger cows. The Aberdeen cows with calmer temperaments had longer commercial use and better maternal qualities (Oliveira et al. 2020). In both of the methods of rearing, the older Aberdeen cows, after the age of five years, reacted more calmly, had more balanced movements, better orientation in a chute, and better behaviour in a crush when they were fixated than the younger cows. Within the age group examined, the method of rearing, the constant contact with people and the more frequent passing through a crush have led to the calmer temperament of the cows: with 25% at two-year-old cows, with 18% at three-year-old cows, with 30% at four-year-old cows, with 35% at five-year-old cows, with 45% at six-year-old cows, with 41% at seven-year-old cows, and with 23% at eight-year-old cows. In both types of farms when there were procedures and there had to be formed a group for passage through a chute, it was observed that the more agitated and restless cows caused agitation in the group as a whole. The more excitable cows which had restless temperaments were unwilling to walk through the chute. They were agitated and found it difficult to orientate how to enter the crush. In most of the cases, these animals did not pass through the chute and the chute first, rather than that they waited because of their fear. It was noticed that in both methods of rearing the cows with calmer temperament were the first to walk at the beginning of the procedures and they had easier orientation and no additional movements. However, the more temperamental cows lagged

behind the calmer ones which had already passed. At the end of the procedures there were mostly cows with restless temperament in front of the chute, and this made their entering in the chute even more difficult. For the purpose of alleviating the agitation, it is advisable that the younger and restless cows should be grouped with older cows that have calmer temperaments upon walking through a chute. Another measure which can be taken towards lessening the agitation within the group is to let all animals – both calm and restless to walk through the chute together. Thus the more temperamental animals will be more confident upon entering the crush and will orientate more easily thanks to the herd instinct.

According to my study, the regular contact with people and the accustoming to more frequent manipulations in a crush has led to 60% of the cows receiving temperament scores of 1 and 2, 27% – 3 and around 16% – 4 and 5 within this method of rearing. Upon infrequent human contact, around 46% of the Aberdeen cows had temperament scores of 1 and 2. In both regular and infrequent contact with people, the cows which got a score of 3 for restless temperament had a similar percentage. Around 26% of the cows had high excitability and unruly temperament earning scores of 4 and 5. The method of rearing ($P < 0.001$) as well as the age group ($P < 0.001$) had a highly reliable influence on the formation of behavioural reactions in the Aberdeen cows with reference to their orientation towards a chute, passing through a chute and the behaviour during manipulations performed in a crush (Table 2).

Genetic analysis of the temperament evaluation proves its genetic connection and correlation with other productive features, especially in young animals (Garza-Brenner et al. 2020). According to (Riley et al. 2016; Costilla et al. 2020) the heredity of the temperament is moderate within $h^2 = 0.30–0.35$. In the opinion of Walkom et al. (2016), the heredity parameter for the Aberdeen Angus cattle breed is 0.21.

Table 2. Influence of some factors on the temperament of cows from the Aberdeen Angus cattle breed

Factor	Temperament
Method of rearing	69.892***
Age (years)	17.725***

*** $P < 0.001$

CONCLUSION

My study evaluated the temperament of the cows from the Aberdeen Angus cattle breed with a score of 2.74 ± 0.04 . The cows above the age of four years are calmer and easier for manipulation. The cows with frequent human contact which are reared in the farm or immediately next to it have lower values for the parameter with reference to all age groups. The method of rearing ($P < 0.001$) as well as the age group ($P < 0.001$) have a significant influence on the formation of behavioural reactions in the Aberdeen cows in connection to orientation, passage through a chute and behaviour during manipulations in a crush. The animals are calmer when the groups are formed by animals of different ages. It is recommended activities such as manipulations in the cattle crush be performed before the start of the pasture period when the animals are on the farms.

Conflict of interest

The author declares no conflict of interest.

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