Risk factors for dystocia and perinatal mortality in extensively kept Angus cattle

T. Hohnholz[1], N. Volkmann[2], K. Gillandt[2], R. Wassmuth[1], N. Kemper[2]

[1]University of Applied Sciences Osnabrueck, Faculty of Agricultural Sciences and Landscape Architecture

[2]University of Veterinary Medicine Hannover (Foundation), Institute for Animal Hygiene, Animal Welfare and Farm Animal Behaviour

Introduction

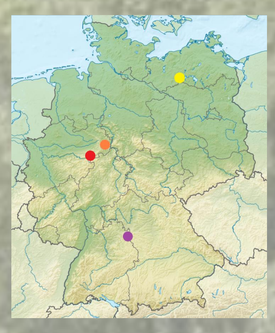
In 2017 the share of suckler cows in the total cow population was 13.6% in Germany [1]. However, due to increasing consumer demands for economic sustainability, animal welfare and product quality, suckler cows are gaining importance in livestock farming. One decisive factor for the efficiency of suckler cow cattle production, especially under extensive conditions on pasture, is complication-free calving. Dystocia resulting in increased perinatal mortality and decreased subsequent reproduction causes important economic losses in beef cattle industries.

Calving ease and early calf survival are affected by various genetic and non-genetic factors. Various attempts have been made to decrease calving difficulties and thus likewise perinatal mortality. For instance, internal pelvimetry has been widely used in beef cattle industries. In recent years, however, research concentrated on the associations between externally measured pelvic parameters and dystocia and perinatal mortality.

The objectives of the present study were to determine the prevalence of dystocia and perinatal mortality and to evaluate risk factors, especially external pelvic parameters, for both in extensively kept Angus suckler cows.

Materials and methods

Animals: The study was performed on five beef suckler cow farms in four various regions of Germany from April 2015 until March 2017. The breeds were Aberdeen and German Angus with herd book registration. From spring to autumn (April to October) the animals grazed on pastures. In winter (November to March), the herds were housed in free stalls on four out of the five farms and on one farm they were kept outdoors with weather protection being provided. Natural mating was used for all herds. The calving periods differed between farms. On all farms an autumn calving period was established. Two farms had an additional calving period in spring and winter, respectively.



Methods: Calving ease (1 to 4) and early calf survival (1 or 2) were documented using a modified version of scales recommended by the German Cattle Breeders' Federation [2]. The pelvic parameters length of pelvis, position of pelvis, distance between hip bones and distance between ischial tuberosities were externally measured [3]. Additionally the parameters pelvic area (length of pelvis x distance between hip bones) and ratio of calf birth weight to pelvic area (calf birth weight /pelvic area) were calculated [4]. Within 24 hours after parturition, the following measurements were derived from the calves [3]: Birth weight, body length, cannon bone circumference and head circumference. Statistical analysis was performed using SAS version 9.4 (SAS Institute, Cary, NC, USA) with logistic regression (PROC LOGISTIC) with stepwise selection ($p < 0.05$). For statistical analysis, all twin births and calvings with missing information on sex and birth weight of calf were omitted from the data set.

Results and discussion

825 parturitions were recorded. Of these, 4.1% (n=34) were twin births so that a total number of 859 calves were born. The dystocia rate among single pregnancies was 3.8% (n=33) and among multiple pregnancies 8.8% (n=3). Within 48 hours after parturition, 5.3% (n=42) of singleton calves and 33.8% (n=23) of twin calves died. After editing, the data set contained 785 parturitions.

Diagram 1: Relative frequencies for calving ease and early calf survival (n = 785)

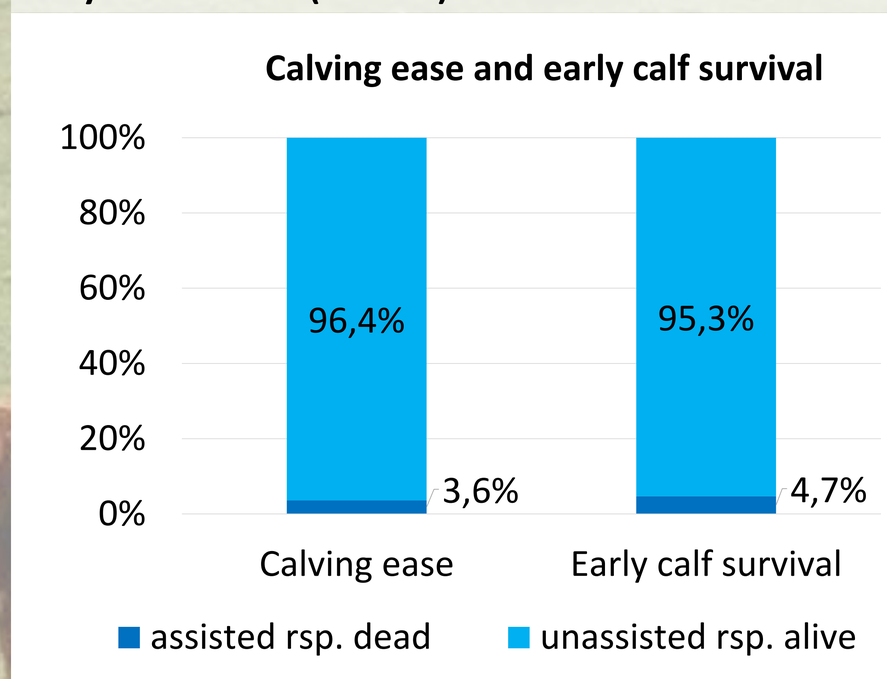


Table 1: Logistic regression model for dystocia

Effect	Level or unit	Comparison	OR	95 % CI	P-value
Parity of dam	1 = primiparous 2 = multiparous	1 vs. 2	8.411	3.698 - 19.133	<0.0001
Calf birth weight	kg	Linear trend	1.182	1.072 - 1.303	0.0008

Table 2: Logistic regression model for perinatal mortality

Effect	Level or unit	Comparison	OR	95 % CI	P-value
Calving ease	1 = assisted 2 = unassisted	1 vs. 2	17.791	4.272 - 74.102	<0.0001
Parity of dam	1 = primiparous 2 = multiparous	1 vs. 2	3.427	1.006 - 11.668	0.0488
Length of pelvis	cm	Linear trend	1.244	1.078 - 1.435	0.0028
Calf birth weight	kg	Linear trend	0.831	0.751 - 0.918	0.0003

Conclusions

The study points out that dystocia and perinatal mortality are closely related traits that are more critical in primiparous than in multiparous cows. Moreover, calf birth weight seems to be a crucial factor for both issues. In addition, the investigation indicates that externally measured length of pelvis has an impact on perinatal mortality.

Literature

1 BRS (2018): Rinderproduktion in Deutschland 2017. BRS-Bonn, 78pp.
2 ADR (2004): ADR-Empfehlung 3.2 zur Zuchtwertschaetzung für funktionale Merkmale von Bullen und Kuehen . Arbeitsgemeinschaft Deutscher Rinderzüchter e.V., Bonn, D. Available from URL:http://www.adr-web.de/richtlinien/funktionale-merkmale.html
3 Gundelach Y., Essmeyer K., Teltscher M.K., Hoedemaker M. (2009): Risk factors for perinatal mortality in dairy cattle: Cow and foetal factors, calving process. Theriogenology 71: 901–909
4 Johanson J.M., Berger P.J. (2003): Birth weight as a predictor of calving ease and perinatal mortality in Holstein cattle. Journal of Dairy Science 86: 3745–3755.
5 Nugent R.A., Notter D.R., Beal W.E. (1991): Body measurements of newborn calves and relationship of calf shape to sire breeding values for birth weight and calving ease. Journal of Animal Science 69: 2413-2421

Analysing and optimising the relationships between greenlands, animal health and animal breeding in suckler cows (MuKuGreen)

The funding of the project was provided by the Federal Ministry of Food and Agriculture (BMEL) under a resolution passed by the German parliament. The project was funded by the Federal Office for Agriculture and Food (BLE) within the Federal Scheme Organic Farming and Other Forms of Sustainable Agriculture (BÖLN).

Gefördert durch:
Bundesministerium für Ernährung und Landwirtschaft
aufgrund eines Beschlusses des Deutschen Bundestages
BÖLN
Bundesprogramm Ökologischer Landbau und andere Formen nachhaltiger Landwirtschaft