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Review Article

Bronchopneumonia and Density of Calves in Stables

Veterinary Medicine

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Abstract

Bronchopneumonia of calves is polyfactorial disease. It is problematic in intensive farms raising calves reared in groups and staying in stalls. From factors with significant role in the birth of pneumonia is the density of the calves in the farm. The study aims to specify relations of morbidity of calves on the density when there are holds in the group. The study was conducted in three farms that breed calves for meat production, for several years. Calves reared in stalls with large groups have a higher risk to be affected by respiratory diseases compared to those in small groups. In Besi farm impact of density is greater and connectivity has shown with correlation coefficient R2 = 0.72. In Leban's farm impact is true but it is lower than R2 = 0.62. In Raskov farm the density impact were not statistically proven, R2 = 0:04. The data of one factorial regression equation were statistically proven for Besi farm (P = 0.0003) and Leban (P = 0.00045) and not proven for Raskova farm (P = 0.84).

Introduction

Bronchopneumonia, is one of the major and severe pathologies of respiratory system. Furthermore, the disease was observed in calves aged 1-4 months and rarely in older calves, *Berberi.P et al (2009); Berberi.P, Ceroni V. et al (2009); Patricia C. et al. (2012).* Bronchopneumonia causes major damage. According to *Alvaro G. et al. (2010),* respiratory diseases constitute the main cause of economic loss from deaths of calves.

Respiratory problems have increased up to 34% level in the last 20 years, causing 21% of total losses in calves. Various authors provide extensive data on the incidence of pneumonia. Thus, *Waltner et. al. (1986)* report that 15 % of calves, Holstein Ontario race were treated for pneumonia before secession. *Van Donkersgoed J. et. al. (1993),* found that the risk of pneumonia was 39% according to the diagnosis of farmers and 29% by veterinarians' diagnosis.

While *Virtola A.K. et.al (1996, 1999)* in their study found that pneumonia in calves was 11% by farmers and 25,6 % by veterinarians. For the birth of pneumonia causes are complex and include environmental agents, infectious and immune status of the animal. According to *Smith Thomas (2013),* in addition to stressors factors in the emergence of respiratory diseases among them *bronchopneumonia* plays a major and overcrowding role, keeping calves closed for a long time and other sick animals. The study aimed to assess the relation of dependence of the incidence of pneumonia in calves, with their frequency at stalls setting regression equations and correlation coefficients.

Material and Methods

Implementation of a study focused on calves of farms *Besi*, *Leban* and *Raskov* located in the outskirts of Prishtina. In each farm were carried out physical measurements of the calves size of all stables and defined pipes were built in m^3 per stable, area in m^2 for every claves every month, for 2012; 2013 and 2014; Raskov farm courses only for 2012 and 2013. At the same time monthly record was kept of the number of calves in the stable and the number of sick calves with bronchopneumonia.

The data obtained were processed statistically, it was estimated the degree of impact of the density of calves at stables for their morbidity with pneumonia and were determined coefficients of correlation and factorial regression equations.

Results and Discussion

The processing of data was prepared in the following tables, according to farms and by years of study. In table 1, are presented dynamics of level of disease in calves with bronchopneumonia in % and density of calves for breeding surface in m^2, according to years of study in *Besi* farm.

Table 1: Disease level from bronchopneumonia and density in m2 / calve, in Besi farm, for 2012-2014.

Indicators	2012	2013	2014	Truth of change		
	1	2	3	1:2	1:3	2:3
Morbidity %	7.3 ± 0.47	5.6 ± 0.57	7.82 ± 1.13	2.3	0.43	1.39
Sur. m^2/Calve	6.86 ± 0.14	10.83 ± 0.25	6.95 ± 0.27	-13.69	0.3	10.54

Data show that morbidity is lower in 2013. In year 2012 and 2014 statistically is about the same morbidity. The same phenomenon is also observed for the stable surface in m^2 was up to each year. Density of calves at stall was about the same in 2012 and 2014. The low density of animals in the stall was found in 2013.

These data show that between morbidity and density of calves are also correlative relationships of negative character. Changes in the level of diseases of calves with bronchopneumonia were statistically confirmed through comparisons between data of 2012 with those of 2013 (P <0.05) and which were not sustained in the other comparisons (P <0:05). Expressed density that is provided for each calf in m^2, was confirmed statistically in comparison between data 2012 with those of 2013 (P > 0:01) and between data of 2013 with those of 2014 (P > 0:01) and not proved in the comparison between the data of 2012 with those of 2014 (P <0:05). Thus, the calf growth decreases and the average morbidit increases, too.

Leban farm data (table 2) show that morbidity was higher in 2012 when the density of calves was higher. In 2013 there is a decrease in density compared to 2012. This means fewer calves were with this disease. In year 2014 the data show that there was no proven relationship between morbidity and density of calves.

Table 2: Morbidity from bronchopneumonia and density m^2/calve, in Leban farm for years 2012-2014.

Indicators	2012	2013	2014	Truth of change		
	1	2	3	1:2	1:3	2:3
Morbidity%	13.17±0.46	7.24±0.84	10±1.78	6.18	1.72	1.4
Sur. m^2/Calve	6.4±0.09	8.78±0.22	8.27±0.2	10.04	7.8	1.71

The data griven in table 2, for farm *Leban*, it is noted that the morbidity is higher in calves reared in 2012 and reared in 2014 and lower in calves reared in 2013. Changes were proven only statistically when compared with each data of 2012 with those of 2013 (P <0.05) and not sustained in comparisons of other groups (P <0:05).

Two years of the study of morbidity of calves with pneumonia in the farm of *Raskov* is presented in table 3. The data clearly noted that the decrease in density of calves at home brings their reduction in pneumonia morbidity in 2012. In 2013, it was found that the increase in density has significant increase of morbidity in calves.

Table 3: Morbidity from bronchopneumonia and density in m^2/calve, in Raskov farm, for years 2012-2013.

Indicators	2012	2013	Truth of change
	1	2	1:2
Morbidity %	5.96±0.63	6.83±0.82	-0.85
Sur. m^2/Calve	6.65±0.07	6.15±0.49	0.5

The data obtained testify that morbidity was higher in 2013 compared to 2012. But the statistical valuation appears that the level of morbidity is not confirmed statistically (P <0:05).

Statistical data was processed through one factorial regression depending on the density of calves in stalls for 2012, and thus according to these studied farms, below are presented the following equations.

$Y_{(Morbidity)}$= -0.2+0.072X R^2=0.72, $F_{(llog)}$ = 28.66, P= 0.0003 For Besi farm
$Y_{(Morbidity)}$= -25.01+0.48X R^2=0.62, $F_{(llog)}$ = 26.17, P= 0.00045 For Leban farm
$Y_{(Morbidity)}$= 18.2+0.08X R^2=0004, $F_{(llog)}$ = 0.04, P= 0.84 For Raskov farm
X= *Density of calves in stall according breeds.*

Details of the first two equations show that the impact of the density of calves is true, and with high probability. The impact on farm *Besi* is greater (P = 0.0003) and in farm *Leban* the real impact is lower than in the farm Besi (P = 0.00045). The influence of density in *Raskov* farm was not proven statistically (P = 0.84).

The data of one factorial regression equation show that morbidity is more influenced by density of calves in stalls. This is expressed by the strength of the connection expressed through connectivity coefficient (R^2).

This ratio is higher in farm *Besi* (R^2 = 0.72), stands at the farm *Leban* (R^2 = 0.62) and dips, or is insusceptible farm *Raskov* (R^2 = 0.004). The regression equations for farm Besi is certified statistically (P = 0.0003) and for the farm *Leban* (P = 0.00045) and no statistically verified regression equations in farm Raskova (P = 0.84).

Conclusions

1. Overcrowding of calves at stalls brings increased morbidity in calves.
2. The size of the barn in m^2 is higher in farm Besi and the lowest in Raskov farm.
3. Morbidity is higher in farm Besi and Leban and lower in Raskov farm.
4. Among the morbidity and calves in the stalls the density has strong correlative relation of negative character.
5. The correlation coefficients were statistically true for the farm Besi and Leban but not for Raskov farm.

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