



*Original Contribution*

**INCIDENCE OF EARLY EMBRYONIC DEATH IN DAIRY COWS**

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**ABSTRACT**

The purpose of the study was to establish the incidence of early embryonic death among dairy cows. Transrectal ultrasound examination for evaluation of pregnancy in the early period of gestation was used. We equally sought to improve the production in stock breeding farms by reducing the interval between inseminations and the service period. Our study was carried out on 63 Black-and-White heifers with native oestrus and artificial insemination (first group), 184 Black-and-White cows after native oestrus and artificial insemination (second group) and third group – 78 Black-and-White cows with synchronised oestrus and ovulation. Pregnancy was tested on the 28th, 35th, 45th and 60th day after the insemination with ultrasound equipment *Aloka "SSD 500"* and 5 MHz linear probe. Early embryonic death was established in 9.09% of the animals from the first group, 19.02% of the second group and 20.75% of animals from the third group for the whole research period. The highest proportions of early embryonic death were registered between days 28 and 45 - 16.20% and 18.87% in the second and the third groups, respectively.

**Key words :** cow, early embryonic mortality

**INTRODUCTION**

Embryonic death is an important problem in stock breeding. Veterinary specialists and farmers find it difficult to solve this problem. Conception, gestation and giving birth to live foetus is a very complex process involving the embryo, the uterus, the mother's organism and the environment. The factors determining the normal embryonic development are numerous. Managing the genetic factors, the insemination, stress and animal health, and the incidence of embryonic loss could, however, be considerably reduced [1, 2, 3].

The percentage of insemination in cattle is about 90-100%, and only 70% of all pregnancies end with giving birth to live foetuses. The other 30% of pregnancies are interrupted because of some type of embryonic loss; in 65% of these cases, the embryonic death occurred between the 6<sup>th</sup> and 18<sup>th</sup> days of gestation [4, 5, 6, 7].

This level of loss should not be allowed in stock breeding. We therefore feel that our

knowledge of embryonic death incidence would be of immense benefits in any efforts at improving live stock productions.

The purpose of the study was to establish the diffusion of early embryonic death among milk cows using transrectal ultrasound examination, research to value pregnancy in early period of gestation and to improve production in stock breeding farms by reducing the interval between inseminations and service period.

**MATERIAL AND METHODS**

The experiments were performed in three cattle breeding farms, namely: The Experimental Farm of the Trakia University in Stara Zagora, Land O'Lake – Nova Zagora and Tvarditsa 325 dairy cows and heifers, from the Black-and-White breed, aged between 18 months and 7 years, were used. They were placed under similar conditions of housing, feeding and productivity. The animals were divided into 3 groups: 63 Black-and-White heifers with native oestrus and artificial insemination (group I), 184 Black-and-White cows with native oestrus and artificial insemination (group II) and 78 Black-and-White cows with synchronised

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oestrus and ovulation (group III).

Three observations were performed in order to establish the most appropriate time for insemination. The artificial insemination was done with semen under the form of straws, observing the rules for reanimation and application.

In group III, a synchronisation of the oestrus and the ovulation was done according to the Ovsynch – TAI programme described briefly as follows: double treatment with 2 ml i.m. GnRH preparation Derherelin® Veyx – Pharma GmbH (50 µg D-Phe-LHRH, 1 mg methyl-4-hydroxybenzoate/ml) and single treatment with 2 ml i.m. prostaglandin Estrumate® Shering – Plough Animal Health (cloprostenol sodium/ 250 mcg cloprostenol/ml). The artificial insemination was performed 24 hours after the second GnRH treatment.

Tests for early pregnancy were done on days 28, 35, 45 and 60 ( $\pm 2$  days) following the artificial insemination. Pregnancy was confirmed by the presence of enlarged uterine lumen, presence of amniotic fluid and the visualisation of an embryo. The data were statistically processed by the one-way analysis of variance ANOVA.

## RESULTS

Ultrasonography was performed 28 days after artificial insemination of 63 heifers and pregnancy was confirmed on the basis of enlarged uterine lumen, presence of amniotic fluid and visualisation of an embryo in 55 animals (87.32%) and negative result was obtained in 8 (12.68%). The second examination on day 35, confirmed pregnancy in 52 heifers whereas the other 3 cases showed negative signs of pregnancy. The third ultrasonographic survey of 52 heifers confirmed 50 pregnant and 2 not pregnant. By day 60, the pregnancy was confirmed in all 50 animals.

The ultrasonographic studies on group II confirmed 142 cows (77.21%) pregnant while 42 animals (22.8%) returned negative on the 28<sup>th</sup> day after the artificial insemination. In the next periods of investigation, 126 cows were confirmed positive by day 35; 119 cows by day 45 and 115 by day 60.

In the group of cows with synchronised oestrus and ovulation (n=78), the examination by the 28<sup>th</sup> day showed pregnancy in 67.92% (53 animals) and 32.08% non pregnancy (25 animals). From all positive diagnoses on day 28 the subsequent ultrasonographic survey did not conform 7 positive diagnoses by day 35, 3

– by day 45 and 1 –by day 60.

The analysis of ultrasonographic results showed that the highest proportion of early embryonic death up to the 35<sup>th</sup> day was observed in cows with synchronised oestrus and ovulation – 13.21%, followed by group II – 11.27 % and the lowest was that in the group of heifers – 5.45%. The third examination, done on the 45<sup>th</sup> day, the pregnancy was interrupted in 2 heifers (3.77 %), 7 animals from group II (5.25%) and 3 cows from group III (6.33%). The cases of embryonic death by post insemination day 60 were 4 for group II and one for synchronised cows. For the entire period of the study, the highest proportion of early embryonic death was observed in the third experimental group – 20.83%, followed by group II with 19.14% and the lowest incidence was that in the groups of heifers – 9.10%.

## DISCUSSION

Our study about the incidence of the early embryonic death in dairy cows showed that it is a problem for cattle breeding in our country. For achievement of higher economic results in this branch, the monitoring and correction of the various causes leading to the appearance of early embryonic death are necessary. To make this possible, we advocate here the following: establishment of oestrus, artificial insemination, and stress and animal health.

The analysis of our data shows that the highest incidence of early embryonic death was observed up to the 35<sup>th</sup> day (5.45%–13.21%) after the last insemination in all experimental groups. These results are similar to those reported by Fricke et al.; Mee et al.; Vasconcelos et al., [8, 9, 10] showing cases of early embryonic deaths in 10%–16% of cows with positive signs of pregnancy by the 28<sup>th</sup> day. The lowest proportion of interrupted pregnancies was observed in heifers. These results are logical taking into account that nulliparous animals are not suffering from the stress of lactation, difficult parturitions, retained placentas and the risk of genital infections resulting from preceding parturitions [3, 11, 12].

## CONCLUSION

The early embryonic death in dairy cows is a difficult problem for Bulgarian cattle breeding. In this study, its incidence was established in the range between 9.10 % in heifers and 20.83% in lactating cows.

The applicaiton of transrectal

ultrasonography for evaluation of pregnancy in the early period of gestation is a very convenient practical means for successful management of reproduction in dairy cattle breeding. It increases the productivity in cows through reduction of the interval between inseminations and the service period.

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