



## Ultrasound Diagnosis of Pregnancy, Monitoring of Mares' Physiological State

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### Abstract

The results of complete evaluation of the mare keeping system at the Hartley Horse House' breeding center, Moscow Region, the monitoring of their condition after insemination and the diagnosis by ultrasound of gestation are presented. The animals are kept in good sanitary and hygienic conditions: indoor air temperature is 4-5 °C, relative air humidity - 75%, air movement speed - 0.3 m/s, the illumination - 150 LX. The quality of the feed according to the main parameters corresponds to the average standard with the exception of slightly increased fiber content. As a result of blood tests on pregnant mares an increase in the number of eosinophils has been found, - on average in the group -  $7 \pm 1.85\%$  and slight decrease in segmented neutrophil index - on average in the group -  $39 \pm 2.21\%$ . All biochemical parameters of the blood serum of the mares in the first gestation period are in accordance with physiological norms, except for an increase in the level of alkaline phosphatase in the blood serum -  $417.11 \pm 22.28$  u/l. Ultrasound surveillance of mares gestation has shown the possibility of monitoring its performance: 14-16 days after insemination, a 15 mm fetal egg is visualized in the right uterine horn; 30 days after the insemination, a developing embryo is visualized. On the 65-70<sup>th</sup> day after the insemination, it is possible to determine the sex of the future foal with an accuracy of 90%. For more effective organization the reproduction of horses in the breeding centers, it is necessary to carry out a complete evaluation of keeping and feeding the mares with an analysis of the structure of the diet and feed quality, to assess clinical condition of animals after the insemination, to use the method of transrectal ultrasound for early diagnosis of gestation and morphometric and functional embryonic development.

**Keywords:** Mares; Reproduction; Ultrasonic Diagnostics; Monitoring

## Introduction

Comprehensively improving the quality of horses and improving their reproducing abilities are important ass. To enhance the effectiveness of reproduction is possible by perfecting organizational forms of biotechnology reproductions, a complex monitoring system of physiological state and early diag-noseds of mares' he-mies. The studies of physiological problems of the reproductive system of mares, folliculogenesis and ovulation, fertilization and early embryogenesis in horses contribute significantly to the effectiveness of insemination.

## The purpose of the research

Comprehensive assessment of mares in the reproduction centre, monitoring of their condition after insemination and ultrasound diagnosis of foals. Tasks: assess the conditions of keeping and feeding mares in the reproduction center; to conduct a comprehensive monitoring of the condition of the co-insemination on the results of the investigation. Blood donation and ultrasound diagnosis.

## Materials and Research Methods

The research was held in 2019 at the Hartley Horse House Horse Production Centre in Mos-kovsk Region, Russia. Seven animals were monitored.

## The Results and their Discussion

In the center of the re-production used the method of artificial insemination of mares freshly obtained sperm stallions. Clinical and obstetric and gynecological studies of animals were carried out™.

„Esaote“ conducted ultrasound monitoring of ovulation in mares (every 6 hours, when approaching the ovulation mop - in 3 hours) and foals. The blood was examined with the help of the automatic biochemical analyzer EOS Bravo 200, hematological analyzer HemaScreen Vet and RFE-90 Vet.

Analysis of the conditions of mares showed compliance with their sanitary and hygienic treasuries: the rooms inside the stables are dry, light-dark, well ventilated, without drafts. The temperature in the room is between 4-5 degrees Celsius, the relative humidity is 75%, theair speed is 0.3 m/s, and the light is 150 LK.



**Figure 1:** Conditions of mares.

Analysis of the feeding diet of mares. The stallions of mares received grass-grass but, oats, wheat bran, muesli, every day. There is a discrepancy between the composition of the diet and the nutritional value of Terra nova's „Muesli“ APC „New Land“ for mares during the specified period of their physiologyof thecondition. In the analysis of the diet of feeding mares to axis, a slightly increased percentage of the diet for raw and digestible protein, carotene, cal, iron and a reduced percentage of phosphorus, copper, cobalt, iodine, vita-min D was established.

Unbalanced feeding (lack or surplus of individual ingredients of feed-ration) can negatively affect the content of mares to fertilization and the burrowing ofthelod, as well as become the main cause of alimony infertility. The insemination of mares' diet was balanced on basic nutrients.

Analysis of the quality of mare feed showed a dreduce. The content is established: in 1 kg of hay cereal grass (dark) - 141grams of moisture, 859grams of dry matter, 84grams of protein, 26grams of fat, 279grams of fiber. In 1 kg of hay cereal grass (light) - 138g of moisture, 862grams of dry vesif, 90grams of protein, 27grams of fat, 268grams of fiber. In 1 kg of grain oats - 153g of moisture, 847grams of dry vesity, 100grams of protein, 41grams of fat, 99grams of fiber. In 1 kg of wheat bran - 147g moisture, 853g dry matter, 144g protein, 40g fat, 85g fiber. In 1 kg of muesli - 116grams of moisture, 884grams of dry matter, 122grams of protein, 48grams of fat, 128grams of fiber.

Hematological indicators. In the process, it was established that the average values of hema-tological indicators in mares in the group in the tse-scrap corresponded to the norm. The number of leukocyts is  $10.91 \pm 0.64 \cdot 10^9/l$ ; number of red blood cells -  $8.71 \pm 0.43 \cdot 10^{12}/l$ ; haemoglobin -  $90.14 \pm 6.27g/l$ ;  $44.0 \pm 0.82 \text{ mm/h}$ ; hematocrit rate of  $42.46 \pm 2.12\%$ . The average number of platelets was slightly lowered -  $170 \pm 16.86 \cdot 10^9/L$ . Analysis of leukocytic formulas of mares showed an increase in the rate of eosinofi-fishing in animals, which amounted to an average of  $7 \pm 1.85\%$  in the group, and a slight decrease in the showing of segmentoyan nuclear neutrophyl - in the middle of the group of  $39 \pm 2.2\%$ . In our opinion, this may be due to food hypersensitiveness in the early period of mares' heset.

Biochemical blood test.level of common protein -  $73.56 \pm 2.63g/l$ ; albums -  $39.09 \pm 1.27g/l$ ; glucose -  $3.61 \pm 0.22 \text{ mmol/L}$ ; amylase -  $3.71 \pm 0.7 \text{ ed/L}$ , ALT -  $2.25 \pm 16.38 \text{ ed/L}$ ; ACT -  $372 \pm 63.77 \text{ units/l}$ ; bilirubin total -  $30.33 \pm 4.9 \text{ mmol/L}$ ; direct bilirubin -  $8.04 \pm 1.0 \text{ mmol/L}$ ; urea -  $4.86 \pm 0.16 \text{ mmol/L}$ ; Creatinine -  $117.14 \pm 22.28 \text{ mmol/L}$ ; alkaline phosphate -  $411.71 \pm 22.28 \text{ ed/l}$ ; ho-les-terina -  $2.36 \pm 0.09 \text{ mmol/L}$ . All biochemical performance of mare's serum during the first period of foals were within the physio's logical norms, except for an increase in serum alkaline phosphatase to  $411.71 \pm 22.28 \text{ edds}$ .

Ultrasonic monitoring of mares' hesality. The germ bubble (blas-tocyst) begins to be visualized as an echonegative formation with a diameter of 2 mm from the 10<sup>th</sup> day, and embryologs in the form of an echopositive strip from the 20<sup>th</sup> day after the insemination of the mare. 14 to 16 days after the insemination of the pro-silicoun-ter-performance - fruitful. The egg was visualized in the right horn of the uterus measuring 15 mm. After 21-22 days, the heartbeat of the embryo was registered. Thirty days after the insemination, the foal was monitored - visualized by the developing embryo. On the 65-70<sup>th</sup> day after insemination with an exact 90% determine the sex of the future germ-benc.

The results of the study of the level of progesterone in the blood of mares in the first 1.5 months of the hescentities showed that this value is individual and very variable. Between the 35<sup>th</sup> and 45<sup>th</sup> days of normal foal, the concentration of progesterone in the blood of mares increases. On average, the group  $33.01 \text{ nmol/l}$ . The two co-levels of progesterone were lowered and the pitch pitch was  $11.49$  and  $17.81 \text{ nmol/L}$ , respectively.

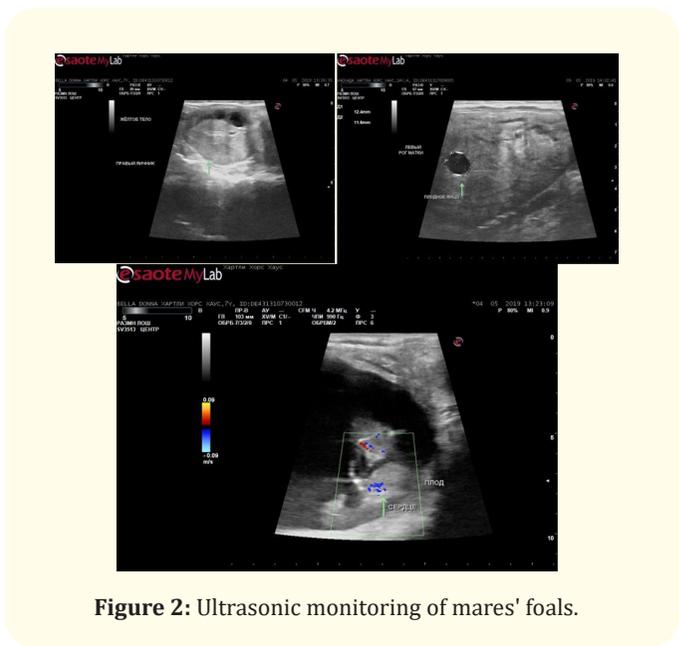


Figure 2: Ultrasonic monitoring of mares' foals.

It was concluded that a drop in the level of pro-gesterone at the specified time frame could be seen as a threat of loss of foals and a basis for naming hormonal support (pro-gestin therapy) [1-6].

**Conclusion**

In order to better organize the reproduction of horses in re-production centers, it is necessary to carry out a comprehensive assessment of the content, feeding mares with an analysis of the structure of the diet and the quality of feed, to assess the clinical status of animals after insemination, to apply the method of tran-sectal visual echoography for early diagnosis of foals and morpho-metric and functional assessment of embryo development.

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