

REPRODUCTIVE AND NUTRITION MANAGEMENT OF THE THOROUGHBRED

MANAGEMENTUL REPRODUCTIV ȘI NUTRIȚIONAL AL RASEI DE CAI PURSÂNGE ENGLEZ

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ABSTRACT | REZUMAT

A successful breeding program requires a feeding program that meets the nutrient requirements in correlation with the animal's reproductive status. Food is still considered an art, and although much scientific knowledge has been gained in recent years, the stallion's weight score should be regularly assessed and adapted to its requirements. Here is a brief overview of Thoroughbred breeding and feeding. In order to exemplify the breeding and feeding programs for this breed, the programs implemented at the Cislău Stud Farm were used

Keywords: Thoroughbred, reproduction, breeding, nutrition

Un program de reproducere de succes necesită o schemă de alimentație care să satisfacă necesarul de nutrienți în corelație cu starea reproductivă a animalului. Alimentația este considerată în continuare o artă și, deși în ultimii ani s-au obținut foarte multe cunoștințe științifice, scorul ponderal al armăsarului ar trebui evaluat în mod regulat și adaptat conform necesităților individuale. Aici se face o scurtă trecere în revistă a reproducerii și alimentației la rasa de cai Pursânge Englez. Pentru exemplificarea programelor de reproducere și furajare la această rasă, s-au utilizat programele implementate de herghelia Cislău (România).

Cuvinte cheie: Pursânge Englez, reproducere, creștere, nutriție

The Thoroughbred breed, the leading actor in galloping races around the world, is one of the most harmonious breeds of horses, anatomically, structurally, and morphologically with the highest performance in galloping races. The importance of raising the closed breed of Thoroughbred, in a regime of freedom, with limited human influence, leads to the observation and subsequent selection of a specimen, depending on its ancestry and behavior in the herd. In this way, you can see compatibility between characters that help in the process of reproduction and the selection of future pairs that will give rise to new products.

Cislău Stud Farm consists of 5 Thoroughbred breed stallions, intended for local breeding, 3 nursery stallions, considered to have superior genetic baggage, 34 breeding mares, 18 foals with 0-6 months old, 7 foals with 6 -12 months old, 7 yearlings horses with 1-2 years, 12 horses with 2-3 years, and 12 juvenile horses in training (Tables 1 and 2).

NUTRITION

In general, the nutritional requirements of a stallion during the reproductive season do not appear to

be different from its needs during growing (1, 14). A slight increase in energy consumption may be necessary or beneficial during the breeding season; however, it is easy to overestimate the need for nutrients at that time, so overfed and obese stallions are more common compared to underweight horses (8). A maintenance ration consists of sufficient amounts of balanced nutrients to support normal bodily functions (8). Proper pastures or good quality hay can usually meet these requirements and free access to traces of mineralized salt and fresh water is also required. Cereals, as an energy supplement in cold weather or under certain stressful conditions, can also be provided. The body weight, general condition, activity, and temperament of a stallion play an important role in his nutritional needs (Fig.1) (9). The healthy stallion consumes 2% -3% of its body weight daily. At least 50% of these should be fiber according to nutritional recommendations (1, 16). Vitamin A plays an important role in reproduction, so a severe deficiency of vitamin A can lead to a decrease or cessation of sperm production (16). Leaves fodder generally provides adequate amounts of vitamin A. Contrary to popular belief, vitamin A and E supplementation to National Research Council requirements does not improve the reproductive performance of stallions. Stallions generally require 10% protein in their diet; younger stallions require 12%-14%. Obesity can negatively affect libido

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and mating ability so the only dietary requirement for efficient sperm production and good reproductive performance is a balanced diet that keeps the stallion at its optimal weight. There is no conclusive evidence for any nutrient to increase sperm count or quality (10). The necessity for vitamins and minerals is considered to be approximately equal to that of mares in the last part of gestation (4). The individual feeding in Cislău Stud Farm focuses as a nutrition program for public stallions and nursery stallions on the use of fibrous and juicy fodder according to the nutritional requirements. Regarding the feeding pattern of mother mares, consumption is exponentially increased compared to stallions by providing a significant proportion of concentrated and fibrous fodder.

Table 1
Register of horses in Cislău Stud Farm

Equine category	Number
Stallion for public breeding	5
Stallion for specific breeding	3
Mares for reproduction	34
Foals within 6-12 months	7
Yearlings horses, 1-2 years	7
Yearlings horses 2-3 years	12
Juvenile horses in training	12
Foals within 0-6 months old	18
Total	98



Fig.1. Paddock feeding

FREEDOM OF MOVEMENT

Horses are naturally grazing animals, and exercise for stallions is an integral part of their management, which influences their mental and reproductive well-being. The movement ensures the harmonious development of the body and the proper functioning of all physiological systems. This basic need for exercise is often ignored or underestimated. A stallion needs exercise to stay fit and maintain a good mental attitude.

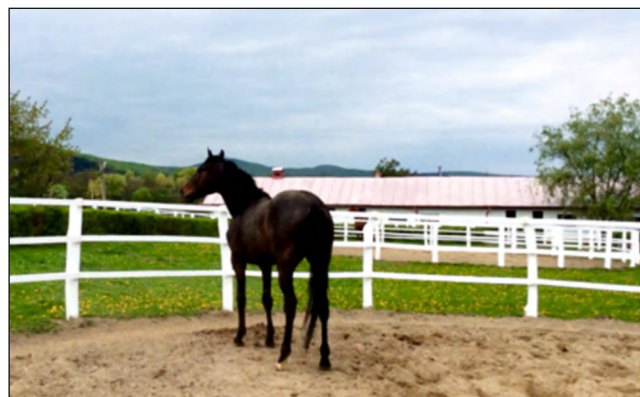


Fig. 2. Ensuring freedom of movement by going out in the paddock



Fig. 3. Ensuring freedom of movement by riding



Fig. 4. Ensuring freedom of movement by walking



Fig. 5. Ensuring freedom of movement by walking

The movement can be ensured by one of the following routes or in various combinations: going out in the paddock (Fig. 2), riding (Fig. 3), or walking (Fig. 4, 5).

In determining the type of exercise program, the breeder must take into account the physical condition of the stallion as well as his temperament. The exercise time must be adapted to the personality of the stallion. Free exercises in a paddock can last up to 24 hours /day for some horses depending on the weather conditions, for other horses, only 1-4 hours/day may be enough (4). Breeding mare managers should monitor their body weight on a regular basis. Historically, there have been differing views on the optimal weight score for pregnant mares and lactating mares (8).

Numerous researches provide valuable management information on the effect of nutrition on reproductive performance in mares. It has been easily demonstrated that breeding mares should be kept in good condition throughout the year and especially near the breeding season. By checking the body condition scoring in mares, the administrators can assign a weight score to the mares, being imperative that it be similar to that of the stallion (8).

Mares with a weight score of less than 5 have lower reproductive performance compared to mares with scores higher than 5 (4, 8). Mares that are moderately overweight can have a sexual cycle earlier in the year, have a few cycles per conception, with a higher pregnancy rate, and maintain pregnancy easily compared to underweight mares (4, 8). Studies also indicate that a weight score of 5 or less in lactating mares produces lower reproductive performance, so it is recommended that they shouldn't be included in the breeding program because their bodies consume a lot of food nutrients mainly for milk production, to the detriment of reproduction, therefore, the scores from 5.5 to 7.5 represent the economic optimum range (8).

Breeding mares normally require good quality fiber as part of their daily diet. Fiber plays an important role in minimizing digestive problems and can prevent the occurrence of non-adaptive behaviors. 14. In Cislău feeding program is administered carotene in the form of fodder carrots (4-5 kg) in the usual dose of 200 mg / animal / day for favoring the appearance of heat cycle. The feeding program for pregnant mares should be divided into three separate stages. The first stage is early gestation, from conception to the first seven months

of pregnancy. The second stage comprises the last trimester of gestation, from about seven months of pregnancy to calving. The third stage is the lactation period, which usually lasts five to six months after calving. (15) The nutritional requirements for these three stages differ and adjustments should be made to the feeding schedule according to the stage of the mare. The most common mistakes in feeding breeding mares are made during early pregnancy by overfeeding and during the lactation period by undernutrition (2).

REPRODUCTION

Stage 1 - First trimester

Nutrition in pregnant mares is closely related to fetal development. Contrary to popular belief, the fetus does not grow at a constant rate during eleven months of pregnancy, being very small in the first five months of pregnancy and at seven months of pregnancy, the fetus represents only 20% of its weight at birth. At this stage of pregnancy, the fetus is less than two percent of the mare's weight and size, and her nutritional requirements are minuscule compared to the mare's nutritional needs. Therefore, unless the mare is lactating, they can follow a normal feeding schedule. An ideal diet can only include grazing with the addition of a vitamin and mineral supplement to balance the nutrient deficiency in green fodder 10 (Table 2).

Advanced gestation

After seven months of pregnancy, the fetus begins to develop rapidly. At this point, the nutrient requirements become significantly higher and adjustments must be made to the mare's feeding schedule (3).

Digestible energy consumption (ED) increases by only 15% in the first quarter. Protein and mineral requirements increase to a greater extent. This is because the fetal tissue that is synthesized during this time is quite high in protein, calcium, and phosphorus. During the last four months of pregnancy, the fetus and placenta store about 77 grams of protein, 7.5 grams of calcium, and 4 grams of phosphorus per day with an energy consumption of 40%. Mineral supplementation is also very important during this period be-

Table 2

Personalized daily consumption at Cislău Stud Farm

Fodder	First part of the gestation	Second part of the gestation	Lactating mare
Hay	3.5	5.5	6-7
Mixed hay	8.5	-	-
Oat	-	2.4	-
Pellets	2.4	2.4	8
Vitamino-mineral premix	0.05	-	0.05

cause the fetus stores iron, zinc, copper, and manganese in the liver for use in the first months after birth. Sodium supplementation in the last part of pregnancy in the Cislău Stud Farm is performed to avoid digestive disorders and has a positive influence in eliminating meconium in the newborn foal (11).

The amount of copper consumed per day should be about 175 mg per day for a mare of 500 kg (12, 13).

Vitamin A is critically important for mares in advanced gestation. A study by Dr. Kathleen Crandell of Kentucky Equine Research showed that if mares are kept only on hay, without green pastures, and without vitamin A supplements, the subsequent growth rates of foals are significantly reduced. As the hay is stored for weeks and months, the content of vitamin A is drastically reduced. 34. If grazing is rare and mare's nutrition is based on hay as a major source of feed, vitamin A supplementation may be needed to avoid this scenario. In addition, supplementation with selenium and vitamin E at the end of pregnancy has been shown in recent studies to increase immunity in both mares and foals. The level of antibodies was higher in foals receiving 3 mg of selenium and 1600 IU of vitamin E / day, as opposed to 1 mg of selenium and 800 IU of vitamin E / day. Selenium can also help the mare by reducing the risk of retaining the placenta (5).

To ensure that mares receive enough copper, vitamin A, selenium, and vitamin E in their diets at this stage of gestation, pre-mixed feed is recommended in the form of supplemented mixtures containing adequate levels of these vitamins and minerals (6).

BREEDING AND NUTRITION

After calving, the mare's nutritional requirements increase significantly. During the first three months of lactation, mares produce milk at a rate equal to about 3-4% of their daily body weight (7). Mare's milk is rich in carbohydrates, proteins, calcium, phosphorus, and vitamins. Early lactating mares require up to 8 kg of hay per day, depending on the type and quality of feed they eat. The purpose of the custom grinding program

should be to provide the best quality feed (6).

Calcium and phosphorus are minerals that should be of primary concern during lactation, so alfalfa hay is the feed of choice due to its high calcium content (Table 3). Foals can also benefit from calcium and phosphorus supplementation for mares (15).

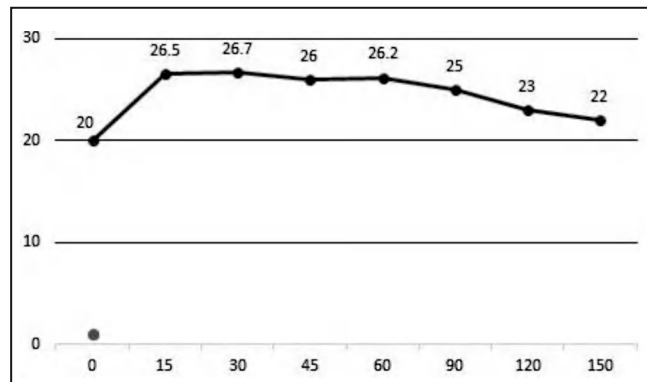


Fig. 6. Graphic representation of daily milk production for mares in Cislău Stud Farm



Fig. 7. Ensuring freedom of movement in the paddock in the cold season in mares

Cereal intake should be gradually increased during the last weeks of gestation so that the mare consumes almost the amount needed for milk production at the time of calving. A rapid increase in grain consumption should be avoided near calving, as this can cause colic.

Table 3

Daily nutrient requirements by reproductive period¹⁴

Nutrients requirements	First part of the gestation	Second part of the gestation	Lactating mare
Protein	635 g	771 g	1360
Carbohydrates	16 Gcal	18 Gcal	28 Gcal
Calcium	20 g	35 g	56 g
Phosphorus	14 g	26 g	36 g
Zinc	480 mg	480 mg	480 mg
Vitamin E (1000 UI)	15	30	30
Vitamin A (1000 UI)	0,5	1	1

After about three months of lactation, milk production begins to decline (Fig. 6). At this point, cereal intake can be reduced to keep the mare in optimal condition (7).

The movement and exercise of breeding mares is as important as that of stallions with many positive influences on the body and especially on the reproductive system. The movement program within the Cislău Stud Farm is organized collectively and throughout the year, including in the cold season (Fig. 7), by taking out in the paddock or in the corridors for 2-3 hours, being customized on groups in different physiological conditions, so the movement regime in mares in the first half of gestation is similar to non-pregnant mares, and mares in the last part of gestation will follow a movement program adapted to the physical condition and not involving considerable effort.

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