

## **Abstract of PhD DISSERTATION**

***“Researches on the canine youth feeding specificity, in romanian shepherd type breeds”***

***PhD Student: Eng. Sorin IACOB***

***Scientific leader: Univ. prof. Ioan Mircea POP, PhD***

Romanian breeds of Shepherd Dogs served with loyalty the inhabitants of our country since ancient times. These breeds are thus endemic to their genesis region – the space between Carpathians, Danube and the Black Sea.

Knowledge of general behavior has a major importance in human-animal relationship, in educating individuals. Dog, without forcing a tendency to unusual behavior, can be modeled easily. Knowledge of behavioral issues for every age, contributes to improve rearing methods, to know the requirements and to address them and to eliminate abnormal aspects or aggressive behaviors in dogs.

Study of feeding behavior and food specificity of these breeds of dogs can provide important information for owners and breeders, very useful information to increase activity towards final approval of the national breed shepherd dogs.

Knowing, the quantitative and qualitative needs of each species and breed, as well as the composition of the appropriate feedstuffs, well balanced food rations could be designed and properly fed to the animals. However, considering the multitude of possible influential factors, it is well to follow the nutritional values referred into standardized tables, as average values and to interpret them in relation with live weight dynamics and health status.

The national literature insufficiently emphasizes on the nutrition of dog breeds and poor referential could be found related to the national Shepherd dogs.



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Foreign authors deepen investigated the matter and presented papers which treat dog nutrition topic. However, they did not focus on the Romanian breeds.

Due to height and conformation peculiarities of the shepherds dogs, there could be observed differences related to food quantity, energy level and to food needs, generally.

Certain pet food companies use feedstuffs with low digestibility level, which are not specific to carnivorous diet (animal/vegetal residues, corn gluten).

Canine youth of large size presents rapid growth, therefore needs to supplement the daily diet with vitamins and minerals, in order to avoid growing troubles. Frequently, the absorption problems cause such troubles, even more than dietary deficiencies for certain nutrients. These issues are, however, particular in certain genetic lines and do not affect a breed as a whole.

The research of the national dogs breeds feeding could provide valuable data both for their husbandry and for definitive recognizing and homologation.

Currently, dogs could be fed either using a “home cooked” diet, either through an industrial manufactured food, bought from retailers.

Depending on the origin, proportion and quality of the industrially produced food (pet-food), this could be classified in: budget food, premium food and superpremium food. This division is accepted for all food types produced industrially.

Processed food for dogs – pet food – appeared due to comfort reasons and followed the evolution and changes in dogs breeds. It reached to be as close to the requirements and being differentiated on age categories, physiological status and body development. More and more feedstuffs are added to the approved list, while other ingredients are eliminated, due to their allergenic potential. Dried food has many advantages, ranging from ingredients inner quality to preservation features.

Knowing that during the last year, pet rearing spread at national level, it imposes to better know the nutritional needs and of feeding behavior for dogs. The novel character of the researches is given by the fact that Romanian Shepherds breeds are taken into study, while they are still inbred and their nutritional specificity is not well known.

Most of the breeds homologated in other countries were studied under the nutritional aspects. Thus the players in the pet food industry elaborate specific feed sorts, adapted to punctual requirements of those breeds, for different sizes, ages, physiological statuses.



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Study of canine ethology offers multiple possibilities for researching. Romanian breeds are more interesting because they are at the onset of genetic improvement, thus very close to the instinctual habits, compared to other dogs which carry out decades of artificial selection in their genome, or even multiple consanguinities. These facts often depreciate the instinctual behavior (eg maternal behavior) and the immune status. Feeding behavior of the adult dog is formed during juvenile period, so mother-baby relationship (in the nest) and agonistic behavior and establish the hierarchy (in the nest and / or kennel) have important influences on a normal behavioral development.

A series of deviant feeding behaviors (bulimia, anorexia, pica, scavengers, coprophagia, poly-and oligo-dipsia etc.) are influenced by improper appropriation of ethological types related to social and explorative in group of dogs.

It is certain that feeding plays a decisive role in the prophylaxis of these abnormalities. Romanian breeds have rusticity, good health and proper transform nutrients, better than other breeds. Studying the shepherds dogs feeding could help us to set their appropriate configuration, in order to definitively homologate them at the International Chinology Federation

The dissertation entitled *Researches on the canine youth feeding specificity, in romanian shepherd type breeds* comprises two sections: *literature survey* and *original achieved results*, followed by *conclusions and advisory*.

The literature survey was divided in three chapters: *ch. I* comprises general notions related to shepherd breeds and their history; *ch. 2* reveals certain important aspects related to dog nutrition and feeding, really useful to understand the digestive system morphology, therefore the basis for design and optimise food rations on this species; *ch. III* emphasises on certain aspects with direct and indirect influence onto the food behavior (feeding, water intake, excretion etc.).

The second section was divided in three chapters and the final conclusions and advisory. Thus, *ch. IV* describes the main research goal, the used materials and applied investigation methods, in order to achieve high accuracy; *ch. V* presents the organisatoric mainframe which hosted the researches and the experimental design on stages; *ch. VI* presents the results of the research and their discussion ana analysis.



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In order to achieve the goal, an experimental protocol was designed; three experimental groups including 5 Mioritic Romanian shepherd breed, females with variable ages. Two females - CERNA and EDELA - were primiparous and three multiparous, IOANA ELI and CLARA. Feeding behavior was observed in puppies throughout weaning period and until 105 days when the puppies had the permanent dentition.

The first experimental group was formed with IOANA and ELI females, who received only cooked food throughout gestation period. Nutrient content of the ration was 5.07% CP, 5.12% EE and an energy content of 1026 kcal / kg ME.

The second experimental group made up of females CLARA and EDELA, was divided into two periods in terms of the type of food that was given. The first period (0-42 days of gestation) with **Bellosan** dry food (pet food) dry food containing protein 18%, fat 8% and a energy value of 2250 kcal / kg ME. In the second period (42-62 days of gestation) females within the experimental group received **Purina Pro Plan** dry food (pet food) containing protein 26%, fat 16% and a energy value of 2650 kcal / kg ME.

The third experimental group consisted of female CERNA, received for the entire gestation period only vegetal originated food (rye bread) containing 9.88% protein, 1.3% fat and a energy value of 2320 kcal / kg ME.

This latter group was considered the control group, with the accurate goal to follow the development of the female fed exclusively with vegetal originated food, and it's conception products, whereas there is the theory that dogs with the evolution of feeding behavior in time, have become omnivores or even "vegetarians".

In order to have more accurate data regarding cooked food chemical composition, samples were taken and analyzed periodically in the Quality Control Laboratory, Faculty of Animal Husbandry, following the current legislation and standards.

Puppies resulted from the five females had a exclusively milk based diet until the age of 21 days when they started to received also **Puppy Quick** dry food (pet food), containing 32% protein, 12% fat and 3580 Kcal / kg ME until the age of 42 days, when they were weaned. Through the end of the experiment (105 days) the puppies were fed only hith dry granulated food.

For the period 1-42 days and 49-105 days, several ethological observation moments were chosen, days 1 to 7 (first week of life the chicks, adaptation to extrauterine), 14 (start



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peeling eyes), 21 (eyes completely peel, early eruption of milk teeth), 35, 42 (weaning), 49, 63, 77, 91, 105 (appearance of permanent dentition).

In order to draw up etograms observations were centralized in a designed observation sheets containing 12 and 24 hours intervals. Specific activities were pursued of the following types of behavior: feeding (sucking and / or dry food consumption), exploration, rest in waking, sleeping and other activities (excretion, play, socialization, grooming, etc.).

Another category of relevant indicators that can influence the nutrition and the normal development of offspring during juvenile period is represented by weight dynamic parameters, related to body mass during calving-weaning, and health status of the puppies: basal temperature and fecal score and compliance with prophylactic protocol against infectious diseases.

In order to avoid excessive stress on puppies, gravimetric measurements were recorded while rectal temperature was taken. For every moment of observation, these parameters were recorded in the morning at 8:00, after the separation of the puppies from mothers.

Fecal score method involved assessing the health status of subjects by observing daily stool consistency and scoring them in a sheet observation using a scale of values from 1 to 5: 1 – hard dry feces, 2 hard, formed stool, 3 – soft, formed stool, 4 – soft, unformed stool; 5 – watery liquid (Apanavicius et al., 2007).

Differentiated nutrition in pregnant bitches has influenced both their somatic development, and the products of conception. At birth, the female that was fed exclusively with vegetal diet showed the lowest weight and lowest number of viable puppies.

The best performance was obtained at birth by female who received cooked food throughout the gestational period and whose nest weighed 6.55 kg and included 10 puppies.

Frequency of feeding by sucking pups throughout the lactation period ranged between 5.33 rounds / day (litter whose mother received dry food in gestation and farrowing winter) - 5.99 rounds / day (litter whose mother received exclusively vegetal diet in gestation and whelped in winter). The situation that occurred in the litter with most sucklings can be explained partly by the need to compensate pups weight deficiency who were born and the fact that there was a greater availability of breastfeeding mothers (only 3 puppies per litter).



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As with age, there was a reduction in frequency of sucklings, inversely related to the duration allocated to each period of feeding, leading to a gradual increase daily allotted time period for this type of behavior.

Reported to daily observation periods (24 hours), eating behavior of the puppies occupied 1.26% on the first day of life, gradually increasing to 1.50% (age 7 days), maintaining the same level relative to 14<sup>th</sup> day 1 - 1.53% (eye opening), then reaching 1.66% on day 21 (the appearance of milk teeth and the introduction of solid food - one meal per day), reaching a maximum of 2.69% on day 35 of life and decreasing to 0.66% (42 days old puppies, fully formed teeth, one sucking and 3 portions per day).

Along with age, ethograms revealed the decrease of sleep activity (from 66.85% to 49.33% at birth to 42 days), while other activities were increased in parallel with the development of puppies sensorial orienteering (exploratory behavior, from 29.27% to 34.02%, other types of behavior - playing, socializing etc., from 1.25% to 9.34%).

Average daily gain of puppies at the end of the lactation period (1-42 days) had in average, the highest value for the litter 3-GI (mother that received cooked food in gestation, winter whelping) and the lowest one for the litter 5-GV (vegetal food for the mother in pregnancy, parturition in summer). A possible explanation may be given by the unbalanced diet and lack of animal originated nutrients in the mother feed during pregnancy, which resulted in a weight of 1500 g for the litter 5-GV (the lowest one), hence a slower development of the offspring.

Regarding the health of the puppies during lactation, it was monitored through indicators "fecal score" and basal temperature, which ranged mostly within the limits of normal variation, pathological conditions are absent. The only time when basal temperature had values that were located slightly above the upper limit of normal were periods of stress caused by the appearance of milk teeth and that separation from their mothers for weaning puppies.

In practice, it is recommended to gradually wean the puppies, alternating the periods of mother presence and separation during the day. Technique must be onset at least two weeks before weaning, in order to prevent aggressive type behaviors caused by stress of weaning.



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After weaning, feeding activity increased progressively occupying in 24 hours from 3.22% (49 weeks) to 4.62% (at approx. 3 months of life); puppies received dry food, in three portions, at intervals set by the owner and amounts related to their rate of development.

During 42 days (weaning) and 105 days (emergence of permanent dentition), the proportion occupied by sleep in waking in the 24-hour cycle, were gradually reduced in favor of other behavioral manifestations, characteristic for puppy's psycho-somatic development and imposed requirements by continuous adaptation to the environment (exploratory behavior, play, hierarchy, sanitation and so on).

Due to low genetic improvement the studied breed is very adaptive and flexible; there is still sufficient sources of variability to be exploited in future research on Romanian shepherd breed regarding nutritional recommendations, in order to propose the most appropriate food sources for both youth and adults . The original results presented in this paper may, therefore, provide the basis for further research in this area.