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COMPARATIVE STUDY OF FALLOW DEER (DAMA DAMA) REARED IN DIFFERENT HABITATS

Tandzhu Mehmedov[1], Zaprianka Shindarska[1], Harry Irgev[2], Petar Stamberov[1]

[1]University of Forestry, Faculty of Veterinary Medicine, Sofia, Bulgaria
[2]Hunting area "ELEDJIK" of National Hunting and Fishing Association – Union of Hunters and Anglers in Bulgaria (UHAB)
E-mail: tmehmedov@ltu.bg

ABSTRACT

A study of fallow deer reared in enclosures at the „Eledjik" hunting farm and free-range at the „Studen kladenets"hunting farm was carried out. Both habitats are at different altitudes and the natural food base differs in terms of grassland, botanical composition and nutritional value. The study included an examination of blood samples from fallow deer's from both habitats. The following biochemical indicators of the blood were examined: albumin, protein, calcium, phosphorus and magnesium. In order to determine the digestibility of the nutrients, samples were taken from the natural meadows and pastures found in the habitats as well as faecal samples tested for: moisture, protein, fat, raw ash and (mineral) and non-nitrogenous extracts. The results show differences between the studied indicators in the two habitats, which are probably due to the differences in the botanical composition of the grass in the natural habitats, as well as to the different composition of the ration used for supplementary feeding.

Key words: fallow deer, blood samples, free-range, reared in hunting enclosures.

Introduction

Over the last decade, intensive game rearing has started at intensive game rearing bases (IGRB) in our country. The base is a fenced area, set up in a hunting reserve relation for the intensive breeding of game above the allowed stock of the habitat (LHGP, 2006). The bases for intensive game rearing are fenced areas where the game is mainly breeded for intensive and highly efficient domestic and international tourism as well as intensive game meat production (Ordinance No. 6/2004). Compared to free-range wild game, the enclosed can be protected from poachers and predators, selected to improve its qualities, with a gender ratio of 1: 2 in favor of females.

Essential to the breeding and quality (hunting trophies and meat) of game in the IGRB is the right choice of game type due to the specific biological requirements of individual species. In their evolution, the individual species are adapted to certain natural conditions to which they adapt difficult when changed abruptly. A number of studies in Bulgaria and around the world have proven the advantage of a fallow deer in this aspect.

Purpose of the study

In the present study we aimed to conduct comparative studies of wild reared fallow deer and fallow deer reared in bases for intensive management of the game (BIMG).

Materials and methods

Two hunting farms were used – Eledjik, where a fallow deer is reared in enclosures and in hunting farm – Studen Kladenets, where the fallow deer is free ranged. The two hunting farms are located in different regions of the country. Characteristics of the habitats:

Hunting farm – Studen kladenets

The farm is located in the eastern Rhodopes at altitudes up to 800 m. This implies a variety of habitats, incl. this of fallow deer. The highest percentage is occupied by habitats on dry soils where low-stem oak forests dominate with undergrowth of hawthorn, dogwood, hornbeam, the open areas are with rich grass composition. A forest fruit presence is represented by wild pear, wild apple, cherry, wild plum and mulberry tree. Near the settlements and the abandoned neighborhoods there are different fruit trees.

Hunting farm – Eledjik

The farm is located at 400-500 meters above sea level in Sredna Gora Mountain. There is a small soil layer of acid soils. In the farm fallow deer is bread in enclosures, which requires the creation of meadows and pastures from existing meadows (≈40 decares). Sowing has been applied to enrich the grass composition, using a grass mix 50/50 birdsfoot trefoil and cocksfoot. On 42 decares of meadows, full processing and sowing has been applied. Annual and perennial crops were used.

During the study samples from the natural meadows and pastures from both farms were taken in order to examine their botanical and chemical composition, as well as fecal samples that allowed the determination of the digestibility of nutrients in natural meadows and pastures. An indicator method was used, taking representative samples of fodder and faeces. Blood samples were also taken from randomly selected fallow deers (without age consideration) from both farms. Some biochemical indicators of blood albumin, protein, calcium, phosphorus and magnesium have been studied.

Results and discussion

In Figure 1 is represented the ratio of the grass composition (wheat / legumes) of both farms. It is noticeable the tendency towards a better ratio of the grassland composition at the hunting farm Eledjik to the one at the hunting farm Studen Kladenets, which is probably due to the processing of meadows and pastures despite the poorer soils.

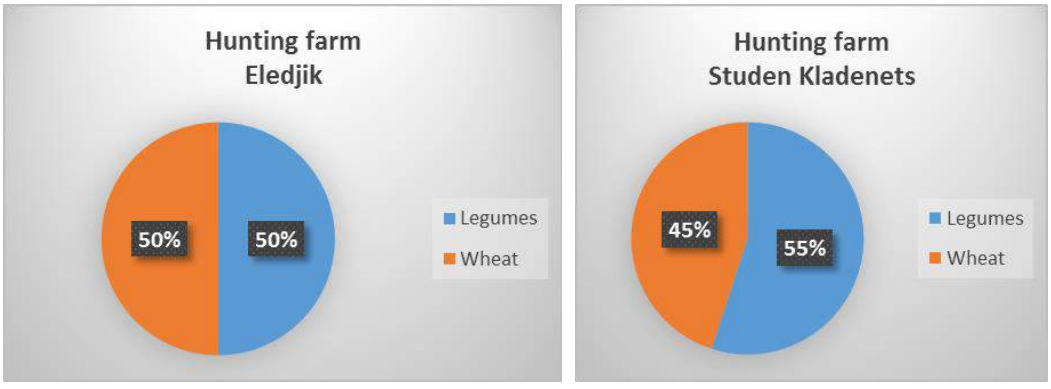

Figure 1: Botanical composition of natural meadows and pastures

Table 1: Chemical composition of meadows and pastures

Hunting farms	Chemical indicators						
	Moisture, %	Dry matter, %	Crude protein, %	Crude fat, %	Crude fiber, %	Crude ash, %	NFE, %
Studen Kladenets	42.51	57.49	13.05	3.33	24.01	15.77	37.54
Eledjik	62.41	37.59	14.35	2.80	19.58	24.72	31.53

The chemical composition of the meadows and pastures (Table 1) shows differences between the both hunting farms. With regard to dry matter (DM), the percentage is higher (57.49 vs. 37.59) at hunting farm Studen kladenets. With regard to protein content, the trend for a higher percentage is in favor of hunting farm Eledjik. Perhaps the processing of meadows and pastures (including supplementary sowing and full sowing) had an impact on their composition. Although the density of game in the BISD is greater, the protein content is 1.3% higher. The values are also higher for the Eledjik hunting farm concerning mineral substances (ash (24.72% compared to 15.77% for the Studen kladenets hunting farm).

With regards to crude fats (CF), the differences in the composition between both farms are less than 1%. Crude Fibers (CF) are higher on the grass in the Studen Kladenets Farm (24.01% vs. 19.52%) compared to the Eledjik Farm. Similar is the trend with NFE, which is more in the grass of the Studen Kladenets farm. Differences in the chemical composition of the natural meadows and pastures are unproven. Probably they are affected by climatic conditions, although the samples for analysis are taken in the same season. Our results can not be confirmed by other studies (ours and others), which requires more systematic research (in dynamics) of grass.

Table 2: Chemical composition of the fecal samples and digestibility ratios of the nutrients

Hunting farms	Chemical composition of the fecal samples													
	Moisture, %		Dry matter, %		Crude protein, %		Crude fat, %		Crude ash, %		Ca, %		P, %	
	VIII	X	VIII	X	VIII	X	VIII	X	VIII	X	VIII	X	VIII	X
Studen Kladenets	53.40	56.87	44.60	43.13	11.47	10.47	2.77	4.06	7.85	12.61	1.12	1.09	0.41	0.33
Eledjik	41.42	46.67	58.58	53.33	10.13	10.49	2.90	2.98	20.65	18.70	1.49	1.56	0.37	0.31
	Digestibility ratios of nutrients													
Studen Kladenets	-	-	59.89	59.72	62.93	61.63	44.99	44.25	-	-	-	-	-	-
Eledjik	-	-	59.13	59.80	60.17	58.70	42.16	58.40	-	-	-	-	-	-

Table 2 presents the chemical composition of the examined fecal samples taken from the hunting farms. It is noteworthy the higher values of CP in fecal samples taken from a fallow deer at Eledjik farm, unlike the CP of grass. It is most likely that these differences are due to the fact that we have year-round supplementary nourishment in Eledjik hunting farm, both in concentrated feed and hay. As for crude protein, its content is higher in the Student Kladenets farm, where the deer is grown freely, and the absorption is probably lower. The tendency for lower absorption of nutrients is also maintained in dynamics (August and October), with the impression that for October the absorption is lower than August for crude protein. The content of calcium and phosphorus in fecal

samples is higher in the Eledjik hunting farm compared to Studen Kladenets hunting farm, with higher values of calcium for October in Eledjik, and no significant differences are observed in Studen Kladenets. Similar are the trends for phosphorus too. The surveyed results of the fecal samples for both farms show a greater stability in the changes in the composition of the Eledik farm, which we attribute again to the year-round supplementary feeding.

The data obtained from the chemical composition of the grass and the fecal samples from both farms are also confirmed by the calculated nutrient digestibility ratios. It is noteworthy that, irrespective of the cultivation (hunting enclosures or free ranged), the digestibility ratio for both hunting farms with respect to DM is within (59.72–59.80) with a tendency for a higher CP digestibility index of the free ranged fallow deer (farm Studden Kladenets). Unlike protein digestibility factors that decrease in dynamics, CF digestibility ratios vary, especially for fallow deer in enclosures, with differences in August and October of 16%.

Table 3: Biochemical indicators of blood (mean ± SD)

Indicators	n	Studen Kladenets (2013)	n	Studen Kladenets (2014)	n	Eledjik (2013)	n	Eledjik (2014)
Albumin, g/l	8	67.80 ±5.4	8	50.30 ±4.1	5	49.75 ±3.2	5	45.03 ±3.4
Protein, g/l	8	81.90 ±6.1	8	73.00 ±5.2	5	68.90 ±4.8	5	71.57 ±4.5
Ca, mmol/l	8	2.30 ±0.43	8	1.10 ±0.23	5	2.10 ±0.35	5	1.35 ±0.32
P, mmol/l	8	3.30 ±0.87	8	2.30 ±0.75	5	2.90 ±0.71	5	2.23 ±0.67
Mg, mmol/l	8	1.90 ±0.25	8	1.50 ±0.21	5	1.70 ±0.18	5	1.55 ±0.16

Table 3 presents the biochemical indicators of fallow deer reared in hunting enclosures and free ranged. With respect to the albumin, the mean values for two consecutive years are in the range of 67.80–50.30 g/l for free-range deer. The values are higher than those for fallow deer reared in hunting enclosures (27% for the first year and 10% for the second year). With regard to blood protein, the trend for higher free-range wild game values is maintained (with 16% for the first year and 2% for the second year). Our results are similar to those of N. Poljičak – Milas et al. that find for albumin in adult fallow deer ranges between 34,36 g/l to 43,04 g/l and for total protein in adult fallow deer ranges between 63.35 g/l to 79.41 g/l. G. Vengušt and A. Bidovec find for albumin in adult fallow deer ranges between 32.80 g/l to 46.60 g/l and for total protein in adult fallow deer ranges between 55.10 g/l to 70.10 g/l which is similar to our data. In terms of calcium, in the first year of study of the free-range game, the values were insignificantly higher (2.30 mmol/l vs 2.10 mmol/ l), and for the second year were insignificantly lower (1.10 mmol/1.35 mmol/l). Similar is the trend for phosphorus for the first year of study, with the latter also showing higher values for free-range fallow deer. With regard to the macroelement magnesium, the trend for the first year of the study is preserved, as well as with calcium and phosphorus, and for the second year differences are not observed. Our results are similar to those of S. Padilla et al., that find that calcium in free-range red deer ranges between 1.90 mmol/l to 2.55 mmol/l, phosphorus in free-range red deer ranges between 2.03 mmol/l to 2.90 mmol/l, and magnesium in free-range red deer ranges between 0.62 mmol/l to 1.32 mmol/l. Olav Rosef et al. find calcium in red deer reared in hunting enclosures ranges between 1.90 mmol/l to 2.00 mmol/l, phosphorus in red deer reared in hunting enclosures ranges between 1.12 mmol/l to 1.36 mmol/l, and magnesium in red deer reared in hunting enclosures ranges between 0.46 mmol/l to 0.50 mmol/l. which is similar to our data.

From the obtained biochemical indicators of the blood of free-range deer and those in enclosures it is seen that the values are higher in free-living game than in hunting enclosures, especially in the first year of study. This difference and higher blood biochemical values are probably due to the fact that free-range game alone selects its food, unlike hunting enclosure in hunting enclosure where human intervention can control some of these parameters to some extent by controlling the composition of the food.

Similar research and results have been received by other authors, but we also need to take into account the fact that similar research has not been done in our country.

Conclusion

The results show differences between the studied indicators in the two habitats, which are probably due to the differences in the botanical composition of the grass in the natural habitats, as well as the different composition of the ration used for supplementary feeding.

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