

PUBERTY AGE AND BODY WEIGHT OF THE WATER BUFFALO HEIFERS

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ABSTRACT

The evolution of WATER buffalo breeding is related to reproduction of water buffaloes and maintaining and increase of their population. A problem is the delayed maturation of the body and the occurrence of puberty.

This aim of this study was to clarify and confirm issues such as age (in days) and body weight (in kg) during the puberty. It has been performed on the basis of 71 water buffalo heifers observed.

Within our surveys, the age of puberty of young buffalo cows of the breed known as Bulgarian Murrah varies from 404.3 ± 3.9 to 543.2 ± 19.5 days, the mean body weight being 359.6 ± 13.3 kg.

The age of the start of puberty (i.e. the maturity) is been affected by the season of birth. Most (70.9%) of water buffalo heifers exhibit signs of puberty occurrence between September and December, included. This can be explained by the shorter daylight time that results in higher levels of melatonin in animals during this season and the positive impact of indoleamine on their sexual centrum and reproductive function.

Key words: water buffalo, puberty, reproduction, hormones, season.

Introduction

Preserved over the centuries in Bulgaria and other countries, this amazing biological species the water buffalo, characterizes the economic aspect of specific regions in Bulgaria and worldwide. The evolution of this livestock sub-sector depends on the population available, which is related to reproduction of buffaloes and its problems, which lead to significant delays in the development of buffalo breeding, as a whole. Along with problems of diet, there are also other specifics of buffalo reproduction. Among them is the late reaching of adulthood due to the extended period of puberty. Against the background of the comparatively high milking rate of Bulgarian Murrah breed, the specifics of the process of breeding, and especially its late maturity, are all of particular economic significance. This is the reason to have to examine the occurrence of puberty in young buffalo cows, together with certain factors that can affect it. In order to be able to characterize the age of puberty, the most important signs are the appearance of the first oestrus combined with respective age and body mass of the young buffalo cows. The young animals require greater resource for a relatively longer period of time, without any visible return on funds, which affects the profits from buffalo breeding. Heinrich (1993), R. Smith (1996), Peeva Ts. (2000), Chadhuryh and P. Ahmed (1979) have conducted an accurate experiment at a Pakistani Experimental Station and found that water buffalo heifers' maturity occurs, as an average, on the 984-th day, the variation being between the 530-th day and the 2023-rd day and a body weight of 451 kg. According to Shalash (1985), the puberty in Egyptian water buffalo heifers occurs between 431-st day (in winter period) and 506-th day (in the summer period). Similar are the results obtained by Ebling F. (2003), Kanchev et al. (1999, 2006), Madan and Prakash (2007), Zin D. (2003). Many authors report the impact of various factors influencing this age and body mass at the time of the occurrence of puberty. Baychev (2007) reports that spring-born buffaloes reach puberty at 14 months of age and at a body weight of 380 kg. Kanchev L. and Zh. Baichev (2008) find identify much older age (in days) of the start of maturity of water buffalo heifers born in the autumn-winter season, explaining this with the circadian rhythmic. Later in the years, Kanchev L. and al. (2010) highlight the great influence of the birth season

on the age of occurrence of puberty. According to Hafez (1992), puberty age ranges from 15 to 36 months.

It would be appropriate to specify certain well confirmed and detailed issues such as: time, age and body mass at the onset of young buffalo cows' puberty. This is reason why we set our goal to determine the age in days and body weight in kg of young buffalo cows at the moment of the start of their puberty depending on their birth season.

Materials and methods

The study has been carried out on a water buffalo farm of 142 animals kept on whole-herd basis (all together) primarily for meat production. These were 43 buffalo cows of at least one season, 23 young buffalo bulls (males) and 76 young buffalo cows (females). It took one (1) year, during which we had to identify all the indicators adopted (season of birth, age in days and body weight in kg). The animals were accompanied with individual data on the ascertained date of birth. During the whole study period, 31 young buffalo cows have shown signs of oestrus assessed by visible signs (reaction to attempts of jumping over by males, behaviour demonstrating demand for contact with males). All those of oestrus occurring have been determined as age in days and body mass in kg. The animals were divided into four groups depending on the season of their birth (spring, summer, autumn and winter). A survey method was developed for the information on identification number, date and season of birth, the date of first oestrus, age in days and body weight in kilograms. The statistical processing of data was performed by using statistical software „SPSS v.17.0 “.

Results and discussion

The results obtained from his study are summarised in the following table and figure

Table 1: Age (in days) and body weight (in kg) for the young buffalo cows of oestrus occurring dependant on the season of their birth

Season of birth	n, number of animals	Age (days)	Body weight (kg)
		(mean \pm s.e.)	(mean \pm s.e.)
Spring	8	404,3 \pm 3,9	324,5 \pm 6,4
Summer	9	491,6 \pm 12,2	360,2 \pm 5,9
Autumn	8	543,2 \pm 19,5	372,7 \pm 8,4
Winter	6	469,4 \pm 8,7	351,1 \pm 11,9

Table 1 shows the data for the studied 31 pubertal water buffalo heifers assessed by clinical signs as demonstrating oestrus. Based on the digital data presented therein, it can be concluded that by both age and body mass, the young buffalo cows enter their puberty period differently. The puberty occurs at an earliest age (an average of 404 \pm 3.9 days) in those born in spring, which are also the animals of lowest weight (324.5 \pm 6.4 kg). The animals of highest body weight at the time of the start of adolescence were those born in autumn (372.7 \pm 8.4 kg), but it is logically that they were also the oldest ones (of age of 543.2 \pm 19.5 days). It should be highlighted that there were relatively large differences depending on the birth season and the subsequent occurrence of puberty. These were 139 days and almost 50 kg, respectively.

Data presented reveal also some other facts as clearly outlining. First and foremost, it is apparent that there is a significant levelling of the individual body weight within each single group, the only exception being for those born in winter, where the error of the arithmetic mean is the

highest (± 11.9 kg). On the other hand, there are relatively large differences in body weight at the time of reaching puberty that depend on the season of their birth.

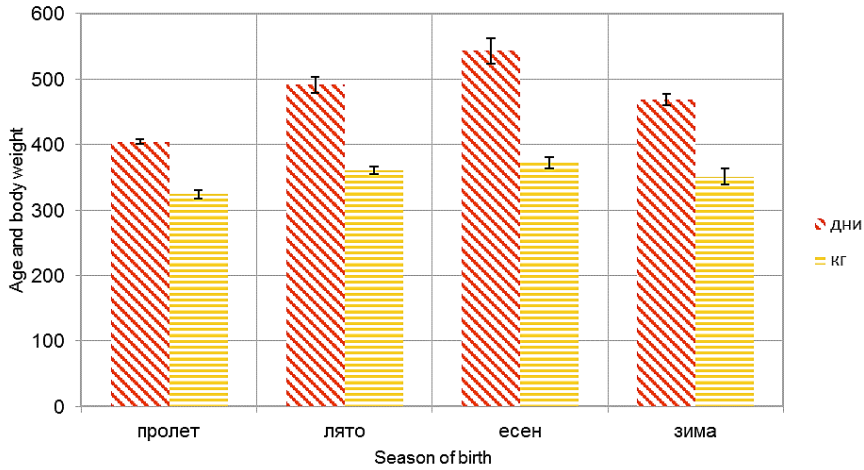


Figure 1: Graphical expression of the age reached (in days) and the body weight (in kg) of the young buffalo cows that have manifested oestrus depending on the season of their birth.

The puberty of water buffalo heifers occurs at relatively high levels of their body weight, which is even more obvious, if compared with the body mass of the adult buffalos, since it is more than 50% of the ones of their mothers.

The analysis of the data animal by animal revealed that most of the young buffalo cows enter into puberty during the period from September to January. In our case, their percentage was 70.9%.

The mean body weight of all the young buffalo cows, regardless the season of their birth season, that have shown signs of their first oestrus and that have begun to cycle was 359.6 ± 13.3 kg.

Figure 1 gives graphical presentation of the results for age (days) and body weight (kg) at the time of start of puberty, if assumed that the oestrus we have established is indicative for this start. The values for the age correlate with the ones of body weight and are positively proportionate to them.

Apparently, the start of puberty of young buffalo cows is season-dependant. It is influenced by the season of their birth and is related to genetically implicated signs of the reproductive seasonal manifestation of the first oestrus. This seasonality in the future reproductive function of the young buffalo cows is to be overcome primarily by the way of their farming, feeding and climatic conditions, thus resulting in all-year-round type of propagation. Water buffaloes, both females and males, are known for the late onset of their puberty. According to Hafez (1992), respective age of females varies widely (between 15 and 36 months), averaging at 21 months (84-85 weeks).

With water buffalo heifers there is a correlation between the seasons of birth and the start of puberty, as well as concerning the colder months when the intensity of the first oestrus is higher. In our case, with the 31 selected young buffalo cows of manifested oestrus, accepted by us to be the initial one or one of the first ones of manifestation, which we have adopted as puberty started, the age is relatively low and varies between 404.3 ± 3.9 and 543.2 ± 19.5 days. This is largely attributable to the whole-herded, free range keeping of the 76 young buffalo cows designated to slaughtering, all kept together with the male population of the herd.

There are certain contradictions, but a number of authors, including Baychev (2007) in his doctorate, prove and confirm that within the first months after the birth the pineal gland of males and females does not synthesize melatonin, this process beginning little later, continuing of high intensity with the onset of puberty, and then decreasing with the increase of the age of adult animals. Thus, those born during the greater lighted part of the year have the opportunity during their first autumn-winter period to synthesize greater amount of melatonin, which can explain their faster sexual maturation.

Conclusion

Based on the results of the study performed, the following more significant conclusions could be drawn:

1. Our surveys demonstrated that the age of the onset of puberty of Bulgarian water buffalo heifers (of the breed known as „Bulgarian Murrah) ranges from 404.3 ± 3.9 to 543.2 ± 19.5 days, respective mean body weight being 359.6 ± 13.3 kg.

2. This age of the start of adolescence in the said animals is influenced by the birth season. Most (70.9%) of the water buffalo heifers have exhibited the clinical signs of puberty occurred between September and December, inclusive. This could be explained by the shorter lighted period of the day resulting in higher levels of melatonin in animals natural for this season and the positive impact of indolamine on their sexual centre and their reproductive function.

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