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SEASONAL VARIATIONS IN SEMEN CHARACTERISTICS  
OF EGYPTIAN BUFFALO BULLES

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## INTRODUCTION

In Egypt, the increasing human population, makes increase in livestock population, both quantitatively and qualitatively, urgently necessary. Ruminants are of special interest because of their unique ability to convert waste or coarse materials into protein of high biological value. Of course, buffaloes are outstanding, even at this elementary genetic point of development, they are endowed by nature with well documented natural advantages. For instance they produce high quality lean meat which contain lower cholesterol content than the most popular meats sold in the market today. They have a higher food utilization rate. An estimated lower cost per pound liveweight production than other beef cattle today (est. 40-45 ¢ /lb. vs 65-70 ¢ /lb for beef cattle). Also, they are capable of producing a relatively large yield of milk as compared with native cattle. They have a much higher percentage of milk fat than many existing dairy animals (7-9% vs. 3.5-4%). One kilogram of butter takes only 10 kg of buffalo milk versus 20 kg of cow milk. The present viscosity of buffalo milk makes it highly suitable to be consumed as liquid milk or for making the most popular kind of cheeses. It is estimated that one kilogram of Domladi cheese takes only 3.3 kg of buffalo milk versus 5 kg of cow milk. Buffaloes have a longer productive life. It is common to find a relatively higher percentage of buffaloes with five or more lactation periods. The percentage is

40% in the farms belonging to this institute. Besides, the fact that buffaloes are well adapted to the subtropical environment of Egypt. This concept constitutes a very major advantage that must be considered.

Despite buffalo advantages yet this animal in this locality tend to have a relatively low rate of reproduction as compared with dairy cattle. It is the author feeling that reproductivity of buffaloes could be much improved by improving management, nutrition, disease control and breeding. Any national strategy for improving this most neglected domestic animal should be based on these four aspects and should include male and female sides.

Few number of investigators studied the quality of buffalo semen using in vitro laboratory tests. Some of them studied the impact of season of the year and sequence of ejaculation on the quality of semen produced. Results of their researches have varied considerably because of differences due to breed of buffalo, management, number and age of bulls, nutrition, locality, season impact, physical conditions of bulls, handling of semen and semen tests adopted.

The object of the present work, therefore, is to clarify the effect of season of the year and sequence of

ejaculation on sexual desire and semen quality - as judged by some laboratory tests - of River Nile buffaloes. Five sexually mature buffalo bulls were used. Bulls very close with respect to their age and weight. They were kept under a uniform managerial and nutritional conditions all the year round. Semen was collected twice weekly at almost equal intervals during the testing periods, at each collection two successive ejaculates were obtained.

## REVIEW OF LITERATURE

The seasonal nature of the reproductive activity is well recognized in many species and breeds of farm animals. Environmental factors comprising climatic, nutritional and managerial conditions are the most important non-genetic factors affecting reproduction both, in males and females. Kushwaha, Mukherjee and Bhattacharya (1955) reported that, semen quality and quantity of male farm animals vary not only in the different geographic regions, but also during the different seasons of the year.

In buffaloes, the seasonal reproductive trends have long been studied for the several breeds under the various environments and localities including: Egyptian buffaloes (Hafez, 1952; Ashor and El-Ehrley, 1958; El-Sheikh and Mohamed, 1965; El-Fouly, Kotby and El-Sherar, 1970) and Indian buffaloes (Singh, Sharma and Singh, 1950; Sand, 1962; Loowami and Kumar, 1968; Raw, Patel and Behren, 1972).

In the present work, the seasonal trends and semen characteristics of buffalo bulls is affected by breed, sequence of ejaculation and season of the year will be reviewed.

### 1. Sexual activity:

libido or sex drive of male bulls is expressed by

reaction time (the period from approaching the bull to the teaser until ejaculation), has been studied by several workers. The average value of reaction time of Egyptian buffalo bulls was found to be 46.06 seconds (Oloufa, Sayed and Bahweldin, 1959); 328.98 seconds (Ibrahim, 1969); 56.15 seconds (El-Hariri, 1975), 98.33 seconds (El-Azab, 1980) and 109 seconds (Mohamed, 1982).

In Indian buffaloes, Jumar, Misra and Johari (1966) recorded a mean value of 79 seconds, whereas Gill, Gangwar and Takmar (1979) indicated that the time was 24.29 seconds. Otherwise, Rajamurugan and Ramakrishnadevaile (1981) observed a higher reaction time of 109 seconds for buffalo bulls in Sri-Lanka.

Several studies were conducted to show the effect of sequence and frequency of ejaculation on the sexual decline of buffalo bulls.

In Egypt, Ibrahim (1969) found a highly significant difference in reaction time between first (188.86) and second (180.41 seconds) ejaculations. The same significant trend was also reported by El-Hariri (1975) who gave mean values of 63.72 and 44.29 seconds for first and second ejaculations respectively. On the same trend, El-Azab, et al. (1977) failed to show any significant difference in reaction time due to

sequence of ejaculation. Values of 98.98 and 158.04 seconds were recorded for the first and second ejaculates. In another trial they noted that, libido of buffalo bulls was improved when the rate of ejaculation was increased from two to four or six ejaculates/week. Moreover, a non significant difference in reaction time was also reported between first (99.55) and second (97.12 seconds) ejaculates (El-Azab, 1980).

In Indian Kussah bulls, Gengar and Sharma (1965) claimed that, reaction time was higher in the second (143.0) than in the first (94.9 seconds) ejaculates with no significant difference. They also reported a gradual decline in the sexual desire on successive ejaculates.

Seasonal variations in the reaction time were observed by some researchers. In scientific literatures concerning this phenomenon for some species of ruminants are shown in (Table 1).

However, there is a controversy by several authors about, whether the observed seasonal sexual desire and semen quality variations are related or independent of each other (Khanolkar, et al., 1969; Gengar, 1966; Glouff, et al., 1959; Sengul and Sharma, 1973 and et al., 1974). Otherwise, El-Gaballati, et al., (1979) concluded that, buffalo bulls with high sexual desire also, had a better semen quality semen.

Table 1. Mean and standard deviation of time (seconds) of some  
 types of work.

| Work                   | Index                      | Means of work |                       | Number of jobs<br>of each<br>type |
|------------------------|----------------------------|---------------|-----------------------|-----------------------------------|
|                        |                            | Mean          | Standard<br>deviation |                                   |
| Preparation<br>of work | Preparation of work (1950) | 45.36         | 35.20                 | 47.00                             |
|                        | Preparation of work (1951) | 47.40         | 35.00                 | 45.00                             |
|                        | Preparation of work (1952) | 47.78         | 35.20                 | 45.00                             |
|                        | Preparation of work (1953) | 47.00         | 35.00                 | 45.00                             |
| Total                  |                            | 46.88         | 35.00                 | 180.00                            |
| Preparation<br>of work | Preparation of work (1950) | 46.43         | 35.00                 | 45.00                             |
|                        | Preparation of work (1951) | 47.00         | 35.00                 | 45.00                             |
|                        | Preparation of work (1952) | 47.00         | 35.00                 | 45.00                             |
|                        | Preparation of work (1953) | 47.00         | 35.00                 | 45.00                             |
| Total                  |                            | 46.88         | 35.00                 | 180.00                            |

Mean = 46.88 seconds of 1/2 level.

Standard deviation = 35.00 seconds of 1/2 level.

## 2. Ejaculate Volume:

It is well known that the volume of the ejaculated semen depends on the size and activity of accessory genital organs; rate of semen utilization and the intensity of sexual preparation of bulls prior collection.

The overall means of the ejaculate volume recorded by several workers for some breeds of buffaloes are shown in table (2). From this table it is clear that the average volume per ejaculate for Egyptian buffaloes ranges between 1.97 and 3.49 ml. For Indian river buffaloes the range was between 1.64 and 5.06 ml. It should be mentioned that the average ejaculated volume for buffaloes is lower than the ejaculate volume in cattle (Dasgupta and Faaborg, 1955; Pomeroy, et al., 1966; Al-Hariri, 1973; Farid, 1977 and Mohamed, 1981).

For the effect of frequency of ejaculation on the ejaculate volume in Egyptian river buffaloes, El-Dewany (1961) found a highly significant difference between first (2.28 ml) and second (2.09 ml) ejaculates. The same result was obtained by El-Hariri (1973) who reported a mean value of 2.66 and 2.79 ml for first and second ejaculates respectively. Values reported for this character by Al-Hariri, et al. (1977) were 2.23 and 1.93 ml for first and second ejaculates, the difference between means was significant. El-Dewany also found a non significant