Reproductive and productive performance of cows of the Tabapuã breed

Desempenho reprodutivo e produtivo de vacas da raça Tabapuã

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ABSTRACT
The objective of this study was to evaluate the performance of 369 Tabapuã cows, from Copacabana farm, in Xambrê-PR, Brazil. Data was submitted to ANOVA, means assessed by the Duncan test, gestation rates and percentages by Chi square (p <0.05). 76.56% (369/482) of the cows presented age ($\mu + \sigma$) of 6.80 + 2.93, and the gestation rate (TG) of the third service, the final TG and the service period varied with the age of cows (p <0.05). The TG of the first and second service, the final TG, the percentage of empty cows and the PS varied according to the number of calving of the cows (p <0.05). The average daily weight gain of calves, weaning weight and calf age varied with cow age (p <0.05). The total percentage of calves weaned and the percentage of males and females did not vary with the age of the cows (p> 0.05). It was concluded that: 1. the age of the cows influenced the TG of the third service, the final TG, the percentage of empty cows, the average daily gain of calves, weaning weight and calf age; 2. the number of births influenced the TG of the first and second services, the final TG, the percentage of calves weaned, the average daily weight gain of calves, calf weight and age; 3. the year of the last calving of the cows influenced the abortion rate, the TG of the first service, the final TG and the number of services / conception, the period of service, the average daily gain of calves, weaning weight and in the age of the calf, and 4. the sex of the calves influenced the average daily weight gain and the weaning weight.

Keywords: Cattle; Tabapuã; IATF; Weight gain.
RESUMO
O objetivo deste estudo foi avaliar o desempenho de 369 vacas Tabapuã, da Fazenda Copacabana, em Xambrê-PR, Brasil. Os dados foram submetidos à ANOVA, as médias foram avaliadas pelo Teste de Duncan, as taxas de gestação e porcentagens pelo Chi quadrado (p<0,05). 76,56% (369/482) das vacas apresentaram idade (media + desvio padrão) de 6,80 + 2,93, e a taxa de gestação (TG) do terceiro serviço, a TG final e o período de serviço variaram com a idade das vacas (p<0,05). A TG do primeiro e segundo serviço, a TG final, a porcentagem de vacas vazias e o PS variaram de acordo com o número de partos das vacas (p<0,05). O ganho médio diário de peso dos bezerros, o peso ao desmame e a idade dos bezerros variaram com a idade da vaca (p<0,05). A porcentagem total de bezerros desmamados e a porcentagem de machos e fêmeas não variaram com a idade das vacas (p>0,05). Concluiu-se que: 1. a idade das vacas influenciou a TG do terceiro serviço, a TG final, a porcentagem de vacas vazias, o ganho médio diário de bezerros, o peso ao desmame e a idade dos bezerros; 2. o número de partos dos animais influenciou a TG do primeiro e segundo serviços, a TG final, a porcentagem de bezerros desmamados, o ganho médio diário de peso dos bezerros, o peso e a idade dos bezerros; 3. o ano do último parto das vacas influenciou a taxa de aborto, a TG do primeiro serviço, a TG final e o número de serviços / concepção, o período de serviço, o ganho médio diário dos bezerros, o peso ao desmame e idade do bezerro e 4. o sexo dos bezerros influenciou o ganho médio diário de peso e o peso ao desmame.

Palavras-chave: Gado; Tabapuã; IATF; Ganho de peso.

1 INTRODUCTION
Brazil has the largest commercial cattle herd in the world, which has been raised almost entirely in pasture, without the use of supplementary feed, except for the supply of minerals, resulting in meat produced in a sustainable way, minimizing the aggression, and integrating the activity into the environment (Aragon et al 2001).

Cutting livestock has been undergoing a process of modernization, due to the need to increase productive efficiency, caused in part by the opening of markets and competition for other types of meat. In order to maintain competitiveness, it is necessary to increase the productivity of cattle, which can be achieved by combining improvements in management, nutrition, reproduction and sanity, together with animals with higher genetic potential (Filho et al 2002).

Like the rest of the country, the State of Paraná has an extensive cattle ranch. Approximately 9.3 million heads form the Parana herd (Department of Rural Economy), allocated in 223,000 properties with an average size of 140 heads and 40,000 producers. The most expressive regions in cattle ranching in the State are the Municipalities of Umuarama and Paranavaí (Mezzadri, 2007).
Zebu cattle (Bos indicus) correspond to approximately 80% of the bovine herd, possibly due to the greater adaptability to the climatic conditions (high temperatures and humidity) and the seasonal availability of food, mainly forage, found in tropical Brazil. Despite the adaptive characteristics of zebu cattle to tropical conditions, in the great majority of Brazilian herds there is a compromise in the reproductive indexes (Ministry of Agriculture, 2016).

Among the zebu breeds, Tabapuã stands out, as a result of crosses between domestic cows and animals of Indian origin (such as Nelore and Guzerá), due to the reproductive advantages of the early age at first calving, fertility, maternal ability and development of calves (Brazilian Association of Zebu Breeders, 2016).

Considering that the maintenance of reproductive efficiency is one of the main factors that contribute to the improvement of the productive performance and economic return of the Tabapuã herds of animals (Ferreira, 1991; Peixoto, Moura and Faria, 1993), this study aims to evaluate the reproductive and productive performance of cows Tabapuã breed.

2 MATERIAL AND METHODS

This study was carried out at Copacabana farm, in a herd of the Tabapuã Breed, formed by 369 cows, located at latitude south 23° 45 '18.3', longitude 53° 33' 5.86 ' and 409 meters elevation, in the municipality of Xambrê, Northwest of the State of Paraná, Brazil.

All the animals studied were extensively localized in an area of 279 alqueires, divided into 14 homogeneous paddocks, composed of MG-5 (Brachiaria brizantha cv.MG-5), Capim Mulato 2 (Brachiaria hybridus) and Brizantão (Brachiaria brizantha cv. Marundu).

The animals were distributed on the pickets by the date of the last calving, following a pasture rotation system, supplemented with mineral salt and water ad libitum. All animals presented similar body condition during the study, and were submitted to the same protocol of artificial insemination at fixed time (IATF), being the non pregnant female submitted to natural mating, from September 2015 to April 2016.

We collected the zootechnical data: identification of the animal, age (years), number of births, last calving (year, sex and calf weight, and abortion occurrence), quarterly calf weighing (kg), date and type of service (IATF or MN) and diagnosis of gestation.

Based on the data collected, we calculated: percentage of births of males and females (number of males and females / number of calves born x 100), percentage of abortion (number of abortions / number of pregnant females x 100), percentage of weaning calves (number of calves weaned / number of calves born x 100), weaning weight adjusted at 205 days (Milagres,
average daily gain of weight (kg - last weight / number days life), age of calves number of services per conception, gestation rate in different services (gestation number in different services / number of females inseminated in different services x 100), final gestation rate (total gestation number / total number of females inseminated x 100), percentage of empty cows (number of empty females / total number of females inseminated x 100) and length of service (days - interval from days of birth to first fertile service).

The reproductive parameters (percentage of birth of females and males, abortion rate, gestation rate from first to fifth service, total gestation rate, percentage of empty cows, number of services per conception and period of service) and productive (percentage of weaning calves, average daily calf weight gain, weaning weight and calf age) were organized according to age, calving number, year of last calving and sex of the last calf, of the females studied.

The data were submitted to analysis of variance, the means being tested by the Duncan test, the gestation rates and the percentage data compared by the Frequency Dispersion Test (Chi-Square), considering 5% of significance, using the package Statistical System SAS® Version 9.4 (SAS, 2016).

3 RESULTS AND DISCUSSION

The age ($\mu + \sigma$) of the 369 cows studied was 6.80 $\pm$ 2.93 years. Using data from the Tabapuã herd registry in Brazilian herds, they reported that from 122,446 observations, between 1971 and 1998, the average age of cows was 7.15 $\pm$ 3.01 years (Vercesi Filho et al 2002).

The mean number of calving was 4.25 $\pm$ 2.37, and 49.05% (181/369) were male calves, 42.28% (156/369) calves and 8.67% (32/369) aborted (without definition of sex), as shown in Table 1. A study with 884 Red Poli x Zebu crossbred cows reported a mean of 6.1 calving per cow during the years 1955 and 1971 on farm located in the city of Pitanguereias, state of São Paulo (Benevides, Lôbo and Filho,1997). The authors reported that at the time of the study, the selection pressure was not so present in the properties and the animals remained longer in the same, allowing a greater number of deliveries, with a mean of 43.7 months of age at the first birth and interval of 429 days. In another study, it was reported that 49.60% (18.736 / 37.778) of Tabapuã cows were male and 50.40% (19042/37778) of females (Vercesi Filho et al 2002).
Table 1. Reproductive parameters according to the age of cows of the Tabapuã Breed.

| Parameter                        | Female births (%) | Male births (%) | Abortion rate (%) | Gestation rate in the first service | Gestation rate in the second service | Gestation rate in the third service | Gestation rate in the fourth service | Gestation rate in the fifth service | Empty cows | Period of service (days) | Number of services |
|----------------------------------|-------------------|-----------------|-------------------|-------------------------------------|--------------------------------------|------------------------------------|-------------------------------------|------------------------------------|-------------|------------------------|-------------------|
|                                  | 47,13% (41/87)    | 47,13% (41/87)  | 5,75% (5/87)      | 48,28% (42/87)A                     | 48,89% (22/45)A                      | 48,89% (22/45)A                      | 4,76% (1/21)B                      | 5,00% (1/2)           | 21,84% (19/87)       | 147,59 ± 138,87   |
| Female births (%)                | 38,85% (54/139)   | 52,52% (73/139) | 8,63% (12/139)    | 44,60% (62/139)A                    | 54,55% (42/77)A                      | 45,16% (15/35)A                      | 15,00% (3/20)         | 5,88% (1/17)          | 11,51% (16/139)      | 133,64 ± 123,76   |
| Male births (%)                  | 50,00% (49/98)    | 38,78% (38/98)  | 11,22% (11/98)    | 44,90% (44/98)A                     | 42,59% (23/54)A                      | 37,50% (14/31)A                      | 17,65% (3/17)         | 0% (0/5)              | 14,29% (14/98)       | 131,00 ± 121,51   |
| Abortion rate (%)                | 26,26% (12/45)    | 64,44% (29/45)  | 8,89% (8/45)      | 57,78% (26/45)A                     | 57,89% (11/19)A                      | 35,05% (3/8)A                       | 0% (0/5)              | 11,22% (11/98)        | 14,29% (5/45)        | 84,27 ± 72,67     |
|                                | 42,28% (156/369)  | 49,05% (181/351)| 8,67% (32/369)    | 50,26% (174/369)A                   | 50,00% (98/195)A                     | 35,05% (34/97)B                     | 11,11% (7/63)         | 3,57% (2/56)          | 14,63% (315/369)     | 129,36 ± 121,51   |

The abortion rate, the gestation rate of the first, second, fourth and fifth services, the service period and the number of services per conception did not vary with the age of the cows studied (Table 1). When analyzing 10,069 Nelore grass breeders born between 1971 and 2002 from herds located in the states of Bahia, Maranhão, Tocantins and Pará, the authors reported that the service number per conception was 1.34 ± 0.67 (Azevêdo et al 2006). In another study, using 126 zebu cows, the authors reported 1.85 service per conception (Aragon et al 2001). However, these authors did not relate this index to the age of the females. Specific reproductive parameters of the Tabapuã breed are scarcely available in the literature.

It was verified that the gestation rate of the third service varied with the age of the cows studied, and cows from two to four years presented a lower gestation rate when comparing...
with older cows ($p < 0.05$ - Table 1). In a study with 135 Nelore primiparous cows submitted to FTAI, 37% (50/135) of gestation was observed in the first service (Borges, 2010). Additionally, when studying 40 cows of the Tabapuã breed submitted to TAI, they verified 75% (30/40) of gestation accumulated at the end of the second service (Freitas et al 2007). A similar result can be observed in this study, with 73.71% (272/369) of gestation accumulated at the end of the second service.

The final gestation rate was higher in cows older than ten years, when compared to two to four year old cows ($p < 0.05$ - Table 1). A study Freitas et al 2007 with 376 cows of the Nelore and Tabapuã breeds (91 primiparous and 285 multiparous) in an extensive breeding system reported a final gestation rate of 82.71% (311/376), similar to that found in this study (85 , 37% - 315/369).

The percentage of empty cows was lower in cows older than 10 years ($p < 0.05$ - Table 1). It was reported that 17.29% (65/376) of Nelore and Tabapuã cows (91 primiparous and 285 multiparous) cows in an extensive breeding system remained empty (Rosa, 2015).

The period of service did not vary with the age of the cows studied ($p > 0.05$ - Table 1). When analyzing 10,069 Nelore females raised on pasture, the authors reported an average service period of 165.76 ± 110.29 days (Azevêdo et al 2006), being higher than that found in the present study.

It was found that the percentage of females, males, abortions, the gestation rate of the third to fifth service, the final gestation rate, the percentage of empty cows and the number of services per conception did not vary with the number of birth of the cows studied ($p > 0.05$ - Table 2).
Table 2. Reproductive parameters according to the number of calving of cows of the Tabapuã breed.

| Variables                      | Number of Births                                                                 |
|-------------------------------|----------------------------------------------------------------------------------|
|                               | 1       | 2       | 3       | 4       | 5       | 6       | 7       | Greater than or equal to 8 | General Average |
| Female births                 | 50.79%  | 35.09%  | 36.92%  | 55.88%  | 30.77%  | 57.89%  | 45.45%  | 30.19%                       | 42.28%          |
|                               | (32/63) | (20/57) | (24/65) | (19/34) | (8/26)  | (22/38) | (15/33) | (16/53)                      | (156/369)       |
| Male births                   | 42.86%  | 56.14%  | 56.92%  | 38.24%  | 50.00%  | 34.21%  | 45.45%  | 58.49%                       | 49.05%          |
|                               | (27/63) | (32/57) | (37/65) | (13/34) | (13/26) | (13/38) | (15/33) | (31/53)                      | (181/369)       |
| Abortion rate (%)             | 6.35%   | 8.77%   | 6.15%   | 5.88%   | 19.23%  | 7.89%   | 9.09%   | 5.66%                        | 8.67%           |
|                               | (4/63)  | (5/57)  | (4/65)  | (2/34)  | (5/26)  | (3/38)  | (3/33)  | (3/53)                       | (32/369)        |
| Gestation rate in the first service | 42.86%  | 50.88%  | 44.62%  | 50.00%  | 30.77%  | 47.37%  | 45.45%  | 58.49%                       | 47.15%          |
|                               | (27/63) | (29/57) | (29/65) | (17/34) | (8/26)  | (18/38) | (15/33) | (31/53)                      | (174/369)       |
| Gestation rate in the second service | 55.56%  | 71.43%  | 50.00%  | 29.41%  | 27.88%  | 60.00%  | 22.22%  | 63.64%                       | 50.26%          |
|                               | (20/36) | (20/28) | (18/36) | (5/17)  | (5/18)  | (12/20) | (4/18)  | (14/22)                      | (98/195)        |
| Gestation rate in the third service | 6.25%   | 12.50%  | 33.33%  | 41.67%  | 46.15%  | 62.50%  | 50.00%  | 37.50%                       | 35.05%          |
|                               | (1/16)  | (1/8)   | (6/18)  | (5/12)  | (6/13)  | (5/8)   | (7/14)  | (3/8)                        | (34/97)         |
| Gestation rate in the fourth service | 6.67%   | 28.57%  | 8.33%   | 28.57%  | 14.29%  | 0%      | 0%      | 0%                           | 11.11%          |
|                               | (1/15)  | (2/7)   | (1/12)  | (2/7)   | (1/7)   | (0/3)   | (0/7)   | (0/5)                        | (7/63)          |
| Gestation rate in the fifth service | 7.14%   | 0%      | 9.09%   | 0%      | 0%      | 0%      | 0%      | 0%                           | 3.57%           |
|                               | (1/14)  | (0/5)   | (1/11)  | (0/5)   | (0/6)   | (0/3)   | (0/7)   | (0/5)                        | (2/56)          |
| Final gestation rate          | 79.37%  | 91.23%  | 84.62%  | 85.29%  | 76.92%  | 92.11%  | 78.79%  | 90.57%                       | 85.37%          |
|                               | (50/63) | (52/57) | (55/65) | (29/34) | (20/26) | (35/38) | (26/33) | (48/53)                      | (315/369)       |
| Empty cows                    | 20.63%  | 8.77%   | 15.38%  | 14.71%  | 23.08%  | 7.89%   | 21.21%  | 15.15%                       | 14.63%          |
|                               | (13/63) | (5/57)  | (10/65) | (5/34)  | (6/26)  | (3/38)  | (7/33)  | (5/53)                       | (54/369)        |
| Number of services            | 1.68±   | 1.58±   | 1.72±   | 1.76±   | 2.04±   | 1.71±   | 1.73±   | 1.55±                        | 1.72±           |
|                               | 0.86    | 0.73    | 0.86    | 0.92    | 0.92    | 0.78    | 0.84    | 0.72                         | 0.15            |
| Period of services (days)     | 169.25± | 139.49± | 127.96± | 127.67± | 152.70± | 122.57± | 123.88± | 76.17±                       | 129.36±         |
|                               | 156.85± | 77.77±  | 121.14± | 127.74± | 76.76±  | 101.96± | 92.81±  | 68.85±                       | 121.51±         |

Values followed by different letters on the same row differ (p<0.05)
Values followed by different letters, in the same column, differ (p<0.05)

However, some authors found differences between the nulliparous, primiparous and multiparous categories for the final gestation rate (84%, 43% and 47%, respectively) and percentage of empty cows (16%, 57% and 53%, respectively) in Nelore cows (Batista et al
2012). Similar variation was not observed in this study. In a study with Nelore cows, they reported a multiparous pregnancy rate of 79.9%, higher than that of primiparous females, which was 37.7% (Oliveira, Bonato and Santos, 2011). Variation in gestation rate between multiparous and primiparous was not observed in this study. In a Nelore study, 481 females were evaluated, gestation rate was 86% for nulliparas, 45.3% for primiparous females and 76.8% for multiparous females (Grillo et al. 2015), similar results were observed in nulliparous and nulliparous females. primiparous of the Tabapuã breed.

When considering the year of the last calving, it was observed that the highest percentage of cows calved in 2015 (76.69% - 283/369), followed by those that calved in 2016 (15.18% - 56/369) and in 2014 (8.13% - 30/369) (p <0.05). Table 3 shows that the lowest final gestation rate was observed in cows that gave birth in 2016, where the highest rate of empty cows, lower service period and fewer services per conception were observed when compared to the cows that gave birth in 2014 (p <0.05). However, there was a great variation in the number of animals that had their last births in 2014, 2015 and 2016, being 30, 283 and 56 cows, respectively, which could explain the differences found.

Table 3. Reproductive parameters according to the year of the last calving, in Tabapuã cows.

| Variables                  | LAST birth year | GENERAL AVERAGE |
|----------------------------|-----------------|-----------------|
|                            | 2014            | 2015            | 2016            |
| Female births (n/total)    | 36.67% (11/30)  | 41.70% (118/283)| 48.21% (27/56)  |
| Male births (n/total)      | 43.33% (13/30)  | 50.18% (142/283)| 46.43% (26/56)  |
| Abortion rate (%)          | 20.00% (6/30)   | 8.13% (23/283)  | 5.36% (3/56)    |
| Gestation rate in the first service | 26.67% (8/30)   | 50.53% (143/283)| 41.07% (23/56)  |
| Gestation rate in the second service | 50.00% (11/22)  | 50.71% (71/140) | 48.48% (16/33)  |
| Gestation rate in the third service | 18.18% (2/11)   | 46.38% (32/69)  | 0% (0/17)       |
| Gestation rate in the fourth service | 55.56% (5/9)    | 5.41% (2/37)    | 0% (0/17)       |
| Gestation rate in the fifth service | 50.00% (2/4)    | 0% (0/35)       | 0% (0/17)       |

Brazilian Journal of Development
Final gestation rate 93.33% (28/30)<sup>a</sup> 87.63% (248/283)<sup>a</sup> 69.64% (39/56)<sup>b</sup> 85.37% (315/369)<sup>a</sup>
Empty cows 6.67% (2/30)<sup>b</sup> 11.66% (33/283)<sup>a</sup> 30.36% (17/56)<sup>a</sup> 14.63% (54/369)<sup>b</sup>
Number of services 2.27 ± 1.28<sup>a</sup> 1.65 ± 0.78<sup>ab</sup> 1.63 ± 0.56<sup>b</sup> 1.85 ± 0.36
Period of services 427.46 ± 72.87<sup>a</sup> 100.30 ± 81.22<sup>b</sup> 96.32 ± 46.55<sup>b</sup> 129.36 ± 21.51

<sup>ab</sup>Values followed by different letters on the same row differ (p<0.05)
<sup>AB</sup>Values followed by different letters, in the same column, differ (p<0.05)

When analyzing data from 500 Nelore matrices and 2,500 calving intervals (PID) between 1997 and 2005, high PID values were reported in primiparous attributed to first calving stress and the need for energy mobilization both to maintain lactation and to finalize their body growth (Aguiar and Resende, 2007). The authors also considered that the differences of the PIDs reported in the literature are due to the environmental diversity existing between the regions of the country and the different management techniques used, besides the genetic variability of the herds.

The percentage of calves weaned did not vary with the age of the cows studied (p>0.05 - Table 4). However, the average daily gain of calves (kg) and weaning weight was higher in calves from cows older than five years (p<0.05 - Table 4). Cows over ten years of age weaned younger calves (p<0.05 - Table 4). It has been reported that adult cows generally wean calves that are heavier than young and old cows because they are in a more favorable physiological condition (Bocchi, Fries and Albuquerque, 1999). The age of the mother influences in the prenatal period, in relation to placental differences, and postnatal, by the proportion of care and the production of milk (Samento <i>et al</i> 2003).

### Table 4. Productive parameters according to the age of Tabapuá cows.

| Variables          | SEX     | AGE (Years) | GENERAL AVERAGE |
|--------------------|---------|-------------|-----------------|
| Calves weaned (%)  | MALE    | 35.63 (31/87) | 39.57 (55/139) | 26.53 (26/98) | 57.78 (26/45) | 37.40 (138/369) |
|                    | FEMALE  | 37.93 (33/87) | 30.22 (42/139) | 37.76 (37/98) | 22.22 (10/45) | 33.06 (122/369) |
| TOTAL              |         | 73.56 (64/87) | 69.78 (97/139) | 64.29 (63/98) | 80.00 (36/45) | 70.46 (260/369) |
| Average daily gain of calves weight (kg) | MALE    | 0.72 ± 0.19 | 0.82 ± 0.19 | 0.82 ± 0.19 | 0.81 ± 0.14 | 0.80 ± 0.19 |
|                    | FEMALE  | 0.70 ± 0.12 | 0.77 ± 0.23 | 0.79 ± 0.13 | 0.81 ± 0.15 | 0.76 ± 0.15 |
In a study developed with Nelore cows in the Cerrado Region of Central Brazil (Vieira et al. 2005), it was reported that cows at first calving weaned calves with lower weight, compared to cows from third to eleven calving, consistent with the results found in this study. In addition, the authors (Vieira et al. 2005) added that from the 8th calving there was a new decline in calf weaning weight, which was not observed in this study for Tabapuã cows (Table 4).

In a study developed with the Tabapuã and Nelore breed, using data provided by the Brazilian Association of Zebu Breeders (ABCZ), it was observed that the average daily gain of calves from Tabapuã cows increased from the mother's three years of age (0.678 kg / day for males and 0.629 kg / day for females), with their maximum gain at approximately 6 years and decreasing to 18 years, when the lowest weight gain occurred, and from the age of 11 the cows began to present calves than heifers (Bocchi and Albuquerque, 2005). In a study with the Guzerá breed, it was reported that primiparous cows, and those older than 196 months (older than 16 years), generated lighter calves (Germin et al. 2004). In the same study Germin et al. 2004, cows from 10 years of age presented an initial decline in calf weight at weaning, disagreeing with the results of this study, in which Cows of the Tabapuã Breed, over ten years old, had calves with higher average daily weight gain and weaning weight.

The mean daily weight gain of 0.675 kg / day (males) and 0.614 kg / day (females) for the Nelore breed, and 0.691 kg / day (males), were analyzed by 39,220 Tabapuã and 463,917 Nelore animals. 0.638 kg / day (females) to Tabapuã (Bocchi and Albuquerque, 2005). Studying records of 128,148 Nelore cattle in a pasture production system, it was reported that

| Weight at weaning (kg) | MALE | FEMALE | TOTAL |
|------------------------|------|--------|-------|
| 181.55 ± 39.51         | 201.21 ± 39.14 | 203.03 ± 39.88 | 200.59 ± 28.24 | 197.00 ± 38.59 |
| 176.01 ± 23.60         | 189.52 ± 47.36 | 193.86 ± 26.79 | 197.37 ± 30.52 | 188.15 ± 31.35 |
| 178.78 ± 3.92          | 192.89 ± 35.64 |

| Age of calves (months) | MALE | FEMALE | TOTAL |
|------------------------|------|--------|-------|
| 9.90 ± 5.39            | 8.50 ± 3.21 | 8.00 ± 3.21 | 7.68 ± 0.95 | 8.62 ± 3.70 |
| 9.25 ± 4.38            | 8.95 ± 5.91 | 8.30 ± 3.32 | 7.40 ± 1.40 | 8.70 ± 3.73 |
| 9.56 ± 0.46            | 8.73 ± 0.32 | 8.15 ± 0.21 | 7.54 ± 0.20 | 8.66 ± 3.71 |

Values followed by different letters on the same line differ (p<0.05)
the average daily gain of calves was 0.74 kg / day, similar to the results of this study for Tabapuã calves (0.78 kg / day) ) (Table 4).

Table 5 shows the percentage of calves weaned, the average daily weight gain (kg), the weaning weight (kg) and the age of calves from cows with different calving numbers.

Table 5. Productive parameters according to the number of calving of Tabapuã cows.

| Variables | SEX | Number of births | General |
|-----------|-----|------------------|---------|
|           |     | 1 | 2 | 3 | 4 | 5 | 6 | 7 | More than 7 |
|           | MALE | 36.51 | 40.35 | 46.15 | 17.65 | 38.46 | 26.32 | 27.27 | 50.94 | 37.40 |
|           | (23/63) | (23/57) | (30/65) | (6/34) | (10/26) | (10/38) | (9/33) | (27/53) | (138/369) |
| Calves Weaned (%) | FEMALE | 41.27 | 31.58 | 29.23 | 38.24 | 19.23 | 44.74% | 33.33% | 24.53 | 33.06 |
|           | (26/63) | (18/57) | (19/65) | (13/34) | (5/26) | (17/38) | (11/33) | (13/53) | (122/369) |
| TOTAL | 77.78 | 71.93 | 75.38 | 55.89 | 57.69 | 71.05 | 60.61 | 75.47 | 70.46 |
|           | (49/63) | (41/57) | (49/65) | (19/34) | (15/26) | (27/38) | (20/33) | (40/53) | (260/369) |

Average daily gain of calves

| SEX | MALE | 0.72 ± 0.17 | 0.75 ± 0.22 | 0.81 ± 0.19 | 0.87 ± 0.15 | 0.88 ± 0.19 | 0.85 ± 0.13 | 0.73 ± 0.24 | 0.83 ± 0.14 | 0.80 ± 0.19 |
|     | FEMALE | 0.70 ± 0.11 | 0.77 ± 0.16 | 0.75 ± 0.21 | 0.72 ± 0.09 | 0.82 ± 0.13 | 0.82 ± 0.13 | 0.80 ± 0.15 | 0.79 ± 0.15 | 0.76 ± 0.15 |
|     | TOTAL | 0.71 ± 0.10 | 0.75 ± 0.08 | 0.78 ± 0.04 | 0.79 ± 0.11 | 0.82 ± 0.04 | 0.85 ± 0.02 | 0.84 ± 0.05 | 0.77 ± 0.03 | 0.81 ± 0.03 | 0.78 ± 0.17 |

Average daily weight of calves (kg)

| SEX | MALE | 11.86 ± 6.17 | 8.86 ± 3.70 | 8.36 ± 2.44 | 6.62 ± 1.75 | 7.33 ± 1.10 | 9.13 ± 3.85 | 7.93 ± 3.54 | 7.47 ± 1.02 | 8.62 ± 3.70 |
|     | FEMALE | 181.51 ± 34.68 | 187.02 ± 45.30 | 200.17 ± 38.06 | 212.78 ± 38.92 | 214.38 ± 27.54 | 209.20 ± 27.54 | 200.20 ± 48.87 | 203.62 ± 29.42 | 197.00 ± 38.59 |
|     | TOTAL at FEMALE | 175.74 ± 22.86 | 189.09 ± 31.89 | 186.59 ± 43.51 | 179.28 ± 36.62 | 199.38 ± 17.57 | 200.27 ± 27.05 | 195.77 ± 18.34 | 193.66 ± 30.75 | 188.15 ± 31.35 |

Weight of weaning calves (kg)

| SEX | MALE | 178.63 ± 4.08 | 188.06 ± 1.46 | 193.38 ± 9.60 | 196.03 ± 23.69 | 206.88 ± 10.61 | 204.74 ± 6.31 | 190.19 ± 7.89 | 198.64 ± 7.04 | 192.89 ± 35.64 |
|     | FEMALE | 11.86 ± 6.17 | 8.86 ± 3.70 | 8.36 ± 2.44 | 6.62 ± 1.75 | 7.33 ± 1.10 | 9.13 ± 3.85 | 7.93 ± 3.54 | 7.47 ± 1.02 | 8.62 ± 3.70 |
|     | TOTAL | 181.51 ± 34.68 | 187.02 ± 45.30 | 200.17 ± 38.06 | 212.78 ± 38.92 | 214.38 ± 27.54 | 209.20 ± 27.54 | 200.20 ± 48.87 | 203.62 ± 29.42 | 197.00 ± 38.59 |

Braz. J. of Develop., Curitiba, v. 6, n.4, p.20925-20941 apr. 2020. ISSN 2525-8761
Age of calves (months) | FAMLE | TOTAL |
|----------------------|-------|-------|
| 9.99 ± 5.09          | 10.93 ± 1.32 | 13.26 |
| 9.62 ± 4.03          | 9.24 ± 0.54  | 8.76 |
| 9.01 ± 4.13          | 8.68 ± 0.46  | 8.23 |
| 8.64 ± 4.08          | 7.48 ± 1.64  | 7.13 |
| 7.31 ± 1.44          | 7.32 ± 0.01  | 7.02 |
| 8.14 ± 3.06          | 8.63 ± 0.22  | 8.03 |
| 7.61 ± 1.41          | 7.70 ± 0.06  | 7.43 |
| 7.38 ± 1.39          | 7.43 ± 0.22  | 7.43 |
| 8.71 ± 3.73          | 8.66 ± 3.71  | 8.66 |

Values followed by different letters on the same line differ (p<0.05)

In a study conducted with cattle of the Tabapuã breed, raised in an exclusively pasture regime, weaning average weight of 170.30 ± 24.51 kg was reported at 205 days of age (Germin et al 2004). When performing genetic evaluations of growth characteristics of Tabapuã animals, they reported that the mean weight at weaning at 205 days was 172.53 ± 21.55 kg (Ribeiro et al 2009). The evaluation of 14,918 animals of the Nelore breed in an exclusive grazing regime showed a mean weaning weight of 178.42 ± 28.96 Kg (Boligon, Albuquerque and Rorato, 2008), and the evaluation of 128,148 Nelore animals in a pasture system showed weight weaning weight of 171.15 kg, close to seven months of age (Boligon, Albuquerque and Rorato, 2008). Table 5 shows that the weaning weight of Tabapuã calves studied in both males and females was higher than those reported in the studies cited.

It was observed that the year of the last calving of the cows influenced the average daily gain of calves, weaning weight and age of the calf (p <0.05 - Table 6), without, however, observing difference between male calves and weaned females (p> 0.05).

Table 6. Productive parameters according to the year of the last calving of Tabapuã cows.

| Variables                  | SEX | Year of last birth | GENERAL AVERAGE |
|----------------------------|-----|--------------------|-----------------|
| Calves weaned (%)          |     | 2014 | 2015 | 2016 | 2014 | 2015 | 2016 |
| MALE                       |     | 43.33 (13/30) | 44.17 (125/283) | 0 (0/56) | 37.40 (138/369) |
| FEMALE                     |     | 36.67 (11/30) | 39.22 (111/283) | 0 (0/56) | 33.06 (122/369) |
| TOTAL                      |     | 80.00 (24/30) | 83.99 (236/283) | 0 (0/56) | 70.46 (260/369) |
| Average daily gain of calves weight (kg) | MALE | 0.52 ± 0.06 | 0.81 ± 0.18 | 0.82 ± 0.15 | 0.80 ± 0.19 |
| FEMALE                     | 0.50 ± 0.01 | 0.78 ± 0.02 | 0.80 ± 0.01 | 0.76 ± 0.15 |
| TOTAL                      | 0.51 ± 0.06 | 0.79 ± 0.06 | 0.81 ± 0.06 | 0.78 ± 0.17 |
| Weaning weight (kg)        | MALE | 140.79 ± 1.30 | 200.83 ± 37.83 | 202.23 ± 29.75 | 197.00 ± 38.59 |
| FEMALE                     | 133.73 ± 1.86 | 191.56 ± 30.12 | 195.43 ± 19.48 | 188.15 ± 31.35 |
| TOTAL                      | 137.26 ± 4.99 | 196.20 ± 6.55 | 198.83 ± 4.80 | 192.89 ± 35.64 |
The percentage of weaned calves was similar between males and females, being 37.40% (138/369) and 33.06% (122/369), respectively (p > 0.05 - Table 7). Similarly, the mean age at weaning did not vary between them (8.62 ± 3.70 and 8.71 ± 3.73 months for males and females, respectively - p > 0.05 - Table 7). Male calves showed average daily gain (kg) and weaning weight (kg) when compared to females (p < 0.05 - Table 7). Similar variation between males and females in relation to weaning weight were observed in a study that used 2,973 Nelore calves born between 1992 and 2003, the offspring of 849 females from a herd located in the Southwest region of the State of Goiás, where males obtained a mean weight to weaning at the age of eight months of 188, 22 kg, while females reached 176.99 kg in the same period (Viu et al 2006).

Table 7. Productive parameters according to sex, in the Tabapuã breed.

| Variables                  | Calf Sex     | GENERAL AVERAGE |
|----------------------------|--------------|-----------------|
|                             | Male         | Female          |
| Calves weaned (%)           | 37,40 (138/369) | 33,06 (122/369) | 70,46 (260/369) |
| Average daily gain of calves weight (kg) | 0.80± 0.19a    | 0.76± 0.15b    | 0.78 ± 0.17 |
| Weight at weaning(kg)       | 197,00± 38,59a | 188,15± 31,35b | 192,89 ± 35,64 |
| Idade dos bezerros (meses)  | 8,62 ± 3,70   | 8,71 ± 3,73    | 8,66 ± 3,71 |

abcValues followed by different letters on the same line differ (p<0.05).

Using average daily gain data from animals of the Nelore breeds (463,971 animals) and Tabapuã (39,220), from the archive of the Brazilian Association of Breeders of Zebu (ABCZ), it was reported that the means of average daily gain of weight, observed for Nelore and Tabapuã were 0.675 and 0.691 kg / day for males, and 0.614 and 0.638 kg / day for
females, respectively (Muniz and Queiroz, 1998). Values higher than these were reported in this study (Table 7).

4 CONCLUSION

Under the conditions of this study, we conclude that:

1. The age of the cows influenced the gestation rate of the third service, the final gestation rate, the percentage of empty cows, the average daily weight gain of the calves, the weaning weight and the age of the calf;

2. The number of calving of the cows influenced the gestation rate of the first and second service, the final gestation rate, the percentage of calves weaned, the average daily weight gain of calves, calf weight and age;

3. The year of the last calving of the cows influenced the percentage of abortion, the rate of gestation in the first service, the final gestation rate, the percentage of empty cows, the number of services / conception, the period of service, the average daily weight of calves, the weaning weight and the age of the calves, and

4. The calves' sex had an influence on the average daily weight gain and weaning weight.

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