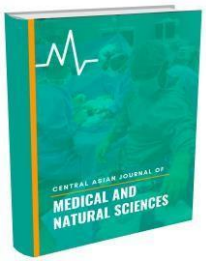

CENTRAL ASIAN JOURNAL OF MEDICAL AND NATURAL SCIENCES
https://cajmns.centralasianstudies.org/index.php/CAJMNS
Volume: 05 Issue: 04 | October 2024 ISSN: 2660-4159

.

Article

Ovarian Dimensions of Domestic Female Donkey (Equus Asinus) During Iraq Summer

Rabab S. Kadhim[1*], Sinan A. Mohamad[2]

1. Department of Anesthesia, College of Health and Medical Techniques, Sawa University, AL-Muthanna, Samawah, Iraq
2. Department of Surgery and Obstetrics, College of Veterinary Medicine, University of Baghdad, Baghdad, Iraq

* Correspondence: Rabab.sameer@sawauniversity.edu.iq

Abstract: This study provides data on the ovarian dimensions of domestic female donkeys (Equus asinus) during the ovulatory season (May to July) in Iraq's hot summer. While previous research on equine ovarian dimensions exists, there is limited data specific to donkeys in extreme climates, revealing a knowledge gap. The research aimed to measure the length, width, and weight of the ovaries in seven adult donkeys undergoing left flank unilateral ovariectomy. Results indicated mean dimensions of 30.30 mm in length, 23.70 mm in width, and 12.48 g in weight. These values were lower than those reported in earlier studies, suggesting that high summer temperatures may affect ovarian size. This data contributes to understanding reproductive adaptations in donkeys under harsh environmental conditions.

Keywords: Jenny, Ovary, Equus Asinus, Ovarian Dimensions, Iraq, Female Donkey

1. Introduction

Donkeys are one of the most useful livestock species. Ninety-six percent of these animals live in developing nations. They are mostly utilized for human transportation, packing, riding, and as draft animals. Recently, International demand for donkey goods, including skin gelatin and hypoallergic milk, is high. As a result, donkey populations have sharply declined, and 79% of domestic donkey breeds are currently in danger of being extinct [1,2,3]. All species depend on successful reproduction for their continued existence and evolution. Understanding the variables influencing donkey reproductive and breed-specific needs is necessary to increase the population of these animals and preserve their variety [4]. Unlike most of the domestic species, very little is known about donkey's reproduction [5].

Seasonal breeders those that actively breed just for a certain amount of time each year. They govern numerous physiological and behavioral processes by using the variations in day length as a calendar [6]. The time between one ovulation and the next, during which each ovulation is followed by estrous symptoms, is known as the estrous cycle [7].

The length of daylight (photoperiod) is the primary factor that determines the seasonality of reproductive activity in equids [8,9]. So, the length throughout the ovulatory season that equids experience based on the latitude in which they currently reside,

Citation: Rabab S. Kadhim, Sinan A. Mohamad. Ovarian Dimensions of Domestic Female Donkey (Equus Asinus) During Iraq Summer. Central Asian Journal of Medical and Natural Science 2024, 5(4), 864-868.

Received: 6th August 2024
Revised: 6th Sept 2024
Accepted: 13th Sept 2024
Published: 20th Sept 2024

nevertheless, additional elements that may contribute include climate, diet, genetics, and other environmental factors [10,11,12] the breeding season of donkeys (Equus asinus) is similar to that of horses and extends from March to August [13]. It was discovered that the estrous length increased significantly in the spring and summer as opposed to the fall and winter. Summer diestrus was shorter than other diestrus [14].

Nonetheless, the potential influence of ambient factors such as temperature and natural lighting on the ovary size of the female donkey and in seasonal breeding, is still awaiting further investigation [15,16,17]. With the intention of supplying fresh knowledge for the ovarian dimensions during the ovulatory season and in such dry, sunny summer in Iraq country, the purpose of the research was the investigator of the potential connection between ovarian dimensions and the seasonal influence in the domestic female donkey (Equus Asinus) this including the ovary length, width, and weight [18,19]

Ethical approval

This study was approved by the local committee of the animal care and use at the College of Veterinary Medicine within the University of Baghdad (Number 1601 in 05/09/2022) [20].

2. Materials and Methods

Seven adult healthy female donkeys aged (3-4 years) And weighted (150-250 kg) were used in the presented study [21]. The animals kept under similar conditions of management and feeding, in exposed paddocks and subjected to the atmospheric conditions of nature under natural day length for the whole trial. Surgical operations were done in ovulatory season of domestic female donkey [22,23] Unilateral ovariectomy was done traditionally through left flank region. The operation was done under sedation Acepromazine (vetoquinol®/ France) at dose (0.01-0.5 mg/kg B.W.) (McFadzean & Love, 2017) and paravertebral nerve block with (0.01 to 0.014 mL/kg B.W.) of 2% lidocaine hydrochloride (Mobedco-Vet®/ Jordan) (Woodie, 2013). To ascertain the length and width of each ovary, a digital caliper was used and weighted by a digital medical electronic balance immediately after surgery (Figure 1) [24,25].

Figure 1. Shows the measurement of length and width by digital caliper, and the weight by digital medical electronic balance of the left ovary of domestic female donkeys

Statistical Analysis

To ascertain the impact of various elements on the research parameters, the Statistical Analysis System- SAS (2018) application was utilized. In this study, the T-test was employed to compare the values [26].

3. Results and Discussion

As far as we are aware, this is the initial research project. to examine the outcome of seasonality in a long, hot, dry weather in Iraq on all the ovarian dimensions length, width and weight in the equids species. A deeper comprehension of the ovaries requires the data provided in this paper, which are considered the most dynamic organ responsible for regulating reproductive events in the female reproductive cycle, also to be a reference for further studies [27].

The ovaries are small, bean-shaped organs that remain such until puberty. Depending on the stage of reproduction being studied, the ovary's composition changes, nonetheless, the ovary is primarily made up of a connective tissue stroma that backs up the interstitial tissue additionally, the germinal elements-follicles and corpora lutea. All these structures are parts of the ovarian dimensions [28].

(Table 1) shows the mean (±SD), (±SE) and range of each parameter of the ovary dimensions of all seven left ovaries that were measured Ovary weight results 12.48 (±3.48SD) (±1.31SE) (range 6.70 – 15.60) are similar to results of (Shawky, et al 2020) whom mentioned the left ovary weight in young age donkeys is 14.00±2.83SE, and also that the combined ovarian weight and left ovaries are significantly ($P< 0.05$) lower in young age (1-7 years old) Jennies in contrast to middle-aged or older animals , Shawky, et al 2020 found out in their experiment that despite the dry summer with less green fodder the overall weight of the ovaries was significant ($P< 0.05$) comparatively higher in the summer than in other seasons.

In compare to Renner-Martin, et al (2009), investigation results, the ovarian dimensions of our study are lower in value, where the length was 43.5±5.38SD and width 32.4±7.44SD in their measurements, while the ovary weighted 33.98±9.44. in our point of view the possible explanation is the variation of animal breed, country weather and time of seasonality when the ovary was measured [29]. The equids are a long day seasonal breeder, and as such, typically goes through a summer ovulatory season of reproduction. As one could anticipate, therefore, the size of ovulatory follicles would rise or fall in response to reproductive activity. There is no doubt that there are many factors affect the ovarian size in the same animal specious, whether its age, the animal breed, time within the breeding season, or the reproductive activity. The primary reason of variation in ovarian dimensions is follicular composition.

The biggest ovaries are anticipated to be in heat, the presence of many follicles can cause medium to large ovaries. However, this study does not support the measurement of follicular size by its own but believed it had an effect on the ovarian dimensions, 60% of the experimental ovaries had a follicular at time of measurement (Figure 2). Follicles can be 2-20 mm in size. The least follicle size at the end of the season has been decumented by (Hinrichs & Schmidt, 2000) and a greater follicle size at the start of the season, as suggested by research by Raz, et al (2009). The presented study recommends the further studies to consider the follicular size out of the ovary dimension, plus compare the ovary dimensions between ovulatory season and un-ovulatory season [30].

Table 1. Mean, SD, SE and Range of ovarian dimensions, SD: Stander deviation. SE: Stander error.

Ovarian dimensions	No	Mean	SD	SE	Range
Length (mm)	7	30.30	0.76	0.28	29.20 – 31.20
Width (mm)	7	23.70	2.27	0.86	20.90 – 28.00
Weight (g)	7	12.48	3.48	1.31	6.70 – 15.60

Figure 2. Shows left ovarian folliculars of domestic female donkey

4. Conclusion

In conclusion, this study provides novel insights into the ovarian dimensions of domestic female donkeys (Equus asinus) during the ovulatory season in Iraq's hot summer. The results indicated that the mean ovarian length, width, and weight were lower than those reported in previous studies conducted in different environmental conditions, suggesting that high temperatures and climate may influence ovarian size. This study contributes valuable data on reproductive adaptations in donkeys under extreme climatic conditions, highlighting the need for further research into the effects of environmental factors, such as temperature and day length, on ovarian and follicular development. Future studies should also investigate comparisons between ovulatory and non-ovulatory seasons to better understand these reproductive dynamics.

Acknowledgements

Our deepest gratitude and appreciation to Professor Assistant Serwa Ibrahim Salih whom recommended to take these values.

Conflict of interest

The authors declare that neither the publication nor the funding of this work present a conflict of interest.

REFERENCES

[1] W. R. Allen and R. V. Short, "Equine reproduction: From genetics to behavior," Proc. R. Soc. B: Biol. Sci., vol. 263, no. 1370, pp. 189-194, 1997.

[2] G. H. Arthur, "The ovary of the mare in health and disease," Equine Vet. J., vol. 1, no. 4, pp. 153-156, 1969.

[3] S. A. Asdell, Patterns of Mammalian Reproduction, Ithaca, NY: Cornell Univ. Press, 1964, p. 530.

[4] C. Aurich, "Reproductive cycles of horses," Anim. Reprod. Sci., vol. 124, no. 3-4, pp. 220-226, 2011.

[5] T. L. Blanchard, T. S. Taylor, and C. L. Love, "Estrous cycle characteristics and response to estrus synchronization in mammoth asses (Equus asinus americanus)," Theriogenology, vol. 52, no. 5, pp. 827-834, 1999.

[6] N. C. Cary, Statistical Analysis System, User's Guide, Version 9.4, 4th ed., SAS Inst. Inc., USA, 2018.

[7] F. J. P. Ebling and M. H. Hastings, "Neural basis of seasonal reproduction," J. Anim. Breed., vol. 3, pp. 15-9, 1999.

[8] G. Evans and W. M. C. Maxwell, Salmon's Artificial Insemination of Sheep and Goats, Butterworths, 1987.

[9] M. J. Evans and W. O. Sack, "Prenatal development of domestic and laboratory animals: Growth curves, external features and selected tissues and organs," J. Anim. Sci., vol. 36, no. 3, pp. 448-462, 1973.

[10] L. J. Freedman, M. C. Garcia, and O. J. Ginther, "Influence of photoperiod and ovariectomy on seasonal reproductive activity in mares," Biol. Reprod., vol. 20, no. 6, pp. 567-574, 1979.

[11] O. J. Ginther, Reproductive Biology of the Mare: Basic and Applied Aspects, Cross Plains: Equiservices Publishing, 1992.

[12] O. J. Ginther, S. T. Scraba, and D. R. Bergfelt, "Reproductive seasonality of the jenney," Theriogenology, vol. 27, no. 4, pp. 587-592, 1987.

[13] E. S. E. Hafez and B. Hafez, Reproduction in Farm Animals, 7th ed., Philadelphia: Lippincott Williams & Wilkins, 2000.

[14] K. Hinrichs and A. L. Schmidt, "Meiotic competence in horse oocytes: Interactions among chromatin configuration, follicle size, cumulus morphology, and season," Biol. Reprod., vol. 62, no. 5, pp. 1402-1408, 2000.

[15] H. M. Immegart and E. H. Heath, "The estrous cycle and ovulation in the domestic animal," J. Vet. Res., vol. 45, no. 3, pp. 215-223, 1984.

[16] C. H. G. Irvine and S. L. Alexander, "Factors influencing the seasonal reproductive activity in mares," Anim. Reprod. Sci., vol. 35, no. 3-4, pp. 193-211, 1994.

[17] W. McFadzean and E. Love, "How to do equine anaesthesia in the field," In Pract., vol. 39, no. 10, pp. 452-461, 2017.

[18] M. D. Morel, J. R. Newcombe, and K. Hayward, "Factors affecting pre-ovulatory follicle diameter in the mare: The effect of mare age, season and presence of other ovulatory follicles (multiple ovulation)," Theriogenology, vol. 74, no. 7, pp. 1241-1247, 2010.

[19] P. Nagy, D. Guillaume, and P. Daels, "Seasonality in mares," Anim. Reprod. Sci., vol. 60, pp. 245-262, 2000.

[20] T. Raz and K. Aharonson-Raz, "Ovarian follicular dynamics during the estrous cycle in the mare," Isr. J. Vet. Med., vol. 67, no. 1, pp. 11-18, 2012.

[21] T. Raz, B. Hunter, S. Carley, and C. Card, "Reproductive performance of donor mares subsequent to eFSH treatment in early vernal transition: Comparison between the first, second, and mid-season estrous cycles of the breeding season," Anim. Reprod. Sci., vol. 116, no. 1-2, pp. 107-118, 2009.

[22] T. F. P. Renner-Martin, G. Forstenpointner, G. E. Weissengruber, and L. Eberhardt, "Gross anatomy of the female genital organs of the domestic donkey (Equus asinus Linné, 1758)," Anat. Histol. Embryol., vol. 38, no. 2, pp. 133-138, 2009.

[23] J. Saragusty, A. Lemma, T. B. Hildebrandt, and F. Göritz, "Follicular size predicts success in artificial insemination with frozen-thawed sperm in donkeys," PLoS One, vol. 12, no. 5, p. e0175637, 2017.

[24] K. K. Schillo, The Endocrinology of Reproduction, Hoboken: John Wiley & Sons, 2002.

[25] L. G. Segabinazzi et al., "Structural and functional dynamics of the ovary and uterus during the estrous cycle in donkeys in the Eastern Caribbean," Animals, vol. 13, no. 1, p. 74, 2022.

[26] S. M. Shawky et al., "Factors affecting ovarian activity in donkeys: The effect of season, age and body condition score (BCS)," 2020.

[27] I. Vasantha, "Physiology of seasonal breeding: A review," 2016.

[28] E. D. Watson and M. O. Al-Zi'abi, "Characterization of morphology and angiogenesis in follicles of mares during spring transition and the breeding season," 2002.

[29] J. B. Woodie, "How to use local and regional anesthesia for procedures of the head and perineum in the horse," in Proc. Ann. Conv. Am. Assoc. Equine Pract., 2013, pp. 464-466.

[30] O. Yılmaz, S. Boztepe, and M. Ertuğrul, "The domesticated donkey: III-economic importance, uncommon usages, reproduction traits, genetics, nutrition and health care," Can. J. Appl. Sci., vol. 3, pp. 320-338, 2012.