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Effect of Melatonin Implants on Sexual Behavior and Testosterone in Awassi Rams

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Abstract

Aims: to detect the influence of melatonin implants during different season on sexual behavior and testosterone concentrations in Awassi rams.
Methods: Fifteen adult Awassi rams were divided in to two groups randomly ,control group and treated group (melatonin implants 54 mg). Each ram was given a twenty-minute test period to assess its sexual behavior. In order to determine the levels of testosterone, blood samples from rams were taken every month during the experiment.
Results: In every season, the control group's reaction time values were considerably high significant (P 0.05) than the treated group. In the spring, the amount of ejaculated in the treatment group was substantially higher (P 0.05) than in the control group. In the summer, the treated group's testosterone levels were considerably (P 0.05) greater than the control group.
Conclusions: Treatment with melatonin implants improved the sexual behavior and testosterone level of Awassi rams during different season.
Key words: melatonin; sexual behavior, testosterone, Awassi rams.

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INTRODUCTION

The fertility of rams indicates a complicated relationship between the neuroendocrine system evolution, the development of certain body components, testosterone levels and sexual maturity (Maksimovicet al. 2016). Seasonal alterations caused by an increase in follicle-stimulating hormone release and a reduction in luteinizing hormone (Sarlos et al., 2013). Melatonin produced by the pineal gland is the chemical messenger that enables seasonal animals to detect variations in day length (Chemineau et al., 2008; Rahawy et al., 2017). A neuroendocrine system translates the exogenous photoperiodic signal to the daily change in melatonin level. The slow-release implants that provide exogenous melatonin may be an effective way to regulate reproductive rhythm (Rosaet al., 2012; Sarlos et al., 2013). Melatonin implants can be used to reverse the "long-day influence" on the ram during the nonbreeding season. (Rosa et al., 2012). Adult rams were given melatonin implants to improve their sexual behavior, testicular growth, and semen quality in different breeds. (Casao et al., 2010; Egerszegi et al., 2014) and enhance fertility in ewe (Al-Hamedawi et al., 2020). Testosterone level is affected by age (Al-Shammary et al., 2013; Saaed and Zaid 2019), species(ZAID, 2017), season (Hussain et al., 2017) and heat (Al-Ghetaa, 2012).Sexual behavior is affected by nutrition (AL-Badry et al., 2012; Kadhim and Dawood 2020). Rams' secondary sexual traits and reproductive behavior are fundamentally influenced by the hormone testosterone (Hafez and Hafez, 2013). Some variables, including ram age, breed and season, might affect serum testosterone levels (Hassanin et al., 2013). Determining if melatonin implants have a major impact on sexual behavior during the different season was the goal of this study.

Materials and Methods

The study was done under a natural photoperiod during the non-breeding season in the state board for Agriculture Research Ruminant Researches station-Ministry of Agriculture. To examine the effect of the melatonin implants on the reproductive efficiency of rams objectively, we evaluated each individual ram by subjecting it to estrus ewes for 20 minutes. Fifteen healthy Awassi rams were used. These rams were divided into two groups at random, ten rams as treated group they were given melatonin 54 mg/head and five as control group, within a period of December/2020 to august/2021.Throughout the 20 minute time, each ram's observations were written down every two weeks (Kridli et al., 2006). Direct personal observation was used to capture the features of sexual behavior, which include: Reaction time / second and Number of ejaculated /20minutes.

Every month throughout the study, blood samples from each ram were drawn from the jugular vein and centrifuged at 3000 rpm for 20 minutes. The acquired serum was kept at -20°C until hormone analysis. In the lab, an automated immunoassay machine examined the serum samples

Results and Discussion

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In the present study investigate the effect of melatonin on reaction time/second in different season in (table 1). Showed that all three seasons (summer, spring, and winter) had substantially (P<0.05) longer reaction times in the control group than in the treated group. While control group showed significantly (P<0.05) high value in the reaction time in winter compared with summer. In treatment groups show high significant(P<0.05) in winter(high duration/ second) than spring and summer(low duration /second). this my result agree with Ibrahim (2006), who recorded for the least period of time in the summer and demonstrated that sexual desire was low duration in the summer than in other seasons. This improvement in rams' sexual desire was brought on by an increase in the hormone (Testosterone) due to an increase in the secretion of the interstitial stimulating hormone ICSH and the importance of the hormone (Aksoy et al., 2002). Also agreed with Al-Khashab (2011) found that the lowest time for the first jump occurred in the summer season and that it varied considerably from the values of the time for the first jump during the winter and spring seasons when testing the sexual desire of Awassi rams.

Table 1: The effect of melatonin on sexual desire (reaction time/ second) in different season.

Groups Period	Control	Treatment	LSD
Winter	A35.33±0.33a	A30.16±2.05b	3.18
Spring	AB33.66±0.55a	B19.83±0.60b	
Summer	B31.50±0.64a	C15.50±.0.64b	

Different capital letter means significantly different (P<0.05) vertically.
Different small letter means significantly different (P<0.05) horizontally.

Also the study investigate the effect of melatonin on sexual desire(number of ejaculate/ 20 minutes) in table 2 show that ejaculated in the treatment group exhibited considerably (P<0.05) greater values compared to the control group in spring, while treated group showed significantly (P<0.05) higher value in the number of ejaculated in summer and spring compared with winter. According to Benia et al (2013) and Rekik et al (2015), the animals that received implants had more mounting efforts that resulted in an

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ejaculation than the animals that did not receive implants, which was the most obvious impact on mating effectiveness, in the control group, the number of ejaculated showed significantly (P<0.05) higher values in summer compared with winter. Additionally, it took less time to get the first ejaculation. Also agreed with Egerszegi et al (2014) reported the melatonin implants were inserted into adult rams to promote testicular development, sexual behavior and better semen traits in various breeds. In order to promote testicular development, melatonin implants were implant to mature rams, which led to, increased sexual behavior and better semen characteristics in several breeds (Casao et al., 2010).

Table 2: The effect of melatonin on sexual desire(number of ejaculate/ 20 minutes).

Groups Period	Control	Treatment	LSD
Winter	B1.03±0.03a	B1.08±0.04a	0.14
Spring	AB1.17±0.06b	A1.35±0.04a	
Summer	A1.30±0.06a	A1.38±0.06a	

Different capitalletter means significantly different (P<0.05) vertically.
Different smallletter means significantly different (P<0.05) horizontally.

The effect of melatonin on concentration (ng/ml) in different seasons in Awassi rams in(table 3) show ,the concentration of testosterone hormone high significant(P<0.05) in Summer season than Spring and Autumn in control group and treatment groups , also after implant the melatonin led to high significant(P<0.05) increase concentration of testosterone in Summer without other season(Winter and Spring) , this result agree with Tajangookeh et al (2007) reported that semen and testosterone levels are higher in the summer season compared to the winter season. Also agreed with

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Faigl et al (2009) reported that Melatonin therapy can be used to reverse the "long-day impact" on rams during the nonbreeding season. This result also agreed with what was found by Tajangookeh et al (2007) through his study of three Iranian sheep breeds, as well as with NAJEEB (2011) found when studying Iraqi Awassi rams, the increase achieved the level of Testosterone during the summer season came in harmony with the high level of LH (ICSH), where Pelletier and Ortavant (1975) found that the concentration of ICSH rises about 80% during the summer season.

During the nonbreeding season, melatonin treatment is known to increase the testosterone levels in ram blood, which are known to fluctuate throughout the year, according to reports from other species, including ovine (Kaya et al., 2000). According to Aller et al (2012), Pampinta and Corriedale rams had the greatest levels of testosterone throughout the summer. It's possible that the ram's exogenous melatonin controls the expression of melatonin receptors, elevating testosterone production, Rams treated with melatonin might therefore produce more testosterone than rams who have not received any exogenous melatonin.(Deng 2018).

Table 3: The effect of melatonin on concentration (ng/ml) in different seasons in Awassi rams.

Groups Period	Control	Treatment	LSD
Winter	C3.40±0.35a	C4.22±0.48a	1.21
Spring	B4.89±0.32a	B5.81±0.34a	
Summer	A5.57±0.36b	A7.16±0.16a	

Different capital letter means significantly different (P<0.05) vertically.
Different small letter means significantly different (P<0.05) horizontally.

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