



REPRODUCTIVE PERFORMANCE OF RAMS TO BIOSTIMULATION

Ali Olfati ^{1*}, Gholamali Moghaddam ², Mitra Bakhtiari ³

¹ Ph.D. Students of Animal Physiology, Faculty of Agriculture, University of Tabriz, Tabriz, Iran.

² Professors, Department of Animal Science, Faculty of Agriculture, University of Tabriz, Tabriz, Iran.

³ Assistant professor, Department of Anatomical Sciences, Faculty of Medicine, University of Medical Sciences, Kermanshah, Iran.

ABSTRACT

The bio-stimulation technique offers a potentially useful and practical way for reproductive performance in rams. Reports on how bio-stimulation affects sexual potency rams are scarce: Knowledge of how rams respond to bio-stimulation is useful for persons who involved in semen collection; "hand" (controlled) mating, and the administration of sexual performance evaluations. The reduction of the stimulus value of the ewes after several, or even after one mating, appears to be the major factor accounting for the temporary interruption of the sexual activity of the rams. Sexual stimulation provided a definite, clearly recognizable end point for establishing that a ram was sexually stimulated.

Key words: Biostimulation, Rams, Reproductive Performance

1- INTRODUCTION

Sexual stimulation refers to techniques that used to facilitate sexual performance. In livestock, signalling and priming pheromones are thought to act either singly or in combination through olfaction, visual (sight) or tactile stimuli and auditory. In most studies, in particular, bio-stimulation (olfactory, visual and auditory signals) has received special attention in small ruminant because of its possible application in reproductive management. Biostimulation can be defined as the stimulus provoked by the presence of females, which induce genital stimulation, pheromones, or other external cues. Chenoweth (1981) obviously indicated that visual cues are of greater importance than olfactory cues in eliciting male sexual response. Most information on the sexual behavior of rams has been obtained from pen experiments, which used either estrous synchronized intact ewes or estrous induced, ovariectomized ewes. The sudden introduction of estrous ewes to rams has previously been shown to induce distinct behavioral change in the rams, such as Flehman, mount attempt, Foreleg kicks, sniffing, chin resting and ejaculation. Moghaddam and Olfati (2012) reported that exteroceptive stimuli markedly influence semen characteristics, especially semen volume and sperm concentration in the crossbred rams during breeding

season. In one report, it was stated that (Martin et al., 2004) rams show a preference for ewes which are newly in estrus, with recently mated ewes having a lower stimulus value. The science acquired on the effectiveness of bio-stimulation: the factor which conditions it and the biological mechanism which produces it in livestock species, allows its use as a breeding management tool. The aim of the restricted review is to summarize and discuss the principal advances in our understanding of bio-stimulation in rams.

2- BIOSTIMULATION

2-1- Olfactory

The study of this “sexual behavior” helps us understand the nature and regulation of social interactions between individuals and groups in a particular species. Most social signals, however, are not processed by a specialized sensory system but by common systems adapted for multimodal processing of complex stimuli such as social ones (Sanchez-Andrade and Kendrick, 2009). In a social context, social odours are the prominent cues for social recognition. Ewes release an enormous variety of molecules into the environment, either as specific chemo-signals or as products of metabolic processes (Brennan and Kendrick, 2006), for example: a ewe’s urine component that mediates attraction of rams toward ewes. These molecules can provide a great amount of data about their producer, such as sex state, reproductive situation, age, breed, health and individuality. This recognition is dependent on the main olfactory system since interfering with the olfactory epithelium affects the selectivity of sexual behavior but sectioning of the vomeronasal nerve does not (Levy et al., 1995). Sexual pheromones are of lesser importance because anosmic males can identify estrous ewes in a flock as efficiently as intact males. Recently study (Hawken and Beard, 2009) has shown that the cross breed rams uses the tongue to transfer fluid (probably urine) to a short incisive spur which is located on the dental pad. Another tongue movement compresses the dorsal palate and this is believed to create a vacuum that transfers the fluid to the Vomero-nasal organ (VNO). The VNO is considered to be the site of pheromone identification. Pheromones and other allelomimetic cues can exert profound effects on reproductive activity via the hypothalamus system that generates pulses of gonadotropin-releasing hormone (Rekwot et al., 2000). A powerful additional model of social recognition is also that of mate recognition in pair-bonding voles. Here the act of mating in conjunction with other stimuli from the partner leads to a recognition memory for the partner as well as promoting the formation of a pair bond (Gabriela and Keith, 2009). The rams, through investigation of the ewe’s urine and anogenital region can use these olfactory cues to determine the stage of the female’s estrus cycle. Endocrinological changes, such as increased plasma concentrations of LH and testosterone, have also been reported to increase in the ram when in proximity to estrous females (Gonzalez et al., 1991; Rosa et al., 2000; Hawken et al., 2009). Changing the stimulus female has been reported as one of the most efficient methods of stimulating the male’s olfactory reaction in the rams (Fahey et al., 2012). This olfactory stimulus remains to be classified according to sensory pathway and evaluated in terms of epididymal and accessory gland function. The speed of appearance of the semen output response after sexual preparation does suggest, as has been indicated, that perhaps the sexual preparation stimuli alter the tonicity of the musculature of the excurrent ducts of the reproductive tract of the ram, and consequently affect semen output (Olfati et al., 2012). Fahey et al., (2012) concluded that olfactory cues are not necessary for the stimulation of endocrine response in the sexually experienced ram. In contrast, Maina and Katz (1999) reported an increase in sexual performance of rams that were exposed to other male rams that had been in previous contact with ewes; thus, demonstrating that rams are responsive to the olfactory smell of ewes. Alternatively, Vignozzi et al., (2008) showed that when the rams were stimulated with physical contact of a ewe in estrus, an acute increase in semen volume was evident.

Chanvallon and Fabre-Nys (2009) prove that in sexually naive ewes, male odour is less effective than inexperienced ewes, but the neural pathway involved is not known.

2-2- Visual

Visual stimuli undoubtedly play an important role in the social structure of sheep flocks. In sheep flocks, the rams adopts the major role in the search for a sexual partner. The sexual reaction of rams is triggered mainly by visual and tactile factors. In fact, studies with projected visual images have shown that sheep use visual information to differentiate between familiar and unfamiliar conspecifics, the presence or absence of horns, and stressed or calm animals (Tate et al., 2006). Hawken et al., (2009) indicated that, it seems likely that visual stimuli cannot substitute for the full complement of social-sexual signals from rams. This is in contrast to olfactory stimuli, where the odour of ram's wool can elicit an LH response similar to that observed in ewes exposed to rams (Cohen-Tannoudji et al., 1994) and even induce ovulation (Knight and Lynch, 1980). The use of such visual and physiological cues could provide an opportunity to increase sexual stimulation of males before semen collection, with the aim of increasing libido and semen quality. Visual stimuli are extremely important in males in order to maintain sexual activity of high quality at regular intervals, and might precede each ejaculation in an attempt to maximize semen output. Previous studies reported that a visual stimulus has positive effects on semen characteristics in Suffolk rams (McGrath et al., 1979) and crossbred rams (Olfati et al., 2012). In one study, dominant rams, which were viewed by an audience of 2 submissive rams, showed no alteration in mating behavior than when they were tested without such an audience (Petruilis et al., 2005). When the rams did not ejaculate, the mating failure may be a result of the influence of environmental condition rather than a lack of vision. One of the achievement experimental visual stimuli was that the test period was shorter, and therefore may be considered economically more suitable in the artificial insemination center. Although the rams employs both vision and smell in identifying females in estrus, visual stimuli appear to be of greatest importance in initiating mating behavior. Lack of vision has been shown to reduce greatly the probability that rams would identify and respond to sexually receptive partners, whereas, lack of olfaction was less inhibitory. The authors this review recommended that the future study of in animal science focus on the effects of visual stimulation on reproductive performance in livestock species (especially in rams).

2-3- Auditory

The study of the relationship between auditory stimuli and reproductive efficiency in rams has received less attention than in bulls and goats. Auditory stimuli may also play a role in male–female communication because rams make a low-pitched vocalization when courting an estrus ewe (Banks, 1964). Behavioral responses such as pricking the ears, turning the head, or looking at the speaker were observed and considered to indicate auditory perception in sheep. And also, Hawken et al., (2009) showed that rams vocalizations had no effect on LH release in either ewes or rams Merino, so auditory stimuli seem to be unable to even partially substitute for the other social-sexual stimuli associated with a prospective mate. However, the absence of a neuroendocrine response may also be a reflection of the lack of importance of auditory stimuli for communication in the Merino sheep. Suta et al., (2008) discover that the greater activation of the inferior colliculus in ewes exposed to rams suggests a role for senses other than olfaction, this nucleus is the auditory center of the mesencephalon and it is involved in the processing of auditory information. This activation can be due to the detection of the specific vocalizations emitted by the rams when he courts a ewe although the research did not quantify them. Also

a reminder that the olive nucleus, which is also involved in the processing of auditory information in livestock species.

3- CONCLUSION

Biostimulation communication plays an indispensable role in rams behavior and reproductive processes. The economic benefits of using bio-stimulation through olfactory, visual and auditory signals to enhance semen quality, sexual behavior and early onset of puberty in young rams, may serve as a management tool in adverse condition areas, where livestock production has some constraints. And also, proper assessment of factors such as visual and olfactory sexual ability before breeding can greatly reduce the possibility of poor reproductive performance from single sires.

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