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SHORT COMMUNICATION

A comparative analysis of scent glands in marals

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Scent glands play a crucial role in the communication and survival of various animal species. These specialized glands produce unique chemical compounds that transmit important information about an individual's identity, reproductive status, and territory. The maral, a species of deer inhabiting diverse regions, has been a subject of interest in the study of scent glands. This article delves into a comparative exploration of scent glands in marals, shedding light on their morphological variations, functions, and evolutionary significance.

Keywords: Cutaneous gland, Preorbital gland, Meibomian gland.

Introduction

Marals, also known as Caspian red deer (Cervus elaphus maral), are large ungulates distributed across a wide range, encompassing Europe, Asia, and parts of the Middle East. One of the intriguing aspects of marals is their scent glands, which are integral to their social interactions, mating behaviors, and territorial communication. The extent of skin gland development is influenced by factors such as the animals' gender, age, reproductive condition, and the time of the year. Typically, sexually mature individuals exhibit more advanced glandular development in comparison to juveniles. Moreover, numerous mammals exhibit heightened glandular activity during the breeding season, contrasting with their relatively subdued function during other periods. Notably, researchers have observed that specific skin glands undergo regression following castration, while their growth is stimulated by the introduction of sex hormones (Staddon, B.W., 1979).

Description

Types of scent glands in marals

Preorbital glands: Found near the eyes, preorbital glands are significant in maral communication. These glands often appear as small depressions or openings on the skin. The secretions from these glands might serve as a territorial marker or could aid in identifying an individual's physiological state.

Interdigital glands: Situated between the hooves of marals, interdigital glands are believed to release chemical signals onto the ground as deer walk. These signals might help marals navigate their environment and convey information about their presence to other individuals.

Tarsal glands: Tarsal glands are located on the inner side of a maral's hind legs. These glands produce a strong-smelling secretion that is thought to play a role in marking territory, attracting mates, and possibly even deterring predators (Quay, W.B., 1986).

Functions and significance

The scent glands in marals are a testament to their adaptability and evolutionary strategies. By producing distinct chemical cues, marals can communicate with conspecifics without direct visual or auditory contact. These signals serve several purposes:

Social hierarchy and mating: Scent signals aid in establishing and maintaining social hierarchies within maral populations. Dominant individuals might mark their territories more frequently, while mating-related pheromones could attract potential mates.

Territorial marking: Scent gland secretions serve as territorial markers, delineating a maral's range and minimizing conflicts with neighboring individuals. This helps in conserving energy and reducing unnecessary confrontations.

Environmental adaptation: Scent glands allow marals to adapt to their environments efficiently. The ability to leave scent marks on various surfaces aids in navigation, avoiding hazards, and locating resources.

Comparative morphology: Comparing scent glands across different maral populations reveals intriguing variations. Factors such as habitat, diet, and social structure might contribute to these differences. Studying the morphological variations in scent glands can provide insights into the coevolution of these structures with the maral's environment and behavior (Marinho, C.R., et al., 2014).

This indicates that, in males, the activity of the caudal gland during the beginning of summer remains nearly unchanged in comparison to winter. We hypothesize that the processes leading to the activation of its functional state, as evidenced by the enlargement of secretory cell nuclei, will peak by the end of summer, coinciding with the preparation of males for the rutting season when "odor signaling" becomes crucial for these animals. Additionally, in the semi-captive environment of red deer, where antler growth and shedding occur, the animals are housed in separate enclosures during these stages, isolated from females and young animals. These separations persist until the end of summer when they are reunited (Waterhouse, D.F., et al., 1964).

Our findings partially align with existing literature regarding the seasonal variations in mammalian skin cover. While sebaceous glands typically exhibit little change between winter and summer, sweat glands often display seasonal dynamics.

Considering that the preorbital gland in red deer comprises a combination of sebaceous and sweat glands and serves a marking function, the heightened activity observed during summer seems both reasonable and purposeful. Meibomian glands, being modified sebaceous glands that protect the eyes from various factors, also display increased activity during the summer due to temperature influences. Interestingly, the tail gland, despite its complexity in males during the observed periods, does not exhibit significant seasonal shifts in its functional state (Martínez-Gómez, M., et al., 1997).

Conclusion

The scent glands of marals exemplify the intricate ways in which animals adapt and communicate within their ecosystems. Through comparative analysis, we gain a deeper understanding of how these glands have evolved to serve different functions and how they contribute to the survival and success of maral populations. As we continue to unveil the mysteries of scent glands in marals, we uncover the fascinating story of their role in shaping the behavior and ecology of this remarkable species.

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