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Using Communication to Improve Grasscutters (Thryonomys Swinderianus) Reproductive Behaviour in Cote D'ivoire

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Abstract: ***Stress is a limiting factor in the production of grasscutters. Communication experiments were therefore conducted to reduce or eliminate the psychosocial stress and panic instinct with grasscutters. Two batches of fifty grasscutters were used for that experimentation. A control group and a lot grasscutters subjected to various techniques of communication have been observed. After two months of experimentation, communication beyond words resulted in notable and very noticeable changes in the behavior of grasscutters. They became more docile and non-aggressive. The fear response of grasscutters by seeing man was reduced or eliminated in some cases. They accepted to eat in the hands of the man without fear, even being held by him. Thus, they did not flee the presence of humans and they lent themselves to manipulation, unlike those deprived of human's contacts. The instinct of dominance among them is removed because no competition is observed during feeding. All females (100%) were fertilized after projections in less than 2 months by the male without any injury. However, only 60% of females with deep wounds made by the male were mated within 2 months. These results suggest the technique of communication beyond words as a solution to psychosocial stress of farmed grasscutters.***

Keywords: Grasscutter farming, communication, stress, behavior, reproduction

1. Introduction

It was found that the grasscutter (*Thryonomys swinderianus*) is physiologically characterized by long periods of infertility that penalize the profitability of his rearing [1]. Because of the transience and imprecision signs of heat in the aulacodine (adult female), no heat detection method has been developed for farmers. They have no benchmark for defining a starting point of the sexual cycle because it is virtually impossible to detect estrus [2]. They can have, in turn, a period of sexual rest too long a period of sexual receptivity too short or non-existent [1]. Consequently, females remain locked in pro estrus and refuse to be mated, despite a long male courtship.

The grasscutter is primarily a wild animal. It is fearful. Each unusual noise or sudden movements, smells or strange voices, bring the worry and disturb them. It became a pet today [3]. Therefore, it is important to conduct experiments in communication with grasscutter to reduce or eliminate the stress (especially psychosocial stress) and the instinct of panic. Practicing communication make the grasscutters rearing more docile. Moreover, docility is an attitude and a desired behavior because it promotes female receptivity.

2. Materials and Methods

2.1 Equipment

Animal material consists of 100 grasscutters (80 females and 20 males) from the experimental station of the University Nangui Abroagoua former University of Abobo-Adjamé. They are selected from the age of 2 months (just after weaning) and reared separately in net pens until age by the male who is 6 months for females and 8 months for males. The selection criteria are based on health status; live weight and significant body ranging between 0.5 and 1 kg and pedigree to avoid inbreeding.

2.2 Methods

For this study, we established 2 lots of grasscutters each composed of 50 animals, including 40 females and 10 males. The lot 1 is submitted to a communication process. The other lot of 50 subjects is conventionally raised without communication. A breeding group consists of one male and four females.

2.2.1Grasscutter breeding with communication (Lot 1)

This lot was subjected to various methods of communication including the hearing, the sight and smell. Thus, before entering the house, we issue a signal (noise or hiss) to announce our arrival. We did not change our work clothes for the animals to be familiar with. During the inspection of livestock, communication with grasscutters is engaged. To this end, a recorded voice message on a radio cassette is played in the house. Particular attention is given to the observation of the behavior of each grasscutters to know them better. Periods to crop the silage is at 7.30 am and 6.30 pm. The distribution of food concentrate (at noon) is important moment of communication with the grasscutters. In fact, they constitute the initial establishment of the motor human / animal relationship. The grasscutters farming are attracted by food handheld during the feeding and distribution of dietary supplement; any animal which then approach is stroked.

2.2.2 Grasscutter breeding without communication (Lot 2)

Grasscutters in the lot 2 were deprived of direct contact with the operator. They are raised conventionally [4]-[6].

2.3 Gestation tests

This method allows making a diagnosis with a very high reliability from the 30th day of gestation [1], [4], [7]. Thus, 4 weeks after the coupling, each female is subjected to a pregnancy test according to Mensah & Ekué [4].The test is redone every 2 weeks, if it is negative. The experiment was conducted over two breeding years.

3. Results

3.1 Grasscutters subjected to communication beyond words

Grasscutters who have benefited from direct contact with the farmer through caresses became more docile and non-aggressive. The fear response of grasscutters before the man was reduced or eliminated. Thus, they are not looking more to flee the presence of humans and they lend themselves to manipulation, unlike those deprived of human contact (Fig. 1). The instinct of dominance is removed because no competition is observed during feeding. The communication beyond words also helped to raise several males together in the same enclosure without seeing any fight among them (Fig. 2).

Figure 1: Two aulacodines carried in the arms after the communication

Figure 2: Cane rats subjected to the communication feed in peace.

3.2 Reproduction following communication

Meet the male with its congener following communication occurs much more smoothly. Typically, no deep wound was observed on the female. Only the claw marks due to soft caresses are sometimes present on the flanks of the aulacodine courted. This is indicative of a projection which can be or not fertilizing. In the case of a non-fertilizing projection, the female always away from the male and is often tucked away in a corner at the corner of the enclosure. When the projection is fertilizing, male and female play and groom together; they can even sleep together. However, the male pursues the female no longer for a projection and is more interested in another. All females (100%) were fertilized projections in less than 2 months by the male.

3.3 Grasscutters not subjected to communication beyond words

Grasscutters, those who did not have close contact with the man always show their dominance status within the group (Fig.3). In fact, the oldest grasscutter or the strongest one of the group feeds itself while others are waiting. It asserts its dominance over others. Moreover, sudden deaths without apparent symptoms were recorded. Grasscutters deprived of communication process, exhibit agitated and panic at the sight of the farmer (Fig.4). Thus, psychosocial stress is often fatal for the grasscutters.

Figure 3: Cane rats reared without communication stop feeding in human presence

Figure 4: Cane rats reared without communication ready to pounce at the approach of man.

3.4 Reproduction without communication

In the absence of communication, the court of male to female is often violent and even bloody. The male sniffs the back of the female in heat. But any attempt by the male, she replied with screams and flees. In return, the male responds by violent claws and bites, more or less deep (Fig. 5 and 6), forcing the female to adopt a favorable position in coitus. These fights can last several days. Some females die due to deep wounds. After fertilizing projecting the aulacodine becomes calm and reinstate the breeding pens in the group of animals. The male then left alone and sets its sights on another female group. Only 60% of females were mated in 2 months by the male.

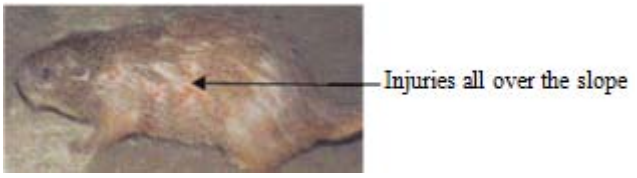

Figure 5: Aulacodine projection after minor injuries by the male

Figure 6: Aulacodine projection after a deep bite by the male

4. Discussion

The behavior of grasscutters subjected to communication results in the absence of aggression between them and the suppression of fear towards humans. Communication is an important step towards domestication of the grasscutters. Indeed, due to the effect of different types of communication, grasscutters let themselves be carried in the arms by man and not seek to flee. These results corroborate those of many authors who worked on goats [8], [9], on sheep [10], [11] and pigs [12]. Thus, after a very long period of domestication, these animals tolerate human presence at the point to become his life companion and let stand. Suppression of aggression and fear are related to the quality of the contacts and manipulations that are developed during communication beyond words with these animals. Indeed, many studies have shown that fear of human presence by animals appears after learning negatively associating the presence of humans to painful or unpleasant events [13]. Many acts and livestock management are obviously painful for the animal, such as dehorning, castration, branding [14]. Capture the animal or keep it in captivity can be less obvious, that can also be negative and stressful for the animal health [15]. Other human behavior, such as unusual cries, blows or feet, are also often observed and are very negative for animals [16]. However, some human contact can be perceived very positively by animals. Several studies in rodents, pets or horses, have shown the positive effects of friendly interactions between humans and animals [17]. During rearing, humans' friendly contacts toward animals reduce the fear of man and stress [18]-[21]. The effect of contact and letting the subject eat out of the hand of the operator, increasing the animals' motivation to interact with humans [10], [22]-[25]. These contacts also encourage interventions and manipulation in livestock [11], [26]-[29]. Sudden deaths recorded while rearing grasscutters without any communication are due to an acute stress or malignant hyperthermia [30]. One explanation for this phenomenon was given by Dantzer and Mormède [31], Nyberg et al. [32] and Weaver et al. [33], who reported that in susceptible animals, any stress can cause malignant hyperthermia syndrome characterized by intense muscle contractions giving generalized rigidity of the muscles, a rapid rise in temperature, metabolic acidosis tissue, cyanosis and may result and lead to death of the subject. The practice of communication beyond words with caresses and other emotional gestures in the reproduction of grasscutters has allowed us to obtain relatively good performance and rather interesting results as immediately usable by farmers. In fact, 100% of the fertilizing projections of aulacodines are obtained within 2 months of the last of all male subjected to communication against 60% in the same period in those without communication. These results are similar to those reported and recorded by Mensah & Ekué [4] and Fantodji et al. [34]. Fear and stress associated with the wild grasscutter is certainly an obstacle to the development of grasscutters. Indeed, authors such as Stoskopf [35], Carlstead [36] and Chanfray [37] reported that the animal in close captivity sees its control capacity reduced. Thus, it is subject to spatial confinement, the quality is not always the one that would suit him. Better, he is forced to permanent promiscuity with other partners, whereas in the wild area, it has the space and diverse food choices. The consequences of this phenomenon led to a disruption of the reproductive cycle, up to abortion.

5. Conclusion

Auditory communication through certain sound expressions, sounds, music, as well as communication through direct contact, fondling and habituation to visual stimuli resulted in notable and very noticeable changes in the behavior of grasscutters. Also, this communication beyond words by farmers has allowed the following changes: drastic reduction in the fear of the animal; disappearance of fear; docility of animals; lack of dominance in animal groups; more receptive female coupling; uncastrated males raised together.
Thus it will rapidly increase the production of grasscutter. Nevertheless, it is likely that the new tools of molecular genetics will help to better characterize the genetic basis of behavior in grasscutter. Therefore, it should be possible in the future to define selection criteria incorporating behavioral reactivity to favor the adaptation of animals to livestock conditions.

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