ROLE OF THE INTRUDER IN THE AGGRESSIVE BEHAVIOUR OF COLONIES OF WILD RATS (RATTUS NORVEGICUS)

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SUMMARY: Wild rats (Rattus norvegicus) formed colonies with 2 males and 2 females. In which albino male (N=23) and wild male intruders (N=10) were placed. The results showed that 34% of the albino intruders were killed during the first test; that a progressive increase in the number of deaths occurred over time; and that the wild intruders presented a lower rate of deaths than the albinos. In experiment II, the intruders, both albino (N=12) and wild (N=9) were placed in the same colonies as previously, under anesthesia. It was found that the latency to investigate and attack the anesthetized intruder was the same to albino and wild, but was higher than when they were awake. It may be concluded that the intruder’s behaviour has a decisive influence on the aggressiveness of the resident, and that visual stimuli are important during aggressive interactions, but that olfactory sensation seems to be required to trigger it.

INTRODUCTION

The aggressive behaviour of the resident male in a colony against an intruder has been reported in various studies (Barnett, 1963; Blanchard & Blanchard, 1977; Eibl-Eibesfeldt, 1961; Flannelly & Lore, 1977a; Grant, 1963; Koolhaas et al., 1980; Lore & Flannelly, 1977; Robitaille & Bovet, 1976; Scott, 1966; Seward, 1945). This behavioural pattern has been described as territorial defense, and seems to play an important role in social dominance (Blanchard et al., 1977, 1984, 1988; Boice, 1972). Descriptions have reported that this behaviour only arises after 100 days of age (Koolhaas et al., 1980; Takahashi & Blanchard, 1982); that it is the males who react against the intruder (Barnett, 1963; Blanchard et al., 1984); that the females seem to play an important role in triggering the aggressiveness of the male (Albert et al., 1988;
Barnett et al., 1968; Flannelly & Lore, 1977b); that this behaviour depends on male sexual hormones (Albert et al., 1986; Flannelly & Thor, 1978; Leshner, 1975); and that social relations at an early age seem to influence its development (Meany & Stewart, 1981; Panksepp, 1981; Takahashi, 1986, Taylor, 1980).

Most of these results were obtained by studying colonies of albino rats, but few have studied the behaviour of wild Norway rats. It was demonstrated that albino rats show aggressive behaviour towards intruders, in the same way as wild ones, but that the latter demonstrate their aggressiveness more obviously than the albino variety (Barnett, 1963; Boice, 1972; Price, 1978; Takahashi & Blanchard, 1982).

The study of a given behaviour involves the analysis of three main factors: the external stimuli which trigger it; the variables of the endocrine and central nervous systems of the animal involved in creating it; and the various forms in which this behaviour can manifest itself in the environment (Ewert, 1985).

In this paper, we analyze the stimuli which trigger the aggressive behaviour of territorial defense in stable colonies of laboratory bred wild rats especially the relative importance of olfactory sensorial and visual inputs.

The study was divided into two experiments: experiment I analyzed the effect of introducing wild male intruders and albino males in stable colonies of wild rats. Experiment II compared the effect of the introduction of wild male intruders, under anesthesia, to that of anesthetized albino males, in the same colonies as experiment I.

MATERIAL AND METHODS

Animals and experimental environment: We studied the 1st, 2nd and 3rd generation of wild Rattus norvegicus rats, laboratory bred from ancestors captured in the city of Porto Alegre (Brazil), in 1986. Each colony was composed of two males and two females, which were not siblings, and began to live together from the time of weaning until the end of the experiment. They received water and food ad libitum.

The animals lived throughout their lives in two environments. They were born in standard plastic cages, and stayed there with their mothers until weaning which occurred between the 21st and 31st day of age. After this they were placed in specially built observation cages. These cages were made of masonry with a wire screen roof, which could be moved and allowed access into the cage. On this, food and water was placed. Inside the cage, in the forward section of the floor, a tunnel was built, partly covered by a metal cover, where the animals could hide. The rats spread sawdust in this