

OLFACTORY BEHAVIOUR IN *MUS SPICILEGUS* PETENYI, 1882 MALES WITH CENTRAL NERVOUS SYSTEM OF VARIOUS TYPE

ALINA LARION

Abstract. *The following olfactory contacts were studied: nasal-nasal (N-N), nasal-anal (N-A), nasal-lateral (N-L) and the approaching to the partner. The positions during the olfactory contacts depend on the situation and on the social status of the partners and are particular for individuals from different mounds, as well as for individuals inhabiting the same mound. Among all the olfactory contacts the most numerous are the nasal-nasal ones. The approaching to the partner is an index that indicates the rank of the individual in group and in mound. The most numerous approaching to partners, as well as other olfactory contacts were registered in the first 5 minutes of the experiment. The individuals with weak CNS type are more curious, they more frequently approach to the partner. Thus, the olfactory contacts and approach to the partner is of great importance for *Mus spicilegus*, because in the cold period of the year the individuals live in groups.*

Keywords: *olfactory contacts, *Mus spicilegus*, CNS type.*

Rezumat. Comportamentul olfactiv la masculii de *Mus spicilegus* Petenyi, 1882 cu sistem nervos central de tip diferit. *Au fost studiate următoarele contacte olfactive între indivizi: nazo-nazale, nazo-anale, nazo-laterale, precum și apropierea de partener. Poziția indivizilor la toate contactele olfactive depinde de situație și de statutul social al partenerilor, sunt caracteristice atât pentru indivizii din diferite mișuni, cât și pentru cei din aceeași mișună. Dintre toate contactele olfactive cele mai numeroase sunt nazo-nazale. Apropierea de partener este un indice care indică rangul individului în grup și în mișună. Cele mai numeroase apropieri de partener, cât și celelalte contacte olfactive au fost înregistrate în primele 5 minute ale experienței. Indivizii cu sistem nervos central slab sunt cei cu inițiativă, cel mai frecvent ei se apropie de partener. Astfel, contactele olfactive și apropierea de partener au o importanță mare pentru *Mus spicilegus*, care în perioada rece a anului trăiesc în grup.*

Cuvinte cheie: *contacte olfactive, *Mus spicilegus*, tipul SNC.*

INTRODUCTION

The study of social behaviour, which is based on intraspecific informational relations, has the aim to reveal the adaptation strategies of the animals in different life conditions. The selective olfactory reaction of the individuals can play the role of isolation mechanisms of the related forms (MOORE, 1965; DOTY, 1973; BANKS, 1980; SOKOLOV et al., 1983a, b; 1984a, b; KOTENKOVA & LYALIUKHINA, 1983; KOTENKOVA et al., 1983; KOTENKOVA, 1988a, b etc). *Mus spicilegus* PETENYI, 1882 in the cold period of the year live in groups (average of 7-8 individuals). The individual recognition and the stable structure of the relationships between the group members do not allow the intrusion of foreign individuals and of the representatives of other species (SOKOLOV et al., 1990).

The aim of the paper is to elucidate the importance of olfactory contacts in *M. spicilegus*.

MATERIAL AND METHODS

M. spicilegus was selected as study object. The type of central nervous system (CNS) was determined after KAMENOV (1973). The description of elements, positions, movements were made in experiments of male-male interactions after GOLTSMAN et al. (1977). 317 male individuals were tested during the experiment.

RESULTS AND DISCUSSIONS

The olfactory contacts nasal-nasal (N-N), nasal-anal (N-A), nasal-lateral (N-L) and the approaching to the partner are behavioural peculiarities during the partner analysis.

The number of olfactory contacts is the highest in the first 5 minutes of the experiment, thus in the period of stabilization and formation of mutual relations between animals. Only in male-male experiments with individuals with strong type of CNS (S-S), the number of nasal-nasal contacts is higher toward the end of the experiment (Fig. 1).

After the 5 first minutes some differences occur: at the individuals from the same mound these contacts decrease and toward the end of the experiment (after 15 minutes) they remain stable at a certain level. At individuals from different mounds the individual activity and the frequency of the contacts between them increases. The maximum number of nasal-nasal contacts according to the obtained data was registered in the first 5 minutes of the experiment in the males with strong CNS type and with medium CNS type and between males with strong CNS type and with weak CNS type (5 contacts on average). The lowest number of nasal-nasal contacts was recorded between males with strong CNS type and with weak CNS type toward the end of the experiment (at 15 minute). The frequency of nasal-nasal contacts depends on the individual status: the lower the individual rank in the hierarchic system the more frequent are its contacts with other animals.

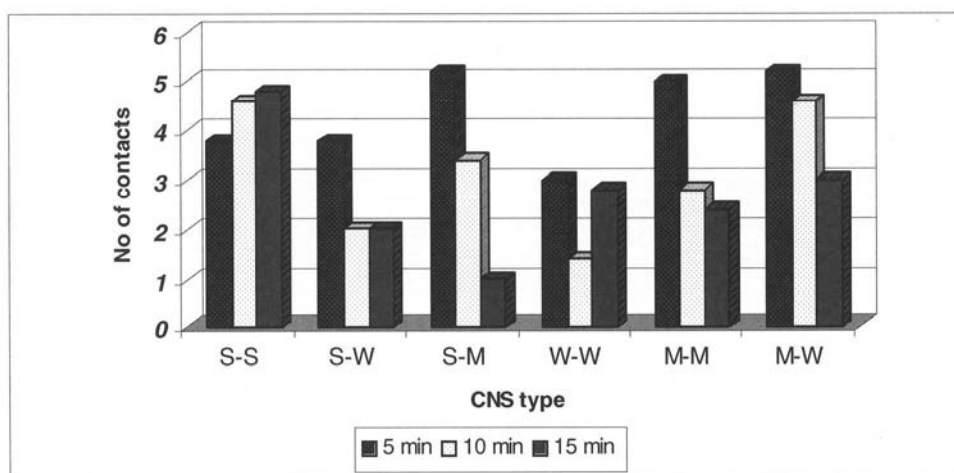


Figure 1. Nasal-nasal contacts in *M. spicilegus* males with various CNS type.
 Figura 1. Contactul nazal-nazal la *M. spicilegus* cu tip diferit de SNC.

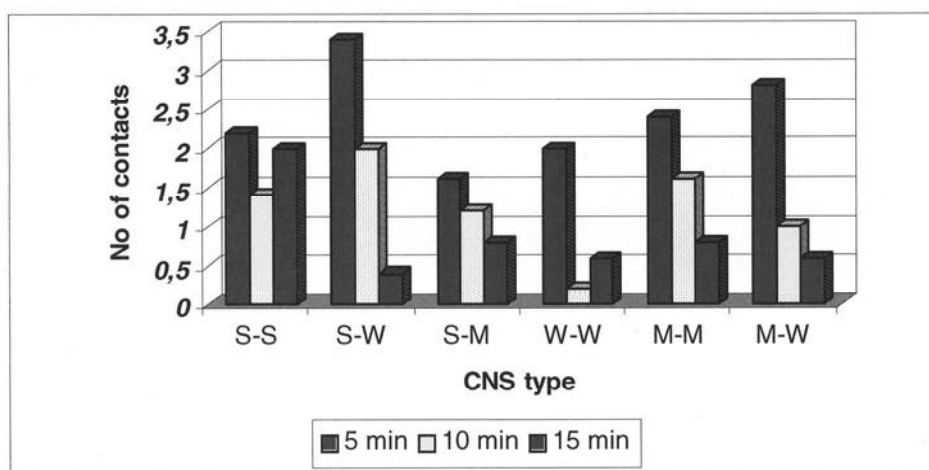


Figure 2. Nasal-anal contacts in *M. spicilegus* males with different CNS type.
 Figura 2. Contactul nazal-anal la *M. spicilegus* cu tip diferit de SNC.

Besides the nasal-nasal contacts the nasal-anal contact were also analyzed. The highest number of nasal-anal contact was registered during the experiment between males with strong CNS type and with weak CNS type (S-W) (Fig. 2). As in the case of the nasal-nasal contacts the highest number of nasal-anal contacts was recorded in the first 5 minutes, than it decreased gradually toward the end of the experiment regardless of CNS type.

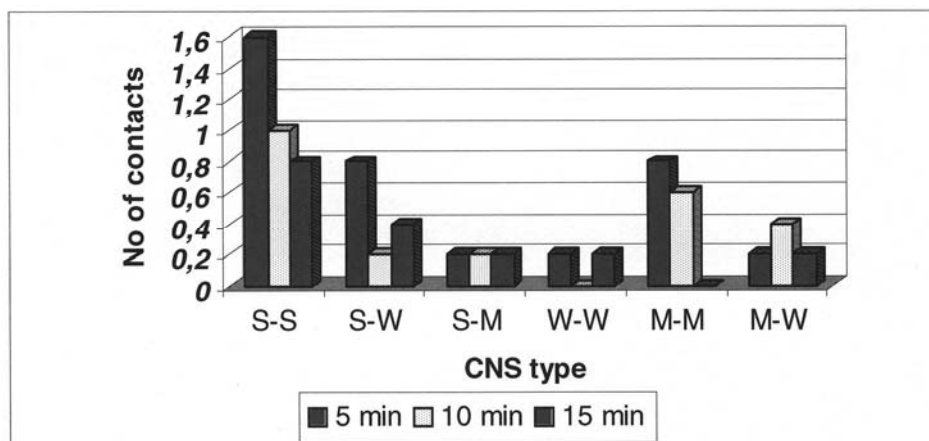


Figure 3. Nasal-lateral contacts in *M. spicilegus* males with different CNS type.
 Figura 3. Contactul nazal-lateral la *M. spicilegus* cu tip diferit de SNC.

The olfactory contacts of various parts of partner body-nasal-lateral contacts are more frequent in individual couples with strong CNS type (S-S) in the first 5 minutes of the experiment (Fig. 3). In male coupling with strong CNS type and with medium CNS type (S-M) the number of nasal-lateral contacts is the same. The nasal-lateral contacts completely miss at the male couples with weak CNS type (W-W) in the middle of the experiment (at 10 minutes) and between males with medium CNS type at the end of the experiment (at 15 minutes).

While analysing the frequency of olfactory contacts during 15 minutes (Fig. 4) we can see that the most numerous contacts are the nasal-nasal ones, followed by nasal-anal contacts and the lowest number of contacts are the nasal-lateral ones no matter the CNS type.

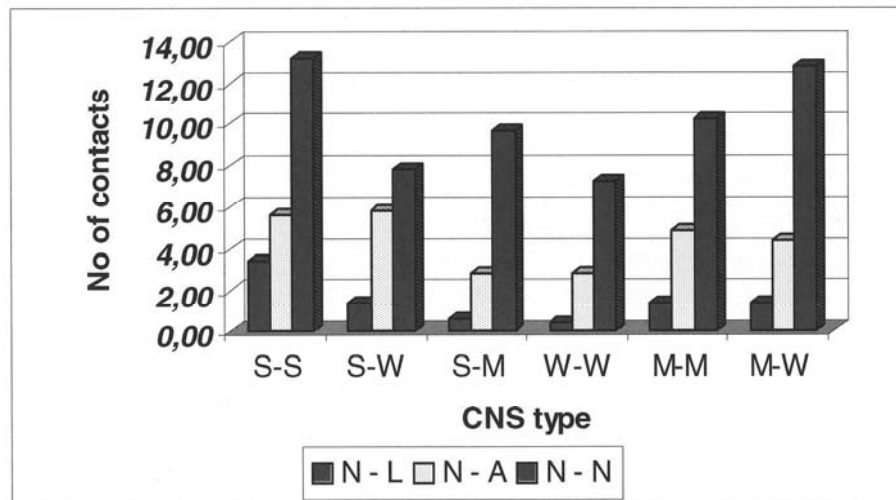


Figure 4. Olfactory contacts in *M. spicilegus* males with different CNS type.
Figura 4. Contacte olfactive la masculii de *M. spicilegus* cu tip diferit de SNC.

CONCLUSIONS

The olfactory contacts and approaching to the partner is of great importance for *M. spicilegus*, because in the cold period of the year the individuals live in groups. The positions during the olfactory contacts depend on the situation and on the social status of the partners and are particular for individuals from different mounds, as well as for individuals inhabiting the same mound. Among all the olfactory contacts the most numerous are the nasal-nasal ones. Between familiar individuals these contacts are short in time, less numerous and no-tense, by comparing with those between unknown individuals from different mounds. According to the obtained data, if the individuals are from different mounds, than the nasal-nasal contacts last 1-2 minutes, the individuals rise on posterior members and “scan” each other.

The approaching to the partner is an index that indicates the rank of the individual in group and in mound. The most numerous approaching to partners, as well as other olfactory contacts were registered in the first 5 minutes of the experiment. The individuals with weak CNS type are more curious, they more frequently approach to the partner.

REFERENCES

- DOTY R. L. 1973. *Reactions of deermice (Peromyscus maniculatus) and whitefooted mice (P. leucopus) to homospecific and heterospecific urine odors*. Ibid. **84**(2): 296-303.
- HUCKS U. W. & BANKS E. M. 1980. *The effects crossfostering behaviour of two species ofg North America lemmings, Dicrostonyx groenlandicus and Lemmus trimucronatus. 1. Olfactory prefences*. Anim. Behav. **28**(4): 1046-1052.
- MOORE P. E. 1965. *Olfactory discrimination as an isolating mechanism between Peromyscus maniculatus and Peromyscus piolinotus*. Amer. Midlife. Natur. **73**(1): 85-100.
- ГОЛЬЦМАН М. Е., НАУМОВ Н. П., НИКОЛЬСКИЙ А. А., ОВСЯННИКОВ Н. Г., ПАСХИНА Н. М., СМИРИН В. М. 1977. *Социальное поведение большой песчанки (Rhombotus opimus Licht.). Поведение млекопитающих*. Moskva: “Nauka”: 5-69.
- КАМЕНОВ Д. А. 1973. *Электрооборонительная методика исследования свойств нервных процессов у мелких грызунов методом выработки пары условных рефлексов*. Науч. докл. Высш. шк. Биол. Науки. **6**: 125-127.
- КОТЕНКОВА ЕЛЕНА В. 1988а. *Методические подходы к изучению химической коммуникации млекопитающих: Обонятельные сигналы как механизмы этологической изоляции между видами*. Итоги науки и техники. Vertebrate Zoology. Moskva. **15**: 92-151.

- КОТЕНКОВА ЕЛЕНА В. 1988b. *Особенности поведения в группах у домашних мышей рода Mus // Грызуны: Тез. докл. VII Всес. совещ. Sverdlovsk. 3: 106-107.*
- КОТЕНКОВА ЕЛЕНА В. & ЛЯЛЮХИНА С. И. 1983. *Распознавание по запаху своей и близкородственной формы домашними (Mus musculus L.) и курганчиковыми (Mus hortulanus Nordm.) мышам.* II Всесоюз. совещ. по хим. коммуникации животных. Moskva: 106.
- КОТЕНКОВА ЕЛЕНА В., ЛЯЛЮХИНА С. И., ЗАГОРУЙКО Н. В., ЛЕВОНЮК И. П. 1983. *Поведение домашних и курганчиковых мышей в группах.* Материалы III Всесоюз. конф. по поведению животных. Moskva **2**: 286-287.
- СОКОЛОВ В. М., КОТЕНКОВА ЕЛЕНА В., ПОТАНСКИЙ В. Г. 1983a. *Распознавание принадлежности особи к своему виду по обонятельным сигналам у домашних мышей: Способность к запечатлению.* Proc. of IIIrd Unional Conference on animal behaviour. Moskva. **1**: 142-144.
- СОКОЛОВ В. Е., ЛЯЛЮХИНА С. И., КОТЕНКОВА ЕЛЕНА В. 1983b. *Поведение курганчиковых мышей в условиях, приближенных к естественным.* Proc. of IIIrd Unional Conference on animal behaviour. Moskva. **3**: 234-236.
- СОКОЛОВ В. Е., КОТЕНКОВА ЕЛЕНА В., ЛЯЛЮХИНА С. И. 1984a. *Распознавание близкородственных форм по обонятельным сигналам у домашних (Mus musculus musculus L.) и курганчиковых (M. hortulanus Nordm.) мышей.* Comm. AS USSR. **272**(5): 1264-1268.
- СОКОЛОВ В. Е., КОТЕНКОВА ЕЛЕНА В., ЛЯЛЮХИНА С. И. 1984b. *Роль обонятельных сигналов в распознавании близкородственных форм у домашних (Mus musculus) и курганчиковых (Mus hortulanus) мышей.* Zool. Zhurn. **63**(3): 429-439.
- СОКОЛОВ В. Е., КОТЕНКОВА Е. В., ЛЯЛЮХИНА С. И. 1990. *Биология домашней и курганчиковой мышей.* Moskva "Nauka": 208pp.

Larion Alina

The Zoology Institute of ASM,
Str. Academiei 1, Chişinău, MD-2028.
E-mail: vicnistreanu@gmail.com

Received: May 26, 2009
Accepted: July 16, 2009