

## COMPARATIVE INVESTIGATIONS ON BEHAVIOUR OF WILD AND DOMESTIC RABBITS IN THE NESTBOX

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**ABSTRACT:** Infrared video observations were used to study behaviour in the nestboxes of both adult wild and domestic rabbits. A total of 1080 hours of observations of wild rabbits and 1008 hours of observations of domestic rabbits kept in two enclosures with free access to two nestboxes and some other hiding-places were analysed. Both wild and domestic adult rabbits spent a considerable part of their time (54.9 % in wild and 30.6 % in domestic rabbits) in pairs or in groups of three and voluntarily were in body contact between 65.3 % (domestic rabbits) and 80.4 % (wild rabbits) of the time. While crouching together, both wild and domestic rabbits used only a very small nestbox space: 0.08 to 0.125 m<sup>2</sup>/animal in wild and 0.14 to 0.21 m<sup>2</sup>/animal in domestic rabbits. Between 7 a.m. and 4 p.m., an average of 2.9 animals from a maximum of 3 wild rabbits stayed in the nestboxes. Domestic rabbits used nestboxes less: an average of 0.9 adults were in the nestbox between 7 a.m. and 4 p.m. Adult domestic rabbits spent much more time than wild rabbits resting outside the nestbox including a wooden tube leading to the nestbox. The use of a small area for resting is a species-specific behaviour both in wild and domestic rabbits.

**Key Words:** Wild rabbits, domestic rabbits, testing behaviour, social behaviour.

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## INTRODUCTION

STODART and MYERS (1964) and LOEFFLER *et al.* (1991) found comparable rhythms of daily activity in wild and domestic rabbits. KRAFT (1976) reported differences in daily rhythms of activity and feed intake between wild and domestic rabbits. He described a regular change of activity and resting in wild rabbits. A period of uninterrupted activity during the night is followed by a period of non-activity during the day. At the beginning and the end of this active period, peaks of activity at dusk and

dawn are observed that are called “bigeminus” (ASCHOFF, 1957).

Less is known about the behaviour of wild rabbits during the period of non-activity in the nest because of methodological difficulties. The aim of our investigations was to observe the nestbox behaviour of wild and domestic rabbits kept in two enclosures.

## **MATERIALS AND METHODS**

The studies were conducted in two enclosures on the research station of the Department of Animal Breeding and Genetics as described by HOY and SELZER (2002). The enclosures, measuring approximately 150 m<sup>2</sup> each with closed wooden fences, were installed in 1998. In one enclosure wild rabbits (one buck and two does with offspring) and in the other domestic rabbits (one buck and two does with offspring – New Zealand White and ZIKA hybrids) were kept. The sex ratio was always 1 adult male: 2 adult females.

Two artificial nestboxes measuring 50 x 50 x 25 cm (width, length, height) for wild rabbits and 65 x 65 x 50 cm for domestic rabbits were placed in the enclosures. The nestboxes had wooden walls with one tube as an entrance and straw as litter material. Outlets of the tubes ended in a heap of soil outside the nestbox. The nestboxes for wild rabbits were fully closed by wooden walls to guarantee full darkness in the boxes. Different hiding-places like plastic tubes, half tubes from ceramics and wooden boxes were put into both enclosures. Additionally, a third artificial wooden box with a short tube as an entrance was installed in the enclosure for wild rabbits. Thus, all three adult rabbits in each enclosure had the possibility to use its “own” box for resting. In the enclosure for domestic rabbits, different wooden boxes and a long wooden tube to each nestbox had the same function.

All pups were weaned at 28 days and were taken away from the enclosures. After several kindlings both wild and domestic rabbit does and bucks were exchanged. In all, 11 litters from 6 wild rabbit does and 15 litters from 8 domestic rabbit does were

observed between March and August during three years. The rabbits were fed commercial pellets, hay and water ad lib as described by HOY and SELZER (2002).

Behaviour of rabbits can be videotaped in complete darkness with an infrared camera in combination with an infrared lamp emitting light with a wavelength of 880 nm. The ability of rabbits to see in dark conditions is similar to human beings. The highest sensitivity of the rabbit eye is at a wavelength of 511 nm (BROWN, 1936).

Behavioural studies were conducted with the infrared video technique described by HOY (2000) and HOY and SELZER (2002). Infrared cameras were installed above the nestboxes. Permanent recordings were made over 24 hours on a minimum of two days each week so that all behavioural patterns showed by rabbits in the nestboxes were recorded. The video technique used is characterised by the following data:

- infrared video camera WV-BP 500 or WV-CD 810 (Panasonic) with spheric lens
- time lapse video recorder (VCR) AG 6024 HE (Panasonic)
- infrared lamp WFL-I-LED 30 W (for indoor use)
- monitor WV-BM 80 (Panasonic).

With the time lapse VCR, a 180 min video tape can be extended to 24 hours recording time without having to change the cassette.

The behaviour of adult wild and domestic rabbits was observed every 5 minutes (point-sampling). The following behavioural patterns were noted:

- presence of one, two or all three adults in the nestbox
- percentage of time with two or three rabbits with body contact
- comfort behaviour (grooming, scratching, licking, gnawing)
- resting
- exploration
- locomotion.

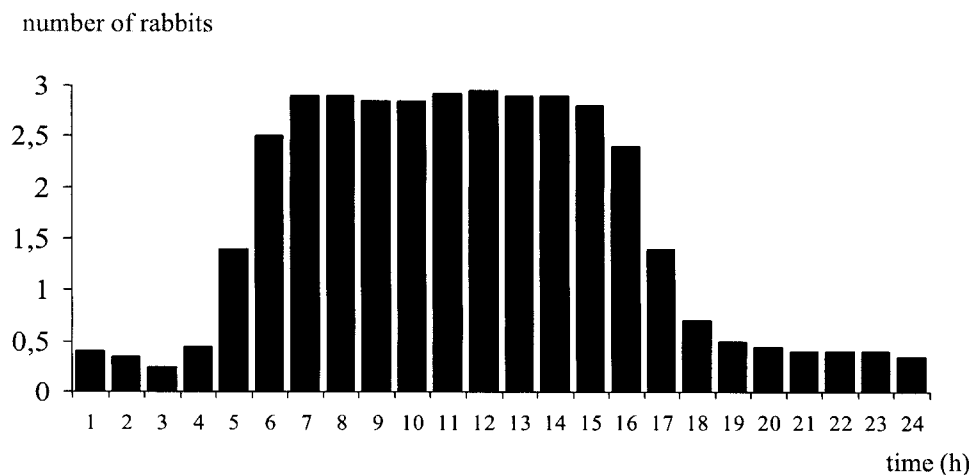
The behaviour of wild rabbits in nestboxes was analysed for 45 days (1080 hours) and the behaviour patterns of domestic rabbits were observed for 42 days (1008 hours). Data were entered into an Excel file and then exported to SPSS 8.0 for Windows.

The mean number of both wild and domestic rabbits staying at the same time in the nestbox was calculated on the basis of one-hour-intervals during 24 hours (descriptive statistics). The percentages of time where one, two or three adults stayed in the nestbox and the percentages of different kinds of activity were calculated. Because of large differences in the duration of stay in the nestboxes between wild and domestic rabbits no Chi-square test was used. The results are given only in figures.

## RESULTS

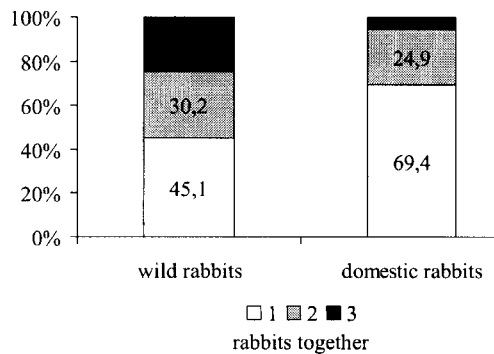
On average, 2.9 adult wild rabbits were in the nestbox between 7 a.m. and 4 p.m. During the night from 6 p.m. to 5 a.m. on average only 0.4 rabbits spent time in the nestbox (Figure 1). Nightly use of nestboxes was mainly caused by rainy weather. In 45.1 % of all 5 min-values only one adult rabbit was in a nestbox. Two animals together

**Figure 1:** Mean number of adult wild rabbits (max = 3) in the nestboxes per hour during the day (n = 1080 hours).

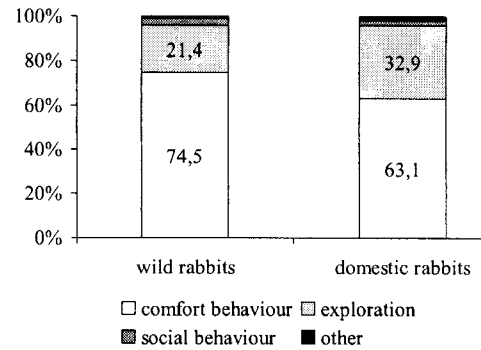


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**Figure 2:** Percentages of stay of one, two or three adult wild or domestic rabbits in the nestboxes (n = 4808 observations in wild and 2373 observations in domestic rabbits).



**Figure 3:** Percentages of different behavioural patterns of adult wild and domestic rabbits in the nestboxes (total activity = 100 %; 2989 observations in wild and 1157 observations in domestic rabbits).

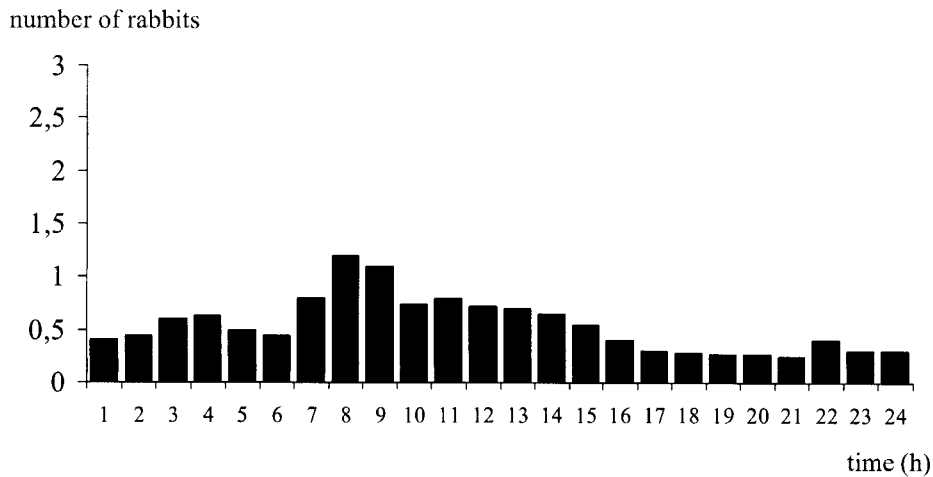


were observed in 30.2 % of the cases. In 24.7 % of all observations three adult wild rabbits were together in one nestbox (Figure 2). If two or three rabbits crouched together they had body contact in 80.4 % (n = 2639 observations) of all cases.

Wild rabbits spent 65.6 % of their time in the nestbox resting and 34.4 % active. The largest part of the activity was comfort behaviour (74.5 %). Especially after coming back from outside the nestbox in the early morning, wild rabbits spent much time with grooming. Exploration was 21.4 % of the activity in the nestbox. It was not always possible to differentiate whether animals sniffed at the nestbox or at other rabbits. Social-grooming and social-sniffing was clearly seen in 2.9 % of all cases. All other behavioural patterns were summarised under “other” (1.2 %) (Figure 3). Defaecation in the nestbox was very seldom observed.

Adult domestic rabbits used the nestboxes with changing intensity. On average 0.9 adults were in the nestbox between 7 a.m. and 4 p.m. From 4 p.m. to 6 a.m. only 0.4 adult domestic rabbits were observed spending time in the nestbox (Figure 4). Compared with wild rabbits there was a changing use of nestboxes by domestic rabbits during the year. In February, the nestboxes were used on average by 0.9 rabbits at the same time but in August adult domestic rabbits seldom used the boxes (mean presence of 0.1 adult).

**Figure 4:** Mean number of adult domestic rabbits (max = 3) in the nestboxes per hour during the day (n = 1008 hours).



The nestboxes very often were used by one adult domestic rabbit (69.4 % of all observations). In 24.9 % of all 5 min-values (n = 2373 observations) two rabbits stayed together in one nestbox and in 5.7 % of all observations all three adult rabbits were together in one box. The percentage of body contact was 65.3 % if two or three adults crouched together in one nestbox.

While in the nestbox, the percentage resting behaviour in domestic rabbits was 64.4% and activity 35.6 %.

Comparable with wild rabbits the most frequent behavioural pattern of activity in domestic rabbits was comfort behaviour (63.1 %), followed by exploration (32.9 %), social-grooming and social-sniffing (2 %) and other (2 %).

## DISCUSSION

During the daylight period the wild rabbits mainly stayed in the nestboxes. According to observations of MYKYTOWITZ and ROWLEY (1958), STODART and MYERS (1964), KRAFT (1978) and EISERMANN (1988), wild rabbits have seldom been observed

outside the nestbox during day. The investigations took place between March and August both in wild and domestic rabbits to prevent the possible effect of seasonality on group behaviour as described by COWAN (1987).

Up to now no observations of behaviour of wild rabbits in the nestbox or the burrow existed. STODART and MYERS (1964) as well as KRAFT (1976) supposed that wild rabbits would sleep during the daytime. The present investigation shows that both in wild and domestic rabbits the percentages of activity while in the nestboxes were 34.4 % and 35.6 %, respectively. On the basis of the infrared video technique it was not always possible clearly to differentiate between comfort behaviour and exploration, so the differences in the percentages of comfort behaviour and exploration in wild and domestic rabbits may be accidental. Both wild and domestic rabbits spent nearly the same percentage of activity (95.9, 96.0 % respectively) with comfort behaviour and exploration. It has to be emphasised that the percentage of time spent in the nestbox in domestic rabbits was much lower than in wild rabbits (see Figure 1 and 4).

The domestic rabbits are less shy than wild rabbits. This may be why adult domestic rabbits spend much more time during the day and night outside the nestbox.

Although both adult wild and domestic rabbits had the opportunity to use their "own" nestbox, they spent much of their time in the nestboxes together. In wild rabbits in more than the half of the whole observational period (54.9 %), two or three adults spent time crouching together. In 80.4 % of cases they had body contact. That means that they voluntarily used a space of 0.08 to 0.125 m<sup>2</sup> per animal. Obviously, direct body contact in a well established group of adult wild rabbits using only a very small space represents a species-specific behaviour. Aggressive behaviour was seldom seen (SELZER, 2000). It was not possible to differentiate with infrared video technique between males and females while lying together in the nestbox. In domestic rabbits the percentage of time where two or three adults stayed together in the nestbox was lower (30.6 %) compared with wild rabbits. It should be noted that domestic rabbits generally spent less time in nestboxes than wild rabbits (see above). Also domestic rabbits showed body contact while lying in approximately two-thirds (65.3 %) of all observations.

During crouching together the domestic rabbits had space of 0.14 to 0.21 m<sup>2</sup>/animal. Resting together in nestboxes, both in wild and domestic rabbits, mostly took place in those boxes where no litter was present.

## CONCLUSION

Both adult wild and domestic rabbits spend a considerable part of their time in the nestboxes in pairs or groups of three voluntarily having between 65 % and 80 % body contact and using between 0.08 and 0.125 m<sup>2</sup> space per animal in wild and between 0.14 and 0.21 m<sup>2</sup>/animal in domestic rabbits. The night-active wild rabbits crouched together in the nestboxes during many hours of the daylight period. The voluntary use of a small space for resting is a typical behaviour for domestic rabbits.

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