

**PRODUCTIVE VALUE OF FINN RACCOONS
(*NYCTEREUTES PROCYONOIDES* GRAY 1834)
WITH CONFIDENT TEMPERAMENT**

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Abstract

The aim of the study was to determine the relationship between confident temperament of Finn raccoons and their production parameters. The study was carried out in 2006–2008 using young Finn raccoons selected from a group of adult females originating from 3 farms. The empathy test was performed four times to classify the experimental animals according to their temperament. Based on the results obtained, the observed animals were divided into three groups: aggressive, confident and fearful. The following parameters were analysed: final body weight, conformation, and reproductive indices. Confident Finn raccoons (on three analysed farms) had high scores for final body weight, hair cover traits and total conformation score (16.48 points). Based on the results obtained it was concluded that Finn raccoons are easy to breed and mostly characterized by confident temperament that is positively correlated with growth indices, hair cover traits and reproductive performance. More breeding problems are observed in aggressive and fearful animals, which are in the minority on the farms.

Key words: Finn raccoon, temperament, selection

The Finn raccoon (*Nyctereutes procyonoides*) was introduced into the cage system not long ago and a small number of studies on its behaviour was mainly carried out in Finland, which is the leading producer of Finn raccoon skins worldwide. Research began with preliminary observations of the species and better understanding of its biology (Helle and Kauhala, 1991), as well as exploring the possibility of adapting it to farm conditions. The biology, physiology and nutrition of Finn raccoon was investigated by Korhonen and Harri (1984) and Korhonen et al. (1992) in Poland, first studies concerned the behaviour and welfare of Finn raccoons. It was observed that among traits significantly affecting the welfare of Finn raccoons, their temperament plays an important role (Korhonen, 1988; Fortuńska and Gacek, 2001). In earlier studies using polar foxes it was established that their confident tem-

perament positively correlates with their production traits. Observations of the common fox also supported this conclusion (Gacek, 1999). However, research on minks revealed a negative correlation. Minks with confident temperament had unfavourable traits such as late whelping dates or appearance of white spots on the abdomen (Trapezov, 2000). Divergent results confirmed the thesis that every species must be considered individually.

This paper is an attempt to evaluate the relationship between confident temperament and productivity of Finn raccoons.

Material and methods

The study was carried out in 2006–2008 using young Finn raccoons during their rearing and a selected group of adult females originating from 3 farms (Table 1).

Table 1. Number of studied Finn raccoons in different farms

| Farm | Adult females | | Young animals during rearing | | |
|------------------|-------------------|---------------------|------------------------------|---------|-------|
| | number of females | number of whelpings | males | females | total |
| F-I in Poland | 24 | 45 | 100 | 104 | 204 |
| F-II in Poland | 22 | 29 | 61 | 59 | 120 |
| F-III in Finland | 14 | 14 | 82 | 75 | 157 |

Using the empathy test, experimental Finn raccoons were tested and classified according to their temperament four times during rearing. The empathy test (Gacek, 1999) is considered as non-invasive and very accurate. It consisted of placing a stick with a bow at the end into the cage through the wire mesh without opening the door. The stick was placed at nose height of the animal within its sight. The tester stood about 50 cm away from the cage. The animal's initial reaction (15 to 20 seconds long) to a novel object that did not make the animal fearful was observed. The observer watched the animal's behaviour closely and tried to understand its situation. This allowed evaluating the natural temperament of the animal without additional stress stimuli (Fortuńska and Barabasz, 2003).

On the basis of test results, the observed Finn raccoons were classified as aggressive, confident and fearful (Table 2).

Table 2. Classification of Finn raccoons according to their temperament (%)

| Farm | Aggressive | Confident | Fearful |
|------------------|------------|-----------|---------|
| F-I in Poland | 13.7 | 72.5 | 13.7 |
| F-II in Poland | 12.5 | 74.2 | 13.3 |
| F-III in Finland | 16.6 | 69.4 | 14.0 |
| Mean | 14.3 | 72.0 | 13.7 |

The following production traits were analysed:

1) conformation assessment, which was made according to the Polish standard for Finn raccoon evaluation (CSHZ, 1999). The visual assessment, made on a 20-point scale, included 4 traits: size and conformation of the animal (max. 6 points), colour type (max. 3 points), colour purity (max. 3 points), and hair cover quality (max. 8 points);

2) reproductive indices:

- percentage of mated females,
- percentage of females damaging the litter,
- percentage of sterile females,
- number of kits born (per female of foundation stock),
- number of kits weaned (per female of foundation stock),
- number of kits born (per single mated female),
- number of kits weaned (per single mated female).

Pearson's non-parametric χ^2 test and median test for differences between the observed groups of animals in the analysed traits were used for statistical analysis of the results. Statistical analysis was performed using Statistica software.

Results

Confident Finn raccoons, in terms of final body weight (Table 3) as well as traits of hair cover and total score (16.48 points), had the highest rank (Table 4). Statistically significant differences were found between size (body weight) of animals, colour purity, hair cover quality and total assessment score. As a consequence, fearful Finn raccoons scored the lowest on all traits, including their final conformation score (14.89 points). Fearful individuals were characterized by the lowest body weight of all animals observed. Moreover, there were large differences in colour purity (1.98 points) and hair cover quality (5.03 points).

Table 3. Body weight of Finn raccoons with different types of temperament (kg)

| Farm | Aggressive | Confident | Fearful |
|------------------|------------|------------|------------|
| F-I in Poland | 9.18±1.09 | 9.39±0.96 | 8.88±0.89 |
| F-II in Poland | 11.83±1.27 | 11.83±1.04 | 10.45±0.71 |
| F-III in Finland | 11.19±0.89 | 11.85±1.32 | 10.98±1.03 |

Table 4. Assessment scores of Finn raccoons with different types of temperament (points)

| Trait assessed | Aggressive | Confident | Fearful |
|-----------------------|------------|------------|--------------|
| Size and conformation | 5.39±0.93 | 5.51±0.81 | 5.23**±1.08 |
| Colour type | 2.71±0.49 | 2.71±0.49 | 2.65±0.54 |
| Colour purity | 2.12±0.61 | 2.14±0.53 | 1.98**±0.59 |
| Hair cover quality | 5.93*±0.66 | 6.12±1.47 | 5.03**±1.59 |
| Total score | 16.14±2.92 | 16.48±2.48 | 14.89**±2.82 |

Asterisks indicate statistically significant differences: (*) – $P < 0.05$, (**) – $P < 0.001$.

It is worth mentioning that percentage of confident Finn raccoons on all three farms was comparable (F-I 72.5%, F-II 74.2%, F-III 69.4%). However, Finnish animals obviously surpassed Polish ones in terms of almost all traits assessed. The mean body weight of Finnish animals was 11.62 kg compared to 9.29 kg (F-I) and 11.65 kg (F-II) in Polish animals, and the mean assessment score of Finnish animals was 18.24 points compared to 14.28 points (F-I) and 16.83 points (F-II) in Polish animals. In Finnish animals, the hair cover was very dense, silky, elastic and uniform all over the fur surface, also on the abdomen. Finn raccoons on Polish farms showed more differences in terms of qualitative traits, often did not present the required type, had irregularly arranged veil and unattractive hair that was far from silky and elastic. Many animals had numerous thinned-out and felted areas on the abdominal part. Fur bites were also frequent.

Reproduction analysis revealed relatively high and favourable indices in confident animals (68.7% fertility; lowest, 9.4% proportion of sterile females) compared to the groups of aggressive and fearful animals. They were also characterized by large litters, both at birth and at weaning, after the early rearing period (Table 5).

Table 5. Reproductive results of Finn raccoons with different types of temperament.

| Trait assessed | Aggressive | Confident | Fearful |
|---|------------|-----------|-----------|
| Reproductive ability (%): | | | |
| littering | 71.4 | 68.7 | 50.0 |
| damaging litters | 14.3 | 20.3 | 10.0 |
| becoming sterile | 14.3 | 9.4 | 20.0 |
| Reproduction indices: | | | |
| litter size at birth per female of foundation stock | 5.29±4.13 | 5.44±4.26 | 3.40±4.03 |
| litter size at weaning per female of foundation stock | 4.79±3.80 | 4.89±3.86 | 2.60±3.07 |
| litter size at birth per single whelping female | 7.40±2.87 | 7.91±2.63 | 6.80±3.06 |
| litter size at weaning per single whelping female | 6.70±2.72 | 7.11±2.42 | 5.20±2.32 |

Discussion

The results obtained in this study indicate that animals classified as confident had a higher body weight and better hair cover quality than aggressive and fearful individuals. This could be due to poorer food intake by hyperactive animals or more frequent stereotypical behaviours such as fur chewing in animals exposed to long-term stress (Korhonen, 1988; Rekiła et al., 1997; Gacek, 1999).

In comparison to animals from Finland, which is known as a worldwide leader in Finn raccoon breeding, Polish animals had lower fur quality scores. Such great differences in the quality of production traits between Finnish and Polish Finn raccoons may be explained by large differences in breeding animal quality and better nutrition of Finnish animals (Fortuńska and Kasanen, 2002).

Breeding parameters of animals representing different types of temperament indicate that confident and aggressive individuals had similar results. The worst parameters were found in fearful Finn raccoons. In this group sterile females were more

frequent and litter size smaller. It was observed that both confident and aggressive females were good mothers and had a high percentage of littering females (about 70%) compared to the other animals in these groups. Among fearful females, littering females formed only 50%. The results of confident animals were higher than those described in the literature where the proportion of sterile females was 31.6%, and the number of those damaging their litters reached 40% (Barabasz et al., 1991). The possibility of achieving such favourable indices was also confirmed by Ślaska et al. (2000), who obtained similar numbers for littering, damaging litters and sterile females.

It is concluded that Finn raccoons are animals with a considerable degree of domestication and create no breeding problems. The majority of them are characterized by confident temperament that is positively correlated with growth indices, hair cover traits and reproductive performance. Aggressive and fearful animals, which are generally in the minority on the farms, are a much larger problem. The results obtained suggest that the animals should continue to be selected for confident temperament and the associated favourable production traits.

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Wartość produkcyjna jenotów (*Nyctereutes procyonoides* Gray 1834) o temperamencie ufnym

STRESZCZENIE

Celem wykonanych badań było określenie zależności pomiędzy jenotami o temperamencie spokojnym (ufnym) a ich wskaźnikami produkcyjnymi. Badania prowadzono w latach 2006–2008; wykorzystano w nich młode jenoty wybrane z grup dorosłych samic, pochodzących z 3 ferm. Wykorzystując test empatyczny (badania wykonywano cztery razy) zwierzęta doświadczalne sklasyfikowano na podstawie ich temperamentu. Wyniki testu umożliwiły podzielenie ich na trzy grupy: agresywne, strachliwe i spokojne. Określono dla nich następujące parametry: końcową masę ciała, wskaźniki ich pokroju oraz rozrodu. Jenoty spokojne (na trzech badanych fermach) miały wysokie wskaźniki jeśli chodzi o masę ciała, jakość okrywy włosowej oraz łączną ocenę ich pokroju (16,48 pkt). Na podstawie uzyskanych wyników autorzy stwierdzili, że jenoty są zwierzętami łatwymi w hodowli i w większości charakteryzują się temperamentem ufnym, który koreluje dodatnio ze wskaźnikami wzrostu, jakością okrywy włosowej i cechami rozrodu. U zwierząt agresywnych i strachliwych, występujących na fermach w mniejszej ilości, częściej obserwuje się większe problemy hodowlane.