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**Identical cheek tooth anomalies
in two Polish brown hare populations**

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Mandibles of 258 brown hares *Lepus europaeus* Pallas, 1778 from Poland were controlled for abnormal expression of the premolars. In four individuals a reciprocal transposition of the right and left third lower premolars was found. In addition, all the affected premolars were rotated. The rotation showed bilateral symmetry in each of the four specimens. A genetical basis is suggested for this type of tooth anomaly.

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Introduction

In mammals three categories of anomalies of single teeth can be discriminated within an otherwise completely and regularly developed tooth row (e.g. Wiesner and Willer 1974, Meyer 1975, Weiss 1983): (1) abnormal shape or size and reduced appearance (retension, inclusion), (2) irregular position at the correct location of a teeth row (i.e. rotation, torsion, dislocation), and (3) irregular location either in the tooth row, aside of it or elsewhere (i.e. transposition). Among brown hares and rabbits *Oryctolagus cuniculus* individuals exhibiting I^1 , I^2 , I_1 , and M^3 with abnormal shape or size and in irregular position are found occasionally (Lindsey and Fox 1974, Flux 1980, Suchentrunk *et al.* 1992). Presently, a combination of two categories of cheek tooth anomalies is reported to occur in two Polish brown hare populations.

Material and methods

Mandibles of 258 brown hares *Lepus europaeus* Pallas, 1778, collected at seven locations in Poland (Fig. 1) during the hunting seasons from 1986 to 1990 were controlled for irregular expression of the lower premolars. In four individuals exactly the same type of irregular expression of the third lower premolar (P₃) was observed. For biographic data and origins of the affected individuals see Table 1 and Fig. 1.

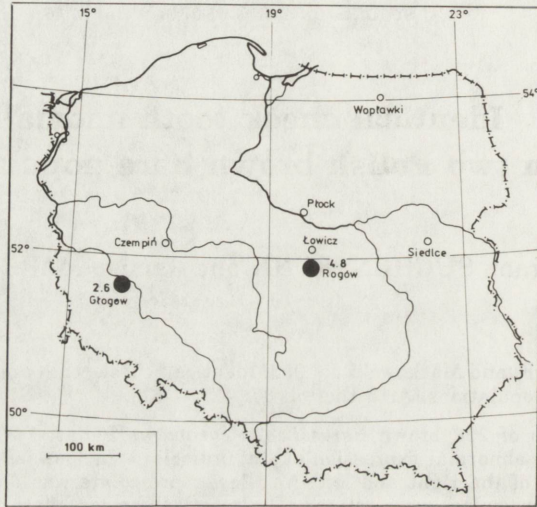


Fig. 1. Locations of the seven Polish hare populations. Black dots indicate populations in which the P₃ anomaly was found. Numbers denote the percentages of occurrence of the anomaly in the populations.

Table 1. Biographic data of brown hare *Lepus europaeus* specimens with P₃ anomaly. SA = subadults, AD = adults according to dry eye lens weights (Suchentrunk *et al.* 1991). Skulls and mandibles are stored at the Department of Ecology and Vertebrate Zoology, University of Łódź. * Shot at the first hunt of the day.

Specimen no.	Sex	Age	Locality (hunting ground)	Date of hunt
03 - 4001	M	SA	Rogów (Jasień)	3.12. 89*
03 - 4004	M	AD	Rogów (Jasień)	3.12. 89*
03 - 4006	F	AD	Rogów (Jasień)	3.12. 89*
06 - 119	F	AD	Głogów	11.12. 88

Results and discussion

In each of the four specimens both P₃ showed a reciprocal transposition: the right P₃ was placed exactly at the location of the left P₃ and vice versa (reciprocal exchange of right and left P₃). In conjunction with the transposition, each of these

premolars was affected by an irregular orientation in the tooth row caused by rotation around its vertical axis (Figs 2 and 3). However, since each of the affected teeth was stemming from the opposite body-side, respectively, none of them could be brought into regular position (i.e. conformity with the side of the respective part of the tooth row) by simply rotating it around its vertical axis while leaving it in the transpositioned place (see Fig. 3). Thus, the term "rotation" might be somewhat misleading when applied to the present type of irregularity. All right and left P_3 affected by transposition showed a bilateral symmetric degree of "rotation" (Fig. 2). The tooth sockets of the affected P_3 were in conformity with

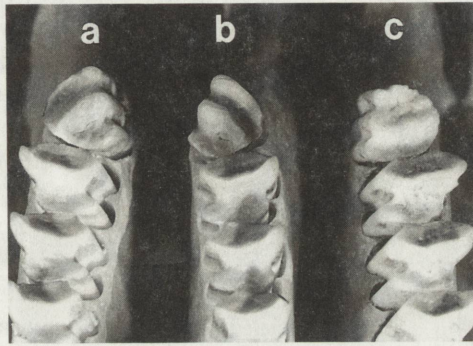


Fig. 2. Abnormal expression of P_3 in the brown hare: transposition in connection with rotation in: (a) the right (No. 03 - 4006), and (b) the left (No. 03 - 4006) mandible; (c) regularly developed P_3 in the left mandible.

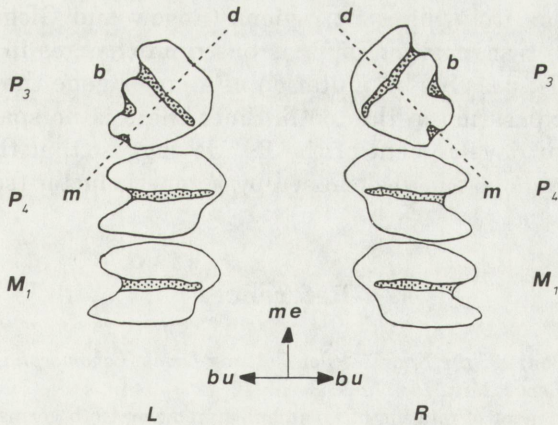


Fig. 3. Reciprocal transposition and bilateral-symmetric "rotation" of P_3 in the brown hare. The enamel patterns of the occlusal surface of P_3 , P_4 , and M_1 are shown schematically: white areas = dentin, stippled areas = cement. R = right, L = left mandible; general orientation in the mandible: bu = buccal, me = mesial; orientation of right and left P_3 : m = mesial, d = distal, b = buccal. Dotted lines indicate the mesiodistal axes of the affected P_3 .

the irregular position of the teeth; no torsions of the tooth crown were found. The bony substance surrounding the affected premolars did not show any peculiarities indicative for external pathogenic development (paradontitis, etc.). The crowns of all affected P₃ exhibited regular shape (normal height and size) and no aberrant erosion by tooth wear was detected. The patterns of the occlusal surface registered in the affected P₃ did not differ in principal from the types described by Angermann (1966) and Suchentrunk *et al.* (in press).

As to our knowledge the tooth anomaly encountered presently in 1.6% of the investigated Polish brown hares has not been reported so far in leporids (e.g. Nachtsheimb 1936, Szabo 1965, Lindsay and Fox 1974). Angermann (1966) has studied the variation in the occlusal surface of the P₃ in various species of the genus *Lepus* but did not mention any instance of abnormality in this cheek tooth. Also, in a large number of Austrian brown hares no P₃ was found to exhibit the presently described abnormality (Suchentrunk *et al.* 1992, Suchentrunk *et al.*, in press). Among the Polish hares the P₃ anomaly occurred only in two populations (Rogów and Głogów, Fig. 1); however, their gene pools were somewhat more separated from each other than those of various other Polish hare populations (Hartl *et al.* 1992).

Since three specimens with abnormal P₃ were shot during the first hunt of December 3, 1989 in the hunting ground "Jasień" (Rogów area) and hares do not tend to disperse far from their place of birth (Zörner 1981), the affected individuals are likely to be genetically related. According to their age (Table 1), they were not all born in the same year. Presumably, there were no identical environmental conditions in the different years of their birth. Also, it is very unlikely that environmental factors could have generated an identical pattern of anomaly in the P₃ of specimens from different regions (Rogów and Głogów). Therefore, we suggested that the transposition of P₃ is based on changes in the genome of the affected individuals; possibly by mutation of a major gene that is responsible for correct bilateral expression of the tooth. Since there is no space limit that could hamper the regular development of the P₃, we suggest that the "rotation" of the transpositioned premolars is also caused by a genetic factor (see also Esaka 1982 for dogs).

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