

Polydactylism in roe deer in Croatia - a case report

Krunoslav Pintur^{1*}, Nina Popović¹, Damir Mihelić², Vedran Slijepčević¹,
and Alen Slavica³

¹Department of Gamekeeping and Environmental Protection, Karlovac University of Applied Sciences,
Karlovac, Croatia

²Department of Anatomy, Histology and Embryology, Faculty of Veterinary Medicine, University of Zagreb,
Zagreb, Croatia

³Department for Game Biology, Pathology and Breeding, Faculty of Veterinary Medicine, University of
Zagreb, Zagreb, Croatia

**PINTUR, K., N. POPOVIĆ, D. MIHELIĆ, V. SLIJEPCJEVIĆ, A. SLAVICA:
Polydactylism in roe deer in Croatia - a case report. Vet. arhiv 81, 779-784, 2011.**

ABSTRACT

A male roe deer (*Capreolus capreolus*) aged 2 years was shot near Našice in Croatia, exhibiting polydactylism. Based on visual examination and radiographs, polydactylism was described on three limbs. On the front and hind right feet digit 2 was duplicated and on the hind left foot there was a 2nd extra metatarsal bone with 3 digits.

Key words: polydactyly, roe deer (*Capreolus capreolus*), Croatia

Introduction

Over the past few decades only a few cases of polydactylism in red and roe deer have been described in the world. This abnormality may occur in both sexes, on the fore or hind feet, as well as on one or more feet (CHAPMAN, 2006). DAVIDSON (1971) described a case of polydactylism in sika deer (*Cervus nippon*) shot in New Zealand, whereas DANIEL (1967) recorded a significant number of 90 red deer (*Cervus elaphus*) with this abnormality. Recently, 64 additional examples from New Zealand and Australia have been documented (BANWELL, 1999). There were also a few single cases described in North America. MILLER and CAWLEY (1970) reported on polydactylism in white-tailed deer (*Odocoileus virginianus*) from Canada, and a single case was described in caribou (*Rangifer tarandus groenlandicus*) (MILLER and BROUGHTON, 1971). Rare cases of

*Corresponding author:

Krunoslav Pintur, Department of Gamekeeping and Environmental Protection, Karlovac University of Applied Sciences, Trg J. J. Strossmayera 9, 47000 Karlovac, Croatia, Phone: + 385 47 843 520; Fax: + 385 47 843 529; E-mail: krunoslav.pintur@vuka.hr

polydactylism have also been described in Europe and according to literature they have only been documented in Great Britain (England, Scotland) and in Germany. Only the second recorded case of polydactylism in roe deer (*Capreolus capreolus*) was determined in Scotland (CHAPMAN, 2006), whilst in German literature there are many documented cases for this species, but the descriptions lack detail.

There have been cases recorded in Croatia, but it is not known to the authors whether any of these have been described. However, a preserved single specimen of polydactylism exists in the Museum of the Croatian Hunting Association.

Materials and methods

Roebuck (*Capreolus capreolus*) with perceived movement difficulties was shot in the hunting ground Krndija II near Našice in Croatia, in the summer of 2004. After visual examination of all four feet, on the front right and on hind left and right foot polydactylism was recorded. The feet were then photographed and radiographed for the purpose of detailed interpretation of this abnormality. Subsequently, specimen osteometric measurements were taken.

Results

The male roe deer shot in the Krndija II hunting ground had a normally developed front left foot. On the front right foot there was duplication of digit 2, respectively one



Fig. 1. Polydactylism (duplication of digit 2) on front right foot, normal front left foot

more digit, formed of two phalanges (2nd and 3rd). This digit had no joint connection with the distal end of the 2nd metatarsal bone. The hoof of this digit did not respond morphologically to the hooves on the 2nd and 5th digit, its length was 21 mm and it was shorter than the hooves of digits 2 (25 mm) and 5 (26.3 mm). On that front foot there were no signs of inflammatory processes. (Fig. 1, Fig 2.)

An almost identical case of 2nd digit duplication was found on the hind right foot. Besides digit 2 there was an additional digit formed of just two phalanges, phalanx tertia et secunda. The first phalanx was of irregular shape, longer than the first phalanges of the normally developed digits 3 and 4, its length was 20 mm and on the plantar side it lay vertically on the metatarsal bone.

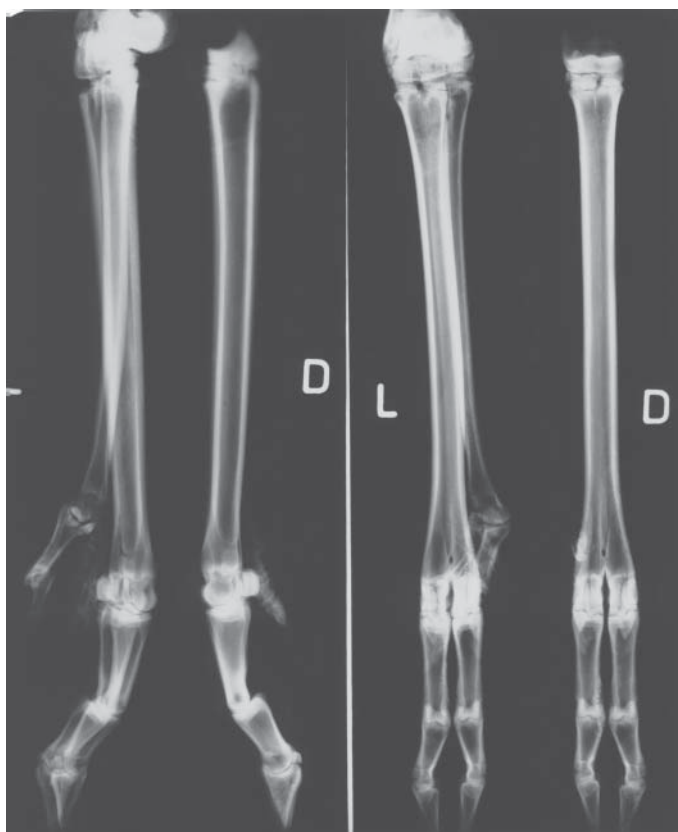


Fig. 2. Radiograph of polydactylous front right foot - duplication of digit 2



Fig. 3. Polydactylism on hind limbs

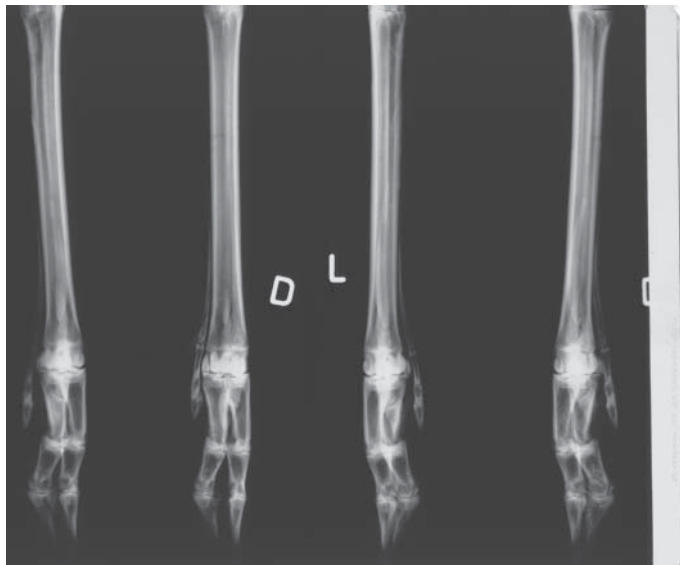


Fig. 4. Radiograph of polydactylous hind limbs

On the hind left foot, besides the normally developed digits 3 and 4, along the medial side of the 3rd metatarsal bone there was an additional metatarsal bone. It was shorter than metatarsals 3 and 4 (183 mm) with length of 149 mm and it was curved on the plantar

and medial sides. On the condylus ossis metatarsalis III there was indication of division into two condyles and there were two digits, one larger and one weaker, forming a joint connection on that condylus. Both digits were formed of all three phalanges, whereas the phalanges of the stronger digit were larger. That digit, probably due to injury during its lifetime, in the area of joint connection between the second and third phalanx it had become dislocated and this had led to the fusion of these phalanges. The phalanges of the weaker digit were curved laterally. Along the medial side, besides these two digits and in the extension of the additionally developed metatarsal, one more digit had developed, also formed of all three phalanges. Three digits developed on the additional metatarsal did not have normal morphological appearance and according to their position they were not functional (none of them reach to the ground). (Fig. 3, Fig. 4)

The epiphysis proximalis of the left metatarsal bones was 26 mm and the right foot 18.8 mm in width. The circumference of the ossa metatarsalia, measured at half of its length, was also larger on the left foot and measured 70 mm, as opposed to the circumference of the right foot which measured 65 mm. This difference in breadth and circumference was a consequence of developed ossa metatarsalia accessorius.

On that hind foot there were in total 7 fully developed digits.

Discussion

Polydactylism is probably the abnormality most often described in roe deer. Various types of polydactylism has been described by DANIEL (1967), MILLER and CAWLEY (1970), DAVIDSON (1971), MILLER and BROUGHTON (1971), SCHMID et al. (1990), CHAPMAN (2006). The specificity of this case is that polydactylism occurred on three limbs (the front right and both hind feet) and that has not been described by other authors (CHAPMAN, 2006). Duplication of digit 2, which we determined on the front and hind right feet, was described for caribou (*Rangifer tarandus grenlandicus*) MILLER and BROUGHTON (1971), while in German literature the most often described abnormality was duplication of digits 3 and 4 (BRAUNSCHWEIG, 1982; OBERBACH, 1994). Both duplications were characterised by the absence of the first phalanx, which is not a rare phenomenon in polydactylism, because during embryonic development the duplication of all phalanges did not occur (SADLER, 1996).

DAVIDSON (1971) described an example of an additional metacarpal bone in sika (*Cervus nippon*), whereas in this case for roe deer, an additional metatarsal bone was found on the hind left foot, with three developed digits. On that limb there were in total 7 digits developed.

In more recent world literature there is no record of a similar case description.

Although the cause of polydactylism is not completely clarified, most authors believe that it is a disorder during embryonic development, resulting in duplication of tissues.

References

- BANWELL, D. B. (1999): Polydactylism in New Zealand red deer and related species, *Deer* 11, 40-42.
- BRAUNSCHWEIG, A. (1982): Abnormitäten an Läufen bei Rehwild. *Wild und Hund* 6, 34-38.
- CHAPMAN, N. G. (2006): Polydactyly in roe deer (*Capreolus capreolus*). *Eur. J. Wildl. Res.* 52, 142-144.
- DAVIDSON, M. M. (1971): A case of polydactylism in sika deer in New Zealand. *J. Wildl. Dis.* 7, 109-110.
- DANIEL, M. J. (1967): Polydactyly in red deer, *Cervus elaphus* Linne, 1758, in New Zealand. *Säugetierkundl Mitt.* 15, 149-155.
- MILLER, F. L., A. J. CAWLEY (1970): Polydactylism in a white-tailed deer from eastern Ontario. *J. Wildl. Dis.* 6, 101-103.
- MILLER, F. L., E. BROUGHTON (1971): Polydactylism in a barren-ground caribou from northwestern Manitoba. *J. Wildl. Dis.* 7, 307-309.
- OBERBACH, H. (1994): Rehbock mit neun Schalen. *Die Pirsch* 46, 8.
- SADLER, T. W. (1996): *Langmanova medicinska embriologija*. Školska knjiga, Zagreb.
- SCHMID, P., F. MAURER, H. MEIER (1990): Doppelmißbildung der Zehen (Polydactylie) an den Hinterläufen einer Rehgeiß (*Capreolus capreolus* L. 1758). *Z. Jagdwiss.* 36, 63-65.

Received: 22 October 2010

Accepted: 14 July 2011

PINTUR, K., N. POPOVIĆ, D. MIHELIĆ, V. SLIJEPCHEVIĆ, A. SLAVICA: Slučaj polidaktilije u srneće divljači u Hrvatskoj. *Vet. arhiv* 81, 779-784, 2011.

SAŽETAK

Slučaj polidaktilije opisan je u srnjaka (*Capreolus capreolus*) dobi od 2 godine, odstrijeljenoga kod Našica u Hrvatskoj. Vizualnim pregledom te na osnovi rendgenskih snimki, polidaktilija je utvrđena i opisana na tri noge. Na prednjoj i stražnjoj desnoj nozi utvrđena je duplikacija 2. prsta, a na stražnjoj lijevoj nozi pojava dodatne metatarzalne kosti s 3 prsta.

Ključne riječi: polidaktilija, srnjak, *Capreolus capreolus*
