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POLYDACTYLISM IN A BARREN-GROUND CARIBOU FROM NORTHWESTERN MANITOBA

FRANK L. MILLER* and ERIC BROUGHTON**

Abstract: A polydactylous right front foot was collected from a 5-year-old female barren-ground caribou (*Rangifer tarandus groenlandicus*) in northwestern Manitoba (59°21'N, 100°13'W). We determined by gross visual and radiographic examination that the foot had a complete extra digit in the position of the ancestral 1st digit. This is the first account of a polydactylous foot in the genus *Rangifer*.

INTRODUCTION

Polydactylism has been reported for only one species of deer in North America. Miller and Cawley³ reported a female white-tailed deer (*Odocoileus virginianus*) fawn from eastern Ontario with a polydactylous right front foot. Stone et al.⁵ reported a 2½-year-old female white-tailed deer from Seneca County, New York with a polydactylous right front limb. The only other reports of polydactylism in cervids have been by Nobs⁴ for a single German roe buck (*Capreolus capreolus*) and by Daniel¹ for about 90 red deer (*Cervus elaphus*) in New Zealand. Daniel believed that the characteristic probably originated in the red deer with one stag and two hinds that were introduced to New Zealand in 1863 from the royal deer herd at Windsor Park, England. Recently Davidson² reported a case of polydactylism in a sika deer (*Cervus nippon*) hind in New Zealand. She stated that the polydactylism of the sika deer was similar to about two-thirds of the cases reported by Daniel.¹

METHODS

We collected the polydactylous right front foot from one of five barren-ground caribou obtained for examination of glandular material, in northwestern Manitoba on April 14, 1970. We detected

the anomaly while preparing the foot for extraction of material from the interdigital gland. We examined the foot visually and recorded linear measurements of the extra hoof, the altered 2nd digit, and 5th digit. The foot was then photographed and radiographed for detailed interpretation of the polydactylous condition. The age of the animal was determined histologically by counting the annulations in the dental cementum in the 1st incisor. We performed a necropsy on the animal.

RESULTS

The polydactylous right front foot had an extra digit of three phalanges and an extra metacarpal on the inside of the foot in the position of the ancestral first digit. Radiographs of the foot showed polydactylism which involved the metacarpus. The digits extended the entire length of the metacarpus, from the carpus to the metacarpo-phalangeal articulation. In the metacarpal region the digits were well formed and were about 5 mm thick in some places. The extra metacarpal bone was not fused along its length to the cannon bone. The hoof on the extra digit curved upward in a tapered crescent, and was exaggerated in size and shape (Figs. 1 and 2). The deformed normal 2nd digit was also crescentic and cylindrical-conical in shape (Figs. 1 and 2).

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Figure 1

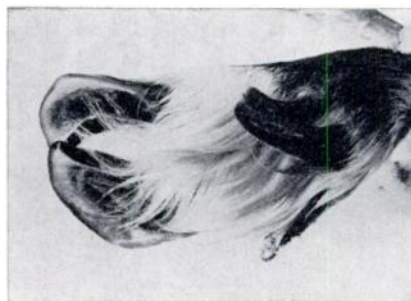


Figure 2

FIGURE 1. (Top) Lateral view of inside of right front foot from polydactylous female barren-ground caribou showing exaggerated curvature of extra digit and deformed normal 2nd digit.

(Bottom) Normal right front foot from female barren-ground caribou showing normally developed 2nd digit.

FIGURE 2. Lateral ventrad view of inside of polydactylous right front foot showing abnormal cylindrical conical development of the extra digit and deformed normal 2nd digit.

The extra hoof had a maximum lower surface length of 92 mm, 61% more than its upper surface length of 57 mm, and exceeded the lower surface lengths of the normally developed 5th digit (62 mm) by 48%. The upper surface length of the extra hoof, however, was only 92% of the upper surface length of the 5th digit. The deformed 2nd digit was similar to the 5th digit in medio-length (60 mm vs 62 mm) and appeared as a rolled and curved version of the 5th digit.

The necropsy revealed no other abnormalities. The cow weighed 76.2 kg and carried a 1.7 kg male fetus. Her fat reserves were good for the season of the year and she retained both antlers.

DISCUSSION

The paucity of examples of polydactylism in cervids precludes any definitive evaluation of the anomaly's origin. Stone

et al.⁵ concluded, "that deer have a predisposition for embryonic duplication of the tissues of the front limb bud". Nobs⁴ attributed the polydactylous condition to embryonic duplication of the tissues of the limb buds and Daniel¹ believed that polydactylism was probably caused by a dominant gene of limited permeation and variable expression. Davidson² offered no possible explanation for the polydactylism. Whether polydactylism in cervids is aberrant or atavistic remains unknown. Polydactylism has now been found in front feet in five species of cervids from different parts of the world but is yet to be reported in the hind feet of cervids. Thus Miller and Cawley's³ suggestion that there is some predisposition for the location of the anomaly is still pertinent. Ancestral deer may have lost the 1st digit of the forefoot later than that of the hind foot, and this could be why we find polydactylous front feet in cervids.

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