THE CAUDAL GLAND IN REINDEER (*Rangifer tarandus* L.): ITS BEHAVIORAL ROLE, HISTOLOGY, AND CHEMISTRY

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Abstract—Behavior observations in European reindeer (*Rangifer tarandus*) showed a high frequency of sniffing the tails of conspecifics. A caudal gland was found, and it is the largest skin gland in *Rangifer*. Behavioral contexts of tail sniffing, the histology of the gland, and some aspects of the composition of the volatiles in the gland’s secretion are described.

Key Words—caudal gland, cervids, deer, mammals, pheromones, *Rangifer tarandus*, reindeer, scent communication, scent gland, skin gland, tail gland.

INTRODUCTION

During observations on chemical communication in captive “forest” reindeer (*Rangifer t. tarandus* L.) in May and June 1975, one of the authors (D.M.-S.) noted that social interactions are often accompanied by sniffing another individual’s tail.

Close examination of live reindeer showed a large amount of secretion on the basal third of the long white hair on the sides of the tail. This secretion was particularly obvious when the animals were shedding their tail hair in June. During that period, large bunches of old tail hair could easily be pulled out and used for extraction and chemical analysis of the deposited secretion. The secretion was present in both sexes, but more evident in females, and

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particularly in a lactating cow. A large gland was found that had not been described for European reindeer.

After these observations we found that caudal glands had been discovered in study skins of the American caribou \((Rangifer tarandus arcticus)\) by Lewin and Stelfox (1967). For the European reindeer \((Rangifer t. tarandus)\) no caudal gland had been reported. The other, well-known skin glands in this species are the antorbital, tarsal, and interdigital glands (Quay, 1955).

**METHODS AND MATERIALS**

**Behavior**

Nine captive reindeer (4 males, 4 females, ranging in age from one to four years, and one calf born in June 1975) of the “forest” variety were observed at the field station of Umeå University in northern Sweden. The observations took place in two pens, each 100 x 100 m large, from May to September 1975. In addition, 90 free-ranging reindeer were observed for two days in Norra Storfjället, Swedish Lappland.

**Histology**

Tails from both sexes were collected in September 1975 at the annual reindeer slaughter at Klimpfjäll, Lappland, and preserved in Bouin’s solution. The gland was studied histologically at 8 sites of caudal skin: middorsal and midventral at basal, distal (tail-tip), and intermediate points, and lateral at basal and intermediate points. Serial sections 6 to 8 \(\mu m\) thick were stained with Ehrlich’s acid alum hematoxylin and eosin Y.

**Chemistry**

Tail hair from both sexes was collected at the field station of Umeå University in July 1975 and at Klimpfjäll (Lappland) in September 1975, immediately frozen in liquid nitrogen, and stored at \(-20^\circ C\) in the dark until analyzed by methods described by Andersson et al. (1975).

We used GLC with 2.0 and 2.7-m glass columns, coated with 10% Reoplex 400 (isothermal at 58°C) and 3% OV-17 (isothermal at 100°C), respectively, on 100/120 mesh Chromosorb W-AW-DMCS, and nitrogen (40 ml/min) as carrier. Mass spectra were run on a LKB 9000 mass spectrometer with helium as carrier.

Acids were analyzed both as free acids and as methyl esters formed by methylation with diazomethane in ether.