

Brief Communication

EFFECT OF NATURAL FEED, ANTIBIOTICS, TANNIN,
DIPHENYLIODONIUMCHLORIDE AND SALICYLIC ACID
SUPPLEMENT ON PLASMA URIC ACID CONCENTRATION IN
CAPTIVE WILLOW PTARMIGAN (LAGOPUS L. LAGOPUS)

Nephritis and uric acid diathesis occur during the fall and early winter in captive willow ptarmigan (*Lagopus l. lagopus*), and plasma uric acid is significantly higher when these birds are fed high than low protein diet (*Hanssen* 1982). Captive willow ptarmigan on 5 h daylight and concentrated feed dropped 5.8 g feces/h during the light period and 2.1 g/h (wet weight) during the dark period. The percentage of dry matter was also different, ranging between 5—15 and 16—24, respectively (*Hanssen* unpublished). This indicates a slower transit of digesta through the intestine of captive willow ptarmigan during the dark compared to the light period. *Hanssen* found that most of the birds dead from nephritis and uric acid diathesis showed enteritis and high numbers of bacteria in the intestines. This might have been caused by slow transport of protein-rich digesta through the gut, which is known to facilitate growth of indigenous gut bacteria (*Wehman et al.* 1978) which may produce various nitrogenous compounds exerting both toxic effects and increased nitrogen load on the animal (*Perry et al.* 1965).

The present study has examined if manipulation of the gut microflora affects the plasma uric acid concentration in captive willow ptarmigan fed a protein-rich diet. The substances used were natural feed supplement, antibiotics, tannin, diphenyliodonium chloride (DIC) and salicylic acid. Ptarmigan natural feed, here represented by blueberry (*Vaccinium myrtillus*) plants and willow (*Salix* spp.) twigs, contain antibacterial substances which influence willow ptarmigan gut microflora (*Hanssen* unpublished). Tannin and salicylic acid are both substances present in ptarmigan natural feeds. The first mentioned substance is a potent inhibitor of microbial urease (*Fernando & Roberts* 1976), while the latter is an antifermentative substance which has been shown to reduce the plasma uric acid in chicken, probably by

enhancing uric acid secretion in the kidneys (Thomas *et al.* 1967). DIC is an inhibitor of amino acid deamination (Broderick & Balhtrops 1979).

The experimental birds were hatched from eggs either laid by wild or captive plarmigan hens and reared on a concentrated food mixture supplemented with blueberry plants.

All birds were kept indoors on a light regime synchronous to the outdoor photoperiod (Hanssen). From the beginning of September the chicks were gradually adapted to a concentrated experimental diet (28 % crude protein) over a two-weeks period. Both feed and water were provided *ad libitum*.

The birds were divided into groups consisting of 4–7 individuals. The control group received the experimental diet only, while the test groups had the same diet supplemented daily with the test substances (Table 1). An anticholinergicum, oxiphencyclinichloride 10 mg/bird/day, was supplied *per os* to both test and control birds to reduce intestinal peristalsis and promote bacterial growth, in the antibiotics experiment. Blood samples (1½ ml) were taken from a wing vein every 10 days, and plasma was analysed spectrophotometrically for uric acid according to a method described by Kageyama (1971).

Table 1. Effect of natural feed supplement, antibiotics, tannin, diphenyliodoniumchloride (DIC), and salicylic acid on plasma uric acid concentration (mean \pm s).

Experiments	Plasma uric acid (mmol/l)	
	Control group	Test group
Natural feed supplement 10 g/day	0.78 \pm 0.39 (26) ²	0.48 \pm 0.18 ¹ (14)
Neomycin and oxytetracycline, ³ 0.01 and 0.015 %, respectively, in the water	0.72 \pm 0.24 (19)	0.62 \pm 0.24 (21)
Tannin, 0.2 % in the water	0.65 \pm 0.26 (14)	0.63 \pm 0.12 (15)
DIC, 0.5 mmol/l in the water	0.65 \pm 0.26 (14)	0.57 \pm 0.19 (15)
Salicylic acid, 0.25 % in the water	0.54 \pm 0.17 (35)	0.49 \pm 0.21 (36)

¹ The difference is significant, $P < 0.05$.

² () number of samples.

³ Neo-Terramycin "Pfizer".

No effects on plasma uric acid concentration of feeding antibiotics, tannin, DIC and salicylic acid to captive willow ptarmigan were demonstrated. Only supplement of blueberry plants and willow twigs reduced the plasma uric acid concentration significantly. This was probably not caused by the antimicrobial substances in these food items, but possibly by the concomitant reduction in total ration protein content (*Hanssen*). From this it can be concluded that nitrogenous compounds of gut microbial origin are not likely to be the eliciting factor in nephritis and uric acid diathesis of willow ptarmigan.

Ingolf Hanssen

The Department of Arctic Biology and Institute of Medical Biology,
University of Tromsø, Norway.

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Reprints may be requested from: Ingolf Hanssen, Steinåsen 33, N-7000 Trondheim, Norway.