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The Anatomy and Histomorphology of the Uropygial Gland in New Zealand Endemic Species

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Abstract

Considering that there are more than 10,000 species of birds on earth, and that the uropygial gland is the most prominent integument gland in this vertebrate group, it is puzzling that little is known about its morphology and function. The current hypotheses for the function of the uropygial gland can be placed into four groups: 1) feather maintenance; 2) water-proofing; 3) intraspecific communication/health; and 4) defence against predators and/or parasites. Several studies have examined these hypotheses, although no general function for the uropygial gland has been established.

This thesis aimed at reducing the gap in knowledge of the uropygial gland by investigating New Zealand birds. The purpose of this study was to examine the anatomical and histological structure of the uropygial gland in New Zealand birds and to investigate the defence hypothesis as a function of the gland specifically in brown kiwi (*Apteryx mantelli*).

Anatomical and histological analyses of the uropygial glands from brown kiwi, great spotted kiwi (*Apteryx haastii*), hihi (*Notiomystis cincta*), New Zealand bellbirds (*Anthornis melanura*), tui (*Prosthemadera novaeseelandiae*), and saddleback (*Philesturnus carunculatus*) were carried out. The anatomy and histology of all glands were compared both within family and order and to those available from other species worldwide. The defence hypothesis function of the uropygial gland was investigated using the tick species *Ixodes anatis* from the skin of brown kiwi.

This study revealed a range of uropygial gland characteristics in the kiwi, hihi, New Zealand bellbird, tui, and saddleback that were not known to previously exist in other species. For example kiwi uropygial glands were found to possess eight primary sinuses. Comparison of the New Zealand passerines revealed that bellbirds possess the largest gland in relation to body size out of the four species. The uropygial secretion of brown kiwi may play a role

in parasite repellence as both males and female ticks were deterred from the secretion. Based on histomorphology I suggest that rather than a single function, the gland may have species/group functions. However, this hypothesis still remains enigmatic due to the lack of birds studied to date.

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Table of Contents

Abstract	ii
Acknowledgements	iv
Table of Contents	vii
List of tables	x
List of figures	xi

CHAPTER 1. INTRODUCTION..... 1

1.1. Uropygial gland overview	2
1.2. Uropygial gland morphology	Error! Bookmark not defined.3
1.3. Uropygial gland histology	7
1.3.1 Uropygial capsule.....	8
1.3.2 Uropygial lobules	9
1.4. Embryology of the uropygial gland in birds	12
1.5. Blood and nervous supply of the uropygial gland	13
1.5.1 Blood supply.....	13
1.5.2 The nerve supply.....	14
1.6. Functions of the uropygial gland	14
1.6.1 Feather maintenance hypothesis	14
1.6.2 Water-proofing hypothesis.....	15
1.6.3 Intraspecific communication/health hypothesis.....	16
1.6.4 Defence hypothesis	17
1.7. Why should we investigate the uropygial gland of New Zealand birds?	18
1.8. Aims of this study	21

References

CHAPTER 2. THE UROPYGIAL GLAND OF KIWI (APTERYX SPP): MORPHOLOGY AND PATHOLOGY.....29

Abstract

2.1	Introduction	31
	2.1.1 Study aims.....	32
2.2	Materials and methods	32
	2.2.1 External morphometrics.....	32
	2.2.2 Histological and pathological examination.....	32
	2.2.2.1 Histomorphometrics.....	34
	2.2.3 Statistical analysis.....	35
2.3	Results	36
	2.3.1 Gross anatomy of the kiwi uropygial gland.....	36
	2.3.2 Microscopic anatomy of the kiwi uropygial gland.....	40
	2.3.3 Histology of the kiwi uropygial gland follicles.....	43
	2.3.3.1 Histomorphometrics.....	45
	2.3.4 Pathology of the kiwi uropygial gland.....	50
	2.3.4.1 Atrophy of the uropygial gland.....	50
	2.3.4.2 Pustular dermatitis of the uropygial gland.....	52
	2.3.4.3 Uropygial gland adenitis.....	54
2.4	Discussion	56

References

CHAPTER 3. THE COMPARATIVE MORPHOLOGY OF THE UROPYGIAL GLAND IN HONEY-EATING FOREST BIRDS OF NEW ZEALAND 66

Abstract

3.1	Introduction	65
3.2	Materials and methods	68
	3.2.1 Study species.....	68
	3.2.2 Morphological examination.....	69
	3.2.3 Histological examination.....	70
	3.2.3.1 Histomorphometrics.....	70
	3.2.4 Statistical analysis.....	71
3.3	Results	72
	3.3.1 Gross morphology of hihi uropygial gland.....	72
	3.3.1.1 Hihi.....	72

3.3.1.2 Bellbird	75
3.3.1.3 Tui	76
3.3.1.4 Saddleback	76
3.3.2 Uropygial gland follicular characteristics	78
3.3.2.1 Hihi	80
3.3.2.2 Bellbird	80
3.3.2.3 Tui	80
3.3.2.4 Saddleback	81
3.3.3 Histomorphometrics	81
3.4 Discussion	86

References

CHAPTER 4. EFFECT OF SEX AND SEASON ON THE CELLULAR TOPOGRAPHY OF THE UROPYGIAL GLAND OF HIHI (*NOTIOMYSTIS CINCTA*)..... 94

Abstract

4.1 Introduction	95
4.2 Materials and methods	96
4.2.1 Study species.....	96
4.2.2 Histological examination	96
4.2.3 Histomorphometrics	97
4.2.4 Statistical analysis	97
4.3 Results.....	98
4.3.1 Histomorphometrics	98
4.4 Discussion	99

References

CHAPTER 5. THE EXAMINATION OF ECTOPARASITE (*IXODES ANATIS*) BEHAVIOUR TOWARD THE UROPYGIAL GLAND SECRETION OF BROWN KIWI (*APTERYX MANTELLI*)..... 103

Abstract

5.1 Introduction	105
5.1.1 Avian defence mechanisms against ectoparasites	106
5.2 Materials and methods	112

5.2.1 Study site.....	112
5.2.2 Study Species	113
5.2.2.1 Brown Kiwi (<i>Apteryx mantelli</i>)	113
5.2.2.2 <i>Ixodes anatis</i>	114
5.2.3 Experimental procedure	117
5.2.4 Statistical Analysis.....	118
5.3 Results.....	118
5.4 Discussion	120
References	

CHAPTER 6. GENERAL DISCUSSION..... 132

References

List of tables

Chapter 2:

Table 2.1: Sample sizes for histology aspect of investigation (excludes birds used for pathology).
.....33

Table 2.2: Overview of statistical results of comparisons of sex (male vs. female) and species (brown kiwi vs. great spotted kiwi) on mean follicular diameter, mean luminal diameter, mean number cells in follicle epithelial layer, mean number germinative cells in follicle epithelial layer, mean number intermediate cells in follicle epithelial layer, mean number secretory cells in follicle epithelial layer. Bold values in 'p-value' column represent significant tests45

Table 2.3: Species found by Jacob and Ziswiler (1982) with more than two orifices57

Chapter 3:

Table 3.1: Average male and female weights (grams) for the four study species. Tui is the largest, followed buy the saddleback, hihi and bellbird. (Heather & Robertson, 1996)69

Table 3.2: Mean and standard deviation for external lobe and papilla characters: lobe length, lobe width, lobe depth, papilla length, papilla width, and papilla depth73

Table 3.3: Descriptive statistics for UG follicular characteristics of hihi, bellbirds, tui, and saddleback. N = number of follicles examined 81-82

Table 3.4: Gross morphological characteristics and proportions of the UG in Passeriformes. Papilla direction: right angle = the papilla is almost at right angles to the plane of the lobes; rectilinear = the papilla barely makes an obtuse angle with the lobes. Ecology describes where the species most commonly inhabits. Species are listed according to the length:width index. Study species highlighted in grey. (Modified table from Jacob & Ziswiler, 1982). 87-88

Chapter 4:

Table 4.1: Paired t-test statistics for UG follicular characteristics of hihi. Comparisons of sex (male vs. female) and season (summer vs. winter) are shown; df = degrees of freedom, p = p-value. 12 tests so p Bonferroni corrected = $0.05/12 = 0.0042$ 99

Chapter 5:

Table 5.1: Ectoparasites collected from brown kiwi (*Apteryx mantelli*) in New Zealand (Heath, 2010).* indicates endemic to kiwi113

Table 5.2: Cross tabulation of sex, body condition, life-stage and uropygial gland secretion119

Table 5.3: Cross tabulation of sex, body condition, life-stage and canola oil120

List of figures

Chapter 1:

Figure 1.1: Photo showing the location of the UG in a penguin (arrow). The gland is located in the same general place in all bird species studied this far. Photo sourced from www.google.co.nz/images.....3

Figure 1.2: Modified drawing of a UG illustrating anatomical organization. (Jacobs & Ziswiler, 1982)4

Figure 1.3: Illustration demonstrating morphological diversity of UG lobe shape and size (Salibian & Montalti, 2009)5

Figure 1.4: Diagram of uropygial circlet feathers described by Johnston (1988). Type 1 = modified down feather; type 2 = modified semiplume; type 2a = modified semiplume7

Figure 1.5: Illustration showing the three different uropygial circlet arrangements (a = dorsal view of papilla showing feathers (hollow circles) surrounding orifices (slits); b = longitudinal view showing tuft arrangement). 1 = single tuft (arrangement 1); 2 = double tuft (arrangement 2); 3 = individual rows (arrangement 3). Illustration by author.....7

Figure 1.6: Illustration of a follicle from the UG of a Single Comb White Leghorn Chicken. Scale = 0.01mm. (Lucas & Stettenheim, 1972).....10

Figure 1.7: Generalised UG structure from follicle through to primary sinus. (Jacob & Ziswiler, 1982)12

Figure 1.8: Photograph of a male hihi. Photograph taken by Isabel Castro.....19

Figure 1.9: Photograph of a New Zealand tui. Photograph taken by Isabel Castro19

Figure 1.10: Photograph of a New Zealand bellbird. Photograph taken by Isabel Castro19

Figure 1.11: Photograph of a New Zealand saddleback. Photograph taken by Isabel Castro.. 19

Figure 1.12: Photograph of a brown kiwi. Photograph taken by Jay Bent20

Chapter 2:

Figure 2.1: Model illustrating histological sections produced from each UG - the two small circles in the middle represent dorsal view of papilla. Illustrations by author.....33

Figure 2.2: Photomicrograph of the UG of a brown kiwi showing the longitudinal transect of maximum glandular diameter. H&E scale bar = 5mm. Photograph by author35

Figure 2.3: Brown kiwi *Apteryx mantelli* UG. a) Position of the bird for measurements and photographs; b and e: photos taken from above; c and d: photos taken from the side. For b-e, the head of the birds is located to the left of the photographs and the backside to the right. b)Location of the UG in relation to the vent (cloaca), V = vent; UG = Uropygial gland. Notice the presence of two (b) and one (c) feathers respectively at the apex of the gland and the variation in the proximity of the gland to the vent; in b the vent is separated from the UG by about 3mm while in c the vent surrounds the UG. c and d) Un-pigmented UG showing a prominent forward extension of the gland that was named cartilaginous protuberance or CP, also visible in e. e) UG showing high pigmentation. Photographs by Isabel Castro37

Figure 2.4: Brown kiwi UG anatomical organisation. Mid transverse section. Scale graduations = millimetres. Photograph by Maurice Alley38

Figure 2.5: Photographs of brown kiwi UG: a) showing dark pigmentation spots on its surface due to melanin pigments; b) ventral view showing two lobes, a papilla, and uropygial circlet feathers. Scale = millimetres. Photographs taken by a) Isabel Castro and b) by author38

Figure 2.6: Relationship between UG volume in the two years of the study. The short line within the box represents the median of the UG volume. The bottom and top edges represent the 25th and 75th percentiles. The “whiskers” extend to the 5th and 95th percentiles. The minimum and maximum values in the sample are indicated with a '+' sign39

Figure 2.7: Characteristics of the kiwi UG and its secretion. a) Number of feathers present on the UG. b) UG secretion colour. White bars = 2008; black bars = 200940

Figure 2.8: Percentage of males and females presenting pigmentation of the UG. Black = females; white = males; n = 13 females, 15 males40

Figure 2.9: Photomicrograph of brown kiwi UG: a) capsule; b) branching of interfollicular septae into glandular area c) nerves; d) follicle. Massons Trichome stains connective tissue blue; scale bar = 200µm. Photograph by author41

Figure 2.10: Photomicrograph of brown kiwi UG: a) glandular area; b) capsule c) smooth muscle; d) dermal collagen. H&E scale bar = 200µm. Photograph taken by author.....41

Figure 2.11: Photomicrograph of great spotted kiwi UG: a) tendon formed with capsule of UG; b) secretory area. Van Gieson scale bar = 200µm. Photograph taken by author41

Figure 2.12: Photograph of the inside of a lobe of a brown kiwi UG. Four primary sinuses and some secondary sinuses are clearly visible. Lateral sagittal section. Scale graduations = millimetres. Photograph by author42

Figure 2.13: Photomicrograph of great spotted kiwi UG midline section. Showing compact type of four primary ducts, each associated with their own sinus. H&E scale bar = 2mm. Photograph by author 43

Figure 2.14: Photomicrograph of brown kiwi UG lateral section. Showing lipids in the secretion staining strongly positive with Sudan Black; scale bar = 200µm. Photograph by author43

Figure 2.15: Photomicrograph of brown kiwi UG Midline section. Follicle cell types: a) germinative cells; b) intermediate cells; c) secretory cells. H&E scale bar = 200µm. Photograph by author.....44

Figure 2.16: Comparison of mean follicular diameter of kiwi uropygial gland between sex and species (micrometers). Brown kiwi n=4 males; 3 females; GSK n= 1 male; 2 females. Dark grey = midline section; light grey = lateral section. Error bars represent standard error46

Figure 2.17: Comparison of mean luminal diameter of kiwi uropygial gland between sex and species (micrometers). Brown kiwi n=4 males; 3 females; GSK n= 1 male; 2 females. Dark grey = midline section; light grey = lateral section. Error bars represent standard error46

Figure 2.18: Comparison of mean number of cells counted in the follicle epithelium of kiwi uropygial glands between sex and species (micrometers). Brown kiwi n=4 males; 3 females; GSK n= 1 male; 2 females. Dark grey = midline section; light grey = lateral section. Error bars represent standard error.....47

Figure 2.19: Comparison of mean number of germinative cells in the follicle epithelium of kiwi uropygial glands between sex and species (micrometers). Brown kiwi n=4 males; 3 females; GSK n= 1 male; 2 females. Dark grey = midline section; light grey = lateral section. Error bars represent standard error.....48

Figure 2.20: Comparison of mean number of intermediate cells in the follicle epithelium of kiwi uropygial glands between sex and species (micrometers). Brown kiwi n=4 males; 3 females; GSK n= 1 male; 2 females. Dark grey = midline section; light grey = lateral section. Error bars represent standard error.....48

Figure 2.21: Comparison of mean number of secretory cells in the follicle epithelium of kiwi uropygial glands between sex and species (micrometers). Brown kiwi n=4 males; 3 females; GSK n= 1 male; 2 females. Dark grey = midline section; light grey = lateral section. Error bars represent standard error.....49

Figure 2.22: Photomicrographs of the UG in great spotted kiwi case one. a) Follicles are reduced in number and epithelial thickness is lacking; H&E scale bar = 2mm. b) showing severely reduced epithelial thickness and expanded lumina of follicles; H&E scale bar = 200µm. Photographs by author50

Figure 2.23: Photomicrograph of the UG in great spotted kiwi case two. a) Follicles are reduced in number and epithelial thickness is also reduced. No secretion is present within the follicles. H&E scale bar = 2mm. b) The epithelium is reduced to a single layer in many areas and the lumina are expanded. H&E scale bar = 200µm. c) Photomicrograph of normal juvenile female great spotted kiwi UG. The follicle epithelium is much thicker and follicle lumens are smaller in size than atrophied glands. H&E scale bar = 200µm. Photographs by author51-52

Figure 2.24: Photomicrograph of the uropygial papilla in a female brown kiwi showing hyperkeratosis and pustule formation (arrows). H&E scale bar = 2mm. Photograph by author53

Figure 2.25: Photomicrograph showing hyperkeratosis (h) and pustule formation (p) of the papilla in a female brown kiwi. Arrows: heterophil infiltration of the dermis. H&E scale bar = 200µm. Photograph by author53

Figure 2.26: Photomicrograph showing Haast Tokoeka UG - ventral UG sinus filled with necrotic keratinaceous debri (arrow). H&E scale bar = 5mm. Photograph by author55

Figure 2.27: Photomicrograph showing Haast Tokoeka UG - ventral UG sinus filled with necrotic keratinaceous debri and clumps/pairs/singles of Gram-positive cocci. Gram stain scale bar = 200µm. Photograph by author55

Figure 2.28: Photomicrograph showing severe diffuse hyperkeratosis, squamous metaplasia, and hyperplasia of affected glandular epithelium. H&E scale bar = 200 µm. Photograph by author55

Figure 2.29: Photomicrograph showing numerous epithelial pegs extending from the base of the epithelium into the surrounding connective tissue. H&E scale bar = 500µm. Photograph by author55

Chapter 3:

Figure 3.1: a) A model illustrating morphological features measured: length, width, and depth; b) A model illustrating histological sections produced from each UG - the two small circles in the middle represent dorsal view of papilla. Illustrations by author69

Figure 3.2: Photomicrograph of the UG of a New Zealand bellbird showing the longitudinal transect of maximum glandular diameter (red line). a) coccygeal bone of the tail; b) feather follicle. H&E scale bar = 2mm. Photograph by author71

Figure 3.3: Lobe characteristics for each species. Dark grey = mean lobe length; light grey = mean lobe width; medium grey = mean lobe depth. Error bars represent standard error72

Figure 3.4: Papilla characteristics for each species. Dark grey = mean papilla length; light grey = mean papilla width; medium grey = mean papilla depth. Error bars represent standard error73

Figure 3.5: Photomicrograph of hihi UG showing thin interfollicular septae (black arrows). Massons Trichome scale bar = 200 µm. Photograph by author74

Figure 3.6: Hihi UG anatomical organisation. Mid transverse section. Scale = millimetres. Photograph taken by author75

Figure 3.7: Photomicrograph of hihi UG showing three distinct primary sinuses. H&E scale bar = 500µm. Photograph taken by author75

Figure 3.8: 1,2,3, & 4: Photographs of ventral view of UG showing the bipartite nature and nakedness of the lobes and papilla. Scale = millimetres. i, ii, iii, & iv: Photomicrographs of UG showing a) thin ventral capsule; b) primary sinuses; c) papilla valve; d) papilla; e) tail feather follicle. 1.i = hihi; 2.ii = New Zealand bellbird; 3.iii = tui; 4.iv = saddleback H&E i & ii (scale bar = 2mm), iii & iv (scale bar = 5mm)..... 77-78

Figure 3.9: Photomicrograph of UG follicle cell types: a) germinative cells; b) intermediate cells; c) secretory cells. i = hihi; ii = New Zealand bellbird; iii = tui; iv = saddleback. H&E scale bar = 200µm. Photograph by author79

Figure 3.10: Showing UG follicle diameter of each species. a) Midline follicle diameter; b) lateral follicle diameter. Red dots = maximum and minimum values; dash in middle of box = median; top and bottom of box = upper and lower quartiles respectively82

Figure 3.11: Showing UG lumen diameter of each species. a) Midline lumen diameter; b) lateral lumen diameter. Red dots = maximum and minimum values; dash in middle of box = median; top and bottom of box = upper and lower quartiles respectively83

Figure 3.12: Showing the number of cells in the UG follicular epithelium of each species. a) Number of cells in the follicular epithelium of the midline of the UG; b) number of cells in the follicular epithelium of the lateral aspect of the UG. Red dots = maximum and minimum values; dash in middle of box = median; top and bottom of box = upper and lower quartiles respectively84

Figure 3.13: Showing the number of germinative cells in the follicular epithelium of each species. a) Number of germinative cells in the follicular epithelium of the midline of the UG; b) number of germinative cells in the follicular epithelium of the lateral aspect of the UG. Red dots = maximum and minimum values; dash in middle of box = median; top and bottom of box = upper and lower quartiles respectively.....84

Figure 3.14: Showing the number of intermediate cells in the follicular epithelium of each species. a) number of intermediate cells in the follicular epithelium of the midline of the UG; b) number of intermediate cells in the follicular epithelium of the lateral aspect of the UG. Red dots = maximum and minimum values; dash in middle of box = median; top and bottom of box = upper and lower quartiles respectively.....85

Figure 3.15: Showing the number of secretory cells in the follicular epithelium of each species. a) number of secretory cells in the follicular epithelium of the midline of the UG; b) number of secretory cells in the follicular epithelium of the lateral aspect of the UG. Red dots = maximum and minimum values; dash in middle of box = median; top and bottom of box = upper and lower quartiles respectively.....85

Chapter 4:

Figure 4.1: Mean luminal diameter of hihi uropygial glands (micrometers). Significant difference in season between midline only. Error bars represent standard error. Dark grey = midline section; light grey = lateral section 98

Chapter 5:

Figure 5.1: Photograph of a Common Kingfisher (*Alcedo atthis*) preening. (<http://www.besgroup.org>)106

Figure 5.2: Picture illustrating the comb-like structure of the pectinate claw. (http://people.eku.edu/ritchisong/avian_integument.htm).....106

Figure 5.3: Photograph of ‘Mauro’ – Ponui Island brown kiwi male. Photograph by Jay Bent114

Figure 5.4: Distribution of *Ixodes anatis* within New Zealand (Heath, 2010).....115

Figure 5.5: Ixodid tick three-host life-cycle ([http://extension.entm.purdue.edu/public health/ insects/tick.html](http://extension.entm.purdue.edu/public_health/insects/tick.html))116

Figure 5.6: Photograph illustrating differences between unengorged female tick and male tick – *Ixodes anatis* (Cane, 2009)116

Figure 5.7: a) Illustration showing experimental setup showing Petri dish with square of oil and tick placed in the middle; b) Photograph showing experimental setup depicting three separate treatments: 1) control, 2) UG secretion, and 3) Homebrand® canola oil. Ticks were exposed to each treatment for 5 minutes. Illustration and photograph by author117

Figure 5.8: Figure showing the percentage of ticks which left the central square under each treatment (UGS = uropygial gland secretion, canola oil, and control).....119