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AVIAN TAXONOMY

DIFFERENCES BETWEEN VIOLET AND GREEN WOODHOOPOE MANTLE FEATHERS

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Abstract

Taxonomic status of Namibian Violet Woodhoopoe *Phoeniculus d. damarensis* was determined by microscopic differences in violet and green mantle feathers. Outer iridophore diameters from Green Woodhoopoe *P. p. purpureus* barbules (0.22 ± 0.03 µm, n = 244) were smaller than those from violet barbules (0.28 ± 0.04 µm, n = 248) whereas the inner diameters were similar in both cases.

Introduction

The Namibian Violet Woodhoopoe *P. d. damarensis* has an uncertain taxonomic status (Cooper *et al.* 2001*a*; Cunningham & Cherry 2005; Simmons *et al.* 2005). Here we provide some resolution to the taxonomic status of the Violet Woodhoopoe by comparison with the green woodhoopoe, using microscropic details of mantle feathers.

Materials and Methods

Mantle feathers were sampled from netted live Violet (Namibia: Hobatere and Omaruru; n = 9) and a dead Green Woodhoopoe (Morgan Bay; n = 1) in 1999. Mantle feathers were soaked for 30 min in 0.25M NaOH, followed by 2 hours in formic acid: EtOH (2:3 v/v) and 3 days in 15% (v/v) Spurr's resin in propylene oxide. They were then embedded in Spurr's resin. Both transverse and longitudinal sections of the barbules were cut, revealing that the iridophores of both species were hollow prolate cylinders. Iridophore cylinder widths were calculated and statistically compared using the T-Test calculator for Independent means (http://www.socscistatistics.com/tests/studentttest/Default.aspx).

Results

Mantle feathers and iridophores from Namibian Violet Woodhoopoe *P. damarensis* and Green Woodhoopoe *P. p. purpureus* are shown (Figures 1-3). Birds identified as *P. d. damarensis* had predominantly violet mantles. The difference between woodhoopoe species' colours is shown in Figure 1 below. The outer iridophore diameters from green barbules were smaller than those from violet barbules, whereas the inner diameters were similar (Table 1). Outer and inner diameters were significantly different from each other (t = 4.66667, n = 2, p = 0.02149).

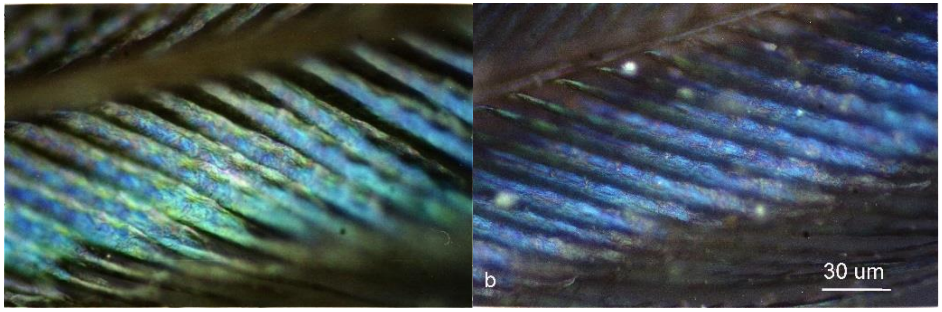

Figure 1 – Close-up light microscope image of a Green Woodhoopoe, *P. purpureus* mantle feather (left) and Violet Woodhoopoe, *P. damarensis* mantle feather (right).

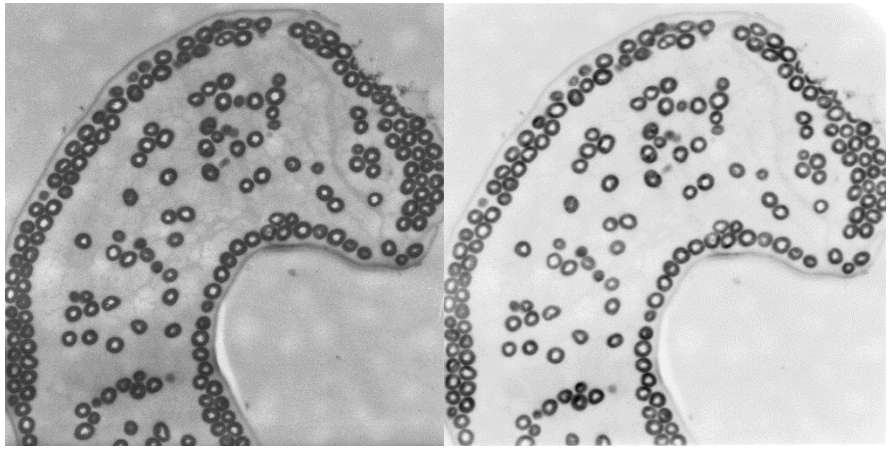

Figure 2 – X-sections of mantle feather barbules showing iridosomes of a Green Woodhoopoe (left) beside a Violet Woodhoopoe (right)

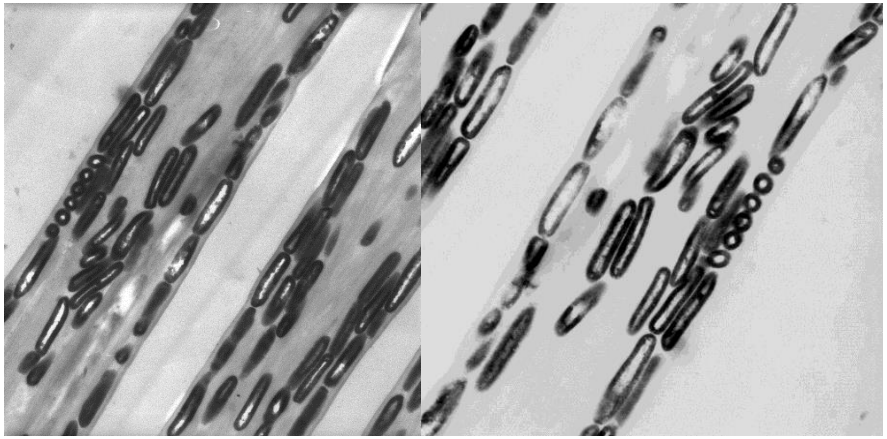

Figure 3 – Longitudinal sections of mantle feathers of a Green Woodhoopoe (left) and Violet Woodhoopoe (right) viewed with transmission electron microscope (TEM)

Table 1. Iridophore sizes of woodhoopoe mantle feathers

Character	*P. damarensis*	*P. purpureus*	n
Inner diameter (µm)	0.11±0.03	0.11=±0.02	248
Outer diameter (µm)	0.28±0.04	0.22±0.03	244

Discussion

Examination of mantle feathers from Violet and Green Woodhoopoe indicates these are separate entities. A simple model cannot account for differences between iridophore diameters, but differences are enough to distinguish Green from Violet (Cooper *et al.* 2001*b*).

References

Cooper MI, Cunningham M, Cherry MI 2001*a*. Taxonomic status of the Namibian Violet Woodhoopoe *Phoeniculus damarensis* as determined by mitochondrial DNA. *Ibis* 143(3): 572-579. DOI: 10.1111/j.1474-919X.2001.tb04884.x

Cooper MI, Sewell BT, Jaffer MA 2001*b*. Failure of a simple model to account for the iridescent colours of woodhoopoe feathers. *Proceedings of the microscopy society of southern Africa* 31: 82.

Cunningham M & Cherry MI 2005. Seeing the woodhoopoe for the trees: a response to Simmons et al. (2005). *Ibis* 147(1): 225–227. DOI: 10.1111/j.1474-919x.2005.00397.x

Simmons RE, du Plessis MA, Hedderson TAJ 2005. Seeing the woodhoopoe for the trees: should we abandon Namibia's Violet Woodhoopoe *Phoeniculus damarensis* as a species? *Ibis* 147(1): 222-224. DOI: 10.1111/j.1474-919x.2005.00385.x