

# A review of the taxonomy and status of the Plain-pouched Hornbill *Aceros subruficollis*

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The Plain-pouched Hornbill *Aceros subruficollis* has been the subject of considerable taxonomic confusion (reviewed herein), but is now considered to be a full species. Originally known only from southern Myanmar (Burma), it has also been thought erroneously to occur in north-east India, north and west Burma, north-west Thailand, Sumatra, and Borneo. Most of the confusion is due to the similarity of adult Plain-pouched Hornbills to juveniles and the Greater Sunda populations of the Wreathed Hornbill *A. undulatus*. Numerous morphological characters, however, differentiate the species, and these are described and illustrated in this paper. Its true range evidently includes only southern Burma, south-west and southernmost Thailand, and northernmost Malaysia. Although this re-evaluation of the species's range shows it to be a great deal more restricted and local than previously thought, large numbers have recently been found in a few new sites, but most of the 19th century sites have not been re-surveyed.

## HISTORY

Since its description as a species rather early in the 19<sup>th</sup> century, the Plain-pouched (or Tenasserim) Hornbill *Aceros subruficollis* (Plate 2) has been the subject of a great deal of taxonomic uncertainty. Of the various treatments that have been invoked, the most ignominious and far-reaching one was the idea that *subruficollis* was merely the juvenile of the Wreathed Hornbill *Aceros undulatus* (Sanft 1953), and thus not even a valid taxon. More recently, the Plain-pouched Hornbill has been found to breed assortatively in what had been thought to be the juvenile plumage of the Wreathed Hornbill, with which it is sympatric, and thus it is clearly a good species (Figure 1). Nevertheless, much confusion involving this enigmatic bird persists in the literature.

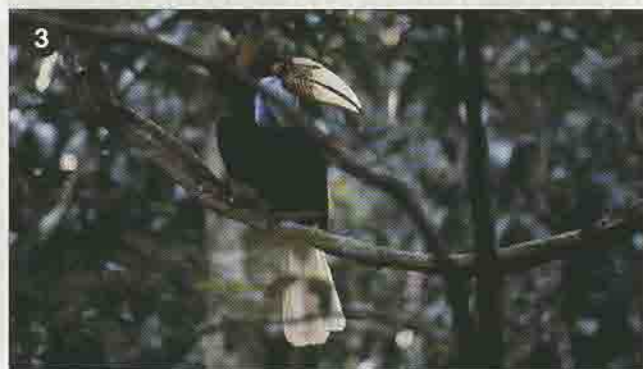
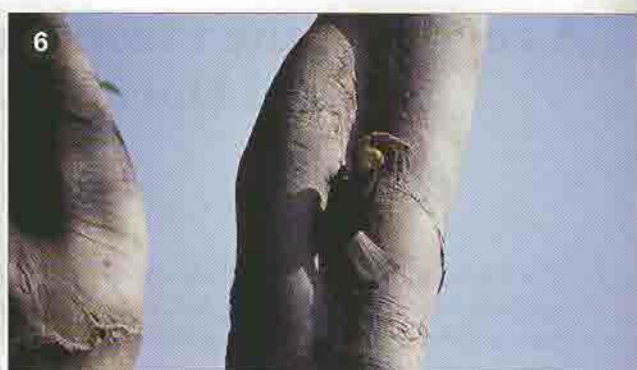
That has not always been so. When some hornbills collected by Dr Helfer around 1837 in Tenasserim reached the Indian museum in Calcutta, the Curator Edward Blyth realized that, although virtually identical in plumage, they were strikingly different in certain other respects from the Wreathed Hornbill. Blyth (1843) named the new species, comparing it to what he recognized as the closely similar Papuan Hornbill *A. plicatus*. Even then Blyth realized that *subruficollis* could not be conspecific with the sympatric Wreathed Hornbill, and he cogently discussed age-related changes in casque and bill structure, as well as constant differences between adults of the two species in casque shape. However, Blyth (1843, 1847, 1849, 1866 and 1875) vacillated as to whether *subruficollis* should stand as a full species or be treated as a subspecies of *plicatus*.

For the next thirty years *subruficollis* was only known from southern Myanmar (Burma) (Anderson 1889, Hume and Davison 1878, Oates 1882, Ramsay 1877), until Sharpe (1879) listed Bornean specimens as this, whereupon specimens from other regions ("Malacca" and Sumatra) were identified with *subruficollis* (Dubois 1884, Nicholson 1883). Also around this time, the idea was first advanced by German ornithologists that *subruficollis* was the juvenile of *undulatus* (Blasius and Nehr Korn 1881, Müller 1882). Later, specimens of

*subruficollis* were identified from Thailand (Gairdner 1915, Gyldenstolpe 1916 and 1920, Meyer de Schauensee 1946, Riley 1938) and northern Burma (Stanford and Ticehurst 1935 and 1939), so it seemed that its range was quite extensive and largely coincident with that of *undulatus*. The only major areas of the range of *undulatus* from which *subruficollis* had not been definitely recorded were Indochina, north-east India, and Java. Then when Sanft (1953) argued (for the first time in English) that *subruficollis* represented only a juvenile stage, most subsequent authors (Kemp 1978, van Marle and Voous 1988) followed him in relegating *subruficollis* to the synonymy of nominate *undulatus*. Sanft (1960) even hypothesized that lowland birds are smaller than those of the highlands, thereby justifying both his invalidation of *subruficollis*, and his synonymy of the large northern race of Wreathed Hornbill *A. undulatus ticehursti* (Deignan 1941). Some authors (beginning with Schlegel 1862) considered all three (*undulatus*, *subruficollis*, and *plicatus*) conspecific.

It is ironic that Sanft's idea that *subruficollis* was the juvenile of *undulatus* found such wide acceptance, since age-related changes in casque structure of congeneric species had been known for many years, and many specimens of *subruficollis* are obvious adults with several casque tiers. Even harder to comprehend is Sanft's claim that E. Stresemann agreed with him on this taxonomic issue, since Stresemann (1914) had previously dealt thoroughly with the subject of casque development in the closely related Papuan Hornbill.

A few, however, resisted Sanft's ideas: Deignan (1963) considered *subruficollis* a race of *plicatus*, and Elbel (1969 and 1977) attempted to clarify the dispute with his studies of mallophagans (feather lice). Results of Elbel's work were widely taken as showing that *subruficollis* hosts different feather lice than does *undulatus*, and that (assuming that the host-specificity of these parasites has compelling taxonomic implications) *subruficollis* is closer to *plicatus* (Hussain 1984) or to *undulatus* (Kemp 1995). However, what Elbel showed was that, for three different genera of feather lice: 1) the same species of one genus was found



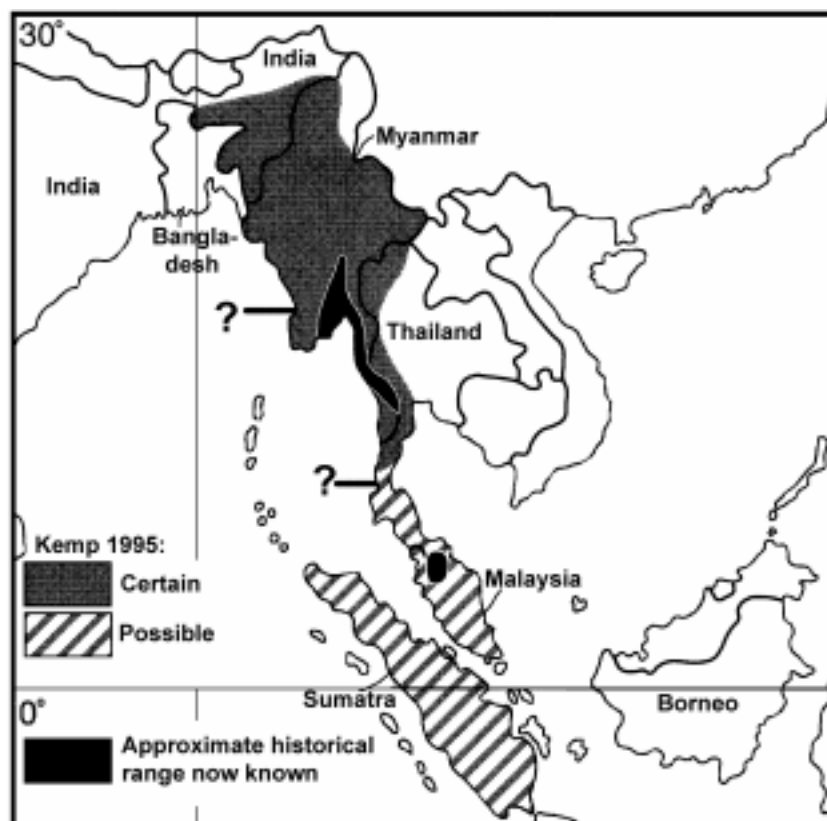
**Figure 1.** (page 84)

1. Adult male Wreathed Hornbill (Thailand, P. Poonswad).
2. Adult male Plain-pouched Hornbill (A. Vidhidharm). Note bright eye-ring, dark surrounding skin.
3. Adult female Wreathed Hornbill (Thailand, P. Poonswad).
4. Adult female Plain-pouched Hornbill (A. Vidhidharm). Note orbital skin coloration as in male.
5. First-year Wreathed Hornbill (Thailand, P. Poonswad). Note reddish base of unwreathed bill.
6. Fledgling Wreathed Hornbill (Thailand, P. Poonswad). Note pale iris and near lack of throat slash.
7. Dorsal views of adult male hornbill specimens: (left) mainland nominate Wreathed; (centre) Greater Sundas nominate Wreathed; and (right) Plain-pouched Hornbill. Note the more acute angles formed by casque tiers of Plain-pouched and the redder basal tier; the slightly paler, redder crest colour of Sundas specimen; and the greener upperparts colour of Plain-pouched.
8. Lateral views of same as in 7. Note also more golden-buff sides of head on Sundas Wreathed and Plain-pouched; and for Plain-pouched only, bicoloured orbital skin, broader gape feathering, and chestnut forehead feathering broadly reaching orbital ring.
9. Pair of Plain-pouched Hornbills (A. Vidhidharm).
10. Third-year female Wreathed Hornbill (P. Poonswad). Note throat pouch colour changing from yellow to blue.

on all three hornbills; 2) one species of the second genus was found on both *undulatus* and *subruficollis*, while another occurred only on *plicatus*; and 3) one species of the third genus was found on both *subruficollis* and *plicatus*, and another species occurred only on *undulatus*. Thus, studies of the mallophagans of *subruficollis* actually have not provided the assorted taxonomic insights attributed to them.

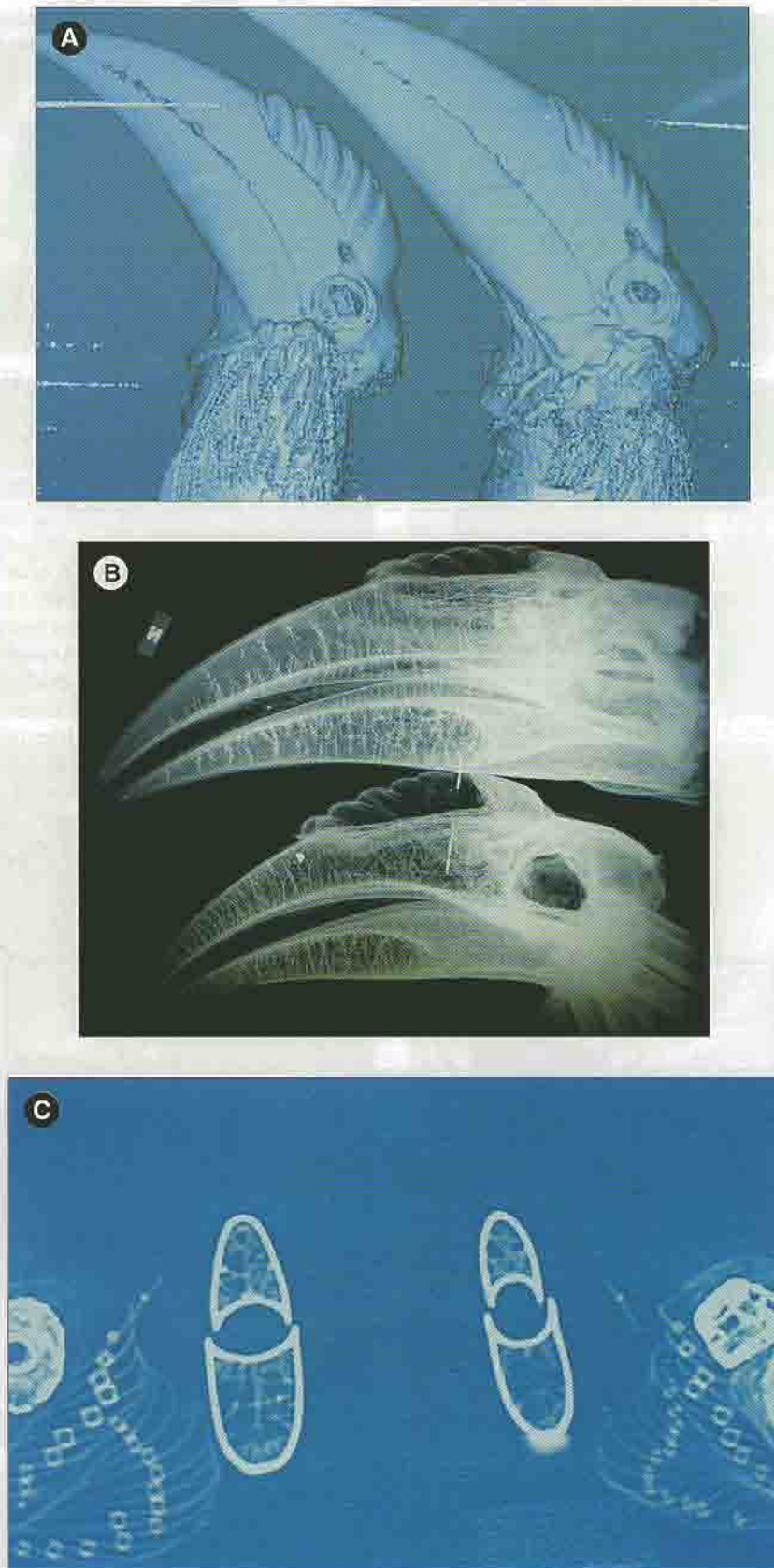
### RE-EVALUATION OF RANGE IN MAINLAND ASIA

The records of Plain-pouched Hornbill from Upper Chindwin (Stanford and Ticehurst 1935 and 1939) in West Burma led to Ripley's (1961) suggestion that it might be expected in north-eastern India, and to its being listed for Assam (Kemp 1988, 1995) (Figure 2). However, my enquiries and searches at the AMNH, where *subruficollis* specimens from Margherita, Assam (Hussain 1994, Kemp 1988 and 1995, Ripley 1961) were said to be held, showed that no Assam *subruficollis* are now there, nor was there a record of any in the only major accession from Assam (the Rothschild Collection). It then became evident (Rasmussen 1998) that these records resulted from confusion with the largest race of Wreathed Hornbill (*ticehursti* of West Bengal through northern Thailand) (Rasmussen 1998). In this connection, it should be noted that re-examination of all three syntypes of *subruficollis* (Warren 1966) at BMNH failed to confirm the comment (Kemp 1995) that any had been re-labelled as *ticehursti*.



**Figure 2.** Map comparing formerly understood range of Plain-pouched Hornbill (Kemp 1995) with that deriving from this study and more recent data.

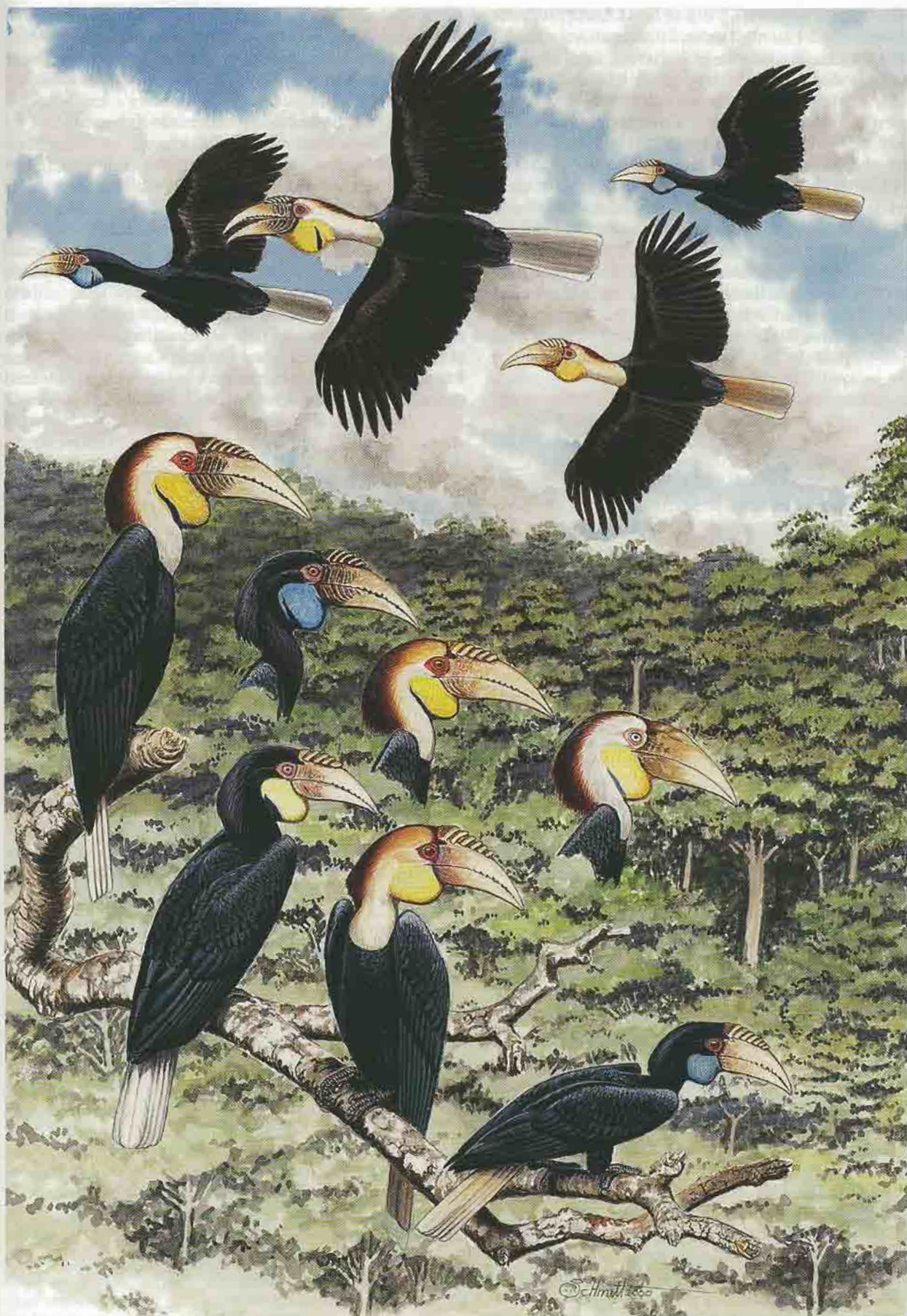




**Figure 3.**

- (A) CT-scan of lateral views of Wreathed (left) and Plain-pouched (right) showing differing bill proportions (basal casque height, casque vs. bill length ratios) and less swollen, more curved lower mandible of Plain-pouched.
- (B) X-ray (radiograph) of lateral view of bills of Wreathed Hornbill (upper) and Plain-pouched Hornbill (lower). Note especially the much higher bony structure underlying the base of the casque in Plain-pouched, and the greater density of bony struts within the mandibles.
- (C) CT-scan of frontal views of bills at about midsection: (left) Wreathed and (right) Plain-pouched (other visible structures are stuffing and feather shafts). Note narrower, more compressed bill shape of Plain-pouched.





**Plate 1.** Wreathed and Plain-pouched Hornbills. In flight (l to r): adults of mainland Wreathed, female and male; adults of Plain-pouched, male and female. Centre row (l to r): adults of mainland Wreathed, male, and female's head; adult male's head of Sundas nominate Wreathed; head of juvenile Wreathed. Lower row (l to r): adult female Sundas nominate Wreathed (yellow-pouched variant); adult male and adult female Plain-pouched. Original watercolour by John Schmitt.

In the course of working out that no Assam records of Plain-pouched Hornbill exist, I also realized that the northern Burma records were incorrect, and that this species thus does not even approach India's borders. The only evidence for the presence of this species in northern Burma (Myitkyina District) was on the authority of Stanford and Ticehurst (1935 and 1939); however, both Stanford's specimens from there (and now at BMNH) are *undulatus*; one is a juvenile that (understandably) had been misidentified as *subruficollis* (M. P. Adams, *in litt.*). Further, Stanford and Ticehurst (1939) mentioned that the Vernay-Upper Chindwin Expedition obtained a *subruficollis* at Dalu, but in fact that AMNH specimen had been published (Mayr 1938) correctly as a juvenile *undulatus*; it had once been identified as *subruficollis*, but this had been erased and replaced with *undulatus*. Thus, records from northern and western Burma were based solely on misidentifications.

In Arakan, Burma, Col. Tickell (1864) observed what was later interpreted as being *subruficollis* (Elliot 1882), and although a figure he published separately illustrates *subruficollis* (Oates 1883), Tickell did not distinguish between it and *undulatus*. The species's existence in Arakan would seem to be otherwise substantiated by an 1844 specimen collected by Phayre that was once held in the Indian Museum (Blyth 1847 and 1849), but Blyth did not specify it as an adult, while he did so for Arakan *undulatus*, and subsequently (1875) he listed only the latter for Arakan, so there is serious doubt about the identity of this specimen (which additionally was not located when I requested to see *subruficollis* specimens at the ZSI, Calcutta in 1996). Finally, Oates (1883) discounted the presence of the species in Arakan, so it should therefore be treated as unconfirmed there and, although it has been cited for the Karen Hills (Kemp 1995), as of 1943 neither species had been reported there, according to one source (Smith and Garthwaite

**Table 1.** Selected morphological characters of adults that distinguish populations of Wreathed Hornbill and/or are diagnostic for Plain-pouched Hornbill.

Character	Populations of <i>undulatus</i>				<i>subruficollis</i>
	<i>ticehursti</i>	Mainland nominate	Sundas nominate	<i>aequabilis</i>	
Size <sup>1</sup>	very large	medium	medium-small	small	small
Basal casque height	low	low	low	low	high
Casque tier shape (from above)	obtuse	obtuse	obtuse	obtuse	acute
Casque vs bill length	< ½	< ½	< ½	< ½	> ½
Basal casque tier colour	dark red-brown	dark red-brown	dark red-brown	dark red-brown	bright maroon
Bill sides colour (males)	very dark red-brown	very dark red-brown	very dark red-brown	very dark red-brown	rosy-tinged
Situation of above colour	extrinsic	extrinsic	extrinsic	extrinsic	intrinsic
Wreathing on bill sides	strong	strong	moderate to none	little to none	none
Crest colour	reddish-black	reddish-black	brighter, redder	brighter, redder	reddish-black
Crest gloss	very glossy	very glossy	very glossy	very glossy	less glossy
Colour of crown sides	pale buff	pale buff	richer golden-buff	richer golden-buff	richer golden-buff
Feathering above eye <sup>2</sup>	condition 1	condition 1	condition 1	condition 1	condition 2
Bare eye-patch size	larger	larger	larger	larger	smaller
Bare orbital skin colour (skins)	unicoloured	unicoloured	unicoloured	unicoloured	orbital ring paler, brighter, rest darker, duller
Width of commissure feathering	narrow	narrow	narrow	narrow	wider
Throat bars	slash	slash	slash	irregular, broader	none
Ad. female pouch colour (see text)	all pale blue	all pale blue	irregular yellow patches	irregular yellow patches	all pale blue
Gloss of upperparts	bluish	bluish	bluer	bluer	bronzier
Tail staining	not obvious	not obvious	not obvious	not obvious	strong chestnut stain
Tail feathers	broad	broad	broad	broad	narrower
Wing shape	broader, tip more rounded	broader, tip more rounded	broader, tip more rounded	broader, tip more rounded	slightly narrower, tip more pointed

<sup>1</sup> All are highly sexually dimorphic in size, and comparisons were made within sexes.

<sup>2</sup> Condition 1: chestnut feathering of male's forehead diagonal to eye and does not reach bare eye-skin.

Condition 2: chestnut feathering of male's forehead perpendicular to eye and broadly reaches bare eye-skin.



1943). Thus, there are no valid records of *subruficollis* anywhere north of Upper Pegu, and the species's historical range in Burma should include only the lowlands of the Pegu area through Tenasserim (Figure 2).

Most if not all of these mistaken identifications have resulted from the similarity of juvenile and immature Wreathed Hornbills (to three years of age, P. Poonswad *in litt.*) to adult male or juvenile Plain-pouched Hornbills; juvenile Wreathed Hornbills (Plate 2) lack the wreaths on the bill sides and have undeveloped casque tiers and paler throat bars. On some juvenile Wreathed specimens, the throat bars are very difficult to see, hence the misidentifications which have long clouded the literature.

Ornithologists working in Thailand generally did not accept Sanft's (mal) treatment of *subruficollis*, and instead most considered it a race of *plicatus*. Even there, however, misleading distributional information accrued, including Gyldenstolpe's (1916 and 1920) confused accounting of which species he had observed and collected in northern Thailand. His Plain-pouched Hornbill records were probably correctly rejected by Deignan (1945) but elsewhere (Kemp 1995) were interpreted as a local extirpation, although no definite records exist from northern Thailand. In Thailand it is now definitely known from a few sites in the south-west (Chimchome *et al.* 1997, Junge and Kooiman 1951, Poonswad 1994, Poonswad *et al.* 1994, Round 1988) in lowland mixed deciduous and dry evergreen forest (P. Poonswad *in litt.*).

What may be the original record of *subruficollis* for "Malacca" was said (Dubois 1884) to be a specimen in the museum in Brussels (IRSNB), but this specimen was not located by the author during a 1998 visit there, and in any case, 'Malacca' trade-skins are of unreliable provenance. For many years, *subruficollis* was listed for Malaysia (Chasen 1935), but was subsequently treated as unconfirmed there (Wells 1973). Persistent reports (Ho and Supari 1993 and 1997, Wells 1999) of flocks in flight were finally confirmed very recently (P. Poonswad and D. R. Wells, pers. comm.) by a videotape proving the occurrence of Plain-pouched Hornbills in northern Malaysia.

## RE-EVALUATION OF PURPORTED RANGE IN INDONESIA

The other major source of confusion has been the Greater Sunda populations of Wreathed Hornbill. These are typically smaller, often much smaller, than mainland Wreathed Hornbills, especially of the northern race. Most Sunda specimens lack or have very reduced bill wreaths even as full adults (Plate 2). Compared to mainland Wreathed Hornbills, their proportions are more compact, their bills shorter, and the males even have more golden-tinged sides of the head, all characters that make them more similar to the Plain-pouched Hornbill. It is therefore not surprising that there has been so much confusion. However, in other features the Sunda birds are clearly Wreathed Hornbills. It is telling that the German ornithologists (Blasius and Nehrkorn 1881, Müller 1882, Parrot 1907, Sanft 1953) who espoused the treatment of the Plain-pouched Hornbill as the juvenile of Wreathed Hornbill had almost no true Plain-pouched specimens available for study—they were

referring instead to Wreathed Hornbills from the Greater Sundas in German museums, many of which had been (and still are) labelled as *subruficollis*. The confusion between Plain-pouched Hornbills and Sundaic Wreathed Hornbills is such that, even in Forshaw's (1994) monumental *Kingfishers and related birds*, an adult female *undulatus* from Sumatra (identified by USNM number) was accidentally illustrated instead of a true female *subruficollis*, with the casque details faithfully rendered as in *undulatus*.

The first report of *subruficollis* outside of Burma was of specimens collected on the Lawas River, Borneo, by Ussher and Treacher, and identified as such by Sharpe (1879). Following this, several authors recorded the species from Borneo (Everett 1899, Hose 1893, Ogilvie-Grant 1892), and although its occurrence on this island has been dismissed (Kemp 1995), numerous specimens in various museum collections are still labelled as such. Nevertheless, all of the many Bornean specimens re-examined for this study, including those cited by Sharpe (1879), are clearly *undulatus*.

The original record of *subruficollis* for Sumatra (Nicholson 1883) is clearly in error, as the soft-part colours recorded for the specimen in question by the collector include "skin below throat... followed by a broad black line ...". Despite this, and while reiterating that *subruficollis* lacks the black throat bar, Nicholson (1883) stated "I cannot detect it on the skin" and blithely considered this obvious *undulatus* as the first record of *subruficollis* for Sumatra with the caveat "having been recorded from Borneo, it was quite likely to occur in [Sumatra] also." This error led to others, and *subruficollis* continues to be listed as definite or tentative for Sumatra (Andrew 1992, Collar *et al.* 1994, Holmes *et al.* 1994, Kemp 1995, King 1997), and although said (Kemp 1995) to have been rejected for Sumatra by van Marle and Voous (1988), these authors were instead following Sanft's treatment. However, all four purported *subruficollis* specimens at AMNH from "Boelse" (=Boeloe), Sumatra (Kemp 1988 and 1995) are actually *undulatus*. Other reports from Sumatra all appear either to pertain to misidentified *undulatus* specimens or to sight records. Given this confusion, undocumented sight records can hardly be accepted, and the occurrence of the Plain-pouched Hornbill in Sumatra is unsupported and unlikely.

## MORPHOLOGICAL DIFFERENCES

Although most recent sources indicate the lack of a throat bar and wreathing on the bill sides as the only distinguishing features, morphological comparisons show several consistent differences between Wreathed and Plain-pouched hornbills. In casque height and shape (Figure 3), and a number of other characters (summarized in Table 1), the two species differ strikingly, and the Plain-pouched Hornbill is closer to Papuan Hornbill. Indeed, the latter two can hardly be distinguished on casque shape, and their presumptive relationship was already recognized in the 1840s by Blyth. Although a case could be made for the treatment of Plain-pouched as a race of Papuan Hornbill, their major differences in soft-part colours and male head coloration (not to mention the huge range discontinuity

between northern Peninsular Malaysia and the Moluccas), indicates they would almost certainly behave as distinct species in the unlikely event of overlap, and thus are best considered as biological species.

Clearly there is a taxonomic problem within the Wreathed Hornbill: the nominate race as presently constituted contains both southern mainland birds, which are smaller than *ticehursti* but otherwise seem indistinguishable; and the Sumatran, Javan, and Bali birds which have less-developed bill wreaths or lack them altogether. Adult males of the Sundaic birds have more golden-buff on the sides of the head, and have paler, brighter reddish crests than the reddish-black ones of continental birds. Bornean birds were separated out as a new race *aequabilis* by Sanft (1960) solely on the basis of their small size, but while this probably does not hold consistently since most other Sundaic birds are also small, almost all specimens from Borneo do differ from the other island populations in having a larger, more irregular dark throat bar, sometimes covering the entire rear half of the pouch. Exactly how this translates into the colours of the living birds is not clear. Also, many adult females from the Sundas have yellowish blotches on their throat pouches, rather than solid blue ones, and one photographed (Davison and Chew 1996) of uncertain but probably Greater Sundas origin, has the pouch entirely yellow, as does at least one Javan female at NNM. An adult female from Cambodia at BMNH also has an entirely orange-yellow throat, but the significance of this is uncertain as it is the only continental specimen yet seen from east of Thailand. It should also be noted here that adult males of both *undulatus* and *subruficollis* consistently have yellow throat pouches, reports of blue-pouched male *subruficollis* (Hussain 1984) being due to confusion with *A. plicatus*.

## CURRENT POPULATION STATUS

The above re-evaluation of historical records shows that the confirmed range of the Plain-pouched Hornbill was much more restricted than previously thought (Figure 2). Since within that small range only a few pairs of the Plain-pouched Hornbill were known in western Thailand, there seemed real cause for concern, especially given the revelation that this species is a lowland specialist. In 1995, during several days spent in one of the Plain-pouched Hornbill's former strongholds, around Tonghoo in the Sittang Plain of southern Myanmar, I failed to see a single hornbill, and indeed virtually all the lowland areas we saw were under rice cultivation. However, the recent and now-confirmed reports of a flock of about 900 in southernmost Thailand near the Malaysian border (P. Poonswad *in litt.*) and large flocks in northern Malaysia have radically altered the picture for the Plain-pouched Hornbill, and for a change the news is good. The species seems to be highly local, and surveys are especially needed in their areas of former abundance in Myanmar, both in the Pegu region and in Tenasserim, to gain a real understanding of their current situation.

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