

Do Hybrids Occur Between the Black Hornbill and Oriental Pied-Hornbill?

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Introduction

Hornbill hybrids in the wild are rare but scientifically documented. The most notable example involves the interbreeding of the Great Hornbill *Buceros bicornis* and the Rhinoceros Hornbill *Buceros rhinoceros* (Chamutpong et al. 2013). They are recognised as sister taxa, belonging to the same genus (*Buceros*), and share highly similar genetics, physical characteristics, and overlapping habitats. This hybridisation between the Great and Rhinoceros Hornbill has also been observed in Malaysia (Plate 1).



Plate 1: Male Rhinoceros/Great Hornbill hybrid (red iris with unique casque in male) with female Great Hornbill visiting potential nesting site and courtship behaviour. Tanarimba, Janda Baik, Pahang, Malaysia, Mar 2026. See also: <https://ebird.org/checklist/S306634290>

There have been no reports of hybridisation between the Oriental Pied-Hornbill *Anthracoceros albirostris* and the Black Hornbill *Anthracoceros malayanus*. (Kemp & Boesman 2020; Kemp et al. 2020). We report the possibility of such a hybrid occurring in the wild with an unusual darkening of the bill and casque.

Observations

Observation 1

In July 2026 Marlina Jamal observed what was possibly a hybrid, male Black/Oriental Pied-Hornbill (Plate 2). The bird had dark, black plumage across its face, neck, chest, and back, as expected of a Black Hornbill; with some glossy plumage on the wings and white tipped tail. It had the red iris typical of an adult male Black Hornbill with the right casque shape. There was no white or pale grey superciliary stripe shown in this bird. A small percentage number of black hornbills individuals do not have this feature. Hence, there are some individual variations present. However, the tips of the wing feathers were unexpectedly white. The casque and bill



coloration was charcoal-grey with lighter, mottled bone/ivory patches along the upper ridge of the casque and mandible (Plate 3 & 4).



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Plate 2: Black/Oriental Pied-Hornbill hybrid male. Bangsar, Kuala Lumpur, Malaysia, Jul 2026.



Plate 3: Black/Oriental Pied-Hornbill hybrid male with side view of its casque and the white tip of its wing feathers. Bangsar, Kuala Lumpur, Malaysia, Jul 2026.



Plate 4: Male Black Hornbill (left) compared to the male Black/Oriental Pied-Hornbill hybrid (center) and female Oriental Pied-Hornbill (right) in flight. Black/Oriental Pied-Hornbill hybrid imaged at Bangsar, Kuala Lumpur, Malaysia, Jul 2026.

The Black/Oriental Pied-Hornbill hybrid male was accompanied by what appeared to be a female Oriental Pied-Hornbill (Plate 5).



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Plate 5: Female Oriental Pied-Hornbill (left) with Black/Oriental Pied-Hornbill hybrid male. Bangsar, Kuala Lumpur, Malaysia, Jul 2026

The owner of a nearby local food stall had been observing the birds at that the Bangsar location since 2020-2021, right around the time of the COVID-19 Movement Control Order (MCO). The birds were familiar with humans. It was her opinion that they had been nesting nearby on a few occasions, and produced several offspring. The whereabouts of the offspring are unknown, but the same two adults keep on returning.

The images of the birds taken in 2024 showed that the male hybrid showed less dark coloration on its casque (Plate 6), whereas the image of the bird taken in 2026 appears to show a large amount of dark coloration on its casque (plate 2)



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Plate 6: Female Oriental Pied-Hornbill (left) with Black/Oriental Pied-Hornbill hybrid male. Bangsar, Kuala Lumpur, Malaysia, circa 2024

This could suggest a number of possibilities:

1. A form of melanism from mild to advance; this is very rare and unlikely (please refer to the discussion on melanism below).
2. A likely form of hybridization from the pairing of two species genes (please see discussion on hybrids below).
3. Aging of species. There is a possibility of the bird being a young adult/sub adult. Typically, in this phase the male can retain large swaths of dark or mottled colouring on their bills for an extended period before turning completely pale yellowish-white. As birds age, their bill colour may darken over time, a possibility that is worth considering.
4. Preen gland secretions that contains natural pigments that heavily stain or discolour the hornier keratin layers of the bill and casque. Absence of this preening behaviour or variations in their diet (in an urban setting) can leave the bill looking unusually dark.
5. Environmental smudges. Feeding on sticky fruits, resins, unusual food, or wet decayed tree barks routinely coats and may darkens the porous surface of the bill.

Observation 2

In Jan 2021 at Morib, Selangor, Malaysia, Xian Lim saw a male Black Hornbill (not hybrid) offer an insect prey to a female Oriental Pied-Hornbill (Plate 7), suggesting courtship behaviour. The food was not accepted.



Plate 7: Black Hornbill male attempted courtship feeding of female Oriental Pied-Hornbill. Morib, Selangor, Malaysia, Jan 2021.

Observation 3

Janson Lee has observed a male Black Hornbill (not hybrid) socially interacting with a female Oriental Pied-Hornbill on a number of occasions from November 2025 to March 2026 at Bukit

Lagong, Selangor, Malaysia. Bukit Lagong is located at the outskirts of Kuala Lumpur. He noticed the two birds following each, foraging and flying together

Discussion

Our analysis of the submitted photographs, behavioural data depicted from the photos, and field observations strongly suggests hybridization between the Black Hornbill and the Oriental Pied Hornbill.

While wild hybridization between these two species remains undocumented in peer-reviewed literature, hybridization between the Black Hornbill and the Oriental Pied Hornbill is biologically possible. Taxonomically, both species belong to the same Asiatic clade and share the same genus, *Anthracoceros*, meaning they possess the necessary genetic compatibility to interbreed. Closely related hornbill species often share similar breeding systems and courtship rituals, which facilitates cross-species mate recognition.

Such a pairing may be driven by extreme stress, such as localised habitat fragmentation or a low population density of their own species in the area. If an adult hornbill reaches breeding age (and readiness) but cannot locate a conspecific mate within its home range, the drive to reproduce can override species-recognition barriers. Black Hornbill used to frequent the outskirts of Kuala Lumpur, in pockets of remnant forest. When much of the forest was cleared, it is possible that some of these long lived Black Hornbill joined Oriental Pied-Hornbill flocks, which are more habituated to urban environments. If so, their offspring might also be less forest-dependent.

Are hybrid hornbills sterile?

Bird hybridization can produce fertile offspring, especially between closely related species; distantly related species are often infertile. Haldane's Rule applies here (Coyne 1985). When hybrid birds do experience reduced fertility or inviability, it rarely affects both sexes equally. Haldane's rule states that, in hybrid animals, if only one sex is sterile or inviable, it is usually the heterogametic sex (the sex with two different sex chromosomes). In mammals (XY system), males are heterogametic (XY), so hybrid males are typically sterile while hybrid females may be fertile. However, in birds (ZW system), females are the heterogametic sex (ZW), while males are homogametic (ZZ). As a result of this chromosomal system, hybrid male birds are often fertile even when hybrid female birds are completely sterile.

Could this Black/Oriental Pied-Hornbill hybrid male also be melanistic?

True melanism is a genetic change causing an excess of dark pigment melanin mostly affecting feathers and skin rather than changing the light colour of the bill into a darker coloured structure. The dark or unusually marked bill is far more frequently caused by the regular biological and other factors mentioned in the report above. Typically, hornbill bills often get their colours from carotenoids or staining rather than presence of melanism.

There is one photographic record of melanism, occurring in a Malabar Grey Hornbill *Ocyroceros griseus* (Divin 2023). Apart from this, hyper-melanic mutations and other colour aberrations are not reported in hornbills (Kemp 1995; Poonswad et al. 2013). Many hornbill species naturally possess predominantly black or dark plumage driven by eumelanin (Kemp 1995).

Because black is already a major constituent of their normal plumage, identifying or distinguishing true genetic melanism in the wild is exceptionally difficult compared to species with lighter, brighter plumage.

The hybrid male Black/Oriental Pied-Hornbill in this report appears to have had a darkening of the casque and bill over a few years caused by aging and or the other factors discussed above.

Hein van Grouw (pers. comm.) was very kind to offer his insights on the hybrid male Black/Oriental Pied-Hornbill:

1. The term melanism is normally used only for heritable aberrations (mutations) that make an individual darker than the species' normal coloration. It is a genetic anomaly altering the production and deposition of melanin in skin, feather, or hair cells (van Grouw 2017).
2. Most heritable forms of melanism affect only the plumage and not the skin. Conversely, certain melanism mutations affect only the skin/bare parts and leave the plumage unaffected.
3. True genetic melanism is present from birth (hatching) and does not develop spontaneously later in life.
4. Some veterinarians and birdwatchers suggest that gradual 'melanism' occurs slowly over time in keratinized structures, such as the beak and casque. However, this is not genetic melanism, but rather melanisation - the normal physiological deposition of melanin into tissue, often driven by age, hormonal shifts, or maturation (Galván & Solano 2016).
5. Interestingly, hybrids do not always exhibit an exact 'intermediate' appearance between the parent species. Given the parentage, one would reasonably expect a lighter bill colour in this hybrid.
6. While the bill of this hybrid is not affected by genetic melanism, why it exhibits such extensive melanisation remains uncertain.

Chin-Aik Yeap (pers. comm.), project manager for the Malaysian Nature Society's Hornbill Conservation Project, commented that the pairing of the Black Hornbill and Oriental Pied Hornbill appears to be the first of its kind. To the best of his knowledge, there are no documented cases in (southern) Thailand or even in Indonesia. He agrees that the hybrid could be a consequence of habitat loss that "*catalysed closer interactions between a generally forest species (Black Hornbill) and the more semi-urban/secondary forest species (Oriental Pied Hornbill)*".

In conclusion, photographic, behavioural, and observational data strongly indicate a hybrid between the Black Hornbill and Oriental Pied Hornbill with bill and casque melanisation.

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