FEATURED PHOTO

HYBRIDIZATION OF A YELLOW-CROWNED AND BLACK-CROWNED NIGHT-HERON IN SOUTHERN CALIFORNIA

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We report the second successful hybridization in the wild between a Yellow-crowned Night-Heron (*Nyctanassa violacea*) and a Black-crowned Night-Heron (*Nycticorax nycticorax*), and the first with observations of young on the nest.

Hybridization among herons is uncommon but has been reported previously for the Black-crowned Night-Heron (McCarthy 2006, Monson and Phillips 1981). These reports include a natural cross with either a Little Blue Heron (*Egretta caerulea*) or a Tricolored Heron (*E. tricolor*) where the exact identification was uncertain. In Java, Sulawesi, and the Philippines natural hybridization between the Black-crowned Night-Heron and Rufous Night-Heron (*Nycticorax caledonicus*) has been noted repeatedly (McCarthy 2006). In captivity a Black-crowned Night-Heron crossed with a Little Egret (*Egretta garzetta*), but these species' breeding ranges overlap so a natural hybrid is also possible (McCarthy 2006). A captive Black-crowned Night-Heron crossed with a Yellow-crowned Night-Heron in 1975 at the Dallas Zoo, Texas; these species' breeding ranges overlap as well (McCarthy 2006). In captivity many cases of hybridization are due to proximity and lack of choice in mates and never occur under natural circumstances in the wild.

Until recently, the only reported natural hybrid between the Yellow-crowned Night-Heron and the Black-crowned Night-Heron was collected in 1951 north of Prescott, Arizona (Monson and Phillips 1981). The immature bird was originally identified as a Yellow-crowned Night-Heron (Phillips et al. 1964), but after further examination the identification was later changed to a hybrid Black-crowned × Yellow-crowned Night-Heron (Monson and Phillips 1981).

In North America, the Yellow-crowned Night-Heron breeds throughout the southeastern United States with colonies north along the Atlantic coast to Connecticut and from the Gulf of Mexico north to Indiana and Illinois (Watts 1995). It breeds throughout the Caribbean and along both coasts of Mexico, north along the Pacific coast of Baja California to Laguna Ojo de Liebre and the San Benito Islands (Wilbur 1987), approximately 300 miles south of San Diego, California. Until 2005 the Yellow-crowned was a rare visitor to southern California, with as few as 23 individuals reported (Hamilton et al. 2007). The single specimen of an adult from California, collected at the Tijuana River mouth on 25 October 1963 (SDNHM 30758, McCaskie 1964) has the thick bill (depth at nostril 22.5 mm) typical of the subspecies *bancrofti*, originating from western Mexico, and too thick for *violaceus* from the eastern United States (McCaskie and Banks 1966, Unitt 1984).

A pair of Yellow-crowned Night-Herons in Imperial Beach, San Diego County, present since at least 27 June 2005, fledged three young in July 2006, establishing the first record for that species' nesting in California (McCaskie and Garrett 2007). They fledged three young in early August 2007 and again in July 2008, with one juvenile found two or three days dead on 30 August 2008 (spread wing and skeleton

preserved, San Diego Natural History Museum 52127; G. McCaskie pers. comm.). In 1989 and 1992, a Black-crowned Night-Heron was observed nesting with a Yellow-crowned Night-Heron at a colony of the Black-crowned at the Scripps Institute of Oceanography in La Jolla, California, but these attempts did not produce young (Pyle and McCaskie 1992, Heindel and Patten 1996).

On 8 May 2007, at Naval Air Station North Island, Naval Base Coronado, Molloy photographed an adult Black-crowned Night-Heron on the same nest where an adult Yellow-crowned had been seen incubating two days earlier. The nest was located approximately 35 feet high in a fig tree (*Ficus* sp.) on the south side of Building 6 (latitude 32° 42.6310′ N, longitude 117° 11.5608′ W). Further observations on 12 May 2007 by Platter-Rieger and Molloy revealed the Black-crowned incubating or brooding from 0800 to 0915, at which time the Yellow-crowned took over. Another shift change took place sometime before 1500 because at 1530 the Yellow-crowned replaced the Black-crowned and again resumed incubation or brooding. At this time the adult Yellow-crowned put its head down in a feeding posture and we observed a small nestling. On the basis of the hatched shell fragments seen under the tree on 6 May 2007, at least one hybrid was at least seven days old, and begging calls indicated that there was more than one young. The calls were pitched higher and distinctly different from the vocalizations of nestling Black-crowned Night-Herons (Platter-Rieger pers. obs.). Later observations confirmed that two young were in the nest, one much larger than the other. The two hybrids on the nest were photographed by Anthony Mercieca on 19 May 2007 (Figure 1).

Figure 1. Both hybrid Yellow-crowned × Black-crowned Night-Heron young on the nest, showing the already large size difference between the older young, estimated age 14 days, and its smaller sibling, estimated age 10 days. Note the extensive yellow on the lower mandible.

Photo by Anthony Mercieca, 19 May 2007

With the help of the Naval Base Coronado Federal Fire Department Shepherd captured and banded the smaller of the two hybrids on 29 May 2007 (estimated age 20 days on the basis of the hatched shells seen on 6 May 2007) and recorded the following measurements: mass 360 g, tarsus length 42.27 mm, bill width 16.26 mm, and culmen length 35.28 mm. The wing chord was not measured because of insufficient feather growth. For future identification, the young was banded with a federal aluminum band covered in black electrical tape, and, for better detection later, the breast feathers were colored with a red marker. On 14 June 2007, Timothy Burr and Tamara Conkle made a second attempt to capture the larger hybrid. It was already too large and agile to be captured, but Burr photographed it (Figure 2). During this same attempt, the smaller hybrid was again captured and a red color band was placed on its opposite leg (Figure 3).

Figure 2. Older hybrid fledgling standing in the top of the *Ficus*. Note the thin white streaks over the dark brown color of the head and upper neck, as in a Yellow-crowned Night-Heron; the lower neck is patterned more like that of a Black-crowned Night-Heron.

Photo by Timothy Burr, 14 June 2007

Figure 3. Younger hybrid showing the rich yellow on the lower mandible, the backs of the legs, and bottoms of the feet. The green on the front of the legs is more yellow than that on a Black-crowned Night-Heron of similar size or age.

Photo by Tamara S. Conkle, 14 June 2007

On 21 June 2007 Platter-Rieger found the younger hybrid lying dead, abdomen down, on the pavement next to the curb and approximately 10 feet horizontally east from its nest. Death, at estimated age of 42 days, occurred sometime in the evening of 20 June 2007, most likely from a fall while climbing around the branches. This bird was collected and given to the San Diego Natural History Museum, where Philip Unitt prepared it as a study skin (SDNHM 51757). Both legs had the tibiotarsus broken; the right was an open break, the left was a closed break. Ants had already done some damage to the inner skin of the wings. Both bands remain on the study skin, as does the red marking on some breast feathers. Measurements of the specimen when picked up were mass 294 g, tarsus length 54 mm, bill width 16 mm, culmen length 40 mm, and flattened wing 172 mm. This heron was a male and small for his estimated age with a very low growth rate (Figures 4 and 5). The body was in poor nutritional condition; muscle mass was reduced, and there was no visible fat. There was some hemorrhaging around the heart and upper liver with a small amount of blood in both lungs. The brain, liver, and other internal organs had some post-mortem color changes but otherwise appeared normal in comparison to organs of other freshly dead young Black-crowned Night-Herons Platter-Rieger has seen in previous dissections. The stomach was empty.

Platter-Rieger photographed the older hybrid, resting calmly on the nest, on 24 June 2007 at an estimated age of 50 days (see this issue's back cover), and we assumed it fledged successfully since it appeared healthy and many surveys of the breeding site and nearby areas failed to yield a carcass. Note the breast feathers patterned like those of a Black-crowned Night-Heron and the "swollen" bill with a rich yellow on the lower mandible. Some downy feathers from preening are caught at the tip of the bill.

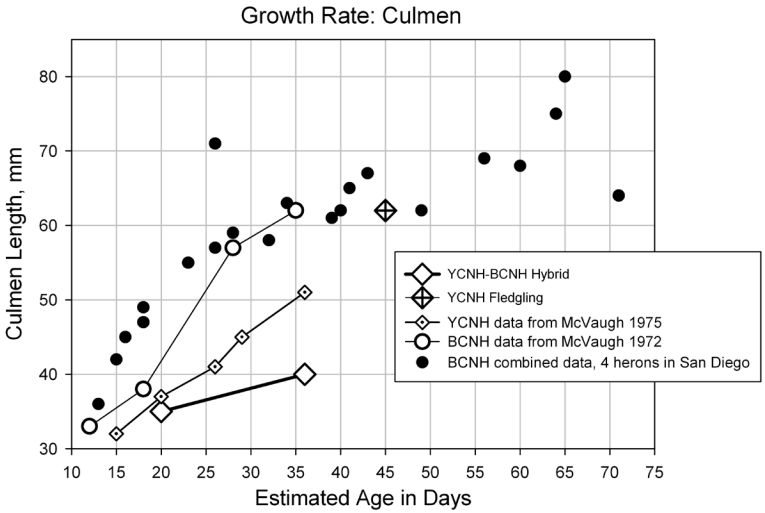

Figure 4. Growth of four young and healthy Black-crowned Night-Herons from San Diego raised at Project Wildlife. Repeated measurements of their culmen length are plotted with two measurements of the culmen of the youngest Yellow-crowned Night-Heron × Black-crowned Night Heron. The hybrid's growth rate was abnormally low for its age relative to growth rates of Black-crowned Night-Herons in both San Diego and North Carolina (McVaugh 1972), as well as of Yellow-crowned Night-Herons in North Carolina (McVaugh 1972). The culmen of the Yellow-crowned fledgling struck by a car in El Cajon, California, in 2005 is similar in length to a Black-crowned Night-Heron's.

For the purpose of this paper we define nestlings as young from hatching to fully feathered but retaining quill sheaths on the primaries, fledglings as those with natal down left on the crown but fully grown primaries with no quill sheaths remaining. Four healthy orphaned nestling Black-crowned Night-Herons received at Project Wildlife with down and primaries still in their sheaths enabled Platter-Rieger to make repeated measurements and quantify growth rates. All comparative measurements are taken from a database created and maintained by Platter-Rieger for research into local heron and egret mortality. Tarsus lengths were also compared, using culmen length as an indicator of age in nestlings and fledglings for a higher sample size and to eliminate starvation effects. Previous measurements (Platter-Rieger pers. obs.) demonstrated that of the various measurements culmen growth was the least affected by starvation.

The following comparisons are for individuals within the above age definitions. A fledgling Yellow-crowned Night-Heron found struck by vehicle in El Cajon, California, on 23 August 2005 (SDNHM 51156, Iliff et al. 2007) had a tarsus much longer than those of local fledgling Black-crowned Night-Herons (Figure 6). The longer tarsus is the most distinct structural difference between fledgling Yellow-crowned Night-Herons and Black-crowned Night-Herons, besides the laterally broadened bill (Figures 5 and 7). The hybrid's tarsus and culmen lengths fall below both those of nestling Yellow-crowned and Black-crowned Night-Herons when plotted by estimated age, indicating that its growth was extremely slow (Figures 4 and 5). When culmen length

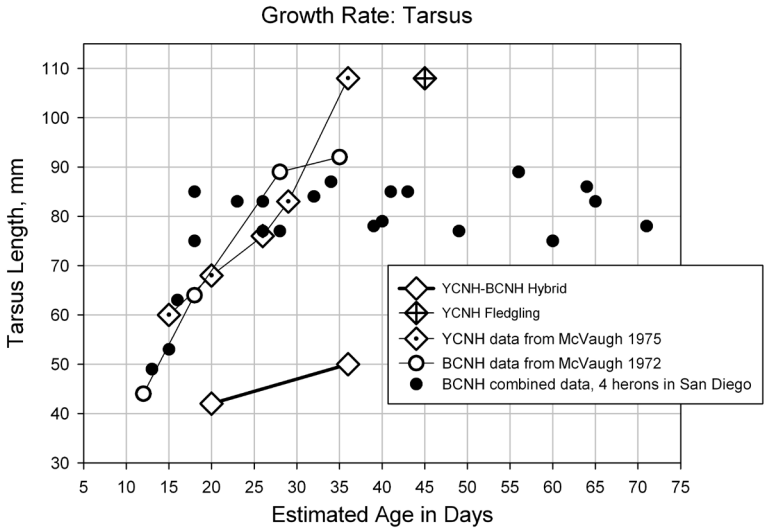

Figure 5. Repeated measurements of tarsus length plotted against estimated age for four young Black-crowned Night-Herons from San Diego rasied at Project Wildlife and one measurement of the fledgling Yellow-crowned Night-Heron from El Cajon are compared to two measurements for the younger hybrid Yellow-crowned × Black-crowned Night Heron. Again, the hybrid's growth rate was slow in comparison to both local night-herons and those in North Carolina measured by McVaugh (1972, 1975).

is used to estimate age and to eliminate the effects of starvation, the hybrid's tarsus length still falls among measurements for nestling Black-crowned Night-Herons but is on the high side (Figure 6). The measurement of bill width (Figure 7) at the distal edge of the nostril falls between measurements of the Yellow-crowned Night-Heron and the Black-crowned Night-Heron.

The hybrids differed from nestling Black-crowned Night Herons as follows. Bill: In the hybrids the lower mandible was a bright yellow (Figures 1, 2, 3, and back cover), much brighter than in the Black-crowned, in which the mandible is typically a light blue-green to grayish yellow. In the hybrids the bill appeared swollen and rounded, especially when seen from the top (Figure 7). In the Black-crowned the bill tapers to a sharp point when seen from the top.

Feet and legs: On the hybrids the backs of the legs and bottoms of the toes especially were a deep, rich yellow; the front of the legs and upper surfaces of the toes tended to a warm yellow-green. Nestling Black-crowned Night-Herons start with brilliant yellow-green legs and feet, which age into various shades of gray to blue-green in juveniles.

Plumage: The base color of the hybrids' plumage started out and remained a deep, very dark brown. Head and neck feathers were more distinctly "pin-striped" with whitish than in the Black-crowned Night-Heron. The moderate streaking on the back was more similar to that of the Black-crowned. All forward edges of the greater secondary wing coverts were consistently edged with ivory color. Lighter "tick marks" on the wing

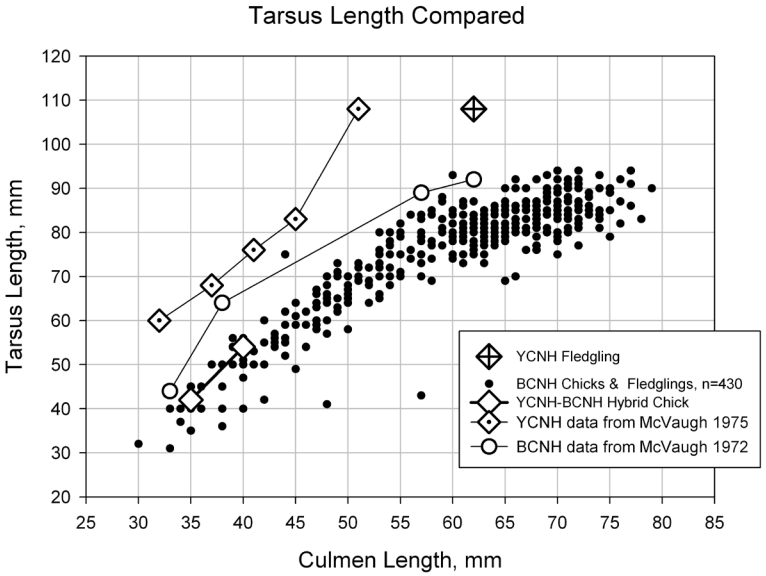

Figure 6. The ratio of tarsus to culmen is higher in the Yellow-crowned than in the Black-crowned Night-Heron. The hybrid's ratio is within the range of variation in the Black-crowned Night Heron.

coverts were thinner than the average "tick marks" seen on young Black-crowned Night-Herons. In the Black-crowned Night-Heron the base color of the juvenile plumage starts out as a deep, rich reddish brown, variable from light to dark, and fades with exposure to sunlight into a paler brown as seen in many older juveniles (past the fledgling stage and past year of hatching, Platter-Rieger pers. obs.). The head and neck feathers are broadly streaked with warm brown. The back usually has broad light brown streaks, but these can vary as small lines. Very little ivory-colored edging exists on the forward edges of the greater secondary wing coverts; if present it can be found at the very forward wing edge. Lighter "tick marks" on the wing coverts tend strongly toward large and broad but vary greatly in size.

The growth rate of the hybrid's culmen and tarsus were slow in comparison to those of the local Black-crowned Night-Herons and the fledgling Yellow-crowned Night-Heron from El Cajon (Figures 4 and 5). Its tarsus length is within, although to the higher side, the range of local Black-crowned Night-Herons of similar age.

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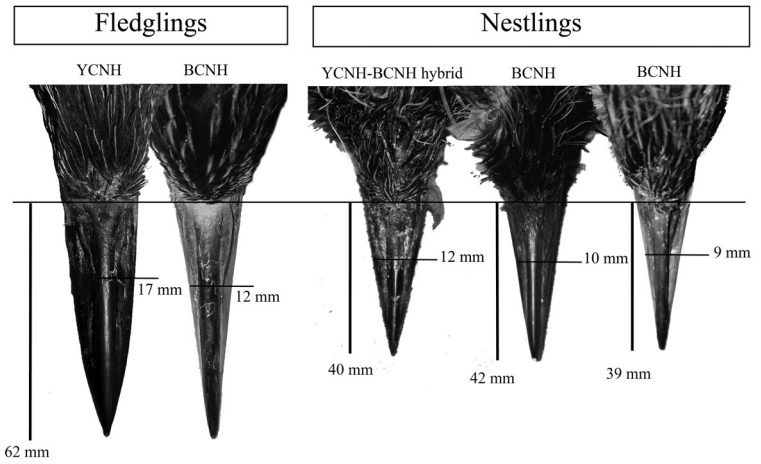

Figure 7. Dorsal view of the bills of Yellow-crowned and Black-crowned Night-Heron fledglings, defined as flying age but still with down on the crown (culmen of both 62 mm), in comparison to dorsal views of the young Yellow-crowned × Black-crowned Night-Heron (culmen 40 mm) and two nestling Black-crowned Night-Herons of similar ages. Left to right: Yellow-crowned Night Heron fledgling on 13 September 2005, Black-crowned Night-Heron fledgling on 3 June 2007, Yellow-crowned × Black-crowned Night-Heron on 21 June 2007, Black-crowned Night-Heron nestlings on 13 June 2008 and 3 July 2008.

Photos by Mary F. Platter-Rieger

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Philip Unitt