

FOSSIL CUBAN CROW *CORVUS* CF. *NASICUS* FROM A LATE QUATERNARY CAVE DEPOSIT IN NORTHERN MATANZAS, CUBA

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Abstract: Crows are rare in the Cuban fossil record. To date, there have been two reports of the Cuban crow *Corvus nasicus*, one from late Quaternary deposits of the San Felipe tar pits in northeastern Matanzas Province, and the other from Cuevas Blancas cave deposits in Havana Province. Here I report two additional *Corvus* cf. *nasicus* specimens from a late Quaternary cave deposit in northern Matanzas Province. This record supports a more western distribution in Matanzas during the Quaternary.

Key words: cave deposits, *Corvus nasicus*, Cuba, fossil, Quaternary, West Indies

Resumen: RESTOS FÓSILES DE CAO MONTERO *CORVUS* CF. *NASICUS* PROCEDENTES DE UN DEPÓSITO CAVERNARIO EN EL NORTE DE LA PROVINCIA DE MATANZAS, CUBA. Los cuervos son raros en el registro fósil de Cuba. Hasta ahora se han reportado dos especímenes pertenecientes a la especie de Cao Montero *Corvus nasicus*, procedentes de los depósitos Cuaternarios de las Breas de San Felipe, en la provincia de Matanzas, y de Cuevas Blancas, en la provincia de la Habana, Cuba. Aquí se reportan dos especímenes adicionales de *C. cf. nasicus* que amplían el conocimiento biogeográfico de los cuervos en Cuba, demostrando una mayor distribución durante el Cuaternario cubano que es comparable con el del resto de las Antillas.

Palabras clave: *Corvus nasicus*, Cuaternario, Cuba, depósitos de la cueva, fósil, Indias Occidentales

Résumé : FOSSILE DE CORNEILLE DE CUBA *CORVUS* CF. *NASICUS* DANS DES DÉPÔTS D'UNE GROTTTE DE LA FIN DU QUATERNAIRE AU NORD DE MATANZAS, CUBA. Les corneilles sont rares dans les fossiles de Cuba. À ce jour, il existe deux mentions de Corneille de Cuba *Corvus nasicus*, l'une dans des dépôts de la fin du Quaternaire provenant des puits de bitume de San Felipe, dans le nord de la province de Matanzas, et l'autre dans des dépôts des grottes Cuevas Blancas dans la province de La Havane. Deux spécimens supplémentaires de *Corvus* cf. *nasicus* provenant de dépôts de la fin du Quaternaire dans une grotte du nord de la province de Matanzas sont décrits dans le présent article. Cette mention confirme une distribution de l'espèce plus occidentale à Matanzas au cours du Quaternaire.

Mots clés: Antilles, *Corvus nasicus*, Cuba, dépôts, grotte, fossile, Quaternaire

Crows are the only representatives of the family Corvidae in the West Indies. Of the five presently recognized taxa, two distinct and sympatric forms inhabit the Cuban archipelago (Johnston 1961, Garrido and Kirkconnell 2000): the Lesser Cuban Palm-Crow *Corvus minutus* Gundlach, 1852 (Gundlach 1876), which is a probable subspecies of the Palm Crow *C. palmarum* Württemberg, 1835 (Garrido 1985, Sibley and Monroe 1990, Garrido and Kirkconnell 2000), and the more common Cuban Crow *C. nasicus* Temmick, 1826 (Garrido *et al.* 1997, Garrido and Kirkconnell 2000).

Fossil evidence indicates that crows in general, and *C. nasicus* in particular, had a wider distribution in Cuba during the Quaternary. Conversely, historical accounts suggest a sharp decline and fragmentation of population density during the 19th century (Fig. 1; Lembeye 1850, Gundlach 1876, Barbour 1923, Johnston 1961, Berovides 1983).

Despite recent advances in the understanding of Cuba's Quaternary fossil avifauna, crow fossils are rare (Suárez 2009). The two Cuban crow species

have been sparsely represented in the fossil record. *C. palmarum* (cf. *minutus*) specimens are reported only from Quaternary deposits in Cueva de Sandoval, Havana Province. This record is composed of 33 specimens, including several humeri, ulnae, carpal-metacarpals, femora, and tibiotarsi (Suárez and Arredondo 1997). *C. nasicus* has been previously reported from two localities from only two specimens. One is an undescribed element from the Breas de San Felipe, a tar pit deposit located in northern Matanzas Province, radiometrically dated between the late Pleistocene and early Holocene (15,450–4,950 cal BP; Iturralde-Vinent *et al.* 2000, Steadman *et al.* 2005), and the other is an incomplete femur from the middle Holocene (7,044–6,504 cal BP) cave deposit of Cuevas Blancas, in Havana Province (Jiménez-Vázquez 2001).

Here I report two additional fossil specimens of the Cuban Crow from a late Quaternary cave deposit in northwestern Matanzas province of western Cuba.

SYSTEMATICS

Class Aves
Family Corvidae

Corvus cf. *nasicus* Temminck, 1826

These *C. nasicus* fossil specimens were taxonomically classified by size and morphology. They differ from *C. minutus* and other Antillean crows in being intermediate between *C. jamaicensis* and *C. leucognaphalus*, but larger than *C. palmarum* (Fig. 2, Table 1). The specimens are now deposited at the National Natural History Museum in Havana (MNHNCu).

REFERRED MATERIAL

A proximal ulna (P353) missing the distal articulation and an incomplete sternum (P345) of *C. cf. nasicus* were collected from La Centella Cave, located on a littoral karstic area 1.4 km southeast of the Canimar River, Matanzas city, Matanzas Province, Cuba (23°01'18" N, 81°28'32" W; Fig. 1, locality with heavy black arrow). The cave's entrance is a large, open sinkhole nearly 50 m above present sea level. The fossils were excavated from a large

test pit measuring 1 m long by 0.5 m wide and 0.5 m deep, and dry screened with a fine mesh (1.6 mm).

The ulna is highly mineralized and partly incrustated with red sediment. The reddish-brown sternum is not mineralized. Although there are undulated fractures on the keel of the sternum, the specimens do not show evidence of burial modification such as bone exfoliation and splitting due to weathering, or fractures due to trampling, therefore suggesting quick burial. Sternum measurements are as follows: manubrium width 3.0 mm, coastal margin length 7.7 mm, width at coastal margin 16.03 mm, and manubrium to carinal length 5.85 mm. The coastal margin contains three spaces of stern-coastal articulations. Ulnar measurements were recorded with a digital caliper and are in Table 1.

These fossil specimens were found in direct association with the following extinct taxa: the sloth *Parocnus brownii*, giant barn owl *Tyto noeli*, extinct jutías *Geocapromys columbianus*, *Mesocapromys nanus*, *M. kraglievichi*, *Boromys torrei*, two lipotyphlan shrews *Nesophontes major* and *N. micrus*,

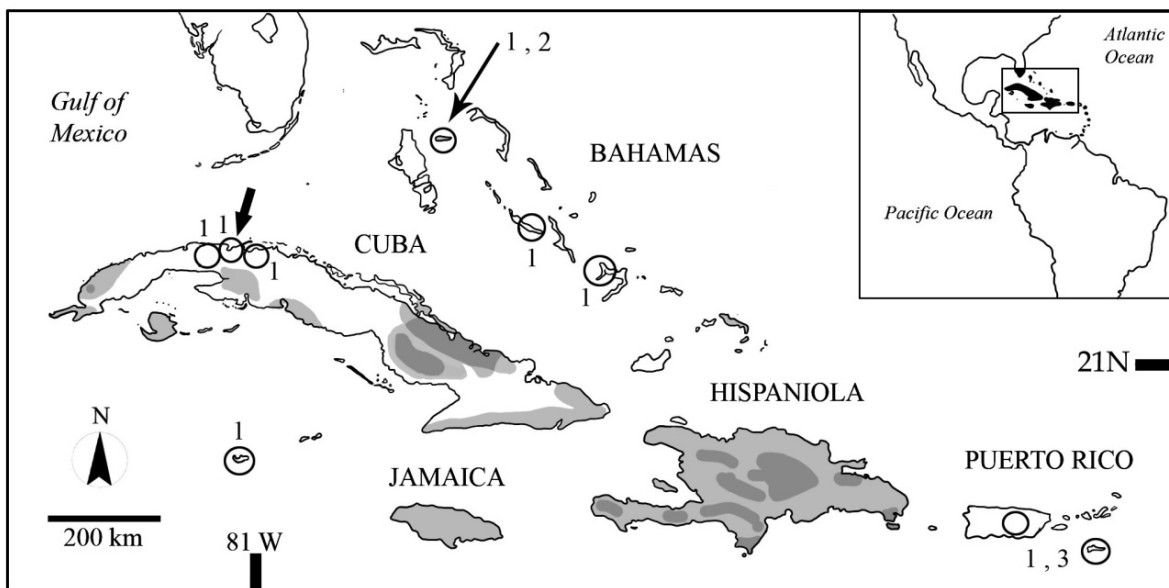


Fig. 1. Map showing locations of Antillean *Corvus* fossils and present *Corvus* distribution. Numbers represent extinct populations: (1) *Corvus nasicus* from Cuba, Bahamas, Gran Cayman, and probably Puerto Rico (= *C. pumilis*); (2) fossil *C. palmarum* from Bahamas; and (3) extinct *C. leucognaphalus* from Puerto Rico and St. Croix. Shading indicates present distribution ranges. Jamaica: extant populations of *C. jamaicensis*. Hispaniola: lighter shade represents *C. palmarum* and darker shade *C. leucognaphalus*. Turks and Caicos: *C. nasicus*. Cuba: lighter shade represents *C. nasicus* and darker shade *C. minutus*. The heavy black arrow indicates the locality of La Centella Cave in Cuba. Map adapted and modified from Olson and Hilgarter (1982), Garrido and Kirkconnell (2000), and Raffaele *et al.* (2003).

and the tortoise *Geochelone cubensis*.

DESCRIPTIONS AND COMPARISONS

Size was the most discriminative characteristic in discerning between Cuban crow ulnae. Antillean crows, at least in ulnar morphology are not strikingly different (Fig. 2). Morphologically, the ulna (P353) is intermediate between gracile species (e.g.,

C. jamaicensis) and robust species (e.g., *C. leucognaphalus* or *C. corax*), sharing more discrete characteristics with *C. nasicus* than any other species. The ulna has a long, thick, and slightly curved olecranon process, with a small groove in its distal end. The lateral or external cotyla (i.e., articulating facet) is round and expanded laterally, away from the olecranon fossa. The internal cotyla is positioned

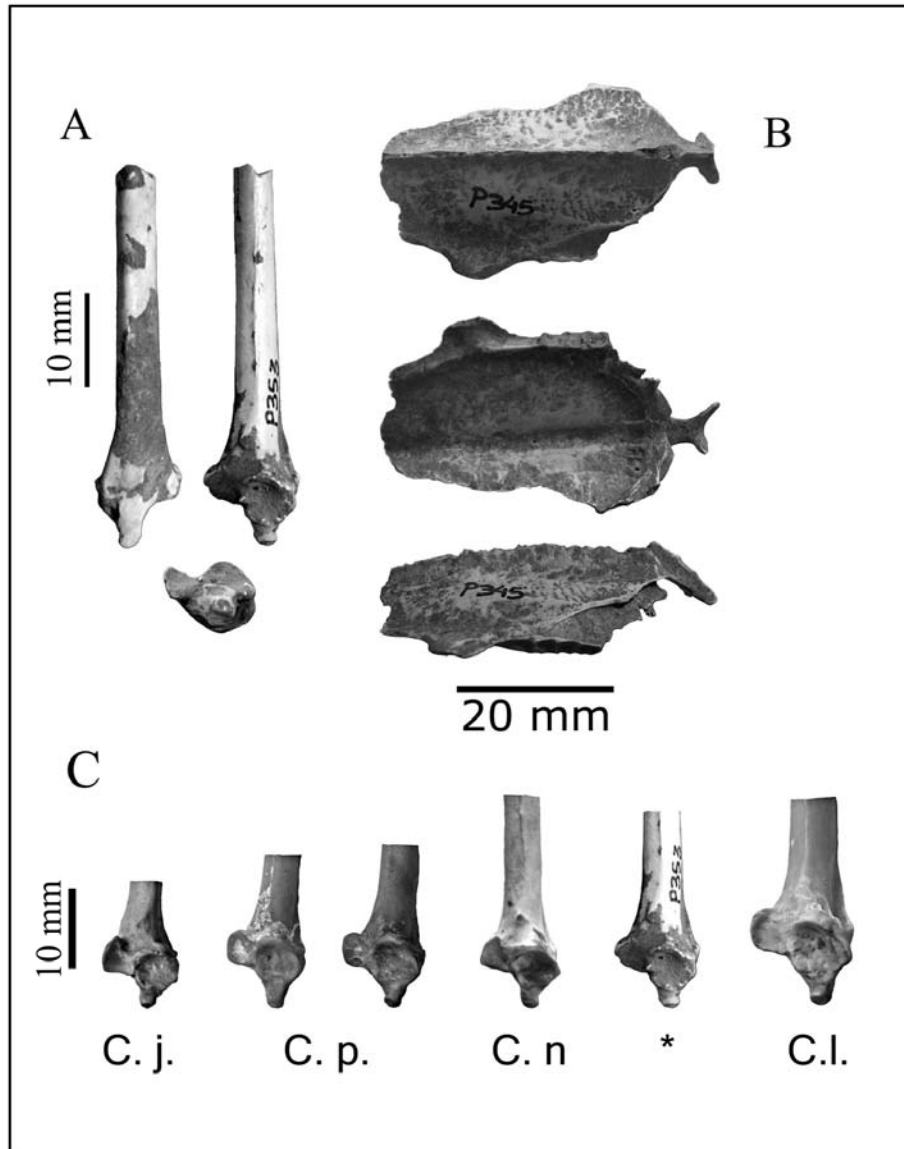


Fig. 2. *Corvus nasicus* elements described in text. (A) distal ulna P353 in superior, inferior, and proximal views; (B) incomplete sternum P345 in dorsal, ventral, and lateral views; and (C) modern Antillean crow ulnae anterior view of proximal articulation: C. j. = *Corvus jamaicensis* (UF11485), C. p. = *C. palmarum* (UF32218 and UF32218), C. n. = *C. nasicus* (Orlando Garrido Collection IZ-8-P114), * = P353 *C. cf. nasicus*, and C. l. = *C. leucognaphalus* (UF32220).

Table 1. Ulnar measurements (mm) in Antillean species of *Corvus* (mean \pm standard deviation [*n*], range). Six *C. nasicus* specimens from the United States National Museum of Natural History (USNM) are included in measurements of the total length of the ulna (454172, 5554292-5554296M).

| Ulnar Measurements | P353 | <i>C. jamaicensis</i> | <i>C. palmarum</i> | <i>C. nasicus</i> | <i>C. leucognaphalus</i> |
|-----------------------------------|-------|-----------------------|------------------------------------|------------------------------------|-------------------------------------|
| Total length | – | – | 64.4 \pm 0.96 (4) 63.54–65.37 | 70.52 \pm 2.45 (8) 66.7–73.3 | 80.09 \pm 0.71 (4) 79.12–80.70 |
| Exterior cotyla length | 4.35 | 4.53 | 4.00 \pm 0.06 (4) 3.92–4.07 | 4.92 \pm 0.03 (2) 4.90–4.95 | 5.14 \pm 0.16 (4) 5.03–5.38 |
| Exterior cotyla width | 3.96 | 3.24 | 3.55 \pm 0.28 (4) 3.24–3.92 | 3.10 \pm 0.14 (2) 3.0–3.2 | 4.20 \pm 0.14 (4) 4.12–4.43 |
| Interior cotyla length | 5.38 | 5.56 | 5.34 \pm 0.48 (4) 4.63–5.67 | 5.05 \pm 0.12 (2) 4.90–5.2 | 6.44 \pm 0.27 (4) 6.20–6.83 |
| Interior cotyla width | 5.11 | 5.19 | 5.13 \pm 0.51 (4) 4.41–5.60 | 5.75 \pm 0.35 (2) 5.50–6.0 | 6.33 \pm 0.35 (4) 5.92–6.72 |
| Width of shaft | 3.98 | 4.08–4.16 | 3.70 \pm 0.16 (4) 3.57–3.88 | 3.90 \pm 0.14 (2) 3.80–4.0 | 4.76 \pm 0.19 (4) 4.61–5.03 |
| Olecranon process to 1st papillae | 21.79 | 19.18 | 19.8 \pm 0.35 (4) 19.48–20.20 | 20.79 \pm 0.42 (2) 20.5–21.09 | 23.43 \pm 0.32 (4) 23.14–23.74 |
| Olecranon length | 3.34 | 2.81 | 3.13 \pm 0.36 (4) 2.78–3.49 | 3.29 \pm 0.57 (2) 2.90–3.70 | 3.10 \pm 0.18 (4) 2.92–3.30 |
| Proximal width | 9.39 | 8.84 | 8.64 \pm 0.23 (4) 8.44–8.91 | 9.25 \pm 0.35 (2) 9.0–9.50 | 10.44 \pm 0.11 (4) 10.30–10.55 |

superiorly to the lateral cotyla. The intermuscular line is high and visible. Six feather papillae are well defined on the shaft. The humero-ulnar depression (viewed in a proximal-dorsal aspect) is moderately shallow compared to that in larger species such as *C. leucognaphalus* or *C. corax*. The biceps fossa for the insertion biceps muscle is shallow. The brachialis anticus muscle fossa is deep and without a medial protuberance. The internal cotyla border proximal to the olecranon process is less pronounced in *C. palmarum* than in *C. nasicus*. The proximal ring of the olecranon fossa is more pronounced in *C. nasicus* than in *C. palmarum* (Fig. 2C). The sternum (P345) is missing the keel, posterior left processes, and the right lateral costal margin. It is not robust and has a large and thin manubrium with prominent anterior-lateral processes. The xiphial area is rounded and wide, and the coracoid groove is deep. The sternal notches are not visible. This sternum most closely resembles *C. nasicus* than *C. palmarum* in having an elongated and slim manubrium, in comparison to the short and robust manubrium of *C. jamaicensis* and *C. leucognaphalus*. Morphologically these two fossil specimens closely resemble *C. nasicus* and are classified as *C. cf. nasicus* until better evidence is available.

The incomplete state of the two fossils described here and the availability of Cuban *Corvus* skeletons for comparison limited my study of their skeletal morphology. Even though the size of the P353 ulna is intermediate between the studied specimens of *C. palmarum* and *C. nasicus*, it is not enough evidence to consider P353 as a temporal subspecies or species. Further comparisons with Cuban fossil *Corvus* specimens were not possible because ulnae and sternums were not available, except for the report of *C. palmarum* cf. *minutus* reported in Suárez and Arredondo (1997) and those used herein.

REMARKS

The presence of the giant barn owl *Tyto noeli* in the deposit suggests a shrub-like or savanna environment during the time of deposition (Iturralde-Vinent *et al.* 2000), while the presence of the bat *Phyllops falcatus*, the West Indian Woodpecker *Melanerpes superciliaris*, and the Great Lizard Cuckoo *Saurothera merlini* suggest the presence of nearby forests. Other studies also indicate that this cave's area was originally forested (Anonymous 1989).

Corvus nasicus fossils are not unexpected from northern Matanzas. One of the two previous fossil

records comes from Las Breas de San Felipe asphalt seeps near the city of Martí, northeastern Matanzas province. Additionally, the naturalists Johannes Gundlach and Thomas Barbour recorded the rare presence of crows in northern Matanzas during the late 19th century (Lembeye 1850, Gundlach 1876, Barbour 1923). Presently in Matanzas, *C. nasicus* occurs only in the Zapata Swamp, on the southernmost peninsula, where is currently uncommon (Fig. 1; Kirwan and Kirkconnell 2002).

The *C. cf. nasicus* fossil specimens reported here provide evidence of the species's occurrence beyond its current range, and supports a wider distribution within the island during the late Quaternary that may have lasted until the late 19th century. Even though most *Corvus* records occur around the same area, it adds another potential record in the region that can be helpful for future studies.

ACKNOWLEDGMENTS

I am greatly indebted to David W. Steadman and Tom Webber of the Florida Museum of Natural History (FLMNH) for allowing me to study crow specimens and fossils in their care, and Storrs L. Olson of the United States National Museum of Natural History (USNM), Washington D.C., for his useful comments and for providing ulnar measurements on Cuban crows in the USNM collections. I also thank Osvaldo Jiménez Vazquez of the Gabinete de Arqueología, Habana Vieja, Cuba, who allowed me to study crow specimens under his care. For logistics and field support, I thank Leonel Pérez Orozco, Cándido Santana, Ricardo Viera Muñoz, and Joel Monzón, all members of the Cuban Speleological Society, and of without whom this research could not have been completed. For revisions, support, and encouragement, I thank Adrian Tejedor, Tamara Castaño, Amarilis León, and Jorge Álvarez Licourt. Reviews by D. W. Steadman and an anonymous referee greatly improved the manuscript.

LITERATURE CITED

- ANONYMOUS. 1989. Nuevo atlas nacional de Cuba. Instituto de Planificación Física, Cuba.
- BARBOUR, T. 1923. The birds of Cuba. *Memoirs of the Nuttall Ornithological Club* 6:1–141.
- BEROVIDES, V. 1983. Protejamos nuestra fauna. Gente Nueva, Havana, Cuba.
- GARRIDO, O. H. 1985. Cuban endangered birds. *Ornithological Monographs* 36:992–999.
- GARRIDO, O. H., G. B. REYNARD, AND A. KIRKCONNELL. 1997. Is the Palm Crow, *Corvus palmarum* (Aves: Corvidae), a monotypic species? *Ornitología Neotropical* 8:15–21.
- GARRIDO, O. H., AND A. KIRKCONNELL. 2000. Field guide to the birds of Cuba. Comstock Publishers and Cornell University Press, Ithaca, NY.
- GUNDLACH, J. 1876. Contribución a la Ornitología Cubana. La Antilla Press, Havana, Cuba.
- ITURRALDE-VINENT, M. A., R. D. E. MACPHEE, S. DÍAZ-FRANCO, R. ROJAS-CONSUEGRA, W. SUÁREZ, AND A. LOMBA. 2000. Las Breas de San Felipe, a Quaternary fossiliferous asphalt seep near Martí (Matanzas Province, Cuba). *Caribbean Journal of Science* 36:300–313.
- JIMÉNEZ-VÁZQUEZ, O. 2001. Registros ornitológicos en residuarios de dieta de los aborígenes precerámicos cubanos. *Pitirre* 14:120–126.
- JOHNSTON, D. W. 1961. The biosystematics of American Crows. University of Washington Press, Seattle, WA.
- KIRWAN, G. M., AND A. KIRKCONNELL. 2002. The avifauna of Pálpite, Ciénaga de Zapata, Cuba, and the importance of the area for globally threatened and endemic birds. *Pitirre* 15:101–109.
- LEMBEYE, J. 1850. Aves de la Isla de Cuba. Imprenta del Tiempo, Havana, Cuba.
- OLSON, S. L., AND W. B. HILGARTNER. 1982. Fossil and subfossil birds from the Bahamas. Pp. 22–56 in *Fossil vertebrates of the Bahamas* (S. L. Olson, ed.). Smithsonian Contributions to Paleobiology no. 48.
- RAFFAELE, H., J. WILEY, O. GARRIDO, A. KEITH, AND J. RAFFAELE. 2003. *Birds of the West Indies*. Princeton University Press, Princeton, NJ.
- SIBLEY, C. G., AND B. L. MONROE, JR. 1990. *Distribution and taxonomy of birds of the World*. Yale University Press, New Haven, CT.
- STEADMAN, D. W., P. S. MARTIN, R. D. E. MACPHEE, A. J. T. JULL, H. G. McDONALD, C. A. WOODS, M. ITURRALDE-VINENT, AND G. W. L. HODGINS. 2005. Asynchronous extinction of late Quaternary sloths on continents and islands. *Proceedings of the National Academy of Sciences of the United States of America* 102:11763–11768.
- SUÁREZ, W. 2009. Biogeografía de las aves fósiles de Cuba. www.redciencia.cu/cdorigen/arca/paper/williaiv.pdf.
- SUÁREZ, W., AND O. ARREDONDO. 1997. Nuevas adiciones a la paleornitología Cubana. *Pitirre* 10: 100–102.