Biometrics and body masses of some birds of prey of Argentina

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ABSTRACT: We present data from 97 live specimens from 20 different taxa of diurnal raptors from Argentina. Data were obtained from bird banding campaigns conducted by the Centro Nacional de Anillado de Aves (CENAA), Universidad Nacional de Tucumán, Argentina. Another important source of data was the Centro de Rehabilitación de Aves Rapaces (CeRAR). We used mist nets and bal-chatri traps to catch birds during CENAA campaigns in central and northern Argentina, in order to band them and study their migration. During fieldwork, we measured total body length, bill length (exposed culmen and culmen with cere), wing chord, and body mass of each bird. The biometric information of raptors in Argentina is scarce. These measurements can therefore be useful for a variety of topics such as conservation, ecology, biology, taxonomy and phylogeny.

KEY-WORDS: Accipitridae, Cathartidae, diurnal raptors, Falconidae, measurements.

In Argentina, 40 species of diurnal raptors, 20 species of nocturnal raptors and five scavengers are present, but very little is known about their biology and ecology due to their low population abundance and the difficulties associated with their study (Trejo et al. 2007). Previous studies reporting body masses of birds in the region include Belton (1984) and Dunning-Jr. (1992, 2008). However, in general, biometric data of raptors in Argentina is scarce (Trejo 2007). These measurements can be useful for a variety of topics such as conservation, ecology, biology, taxonomy and phylogenetic studies.

Few studies on austral raptors present morphometric data, and these are mostly based on specimens housed in collections, instead of live birds. Therefore, certain measurements such as body mass or total body length are nonexistent or inaccurate (Jiménez 1995). Here, we present information on body measurements and body mass of 20 species of scavengers and raptors belonging to the families Cathartidae, Accipitridae and Falconidae.

Data were obtained from bird banding campaigns conducted by the Centro Nacional de Anillado de Aves de Argentina (CENAA), Universidad Nacional de Tucumán. Another important source of data was the Centro de Rehabilitación de Aves Rapaces (CeRAR) of Reserva Experimental de Horco Molle (REHM), which is part of the Facultad de Ciencias Naturales e Instituto Miguel Lillo, Universidad Nacional de Tucumán. The CeRAR, created in 2008 and under authorization from the Departamento de Flora y Fauna of Tucumán Province, rescues, rehabilitates, and releases raptors. These interventions are conducted according to international protocols and guidelines of the International Union for Conservation of Nature and Natural Resources (IUCN), taking into account both conservation and animal welfare. Many of these birds, especially of Geranoaetus polyosoma, were part of the undergraduate thesis work of Aráoz (2012).

We also used mist nets and bal-chatri traps (Bloom et al. 2007) to catch birds during CENAA campaigns in central and northern Argentina, in order to band them and study their migration. The bal-chatri traps, a handmade box of thick wire with numerous plastic wire ties on its exterior, upper surface, were baited with live laboratory mice. These plastic ties slide and entangle the legs of the raptors that attempt to take the mice, without causing injury to the birds. A heavy weight tied to the trap prevents birds from lifting the trap off the ground.
The two capture methods are different: mist nets catch prey at random, while bal-chatri traps deliberately aim to capture a particular individual. The later method presents some difficulties, for example, the capture success of the bal-chatri with *G. polyosoma* is usually very low, with only a few individuals captured in dozens of attempts.

The capture of birds of prey with nets was only occasionally possible, as several hawks, Barred Falcons, and American Kestrels (*Accipiter bicolor, A. striatus, Micrastur ruficollis, and Falco sparverius*, respectively) were entangled as they tried to feed on small birds caught in the nets; all of these captures occurred in dense forest. However, bal-chatri traps were specifically effective for Variable and Savanna Hawks (*G. polyosoma, B. meridionalis*, respectively) and Black-chested Buzzard-Eagles (*Geranoaetus melanoleucus*). We found that these traps operated better in open landscapes, such as at 3000 m high pastures composed of tall grasses.

During fieldwork, we measured the total body length, bill length (exposed culmen and culmen with cere), and wing chord of every captured bird. We used a caliper to measure the bill, a metal ruler to measure wing chord and total body length, and 100 g, 500 g and 1000 g Pesola® scales to measure body mass. For heavier birds, a 50 kg digital scale was used. Birds were banded with bands from the *Instituto Miguel Lillo, Universidad de Tucumán*, and later released. Many birds were also banded with colored bands.

Age of *G. polyosoma* and *G. melanoleucus* was determined by plumage (Cabot & De Vries 2004, Seipke 2007). For the nomenclature of raptor species, we followed the list of species proposed by Remsen-Jr. et al. (2016).

We distinguish between captive birds and those captured in the field. Raptors raised from young might be smaller, and although measurements may be similar to those found in natural conditions if they have been in captivity for a long time, their masses may be inaccurate (i.e., they may be either very thin or very fat in comparison to natural conditions). Some specimens were sexed by plumage (*F. sparverius, G. polyosoma, Vultur Gryphus*), while others that died at the CeRAR were sexed by gonad examination during necropsy. The sex of some birds with no sexual dimorphism in plumage remained undetermined; although females are usually larger, small females can frequently have measurements that overlap with smaller males.

The localities in Argentina (Figure 1) where specimens were obtained, by province, were: **Salta:** Orán (23°08'S; 64°19'W), Rosario de la Frontera (25°48'S; 64°58'W), Gaona (25°12'S; 64°05'W), Potrerillos (26.08'S; 65.46'W), Tolombón (26°12'S; 65°55'W); **Jujuy:** Caimancito, Calilegua (23°48'S; 64°47'W), Aguas Negras, Calilegua (23°55'S; 64°50'W); **Formosa:** Comandante Fontana (25°20'S; 59°41'W); **Tucumán:** Ruta 9, Tapia (26°13'S; 65°16'W), Burrucayu (26°29'S; 64°44'W), Altos de Medina (26°36'S; 65°05'W), Amaicha del Valle (26°36'S; 65°55'W), Tafi Viejo (26°43'S; 55°33'W), San Javier (26°43'S; 65°22'W), Pinar de Velardez (26°43'S; 65°22'W), Horco Molle (26°45'S; 65°23'W), El Infiernillo (26°45'S; 65°40'W), Villa Mariano Moreno (26°46'S; 65°12'W), Cebil Redondo (26°47'S; 65°17'W), Alderetes (26°49'S; 65°08'W), Yerba Buena (26°49'S; 65°19'W), Country Las Yungas (26°49'S; 65°19'W), Villa Amalia (26°51'S; 65°12'W), San Pablo (26°52'S; 65°18'W), Los Vallistos (26°59'S; 65°15'W), Tafi del Valle (26°52'S; 65°41'W), Lastenia (26°52'S; 65°09'W), Las Cejas (26°53'S; 64°44'W), La Aguadita (26°69'S; 65°12'W), Famaillá (27°03'O; 65°24'W), Rio Colorado (27°09'S; 65°21'W), Simoca (27°16'S; 65°20'W), Concepción (27°20'S; 65°35'W), Reserva Provincial de Santa Ana (27°26'S; 65°46'W), Escaba (27°39'S; 65°45'W); **Misiones:** Posadas (26°55'S; 54°31'W); **Catamarca:** Santa María (26°41'S; 66°02'W), Capital (28°28'S; 65°46'W); **Santiago del Estero:** Rapelli (26°23'S; 64°30'W), Guasayán (27°06'S; 64°16'W), Pozo Honda (27°10'S; 64°29'W), Capital (27°47'S; 64°16'W), Loreto (28°18'S; 64°12'W), Sumampa (29°22'S; 63°28'W); **San Luis:** Bajo de Veliz (32°18'W; 65°24'W); **La Pampa:** Guatráché (37°40'S; 63°32'W).

![FIGURE 1. Sampling sites in Argentina where specimens were captured (black dots).](https://example.com/figure1.png) **Tucumán** Province is displayed at the bottom right.
At El Infiernillo, Tafí del Valle, Tucumán Province, we captured 17 specimens during the impressive migration of birds of prey that takes place in fall, and which belongs to an Andean migratory route (Capllonch et al. 2011). The area is a true migratory corridor that acts as a “funnel” for soaring birds (Trejo et al. 2007, Capllonch & Ortiz 2009). This region constitutes the first site with a migration of such magnitude, in terms of number of birds, described for migrating raptors in Argentina (Capllonch et al. 2011), especially for G. polyosoma (Aráoz 2012). The valley, which reaches 2000 m a.s.l. and has an extension of 20 km between 27°S and 65°W, acts as a connection between two mountain chains, Aconquija and Cumbres Calchaquíes, and thus, specimens are able to acquire greater speeds when crossing the valley in a N-S direction.

We obtained data from 97 live specimens from 20 different taxa. The most captured species were G. polyosoma, G. melanoleucus, Buteo magnirostris, and F. sparverius. Three subspecies of Roadside Hawk (B. magnirostris) were captured: saturatus from the Yungas, pucherani from the eastern Chaco, and magniplumis from the Atlantic Rainforest (Table 1). Regarding G. p. poecilochrous, which is common and resident in Tafí del Valle, it was earlier considered a distinct species, with some authors still considering it as a full species, but later genetic studies placed it subspecifically (Riesing et al. 2003). This subspecies coexists during winter months with G. p. polyosoma in valleys between 2000 and 3500 m a.s.l.

For F. sparverius, all of which belong to the same subspecies in Argentina, individuals captured in the southern area of Argentina are larger than those in the north, confirming Bergmann’s Rule. Specimens captured in La Pampa Province (Guatraché) and in Bajo de Véliz, at 32°S, in San Luis Province (the two most southerly points in Figure 1), are strikingly larger than those captured in Tucumán Province, at 26°S. The same applies to some specimens caught at 2000 m a.s.l. in Tafí del Valle, Tucumán Province, which are larger than those captured on the plains.

**TABLE 1.** Body mass, total body length, wing chord, tail, bill, and tarsus length measurements of 97 live specimens. CERAR = data provided by Centro de Rehabilitación de Aves Rapaces; CENAA = data obtained from bird banding campaigns conducted by the National Bird Banding Center; M = male; F = female; A = adult; SA = subadult; - data not obtained.
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Cabot, J. & De Vries, T. 2004. Age- and sex-differentiated plumages in the two colour morphs of the Variable Buzzard Buteo polyosoma: a case of delayed maturation with subadult males disguised in definitive adult female plumage. Bulletin of the British Ornithologists’ Club, 124: 272–285.

Capllonch, P. & Ortiz, D. 2009. Migración del Aguilucho Común (Buteo polyosoma) en Tafi del Valle, Tucumán, Argentina. Nuestras Aves, 54: 33–35.

Capllonch, P.; Ortiz, D. & Ferro, J. 2011. Avifauna de las Cumbres Calchaquíes, Tucumán, Argentina. Acta Zoológica Lilloana, 55: 50–63.

Dunning-Jr., J. B. 1992. CRC handbook of avian body masses. Boca Raton, CRC Press.

Dunning-Jr., J. B. 2008. CRC handbook of avian body masses, 2nd edn. Boca Raton, CRC Press.

Jiménez, J. E. 1995. Historia natural del Aguilucho Buteo polyosoma: una revisión. Hornero, 141–18.

Riesing, M. J.; Kruckenhausen, L.; Gamauf, A. & Haring, E. 2003. Molecular phylogeny of the genus Buteo (Aves: Accipitridae) based on mitochondrial marker sequences. Molecular Phylogenetics and Evolution, 27: 328–342.

Seipke, S. H. 2007. Aging Black-chested Buzzard-Eagles (Geranoaetus melanoleucus). P. 220–228. In: Bildstein, K. L., Barber, D. R. & Zimmerman, A. (eds.), Neotropical Ornithology. Orwigsburg: Hawk Mountain Sanctuary.

Trejo, A. 2007. Bibliografía comentada sobre aves rapaces de Argentina. Hornero, 22: 185–217.

Trejo, A.; Bó, M. S.; Bellocq, M. I. & López-de-Casenave, J. 2007. Editorial - ecología y conservación de aves rapaces en Argentina. Hornero, 22: 81–83.

Trejo, A., Capllonch, P. & Sympton, L. 2007. Migratory status of the White-Throated Hawk (Buteo alligata): What do we know up to now? Ornitología Neotropical, 18: 11–19.

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