

First record of the Andean Flamingo *Phoenicoparrus andinus* (Phoenicopteriformes: Phoenicopteridae) from Rio de Janeiro state, Brazil

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Resumo: O flamingo-dos-andes *Phoenicoparrus andinus* (Philippi, 1854) é o maior representante da família Phoenicopteridae na América do Sul. Vive em ambientes alagados onde obtém o seu alimento. Ocorre no sul do Peru, na Bolívia, no Chile e em parte da Argentina. No Brasil, a espécie tem sido observada no sul do país, nos estados do Rio Grande do Sul e Santa Catarina. É considerada vulnerável à extinção devido à perda de habitat, incrementada pelas ações da agricultura e da exploração dos ambientes alagados nos Andes. Observações de campo foram realizadas com binóculos 10x50, máquinas fotográficas e caderno de anotações. A espécie foi identificada com guias de campo e através da consulta a ornitólogos. Destaca-se o primeiro registro documentado do flamingo-dos-andes *P. andinus* no estado do Rio de Janeiro na costa sudeste do Brasil. As observações e fotografias foram realizadas na localidade de Salinas do Perú no município de Cabo Frio em Outubro e Novembro de 2016. Nestas datas, a ave apresentava uma plumagem de adulto e nossos dados reafirmam que alguns indivíduos de flamingos (Phoenicopteridae) migram para os alagados baixos na América do Sul. O monitoramento regular do ambiente costeiro da região do Rio de Janeiro pode ajudar na compreensão dos padrões sazonais e das rotas migratórias.

Palavras-chave: aves aquáticas, distribuição, região costeira, salinas, vagante.

Flamingos (Phoenicopteriformes) are widely known because of their typically vivid pink coloration, unique bill shape, feeding behavior, unusual body form yet graceful flight, and their highly social behavior (JOHNSON *et al.* 1958, SIBLEY & MONROE-JR 1990). Flamingos are found in South America including Galápagos, the Caribbean, Africa, southern Europe, southwest Asia, the Middle East, including Indian territory (DEL HOYO *et al.* 2020). Flamingos are unmistakable in body shape, size, as well as their coloration. All species are similar in shape and have common plumage features. Three species, Chilean Flamingo *Phoenicopus chilensis* Molina, 1782, Andean Flamingo *Phoenicoparrus andinus* (Philippi, 1854), and James's Flamingo *Phoenicoparrus jamesi* (Sclater, 1886), occur only in South America. The Chilean Flamingo has the largest range, from Peru through Chile, Bolivia, and Argentina (SICK 1997, DEL HOYO *et al.* 2019, DEL HOYO *et al.* 2020), while the Andean and the James Flamingos are confined to

much the same area of the high Andes, encompassing southern Peru, western Bolivia, northern Chile, northwestern Argentina and some areas southern from Brazil (JOHNSON *et al.* 1958, SIBLEY & MONROE-JR 1990, BENCKE 2010, DEL HOYO *et al.* 2019, DEL HOYO *et al.* 2020).

They are separable in the field by size, the coloring of plumage, soft parts, colorful legs and neck (OGILVIE 2002). The Andean Flamingo *Phoenicoparrus andinus* has a total length of 102–110 cm (DEL HOYO *et al.* 2019) and body mass 2,000 to 2,400 g (OGILVIE 2002, DEL HOYO *et al.* 2019). Females are approximately 10% smaller than males (OGILVIE 2002). This species can be observed feeding on diatoms (Bacillariophyceae) in the phytoplankton (HULBERT & CHANG 1983) and micro-invertebrates (CAZIANI & DERLINDATI 2000). In addition, the Andean Flamingo *P. andinus* shows differences in the bill with nine lamellas per cm, whereas the James's Flamingo has about 20 lamellas per cm (MASCITTI & KRAVETZ 2002). In *P. andinus*

the offspring and chicks are covered in grey down, with adult plumage attained at three and four years (JOHNSON *et al.* 1958, OGILVIE 2002, DEL HOYO *et al.* 2019).

The species lives on the large Andes plateaus from Peru (SIBLEY & MONROE-JR 1990), Chile (TOBAR *et al.* 2012), Bolivia (HURLBERT & CHANG 1983) to Argentina (BUCHER 1992, DERLINDATI *et al.* 2014). These birds are partial elevational migrants, but some individuals show directional movements from the high tableland of central South America (altiplano) and Atacama Desert of South America (CAZIANI *et al.* 2007). The species is listed as 'vulnerable' by the International Union for Conservation of Nature (BIRDLIFE INTERNATIONAL 2020), because its population has been decreasing quickly due to exploitation and loss in habitat quality (BIRDLIFE INTERNATIONAL 2020). In Brazil, the first documented records were in the Santa Catarina State (SICK 1997), based on a juvenile found in Erval Velho municipality. These are deposited in the collection of the National Museum of Rio de Janeiro (MN 36.548), (BEGE & PAULI 1990), and in the Jaraguá do Sul municipality, based on individuals from museums (BORNSCHEIN 1992). The species has been observed in many areas in Santa Catarina state (BEGE & MARTERER 1991). In Rio Grande do Sul, there are records in Peixes lagoon (ANTAS 1992, BORNSCHEIN & REINERT 1996, JACOBS & FENALTI 2020) and the species has also been found together with Chilean Flamingo *P. chilensis* (BENCKE 2010). Recently, Andean Flamingo *P. andinus* had its first documented record from Rio de Janeiro state (this study).

The Andean Flamingo *P. andinus* population has been documented with large movements occurring between lakes, dependent on changes in water levels and food availability (MASCITTI & BONAVENTURA 2002, DERLINDATI *et al.* 2014). During the winter and in snowy conditions the birds move to lower latitudes, including Buenos Aires in Argentina (ROMANO *et al.* 2002) and Bolivia (HURLBERT & CHANG 1983), but they also occur in lower latitudes in Peru and Brazil (SIBLEY & MONROE-JR 1990). The records from Brazil have been attributed to vagrancy (PIACENTINI *et al.* 2015), meaning that it is a scarce

but regular winter visitor there (GHIZONI-JR & PIACENTINI 2010, SILVEIRA 2012). Recently, a young individual of *P. andinus* was found in the Amazonas state, Brazil (BERNARDON & VALESCHI 2014).

In Rio de Janeiro, the drainage of wetlands for agricultural development may be an important factor of threat to the aquatic birds. Besides that, some changes in coastal areas, including water pollution can negatively affect some bird populations that live in wetlands (ALVES & SANTOS 2011, MALLET-RODRIGUES & PACHECO, 2015). In this context, some individuals of *P. chilensis* have only been recorded in the coastal region and interior wetlands (SERPA *et al.* 2008, PIMENTEL & OLMOS 2001) and Guanabara Bay (PACHECO 1996). The presence of *P. chilensis* in coastal areas of the state demonstrates the importance of this habitat to populations that migrate to the region (MALLET-RODRIGUES 2012), even though the species is considered a vagrant and near threatened (MALLET-RODRIGUES & PACHECO, 2015).

Inventory and observation of waterbirds were regularly carried out by the authors using transects, a digital camera and 10x50 binoculars between 7:00 h and 1:00 h (BIBBY *et al.* 1992). In this case, eight researchers carried out the bird sampling in field: (LP) at October 15, (AM) at October 16, (EP and AMQ) at October 19, (RF) at October 28, (EF) at October 29 and (RF and YFR) at November 11. The first record in the field by (LP) was entered on WIKIAVES (2021) (i.e., a Brazilian website for sharing ornithological records, and the author allowed the use of the data in this study (PALHA 2016), (Table 1). The bird data was represented by quantitative and qualitative analysis, for example, observers (s) species name (s), number of individuals of each species, bird sampling time and behavior noted (BIBBY *et al.* 1992).

In this survey we recorded one single adult Andean Flamingo (Figure 1) and all researchers spent between one and three hours bird sampling at "Salinas do Però", Cabo Frio municipality from Rio de Janeiro state, Brazil (22°51'54"S and 42°00'11"W). During the observations, some photographs were

Table 1. Date, Bird sampling start time, Hour total, Photographic time, Data collection and Authors of the Andean Flamingo *Phoenicoparrus andinus* recorded from Cabo Frio municipality, Rio de Janeiro.

Date	Bird sampling start time	Hour total	Photographic time	Data collection	Authors
2016/10/15	09:00 h	1 h	09:33 h	Visual and photographic	PALHA (2016)
2016/10/16	11:30	1 h	12:26 h	Visual and photographic	AM
2016/10/19	09:17	1 h	10:19 h	Visual and photographic	EP and AMQ
2016/10/27	08:50	2 h	08:53 h	Visual and photographic	GAS
2016/10/28	07:30 h	2 h	08:00 h	Visual and photographic	RF
2016/10/29	07:50 h	1 h	07:57 h	Visual and photographic	EF
2016/11/11	08:00 h	3 h	08:40 h	Visual and photographic	RF and YFR



Figure 1. Adult Andean Flamingo *Phoenicoparrus andinus* recorded in 2016/10/28 at Salinas do Però, Cabo Frio municipality, southeastern Brazil. Photo: Rafael Fernandes.

Figura 1. Flamingo-dos-andes adulto *Phoenicoparrus andinus* registrado em 26/10/2016 na Salinas do Però, município de Cabo Frio, sudeste do Brasil. Photo: Rafael Fernandes.

taken to document the plumage pattern and bird behavior such as when the Andean Flamingo lowers its head into the water for catching any food and flight over the area, where the individual was located alone or together with some aquatic birds and shorebirds. The identification was confirmed using bird field guides and by consulting other ornithologists, which noted the field marks, the head and neck with wine-red color, the majority of the body whitish and pink, while the flight feathers are black. The bill, legs and feet are yellow. After that reference was made to the Andean Flamingo distribution map in Brazil which showed the previous record in Santa Catarina, Rio Grande do Sul and Amazonas states (Figure 2). The map also showed the species home range (DEL HOYO *et al.* 2019, DEL HOYO *et al.* 2020) and breeding area (BIRDLIFE INTERNATIONAL 2019) from South America.

We spent 11 hours in the field during seven days, with the first record in October and last record in November. We assume that the bird was the same individual. All observations were conducted in the same area with mangrove vegetation and near an urban area. The bird sampling was made in the summer season, during which there is normally an increase in the bird species in the Neotropical Region due to migration (SICK 1997). Our observations demonstrate habitat use by the species during seven field activities and we suggest that an individual stayed in this location for 27 days. This individual was observed with a mixed flock that included Greater Yellow legs *Tringa melanoleuca* (Gmelin, 1789), Lesser Yellow legs *Tringa flavipes* (Gmelin, 1789), White-backed Stilt *Himantopus melanurus* Vieillot, 1817 and Black-bellied Plover *Pluvialis squatarola* (Linnaeus, 1758). Andean Flamingo *P. andinus* was not banded, but our data suggests the same individual was recorded with visual contact and photography by all authors.

Additionally, *P. andinus* was observed foraging near Roseate Spoonbill *Platalea ajaja* Linnaeus, 1758 and Neotropic Cormorant *Nannopterum brasilianus* (Gmelin, 1789). Over a period of 10 hours it was possible to observe the flight and movement between the flooded lagoons known as “Salinas do Però”. This habitat is important in Rio de Janeiro for migrants to wetlands located at lower latitudes (ALVES & SANTOS 2011). The species was recorded in abandoned salt evaporation ponds and can be observed in coastal lagoons in the Cabo Frio region. Our data represents the first documented occurrence of this species in Rio de Janeiro state, but it does not provide conclusive evidence to assist our understanding of the species movements, dispersal and migration in South America (SICK 1997) and Rio de Janeiro state (MALLET-RODRIGUES 2012). The relative abundance of flamingo species using the lakes was related to habitat conditions (CAZIANI & DERLINDATI 2000). These conditions allowed us to describe the wetlands, though habitat conditions may indicate food availability (SICK 1997; DEL HOYO *et al.* 2019). Indeed, the water salinity of the saline and hypersaline lakes in Bolivia, Chile and Argentina is ideally condition habitat and it attracts large flamingos in South America. In this case, some coastal areas from Rio de Janeiro have similar conditions. For instance, Araruama lagoon and adjacent areas that offer habitat for flamingos in our state (ALVES & SANTOS 2011). In the past, WILLIS (2003) highlighted the importance of the accurate identification of migrant birds in Brazil and the accuracy in the inventory of Birds in the Neotropics. The systematic and continuous monitoring of the coastal environments of Rio de Janeiro will be required, in order to determine the seasonal patterns and migration routes of the Andean Flamingo in the region.

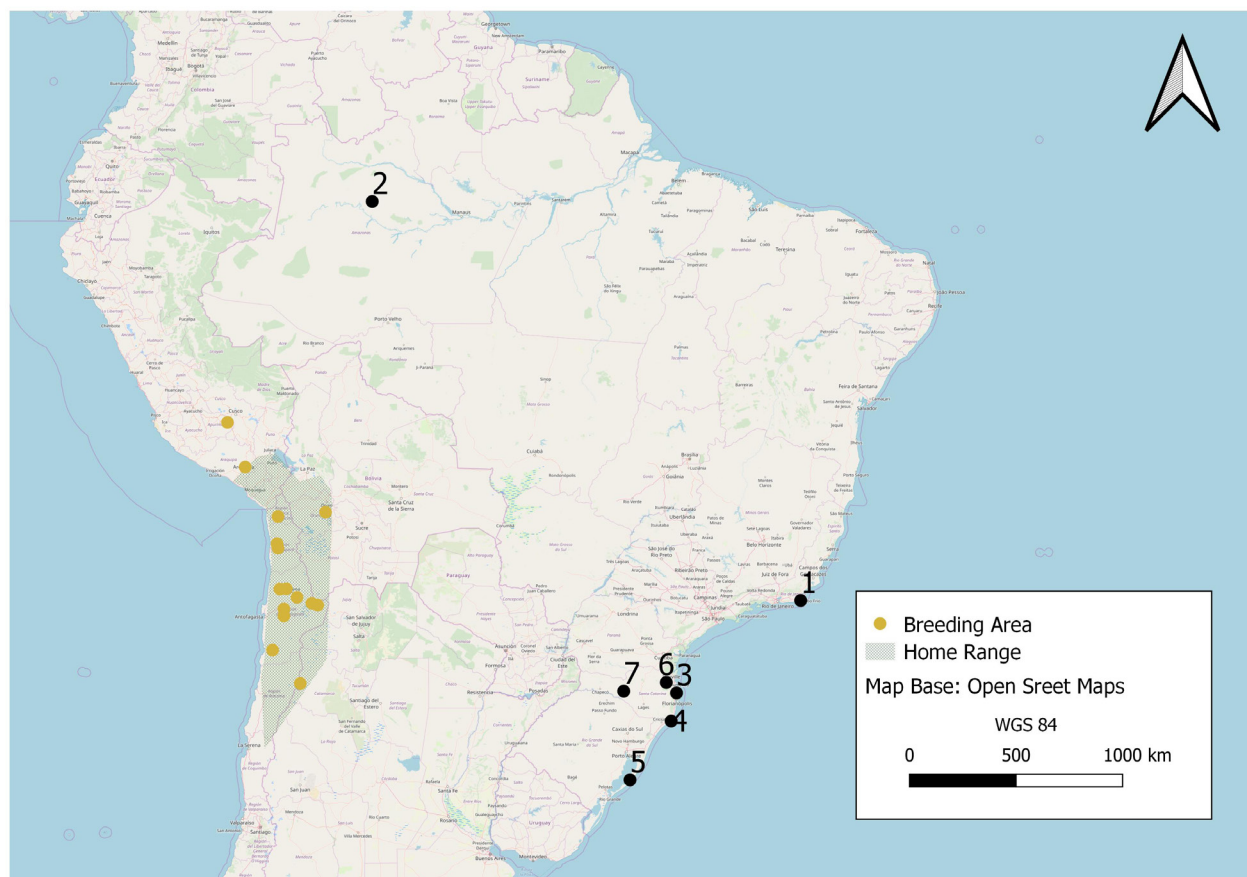


Figure 2. Documented records of the Andean Flamingo *Phoenicoparrus andinus* from Brazil. 1. Present study, 2. Bernardon & Valsechi (2014), 3. Ghizoni-Jr. & Piacentini (2010), 4. Ghizoni-Jr. & Piacentini (2010), 5. Antas (1992) and Bornschein & Reinert (1996), 6. Bornschein (1992) and Ghizoni-Jr. & Piacentini (2010), 7. Bege & Pauli (1990).

Figura 2. Localidade dos registros documentados do flamingo-dos-andes *Phoenicoparrus andinus* no Brasil. 1. Presente estudo, 2. Bernardon & Valsecchi (2014), 3. Ghizoni-Jr. & Piacentini (2010), 4. Ghizoni-Jr. & Piacentini (2010), 5. Antas (1992) and Bornschein & Reinert (1996), 6. Bornschein (1992) and Ghizoni-Jr. & Piacentini (2010), 7. Bege & Pauli (1990).

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REFERENCES

- ALVES, M.A.S. & T.R. SANTOS. 2011. Região costeira do Rio de Janeiro, no corredor da Serra do Mar. p. 251-263. In: VALENTE, R.M.; J.M.C.SILVA; F. C. STRAUBE & J.L.X. NASCIMENTO (Eds.). **Conservação de aves migratórias neárticas no Brasil**. Belém: Conservação Internacional do Brasil.
- ANTAS, P.T.Z. 1992. Novos registros para a avifauna do Rio Grande do Sul, p. 80-81. In: **Anais do VI Encontro Nacional de Anilhadores de Aves**. Pelotas: Universidade Católica de Pelotas, Educat.
- BEGE, L.A.R. & B.T. PAULI 1990. Two birds new to Brazilian avifauna. **Bulletin of the British Ornithologists' Club** 110 (2): 93-94.
- BEGE, L.A.R. & B.T.P. MARTERER. 1991. **Conservação da avifauna na Região Sul do Estado de Santa Catarina**. Florianópolis, SC: FATMA. 56p
- BENCKE, G. A. (2010) Revisão e atualização da lista das aves do Rio Grande do Sul, Brasil. **Iheringia, Série. Zoologia**. (100) 4:519-556.
- BERNARDON, B. & J. VALESCCHI. 2014. First record of the Andean Flamingo in the Brazilian Amazon. **Revista Brasileira de Ornitologia** 22 (3), 285-287

- BIBBY, C.; BURGESS, N.D.; & D.A. HILL. 1992. **Bird Census Techniques**. Academic Press. 252p
- BIRDLIFE INTERNATIONAL. 2019 **Species factsheet: *Phoenicoparrus andinus***. Available in <<http://www.birdlife.org>>Accessed at:[13/03/2019]
- BIRDLIFE INTERNATIONAL. 2020. ***Phoenicoparrus andinus*. The IUCN Red List of Threatened Species** 2020: <e.T22697387A182422217. <https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T22697387A182422217>>Accessed at:[14/02/2021]
- BORNSCHEIN, M.R. 1992. Nova ocorrência de *Phoenicoparrus andinus* para o Brasil. p. 55. In: **Anais do Congresso Brasileiro de Ornitologia**, Campo Grande.
- BORNSCHEIN, M.R. & B.L. REINERT. 1996. The Andean Flamingo in Brazil. **Wilson Bulletin** 108 (4): 807-808.
- BUCHER, H.A. 1992. Population and Conservation Status of Flamingos in Mar Chiquita, Cordoba, Argentina. **Colonial Waterbirds** 15 (2):179-184
- CAZIANI, S.M. & E. DERLINDATI. 2000. Abundance and habitat of high Andes flamingos in northwestern Argentina. **Waterbirds** 23 (Esp): 121-133.
- CAZIANI, S.M.; ROCHA, O.O.; RODRIGUEZ, R.E.; ROMANO, M.; DERLINDATI, E.J.; TÁLAMO, A.; RICALDE, D.; QUIROGA, C.; CONTRERAS, J.P.; VALQUI, M. & H. ROSA. 2007. Seasonal distribution, abundance, and nesting of Puna, Andean, and Chilean Flamingos. **The Condor** 109 (2): 276-287.
- DEL HOYO, J.; BOESMAN, P. E.F.J. GARCIA. 2019. Andean Flamingo (*Phoenicoparrus andinus*). In: DEL HOYO, J.; ELLIOT, A.; SARGATAL, J.; CHRISTIE, D.A & E. JUANA (Eds.). **Handbook of the Birds of the World Alive**. Lynx Edicions, Barcelona. Available in <<http://www.hbw.com/node/52788>>Accessed at[13/03/2019]
- DEL HOYO, J. (Ed). 2020. **All the Birds of the World**. Lynx Edicions, Barcelona. 967pp.
- DERLINDATI, E. J.; ROMANO, M. C.; CRUZ, N.N. BARISÓN, C.; ARENGO, F. & I. M. BARBERIS. 2014. Seasonal activity patterns and abundance of Andean flamingo (*Phoenicoparrus andinus*) at two contrasting wetlands in Argentina. **Ornitologia Neotropical** 25 (3): 317-331.
- GHIZONI-JR., I.R., & V.Q. PIACENTINI. 2010. The Andean Flamingo *Phoenicoparrus andinus* (Philippi, 1854) in southern Brazil: is it a vagrant? **Revista Brasileira de Ornitologia** 18(3): 263-266.
- HURLBERT, S.H. & C.C.Y. CHANG. 1983. Ornitholimy effects of grazing by the Andean Flamingo (*Phoenicoparrus andinus*). **Proceedings of the National Academy of Sciences** 80 (15) 4766-4769
- JACOBS, F. & P. FENALTI. 2020. **Guia de identificação: Aves do Rio Grande do Sul**. Pelotas: Aratinga. 454pp
- JOHNSON, A.W.; BEHN, F. W. & R. MILLIE. 1958. The South American Flamingos. **The Condor** 60 (5): 289-299
- MALLET-RODRIGUES, F. 2012. O estado do Rio de Janeiro como limite sul e norte de distribuição de algumas espécies de aves. **Iheringia. Série Zoologia** 102 (4): 438-447
- MALLET-RODRIGUES, F. & J.F. PACHECO. 2015. The local conservation status of the regionally rarest bird species in the state of Rio de Janeiro, southeastern Brazil. **Journal of Threatened Taxa** 7 (9): 7510-7537
- MASCITTI, V. & S.T. BONAVENTURA. 2002. Patterns of abundance, distribution and habitat use of flamingos in the High Andes, South America. **Waterbirds** 25 (3):358-365
- MASCITTI, V. & F.O. KRAVETZ. 2002. Bill morphology of south american flamingos. **The Condor** 104 (1): 73-83
- OGILVIE, M. 2002. Phoenicopteriformes Flamingos. p.303-311. In: HUTCHINS, M.; JACKSON, A.J.; BOCK, W.J. & D. OLENDORF. (Ed) **Grzimek's Animal Life Encyclopedia**. 2nd Ed. Vol 8, Birds I. Farmington Hills, MI: Gale Group,
- PACHECO, J.F. 1996. Flamingos em plena Baía de Guanabara, ou a singela história de um registro que não pegou! **Boletim da Sociedade Brasileira de Ornitologia** 28: 5-8.
- PALHA, L.R. 2016 [WA2370670, *Phoenicoparrus andinus* (Philippi, 1854)]. **Wiki Aves – A Enciclopédia das Aves do Brasil**. Available in <<http://www.wikiaves.com/2370670>> Accessed at [13/03/2019]
- PIACENTINI, V.Q.; ALEIXO, A.; AGNE, C.E.; MAURICIO, G.N.; PACHECO, J.F.; BRAVO, G.A.; BRITO, G.R.R.; NAKA, L.N.; OLMOS, F.; POSSO, S.; SILVEIRA, L.F.; BETINI, G.S.; CARRANO, E.; FRANZ, I.; LEES, A.C.; LIMA, L.M.; PIOLI, D.; SCHUNK, F.; STRAUBE, F.C. & E. CESARI. 2015. Annotated check list of the birds of Brazil by the Brazilian Ornithological Records Committee. **Revista Brasileira de Ornitologia** 23 (2):91-298.
- PIMENTEL, L. & F. OLMOS. 2011. The birds of Reserva Ecológica Guapiaçu (REGUA), Rio de Janeiro, Brazil. **Cotinga** 33: 8-24.
- ROMANO, M.; PAGANO, F. & M. LUPPI. 2002. Registros de Parina grande (*Phoenicoparrus andinus*) em la laguna Melincué, Santa Fe, Argentina. **Nuestras Aves** 43: 15-17.
- SERPA, G.A.; CAMACHO, I.; MENDES, I.L.B. & A.E.O. SILVA. 2008. Registros documentados do flamingo-chileno *Phoenicoparrus chilensis* (Phoenicopteridae) no Estado do Rio de Janeiro. **Atualidades Ornitológicas** 145:15.
- SIBLEY, C.G. & B.L. MONROE-JR. 1990. **Distribution and Taxonomy of Birds of the World**. Yale University Press: New Haven & London. 1110p.
- SICK, H. 1997. **Ornitologia Brasileira**. Rio de Janeiro: Nova Fronteira. 912p.
- SILVEIRA, L.F. 2012. Os insólitos flamingos. **Cães & Cia** (393) :56 Available in <http://www.ib.usp.br/~lfsilveira/pdf/a_2012_cecfamingos.pdf>Accessed at [13/03/2019]
- TOBAR, C.; RAU, J.R.; INIARTE, A.; VILLA LOBOS. R.; LAGOS, N.; CURSACH, J.; DÍAZ, C.; FUENTES, N. & A. GANTZ. 2012. Composition, diversity and size of diatoms consumed by the andean flamingo (*Phoenicoparrus andinus*) in salar de puntanegra, Antofagasta region, Northern chile. **Ornitologia Neotropical** 23 (2): 243-250
- WIKIAVES. 2021. **Plataforma das Aves do Brasil**. Wikiaves. Available in < <http://www.wikiaves.com.br> >Accessed at [14/02/2021]
- WILLIS, E. 2003. Bird records in the southern neotropics: on the need to critically check specimens, literature citations and field observations. **Ornitologia Neotropica** (11) 4: 549-552.