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The Crowned Solitary-eagle *Harpyhaliaetus coronatus* (Accipitridae) in the cerrado of Estação Ecológica de Itirapina, southeast Brazil.

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RESUMO. **Ocorrência da águia-cinzenta *Harpyhaliaetus coronatus* (Accipitridae) no cerrado da Estação Ecológica de Itirapina, sudeste do Brasil.** A águia-cinzenta é um accipitrídeo mundialmente ameaçado segundo a IUCN e considerado vulnerável no Brasil pela lista do IBAMA. Particularmente, no Estado de São Paulo poucos registros têm sido obtidos nos últimos 30 anos, o que colocou a espécie como criticamente em perigo na lista estadual de animais ameaçados de extinção. Neste estudo são reportadas as ocorrências de uma família (casal e um subadulto), um subadulto e um casal, respectivamente em julho de 2005, outubro de 2005 e julho de 2006, na Estação Ecológica de Itirapina (22º15' S, 47º49' W). Cabe mencionar que na última observação foi registrado um comportamento de cópula. A Estação Ecológica de Itirapina é um dos últimos remanescentes preservados de vegetação natural de cerrado no estado, com 2.300 ha. Além disso, presas importantes da águia-cinzenta, como tatus (Dasypodidade) e serpentes são particularmente abundantes nesta unidade de conservação. Todos esses elementos, aliados ao alto grau de alteração da paisagem no Brasil centro-sul, a uma grande área de vida, ao alto potencial de dispersão da espécie, sugerem que estas águias podem viver em metapopulação.

Palavras-chave: *Harpyhaliaetus coronatus*, águia-cinzenta, cópula, cerrado, Brasil.

Key words: *Harpyhaliaetus coronatus*, Crowned Solitary-eagle, mating, Cerrado, Brazil.

The Crowned Solitary-eagle *Harpyhaliaetus coronatus* (Accipitridae) is a large buteonine (about 2.9 kg) endemic to south-central South America, ranging from eastern Bolivia and south-central Brazil through Paraguay and northern Argentina (Collar *et al.* 1992, Ferguson-Lees and Christie 2001). This rare eagle occurs in low densities in open and semi-open habitats in thin open woodland, savannah, brushy steppe, dry scrub, lowland, and open or lightly wooded foothills up to 1,200 m (Thiollay 1994, Ferguson-Lees and Christie 2001). *Harpyhaliaetus coronatus* is globally endangered due to its very small and fragmented population and ongoing habitat loss resulting in significant and continued decline in numbers (http://www.redlist.org, IUCN 2004). In Brazil (country with larger occurrence area), it is considered vulnerable (Ministério do Meio Ambiente 2003), while in the state of São Paulo it is critically endangered (São Paulo 1998).

There are only four records of *H. coronatus* made in the last 30 years for São Paulo: Nazaré Paulista in 1984 (Willis and Oniki 2003), Serra da Bocaina National Park in 1988 (Collar *et al.* 1992), Bananal in 1989 (Collar *et al.* 1992) and Pontal in 1991 (Collar *et al.* 1992) (Figure 1). Only three historical records are available for the state of São Paulo: Itararé in 1820 (von Pelzeln 1868-1871), Porto do Rio Paraná in 1823 (von Pelzeln 1868-1871), and Chavantes in 1927 (Pinto 1938) (Figure 1).

During a raptor monitoring project in central São Paulo we recorded *H. coronatus* on three different occasions. All records were made in Estação Ecológica de Itirapina (EEI), in the municipalities of Itirapina and Brotas. The EEI (22º 15' S, 47º 49' W) is one of the last remnants of Cerrado in São Paulo, with an area of approximately 2,300 ha. The climate is tropical (Köppen's Cwa), with two distinct seasons, a dry (April to September) and a wet season (October to March). Altitude ranges from 705 to 750 m (SEMA 2000). The vegetation includes "campo limpo" (open grassland), "campo sujo" (shrubby grassland) and "campo cerrado" (scrub savannah with scattered trees), and "cerrado" (dense scrub savannah; see Coutinho 1978). Marshes and gallery forests are also found in the area (Mantovani 1987). The EEI is surrounded by plantations of *Pinus* sp., *Eucalyptus* sp., *Citrus* sp., as well as sugar-cane crops, pastures, and small isolated patches of forest and "cerrado".

Our first record was made on 12 July 2005 at 16:28 h in "campo cerrado". We observed an adult *H. coronatus* soaring at low altitude parallel to our car, then perching atop a small tree about 4.5 m high at 22º 13' 50" S, 47º 53' 30" W. A few minutes later, it began calling constantly to another adult eagle, which answered at once. The second bird was perched on a 6 m high tree about 25 m away from the first bird. The two individuals kept calling to each other until 17:06 h, when both flew to the same tree (about 7 m of height) 50 m away from the perch of the first bird. Then, we noticed a subadult perched 50 m away from the calling adults. Around 17:30 h the three birds flew to different places, and we could verify that one adult returned to a tree (about 5.5 m height) close to the first perch, staying until 17:52 h.

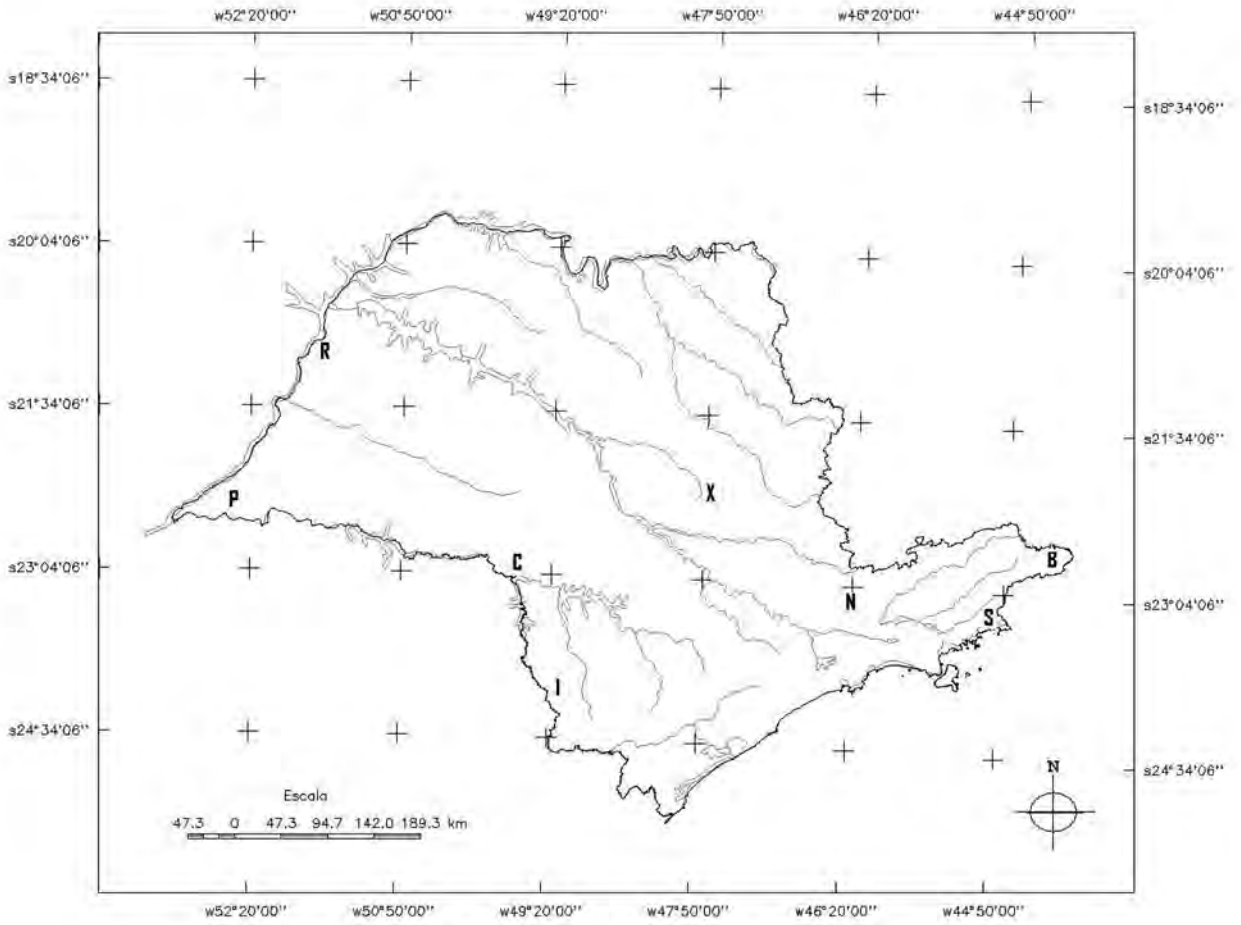

Figure 1. Map of the state of São Paulo showing recent and historical records for the Crowned Solitary-eagle (*Harpyhaliaetus coronatus*). Historical records: **(I)** Itararé, 1820; **(R)** Porto Rio Paraná, 1823 and **(C)** Chavantes, 1927. Recent records: **(S)** Serra da Bocaina National Park, 1988; **(B)** Bananal, 1989; **(P)** Pontal, 1991; **(N)** Nazaré Paulista, 1984; **(X)** Itirapina, 2005.

On 19 October 2005 at 08:35 h, one subadult bird was perched on a 4.2 m high dead tree in an ecotone area between "campo sujo" and "campo cerrado"(47º 53' 44" S, 22º 13' 56" W). At 09:08 h, an adult Yellow-headed Caracara (*Milvago chimachima*) perched on a different branch of the same tree for around 2 min, with no antagonistic behaviour between the raptors. Nineteen minutes later, it started raining and the eagle flew to a tree with denser foliage within "campo cerrado" 320 m away, where it stayed until 12:20 h. At that point we were unable to see the bird's position and movements because of heavy rain.

On 27 July 2006 at 13:17 h, we observed one adult male perched on a 5.2 m high *Dalbergia miscolobium* in the "campo cerrado" physiognomy (47º 53' 40" S, 22º 13' 56" W). At 13:29 h the male flew 500 m northwest to a tree (roughly 10 m high) where there was a female. At 13:43 h the male successfully copulated with its mate. Finally at 13:47 h the female flew away followed by the male 4 min later.

According to Ferguson-Lees and Christie (2001), the Crowned Solitary-eagle lives solitary or in pairs and might sometimes live in family trios, which was supported by our observations and also by F. Pacheco and R. Silva e Silva (pers. comm. 2002) in the Jalapão region, southeast state of Tocantins. Additionally, Ferguson-Lees and Christie (2001) mentioned that juveniles and subadults probably remain with adults for several years, which is consistent with our observation of a subadult close to an adult pair.

Three records in a short time span suggest that *H. coronatus* may frequently use the EEI area. Three points support this possibility. First, EEI is one of the last patches of "cerrado" in the whole state of São Paulo, and has open physiognomies typically used by this species. Increasing agriculture in the region probably has forced any remnant eagles into the EEI area, a scenario previously reported in Bolivia (see Ferguson-Lees and Christie 2001). Second, our last observation included a mating event, suggesting that breeding may take place in EEI. Data about Crowned Solitary-eagle breeding are virtually inexistent. Ferguson-Lees and Christie (2001) report only that egg occurs in October and that incubation and fledging periods are unknown. However, in Argentina two copulation events were observed in earlier August (R. Pereyra, pers. comm. 2005). Third, existing data on the diet of *H. coronatus* includes mammals (e.g. weasels, rodents, skunks, armadillos, lambs), birds (e.g. tinamous and poultry), reptiles (e.g. snakes), carrion, and even fish. However, armadillos (mostly *Dasypus*) are apparently a significant item in their food habits (see Collar *et al.* 1992, Thiollay 1994, Ferguson-Lees and Christie 2001). Bonato (2002) found four species of armadillos in the EEI area

(weighing from 1.0 to 5.5 kg), including two species of *Dasypus* which occur in all habitats at the station. In addition, this author studied the activity pattern of two species (*Cabassous unicinctus* and *Euphractus sexcinctus*), which were active throughout the day and crepuscular, thus coinciding with *H. coronatus* hunting time (Thiollay 1994, Sick 1997, Ferguson-Lees and Christie 2001). Additionally, our observations suggest that EEI has a relatively high abundance of armadillos, as indicated by the large number of burrows in the area. Also, 35 snake species inhabit the EEI area (Sawaya 2004), some of them apparently in high abundance (M. R. C. Martins and R. J. Sawaya, pers. comm. 2005). Like armadillos, snakes may be an important food item for *H. coronatus*, as their short toes are typical of a snake-eating raptor (see Thiollay 1994).

The large home range (Ferguson-Lees and Christie 2001) and apparently high potential of subadult´s dispersion (F. Olmos, pers. comm. 2006) suggest these eagles may live in metapopulations. Some individuals may explore open grassland and savannah remnants as vagrants, including not only the São Paulo localities but also other localities as Serra da Canastra (state of Minas Gerais, Silveira 1998), Serra dos Órgãos (state of Rio de Janeiro, Collar *et al.* 1992) and Parque Estadual Vila Velha (state of Paraná, Mikich and Bérnils 2004). However, during their wanderings in the disturbed and human densely inhabited areas some eagles certainly are hunted or suffer accidents (Sarasola and Maceda 2006, L. Fukui and P. Scherer-Neto, pers. comm. 2005). In this sense, disturbed and fragmented habitat may expose these eagles even more to persecution. Further studies should include banding, satellite telemetry and/or at least a kin selection degree analysis within and between populations to elucidate the real dispersion capacities and to help in the conservation strategies of this threatened eagle.

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REFERENCES

Bonato, V. (2002) *Ecologia e história natural de tatus do Cerrado de Itirapina (Xenarthra: Dasypodidae)*. Dissertação de mestrado. Campinas: Universidade Estadual de Campinas.

Collar, N. J., Gonzaga, L. P., Krabbe, N., Madroño Nieto, A., Naranjo, L. G., Parker III, T. A. and D. C. Wege (1992) *Threatened birds of the Americas: the ICBP/IUCN Red Data Book.* Cambridge, UK: International Council for Bird Preservation.

Coutinho, L.M. (1978) O conceito de Cerrado. *Rev. Bras. Bot*. 1:17-23.

Ferguson-Lees, J. and D.A. Christie (2001) *Raptors of the World*. New York: Houghton and Mifflin Company.

IUCN (2004) *Red List of Threatened Species.* www.iucnredlist.org (accessed in 30/12/2005).

Mantovani, W. (1987) *Análise florística e fitossociológica do estrato herbáceo-subarbustivo do cerrado na reserva biológica de Guaçu e Itirapina*. Tese de Doutorado. Campinas: Universidade Estadual de Campinas.

Mikich, S. B. and R. S. Bérnils (2004) *Livro Vermelho da Fauna Ameaçada no Estado do Paraná*. http://www.pr.gov.br/iap (accessed in 14/08/2006).

Ministério do Meio Ambiente (2003) Instrução normativa Nº 3, de 27 de maio de 2003. *Diário Oficial da União*. Brasília - Seção 1 101:88-97.

von Pelzeln, A. (1868-1871). *Zur Ornithologie Brasiliens: Resultate von Johann Natterers Reisen in den Jahren 1871 bis 1835*. Wien: A. Pichler's Witwe und Sohn.

Pinto, O. M de O. (1938) Catálogo de aves do Brasil e lista dos exemplares que as representam no Museu Paulista. *Rev. Mus. Paul.* 22.

Sarasola, J. H. and J. J. Maceda (2006) Past and current evidence of persecution of the endangered Crowned eagle *Harpyhaliaetus coronatus* in Argentina. *Oryx* 40: 1-4.

São Paulo (1998) *Lista da fauna ameaçada e provavelmente ameaçada do Estado de São Paulo*. Decreto n. 42838 de 4 de fevereiro de 1998.

Sawaya, R. J. (2004) *História natural e ecologia das serpentes de cerrado da região de Itirapina, SP*. Tese de Doutorado. Campinas: Universidade Estadual de Campinas.

SEMA [Secretaria de Estado do Meio Ambiente] (2000) *Atlas das unidades de conservação ambiental do Estado de São Paulo.* São Paulo: Secretaria de Estado do Meio Ambiente.

Sick, H. (1997) Ornitologia brasileira. Rio de Janeiro: Nova Fronteira.

Silveira, L. F. (1998) The birds of Serra da Canastra National Park and adjacent areas, Minas Gerais, Brazil. *Cotinga* 10: 53-63.

Thiollay, J. M. (1994) Family Accipitridae, p. 52-205. In: J. del Hoyo, J. Elliot. and J. Sargatal (eds.). *Handbook of the birds of the world, vol. 2: New World vultures to guineafowl*. Barcelona: Lynx Edicions.

Willis, E. O. and Oniki, Y. (2003) *Aves do Estado de São Paulo*. Rio Claro: Edição dos autores.