

Greater Rhea predation in the Eastern Chaco of Argentina

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RESUMO. Depredação de emas no Chaco Oriental de Argentina. Reporta-se a depredação de *Rhea americana* em indivíduos e ovos para áreas abertas numa área protegida no nordeste da Argentina dentro da região biogeográfica do Chaco Úmido. Cinco casos de depredação através de pumas e um por cachorro, junto com duas ninhadas são informadas. Depredação de tatu em ovos de rheas é informada pela primeira vez. Eventos de depredação têm acontecidos durante formação de harém (julho-agosto) que pode indicar que as emas são mais vulneráveis durante o período de procriação, quando a vigilância para predadores pode ficar reduzida.

PALAVRAS-CHAVES: ema, *Rhea americana*, depredação, puma, tatu, conservação.

ABSTRACT. Individual and egg Greater Rheas predation is reported for open areas in a protected area in northeastern Argentina within the Humid Chaco biogeographical region. Five cases of predation by cougars (*Felis concolor*) and one by dog, together with two broods are reported. Armadillo predation on rheas eggs is reported for the first time. Predation events have occurred during harem formation and courtship (July-August), which may indicate rheas are more vulnerable during the breeding period, when vigilance for predators may be reduced.

KEY WORDS: Greater Rhea, predation, cougar, armadillo, conservation.

The Greater Rhea (*Rhea americana*) is the largest bird in the Neotropics reaching 30 kg in body weight and 150 cm in body height when adults. The species occurs in open habitats in Brazil, Bolivia, Paraguay, Uruguay and Argentina, and is listed in Appendix II of CITES because its populations are vulnerable to extinction in the near future if hunting of wild birds is not regulated. Hunting of rheas is carried out to provide feathers to a well established market, and also for flesh and hides. Rhea feathers are one of the principal wildlife products in Argentina.

The status of wild rhea populations in northeastern Argentina is perhaps better than in other parts of its range, primarily because suitable natural habitat exists, with limited agriculture and few human activities (Giai 1977). Nevertheless, these favorable situations are changing and the future of Argentinian populations is in jeopardy.

Bruning (1973) and Ferrari (1984) suggested Crested Caracaras (*Polyborus plancus*) together with wild felids are among the potential predators of these birds. Puma and jaguar predation on rheas has been reported in the Paraguayan Chaco by Taber *et al.* (1997). Additionally, rheas are listed as known food items for South American pumas and jaguars in the central Neotropical areas of Bolivia and Brazil (Eisenberg and Redford 1999, Oliveira 1994). It is well known that pumas prey on rheas at Serra da Canastra and Emas National Parks in the Brazilian Cerrado, where carnivore researchers have been active. Codenotti (1997) has reported predation by mustelids in Brazil.

From July 1991 to June 1992 we conducted intensive ecological studies of Greater Rheas at El Bagual Ecological Reserve in northeastern Argentina (Yanosky 1989). El Bagual is a 3,463 ha fenced area in northeastern Argentina (26°10'53"S, 58°56'39"W) within the Humid Chaco biogeographical region. The Reserve is fenced to keep cattle out and hunting is prohibited. Rainfall is highly unpredictable, and consequently extreme drought or flooding conditions may occur, principally during winter and summer, respectively. El Bagual is characterized by flooded grasslands interspersed with patches of variable woodland communities.

Woodland communities are represented by grasslands or shrubby savannas, formerly exploited for agriculture and subsequently abandoned; many of these areas have turned into *Imperata* grasslands. Forests are variable in height, typically 15-17 m high for low forests and 20 m for high forest (Yanosky and Mercolli 1995).

Rheas are common at El Bagual Reserve with a density of 1.18-1.85 groups/km² (1.517 ± 0.27 , N = 85). These groups were composed of 2.92 ± 0.62 individuals (N = 103, R = 1,92-4) and were randomly distributed throughout the habitat types (Mercolli 1993).

We recorded five cases of predation by cougars (*Felis concolor*) in June through August 1991: involving one adult male and four adult females. In all cases rheas were captured in open *Paspalum* grasslands, based on our finding of blood and feathers in that area. Rheas were dragged to the nearest woodlands ($x = 350 \pm 51$ m, R =

290-380) where they were partly buried. Only the birds' abdomens had been opened by the cougars, which had consumed little of the viscera.

In October, a juvenile rhea was observed while attacked by a 12 kg domestic dog in a grassland 500 m from the tall forest and 100 m from the Reserve's perimeter fence. The dog opened the abdomen of the bird and partially consumed the viscera. The juvenile had injured legs and head, but this was presumed to have been caused by its attempts to escape through the perimeter fence while being chased by the dog. Under normal circumstances, rheas easily pass through the Reserve fences.

In December and January, two broods (n = 28 and n = 35, respectively) of 2-3 month-old rhea chicks were found dead in the same grassland habitat. None of the chicks had been eaten, but had many wounds resembling bite marks on their skins. These wounds suggest the birds had been killed by cougar kittens learning to hunt, in agreement with two sightings of a cougar with kittens (probably the same group) in the same period.

We followed two nests with 16 and 28 eggs, respectively, for an evaluation of reproductive success (Mercolli, 1993). In November, both were found partially buried in an ecotone between a *Paspalum* grassland and a humid mature forest. Eight and nine eggs, respectively, had been destroyed by a six-banded armadillo (*Euphractus sexcinctus*), that had burrows just below the nests containing eggshells. It is notable that when we first found the nests they were not over the armadillo burrows. We presume the armadillos dug their burrows under the nests after egg-laying. In both cases, the male rheas abandoned their nests. Fernandez and Roboreda (1995) reported predation on rheas by *Chaetopractus villosus* in Argentina.

From these observations it is clear that predation on adult wild rheas took place during harem formation and courtship (July-August) (Mercolli 1993). Cougars are known to prefer large vertebrate preys (Hornocker 1969, 1970, Seidensticker *et al.* 1973, Iriarte *et al.* 1990). Wilson (1984) and Cajal & López (1987) have recorded the fundamental role of cougars as a vertebrate predator in Chile and Argentina, respectively.

In all of our observations, rhea predation by cougars occurred in open habitats with sparsely forest patches where potential prey move in response to adverse environmental conditions. In this study, predation took place in open areas, and even despite rheas being strong runners, the occurrence of predation events during courtship and harem formation suggests rheas are more vulnerable during the breeding period, when vigilance for predators is reduced.

Rhea conservation strategies should consider cougars as effective predators of both chicks and adults, when occurring in sympatry. Management of cougar populations should be stressed in all reintroduction projects as an

increase of the predator population could limit populations of wild ranging rheas. The six-banded armadillo population is increasing due to enhanced availability of agricultural products for food; while remaining populations of rheas are usually associated with crop fields within southern and central South America. The effect of this armadillo on nesting success should be assessed with regards to attempts to conserve wild populations of rheas.

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REFERENCES

- Bruning, D. F. (1973) The Greater Rhea chick and egg delivery route. *Nat. Hist.* 82:68-75.
- Cajal, J. L. & N. E. Lopez (1987) El puma como depredador de camélidos silvestres en la Reserva San Guillermo, San Juan, Argentina. *Rev. Chil. Hist. Nat.* 60:87-91.
- Codenotti, T. L. (1997) Fenología reproductiva y biometría de nidos, huevos y pollos del ñandú, *Rhea americana*, en Rio Grande do Sul, Brasil. *Hornero* 14:211-223.
- Eisenberg, J. F. & K. H. Redford (1999) *Mammals of the Neotropics: the central neotropics (Ecuador, Peru, Bolivia, Brazil)*, v. 3. Chicago: University of Chicago Press.
- Fernandez, G. J. and J. C. Roboreda (1995) Adjacent nesting and egg stealing between males of the Greater Rhea *Rhea americana*. *J. Avian Biol.* 26:321-324.
- Ferrari, M. A. (1984) El ñandú. In: *Aves. I. Fauna Argentina*. Buenos Aires: Centro Editor de América Latina S.A.
- Giai, A. G. (1977) El ñandú *Rhea americana* en el Chaco Boreal y Austral. *El Hornero* 11:420-422.
- Hornocker, M. G. (1969) Winter territoriality in mountain lions. *J. Wildl. Manage.* 33:457-464.
- _____. 1970. An analysis of mountain lion predation upon mule deer and elk in the Idaho Primitive Area. *Wildl. Monogr.*, no. 21.
- Iriarte, J. A., W. L. Franklin, W. E. Johnson and K. H. Redford (1990) Biogeographic variation of food habits and body size of the American puma. *Oecologia* 85:185-190.
- Mercolli, C. (1993) *Observaciones ecológicas sobre el ñandú común (Rhea americana Rotschildi) en la reserva ecológica El Bagual, provincia de Formosa*. Tesis de licenciatura. Argentina: Universidad Nacional de Mar del Plata.

- Oliveira, T. G. (1994) *Neotropical cats: ecology and conservation*. São Luís: EDUFMA.
- Seidensticker IV, J. C., M. G. Hornocker, W. V. Wiles and J. P. Messick (1973) Mountain lion social organization in the Idaho Primitive Area. *Wildl. Monogr.*, no. 35.
- Taber, A. B., A. J. Novaro, N. Neris and F. H. Colman (1997) The food habits of sympatric jaguar and puma in the Paraguayan Chaco. *Biotropica* 29:204-213.
- Wilson, P. (1984) Puma predation on guanacos in Torres de Paine National Park, Chile. *Mammalia* 4:515-522.
- Yanosky, A. A. (1989) Importancia y desarrollo de la Reserva Privada El Bagual, Pcia. de Formosa. *Actas Primeras Jornadas Nac. de Fauna Silvestre, Santa Rosa, La Pampa. Argentina* 1987 (1989):638-647.
- _____ and C. Mercolli (1995) The psittacids (Aves: Psittacidae) of El Bagual Ecological Reserve of northeastern Argentina. *Texas J. Science* 47:174-178.