

Toco Toucans are a Double-edged Sword for Endangered Macaws

A Conservation Paradox in Brazil Shows the Importance of Ecological Interactions for Conservation

Nathan Brouwer

Conservationists often focus on preserving endangered, flagship, or charismatic species. Recent research in Brazil by Marco Aurélio Pizo of the Universidade do Rio dos Sinos and his colleagues indicates that a broader perspective may be necessary for successful conservation of some species. Their research illustrates the importance of considering multiple species and their interactions when developing conservation plans.

Pizo and colleagues studied the hyacinth macaw (*Anodorhynchus hyacinthus*), the world's largest species of parrot. The hyacinth macaw is found only in the forests of central Brazil, woodlands within the Pantanal of Brazil, Paraguay and Bolivia, and an enclave in the Amazon basin. Considered endangered by the ICUN, it is threatened by habitat loss as well as trapping for the pet industry. The macaw nests in cavities within large trees that have been excavated by other

animals, enlarging them to suit their needs. Otherwise suitable forests may lack nesting sites if their trees are too small, limiting the macaw's habitat options.

To better understand how to conserve the species, Pizo and colleagues studied its nesting ecology in the Brazilian Pantanal. The Pantanal is a vast wetland in south-central South America. The Pantanal is severely threatened by the intensification of agriculture and the conversion of wetlands and woodlands to pastures. Its uniqueness has earned it classification as a UNESCO Biosphere Reserve.

Seed dispersal is a central aspect of forest regeneration. Maintaining the processes that spread seeds throughout the forest is therefore essential to creating and maintaining macaw habitat. On the other hand, nest predation is one of the leading causes of death for young birds. In the short term, it is therefore necessary to know what predators are killing young macaws.

Hyacinth macaws in this region rely on manduvi trees (*Sterculia apetala*) 60 years or older for their nesting sites. Pizo's team sought to identify which species of animals disperse manduvi seeds, and which prey upon the macaw's eggs and hatchlings.

Over the course of four years, Pizo and his assistants spent over 250

An endangered hyacinth macaw in the Brazilian Pantanal



hours observing which species visited manduvi trees, and whether they removed fruit. This part of the study revealed that by far the bird that most frequently visited manduvi trees and removed fruit was the toco toucan (*Ramphastos toco*). Toco toucans made up 64% of all visitors to the trees, and committed 86% of the fruit removal. These toucans therefore have the most opportunity to spread manduvi seeds away from their mother tree.

The importance of seed dispersal to the macaw's ecology was assessed by finding the location of manduvi seedlings around current nest sites. The distance from each seedling to the nearest adult tree was measured, indicating that most seedlings were located near adult trees. More than 50% of all adult trees, however, were greater than 30 m from each other. Pizo and his colleagues concluded that manduvi seeds are most likely to grow into suitably large trees only if they are dispersed away from other trees. Additionally, Pizo's team found that there is typically 30 m

between trees that have been colonised by the macaws, indicating the birds' preference for a bit of isolation from their neighbors.

To determine which species were entering hyacinth macaw nests and eating eggs, Pizo and his assistants monitored over 300 nests for five years. Blame for any harm done to the nest was assigned based on actual observation of the act, feathers or other signs left behind, or by the occupation of the nest by another animal.

In addition to the usual suspects of jays, opossums, and coatis, toco toucans emerged as an unexpected predator. Overall, 23% of the eggs that were monitored were destroyed by predators. Among the destroyed eggs, toucans were responsible for half.

The authors conclude that any efforts to conserve the hyacinth macaw must address its ambiguous relationship to the toucan. In the short term, toucans are a major source of mortality, while in

the long term they promote the creation of new habitat. The fate of the macaw is therefore intricately tied to the toco toucan. Based on their experience, Pizo and his colleagues encourage other researchers and managers to be aware of the consequences of such complicated interactions.

Further reading:

The hyacinth macaw:
http://en.wikipedia.org/wiki/Hyacinth_macaw
Parrots:
<http://en.wikipedia.org/wiki/Psittacidae>
The IUCN Red List:
<http://www.iucnredlist.org/details/142575>
The Pantanal:
<http://en.wikipedia.org/wiki/Pantanal>

Summarised from:

Pizo, M.A., C.I. Donatti, N.M.R. Guedes and M. Galetti. 2008. Conservation puzzle: Endangered hyacinth macaw depends on its nest predator for reproduction. *Biological Conservation* 141: 792.

Nathan Brouwer (brouwern@gmail.com) is a PhD student at the Department of Biological Sciences, University of Pittsburgh, USA.

Bushmeat Biometrics

Biologists Take a Critical Look at How Bushmeat Hunting Should be Assessed

Nathan Brouwer

Wild game is a major food source for many people in the tropics. Rural population growth and an increasing urban demand for meat have made hunting a major threat to biodiversity. Most researchers investigating this problem assume that the impact hunters have on wildlife is somehow proportional to the amount of time and effort they exert in hunting. But

how do you calculate their effort? According to Janna Rist and her colleagues from London's Zoological Society and the Imperial College of London, different researchers employ a myriad of methods. In order to gauge hunting effort and derive impacts on wildlife, different calculations may integrate days spent hunting, distance traveled while hunting, or distance traveled to a hunting location.

With so much variation in how, where, and what is hunted, Rist and her colleagues question whether there is a consistent relationship between the time hunters spend in the field and the number of animals harvested. After evaluating numerous studies, they found that the significance of these potential sources of variation has not been assessed. From the literature, the authors identified nine assumptions