Recent Research on the

Anodorhynchus Macaws Feeding Habits

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Until very recently, little was known about the feeding habits of the *Anodorhynchus* macaws. The earliest detailed references I have found on their feeding habits both occur in H.W. Bates' *The Naturalist on the Amazons,* first published in 1863 about his 11 year sojourn in Brazil.

In the chapter entitled "The Tocantins and Cameta", his entry for 7th September, 1848 includes the following: "We saw here, for the first time, the splendid Hyacinthine Macaw *(Macrocercus hyacinthinus, Lath.,* the *Araruna* of the natives), one of the finest and rarest of the parrot family . . . . It flies in pairs, and feeds on the hard nuts of several palms, but especially of the Mucuja *(Acrocomia lasiopatha).* These nuts, which are so hard as to be difficult to break with a heavy hammer, are crushed to a pulp by the powerful beak of this macaw."

Four years later in describing the "Voyage up the Tapajos", he wrote, "The Macaws were found feeding in small flocks on the fruit of the Tucuma palm *(Astryocaryum tucuma),* the excessively hard nut of which is crushed into pulp by the powerful beak of the bird. I found the craws of all the specimens filled with the sour paste to which the stone-like fruit had been reduced."

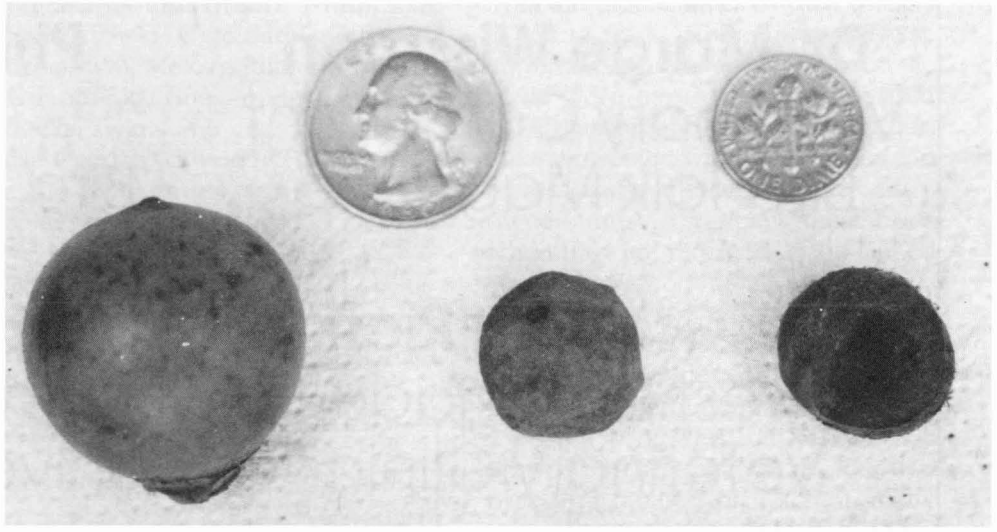
For the next 125 or more years there does not appear to have been much added to these two pieces of information. Goeldi, in his *As Aves do Brasil* of 1894, appears to have transferred the feeding habits of the Hyacinthine Macaws described by Bates to the Glaucous Macaw *(Anodorhynchus glaucus)* and this was then repeated by Helmut Sick in his great work *Ornitologia Brasileira* of 1984.

In the last few years, research carried out by Munn, Yamashita, Brandt and Machado has confirmed *Anodorhynchus* macaws to be specialist palm-nut feeders. In our own visits to the Pantanal in Brazil, we have observed the Hyacinthine Macaws feeding off "acuri" palms *(Scheelea* or *Attalea phalerata)* and "bocaiuva" palms *(Acrocomia aculeata).*

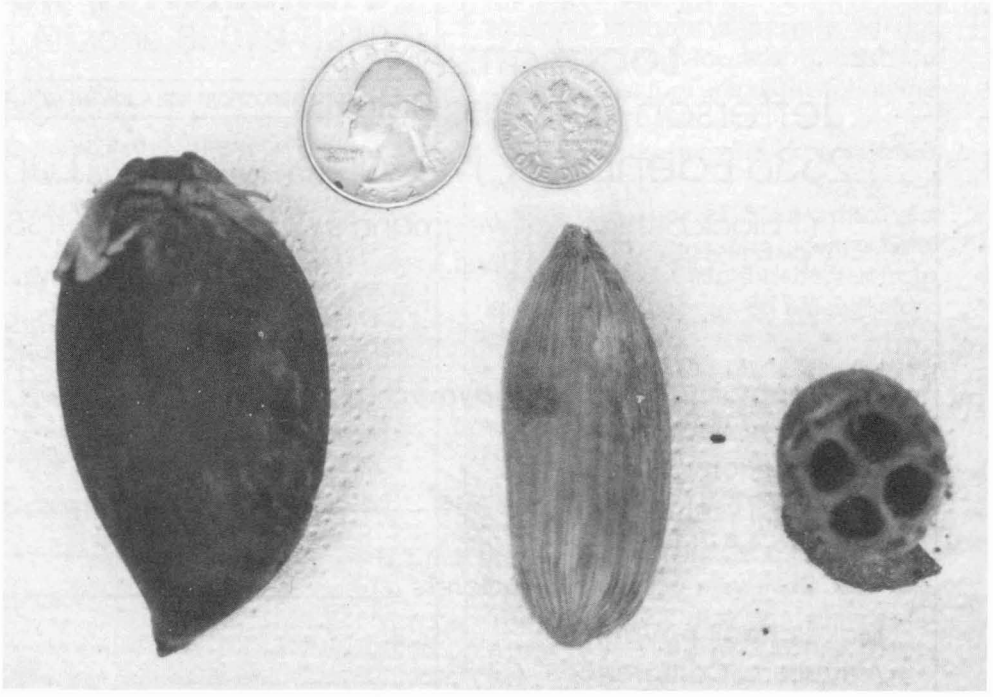
In my report in the November 1992 issue of the Parrot Society Magazine ("The Glaucous Macaw. Does it Still Exist?") on our visit to Argentina, Paraguay and Brazil to investigate the extant habitat of the Glaucous Macaw, I related how Joe Cuddy and I speculated from numerous historical references to the flora of the region that the Glaucous Macaw fed exclusively off the palm nuts of the yatay palm *(Butia yatay)* and had become extinct because of clearance of the yatay palm groves throughout its distribution area.

This has now been confirmed in an article by Carlos Yamashita and Mauro de Paula Valle published in the April 1993 issue of the BOC Bulletin. In this article, the authors compared the bill cutting action and efficiency of the *Anodorhynchus* macaws, which specialize in palm nuts, and other members of the parrot family, which are not such specialists.

The *Anodorhynchus* macaws are known to have the strongest chisel action with the lower mandible of all the parrot family. Both the Hyacin-



Bocaiuva (Acrocomia aculeata) palm fruit, nut and opened nut, food of the non-specialist Green-winged Macaw (A. chloroptera).



Acuri (Scheelea or Attalea phalerata) palm fruit, nut and opened nut, food of the Hyacinthine Macaw.

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Photo by Tony Pittman

Licuri (Syagrus coronata) palm nut, main food source of Lear's Macaw (Anodorhynchus leari), highlighting precision of cutting chisel.

thine and the Lear's Macaw use the cutting edge of the "chisel" to split palm nuts in two. It would appear logical to assume that the Glaucous Macaw, as a member of the *Anodorhynchus* genus, shared this characteristic.

For their study, Yamashita and de Paula Valle measured the chisel width of all three *Anodorhynchus* species as well as that of 13 other parrot species in museum skin collections. They also collected palm nuts opened by different species of macaws to compare the cutting pattern.

The mean chisel width size for non palm-nut specialists ranged between 7.4 mm for the Red-shouldered or Hahn's Macaw *(Ara nobilis)* to 15.4 mm for the Green-winged Macaw *(Ara chloroptera)*. The *Anodorhynchus* macaws had a much larger chisel width with a mean of 22.4 mm for the Lear's Macaw *(A. leari)* 24.2 mm for the Glaucous Macaw *(A. glaucus)* and 30.6 mm for the Hyacinthine Macaw *(A. hyacinthinus)*. The authors also discovered that body size does not correlate to chisel width. The Red-fronted Macaw *(Ara rubrogenys)*, for example, is smaller than the Blue and Yellow Macaw *(Ara ararauna)*, but has a wider chisel width. The Lear's Macaw, Blue and Yellow Macaw and Scarlet Macaw *(Ara macao)* are similar in size and weight, but have very different chisel widths with a mean of 22.4 mm, 11.3 mm and 12.2 mm respectively. Some conures have very wide chisel widths in relation to their size.

Comparison of opened palm nuts showed that the *Anodorhynchus* macaws cut the palm nut open expertly and with amazing precision whereas non palm-nut specialist macaws crushed or cut the palm nut crudely. They concluded that the *Anodorhynchus* species are highly selective in their choice of palm nut. The palm nuts have to be the right size and shape as well as have an extractable kernel with the right lignin pattern.

The licuri palm *(Syagrus coronata)* appears to be the only palm in the distribution area of the Lear's Macaw to meet these criteria, thus making this sub-species extremely vulnerable to habitat clearance. There are four species of palm in the Paraguay Basin distribution area of the Hyacinthine Macaw. Apart from the "acuri" and "bocaiuva" mentioned above, there are the "caranda" *(Copernicia alba)* and the "babassu" *(Orbignia martiana)* palms.

The "acuri" palm nut was found to be most appropriate in relation to chisel width and is, indeed, preferred by the Hyacinthine Macaw. The "bocaiuva" palm nut is smaller, but still suitable. However, the "caranda" palm nut has an unsuitable lignin pattern, rendering it inedible and the "babassu" palm nut is usually too large for the macaw to cut, thus only a very small proportion is eaten.

By calculating the ratio of chisel width to suitable palm nut diameter for the Lear's Macaw and the Hyacinthine Macaw, it was possible to extrapolate the nut size and shape most suitable for the Glaucous Macaw. The only palm nut to match this requirement existing throughout the known Glaucous Macaw distribution area was the yatay palm *(Butia yatay)*. The other palms either had the wrong lignin pattern in their nuts and were therefore inedible or, in the case of *A. aculeata,* the palm only occurred in certain parts on the edge of the macaw's distribution area. Therefore, one can conclude that the fate of the Glaucous Macaw was, indeed, closely linked to that of the "yatay" palm as we had surmised.

All the palms concerned are colonial species with very special soil requirements for reproduction and growth. In the Pantanal, which can flood to four meters in places, they grow on higher ground and, therefore, often near housing. This is why Hyacinthine Macaws are frequently found near ranch houses as at the Pousada Caiman. Fairly dense groves are necessary to support a population of *Anodorhynchus* macaws. Therefore, every effort must be made to ensure such areas are protected, particularly in a ranch environment, and new growth promoted for the future. The initiative of the World Parrot Trust with the "licuri" palm project is thus very welcome and should be supported.

Finally, Joe Cuddy and I met up with Carlos Yamashita in Sao Paulo at the end of our trip to Brazil and Paraguay early last month and spent several fascinating hours discussing his work and our own activities. He kindly gave us a copy of the article on which this is based and some specimens of opened palm nut husks to add to our palm nut collection. During this fruitful exchange, he also suggested that the habit of foraging palm nuts excreted by cattle observed by researchers may not have been recently acquired, but could be the revival of an ancient one acquired when the Giant Sloth *Megatherium* and other very large prehistoric herbivores browsed the palm trees. I leave you with this intriguing idea.

References

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