Special Conservation Report . . .

Ecological Aspects of the Yucatan Parrots

*and perspectives for their conservation**

(Amazona xantholora and A. albifrons nana)

by Mauro Berlanga Cano and Rafael Gutierrez Ronces with the collaboration of Rafael Castillo Bussio Merida - Yucatan, Mexico

During the three month period from April to June 1989, nine journeys were made around the Yucatan Peninsula. These took in extensive portions of Yucatan, Campeche and Quintana Roo, and covered some 4,200 kilometers of highways and white roads (see map).

In the state of Yucatan, coastal regions were visited at Sta. Maria de Sisal in the west and at Rio Lagartos, San Felipe and El Cuyo in the east. To the south was included the mechanized agricultural and horticultural region between Oxcutzcab and Tekax, taking in the most distant portions such as the villages of Tigre

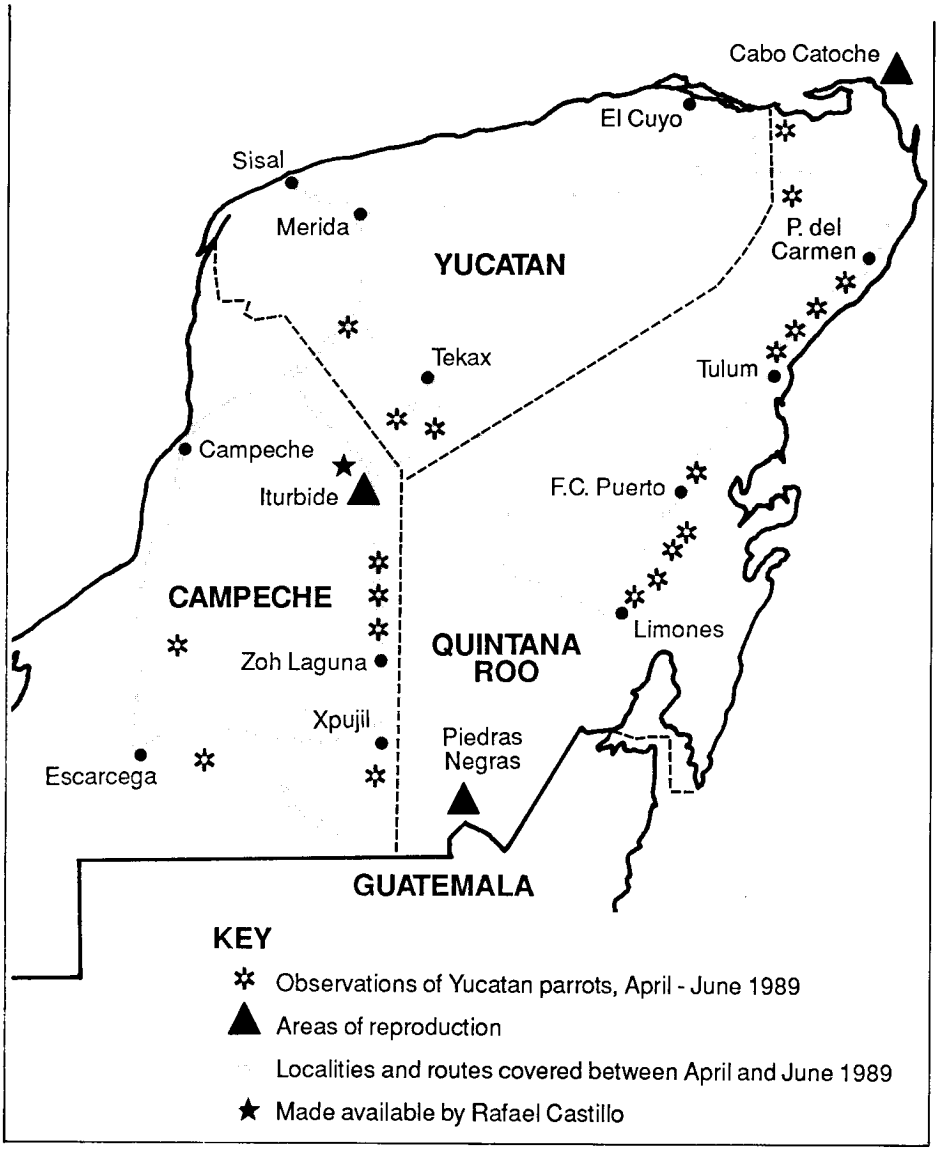

Table 1

Field Records of Yucatecan Parrots
April - June 1989, Yucatan Peninsula

Date	Hour	Number	Locality	Vegetation
5-4-89	13:40	1	M. Avila Camacho Quintana Roo.	Secondary succession of medium forest. Mechanized agriculture.
6-4-89	6:00 8:00	25	Road F.C.P. Limones, Q. Roo.	Forest edge, corn fields, secondary vegetation after wood extraction.
6-4-89	16:20 17:00	14	Tulum-Pl. Carmen, Q. Roo.	Cattle ranches and secondary growth.
7-4-89	18:00	2	Nuevo Xcan, Q. Roo.	Tolche' and secondary tree growth.
15-4-89	6:30	1	Road to Becanchen, Yucatan	Cattle ranches and patches of trees.
15-4-89	7:40	12	Rancho Bacax, Becanchen, Yucatan	Hills with cattle ranches and patches of trees
16-4-89	6:45	2	3 kms. from turnoff to Tzucacab Nohbec, Yucatan	Cattle ranches and patches of secondary growth
16-4-89	8:00	1	North of Tigre Grande, Yucatan	Abandoned corn fields 2 to 5 meters high
24-4-89	16:00	2	Centenario, Campeche	Patches of arboreal vegetation
25-4-89	5:30	3	La Esperanza, Campeche	Secondary vegetation with abundant trees
25-4-89	16:55	5	Aguada Lechugal, Calakmul B.R., Campeche	Extensive clearing with trees. Old logging camp.
28-4-89	17:40	1	Calakmul, B.R., Campeche	Near logging camp.
21-6-89	9:27	4	State border, Yucatan - Quintana Roo	Long abandoned coconut groves. Coastal dunes.
22-6-89	11:18	6	3 kms. south of El Cuyo, Yucatan	Edge of mangroves and seasonally flooded forest. Dead trees.
25-6-89	5:40	5	Km. 175 Merida — Uxmal road.	Secondary vegetation 5 to 7 meters high. Hills.
25-6-89	8:50	4	South of Dsibalchen, Camp.	Secondary vegetation. Borders of arboreal vegetation. C9m.
25-6-89	18:00	3	Xpujil, Camp.	Wood edges.
25-6-89	18:30	4	Xpujil-Zohlaguna	Edge of disturbed forest.
26-6-89	7:15 7:49	6	Ejido Alvaro Obregon, Camp.	Forest edge and corn fields.
26-6-89	11:06	3	Ejido A. Obregon, Campeche	Forest somewhat thinned by logging
26-6-89	17:40	111	Xpujil - Ucum road	Newly felled areas in forest
	Total	**216**		

Grande, Becanchen, Nohalal and Hunto Chac. This region represents an area of some 40,000 ha. enclosed by four perimeter roads.

In the state of Campeche, parts of the Calakmul Biosphere Reserve were visited and also the neighboring "ejido" of Alvaro Obregon at the northeastern boundary. Here, visits were made from the 24th through the 28th of April and from the 25th through the 27th of June.

Only one extensive journey was made to the state of Quintana Roo and this was affected by strong transient rains.

Our aim is to gain detailed knowledge of the seasonal food habits and local movements of the parrots and to diagnose the current state and distribution of their populations, as well as the plant associations which still remain as natural habitat in the south of the Yucatan.

The passage of Hurricane Gilbert in 1988 obliged thousands of parrots to invade the citrus groves in the south of the state of Yucatan. A battle ensued in which the horticulturists used mainly firearms against the birds. The future consequences of the latter event, along with our lack of knowledge of current population levels of the parrots in the area (although it is thought they have suffered a drastic reduction in numbers in recent years), were among the central motives for carrying out this report.

To obtain data, interviews were carried out with local inhabitants with emphasis being placed on aspects of capture, trade, human disturbance, nesting areas and the birds' food. During field work, we proceeded to determine those plants with flowers or fruits and collected material for a herbarium. In addition, some markets were visited in the main towns in the south of the Yucatan.

Summary of Progress Made

1. Field Surveys

Visual surveys showed that the large groups of parrots consisting of hundreds of individuals reported at the end of 1988, specifically in the horticultural zone of the Yucatan, were no longer present in the area. Apparently, no large concentrations were to be seen from March onwards (J. Ehrenberg, pers. comm.). The extensive surveys carried out between April and June 1989 in numerous localities of the Peninsula were

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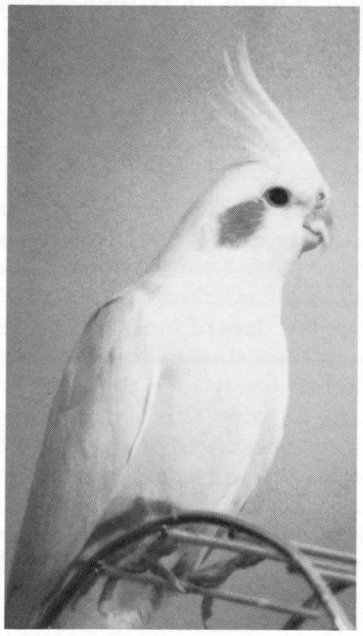

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characterized by the absence of such gatherings.

Observations took place in April and June. In May, surveys of the littoral zone of the Yucatan yielded no records of parrots. Most observations were during the early hours of the morning and at dusk (Table 1), the majority of these being of pairs or singles. The total number of parrots seen was 216 (Table 2).

Groups, when seen, were of small size, the largest being of 16 birds seen flying in pairs. Groups of parrots seen flying in the south of Campeche during the last days of June were more or less defined due to the fact that it could be clearly seen that they were moving in pairs. This is in contrast to what was observed at the beginning of April when the few groups that were seen were flying in aggregations with no apparent order. The latter phenomenon was again observed in early July by Rafael Castillo.

In total, 19 days were spent in the field. Of these, parrots were recorded on 13 days so that the frequency of occurrence (68.4%) was high. The frequency of occurrence was obtained following Edwards and Tahsian (cited in Nocedal, 1981), where it is described as the quotient of the number of days with records by the total number worked, multiplied by 100.

2. Food

A list was made of some of the plant species utilized by the parrots, whether this be as a food source or as nest sites. At present, direct evidence is scant and the results of interviews with the local inhabitants revealed 19 species of trees altogether, several of which are considered of use to the human population (see list).

Table 3 presents the phenology of some trees that are important in the parrots' diet. This is related to the time of year when citrus fruits are harvested in the Yucatan. The phenological data have been taken from biogeographical sources. However, specific information for the area, which is deposited in the herbarium of the Centro de Investigaciones Cientificas de Yucatan (CICY), is in the initial stages of being collected.

3. Reproduction

These species form pairs in late March and during the first weeks of April, and, for this reason, it is at this time that flocks break up and disperse. In May, the first chicks, normally two per brood, begin to hatch. However, some of those interviewed claimed that broods may contain up to five young. Young are reared from May through June, and this is the period when the baby parrots are caught and sold.

Nests are placed in old or dry trees which are present in the most developed plant associations, and those which have been little altered. These areas are known in Maya as "Hobon K'aax" which, literally translated, means "woodland of hollow trees" (Sosa et al, 1985, F2).

Other sites which appear to be of interest for nesting are abandoned corn fields ("milpas") and cattle ranches. These usually contain numerous dead trees. These are trees that have been left standing but killed by the fire that is lit to prepare the soil after felling.

Two species of trees are of particular interest since living individuals are used by various birds as nest sites, and

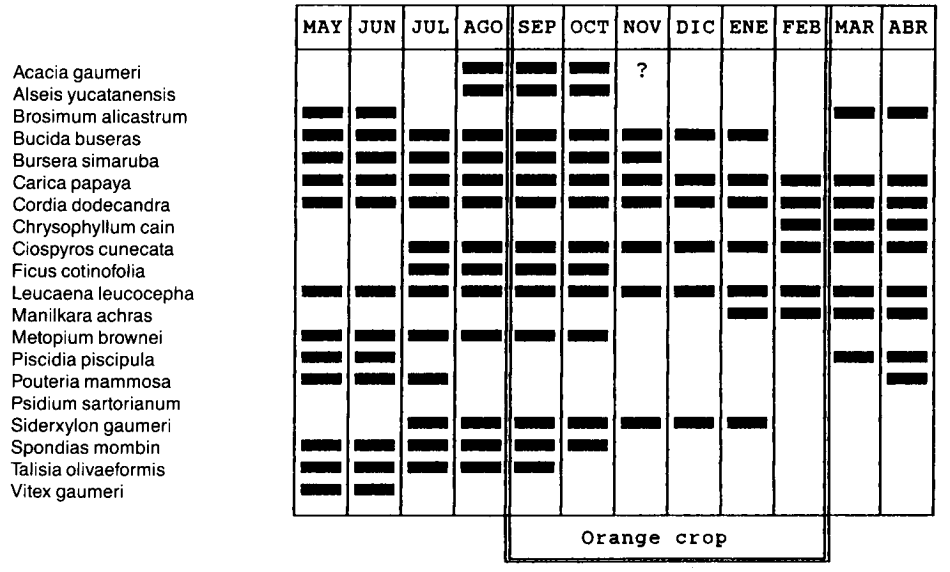
Table 2

Summary of Observations and Sociability by State

State	Date	Number of Observations	Solitary	Sociability Pair	Gregarious	Number of Individuals
	5-4-89	1	1			1
Quintana Roo	6-4-89	21	9	9	3	39
	7-4-89	—	—	1	—	2
		22	10	20	3	42
	15-4-89	4	2	1	1	15
	16-4-89	2	1	1	—	3
Yucatan	21-6-89	1	—	1	—	2
	22-6-89	1	—	—	1	6
	25-6-89	1	—	—	1	5
		9	3	3	3	31
	24-4-89	1	—	1	—	2
	25-4-89	4	1	2	1	8
Campeche	28-4-89	2	1	—	1	5
	25-6-89	4	1	3	—	7
	26-6-89	24	5	50	5	121
		35	8	56	7	143

Table 3

Vegetation: Production of Fruits in Relation to the Orange Producing Season in the South of the Yucatan



this was backed by direct observational evidence. These trees are the "Chaca" *'Bursera simaruba)* and the "Kitmiche" *(Caesalpinia gaumeri).* The first has a soft wood which is easily worked with the bill. The second is a leguminous species of hard wood but which has an irregular body structure that commonly gives rise to many natural hollows. Both species are abundant in the south of Yucatan and the "Chaca" has a high potential for regeneration and growth, as well as being a species which is dispersed by birds (Sousa, 1969).

Some species of palm are also used as nest sites by parrots. Species of "Guano" *(Sabal yapa),* whose leaves are esteemed by regional inhabitants for the construction of the thatched roofs of traditional dwellings, have a wide distribution and important populations on the peninsula. Coconuts *(Cocus nucifera),* which are intensively cultivated along the coasts, are also appreciated by the rural population of the interior. There appears to be an important nesting area in the coconut groves of Cabo Catoche, Quintana Roo.

Other sites used frequently are termite nests and preferably those constructed in the crowns of trees. A pair of *Aratinga astec* was in occupation of one of these constructions in the south of Campeche in April.

No evidence is available concerning the segregation of *A. xanthora* and *A. albifrons* for breeding, either in regard to area or different plant associations. A campesino from the south of Quintana Roo can find a nest of either of the two species, as was observed on a ranch to the south of Felipe Carillo Puerto. However, we are told that *A. xantholora* is "scarcer."

4. Human Pressure

According to the geographical location and the season of the annual cycle, the parrots are considered as either harmful or useful by the farmers of the region. As harmful organisms, they are among the main predators of corn fields and fruit trees. As useful animals, the young may be caught as pets, they may be sold, or they may even provide an additional source of animal protein.

As members of the fauna considered harmful to agricultural production, parrots are among the most pernicious due to their large flocks and their extremely wasteful feeding habits. According to the campesinos'

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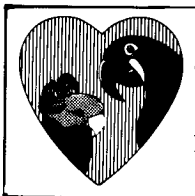
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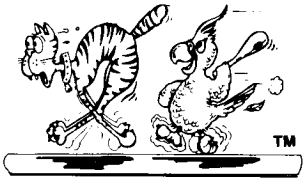


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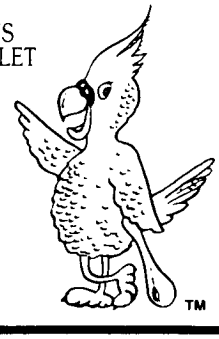
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own estimates, in the "ejido" Tres Garantias, in Quintana Roo, damage done to corn crops by wildlife may be as high as 40% (D. Garrido, pers. comm.).

Farm workers interviewed on the "ejido" of Alvaro Obregon, in Campeche, claimed that parrots and parakeets *(Aratinga astec)* could, on their own, finish off the whole crop of a corn field if it was left unattended for a couple of weeks. Similar comments were heard during our journeys through the south of Yucatan.

As a source of food for the human population, the information available indicates that this practice is confined to the southern portion of Yucatan.

What is known about southern Yucatan can be summarized as follows: the flocks of parrots that arrive in September, when the harvest of tender ears of corn and citrus fruits is beginning, are attracted by the tender pods of the "Kaatzim" *(Acacia gaumeri),* a species which is endemic to the Yucatan (Cabrera et al, 1982) and which is abundant in secondary succession plant associations. It appears that it is the main attraction in the seasonal migration of psittacines and there was a consensus on this point amongst the majority of people interviewed in the zone.

Contrary to what was previously thought, predation by parrots of citrus groves and corn fields in this area has, in the past, never reached the alarming scale experienced after Hurricane Gilbert.

When large flocks of parrots arrive in the area, hunting begins along the roadsides and, to a lesser extent, in the corn fields and groves. Prey is generally captured for personal consumption, but some traders at Tekax market informed us that people occasionally arrive with ready-cooked parrot meat and offer it to the public. They said they did not remember last year's prices, but figures of between 3,000 and 3,500 pesos were mentioned. This would represent about a fifth of the market price for a small nestling.

The use of parrots as food by people in the south of Yucatan has been known for some time, while another 14 species of wild birds have been recorded as being caught for the same purpose (Sanabria et al, op. cit.). As far as it is known, eight of these species are not used in such a way in any of the remaining Mexican states of the Yucatan Peninsula.

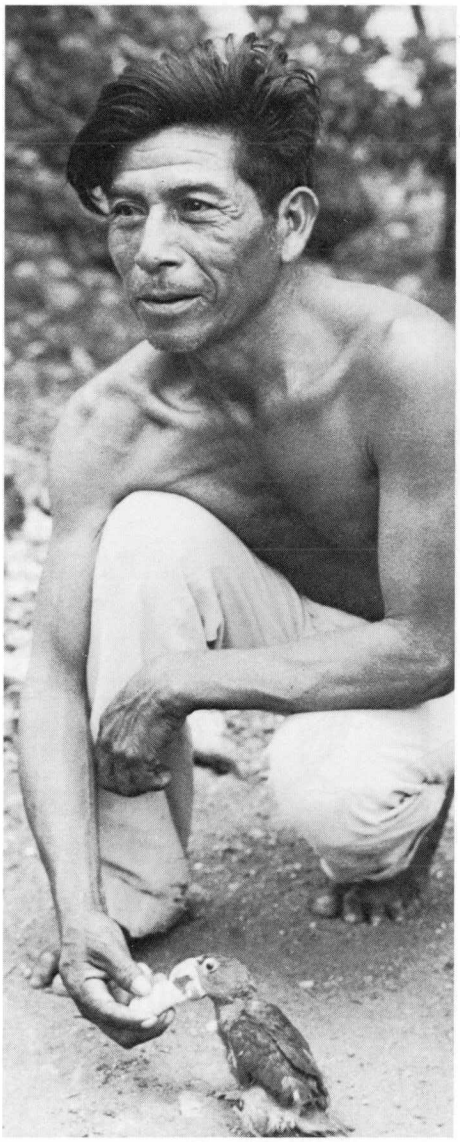

Photo by authors

Iturbide, Campeche, July 1989 — campesino with one of the White-fronted Parrots (Amazona albifrons) which was caught using corn dough. The parrot was injured when they cut the tree, so it was not sold.

5. Capture and Trade

Young are captured from May until the final days of June. Little information is available in this respect for this year. However, first-hand information of the greatest importance, obtained by Rafael Castillo, has enabled us to identify the area of origin of the majority of young birds sold this year in the city of Merida.

The town of Iturbide is situated in the northeast of the area known as "Punto Put" in Campeche, near where the three states intersect. Here, Rafael Castillo watched as a "crowd" of people came out into the street carrying baby parrots as soon as they learned of the presence of a buyer, who, it would seem, controls this business. He paid 5,000 pesos per bird irrespective of size. In fact, he was able to choose since profits increase according to whether the birds are feathered or can feed themselves. He witnessed the transportation of two consignments, at different times, of between 50 and 70 birds each.

Young birds are captured by two methods according to the condition of the tree or trunk that contains the nest and the age or skill in climbing of the collector. Informants in Quintana Roo spoke of their preference for respecting the tree since, in this way, they were sure to find chicks in subsequent years. In Jose Maria Morelos, in the same state, an elderly "professional" collector cuts down the nest trees with his axe, a method that results in the loss of nest sites as well as the fact that not all of the young survive the impact of the fall.

Whether the parrots prefer to nest in colonies or to disperse in isolated pairs is a question which we cannot definitely answer at this moment in time since there is positive evidence that both patterns occur. Rafael Castillo has no doubt that the area around Iturbide is of the greatest importance for breeding. The same can be said of the coconut groves of Cabo Catoche, where the first reference to mass nesting dates from eight years ago. At present, fishermen of "El Cuyo" testify to the importance of the zone for obtaining young birds since no type of control exists in the area.

On the other hand, observations of scattered nests, and the information from campesinos of Quintana Roo who have been known to us for several years, permit us to state that numerous nestings do take place in isolation. It seems certain that the most important breeding areas are in the south of the peninsula and that these diminish and become more scattered as one moves north, being determined by the state of conservation of the natural vegetation (see map).

Although only a vague reference was obtained, one piece of information that seems to us worthy of mention refers to the mass capture of adult parrots in the vicinity of Nohbec in Quintana Roo. Here, we were informed that each year, towards the month of September, people arrive from the interior of the country in a vehicle loaded with cages and nets and leave with "hundreds" of parrots. Various trips are made during the season, which lasts while the birds remain together

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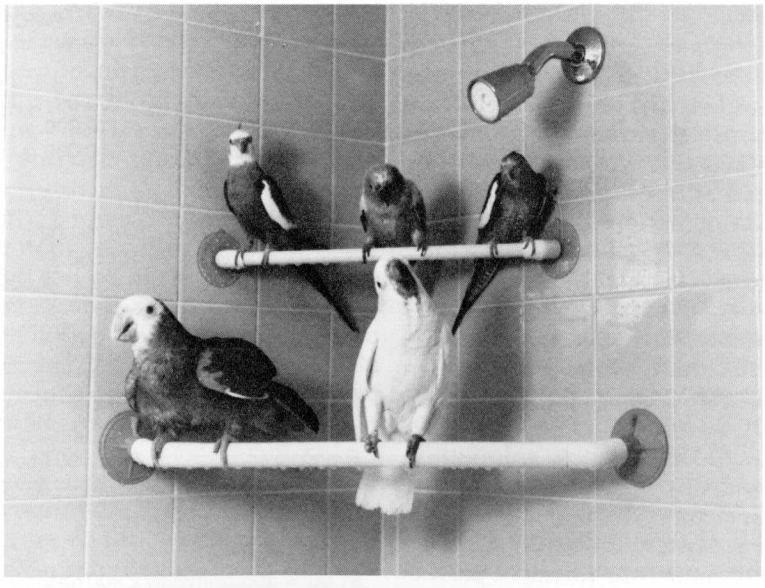

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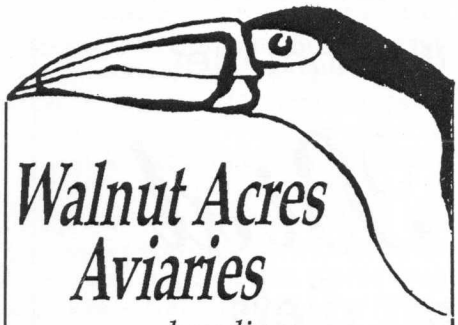

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We know that the city of Merida absorbs the majority of birds caught by regional inhabitants for commercial gain. We even saw a pair of young vendors in the street with 20 young birds. The two claimed that the birds had arrived from Tabasco and had been sent by a "relative." These vendors did not go near the city market since, according to them, the business is tightly controlled and they would be sure to lose their animals to the hands of the established merchants.

In the city of Merida, the sale of baby parrots began in June. Previous to this, vendors informed us that they had no birds because suppliers were waiting for the birds to grow so they could be sold at a higher price. Once numerous consignments started to arrive, they consisted of young birds from about three weeks of age, almost totally lacking in feathers, to birds that were beginning to feed themselves. This resulted in large variation in the prices at which they were offered to the public (Table 4).

None of the markets of the main cities in Quintana Roo have sections for the sale of wild animals. According to Rafael Castillo, the only other market on the peninsula that does have one is that in Campeche, although this is not as important as Merida. For this year, no exact information on trade is available for the former.

Comments

- The difficulty of distinguishing between the two species *Amazona xantholora* and *A. albifrons* in the field makes it impossible to evaluate specific patterns of distribution and abundance.
- Records of *A. xantholora* were few (four), but most observations were inconclusive. The regional inhabitants claim that this species is scarcer, and this would appear to be supported by birds seen at the market in the city of Merida. Out of 37 young parrots present on June 15th, only five were of this species and 19 of *A. albifrons*. The rest were babies almost totally devoid of feathers.
- In the south of the peninsula, in Campeche and Quintana Roo, parrot populations appear to be abundant. In Yucatan, the breeding population is limited and scattered over the southern portion of the state. Between September and February each year, numerous flocks of parrots arrive in this area, so that it may be

Photo by authors

Campesino with Yellow-lored Parrot (Amazona xantholora) at Iturbide, Campeche. This parrot has a broken wing.

Table 4

Wild Birds Sold in the City of Merida Prices from May - June 1989

PSITTACINES	PRICES IN PESOS Adults	Young
Amazona albifrons & A. xantholora	70,000	15 - 35,000
Amazona autumnalis	170,000	125,000
Amazona ochrocephala	540,000	—
FRINGILLIDS		
Sporophila torqueola	6 - 8,000	—
Volatinia jacarina	1,500	—
Passerina cyanea	1,500 - 2,500	—
Pheuticus ludovicianus	8 - 10,000 (males)	—
Cardinalis cardinalis	15,000 (males)	—
Arremonops rufivirqatus	4,000	—
OTHERS		
Turdus grayi	15,000	—
Euphonia sp.	12,000 (males)	—
Colinus nigrogularis	20,000 (per pair)	—
Zenaida asiatica	30,000 (per pair)	—

(Value in dollars:
$1.00 = approximately 2,400 pesos.)

considered subject to seasonal migrations. Sightings of birds in the coastal region, on the state border with Quintana Roo, may concern individuals connected with the breeding colony at Cabo Catoche.

- There are no studies on the productivity of fruit of the plant species of interest, or even on their human consumption, in the Yucatan Peninsula and we are far from understanding the specific relations between frugivorous communities. The list of food species which was obtained is still incomplete. However, it should tend to point out "key" species that sustain the parrot population through annual periods of scarcity. In this case, it is probable that the list will be reduced, as has been demonstrated at Cocha Cashu in Peru. Here, the "key" species are limited to a dozen plants that, altogether, make up less than 1% of the total plant diversity, but are considered as such due to the fact that it is their abundance, and a lack of substitutes for many consumers, that sustains the frugivorous community during times of scarcity (Terborg, 1986).
- It has been suggested that trees which are important food sources for parrots should be included in reforestation programs for the Yucatan, and it appears that there are some likely candidates for such projects. These species should be chosen according to three criteria. First, they should be species native to the areas that are to be reforested. Second, those species showing rapid rates of growth should be chosen and, third, they should be of use as forest subproducts or for collection, i.e. species of which parts of the plant, such as branches, fruits, latex, etc., are used while the individual itself is preserved.
- It appears reasonable to think that the scattered distribution of breeding birds is a product of deforestation, and that this is clearly the case in the south of Yucatan. At present, the only known breeding areas that can be defined with any certainty are reduced to one in the vicinity of the town of Iturbide in Campeche, another at Cabo Catoche, in the north of Quintana Roo, and probably a third in the south of the same state in the Piedras Negras area.

Conservation Perspectives

It would be hazardous to forecast the future of the parrot populations in the Yucatan Peninsula. It must be expected that the tendency towards deforestation and the changes in soil usage will increase human pressure on the major part of the peninsula.

Perspectives do not look favorable from the point of view of those areas detected up to the preparation of this report. Two of these, surrounding the towns of Iturbide and Piedras Negras, have been recognized thanks to the intensive capture of young for commerce. The coastal area of Cabo Catoche seems to be in danger of disappearing due to the inexorable destruction of coconut plantations by the blight known as "lethal yellowing of the coconut." It should also be mentioned that the mass capture of young has only been proven in the town of Iturbide, in Campeche.

On the other hand, looking at areas subject to conservation, both those already officially established and other new projects to be decreed, we have the following: more than 700,000 hectares of tropical semi-evergreen forest, with the recently decreed biosphere reserve of Calakmul. In Quintana Roo, the Sian Ka'an biosphere reserve has 528,000 ha. of which 108,000 are medium tropical semi-evergreen forest and almost 12,000 ha. are tropical dry and semi-dry forests (Olmsted et al, 1983).

Yucatan has 150,000 ha. in the wildlife refuges of Rio Celestun, Rio Lagartos, and the state reserve of Dzilam de Bravo, all situated along the coastal belt. The government of the state carried out a project to create a System of Protected Areas of Yucatan (Sistema de Areas Protegidas de Yucatan, SANPY), which attempts to integrate a group of smaller areas (10,000 to 20,000 ha. in extension) representative of terrestrial ecosystems that are still conserved.

Quintana Roo and Campeche still possess considerable extensions of forest in the southern parts, while in Yucatan it has been almost eliminated, with only remnant patches of arboreal vegetation scattered throughout the area.

Apart from the areas with official decrees, and perhaps of greater consequences for the future, is the presence of so-called "permanent forest areas" of the association of forest "ejidos" of the "Pilot Forest Plan for the South of Quintana Roo" (Plan Piloto Forestal del Sur de Quintana Roo). These are dedicated to sustainable management and the results obtained raises hope that the tendency will be for them to remain in the medium and long-term.

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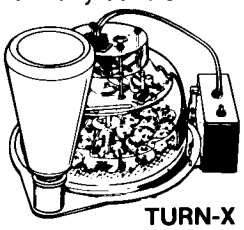
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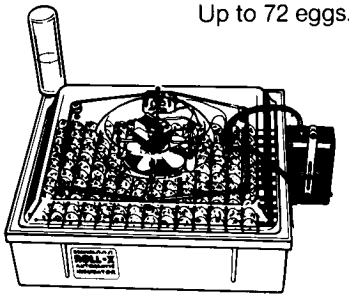
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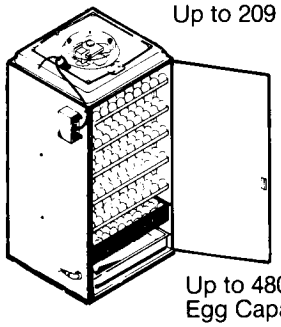
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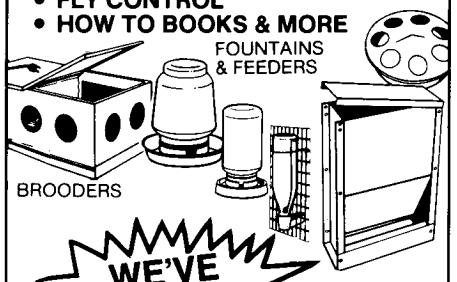

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The idea of integral, sustainable management seems also to have germinated in at least one of the forest "ejidos" in the south of Campeche. If this bears fruit and extends to other "ejidos" adjacent to the Calakmul reserve, it is to be hoped that the natural wildlife habitat will be conserved, both in this area and within its zone of influence.

The multiplication of experiences such as those described above could play a key role in assuring the preservation of the Yucatecan parrots, as well as other psittacine species which are rarer and have reduced populations.

Developing management programs integrated with the local populations seems to offer one of the last opportunities of conserving these parrots, as well as many other wildlife species, in Yucatan.

At present, the integration of SANPY remains a project to be carried out by the state government. Support for its establishment, as well as the gradual recuperation of degraded areas, would seem to us to be a contribution of the first order to conservation strategy in Yucatan.

(Translated by Paul Wood, September 1989)

**Study funded by the AFA Small Grants program, Central Florida Bird Breeders, and the Arizona Avicultural Society.*

List of Plant Species Used by Psittacines as Food or Nest Sites

Field observations:
Brosimun alicastrum
Bucida buceras
Carica papaya
Piscida piscipula

Records obtained from informants:
Acacia gaumeri
Alseis yucatanensis
Bursera simaruba
Cassia racemosa
Ceiba aesculifolia
Cordia dodecandra
Crysophylla
Diospyros cuneata
Ficus cotinifolia
Manilkara achras
Metopium brownei
Pouteria mamosa
Psidium sartorianum
Spondias mombin
Sideroxylon gaumeri
Talisia olivaeformis
Ehretia tinifolia
Caesalpinia gaumeri
Sabal yapa
Vitex gaumeri

Lists of Trees Observed, Collected, or Determined by Field Information that Were in Flower or Fruit, April - May 1989

ANACARDIACEAE

**Metopium brownei* (Jacq.) Urban
Chechem
Flower: March - May
Fruit: May - October
Reddish, fleshy berries, one seed.

**Spondias mombin* L.
Ciruela amarilla, jobo
Flower: May - October
Fruit: May - October
Yellow-orange drupes with three or four seeds.

BOMBACACEAE

**Ceiba aesculifolia* (H.B. & K.) Britton & Baker
Pochote, piim
Flower: December - March
Fruit: July - December
Ligneous capsules with numerous seeds.

Pseudobombax ellipticum (H.B. & K.) Dugand
Amapola, chac k'ux che
Flower: January - June
Fruit: July - August
Similar to previous species.

BORAGINACEAE

**Cordia dodecandra* A. DC.
Ciricote, chac k'oopte, Geiger tree
Flower: all year
Fruit: all year
Drupe with one seed.

BURSERACEAE

**Bursera simaruba* (l.) Sarg.
Chaka, Gumbo Limbo or Naked Indian
Flower: February - August
Fruit: May - November
Capsule with fleshy aril.

CARICACEAE

**Carica papaya* L.
Papaya cimarrona, cich puut, Papaya
Flower: all year
Fruit: all year

COCHLOSPERMACEAE

Cochlospermum vitifolium (Willd.) Spreng.
Chum, chooy, Wild Cotton
Flower: December - May
Fruit: April - May
Capsule with numerous seeds.

COMBRETACEAE

**Bucida buceras* L.
Pukte, Oxhorn Bucida
Flower: December - July
Fruit: May - January

EBENACEAE

Diospyros cuneata Standl.
Silil, Persimmon
Fruit: July - January

LEGUMINOSAE

**Acacia gaumeri* Blake
Box Ka'atzim
Flower: January - May
Fruit: August
Pod

Cassia racemosa Benth.
Ja'abin peek, Senna
Flower: January - March

Enterolobium cyclocarpum (Jacq.) Griseb.
Piich, Guanacaste or Eardrop tree
Fruit: January - May
Pod

Leucaena leucocephala (Lam.) De Witt
Huatsin, waaxsim, Leucaena
Flower: all year around
Fruit: all year around
Pod

**Piscidia piscipula* (L.) Sarg.
Habim, Fishfuddle tree
Flower: April - June
Pod

MELIACEAE

Cedrela mexicana M. Roemer
Cedro, Kulche, Cigarbox tree
Flower: June
Fruit: opens March - May
Capsule

MORACEAE

**Brosimum alicastrum* Swartz
Ramon, Ox, Ramon Bread-nut tree
Flower: November - February
Fruit: March - May
Fleshy berries with one seed

**Ficus cotinifolia* H.B.K.
Alamo, copo, Strangler Fig
Fruit: June - August?
Berry

PALMAE

Acrocomia mexicana Karw. ex Wart.
Coyol, tuk'

RUBIACEAE

**Alseis yucatanensis* Standley
Kakaw che', papalillo
Fruit: August - October
Small capsules that remain on the tree for a long time.

Morinda yucatanensis Green
Drupe with abundant seeds

RUTACEAE

Casimiroa tetrameria Milsp.
Uuy, Yuy
Flower: September - ?
Fruit: April - ?

SAPINDACEAE

**Talisia olivaeformis* (H.B.K.) Radlk
Guaya, uayum
Flower: February - May
Fruit: May - June

SAPOTACEAE

**Chrysophyllum cainito* L.
Caimito, chi'keojil, Star Apple
Flower: May - November
Fruit with one seed.

**Manilkara achras* (Mill.) Fosberg
Sapote, chicozapote, chicle, Sapodilla or Naseberry
Flower: June - October
Fruit: January - April
Berry.

Mastichodendron foetidissimum (Jacq.)
Sibul
Fruit: March

**Pouteria mammosa* (l.) Cronquist
Sapote mamey, chakal ja'as
Flower: January
Fruit: April - July

VERBENACEA

**Vitex gaumeri* Greenman
Yaaxnik
Flower: February - May
Fruit: March - June
Fleshy drupes.

* Species known to be used by parrots.

The information on the phenology was completed by Mr. Juan Varguez Pacheco.

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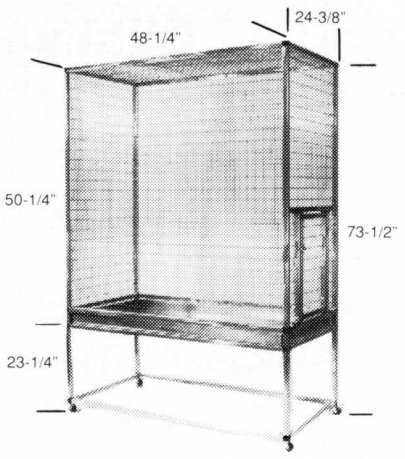

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