

Birds of two human used parks on the Itirapina Chapada, São Paulo state, Brazil

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Introduction

Human use of landscapes is increasing, due to increased numbers of people and high “show-off” competitive consumption by individuals. Loss of natural areas due to these two natural causes is starting to be a major source of extinctions of flora and fauna, leading to comparisons of the “human asteroid” of today with the Yucatán asteroid that killed dinosaurs plus many other animals and plants at the end of the Mesozoic.

Small areas of natural Neotropical habitats usually preserve fewer species, as shown for woodland birds in interior São Paulo State years ago (Willis 1979). However, preservation of large natural areas is difficult, due to the Darwinian human desires above. Conservationists interested in managing and preserving “parks” and “reserves” are under constant attack by many people who see “development” of new or old human areas not just as an option but as necessary for “progress.” Two types of attack are common, that of insisting that “native” or “local” interest groups should use all natural areas (so that not one “ecocentric” park will remain in the increasing list of such “poor” countries as India, Rwanda or Brazil, for example), and that human areas “create biodiversity” and actually preserve many species.

The latter attack on conservation planning even reached the major international journal *Nature*, criticizing a book (1992) by conservationist Al Gore, then vice-president of the United States. This author and others indicate that humans “diversify” the environment, for instance creating open areas and ponds next to woods or prairies. These authors are not claiming that human add species locally (alpha-diversity) or worldwide (gamma-diversity); they are interested in increases in biodiversity when one has two or more environments plus “edge effects” in a two-part zone (beta-diversity). For them, a patchy environment is better for local counts of birds or other organisms, for example forest birds with few water or pasture birds will give more “local biodiversity” even though species are

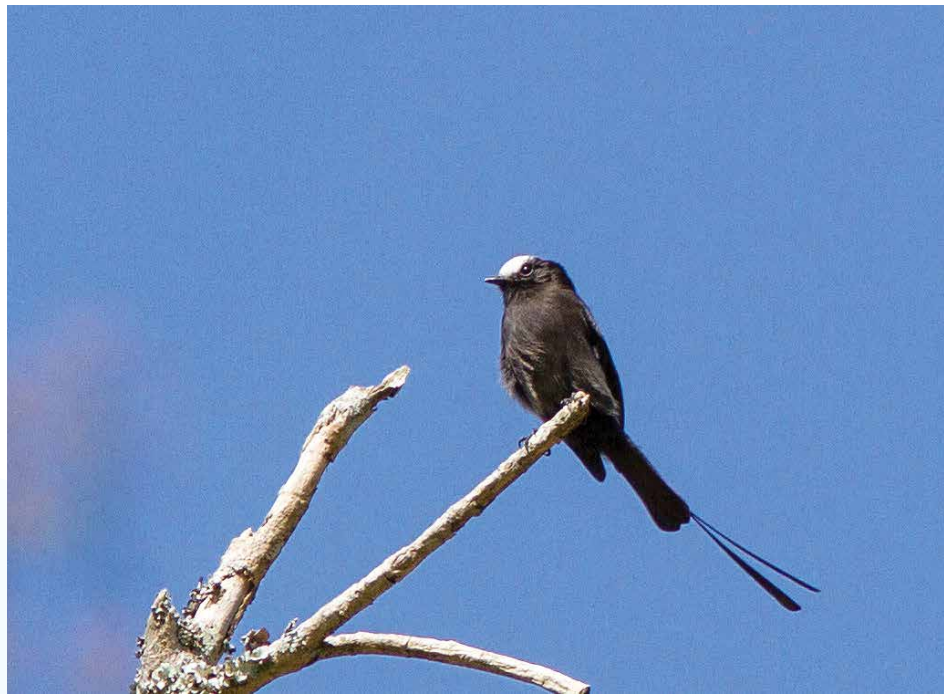


Figure 1. *Colonia colonus*. Photo: Constantino Melo.

disappearing from both forest and pasture because one or both of these habitats is smaller and reduced.

In São Paulo this type of argument was used by a major television channel, claiming that “birds are returning to the cities,” every time a vagrant woodpecker got lost or a released or fugitive cage bird from elsewhere was found in the city and was filmed. Studies of city birds emphasize that many species are surviving in patchy city habitats, for instance on the campus of the University of São Paulo (Höfling & Camargo 1993), without analysis of how many species have disappeared from the sandy prairies of Ipiranga or other habitats once present in the city. There is also no analysis to verify if rare species are breeding or just vagrants or “sink” birds (Pulliam 1988) from distant natural areas. As a result, buildings and highways and agriculture are increasing there and in other regions of the state, for most people think the lists of highly visible and motile (or vagrant) city birds indicate no problem with nature preservation, that even tiny city or farmland parks preserve “many” birds.

The sandstone plateau or *chapada* of Itirapina - São Carlos is one of the few areas of naturally patchy grassland/gallery forest *cerrado* habitat remaining in central São Paulo State. Birds of this region are disappearing at a faster rate than bir-

ds of better-preserved Atlantic forests, even though Atlantic forests receive more national and international conservation efforts (Willis & Oniki 2002). Northward, *cerrado* habitats are disappearing rapidly, with little conservation (Parker & Willis 1997, Willis & Oniki 2002).

In 1982, I started studies of birds of the sandy prairies of Itirapina, plus other local semi-wooded habitats (Willis MS). Here I analyze birds of nearby human areas, one a lake and partly reforested park in town and the other a pond next to eucalyptus and other trees at a roadside gas station. I also checked grazed seminatural marshes and pastures nearby. With the spread of humans, these types of areas are likely to be the only ones with birds 100 years from now. The question is, will such areas preserve rare birds or only city birds like introduced House Sparrows (*Passer domesticus*)? Are the ponds useful for water birds? Can “metapopulations” of motile species use these small scattered patches, with increased “beta diversity” because open zones have trees planted about, like the campus of the São Paulo University in São Paulo City?

Study areas and methods

For this study, one area visited since 1986, is at the headquarters of the Instituto Florestal (IF) (760 m, 22°15' S, 47°49' W) at Km 98 on the highway at the edge of the town of Itirapina. A central pond is surrounded by introduced *Grevillea banksii* and other flowers that attract many hummingbirds. Lawns, scattered trees, patches of woods, and houses provide other habitats nearby. The understories of all wooded areas are cleared out, to some 3 m up. Down the creek to the west, a semi-natural bushy marsh is bordered by eucalyptus and pine plantations that extend for kilometers to native *cerrado* and grassland zones (the latter considered in Willis MS). The *cerrado* and planted forests extend to a hill north across the main road, while the town itself (and gallery wood on a central creek) lies east and south.

The second area, studied since 1995, is at Posto Siriema gas station (PS) at Km 106 on the same highway from Itirapina to Brotas. Houses, a restaurant, a gas station, tall eucalyptus trees and a back-yard orchard border a gallery wood patch just to the west. North across the highway are extensive eucalyptus plantations and a few small grassland reserves of the RIPA-SA S.A. (Cellulose and Paper) company. A nearby pond just southeast (730 m elevation, 22°16' S, 47°55' W) borders on a semi-natural grassland, used as a cattle pasture. The grassland, with scattered bushes on drier sites, has a grassy swamp (*banhado*) down creek from the pond, south of the gas station and going west to gallery woods along the Córrego do Lobo on the border of the Brotas township. Just west of the Córrego, similar natural pastures were converted to orange orchards a few years ago and thus were destroyed. The grasslands were also censused for rare *Anthus nattereri*. Other native species were present, but are here listed separately as not being park birds. A strong fire in 1987 leveled the whole grassland, which is



Figure 2. *Gabula ruficauda*. Photo: Constantino Melo.

now growing back. Also, the manager is seeking more revenue and rented the mayor's tractor to plow dry parts of the area in 1988-89, so that introduced *Brachiaria* grass would invade and produce more for his cows. Orange plantations would probably produce even more revenue on this private property. Data from both areas were examined to 2005.

Censuses were conducted by the transect method, noting the number of birds of each species. At IF, an hour at midday was the usual for the surveys. After December 1994, I added the north side of the lake, with trees and playgrounds, and most censuses were of two hours each. In some visits, to net hummingbirds, I checked birds early or late in the day, but without seeing much difference (we did record more hummingbirds on these days). At PS, I walked to the pasture and back on 1-2 h visits, mostly midday to 6 June 1999, when visits 7-9 am started (better in pasture, but little different at the pond or gas station except for July visits, when birds visited eucalyptus flowers early in the morning).

Results and discussion

Water birds – Dawn surveys of water birds in natural grasslands in the region (Willis MS) showed few species at ponds or narrow creeks in gallery woods, or in natural ponds (mostly in wet summer months, when flooded grasslands were sometimes present). I interpreted this as a result of low fertility of sandy ponds, leading to reduced growth of water weeds and low food supplies. Even the large and “clean” Broa Reservoir down river had few water birds. Colonies of herons developed in 1984 on a gallery wood near Broa and in 1997-98 along a similar gallery forest in town, but fecal matter soon started to kill the nest trees, while children and others killed or frightened birds. A similar colony survived for the whole period on a protected private ranch to the east near Descalvado, but feces gradually killed the gallery wood, and the colony moved up creek each year. All of these colonies were mostly pasture-living Cattle Egrets (*Bubulcus ibis*), the 1984 colony being the first one I recorded for this invading species in the state.



Figure 3. *Euphonia chlorotica*. Photo: Constantino Melo.

Table 1 indicates that the artificial ponds at IF and PS were also rather depauperate of birds, with only a few species and individuals of water birds. Fish-eating birds were occasionally present, rarely a vegetarian species (few ducks, no gallinules) or water-edge insectivores. Neither pond had much edge vegetation, none had trees, and both had dogs wandering about (a flock of geese at the IF until 1995). Eight of 22 species were vagrants, two were rare from downriver gallery creeks and woods, six increased with recent droughts in the whole region (or with the 1997-98 colony upcreek in town in three cases). Only four gallery-wood species (two only at the weedy-edge PS, one at IF where an earth bank provided one site for a nest) stayed at the ponds. The fourth, a small heron, was quite rare at both sites, and cannot nest as it needs bushes over water, which humans rarely permit in parks (because it is often seen as “clutter”).

Swallows commonly drink from these ponds at midday, but only *Tachycineta albiventer* is definitely a water bird (perhaps *T. leucorrhoea* as well, but it hunts over grasslands and edges). It almost disappeared from 1995 on, as no perch sites were available once cormorants started to use the only perch post in the lake. We have seen at Rio Claro that this species flies over ponds easily, but has to have a low perch to rest over water, and this is rarely permitted by humans (often being considered as “debris”).

One vagrant, adapted for grassy-lawn pond edges in semidesert northeastern Brazil, is invading the deforested (= semi-desert) state and may yet occupy the pond edges here (*Fluvicola nengeta*). The ponds here lack earth banks and grassy banks or overhanging bushes for nests in most cases, so that no species nests locally except *Certhiaxis cinnamomea* and *Fluvicola leucocephala*, plus *Chloroceryle amazona* 100 m away near a house at IF. Water “weeds” that such bird species depend upon are often removed from ponds and their borders everywhere in the world.

Land birds – On this sandstone plateau, rarely-preserved natural habitats vary from gallery woods, creeks and small pon-

ds or marshes, bushy edges, and grassy wetlands to dry sandy grasslands, with scattered or dense bushes in less sandy sites, to low *cerrado* woods or medium-tall *cerradão* (Willis MS). Cliffs and hills often had dry woodlands, local patches of red soil with tall semi-deciduous forests. Large areas are now planted with introduced pines, eucalyptus, oranges, coffee groves, or *Brachiaria* pastures, or are covered by big buildings, paved and dirt roads, or railroads. A few swampy gallery woods persist, down creek from the IF pond and at the heron colony site up creek, for instance. Some natural and semi-natural prairies and *cerrados* persist for the moment. Both the IF and PS sites have many planted trees, plus lawns and gardens, especially flowers that attract hummingbirds and other nectar feeders (mostly tanagers).

The two sites attract varying numbers of birds of certain species (125 species, Table 2), while down creek marshy gallery woods at IF and nearby semi-natural pastures at PS attract others (47 species, Table 3).

While 125 species (plus 22 water birds) seems like a long list, approximately equal to the number reported from a much larger campus in São Paulo city (Höfling & Camargo 1993), detailed analysis shows that 43 of the 125 are mere vagrants (“e” in Table 2) flying over or appearing only a few times over the years. Six other species are so rare in migration (“k” in Table 2) that they are essentially vagrants. As for 8 of 22 water birds, the local habitats are often not appropriate except for supporting transient passage. Probably a third or more of birds on other city park lists will also turn out to be mere vagrants.

Some 7 locally nesting non-vagrant species do not breed in the areas (“c” in Table 2), or rarely feed in them (“d”) as far as I could determine; they depend to a considerable extent on other areas. Some species roost there (caracaras) or drink water (*Patagioenas picazuro*) when the lake is low. Eleven others wander so widely during the year that they use the area little (“i” in Table 2, three hummingbirds, 15 swallows, one jay, two tanagers) and are birds of much larger areas and more natural habitat combinations than one might think. A number of non-vagrant species only occur in summer (10 “f” birds) or winter (1 “l” bird). I have elsewhere suggested that these be recorded as “0.5 species” each, which would reduce the local list even further. The birds that wander widely, do not breed, or do not feed likely should also be counted as “0.1 species” or the like, depending on how much of the day or year they spend in the area. Counting such a bird as a full species exaggerates the importance of a city park or other area.

A number of species (“a” in Table 2) do not nest or occur in the shaded PS area, except by its lake or open borders. A number of other species seem absent at PS, such as *Ictinia* kites (37 “b” species in Table 2, so only 88 of the 125 species are present there, notably several hummingbirds not yet recorded at eucalyptus flowers there, and several thrushes that probably wander in from nearby gallery woods. In the partly shaded

IF area, such birds as *Galbula ruficauda*, *Taraba major*, *Myiophobus fasciatus*, *Myiarchus ferox*, *Turdus rufiventris*, *Vireo chivi*, *Setophaga pitiayumi*, *Thlypopsis sordida*, and *Ramphocelus* were rare except peripherally, near dense bushy marshes down creek or woods to the north. *Anumbius annumbi* barely managed to have an open area to forage and a tree for a nest there, and was last seen 13 October 1991. It has also disappeared in open grasslands regionally, surviving presently only in pastures in Fazenda Barreiro Rico (Magalhães 1999). Presently, thanks to help from bird watchers and bird photographers, its occurrence is known from other localities in the state of São Paulo (WikiAves 2017).

Neither *Spinus magellanicus* nor *Sicalis flaveola* persist except at PS, where they apparently are protected from bird trappers (*Sporophila angolensis* and *Cyanoloxia brissonii* probably would survive well near Itirapina, but are so valuable as cage birds that I did not find them except in less human-visited areas). Several *Sporophila* species are trapped in the region, even *Sporophila lineola*, which persists because they are moderately well protected at both IF and PS.

One can ask if the non-vagrant, actual resident birds (including summer and winter residents) at these human-created areas are rare or not. I have suggested that one can judge a species by the number of localities where it occurs, with the least valuable species present at more localities (Willis 2000b). This is a modification of the general “endemic” or “rare species” idea. Of the Itirapina birds in Table 2, only some hummingbirds are at all uncommon; the list otherwise seems to be of the commonest species in southeastern Brazil. The rare hummingbirds are mostly vagrants, visiting the planted *Grevillea* and other flowers.

Some of the species are dry-forest species, spreading southeast in recent years with drought and forest cutting (edges are hot): *Taraba major*, *Patagioenas picazuro*, *Fluvicola nengeta*. One such species, *Tyrannus albogularis* of river edges, here reaches the southeast edge of its breeding zone and is absent in natural gallery areas (with low trees), adding a species to the Itirapina Christmas Count (Willis 1999). *Progne subis* has disappeared in the region, probably as people have chased it off due to feces contamination in city parks, where it roosts; it was only present November to February 1986-87. *Pyrocephalus rubinus* disappeared at IF but appeared at PS as an uncommon winter species. Other “-” or low IF-B numbers in the table are mostly of seldom-seen birds, and perhaps do not indicate significant changes. Christmas counts (1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999 and 2000a) confirmed the observations here but were not added to this study.

Sixteen other species were recorded just down creek in dense cattails and gallery scrub at IF, none being very rare (Table 2). In semi-natural pastures near PS, several of 39 extra species are quite rare, though nearly all occur to the NE across RIPASA eucalyptus groves on open natural grasslands or in



Figure 4. *Nycticorax nycticorax*. Photo: Constantino Melo.

gallery woods. Several migrant *Sporophila* are very rare, as are snipes and other species, as well. The pasture lacks several rare grassland species found NE (Parker & Willis 1997), but until recently had rare *Anthus nattereri* that went extinct in the 1980's on protected grassland. This pipit needs cow-grazed or fire-burned short grass near wet zones, hence it disappeared to the NE because the zone was protected from grazing animals and fire. However, it is now rare near PS, and perhaps is extinct (last seen 15 November 2000), which may be a natural fluctuation or the result of the owner plowing fairly large stretches of dry cerrado nearby in 1998. The dry-cerrado tanager *Cypsnagra hirundinacea* was last seen 24 October 1999, and dry-cerrado *Elaenia chiriquensis* 28 December 1999; *Melanopareia torquata* disappeared in 1995. *Rhynchotus rufescens* disappeared there after 17 December 1995 and *Geranoaetus albicaudatus* after 17 August 1997, perhaps due to occasional hunting. Populations of all of these species and other *cerrado* birds are low in the tract, which is only a few square kilometers and has been plowed widely to encourage introduced grass.

Niches of the non-vagrant species were of border species in 57 cases (*Phaethornis pretrei*, *Turdus rufiventris* somewhat in the woods) and of open-area species in 25 cases (Table 2). Of the border species, 34 (Passeriformes) were omnivorous, 9 were nectar (and insect) eaters, 11 were insectivores, and 1 each was carrion eater and meat-eater (In fact, all were somewhat omnivorous). Of open-area species, 8 ate more insects and 7 more seeds, while 10 were aerial insectivores (some hunting over borders or woods). Not one bird species was truly a forest species, a habitat that is simply not protected by these human-area “parks.”

The open-area species were mostly ones that nest or stay near borders, except *Vanellus chilensis*, so these “parks” protect border nectarivores and omnivores and very little else. Aerial insectivores fly over trees, cities, cane fields, and any other habitat and need only water to drink in the parks, if anything. Seed and fruit eaters that are not cage birds do even better away from parks here, as people clean out “weeds” and “fruit”

other than domesticated species. Nectarivores (which also eat insects, hence are “omnivores” in a general sense) do well at certain park flowers, of course.

Birds are good indicators of the environment’s health. The overall scenario of Brazilian biomes are grim when one looks at the declining status of several species of birds. Future generation of mankind may only see or hear about some species of birds in books or recordings, as is already happening with many other animals as well.

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Table 1. Records of 22 Water Birds at Human-Area Ponds, Itirapina. Legend: IF: Instituto Florestal; PS: Posto Seriema. IF-A, 21 Sept. 86 to 26 June 94, 79 visits for 74.9 hours. IF-B, 23 Oct. 94 to 30 June 01, 60 visits and 99.5 hours. PS, 27 Aug. 95 to 11 June 01, 41 visits for 64.2 hours. a-more with recent drought; b-more with recent colony near; c-rare from downriver gallery woods; d-commoner where grassy margin permitted, at PS; e-no earth bank at either pond for nest, but bank near IF; f-lacks perch over water to sun or rest; g-vagrants, habitat not appropriate (*F. nengeta* perhaps, see text).

Species	IF-A	IF-B	PS	Notes
<i>Ardea alba</i>	19	53	5	ab
<i>Egretta thula</i>	11	55	-	ab
<i>Butorides striata</i>	9	10	4	
<i>Nycticorax nycticorax</i>	-	14	-	ab
<i>Tigrisoma lineatum</i>	1	2	2	c
<i>Pilherodius pileatus</i>	1	-	-	g
<i>Platalea ajaja</i>	-	1	-	g
<i>Mesembrinibis cayennensis</i>	-	1	-	g
<i>Nannopterum brasilianus</i>	6	62	1	a
<i>Anhinga anhinga</i>	-	2	-	fg
<i>Tachybaptus dominicus</i>	-	-	1	g
<i>Amazonetta brasiliensis</i>	-	15	27	ad
<i>Jacana jacana</i>	4	9	30	ad
<i>Himantopus melanurus</i>	-	2	-	g
<i>Aramus guarauna</i>	-	1	-	g
<i>Megaceryle torquata</i>	10	43	2	a
<i>Chloroceryle amazona</i>	50	71	1	e
<i>Chloroceryle americana</i>	1	10	-	ce
<i>Certhiaxis cinnamomeus</i>	-	-	20	d
<i>Arundinicola leucocephala</i>	-	-	37	d
<i>Fluvicola nengeta</i>	-	3	-	g
<i>Tachycineta albiventer</i>	46	3	-	f

Table 2. Records of 125 Land Birds at Human-Area Sites, Itirapina. Legend: IF: Instituto Florestal; PS: Posto Serriema. Notes: a: nearby pastures or gallery woods, mostly; b: mostly flying over; c: nest sites rarely available; d: food rarely obtained; e: vagrant or rare, mostly from distant or adjacent habitats; f: summer birds; g: does sleep in planted trees; h: see text; i: individuals wander to scattered sites and do not inhabit local area all year; j: little night study; k: migrant, accidental or rare; l: winter species; m: high number IF-B due to more study on wooded N margin lake; n: nesting recorded, or young birds; o: uncommon where “weeds” removed; p: bird trappers dangerous; q: bushy pastures, cerrado; r: wet prairie; s: bushy marshes; t: gallery woods.

Species	IF-A	IF-B	PS	Niche	Notes
<i>Bubulcus ibis</i>	50	815	a-261		bcdei
<i>Syrigma sibilatrix</i>	5	7	a-39		e
<i>Coragyps atratus</i>	113	45	36	1	bcdi
<i>Cathartes aura</i>	-	1	-		ei
<i>Ictinia plumbea</i>	22	64	-	7	fm
<i>Accipiter cf. striatus</i>	5	4	-		be
<i>Rupornis magnirostris</i>	31	37	5	2	n
<i>Buteo brachyurus</i>	1	-	-		ei
<i>Geranoaetus albicaudatus</i>	1	-	a-4		be
<i>Gampsonyx swainsonii</i>	1	-	-		ei
<i>Herpetotheres cachinnans</i>	-	-	2		ei
<i>Milvago chimachima</i>	3	13	a-22		egi
<i>Caracara plancus</i>	2	3	a-33		egi
<i>Falco sparverius</i>	4	1	a-13		egi
<i>Falco femoralis</i>	1	1	a-4		egi
<i>Vanellus chilensis</i>	73	111	a-235	8	in
<i>Patagioenas picazuro</i>	48	206	283	9	dhi
<i>Patagioenas cayennensis</i>	-	3+20	a-6		bcdei
<i>Zenaida auriculata</i>	4	10	a-154		bei
<i>Columbina talpacoti</i>	89	123	79	9	n
<i>Columbina squammata</i>	253	172	78	9	n
<i>Leptotila verreauxi</i>	1	4	4		e
<i>Psittacara leucophthalmus</i>	2	102	69		bei
<i>Forpus xanthopterygius</i>	65	104	11	4	
<i>Brotogeris chiriri</i>	5	17	-		bei
<i>Piaya cayana</i>	18	44	5	3	m
<i>Crotophaga ani</i>	53	39	32	8	n
<i>Guira guira</i>	60	72	7	8	n
<i>Athene cunicularia</i>	25	60	a-61	8	n
<i>Megascops choliba</i>	-	2	-	3	jn
<i>Chaetura meridionalis</i>	14	29	-	7	cf
<i>Phaethornis pretrei</i>	34	51	5	6	ci
<i>Florisuga fusca</i>	2	21	-		ei
<i>Anthracothorax nigricollis</i>	18	88	-	6	fm
<i>Eupetomena macroura</i>	377	461	22	6	
<i>Aphantochroa cirrochloris</i>	198	128	-	6	
<i>Amazilia lactea</i>	82	160	1	6	
<i>Amazilia versicolor</i>	14	28	1	6	i
<i>Chlorostilbon lucidus</i>	13	56	4	6	
<i>Hylocharis chrysura</i>	156	257	4	6	
<i>Colibri serrirostris</i>	19	11	21		ei
<i>Chrysolampis mosquitus</i>	-	1	-		ef
<i>Calliphlox amethystina</i>	1	9	-		e
<i>Thalurania glaucopis</i>	3	19	-		cem
<i>Heliomaster squamosus</i>	2	7	-		e
<i>Galbula ruficauda</i>	-	10	-	6	h
<i>Picumnus albosquamatus</i>	-	7	1		em
<i>Melanerpes candidus</i>	19	7	2		begi
<i>Veniliornis passerinus</i>	2	10	2		em
<i>Dryocopus lineatus</i>	4	3	2		e
<i>Colaptes melanochloros</i>	12	28	3	3	m
<i>Colaptes campestris</i>	31	51	a-133	8	n
<i>Lepidocolaptes angustirostris</i>	5	8	-	3	e
<i>Furnarius rufus</i>	35	107	85	8	n
<i>Anumbius annumbi</i>	6	-	-	8	hn
<i>Conopophaga lineata</i>	-	1	1		e
<i>Taraba major</i>	-	4	7	3	h
<i>Elaenia flavogaster</i>	60	38	46	5	n

<i>Elaenia chiriquensis</i>	4	1	a-8		ef
<i>Elaenia chilensis</i>	-	1	-	5	k
<i>Elaenia mesoleuca</i>	1	-	-	5	k
<i>Serpophaga subcristata</i>	12	31	12	5	m
<i>Camptostoma obsoletum</i>	22	16	17	5	
<i>Myiophobus fasciatus</i>	9	4	12	3	
<i>Todirostrum cinereum</i>	10	41	5	3	m
<i>Tolmomyias sulphurescens</i>	-	6	-		em
<i>Hirundinea ferruginea</i>	1	6	-		el
<i>Colonia colonus</i>	1	-	-		e
<i>Pyrocephalus rubinus</i>	14	-	3	8	l
<i>Myiarchus ferox</i>	10	42	11	5	mn
<i>Myiarchus tyrannulus</i>	1	4	-		e
<i>Satrapa icterophrys</i>	33	52	5	3	mn
<i>Sirystes sibilator</i>	1	-	-		e
<i>Machetornis rixosa</i>	89	77	51	8	n
<i>Pitangus sulphuratus</i>	125	178	70	5	n
<i>Megarynchus pitangua</i>	15	70	1	5	mn
<i>Myiozetetes similis</i>	45	41	3	5	
<i>Myiodynates maculatus</i>	18	46	1	5	fmn
<i>Empidonomus varius</i>	11	43	2	5	fmn
<i>Tyrannus savana</i>	135	121	107	5	fn
<i>Tyrannus melancholicus</i>	122	175	80	5	fn
<i>Tyrannus albogularis</i>	5	53	7	5	fmn
<i>Xolmis cinereus</i>	1	1	a-67		e
<i>Pachyrhamphus validus</i>	-	8	-		e
<i>Pachyrhamphus polychopterus</i>	-	5	-		ef
<i>Progne subis</i>	9	-	-	7	hk
<i>Progne chalybea</i>	126	214	82	7	in
<i>Progne tapera</i>	28	3	-	7	cih
<i>Pygochelidon cyanoleuca</i>	250	413	198	7	in
<i>Tachycineta leucorrhoa</i>	72	23	140	7	hin
<i>Stelgidopteryx ruficollis</i>	200	147	29	7	in
<i>Petrochelidon pyrrhonota</i>	5	-	3	7	k
<i>Hirundo rustica</i>	2	-	1	7	k
<i>Cyanocorax cristatellus</i>	60	101	77	5	in
<i>Mimus saturninus</i>	43	146	107	5	n
<i>Troglodytes musculus</i>	43	92	39	3	n
<i>Turdus leucomelas</i>	19	111	9	5	mn
<i>Turdus rufiventris</i>	6	37	-	5	mn
<i>Turdus amaurochalinus</i>	25	36	-	5	n
<i>Turdus subalaris</i>	1	-	-	5	k
<i>Cyclarhis gujanensis</i>	16	42	14	5	mn
<i>Vireo chivi</i>	14	29	12	5	fmn
<i>Passer domesticus</i>	247	250	270	5	n
<i>Setophaga pitiayumi</i>	7	54	3	3	mn
<i>Basileuterus culicivorus hypoleucus</i>	1	4	a-3		em
<i>Coereba flaveola</i>	17	80	1	6	mn
<i>Dacnis cayana</i>	15	23	6	5	i
<i>Conirostrum speciosum</i>	14	13	-	5	
<i>Thlypopsis sordida</i>	2	15	-	3	m
<i>Hemithraupis ruficapilla</i>	-	2	-		e
<i>Euphonia chlorotica</i>	20	72	6	5	im
<i>Piranga flava</i>	-	1	-		e
<i>Ramphocelus carbo</i>	9	23	26	5	cm
<i>Tangara sayaca</i>	152	225	79	5	n
<i>Tachyphonus coronatus</i>	-	7	1		e
<i>Tangara cayana</i>	14	49	13	5	m
<i>Nemosia pileata</i>	-	7	-	5	mn
<i>Coryphospingus cucullatus</i>	-	3	6	5	eo
<i>Volatinia jacarina</i>	42	19	64	9	o
<i>Sporophila caerulescens</i>	63	61	113	8	nop
<i>Sporophila lineola</i>	18	98	35	9	fmnop
<i>Sicalis flaveola</i>	-	-	26	9	op
<i>Zonotrichia capensis</i>	108	137	109	5	n
<i>Spinus magellanicus</i>	1	1	56	5	p
<i>Molothrus bonariensis</i>	143	187	48	5	n

Table 3. Records of 47 Birds Only in Adjoining Semi-preserved Zones – Itirapina. Legend: IF: Instituto Florestal; PS: Posto Seriemá. Notes: a: nearby pastures or gallery woods, mostly; b: mostly flying over; c: nest sites rarely available; d: food rarely obtained; e: vagrant or rare, mostly from distant or adjacent habitats; f: summer birds; g: does sleep in planted trees; h: see text; i: individuals wander to scattered sites and do not inhabit local area all year; j: little night study; k: migrant, accidental or rare; l: winter species; m: high number IF-B due to more study on wooded N margin lake; n: nesting recorded, or young birds; o: uncommon where “weeds” removed; p: bird trappers dangerous; q: bushy pastures, cerrado; r: wet prairie; s: bushy marshes; t: gallery woods.

Species	IF-A	IF-B	PS	Notes
<i>Crypturellus parvirostris</i>	4	-	-	q
<i>Gallinago paraguaia</i>	-	-	24	r
<i>Gallinago undulata</i>	-	-	9	r
<i>Mustelirallus albicollis</i>	-	-	16	r
<i>Pardirallus nigricans</i>	6	23	2	s
<i>Laterallus sp.</i>	10	-	-	s
<i>Cariama cristata</i>	12	3	36	hq
<i>Elanus leucurus</i>	-	-	3	q
<i>Heterospizias meridionalis</i>	-	-	28	q
<i>Tapera naevia</i>	3	2	3	st
<i>Polytmus guainumbi</i>	-	-	1	fqs
<i>Nystalus chacuru</i>	-	-	2	q
<i>Synallaxis spixi</i>	5	8	1	s
<i>Synallaxis albescens</i>	-	-	8	q
<i>Phacellodomus ferrugineigula</i>	8	19	-	st
<i>Thamnophilus caerulescens</i>	-	-	1	t
<i>Thamnophilus doliatus</i>	1	2	1	t
<i>Thamnophilus ruficapillus</i>	7	-	-	hs
<i>Melanopareia torquata</i>	-	-	2	hq
<i>Hemitriccus margaritaceiventer</i>	-	1	-	eqt
<i>Gubernetes yetapa</i>	2	4	16	s
<i>Alectrurus tricolor</i>	-	-	1	qr
<i>Culicivora caudacuta</i>	-	-	1	q
<i>Xolmis velatus</i>	-	-	38	q
<i>Alopocheilidon fucata</i>	-	-	143	qr
<i>Donacobius atricapilla</i>	1	11	-	s
<i>Anthus lutescens</i>	-	-	19	q
<i>Anthus nattereri</i>	-	-	32	hqr
<i>Geothlypis aequinoctialis</i>	14	11	16	s
<i>Myiothlypis leucophrys</i>	-	1	2	t
<i>Myiothlypis flaveola</i>	-	-	1	t
<i>Neothraupis fasciata</i>	-	-	20	q
<i>Cypsnagra hirundinacea</i>	-	-	6	q
<i>Schistochlamys ruficapillus</i>	2	-	-	st
<i>Saltator similis</i>	-	1	-	t
<i>Arremon flavirostris</i>	-	-	2	t
<i>Sicalis citrina</i>	-	-	56	q
<i>Emberizoides herbicola</i>	-	-	67	q
<i>Ammodramus humeralis</i>	-	-	118	q
<i>Coryphaspiza melanotis</i>	-	-	19	qr
<i>Sporophila bouvreuil</i>	-	-	45	tqr
<i>Sporophila hypoxantha</i>	-	-	5	kqr
<i>Sporophila melanogaster</i>	-	-	3	kqr
<i>Sporophila cinnamomea</i>	-	-	1	kqr
<i>Sporophila plumbea</i>	-	-	2	kq
<i>Sturnella superciliaris</i>	-	-	28	fqr
<i>Pseudoleistes guirahuro</i>	-	-	132	qr