

**AN ANNOTATED LIST OF BIRDS IN THREE PARKS OF SÃO PAULO CITY, SE
BRAZIL, WITH OBSERVATIONS ON THEIR FEEDING HABITS**

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ABSTRACT. Between 1985 and 1998, a list was produced with the bird species occurring in three urban parks of São Paulo city (SE Brazil): Parque Estadual das Fontes do Ipiranga (542 ha; including 300 ha of a native secondary forest), Parque da Aclimação (11.8 ha) and Parque Trianon (4.6 ha). Bird species identification was made mainly through visualisation with binoculars. Some species were also tape-recorded, photographed and/or hand-examined. Observations on food and feeding habits were conducted in these areas. The feeding bouts were based both on direct observations of food consumption and on the examination of faeces and/or regurgitations. The 152 species that were found in the three areas were divided into three groups: nesting, migrant and vagrant/visitors. Urban parks of São Paulo are important resting and feeding areas to several migrant and wandering species of birds, especially for those of the families Ardeidae, Anatidae (when water masses are available), Tyrannidae, Muscicapidae (Turdinae), Emberizidae (Thraupinae) and Trochillidae. Many of the most common species found in the three urban areas studied are edge and canopy moving species, mainly frugivore-insectivores. Data on feeding observations suggest that fruits of alien plant species available in urban parks and gardens are a crucial resource for frugivore-insectivore species during their movements. This fact, together with the low amount of potential wild predators in urban areas, turns large cities into important supporting areas for several passerine bird species.

Key-words: bird distribution, colonisation, feeding habits, frugivory, urban parks, urban ecology, Brazil.

INTRODUCTION

Large cities are especially interesting areas to study the ability of birds to adapt to environments that have been deeply altered by man. The urbanisation process implies continuous changes in ecosystems. Usually, several components of the former ecosystems are destroyed (e.g.: rivers, native vegetation, wetlands, rock promontories, native preys) and new elements are incorporated to the landscape (e.g.: building structures, allochthonous vegetation, artificial lakes, new potential preys and predators) (Matarazzo-Neuberger, 1995). Thus, new bird communities are continuously forming in urban habitats.

It is known that several species of birds around the world are able to exploit (temporarily or in long term basis) urban landscapes that show different degrees of anthropization (Beissinger & Osborne, 1982; Sick, 1985, 1993; Dickman, 1987). Nevertheless, data on bird exploitation or colonisation of cities in the Neotropical region are scarce (but see Voss, 1979; Sick, 1985, 1993; Matarazzo-Neuberger, 1995; Souza, 1995; Borges & Guilherme, 2000; Mendonça-Lima & Fontana, 2000, and references therein).

METHODS

This study was conducted between 1985 and 1998 in three urban parks located in the city of São Paulo, in south-eastern Brazil. During the process of urban growing of São Paulo, this and other neighbouring cities have merged their areas to form a megalopolis that hosts more than 18 million people. This megalopolis, locally called "a Grande São Paulo" (i.e. the Large São Paulo) includes several cities and urban areas of the municipalities of Osasco, Taboão da Serra, Diadema, São Bernardo do Campo, São Caetano do Sul, Santo André da Borda do Campo, Mauá and Guarulhos (Figure 1; see also EMBRAPA 2000-2003).

From March 1985 to June 1990, observations of bird species were made 6 days per week (excepting 3-4 weeks between July and August), while the author was assistant curator of birds in the São Paulo Zoo. These observations were made at different times of the day, but particularly in the morning (8:00-11:00h), during inspection routes in the park. Between 1990 and 1998, observations were made at irregular intervals, in July, August and September. Some species were also tape-recorded, photographed and/or hand-examined.

Based on these observations, species were categorised as: *nesting* (**N**: observations on nesting construction and/or incubation of eggs), *migrant* (**M**: regular encounters in more than two years of species known to migrate in other regions) and *vagrants* or *visitors* (**V**: occasional findings, normally of few individuals, of species known to be *wanderers* in other regions; see Willis, 1979), *alien* (**A**: an allochthonous species introduced by humans in the area), *reintroduced* (**R**: population of a species that is native to the region but that was originated in the area from individuals that escaped from captivity). When more than one category appears associated to one species (e.g.: nesting and migrant), it means that this species was detected both through nesting individuals or populations in the area, and also through migrant individuals or populations, which may be either the same that nest or not (e.g.: juvenile individuals). "Migrant" and "vagrant/visitor" may be considered as provisional categories for some species, since only two studies with long term bird banding programs are available in the study areas, one on wild ducks and another one on the American black vulture (both studies were conducted during the 1980's and early 1990's in P.E. Fontes do Ipiranga by Werner C.A. Bokermann / CEMAVE).

Some zoological material (especially from the first half of the 20th century) is deposited in the MZUSP collection (Museu de Zoologia, Universidade de São Paulo), including the material of the former WCAB (Werner C.A. Bokermann) collection.

Common names of birds in Portuguese follow Sick (1985). The classification of birds at family level follows Belton's criteria in Sick (1993).

Food and feeding observations were also conducted in the study areas. The feeding bouts were based both on direct observations of food consumption and on the examination of faeces and/or regurgitations. Plant food items (mainly fleshy fruits) were divided into *indigenous* (**I**: an autochthonous species in the region of São Paulo city according to Hoehne *et al.*, 1941 and Hueck, 1956, 1972) and *alien* ones (**A**: an allochthonous species introduced by humans in the area or the region of São Paulo after the 15th century, when the first Europeans arrived to the region). Data on feeding observations included in this study are only from the study areas.

Study areas

The study areas were chosen because of their location (both in relation to the city and to one each other), their sizes, characteristics (e.g.: different types of potential habitats for birds, such as open and dense vegetation, water bodies, etc.), and the availability of logistic support for long-term studies.

P.E. Fontes do Ipiranga

The Parque Estadual das Fontes do Ipiranga (former Parque do Estado) is a 542 ha protected park, composed by around 300 ha of a native secondary forest, managed by the São Paulo State government. It is located in the East end of the city of São Paulo (at 23° 36' S, 46° 38' W; Figure 1), 16 km from the Serra do Mar mountain chain (covered by Brazilian Atlantic rainforest), 21 km from the Serra da Cantareira mountains and 32 km from the Morro Grande reserve (both covered by subtropical forests, *sensu* Hueck, 1956; 1972). Thus, the Fontes do Ipiranga park is covered by a mixed transitional forest composed by floral elements of both types of forest. The park hosts the Botanical and Zoological Gardens of São Paulo, where several alien plant species are grown. Some of these alien plant species are invasive in native forest habitats (Guix, 1996).

Until the end of the 19th century, the forests of the Fontes do Ipiranga park were connected with the Atlantic rainforests of the Serra do Mar mountain range. These forests became isolated from all the other native ones due to the continuous deforestation process associated to farming and road construction (e.g.: the Imigrantes Road). In 1928 the P.E. Fontes do Ipiranga forest fragment that was surrounded by small farming properties was declared "Logradouro Público" by de São Paulo government (Hoehne *et al.*, 1941; São Paulo, 1988).

Since the implantation of the São Paulo Zoo in 1958, some allochthonous mammal and bird species (e.g. *Penelope* spp., *Crypturellus* spp.) were accidentally introduced or reintroduced in the area.

Parque da Aclimação.

The Parque da Aclimação is a 11.8 ha park of *Eucalyptus* spp. plantations and other allochthonous species. There is an artificial lake of 3.3 ha with fishes (e.g. the autochthonous *Geophagus brasiliensis* and Loricariidae species and alien *Tilapia* and Poeciliidae species).

Parque Trianon.

Although it is commonly known by people as Parque Trianon, its official name is Parque Tenente Siqueira Campos. Even though it is usually considered as a remaining forest fragment of the Atlantic rainforest, this 4.6 ha woodlot is composed of planted trees and bushes, some of which are autochthonous species but many being introduced ones. This planted woodlot imitates a native forest with several vertical strata (emergent trees, canopy, subcanopy and understory).

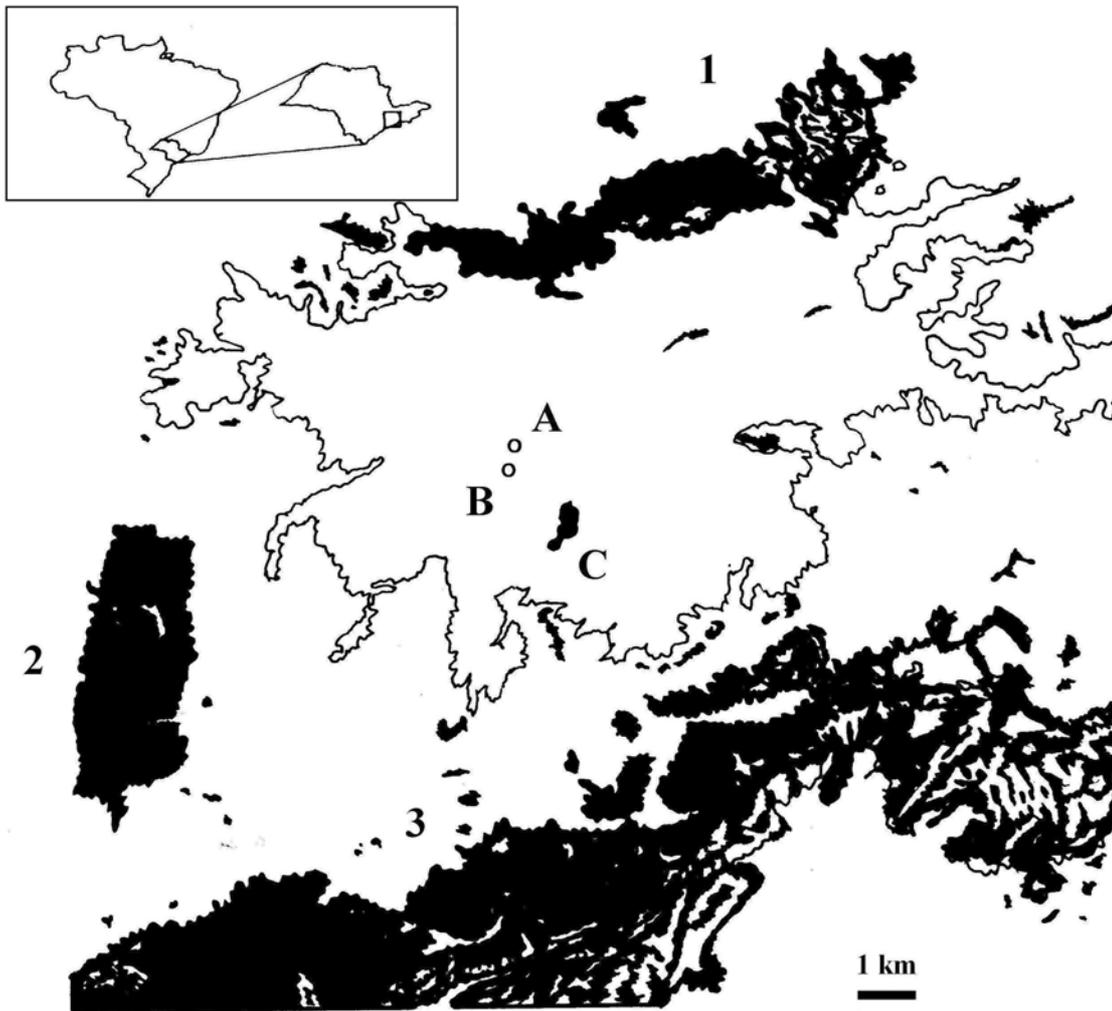


Figure 1. Map based on LANDSAT TM 5 satellite images of the São Paulo megalopolis (in the middle), south-eastern Brazil, showing the surrounding areas covered by remaining native forests (in black) (see also EMBRAPA 2000-2003). The study areas: **A**. Jardim da Aclimação; **B**. Parque Trianon; **C**. Parque Estadual das Fontes do Ipiranga. The nearest large protected areas (more than 7,000 ha): **1**. Serra da Cantareira mountains; **2**. Morro Grande reserve (Caucaia do Alto); **3**. Serra do Mar mountain chain.

RESULTS

During the study period, 152 species of birds were found: 148 in the Parque Estadual das Fontes do Ipiranga (542 ha), 46 in the Parque Aclimação (11.8 ha) and 21 in the Parque Trianon (3.6 ha). At least 10 of these species are allochthonous to the areas where they were found.

PODICIPEDIDAE:

Tachybaptus dominicus (formerly placed in the genus *Podiceps*). **Least Grebe, Mergulhão-pequeno.**

P.E. Fontes do Ipiranga (N) and P. Aclimação (V).

Podilymbus podiceps. **Pied-billed Grebe, Mergulhão.**

P.E. Fontes do Ipiranga (V).

PHALACROCORACIDAE:

Phalacrocorax brasilianus (formerly called *P. olivaceus*). **Neotropic Cormorant, Biguá.**

P.E. Fontes do Ipiranga (M, N) and P. Aclimação (V). Between June and September it made large mixing nesting colonies with *Egretta alba* and *Nycticorax nycticorax* on native trees (e.g.: *Piptadenia* spp., *Miconia* spp., *Alchornea triplinervia*) by the lake of the Botanical Garden, located in P.E. Fontes do Ipiranga. In some years, these mixed nesting colonies grouped more than 400 adult individuals. Feeding observations: wild native fishes (e.g.: *Geophagus brasiliensis*) and introduced ones (e.g.: *Tilapia rendalli*, *Tilapia nilotica*).

ARDEIDAE:

Ardea cocoi. **Cocoi Heron, Socó-grande.**

P.E. Fontes do Ipiranga (V) and P. Aclimação (V).

Bubulcus ibis. **Cattle Egret, Garça-vaqueira.**

P.E. Fontes do Ipiranga (V). It was seen seven times.

Burorides striatus. **Green-backed Heron, Socozinho.**

P.E. Fontes do Ipiranga (M, N) and P. Aclimação (V).

Egretta alba (formerly called *Casmerodius albus*). **Great White Egret, Garça-branca-grande.**

P.E. Fontes do Ipiranga (M, N) and P. Aclimação (V). See also *P. brasilianus*. Feeding observations: wild native fishes (e.g.: *Geophagus brasiliensis*, *Hoplias malabaricus*) and introduced ones (e.g.: *Tilapia rendalli*, *Tilapia nilotica*).

Egretta thula. **Snowy Egret, Garça-branca-pequena.**

P.E. Fontes do Ipiranga (V) and P. Aclimação (V).

***Ixobrychus exilis*. Least Bittern, Socó-escuro.**

P.E. Fontes do Ipiranga (V?). It was seen only twice on margins of lakes, in the early morning.

***Nycticorax nycticorax*. Black-crowned Night-heron, Savacu.**

P.E. Fontes do Ipiranga (M, N) and P. Aclimação (V). See also *P. brasiliensis*. Feeding observations: One captured adult individual regurgitated two entire black rats (*Rattus rattus* A). See also *Phalacrocorax brasiliensis*.

***Syrigma sibilatrix*. Whistling Heron, Maria-faceira.**

P.E. Fontes do Ipiranga (V).

***Tigrisoma lineatum*. Rufescent Tiger-heron, Socó-boi-verdadeiro.**

P.E. Fontes do Ipiranga (V). It was seen three times (two adult individuals and one juvenile specimen) on margins of lakes.

THRESKIORNITHIDAE:

***Platalea ajaja* (formerly placed in the genus *Ajaja*). Roseate Spoonbill, Colhereiro.**

P.E. Fontes do Ipiranga (V). One juvenile specimen stayed for 42 days (January-February, 1989) among a group of captive individuals of the same species in a lake of the Zoological garden and then it disappeared. This individual presented an elusive behaviour, it had well preserved plumage and it could fly well. It did not show any sign of having been captive before, such as deformed and broken feathers in wings and tail. Observations: none of the captive individuals of the species in the area could fly because of a terminal wing amputation.

CICONIIDAE:

***Mycteria americana*. Wood Stork, Cabeça-seca.**

P.E. Fontes do Ipiranga (V). One flying individual was seen in August 1987. One adult flying individual stayed for 27 days (June-July, 1989) in a large lake of the Zoological garden and then it disappeared. Observations: none of the captive individuals of the species in the area could fly because of a terminal wing amputation.

CATHARTIDAE:

***Coragyps atratus*. American Black Vulture, Urubu-comum.**

It is a very common species in the city of São Paulo. P.E. Fontes do Ipiranga (V). One nest containing two eggs was found in the porch of a building in a dense urban area of São Paulo. One female reared two hatchlings in another building of the city.

***Cathartes aura*. Turkey Vulture, Urubu-de-cabeça-vermelha.**

It was seen three times flying high over the P.E. Fontes do Ipiranga, mixed with the Black Vulture.

ANATIDAE:

***Amazonetta brasiliensis*. Brazilian Teal, Marreca-de-pé-vermelho.**

It is a common species in the lakes of the zoological and botanical garden of P.E. Fontes do Ipiranga (M, N), where wild individuals were frequently captured alive in a banding program. It was seen sometimes in P. Aclimação (V). There were vouchered specimens in the former WCAB collection. Observations: none of the captive individuals living in the zoological garden could fly because of a terminal wing amputation.

***Anas bahamensis*. White-cheeked Pintail, Marreca-toicinho.**

Wild individuals were sometimes found mixed with captive and wild ducks in the lakes of the zoological garden of P.E. Fontes do Ipiranga (V). Wild individuals were also captured alive. There were vouchered specimens in the former WCAB collection. Observations: none of the captive individuals living in the zoological garden could fly because of a terminal wing amputation.

***Anas platyrhynchos*. Mallard, Marreca-cabeça-verde.**

P.E. Fontes do Ipiranga (A, N) and P. Aclimação (A, N).

***Dendrocygna autumnalis*. Black-bellied Whistling-duck, Marreca-cabocla.**

It is a common species in the lakes of the zoological and botanical gardens of P.E. Fontes do Ipiranga (V), where wild individuals were sometimes captured alive. It was often seen in P. Aclimação (V). There were vouchered specimens in the former WCAB collection. Observations: none of the captive individuals living in the zoological garden could fly because of a terminal wing amputation.

***Dendrocygna bicolor*. Fulvous Whistling-duck, Marreca-caneleira.**

P.E. Fontes do Ipiranga (M, V). It is a very common species in the zoological and botanical garden of P.E. Fontes do Ipiranga (V). Wild individuals were frequently captured alive in a banding program. It was often seen in the P. Aclimação (V). Observations: none of the captive individuals living in the zoological garden could fly because of a terminal wing amputation.

***Dendrocygna viduata*. White-faced Whistling-duck, Irerê.**

It is the most abundant species of wild duck in São Paulo city. It is very common in P.E. Fontes do Ipiranga (M, V, N) and P. Aclimação (V). It breeds sometimes in house gardens with dense herbaceous vegetation. The banding program conducted by Werner C.A. Bokermann/CEMAVE during the 1980's suggests that a large part of the population of *D. viduata* in the P.E. Fontes do Ipiranga is composed of *wandering individuals* while a little part of the population could be classified as *migrant* (composed by individuals that were detected to make regular movements between two or more areas). Observations: none of the captive individuals living in the zoological garden could fly because of a terminal wing amputation.

***Sarkidiornis melanotus*. Comb Duck, Pato-de-crista.**

Sometimes wild juvenile individuals or females were seen in the lakes of the zoological garden of P.E. Fontes do Ipiranga (V). Wild individuals were sometimes captured alive. Observations: none of the captive individuals living in the zoological garden could fly because of a terminal wing amputation.

ACCIPITRIDAE:

Accipiter sp.

P.E. Fontes do Ipiranga. One individual was seen flying between forest trees.

Buteo brachyurus. **Short-tailed Hawk, Gavião-de-rabo-branco.**

P.E. Fontes do Ipiranga (V). It was seen sometimes flying over the park.

Buteo magnirostris (sometimes placed in the genus *Rupornis*). **Roadside Hawk, Gavião-carijó.**

It is a very common species in P.E. Fontes do Ipiranga (V, N?), P. Aclimação (V) and in all the city of São Paulo.

Elanoides forficatus. **American Swallow-tailed Kite, Gavião-tesoura.**

It was seen once in P.E. Fontes do Ipiranga (V).

Elanus leucurus. **White-tailed Kite, Gavião-peneira.**

It was seen sometimes hovering against the wind over open areas of the P.E. Fontes do Ipiranga (V).

FALCONIDAE:

Falco peregrinus. **Peregrine Falcon, Falcão-peregrino.**

It was seen twice flying over the P.E. Fontes do Ipiranga (V), and once flying in the surroundings of P. Aclimação (V). Feeding habits: In P. Aclimação, it was seen chasing a domestic pigeon (*Columba livia* A).

Falco sparverius. **American Kestrel, Quiriquiri.**

It was often seen in open areas of P.E. Fontes do Ipiranga (A?, V?, N).

Milvago chimachima. **Yellow-headed Caracara, Carrapateiro.**

Two individuals seen in March 1990 in P.E. Fontes do Ipiranga (V).

Polyborus plancus (sometimes placed in the genus *Caracara*). **Crested Caracara, Caracara.**

It was often seen in P.E. Fontes do Ipiranga (V) and P. Aclimação (V) and throughout the city. Feeding observations: it was sometimes seen eating dead fishes (*Tilapia rendalli* A) on the margins of lakes.

CRACIDAE:

Penelope superciliaris. **Rusty-margined Guan, Jacupemba.**

P.E. Fontes do Ipiranga (R, N?). A few individuals were seen alive in the forests of P.E. Fontes do Ipiranga. These individuals probably escaped from the zoological garden, but it can not be discarded that some remanant individuals of wild stock origin survived to the isolation process of this reserve (Werner C.A. Bokermann, per. comm.). See also discussion. Feeding observations: it ingested entire ripe fruits of *Syagrus romanzoffiana* I (Arecaceae), *Coffea arabica* A (Rubiaceae) and *Eriobotrya japonica* A (Rosaceae).

RALLIDAE:

***Aramides cajanea*. Gray-necked Wood-rail, Três-potes.**

P.E. Fontes do Ipiranga (R?, N). It is possibly an introduced or reintroduced species in the area, from individuals that escaped from captivity in the zoological garden.

***Aramides saracura*. Slaty-breasted Wood-rail, Saracura-do-mato.**

P.E. Fontes do Ipiranga (N). It was commonly seen dwelling in secondary forests and by water masses.

***Gallinula chloropus*. Common Moorhen, Frango-d'água.**

P.E. Fontes do Ipiranga (N) and P. Aclimação (V). It is fairly common in P.E. Fontes do Ipiranga.

***Porphyryla martinica*. American Purple Gallinule, Frango-d'agua azul.**

P.E. Fontes do Ipiranga (V)

***Pardirallus nigricans* (formerly placed in the genus *Rallus*). Blackish Rail, Saracura-sanã.**

P.E. Fontes do Ipiranga (V). It was seen sometimes. One individual was captured in a trap for wild ducks in 22 May 1988 and it left.

JACANIDAE:

***Jacana jacana*. Wattled Jacana, Jaçanã.**

P.E. Fontes do Ipiranga (N, V).

CHARADRIIDAE:

***Vanellus chilensis*. Southern Lapwing, Quero-quero.**

P.E. Fontes do Ipiranga (V) and P. Aclimação (V).

COLUMBIDAE:

***Columba livia*. Rock Dove, Pombo-doméstica.**

It is fairly common in P.E. Fontes do Ipiranga (A, N), P. Aclimação (A, N) and P. Trianon (A, N). It is also common throughout the city. Feeding observations: it was seen eating entire ripe fruits of *Pyracantha fortuneana* A (Rosaceae).

***Columbina talpacoti*. Ruddy Ground-dove, Rolinha.**

P.E. Fontes do Ipiranga (N) and P. Aclimação (N).

***Claravis pretiosa*. Blue Ground-dove, Pomba-espelho.**

P.E. Fontes do Ipiranga (V). It was seen ingesting little stones on the ground.

***Geotrygon montana*. Ruddy Quail-dove, Pariri.**

P.E. Fontes do Ipiranga (V).

***Leptotila verreauxi*. White-tipped Dove, Juriti-pupu.**

P.E. Fontes do Ipiranga (V).

***Streptopelia decaocto*. Eurasian Collared-dove, Rola-de-coleira.**

P.E. Fontes do Ipiranga (A, N).

PSITTACIDAE:

***Aratinga leucophthalmus*. White-eyed Parakeet, Periquitão-maracanã.**

P. Trianon (A). Feeding observations: it was seen ingesting pulp of ripe fruits of *Ficus microcarpa* A (Moraceae).

***Brotogeris tirica*. Plain Parakeet, Periquito-verde.**

P.E. Fontes do Ipiranga (V, N), P. Aclimação (V, N) and P. Trianon (V, N). It is very common throughout the city. Two nests were found under house roofs by the P. Trianon. Feeding observations: it was seen ingesting pulp of ripe fruits of *Syagrus romanzoffiana* I (Arecaceae) and seeds and pulp of ripe and unripe fruits of *Ficus luschnathiana* I and *F. microcarpa* A (Moraceae).

***Diopsittaca nobilis* (formerly placed in the genus *Ara*). Red-shouldered Macaw, Maracanã-nobre.**

P.E. Fontes do Ipiranga (A). The spotted individuals had probably escaped from captivity.

***Forpus crassirostris* (formerly called *F. xanthopterygius*). Blue-winged Parrotlet, Tuim.**

P.E. Fontes do Ipiranga (V).

***Pyrrhura frontalis*. Maroon-bellied Parakeet, Tiriba-de-testa-vermelha.**

P.E. Fontes do Ipiranga (V) and P. Trianon (V). Feeding observations: it was seen ingesting pulp of ripe fruits of *Syagrus romanzoffiana* I (Arecaceae), seeds and pulp of ripe fruits of *Ficus luschnathiana* I and *F. microcarpa* A (Moraceae) and seeds of ripe fruits of *Ocotea* sp. I (Lauraceae).

CUCULIDAE:

***Coccyzus americanus*. Yellow-billed Cuckoo, Papa-lagarta-norte-americano.**

P.E. Fontes do Ipiranga (V).

***Coccyzus melacoryphus*. Dark-billed Cuckoo, Papa-lagarta.**

P.E. Fontes do Ipiranga (V, N?) and P. Aclimação (V).

***Crotophaga ani*. Smooth-billed Ani, Anu-preto.**

P.E. Fontes do Ipiranga (N).

***Guira guira*. Guira Cuckoo, Anu-branco.**

P.E. Fontes do Ipiranga (N?).

***Piaya cayana*. Squirrel Cuckoo, Alma-de-gato.**

P.E. Fontes do Ipiranga (N). Feeding observations: it was seen eating ripe fruits of *Trema micrantha* I (Ulmaceae), only in the winter.

TYTONIDAE:

***Tyto alba*. Common Barn-owl, Suindara.**

P.E. Fontes do Ipiranga (N) and P. Aclimação (N).

STRIGIDAE:

***Athene cunicularia*. Burrowing Owl, Coruja-do-campo.**

P.E. Fontes do Ipiranga (N).

***Otus choliba*. Tropical Screech-owl, Corujinha-do-mato.**

P.E. Fontes do Ipiranga.

***Asio clamator* (formerly placed in the genus *Rhinoptynx*). Striped Owl, Coruja-orelhuda.**

P.E. Fontes do Ipiranga (R?). Some captive specimens had escaped from the Zoological garden.

NYCTIBIIDAE:

***Nyctibius griseus*. Common Potoo, Urutau.**

P.E. Fontes do Ipiranga (V). Two individuals were found on tree branches during the day and they were photographed. Vocalizations were heard only three times, always at dusk.

CAPRIMULGIDAE:

***Caprimulgus* sp.**

P. Trianon (V). It is probably *Caprimulgus parvulus*. Vocalizations were sometimes heard at night in the park, in different months. Also a *Caprimulgus* species was seen catching insects at night near the TV Gazeta antenna, placed about 600 m away from the Parque Trianon.

APODIDAE:

***Chaetura andrei* (formerly called *Chaetura meridionalis*). Ashy-tailed Swift, Andorinhão-do-temporal.**

P.E. Fontes do Ipiranga (V), P. Aclimação (V, N), P. Trianon (V, N).

Adults with damaged wings and well developed hatchings that had fallen from chimneys near the three parks were often donated by people to the Zoo of São Paulo.

***Chaetura cinereiventris*. Grey-rumped Swift, Andorinhão-de-sobre-cinzento.**

P.E. Fontes do Ipiranga (V), P. Aclimação (V, N?). One adult with a damaged wing was found in November near P. Aclimação, and it was donated to the Zoo of São Paulo.

***Streptoprocne zonalis*. White-collared Swift, Andorinhão-de-coleira.**

P.E. Fontes do Ipiranga (V).

TROCHILLIDAE:

Agyrtia versicolor (formerly placed in the genus *Amazilia*). **Versicolored Emerald, Beija-flor-de-banda-branca.**

It is fairly common in P.E. Fontes do Ipiranga (V, N?), P. Aclimação (V) and P. Trianon (V). It is common throughout the city. Feeding observations: It was frequently seen licking or sucking nectar of *Hibiscus* spp. A (Malvaceae) flowers through small perforations made by *Coereba flaveola* with the bill on the calyx.

Polyerata lactea (formerly placed in the genus *Amazilia* or *Agyrtia*). **Sapphire-spangled Emerald, Beija-flor-de-peito-azul.**

P.E. Fontes do Ipiranga (V) and P. Aclimação (V). Feeding observations: It was seen licking or sucking nectar of *Hibiscus* spp. A (Malvaceae) flowers through small perforations made by *Coereba flaveola* with the bill on the calyx.

Campylopterus macrourus (formerly called *Eupetomena macroura*). **Swallow-tailed Hummingbird, Beija-flor-tesoura.**

It is fairly common in P.E. Fontes do Ipiranga (V, N?), P. Aclimação (V) and P. Trianon. It is common throughout the city. Feeding observations: It was frequently seen licking or sucking nectar of *Hibiscus* spp. A (Malvaceae) flowers through small perforations made by *Coereba flaveola* with the bill on the calyx.

Chlorostilbon aureoventris. **Glittering-bellied Esmerald, Besourinho-de-bico-vermelho.**

P. E. Fontes do Ipiranga (V). Feeding observations: It was seen drinking sugared water from artificial bottles and sucking sugared liquid exuded from ripe fig fruits (*Ficus luschnathiana* I, Moraceae).

Leucochloris albicollis. **White-throated Hummingbird, Papo-branco.**

P.E. Fontes do Ipiranga (V).

Phaetornis eurynome. **Scale-throated Hermit, Rabo-branco-de-garganta-rajada.**

Five individuals were seen in P.E. Fontes do Ipiranga (V) in different seasons, they were drinking sugared water from artificial bottles.

Thalurania glaucopis. **Violet-capped Woodnymph, Tesoura-de-fronte-violeta.**

P.E. Fontes do Ipiranga (V). Feeding observations: It was seen drinking sugared water from artificial bottles as well as sucking sugared liquid exuded from ripe fig fruits (*Ficus luschnathiana* I, Moraceae). Feeding observations: It was also seen licking or sucking nectar of *Hibiscus* spp. A (Malvaceae) flowers through small perforations made by *Coereba flaveola* with the bill on the calyx.

ALCEDINIDAE:

Megaceryle torquata (formerly placed in the genus *Ceryle*). **Ringed Kingfisher, Martim-pescador-grande.**

It is common in P.E. Fontes do Ipiranga (N) and P. Aclimação. Feeding observations: It was seen capturing *Poecilia* spp. (Poeciliidae).

Chloroceryle amazona. **Amazon Kingfisher, Martim-pescador-verde.**

P.E. Fontes do Ipiranga (V?)

***Chloroceryle americana*. Green Kingfisher, Martim-pescador-pequeno.**

P.E. Fontes do Ipiranga (V?) and P. Aclimação (V?). Feeding observations: It was seen capturing *Poecilia* spp. (Poeciliidae).

RAMPHASTIDAE:

***Ramphastos dicolorus*. Red-breasted Toucan, Tucano-de-bico-verde.**

P.E. Fontes do Ipiranga (R?). Groups of 2-5 individuals were frequently seen in the forest. See also discussion.

PICIDAE:

***Celeus flavescens*. Blond-crested Woodpecker, João-velho.**

P.E. Fontes do Ipiranga (N).

***Colaptes campestris*. Campo Flicker, Pica-pau-do-campo.**

P.E. Fontes do Ipiranga (N).

***Picumnus cirratus*. White-barred Piculet, Pica-pau-anão-barrado.**

P.E. Fontes do Ipiranga (N) and P. Aclimação (V?, N?).

***Picumnus temminckii*. Ochre-collared Piculet, Pica-pau-anão-de-coleira.**

P.E. Fontes do Ipiranga (V?, N?).

***Veniliornis spilogaster*. White-spotted Woodpecker, Pica-pauzinho-verde-carijó.**

P.E. Fontes do Ipiranga (V?, N?). A few adults were seen in the forest.

FORMICARIIDAE:

***Conopophaga lineata*. Rufous Gnateater, Chupa-dente.**

P.E. Fontes do Ipiranga.

***Thamnophilus* sp.**

P.E. Fontes do Ipiranga.

FURNARIIDAE:

***Cranioleuca pallida*. Pallid Spinetail, Arredio-pálido.**

P.E. Fontes do Ipiranga (V).

***Furnarius rufus*. Rufous Hornero, João-de-barro.**

P.E. Fontes do Ipiranga (N) and P. Aclimação (N).

***Synallaxis ruficapilla*. Rufous-capped Spinetail, Pichororé.**

P.E. Fontes do Ipiranga.

***Synallaxis spixi*. Spix's Spinetail, João-teneném.**

P.E. Fontes do Ipiranga.

***Xenops minutus*. Plain Xenops, Bico-virado-miudinho.**

P.E. Fontes do Ipiranga.

TYRANNIDAE:

***Camptostoma obsoletum*. Southern Bearless-tyrannulet, Risadinha.**

P.E. Fontes do Ipiranga (V).

***Contopus cinereus*. Tropical Pewee, Papa-moscas-cinzento.**

P.E. Fontes do Ipiranga (V?, N?). It was often found in the understory of native secondary forests.

***Elaenia flavogaster*. Yellow-bellied Elaenia, Guaravaca-de-barriga-amarela.**

P.E. Fontes do Ipiranga (V), P. Aclimação (V) and P. Trianon (V). Feeding observations: It was seen ingesting entire ripe fruits of *Calypttranthes* sp. I (Myrtaceae).

***Elaenia* sp.2**

P.E. Fontes do Ipiranga (V).

***Machetornis rixosus*. Cattle Tyrant, Suiriri-cavaleiro.**

P.E. Fontes do Ipiranga (V).

***Myiodynastes maculatus*. Streaked Flycatcher, Bem-te-vi-rajado.**

P.E. Fontes do Ipiranga (V) and P. Aclimação (V).

***Myiozetetes similis*. Social Flycatcher, Bem-te-vi-pequeno.**

P.E. Fontes do Ipiranga (V), P. Aclimação (V), P. Trianon (V). Feeding observations: It was seen ingesting entire ripe fruits of *Ficus luschnathiana* I (Moraceae) and *Calypttranthes* sp. I (Myrtaceae).

***Myiarchus* sp.**

One individual was seen in P.E. Fontes do Ipiranga (V) in June 1989.

***Pachyrhamphus polychopterus*. White-winged Becard, Caneleirinho-preto.**

P.E. Fontes do Ipiranga (V).

***Pitangus sulphuratus*. Great Kiskadee, Bem-te-vi.**

P.E. Fontes do Ipiranga (N), P. Aclimação (N) and P. Trianon (N).

It is fairly common in the city. Feeding observations: It was often seen capturing *Poecilia* spp. (Poeciliidae) fishes. One individual was seen capturing a 4 cm long moth (Noctuidae) in the air. It was seen ingesting entire ripe fruits of *Ficus luschnathiana* I, *Ficus* cf. *guaranitica* I, *F. microcarpa* A (Moraceae), *Struthanthus concinnus* I (Loranthaceae), *Psychotria sessilis* I (Rubiaceae), *Calypttranthes* sp. I (Myrtaceae) and *Pyracantha fortuneana* A (Rosaceae). It was also seen ingesting entire seeds + arils of *Copaifera langsdorffii* I (Leguminosae).

***Pyrocephalus rubinus*. Vermilion Flycatcher, Verão.**

P. Trianon (V).

***Satrapa icterophrys*. Yellow-browed Tyrant, Suiriri-pequeno.**

P.E. Fontes do Ipiranga (V).

***Serpophaga subcristata*. White-crested Tyrannulet, Alegrinho.**

P.E. Fontes do Ipiranga (V).

***Tityra cayana*. Black-tailed Tityra, Anambé-branco-de-rabo-preto.**

P.E. Fontes do Ipiranga (V). There is a vouchered specimen in the former WCAB collection (now in the MZUSP collection).

***Tyrannus melancholicus*. Tropical Kingbird, Suiriri.**

P.E. Fontes do Ipiranga (V) and P. Trianon (V). Feeding observations: It was seen ingesting entire ripe fruits of *Alchornea triplinervia* I (Euphorbiaceae).

***Tyrannus savana* (formerly called *Muscivora tyrannus*). Fork-tailed Flycatcher, Tesoura.**

P.E. Fontes do Ipiranga (V). Feeding observations: It was seen ingesting an entire ripe fruit of *Ocotea* sp. I (Lauraceae).

COTINGIDAE:

***Iodopleura pipra*. Buff-throated Purplethroat, Anambezinho.**

P.E. Fontes do Ipiranga (V). One individual was found dead after crashing into a glass-window. It was preserved and added to the former WCAB collection (now in the MZUSP collection).

***Pyroderus scutatus*. Red-ruffed Fruitcrow, Pavó.**

P.E. Fontes do Ipiranga (V). Two individuals with intensely red chest and well preserved plumage were seen in the forest (October 1989 and March 1990).

***Procnias nudicollis*. Bare-throated Bellbird, Araponga.**

P.E. Fontes do Ipiranga (R?, V?).

HIRUNDINIDAE:

***Phaeoprogne tapera*. Brown-chested Martin, Andorinha-do-campo.**

P.E. Fontes do Ipiranga (V) and P. Aclimação (V).

***Progne chalybea*. Gray-breasted Martin, Andorinha-grande-de-casa.**

P.E. Fontes do Ipiranga (V).

***Pygochelidon cyanoleuca* (formerly placed in the genus *Notiochelidon*). Blue-and-white Swallow, Andorinha-pequena-de-casa.**

P.E. Fontes do Ipiranga (V) and P. Aclimação (V).

CORVIDAE:

***Cyanocorax chrysops*. Plush-crested Jay, Gralha-picaça.**

P.E. Fontes do Ipiranga (A). There were vouchered specimens in the former WCAB collection (now in the MZUSP collection). Feeding observations: It was seen ingesting entire ripe fruits of *Ficus luschnathiana* I, *F. microcarpa* A and *Morus nigra* A (Moraceae). In several occasions free specimens were seen offering ripe fruits to captive individuals of the same species (courtship feeding) through the holes of the net and *vice-versa*.

***Cyanocorax cyanopogon*. White-naped Jay, Cancã.**

P.E. Fontes do Ipiranga (A). There was a vouched specimen in the former WCAB collection (now in the MZUSP collection).

***Cyanocorax caeruleus*. Azure Jay, Gralha-azul.**

P.E. Fontes do Ipiranga (A?, V?).

TROGLODITIDAE:

***Troglodytes aedon* (formerly called *T. musculus*). House Wren, Curruíra.**

P.E. Fontes do Ipiranga (N), P. Aclimação (N?) and P. Trianon (V). It is common in the city.

MUSCICAPIDAE (TURDINAE):

***Platycichla flavipes*. Yellow-legged Thrush, Sabiá-una.**

P.E. Fontes do Ipiranga (V, N). Feeding observations: It was seen ingesting entire ripe fruits of *Ficus luschnathiana* I, *F. microcarpa* A, *Morus nigra* A (Moraceae), *Calypttranthes lanceolata* I, *Calypttranthes* sp. I (Myrtaceae), *Mollinedia* cf. *uleana* I (Monimiaceae), *Archontophoenix cunninghamiana* A, *Euterpe edulis* I (Arecaceae), *Pyracantha fortuneana* (Rosaceae) and extracting pieces of pulp of ripe fruits of *Eugenia* sp. I (Myrtaceae).

***Turdus albicollis*. White-necked Thrush, Sabiá-coleira.**

P.E. Fontes do Ipiranga (V). Feeding observations: It was seen ingesting entire ripe fruits of *Ficus luschnathiana* I, *F. microcarpa* A (Moraceae), *Prunus sellowii* I (Rosaceae), *Calypttranthes* sp. I (Myrtaceae), *Pittosporum undulatum* A (Pittosporaceae), and extracted pieces of pulp of ripe fruits of planted *Carica papaya* A (Caricaceae). It was also seen ingesting entire seeds + arils of *Maytenus alaternoides* I (Celastraceae).

***Turdus amaurochalinus*. Creamy-bellied Thrush, Sabiá-poca.**

P.E. Fontes do Ipiranga (V), P. Aclimação (V) and P. Trianon (V). Feeding observations: It was seen ingesting entire ripe fruits of *Ficus luschnathiana* I, *F. microcarpa* A, *Morus nigra* A (Moraceae), *Psychotria sessilis* I (Rubiaceae), *Ocotea* sp. I (Lauraceae), *Pyracantha fortuneana* A (Rosaceae), *Fatsia japonica* A (Araliaceae) and *Schefflera actinophylla* A (Araliaceae) and extracting pieces of pulp of ripe fruits of planted *Carica papaya* A (Caricaceae) and *Citrus reticulata* A (Rutaceae).

***Turdus rufiventris*. Rufous-bellied Thrush, Sabiá-laranjeira.**

P.E. Fontes do Ipiranga (V, N), P. Aclimação (V, N) and P. Trianon (V, N). Fairly common in the city. Feeding observations: It was seen ingesting entire ripe fruits of *Ficus luschnathiana* I, *Ficus microcarpa* A, *Morus nigra* A (Moraceae), *Psychotria sessilis* I (Rubiaceae), *Archontophoenix cunninghamiana* A, *Euterpe edulis* I, *Syagrus romanzoffiana* I (Arecaceae), *Guarea tuberculata* I (Meliaceae), *Rapanea umbellata* I (Myrsinaceae), *Campomanesia eugenoides* I, *Calypttranthes lanceolata* I, *Calypttranthes* sp. I. (Myrtaceae), *Prunus sphaerocarpa* I, *Prunus sellowii* I (Rosaceae), *Ocotea* sp. I (Lauraceae), *Pittosporum undulatum* A (Pittosporaceae), *Eriobotrya japonica* A, *Pyracantha coccinea* A, *P. fortuneana* A (Rosaceae), *Fatsia japonica* A, *Schefflera actinophylla* A (Araliaceae). It was also seen ingesting entire seeds + ripe arils of *Copaifera langsdorffii* I (Leguminosae), *Cupania rubiginosa* I (Sapindaceae) and *Maytenus alaternoides* I (Celastraceae) and extracting pieces

of pulp of ripe fruits of *Psidium catleyanum* I (Myrtaceae), *Eugenia* sp. I (Myrtaceae) and planted *Carica papaya* A (Caricaceae) and *Citrus reticulata* A (Rutaceae).

MIMIDAE:

***Mimus saturninus*. Chalk-browed Mockingbird, Sabiá do campo.**

P.E. Fontes do Ipiranga (V).

VIREONIDAE:

***Cyclarhis gujanensis*. Rufous-browed Peppershrike, Pitiguari.**

P.E. Fontes do Ipiranga (V?, N?).

***Vireo olivaceus* (formerly called *V. chivi*). Red-eyed Vireo, Juruviara.**

P.E. Fontes do Ipiranga (V).

EMBERIZIDAE (PARULINAE):

***Basileuterus* sp.**

P.E. Fontes do Ipiranga. One individual was seen only once in the forest (possibly a *B. culicivorus*).

***Geothlypis aequinoctialis*. Masked Yellowthroat, Pia-cobra.**

P.E. Fontes do Ipiranga (N).

***Parula pitiayumi*. Olive-backed Warbler, Mariquita.**

P.E. Fontes do Ipiranga (V?, N?).

EMBERIZIDAE (COEREBINAE):

***Coereba flaveola*. Bananaquit, Cambacica.**

P.E. Fontes do Ipiranga (N), P. Aclimação (V, N?) and P. Trianon (V). It is fairly common in the city. Feeding observations: It was frequently seen licking or sucking nectar of *Hibiscus* spp. A (Malvaceae) flowers through small perforations made with the bill on the calyx (nectar robbers). It was seen also ingesting pieces of ripe fruits of *Psychotria sessilis* I (Rubiaceae) and planted *Carica papaya* A (Caricaceae).

EMBERIZIDAE (THRAUPINAE):

***Dacnis cayana*. Blue Dacnis, Sai-azul.**

P.E. Fontes do Ipiranga (V).

***Euphonia chlorotica*. Purple-throated Euphonia, Vi-vi.**

P.E. Fontes do Ipiranga (V).

***Euphonia musica*. Blue-hooded Euphonia, Gaturamo-rei.**

P.E. Fontes do Ipiranga (V).

***Euphonia violacea*. Violaceous Euphonia, Gaturamo-verdadeiro.**

P.E. Fontes do Ipiranga (V).

***Pipraeidea melanonota*. Fawn-breasted Tanager, Viúva.**

P.E. Fontes do Ipiranga (V?, N?).

***Ramphocelus bresilius*. Brazilian Tanager, Tiê-sangue.**

P.E. Fontes do Ipiranga (M, N). This species is fairly common in the park all through the year, although the amount of adult individuals increased during winter and juvenile males were only seen during this season. One nest was found in December on a branch of *Tiboucina mutabilis*. Feeding observations: It was seen ingesting entire ripe fruits of *Ficus luschnathiana* I, (Moraceae), *Psychotria sessilis* I (Rubiaceae), *Calypttranthes* sp. I (Myrtaceae), and extracting pieces of pulp of ripe fruits of planted *Carica papaya* A (Caricaceae) and *Citrus reticulata* A (Rutaceae). It was also seen chewing ripe fruits of *Psychotria sessilis* I (Rubiaceae), discarding seeds and ingesting the pulp as well as ingesting ripe arils of *Cupania rubiginosa* I (Sapindaceae).

***Tachyphonus coronatus*. Ruby-crowned Tanager, Tiê-preto.**

P.E. Fontes do Ipiranga (V). Feeding observations: It was seen ingesting entire ripe fruits of *Ficus luschnathiana* I, *Morus nigra* A (Moraceae), *Psychotria sessilis* I (Rubiaceae) and *Trema micrantha* I (Ulmaceae). AI was seen also chewing ripe fruits of *Psychotria sessilis* I (Rubiaceae), discarding seeds and ingesting the pulp.

***Tangara cayana*. Burnished Buff Tanager, Saíra-amarela.**

P.E. Fontes do Ipiranga (V) and P. Trianon (V). Only individuals with a black spot in neck and chest were seen in these two areas. Feeding observations: It was seen ingesting entire ripe fruits of *Calypttranthes* sp.I (Myrtaceae). It was seen also chewing ripe fruits of *Calypttranthes* sp. I (Myrtaceae), discarding seeds and ingesting the pulp.

***Tangara desmaresti*. Brassy-breasted Tanager, Saíra-lagarta.**

P.E. Fontes do Ipiranga (R?, A?, V?).

***Tangara seledon*. Green-headed Tanager, Saíra-de-sete-cores.**

P.E. Fontes do Ipiranga (V). During winter, juvenile and adult individuals were fairly common in the park (see discussion). Feeding observations: it was seen ingesting entire ripe fruits of *Calypttranthes* sp. I (Myrtaceae). It was seen also chewing ripe fruits of *Calypttranthes* sp. I (Myrtaceae), discarding seeds and ingesting the pulp as well as ingesting ripe pulp of *Trema micrantha* I (Ulmaceae).

***Tangara peruviana*. Black-backed Tanager, Saíra-sapucaia.**

P.E. Fontes do Ipiranga (V). It was seen sometimes in winter.

***Tangara velia*. Opal-rumped Tanager, Saíra-diamante.**

P.E. Fontes do Ipiranga (V?, R?).

***Thlypopsis sordida*. Orange-headed Tanager, Canário-sapê.**

P.E. Fontes do Ipiranga (V, N). Feeding observations: It was seen ingesting entire ripe fruits of *Struthanthus concinnus* I (Loranthaceae) and *Trema micrantha* I (Ulmaceae) and ingesting ripe arils of *Maytenus alaternoides* I (Celastraceae).

***Thraupis cyanopectus*. Azure-shouldered Tanager, Sanhaço-de-encontro-azul.**

P.E. Fontes do Ipiranga (V).

***Thraupis ornata*. Golden-chevroned Tanager, Sanhaço-de-encontro-amarelo.**

P.E. Fontes do Ipiranga (V). Feeding observations: it was seen ingesting ripe pulp of *Myrcia rostrata* I (Myrtaceae), *F. microcarpa* A and *Morus nigra* A (Moraceae),

***Thraupis sayaca*. Sayaca Tanager, Sanhaço-cinzentos.**

P.E. Fontes do Ipiranga (N), P. Aclimação (V) and P. Trianon (V). It is fairly common in the city. Feeding observations: it was seen ingesting entire ripe fruits of *Ficus luschnathiana* I, *F. microcarpa* A, *Morus nigra* A (Moraceae), *Pittosporum tobira* A (Pittosporaceae), *Psychotria sessilis* I (Rubiaceae), *Alchornea triplinervia* I (Euphorbiaceae) and *Trema micrantha* I (Ulmaceae). It was also seen ingesting ripe pulp of *Ocotea* sp. I (Lauraceae), *Myrcia rostrata* I, *Myrcia* sp. I, *Eugenia* sp. I (Myrtaceae), and ripe arils of *Copaifera langsdorffii* I (Leguminosae), and extracting pieces of pulp of ripe fruits of planted *Carica papaya* A (Caricaceae) and *Citrus reticulata* A (Rutaceae).

***Thraupis palmarum*. Palm Tanager, Sanhaço-do-coqueiro.**

P. Aclimação (V).

EMBERIZIDAE (CARDINALINAE):

***Saltator similis*. Green-winged Saltator, Trinca-ferro-verdadeiro.**

P.E. Fontes do Ipiranga (V). There is a vouchered specimen in the former WCAB collection (now in the MZUSP collection). Feeding observations: It was seen ingesting entire ripe fruits of *Morus nigra* A (Moraceae) and *Psychotria sessilis* I (Rubiaceae), and extracting pieces of pulp of ripe fruits of planted *Carica papaya* A (Caricaceae) and *Citrus reticulata* A (Rutaceae).

EMBERIZIDAE (EMBERIZINAE):

***Paroaria dominicana*. Red-cowled Cardinal, Galo-da-campina.**

P.E. Fontes do Ipiranga (A).

***Sicalis flaveola*. Saffron Finch, Canário-da-terra-verdadeiro.**

P.E. Fontes do Ipiranga (R?, N).

***Sporophila caerulescens*. Double-collared Seedeater, Coleirinho.**

P.E. Fontes do Ipiranga (R?).

***Volatinia jacarina*. Blue-black Grassquit, Tiziu.**

P.E. Fontes do Ipiranga (V).

***Zonotrichia capensis*. Rufous-collared Sparrow, Tico-tico.**

P.E. Fontes do Ipiranga (N), P. Aclimação (N) and P. Trianon (N). It is fairly common in the city. Kuhlmann & Kühn (1947) cited the subspecies *Zonotrichia capensis subtorquata* in P.E. Fontes do Ipiranga.

EMBERIZIDAE (ICTERINAE):

***Molothrus bonariensis*. Shiny Cowbird, Chopim.**

P.E. Fontes do Ipiranga (N) and P. Aclimação (N).

FRINGILLIDAE (CARDUELINAE):

Carduelis magellanica (formerly placed in the genus *Spinus*). **Hooded Siskin, Pintassilgo.**
P.E. Fontes do Ipiranga (V?, R?).

PASSERIDAE:

Passer domesticus. **House Sparrow, Pardal.**

P.E. Fontes do Ipiranga (A, N), P. Aclimação (A, N) and P. Trianon (A, N). It is fairly common in the city.

ESTRILDIDAE:

Estrilda astrild. **Common Waxbill, Bico-de-lacre.**

P.E. Fontes do Ipiranga (A).

DISCUSSION

The list of species found in Parque Estadual das Fontes do Ipiranga during the present study, does not match well with the preliminary species list made during a survey conducted in 1986 by Argel-de-Oliveira (1987). In fact 74 species found in the present study were not detected by Argel-de-Oliveira (1987) while 13 species identified by Argel-de-Oliveira (1987) were not found in the current work (mainly from the family Tyrannidae; but see also Figueiredo & Lo, 2000).

It is also known that the former Museu Paulista of the Departamento de Zoologia, Secretaria da Agricultura do Estado de São Paulo (now Museu de Zoologia da Universidade de São Paulo - MZUSP) conducted some bird collecting campaigns in the Parque Estadual das Fontes do Ipiranga between the 1930's and 1960's (Werner C.A. Bokermann, pers. comm.), when these areas were still not completely isolated from other natural and agricultural environments by buildings (see also Pinto, 1946).

Until at least 1946, the P.E. Fontes do Ipiranga area contained several large and medium body sized native species of birds, such as *Tinamus solitarius*, *Crypturellus obsoletus*, *Penelope obscura bronzina*, *P. superciliaris*, *Ramphastos dicolorus*, *R. vitellinus* and *Pyroderus scutatus* (W.C.A. Bokermann, pers. comm.). Kuhlmann & Kühn (1947) mentioned that they had frequently collected faeces of "jacús" (*Penelope* sp./spp.) and sometimes of "jacú-guaçú" (*Penelope* cf. *obscura*) until 1945/1946 in P.E. Fontes do Ipiranga.

Several other medium and small sized species of birds existed in the P.E. Fontes do Ipiranga until 1960's/1970's, but they were not found in this study: *Nyctidromus albicollis*, *Caprimulgus parvirostris*, *Phaethornis pretrei*, *Florisuga fusca*, *Colibri serrirostris*, *Leucochloris albicollis*, *Polyerata lactea*, *Calliphlox amethystina* and *Mionectes rufiventris* (Werner C.A. Bokermann, pers. comm.).

Several factors may have contributed to the local extinction of these species in the P.E. Fontes do Ipiranga Reserve: forest isolation, hunting and capture of live birds until the end of the 1970's, diminishment of forest cover due to the construction of infrastructures inside the park (buildings, roads, parkings), progressive deforestation and degradation of small forest fragments neighbouring the P.E. Fontes do Ipiranga, and water and air pollution.

Nevertheless, considering that mist-net samplings were not used in this study, some forest passerine species (probably not detected) are expected to occur at P.E. Fontes do Ipiranga. Among them, there are probably some forest species belonging to the families Formicariidae and Furnariidae, with different "degrees" of habitat sensitivity and feeding specialisation (see Collar, 1999). It must be pointed out that, during the study period, army ants were sometimes found travelling on the ground of the P.E. Fontes do Ipiranga forests, together with ant-following species (mainly in mixed-species flocks composed of Thraupinae and Turdinae representatives).

Urban parks of São Paulo are important areas to rest and feed for several migrant and wandering species of birds, especially for those of the families Ardeidae, Anatidae (when water masses are available), Tyrannidae, Muscicapidae (Turdinae), Emberizidae (Thraupinae) and Trochillidae. In Parque Estadual das Fontes do Ipiranga, where there are several artificial lakes protected from people disturbances and where a food supplement is provided every day by the Zoological Garden, hundreds of *Dendrocygna viduata* and *D. bicolor* can be counted during winter. P.E. Fontes do Ipiranga is also an important area for the reproduction of *Phalacrocorax brasilianus*, *Ardea alba*, *Nycticorax nycticorax*, *Gallinula chloropus*, *Aramides saracura* and *A. cajanea*.

The larger species richness of birds in the Parque Estadual das Fontes do Ipiranga in relation to other areas is probably due to several factors, such as: **a-** the existence of remaining habitats for forest species (with tree holes, fallen trunks, and native species of bromeliads, orchids and bamboos); **b-** new habitats for open environment species (e.g.: wide surfaces of grassy-like pastures); **c-** the relative proximity to other remaining forest fragments and woodlots along the Imigrantes Road; **d-** its larger surface. Conversely, the relatively low amount of species in Parque Trianon could be due mainly to its little area and to its particular location: it is placed in the centre of the city, far away from remaining forest fragments and surrounded by high buildings.

Several migrant and vagrant species (especially frugivore and insect-frugivores ones) that occur in P.E. Fontes do Ipiranga probably use other forests fragments, woodlots and parks and make movements between large surrounding protected areas, such as the Serra do Mar mountain chain, the Serra da Cantareira park (7,000 ha), and the Morro Grande reserve (10,700 ha) (see figure 1). Other species, such as ducks, herons and egrets, frequently travel between large waters masses in the surroundings of the city, such as the Represa Billings, the Represa de Guarapiranga and the floodplains of the Parque Tietê. Nevertheless, for some forests species, such as *Penelope superciliaris* and *Ramphastos dicolorus*, the P.E. Fontes do Ipiranga area is an isolated "island", probably not large enough to maintain long-term populations.

Matarazzo-Neuberger (1995), who studied bird communities in some parks and squares of other cities (Santo André da Borda do Campo and São Bernardo do Campo) of the São Paulo megalopolis (the so-called Large São Paulo), suggested that several bird species that were found in urban areas also use small surrounding farmlands (see also Oniki & Willis, 1986).

Many of the most common species found in the three urban areas studied are edge and canopy moving species, mainly frugivore-insectivores, belonging to Tyrannidae, Muscicapidae (Turdinae) and Emberizidae (Thraupinae) (see Annex I; see also Willis, 1979). Several of them (or at least parts of their populations) are vagrants, wanderers or passage migrants that can exploit the resources of small and medium sized forest fragments isolated in intensively cultivated regions of south-eastern Brazil (Willis, 1979; Guix, 1996). Many edge- and canopy-dwelling birds (mainly Passeriformes) of the Neotropical Region are usually good colonists of secondary (Terborgh & Weske, 1969) and urban environments (current work). In contrast, forest undergrowth bird species are generally bad colonisers of human modified environments (Terborgh & Weske, 1969).

Most of the large cities, including the São Paulo megalopolis, have parks with alien and/or native woody plant species (including some with large body masses) that are structurally similar to forest fragments. Unlike most of the western São Paulo, where most of the forest fragments are separated by wide extensions of sugar cane and very simplified pastures with few trees, urban parks are usually separated by mosaics of buildings and gardens. These gardens could have the function of "small intermediary islands" for birds that visit large and medium sized parks.

Frequently, the detection of new migrants or vagrant species or populations of these groups in the study areas coincides with the entrance of cold air masses from the South Pole. Data on feeding observations, made in these and other areas of the São Paulo city, suggest that fruits of alien plant species available in urban parks and gardens are a crucial resource for frugivore-insectivore species during their movements (see also Guix, 1988; Guix, 1996). This fact, together with the low amount of potential wild predators in urban areas, turns large cities into important supporting areas for several passerine bird species.

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Annex I. Observations of some frugivore-insectivore species of birds with migrant or vagrant populations in the Parque Estadual das Fontes do Ipiranga (São Paulo city, Brazil), during the 1987-1989 period (from Guix, 1996).

SPECIES	MONTHS											
	J	F	M	A	M	J	J	A	S	O	N	D
<i>Elaenia flavogaster</i>						x		x				
<i>Myiozetetes similis</i>					x	x	x	x	x		x	
<i>Tyrannus melancholicus</i>						x	x	x				
<i>Muscivora tyrannus</i>								x				x
<i>Platycichla flavipes</i>						x	x	x	x			
<i>Turdus albicollis</i>						x	x	x		x		
<i>T. amaurochalinus</i>			x		x	x						x
<i>Dacnis cayana</i>					x	x	x					
<i>Euphonia chlorotica</i>								x				
<i>E. musica</i>							x					
<i>E. violacea</i>						x	x					
<i>Ramphocelus bresilius</i>	x	x	x	x	x	x	x	x	x	x	x	x
<i>Tachyphonus coronatus</i>		x	x		x	x	x	x				
<i>Tangara cayana</i>							x	x				
<i>T. peruviana</i>						x		x				
<i>T. seledon</i>		x		x	x							
<i>Thraupis cyanoptera</i>							x	x				
<i>T. ornata</i>												x
<i>T. sayaca</i>	x	x	x	x	x	x	x	x	x	x	x	x
<i>Thlypopsis sordida</i>		x						x		x		