

NEST USURPING OCCURRENCE OF THE PIRATIC FLYCATCHER (*LEGATUS LEUCOPHAIUS*) IN SOUTHWESTERN COSTA RICA

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Resumen. – Usurpación de nidos por el Mosquerito Pirata (*Legatus leucophaeus*) in el suroeste de Costa Rica. – El Mosquerito Pirata (*Legatus leucophaeus*) roba nidos colgantes o en forma de domo hechos principalmente por tiranidos o icteridos, sin embargo la frecuencia con la cual este mosquero se roba los nidos de otras especies es poco conocido. El Mosquerito Pirata robó nidos terminados de los Mosqueros Social (*Myiozetetes similis*) y Cabezigris (*M. granadensis*), construidos en sitios abiertos entre 5 – 9 m de alto. Nidos de otras especies con características similares pero menos abundantes o defendidos agresivamente, no fueron robados por el Mosquerito Piratas. A lo largo de su distribución reproductiva, son registrados usurpaciones de nidos por el Mosquerito Pirata en especies de al menos de cinco familias de aves.

Abstract. – The Piratic Flycatcher (*Legatus leucophaeus*) usurps pensile or domed nests mainly of other flycatchers (Tyrannidae) and icterids (Icteridae), but the frequency of nest parasitism is little known. In our study in south-west Costa Rica, the Piratic Flycatcher took over the finished domed nests of the Social (*Myiozetetes similis*) and the Gray-capped Flycatcher (*M. granadensis*), constructed in open sites between 5–9 m height. Nests of other species with similar characteristics, but less abundant or defended more aggressively, were not parasitized by the Piratic Flycatcher. Throughout its breeding range, nest usurpations by the Piratic Flycatcher have been recorded for species belonging to at least five bird families. Accepted 20 July 2009.

Key words: Piratic Flycatcher, *Legatus leucophaeus*, breeding season, nest abundance, nest usurpation.

INTRODUCTION

Nest usurpation has evolved several times in diverse unrelated bird groups (Lindell 1996, Payne 1998, Sorenson & Payne 2002). This behaviour is explained by having gradually evolved from birds that occasionally used abandoned nests (Skutch 1976) to species that facultative usurp other species' nests (Kappes 1997, Prokop 2004), to finally those species that obligatory depend on parasitizing other species' nests to incubate their own eggs (Skutch 1946, 1960; Payne 1977, Collias & Collias 1984). Usurping nests reduces the fit-

ness of those species that lose their nests as it reduces their probability of successful reproduction, because the birds invest a great amount of time and energy in courtship, nest site selection, and nest construction (Trine *et al.* 1998, Prokop 2004).

The Piratic Flycatcher is a Neotropical species ranging from southeastern Mexico to northwestern Ecuador, Brazil, and the Argentine border on the Atlantic slope (Morton 1977). Mexican and Central American populations migrate annually to South America after breeding (Stiles & Skutch 1989). This species usurps newly constructed domed or

pensile nests, mainly of flycatchers (Tyrannidae) and icterids (Icteridae) (Skutch 1932, 1960; Morton 1977, Stiles & Skutch 1989). Information on the incidence of usurping nests by the Piratic Flycatcher is scarce and fragmentary, being limited to anecdotic observations (Skutch 1932, 1960; Morton 1977). Our objective here is to determine the frequency of usurping domed and pensile nests by the Piratic Flycatcher in southwestern Costa Rica. In addition, we compiled information on species whose nests are usurped by the Piratic Flycatcher throughout its distribution range.

METHODS

This research was conducted during two consecutive breeding seasons (from January through April 2005 and 2006) in the southwestern Pacific coast in Golfito, Puntarenas Province, Costa Rica (83°10'N, 08°38'W; 5–30 m a.s.l.) in an area of 75 ha. Eighty percent of this area are urbanized with houses and large gardens with abundant isolated trees, while the remaining 20% are covered by second growth forest and grasslands. The annual precipitation in the region ranges from 3000 to 5000 mm, with a well defined dry season from December to March (Lobo & Bolaños 2005).

During each research season, we searched for domed and pensile nests by walking along a 3 km transect over the study area, on one day during the first week of each month, from 05:30–07:30 h. The transect was a road constructed at 20–70 m from the forest edge over the least human populated area. For each nest we registered species, nest condition (in construction, finished, or usurped), nest height above the ground, substrate (man-made or arboreal), and cover above the nest. Cover included vegetation and man-made structures and was scaled between 0 (completely uncovered) and 5 (100% cover above the nest). The

abundance of species with domed and pensile nests and the abundance of Piratic Flycatchers was recorded monthly along the 3 km transect.

The use of different substrates for nest construction (pole, tree, cable, and other) and monthly nest abundance were compared with Fisher test, G-test, or chi-square homogeneity tests (due to small sample size, data from both years were combined). G-tests were also used to compare whether the usurpation of nests depended on nest condition, nest location, or species. Nest cover and nest height were compared among species using a one way Kruskal-Wallis test, and a logistic regression was used to compare whether nest height and nest cover differed among usurped and non-usurped nests.

RESULTS

We registered five species of flycatchers that build dome or pensile nests in the study area: Gray-capped Flycatcher (*Myiozetetes granadensis*), Social Flycatcher (*M. similis*), Yellow-olive Flycatcher (*Tolmomyias sulphurescens*), Common Tody-Flycatcher (*Todirostrum cinereum*), and Great Kiskadee (*Pitangus sulphuratus*). Gray-capped, Social Flycatcher, and Great Kiskadee construct bulky domed nests, while Yellow-olive Flycatcher and Common Tody-Flycatchers construct pensile nests. The abundance varied among species but it was similar for each species throughout the sampling period ($\chi^2_3, P > 0.21$ in all cases) (Table 1, Fig. 1).

Nests of the Social and Gray-capped Flycatchers were most abundant, comprising 78% of all nests found (Table 1). The nesting peak for Social ($\chi^2_3 = 28.93, P < 0.001$) and Gray-capped flycatchers was in March ($\chi^2_3 = 23.09, P < 0.001$), and for the Great Kiskadee in February ($\chi^2 = 95.85, df = 3, P < 0.001$). The Common Tody (five nests found in both years) and the Yellow-olive Flycatchers (two

TABLE 1. Number of nests under construction and finished for five flycatcher species during the reproductive seasons 2005–2006. *Myiozetetes* includes nests from either Gray-capped or Social Flycatchers. Data of two consecutive reproductive seasons are combined; percentage of nests usurped by Piratic Flycatchers is given in parentheses.

Spp./Month	Under Construction				Finished		
	January	February	March	April	February	March	April
<i>Myiozetetes</i>	-	-	-	-	-	-	3 (100)
Gray-capped	-	8	8	-	5	21 (19.1)	18 (22.2)
Social	1	12	4	-	7	24 (8.3)	18 (5.6)
Great Kiskadee	1	2	-	1	7	7	7
Common Tody-	-	1	-	-	1	1	1
Yellow-olive	-	1	-	-	-	1	-

nests found in both years) had no reproductive peak during the four month period (Table 1).

The flycatchers used different structures for nesting (Table 2). Social Flycatcher ($\chi^2_3 = 54.48$, $P < 0.001$), Gray-capped Flycatcher ($\chi^2_3 = 23.71$, $P < 0.001$) and Great Kiskadee ($\chi^2_3 = 38.73$, $P < 0.001$) constructed most of their nests on electric posts (Table 2), whereas Yellow-olive Flycatcher and Common Tody-Flycatcher constructed their nests on trees (Table 2). Most nests had either no or a small cover of vegetation or man-made structures (KW = 15.0, df = 5, $P = 0.01$, Fig. 2). The nest height differed among the flycatchers (KW = 28.6, df = 5, $P < 0.001$). Common Tody-Flycatcher and Yellow-olive Flycatchers constructed their nests between 2 and 4 m above the ground. Social (48 of 50 nests), Gray-capped Flycatchers (40 of 44 nests) and Great Kiskadee (22 of 22 nests) constructed their nests between 4 m and 12 m above the ground.

The Piratic Flycatcher was first seen in the study area in January but began its nesting activity on March. Abundance of this species was lowest in January ($\chi^2_3 = 18.24$, $P < 0.001$), but its abundance increased in February and changed only slightly ($\chi^2_2 = 0.26$, $P = 0.89$) over the next three months (Fig. 1). In March, several pairs of Piratic Flycatcher sang ($n =$

10) near to a flycatcher nest, and on five occasions we observed one or both intruders approaching the owner's nest. Piratic Flycatchers sang from a few (2–3) nearby exposed perches and, at least in two occasions, the same pair moved between nearby nests. From all potential nests, Piratic Flycatchers avoided those of Great Kiskadee, but showed a strong preference for nests of both *Myiozetetes* species ($\chi^2_2 = 6.89$, $P = 0.03$) (Table 1). Piratic Flycatcher usurped only finished nests ($G_1 = 7.7$, $P = 0.006$) of Gray-capped and Social Flycatchers ($\chi^2_1 = 74.32$, $P < 0.001$). Nest parasitism was 57% for the Gray-capped and 21% for the Social Flycatcher, although this difference was not significant (two-tailed Fisher test, $P = 0.10$). The other 21% were nests of unidentified *Myiozetetes* (Table 1), whereas data from Common Tody-Flycatcher and Yellow-olive Flycatcher were not included due to their small sample size.

The type of substrate where nests were constructed did not affect the probability of being usurped ($G_4 = 4.4$, $P = 0.35$; Table 2). In addition, the usurpation rate was independent of either the nest height or cover (logistic regression: $\chi^2 = 1.9$, $P = 0.37$, $\rho^2 = 0.021$). The height of usurped nests varied from 5 to 9 m above the ground, and only one of these nests was densely covered (value of four).

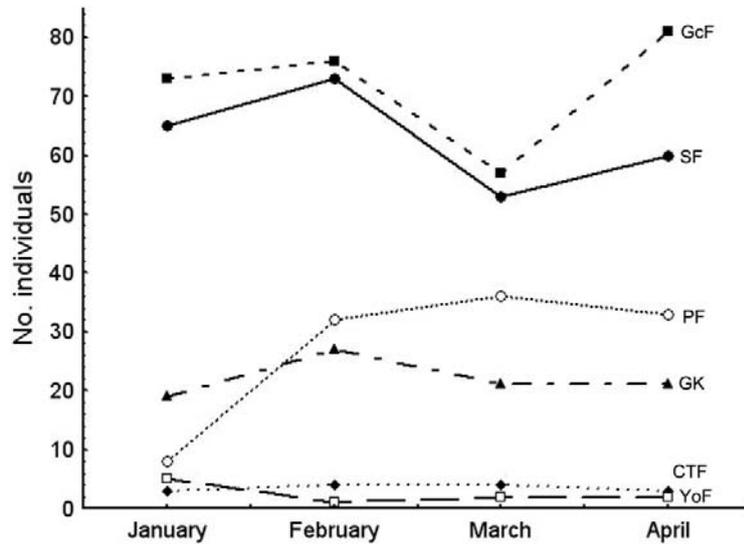


FIG. 1. Abundance of Piratic and five other flycatchers with domed or pensile nests during the reproductive season in Golfito, Costa Rica: GcF - Gray-capped Flycatcher, SF - Social Flycatcher, PF - Piratic Flycatcher, CTF- Common Tody-Flycatcher, and YoF - Yellow-olive Flycatcher. Data of two consecutive reproductive seasons (2005–2006) are combined.

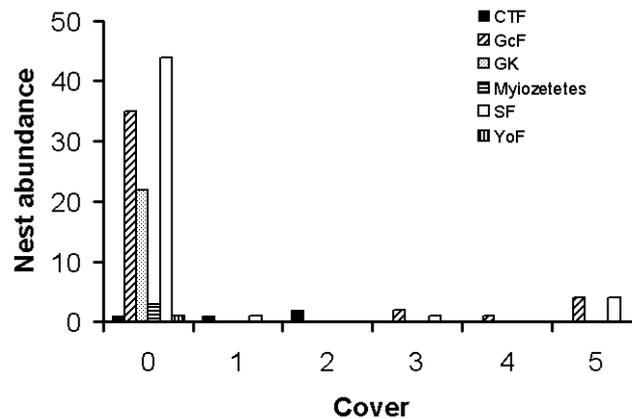


FIG. 2. Nest abundance by covert category (0 - uncovered, 5 - completely covered) in five species of flycatchers in two reproductive seasons: GcF - Gray-capped Flycatcher, SF - Social Flycatcher, PF - Piratic Flycatcher, CTF - Common Tody-Flycatcher, and YoF - Yellow-olive Flycatcher. Data of two consecutive reproductive seasons (2005–2006) are combined.

The other nests were in highly visible locations.

In Costa Rica and South America, the Piratic Flycatcher usurps nests of at least 17

species in five families that construct roofed or domed, but primarily pensile nests (69%, Table 3). Most of these species are flycatchers (50%) and icterids (25%).

TABLE 2. Number of nests on four different substrates for five flycatcher species. Data of two consecutive reproductive seasons were combined; nests usurped by Piratic Flycatchers are given in parentheses.

Species	Cables	Other	Pole	Tree
Common	-	-	-	4
Gray-capped	8 (3)	5	24 (4)	5 (1)
Great	3	-	18	1
Myiozetetes	-	-	3 (3)	-
Social	6	6	35 (3)	3
Yellow-olive	-	.	-	1

DISCUSSION

The reproductive success of the Piratic Flycatchers depends on securing a suitable nest, preferably a newly built domed or roofed nest (Skutch 1960, Stiles & Skutch 1989). This explains the early arrival of Piratic Flycatchers in the study region. The reproductive season of Piratic Flycatchers began with the detection of a potential nest, followed by an intense singing activity from nearby exposed perches. According to Skutch (1960, 1976), when a suitable host nest is finished (or nearly so), Piratic flycatchers intensify their aggressive behaviour, resulting in frequent attacks and persecutions. During the attack one of the pirates leads off the pursuers, while its mate enters the nest, takes an egg, and drops it to the ground (Skutch 1976). This behavioural sequence is repeated until all eggs are destroyed, which causes the owners to abandon the nest.

In our study, Piratic Flycatchers usurped nests of only *Myiozetetes* species. Nests of *Myiozetetes* were the most abundant, and since these species are similar in size to Piratic Flycatchers their nests are possibly more suitable for the intruders. Nests of these two species are similar in shape and size, but Social Flycatchers attack and pursue intruders that approach their nest more aggressively than

Gray-capped Flycatchers (unpubl. data). This may explain the lower rate of parasitized nests of Social Flycatchers. Several other species constructed pensile or domed nests in the study area that were not used by the Piratic Flycatchers. The small size of nests of the Common Tody-Flycatcher makes them less suitable for the piratic, although they have been reported to usurp nests of Black-headed Tody-Flycatcher (*Todirostrum nigriceps*; Table 3). The extremely aggressive behavior of the Great Kiskadee deters pirates from seizing these nests (pers. observ.). Nests of Yellow-olive Flycatchers are frequently usurped somewhere else, but during the study period only one nest of this species was seen when the Piratic Flycatchers had recently arrived. Nests of Yellow-olive Flycatchers are more abundant prior to the arrival of the Piratic Flycatchers (unpubl. data). Selection of nests by the Piratic Flycatchers apparently depends on a combination of several factors: nest abundance, aggressiveness of the nest owner, and nest characteristics (e.g., size of nesting chamber). Other aspects, such as the height of the nest and cover above the nest seem to be of little importance in nest selection by Piratic Flycatchers (Fig. 2).

Throughout its geographic distribution, the Piratic Flycatcher usurps nests of birds belonging to at least five different families (Table 3). These species vary largely in size from very small birds, such as the Black-headed Tody-Flycatcher (6.3 g), to large birds like the Crested Oropendola (*Psarocolius decumanus*) (180 g). Nests of these species also vary in shape from wasp nests and domed nests to pensile nests (Skutch 1976, Stiles & Skutch 1989), but all of them are relatively well protected. Four new reports are included here, such as on *Cinclus leucocephalus*, which is the first case documented for the family Cincidae (B. Quiespe-Estrada pers. com.). It is likely that this list is far from being complete since many other bird species with domed or

TABLE 3. Bird species with nest captured by Piratic Flycatchers (data from literature and pers. observ.). Nest type and country are included.

Taxa	Nest	Country	Source
Trogonidae			
<i>Trogon violaceus</i>	In wasp nest	Costa Rica	Skutch 1960
Tyrannidae			
<i>Rynchocyclus brevirostris</i>	Hanging	Costa Rica	Skutch 1960
<i>Poecilatriccus sylvia</i>	Hanging	Costa Rica	pers. obs.
<i>Todirostrum nigriceps</i>	Hanging	Costa Rica	E. Biamonte (pers. com.)
<i>Tolmomyias sulphureus</i>	Hanging	Costa Rica	Skutch 1960
<i>Tolmomyias poliocephalus</i>	Hanging	Bolivia	J. Tobias (pers. com.)
<i>Tolmomyias flaviventris</i>	Hanging	Suriname	Haverschmidt 1974
<i>Myiozetetes cayanensis</i>	Domed	Panamá	Skutch 1960, Haverschmidt 1971, 1974
<i>Myiozetetes similis</i>	Domed	Costa Rica	Skutch 1932, 1960
<i>Myiozetetes granadensis</i>	Domed	Costa Rica	Skutch 1932, 1960
INCERTAE SEDIS			
<i>Pachyrampus polycopterus</i>	Hanging	Costa Rica	Skutch 1954, 1960
<i>Pachyrampus aglaiae</i>	Hanging	Costa Rica	J. E. Sanchez, E. Biamonte (pers. com.)
Cinclidae			
<i>Cinclus leucocephalus</i>	Domed	Perú	B. Quiespe-Estrada (pers. com.)
Icteridae			
<i>Icterus nigrogularis</i>	Hanging	Venezuela	Skutch 1960
<i>Cacicus cela</i>	Hanging	Panamá, Bolivia	Morton 1977, M. Herrera (pers. com.)
<i>Psarocolius decumanus</i>	Hanging	Argentina	G. Gil (pers. comm.)
<i>Psarocolius wagleri</i>	Hanging	Costa Rica, Panamá	Skutch 1932, 1960; Fleisher & Smith 1992

pensile nests show a seasonal or spatial overlap in breeding with the Piratic Flycatcher.

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