

## ARTÍCULO ORIGINAL

## A New Population of Yellow Warbler (*Setophaga petechia*) on Cozumel Island with a Combination of Characteristics of Mangrove (*S. p. bryanti*) and Golden Warblers (*S. p. rufivertex*)

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### Abstract

Cozumel Island is known to be home to the endemic Golden Warbler, *Setophaga petechia rufivertex*, one of 43 subspecies of the Yellow Warbler, *Setophaga petechia*, while the mainland Yucatán Peninsula is home to a subspecies of Mangrove Warbler, *Setophaga petechia bryanti*, but historically Mangrove Warbler has been absent on the island. On 29 April 2014, we observed and photographed a warbler with extensive chestnut hood resembling Mangrove Warbler at Laguna Montecristo on the north coast of Cozumel. Additional visits on 4-5 August 2014, 13-14 July 2015, and 24 October 2015, in addition to photo-documented reports from resident and visiting birders, has turned up a total of 40+ mostly male Mangrove Warblers in addition to numerous potential females both on the north coast as well as on the south coast of Cozumel. Most records are in mangrove vegetation or a mixture of mangrove with dune or secondary vegetation, with one exception. On the other hand, Golden Warblers were never found in only mangrove habitat. All males photographed had broad breast streaks, darker crowns than rest of head, and both sexes had slightly yellower lores than typical Mangrove Warblers, all being features of Golden Warbler. Genetic studies would be highly desirable to understand the origin of this apparently new population.

**Keywords:** Habitat, mangrove, north coast, Punta Sur, origin.

**Nueva población de Chipe Amarillo (*Setophaga petechia*) en la isla de Cozumel con una combinación de características entre el Chipe Manglero (*S. p. bryanti*) y el Chipe de Cozumel (*S. p. rufivertex*)**

### Resumen

La isla de Cozumel se conoce como la sede del endémico Chipe de Cozumel, *Setophaga petechia rufivertex*, una de las 43 subespecies del Chipe Amarillo (*Setophaga petechia*), y en la costa de la península de Yucatán se localiza la subespecie de Chipe Manglero, *Setophaga petechia bryanti*, esta última históricamente ha estado ausente en la isla. Sin embargo, el 29 de abril de 2014, en Laguna Montecristo, sobre la costa norte de Cozumel, observamos y fotografiamos un chipe con una vasta capucha castaña, similar a la del Chipe Manglero. En visitas posteriores, realizadas el 4 y 5 de agosto de 2014, el 13 y 14 de julio y el 24 de octubre de 2015, los residentes de la zona y observadores de aves registraron un total de 40+ chipes mangleros, casi todos machos, aparte de un potencial número de hembras, que se han visto tanto en la costa norte como en la costa sur de Cozumel en lugares de mangle o mangle mezclado con vegetación de duna o secundaria, con una sola excepción. No encontramos el Chipe de Cozumel en zonas sólo de mangle. Todos los individuos machos fotografiados tenían amplias rayas sobre el pecho, coronas más oscuras que el resto de la cabeza, y tanto el macho como la hembra lores un poco más amarillos que el típico Chipe Manglero, todas éstas son características del Chipe de Cozumel. Estudios genéticos serían de gran ayuda para entender el origen de esta aparente nueva población.

**Palabras clave:** Hábitat, manglares, costa norte, Punta Sur, origen.

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### Introduction

The objective of this paper is to describe a new population of Yellow Warbler (*Setophaga petechia*) that we discovered

serendipitously on Cozumel. We concentrated on photographing plumages of different ages and sexes, and exploring areas of mangrove wetlands in order to understand the distribution of the bird on the island in relation to habitat type.

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Cozumel Island is known to have the endemic Golden Warbler (*Setophaga petechia rufivertex*) (Figures 1 and 2), one of 43 subspecies of the Yellow Warbler (Browning 1994, Dunn and Garrett 1997, Salgado-Ortiz *et al.* 2008). Dr. Raymond Paynter, Jr. described the habitat of this bird as follows: "Bushes and small trees throughout the island" (Paynter 1955), while Griscom stated: "*Dendroica ruficapilla* (= *Setophaga petetchia*) *rufivertex* Ridgway – This species of obvious Antillean relationship replaces *Dendroica* (= *Setophaga petetchia*) *bryanti*, which is abundant on the adjacent mainland, wherever mangroves exist. The Cozumel Yellow Warbler is not a Mangrove Warbler, but is abundant throughout the island" (Griscom 1926). Howell and Webb (1995) confirm that the Cozumel Golden Warbler is found in scrubby woodland and mangrove edge. The only habitat in which we have not found it is in vegetation composed of only mangrove species such as islands located within lagoon systems. The plumage coloration that distinguishes the two subspecies from each other includes the rufous color of the crown and the breast streaks of the Golden Warbler as opposed to the deeper chestnut-colored hood of the Mangrove Warbler (pers. obser. and photos).

We first realized the existence of this new population, which we here label "Cozumel Mangrove Warbler" during an expedition to remote mangrove lagoons and channels in the newly established protected area, Manglares y Humedales del Norte de Isla Cozumel 29 April 2014. We heard what sounded like the song of a Mangrove Warbler, which the first author

knew had never been recorded on Cozumel. We were able to photograph one individual (Figure 3) which showed the extensive chestnut hood similar to the typical Mangrove Warbler found on the adjacent mainland, but in contrast to that subspecies showed a darker chestnut color on its crown than the rest of the head, much yellow on the lores and had broad and lengthy streaking on the breast and along the sides of the abdomen, similar to the typical Cozumel Golden Warbler.

The male Mangrove Warbler from the coastal zone of the peninsula has a deeper chestnut-colored hood and thin reddish stripes on its breast, while the female has varying touches of chestnut on its face along with variation in the intensity of its breast streaks related to age (Figures 4 and 5), as opposed to the adult male and female of the Cozumel Mangrove Warbler.

## Methodology

Since the habitat of the Golden Warbler has never included mangrove (Griscom 1926, Paynter 1955, Howell & Webb 1995) and knowing that Mangrove Warbler on the mainland (Figures 4 and 5) is only found in mangrove wetlands, we decided to strategically search mangrove wetlands to learn the extent of the distribution of the bird on the island. We took coordinates at each location that a Mangrove Warbler type was positively identified. At the same time, we enlisted the support of members of the Cozumel Birding Club, personnel from the national



**Figures 1 and 2.** Cozumel Golden Warbler, *Setophaga petechia rufivertex*, male - left (photo: B. Campos), female - right (photo: E. Patiño).





**Figure 3.** First known photo-documented report of a Mangrove Warbler in Cozumel (photo: A. Dzib-Chay).

parks system (CONANP), and from the Fundación de Parques y Museos de Cozumel (FPMC), to photograph all possible Mangrove-type Warblers, noting location and date. Upon learning of two sightings of male Mangrove Warblers in the area of the parking lot and boat landing at Laguna Ciega and at least three in Laguna Montecristo, we decided to explore Río de la Plata, 5 kms west of Cozumel's most northeastern point, Punta Molas. This would provide an indication of the total area in which the bird was distributed in the wetlands along the north coast of the island.

We explored this lagoon the morning of 4 August 2014

from 8:30 to almost 12:00 noon in a motorized boat. We selected three large mangrove islands in distinct parts of the lagoon, assuming that if the warbler was found in all three areas, it most likely occupied suitable areas in between. The first large island in Río de la Plata was located a short distance from the north side of the entrance to the lagoon system; the second island was located at the northeastern extreme of the lagoon; and the third was in the southwestern portion of the lagoon. All three locations contained red and black mangrove between three and four meters high.

On 5 August 2014 we searched Punta Sur from 8:50 to 12:20 for Mangrove Warblers and apart from the ones we documented, more individuals were photo-documented in the same general area by local residents between December 2014 and September 2015. Subsequently we realized a visit by boat in Laguna Colombia at the southern end of the island the afternoon of 24 October 2015 from 13:30 to 15:15. A brief visit was made to the mangroves at the Caleta the afternoon of 23 October 2015. All locations have been noted on a map of the island (Figure 6).

## Results

An inventory of our findings is summarized in Table 1, and photos of most of the individuals noted are found in Appendix I. The variation in the amount of chestnut color in the heads of the male birds may or may not be indicative of age as one bird photographed in June (Figure 9), when you would assume the



**Figures 4 and 5.** Adult male (left) and sub-adult female (right) of Mangrove Warbler (*Setophaga petechia bryanti*) at Celestún, Yucatán on the mainland (photos: A. Dzib-Chay).

**Table 1.** Records of Cozumel Mangrove Warbler

Location	Coordinates	Date	Habitat	Sex	Estimated Age	Photographer (Ph)/Observer (Obs)
Planta de Tratamiento (water treatment plant)	N20.538117° W-86.893567°	19-10-08	Mixed secondary/ mangrove	male	adult	Obs. A. Knue
Laguna Ciega (Boat landing)	N20.544029° W-86.879769°	13-11-12	Mangrove	male	adult	Obs. A. Dzib
"	"	24-05-14	Mixed dune veg/ mangrove	male	adult	Ph-H. Bajarano
"	"	4-01-15	Mangrove	male	adult	Ph-E. Patiño; Fig. 7
"	"	9-01-15	Mangrove	male	adult +5	Ph-R. Chacón; Fig. 8
"	"	11-01-15	Mangrove	male	adult	Ph-R. Chacón
"	"	28-06-15	Mixed dune veg/ mangrove	male	?	Ph-N. Rivas-Camo; Fig. 9
"	"	13-07-15	Mangrove	male	adult	Ph-A. Dzib
Laguna Montecristo	N20.552617° W-86.824133°	2013	Mangrove	male	adult	Obs. N. Joaquín
"	N20.552317° W-86.823750°	29-04-14	Mangrove	male	adult	Ph. A. Dzib, B.MacKinnon; Fig. 3
"	N20.552117° W-86.821900°	29-04-14	Mangrove	male	adult	Obs. A.Dzib, B.MacKinnon
Río de la Plata –A	N20.567483° W-86.768583°	4-08-14	Mangrove	male	adult	Ph-A. Dzib, B.MacKinnon; Fig. 10
"	"	4-08-14	Mangrove	female	juv	Ph-A. Dzib, B.MacKinnon; Fig. 11
"	"	4-08-14	Mangrove	?	juv	Ph-A. Dzib, B.MacKinnon; Fig. 12
"	"	4-08-14	Mangrove	male	juv	Obs. A.Dzib, B.MacKinnon
Río de la Plata –B	N20.565617° W-86.763733°	4-08-14	Mangrove	?	juv	Ph-A. Dzib, B.MacKinnon; Fig. 13
"	"	4-08-14	Mangrove	male	sub-adult	Ph-A. Dzib, B.MacKinnon; Fig. 14
"	"	4-08-14	Mangrove	female	juv	Ph-A. Dzib, B.MacKinnon; Fig. 15
Río de la Plata -C	N20.560967° W-86.767667°	4-08-14	Mangrove	male	?	Ph-A. Dzib, B MacKinnon; Fig. 16
"	"	4-08-14	Mangrove	male	juv	Ph-A. Dzib, B.MacKinnon; Fig. 17
"	"	4-08-14	Mangrove	male	?	Ph-A. Dzib, B.MacKinnon; Fig. 18
"	"	4-08-14	Mangrove	female	?	Ph-A. Dzib, B.MacKinnon; Fig. 19
Faro Punta Sur/ Lighthouse	N20.272850° W-86.988067°	24-10-15	Mixed dune veg/ mangrove	male	adult	Ph-J.A. Linage; Fig. 20
"	"	24-10-15	Mixed dune veg/ mangrove	female	adult	Ph-J.A. Linage; Fig. 21
Aguada (pond)	N20.273633° W-86.989283°	5-08-14	Mixed dune veg/ mangrove	female	adult	Ph-A. Dzib, B.MacKinnon; Fig. 22
"	"	5-08-14	Mixed dune veg/ mangrove	female	juv	Ph-A. Dzib, B.MacKinnon; Fig. 22
"	"	5-08-14	Mixed dune veg/ mangrove	male	?	Ph-A. Dzib, B.MacKinnon; Fig. 23

Location	Coordinates	Date	Habitat	Sex	Estimated Age	Photographer (Ph)/Observer (Obs)
Camino (road)	N20.286663°	13-01-15	Dune vegetation	male	adult	Ph-P. Sabido
Punta Sur	W-86.995872°					
"	N20.300250°	28-02-15	Dry pond-dune vegetation	male	?	Ph-P. Sabido; Fig. 24
	W-87.004583°					
Bocana	N20.310167°	11-12-14	Mixed dune veg/ mangrove	male	adult	Ph-P. Sabido
(Channel to sea)	W-87.009617°					
"	N20.309217°	24-10-15	Mixed dune veg/ mangrove	male	?	Ph-A. Dzib, B.MacKinnon; Fig. 25
	W-87.009183°					
"	"	24-10-15	Mixed dune veg/ mangrove	female	?	Ph-A. Dzib, B.MacKinnon; Fig. 26
Caleta (harbor)	N20.461183°	23-10-15	Mangrove	male	adult	Obs. A. Dzib
	W-86.983983°					
Casa (house) N. Rivas	N20.509217°	5-03-15	Urban yard	male	sub-adult	Ph-N. Rivas-Camo; Fig. 27
	W-86.937433°					

bird would display the coloration of an adult, does not have a completely colored hood. For lack of a precise date or location, information on a few individuals reported to us by others are not listed but are considered among the 40+ total of Mangrove Warbler type birds found. What we did not find was a population of Mangrove Warbler with similar plumage coloration to that of *S. p. bryanti* that inhabits the mainland and other off shore islands of the peninsula.

It is important to note that no Golden Warblers were found in vegetation composed of only mangrove species found on islets and bordering the entire lagoon of Río de la Plata, nor along the shore of the boat landing at Laguna Ciega where mangrove species dominate the vegetation. However, both Mangrove and Golden Warblers were found within 200 m of the latter location where mangrove was intermixed with dune and secondary vegetation. The same occurred at Punta Sur where most habitat is mixed mangrove with dune vegetation. One Mangrove Warbler type was photographed feeding in a mamey tree, *Pouteria campechiana*, in a garden in the town of San Miguel, approximately 13 kms from mangrove habitat on the road to Laguna Ciega (Figure 27). Upon finding pairs of Mangrove Warblers, we compared the plumage of the females to that of the female feeding the fledgling (Figure 22) and concluded that adult females displayed an olive-brown colored partial hood outlining its yellow lores, face and throat. The sexes and ages noted in Table 1 are our best estimates, taking into consideration plumage, color of lower mandible, dates observed, behavior, in pairs or family groups. However,

due to the great variation in plumage coloration in the Yellow Warbler, we have eliminated estimated sex and age in many instances (Migration Research Foundation).

## Discussion

The island of Cozumel has been a mecca for international bird-watching tours since the 1980's and yet only one Mangrove-type Warbler has ever been reported by a tour participant. An apparent young male Yellow Warbler (Mangrove) was reported in eBird seen near the water treatment plant on the road leading to Laguna Ciega 19 October 2008 by Alan Knue. Knue's description and the fact that he observed a migrant male Yellow Warbler and a male Golden Warbler in the same tree as the Mangrove-type Yellow Warbler, made for a good comparison of the three birds. He was not aware that a Mangrove-type Warbler was not expected on Cozumel until contacted by the first author, the regional reviewer for eBird. Being unfamiliar with the species and only noting the all reddish-colored head, he was unable to note any differences with *S. p. bryanti*. Nor did researchers from the Universidad Nacional Autónoma de México who worked on the island using nets in the 1990's ever report such a bird (Macouzet Fuentes 1997).

As a result of our experience, Dzib recalled having seen a male Mangrove Warbler in the area of the parking lot for the boat landing at Laguna Ciega in 2012, but thought nothing of it. Also, Cozumel resident, Nassim Joaquín Delbouis, re-





**Figure 6.** Cozumel Island, México and where Cozumel Mangrove Warbler was documented.

membered seeing a chestnut-headed, small bird in one of the mangrove-lined canals in Laguna Montecristo in 2013 and one further north in the same lagoon system for which he couldn't recall the date.

The question of the possible origin of this new population of Yellow Warbler on Cozumel is puzzling as it displays characteristics of two subspecies that belong to two different groups, Golden Warbler belonging to the *petechia* Group and Mangrove belonging to the *erithachorides* Group. Eliminating similarities in plumage, the major difference we found between Golden Warbler and the Cozumel Mangrove Warbler is the latter's preference for mangrove habitat.

Upon finding the first chestnut-hooded Yellow Warbler on the island, we considered the probability of hybridization. However, we did not find any Mangrove Warblers displaying plumage characteristics of *S. p. bryanti* during our searches, which led us to consider the possible arrival of an individual, or more, most probably from the mainland during one of the more powerful hurricanes to pass over the island in recent years. Hurricanes that could be considered include Emily, a category four storm 16 July 2005 or more likely, Hurricane Wilma, a category five storm that passed over 21 October 2005 and remained over the region for 65 hours (Delsol 2009). This consideration is attributed to the possibility that the only Lesser Greenlet ever

found on the island was registered 17 October 1995, seven days after the passage of Hurricane Roxanne (Carmody 2012).

Genetic studies are required in order to determine the provenance of the Mangrove Warblers now on the island; additional studies should also seek to explain how long they have been there, whether there has been any gene flow between them and the endemic subspecies, *S. p. rufivertex*, and if the endemic subspecies has shifted its niche at all.

## Acknowledgements

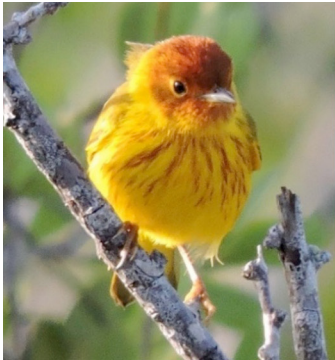
We wish to thank the following people and their organizations that provided support for visiting different locations on Cozumel: Eduardo Patiño - Cozumel Birding Club, Itzel Arista - Comisión Nacional de Áreas Naturales Protegidas, Paulina Sabido and Héctor González - Fundación de Parques y Museos de Cozumel, Benny Campos - Cozumel Country Club, Rafael Chacón - Municipal Government of Cozumel, Nassim Joaquín Delbouis and Capt. Gaspar Chulim. We are also extremely grateful to the following people who provided photos for this article including: Benny Campos, Rafael Chacón, José Antonio Linage, Eduardo Patiño, Noel Anselmo Rivas-Camo and Paulina Sabido. Special thanks to Héctor Gómez de Silva for reviewing an early draft of the manuscript and making insightful recommendations, and to two anonymous reviewers for their critical comments.

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Appendix I



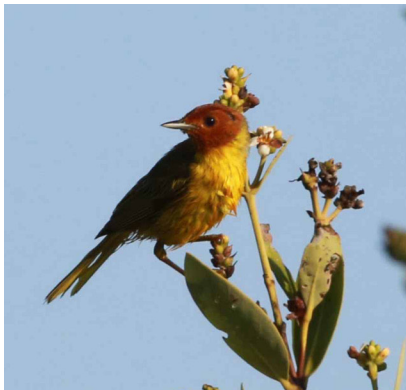
**Figure 7.**  
Photo: Eduardo Patiño



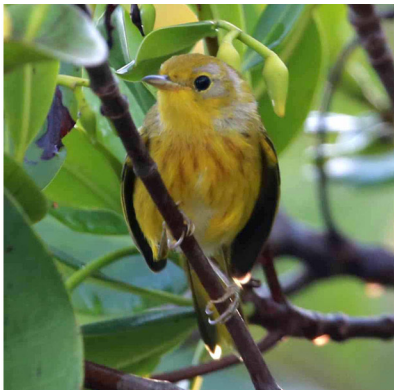
**Figure 8.**  
Photo: Rafael Chacón



**Figure 9.**  
Photo: Noel Rivas Camo.



**Figure 10.**  
Photos: Alexander Dzib-Chay.



**Figure 11.**



**Figure 12.**



**Figure 13.**  
Photos: Alexander Dzib-Chay.

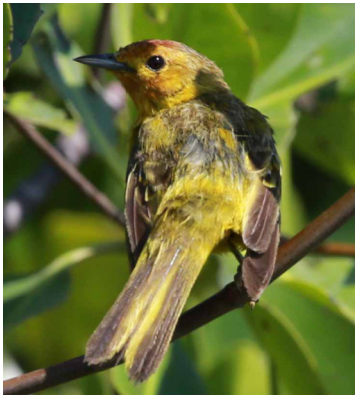


**Figure 14.**



**Figure 15.**





**Figure 16.**  
Photos: Alexander Dzib-Chay.



**Figure 17.**



**Figure 18.**



**Figure 19.**  
Photo: Alexander Dzib-Chay.



**Figure 20.**  
Photos: José Antonio Linage.



**Figure 21.**



**Figure 22.**  
Photos: Alexander Dzib-Chay.



**Figure 23.**



**Figure 24.**  
Photo: Paulina Sabido.



**Figure 25.**  
Photos: Alexander Dzib-Chay.



**Figure 26.**



**Figure 27.**  
Photo: Noel Rivas-Camo.



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