

New records of Van Rossem's Gull-billed Tern (*Gelochelidon nilotica vanrossemi*) nests in the Coast of Jalisco, Mexico

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Abstract

We report new nesting sites for the Van Rossem's Gull-billed Tern (*Gelochelidon nilotica vanrossemi*) at the Agua Dulce and Xola-Paramán lagoons, in the coast of the state of Jalisco, Mexico. We first recorded the nests on 19 June, 2013 and monitored them at two-week intervals until 2 August, 2013. We found eight nests in the Agua Dulce lagoon and 16 in the Xola-Paramán lagoon. These new records expand the known nesting range of the Van Rossem's Gull-billed Tern along the Pacific coast, from San Diego, California to the state of Colima in Mexico.

Keywords: nesting, waterbirds, wetlands, central Mexican Pacific.

Nuevos registros de nidos del charrán picogruoso (*Gelochelidon nilotica vanrossemi*) en la costa de Jalisco, México

Resumen

Reportamos nuevos sitios de anidamiento del charrán picogruoso (*Gelochelidon nilotica vanrossemi*) en las lagunas Agua Dulce y Xola-Paramán en la costa del estado de Jalisco. Registramos los nidos por primera vez el 19 de junio de 2013 y, a partir de esa fecha, visitamos la laguna cada quince días hasta el 2 de agosto de 2013. Observamos un total de ocho nidos en la laguna Agua Dulce, y 16 en la laguna Xola-Paramán. Con estos dos registros se incrementa el área de anidación de *G. n. vanrossemi* en las costas del Pacífico; desde San Diego California, hasta Colima, México.

Palabras clave: anidación, aves acuáticas, humedales, Pacífico central mexicano.

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Introduction

The Gull-billed Tern (*Gelochelidon nilotica*) is a medium-sized (33-38 cm long) seabird of the family Laridae. It can be distinguished from other terns by its black cap and thick black beak. It is a wide ranging species that can be found in several continents (Howell and Webb 1995, Molina *et al.* 2009). In the Pacific Ocean, its distribution ranges from California to Panama, Colombia, Ecuador, and Peru (Molina *et al.* 2009).

The Gull-billed Tern encompasses six subspecies, of which only two can be found in America: *G. n. aranea* breeds on the

Atlantic coast and the Gulf of Mexico (Molina *et al.* 2009), *G. n. vanrossemi* (Bancroft, 1929) nests along the Pacific coast of California, USA (Parnell *et al.* 1995), and in the Mexican states of Baja California and Baja California Sur (Danemann and Carmona 2000, Molina and Garrett 2001, Palacios and Mellink 2007), Sinaloa, Nayarit, and Colima (Palacios and Mellink 2007).

The total number of Van Rossem's Gull-billed Tern (*G. n. vanrossemi*) pairs is relatively small. Molina and Erwin (2006) and the U.S. Fish and Wildlife Service (USFWS 2009) estimated a population size of 250 pairs nesting at two sites in California. In Mexico, 15 nesting colonies and 527 pairs have been reported from Baja California to Colima (Molina and Garrett 2001, Palacios and Mellink 2007, González-Medina and Guevara-Medina 2008; Figure 1).

Bird inventories have been conducted along the coast of Jalisco for several years and this subspecies has been observed

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in some wetlands including La Manzanilla estuary, Chamela Bay, the Chalcatepec and the Xola-Paramán lagoons, the Majahuas estuary, El Chorro estuary, El Ermitaño estuary, and the Agua Dulce lagoon. However, nests of the Van Rossem's Gull-billed Tern had not been recorded in any of those sites (Palacios and Mellink 2007, Hernández-Vázquez *et al.* 2012). In this paper we report two new nesting sites for the Van Rossem's Gull-billed Tern in the coast of Jalisco, Mexico, in the Central Pacific.

Methods

The Agua Dulce lagoon is located 3 km northwest of Portezuelos and 6 km northwest of Cruz de Loreto, in the municipality of Tomatlán, Jalisco (20°02'45"N, 105°30'50"W). The lagoon has an 832.57 ha water mirror and no hydrological communication with the Pacific Ocean. The only water inflows come from rainfall and a man-made floodgate that connects the lagoon with the El Ermitaño estuary, which is managed by fishermen.

The Xola-Paramán lagoon is located 44 km southeast of the Agua Dulce lagoon and 5 km southwest of Campo Acosta (19°43'44"N, 105°16'05"W). This lagoon has a 703.98 ha water mirror and is mostly shallow, with a maximum depth of about 2 m. Water level decreases markedly during the dry season to almost complete desiccation, which leads to salinity levels higher than 100 psu (Figure 1).

Both lagoons are located within the protected area named *Zona de Reserva y Sitio de Protección de Tortugas Marinas Playón de Mismaloya*. This area has been designated as a Priority Hydrological Region (*Región Hidrológica Prioritaria No.24 Cajón de Peñas – Chamela*; Arriaga *et al.* 2002) and a Ramsar site (RAMSAR 2014).

We visited these wetlands from January 2013 to January 2014 as part of the shorebird monitoring activities carried out within the project *Implementación de la Estrategia Nacional para la Conservación de Aves Playeras, fase II: Regiones Altiplano Norte, Centro y Costa del Pacífico Sur*. This project was coordinated by Ducks Unlimited Mexico, A.C.

On 19 June, 2013 we found active nests of the Van Rossem's Gull-billed Tern in the Agua Dulce and the Xola-Paramán lagoons on the coast of Jalisco. Starting on that date, we visited the two nesting sites every two weeks. On each visit, nests were counted between 07:00 and 08:00 hours to avoid exposing eggs and fledglings to excessive heat. New nests were marked with a labelled stake at one of the nest's ends. The nest identification number, substrate type, construction material

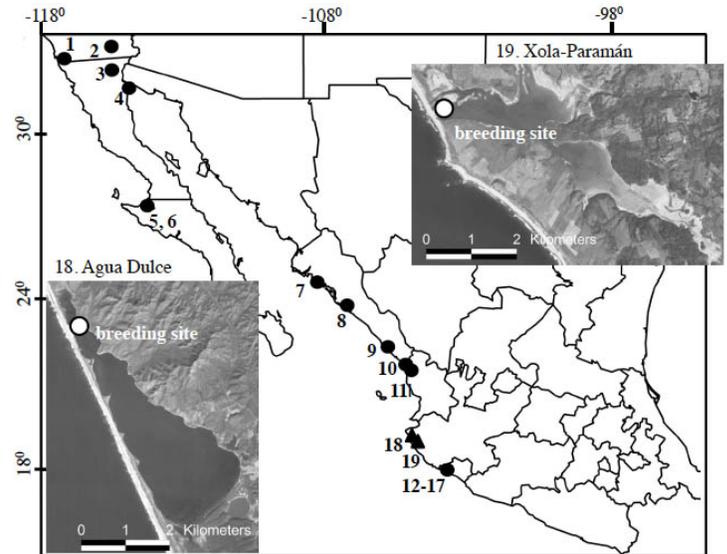


Figure 1. Location of the VanRossem's Gull-billed Tern colony sites previously reported for the USA and Mexico (circles), and those reported in this study (triangles). (1) San Diego Bay, California. (2) Salton Sea, California. (3) Cerro Prieto, Baja California. (4) Montague Island, Baja California. (5 and 6) Ojo de Liebre Lagoon, Baja California Sur. (7) El Rancho Island, Sinaloa. (8) Ceuta bay, Sinaloa, (9) El Caimanero lagoon (Las Tres Tumbas), Sinaloa. (10) Teacapán estuary, Nayarit. (11) Las Garzas lagoon (Pericos), Nayarit. (12-17) Cuyutlán lagoon, Colima (Molina and Garret 2001, Molina and Erwin 2006, Palacios and Mellink 2007, González-Medina and Guevara-Medina 2008). (18) Agua Dulce lagoon, Jalisco, and (19) Xola-Paramán lagoon, Jalisco.

and date we rerecorded; from these records, the total number of active nests during the nesting season was determined.

We recorded the number of eggs and fledglings per nest, as well as fledglings found out of the nest. Eggs were weighed using a portable digital precision balance (300 g \pm 0.05); egg length and width were measured with a digital caliper (inch/metric 0-6 inches). We report the mean and standard deviation (\pm SD). Additionally, we made observations on the major threats to nests at both sites.

Results

At the Agua Dulce lagoon, we found the nests in the northwestern portion of the lagoon (20°04'16"N, 105°31'56"W) on a small sandy islet, approximately 2 ha in area, that emerges when the water level is low (Figure 2a). Nests were built inside small holes in the sandy substrate, where we found remains from surrounding nesting materials such as feathers, crab shells, small shells, and grass (Figure 2b).

We recorded eight nests of the Van Rossem's Gull-billed Tern at this site. On 19 June, we observed three nests with six

eggs (two eggs per nest). On 5 July there were six nests with 13 eggs (five nests with two eggs each and one nest with three eggs). On 19 July we only found three nests, four eggs, and three nestlings (one nest with one egg and one nestling, one nest with three eggs, and one nest with two nestlings). On this same date, we found four larger fledglings out of the nests. On 2 August we visited the site again and found no active nests; we only observed 12 nestlings scattered along the islet margin, hiding in the mud or under tufts of grass or dry seaweed. We located five nests on small mounds of mussel shells and three on a sandy substrate; they were built primarily of dry grass, feathers and various shell remains.

Egg width ranged from 3.08 to 3.30 cm (3.19 ± 0.10 , $n=10$), and egg length from 4.37 to 4.90 cm (4.68 ± 0.24). Egg weight ranged from 20 to 28 g, with an average of 24.42 ± 3.18 .

At the Xola-Paramán lagoon, we found the nests on an islet located at the northwestern portion of the lagoon ($19^{\circ}43'14''\text{N}$, $105^{\circ}17'231''\text{W}$), where the lagoon connects with the ocean.

The islet is approximately 1.5 ha in area and is located 50 m from the sandbar mouth (Figure 2c). All nests were built inside small holes in the sandy substrate using dry grass, feathers and various shell remains as construction materials (Figure 2d).

We found 16 nests at the Xola-Paramán site: on 19 June, we observed nine nests and 11 eggs (seven nests with one egg and two nests with two eggs each); on 5 July we found 13 nests, with 21 eggs and two nestlings (five nests with one egg each, one nest with one egg, and two nestlings, six nests with two eggs each, and one nest with three eggs). By 19 July there were no active nests, but we found 18 fledglings outside of the nests. We found no active nests on subsequent visits, but we observed seven fledglings around the nesting sites. Three of the 16 nests were eventually destroyed, possibly by American crocodiles (*Crocodylus acutus*), as evidenced from tracks found around nests. Egg width ranged between 3.15 and 3.35 cm ($\pm\text{DE}$; 3.26 ± 0.07 , $n=10$), and egg length ranged from 4.30 to 4.95

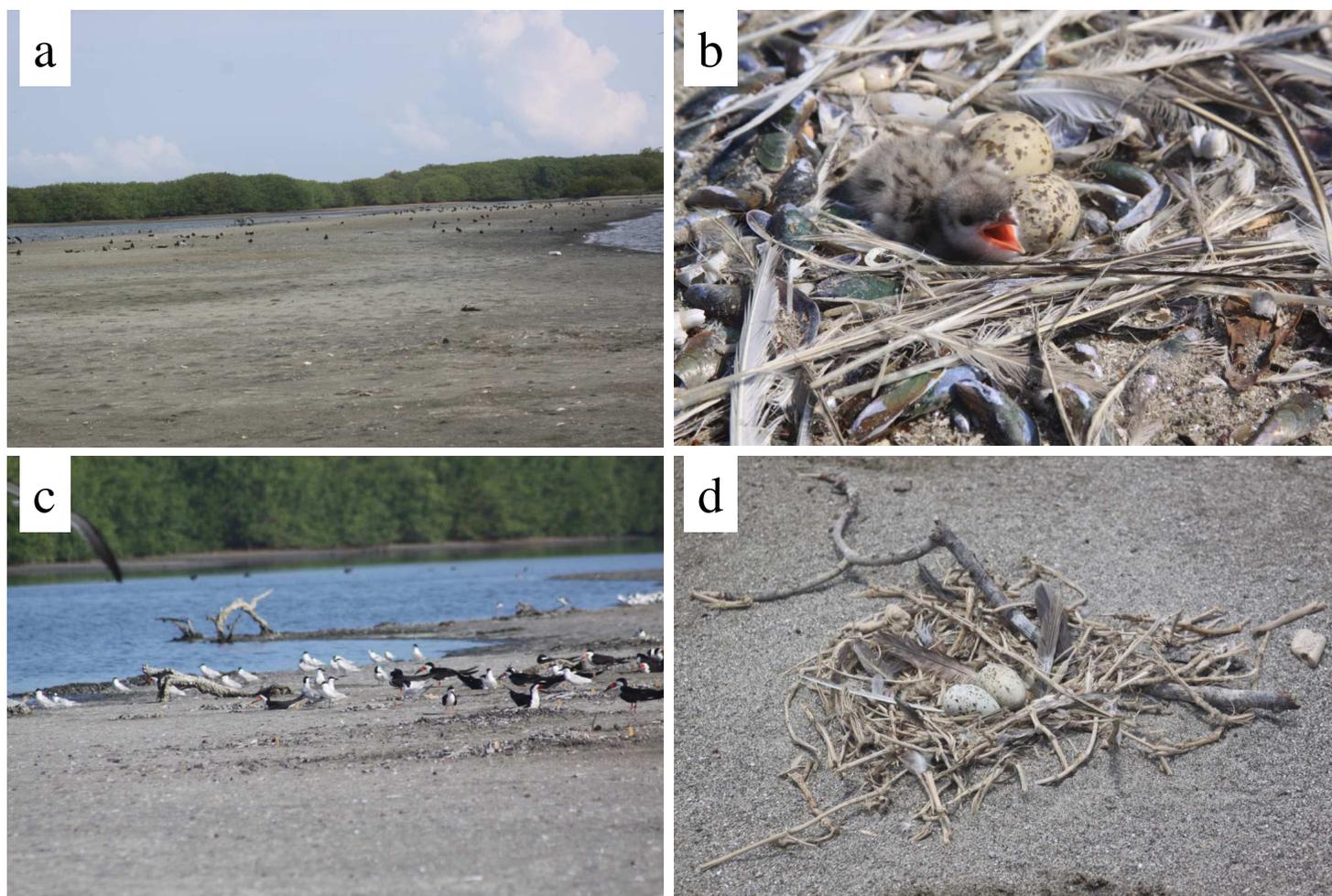


Figure 2. View of the islets where the Van Rossem's Gull-billed Tern and other species were found nesting. (a) Islet in the Agua Dulce lagoon, (b) nest, eggs, and chick in the Agua Dulce lagoon, (c) islet in the Xola-Paramán lagoon, and (d) nest and eggs in the Xola-Paramán lagoon.

cm (4.58 ± 0.24). Egg weight ranged from 23 to 29 g, with an average of 25.78 ± 2.24 .

At both sites the Van Rossem's Gull-billed Tern nests were also associated with those of other species, including the Least Tern (*Sternula antillarum*), the Black Skimmer (*Rynchops niger*), and the Black-necked Stilt (*Himantopus mexicanus*; Figures 2a and 2c).

Discussion

The two new nesting sites of the Van Rossem's Gull-billed Tern reported in this study display characteristics similar to those of other nesting sites recorded in Mexico (Molina and Erwin 2006, Palacios and Mellink 2007). These are islets that are exposed only at low-water level, with sandy substrates surrounded by shallow waters close to the outlet to the ocean. The nesting season occurs before the rainy season, when water level is low, thus preventing the islets—and consequently the nests—from flooding. Existing published reports describe neither nest characteristics nor egg size or weight. Thus, our study provides this information as reference for future studies.

The number of Van Rossem's Gull-billed Tern nests reported for Mexico has varied between sites and years. Numbers reported range from one to two in Isla El Rancho, Sinaloa, in 2005 (Palacios and Mellink 2007) to over 234 and 274 in Baja California, in 2004 and 2005, respectively (Molina *et al.* 2006).

Although breeding colonies of the Van Rossem's Gull-billed Tern are not particularly large, recent studies reveal a rise in the number of nesting sites over the last years. Molina and Erwin (2006) reported 11 breeding colonies in California and México. Palacios and Mellink (2007) reported 14 breeding colonies only in Mexico, some of which were new records for this subspecies. They first recorded nesting in Las Garzas lagoon (160 pairs in 2005), the Teacapán estuary, Nayarit (two pairs in 2003), the Cuyutlán lagoon, Colima (5 islets with 1-25 pairs in 2005), Guerrero Negro, Baja California Sur (14 pairs in 2003, Salt Work Area 8), and El Caimanero lagoon, Sinaloa (25 pairs in 2005). González-Medina and Guevara-Medina (2008) reported a pair incubating in Ceuta bay, Sinaloa. The two nesting sites just found in the Agua Dulce and Xola-Paramán lagoons add to a total of 19 nesting sites of the Van Rossem's Gull-billed Tern recorded on the Pacific coast from California, USA to Colima, Mexico (Figure 1).

The Van Rossem's Gull-billed Tern is a seabird with small population size and restricted distribution facing a variety of threats. Habitat loss and degradation are important factors affecting the tern's nesting sites and breeding success (Molina

and Erwin 2006, USFWS 2009). These impacts are becoming more frequent and extensive due to the current increase in tourist and urban development activities affecting wetlands. The primary threats observed in this study were fishermen walking over the nesting colonies, especially in the Xola-Paramán lagoon. This made the birds fly away, leaving their nests exposed to the sun and predators. The impacts of fishing on breeding colonies have also been documented in other sites, such as the Teacapán estuary (Molina *et al.* 2009), Las Garzas lagoon and Montague Island (Palacios and Mellink 2007). However, a greater concern in the Xola-Paramán lagoon is the opening of the sand bar that separates the lagoon from the sea, to allow the entry of sea water into the wetland. During our fieldwork, the sandbar remained closed and was not artificially opened; however, on subsequent visits (February-July 2014) the bar was opened and no nesting pairs were recorded in 2014 due to flooding of the nesting site.

One of the major concerns at the Agua Dulce lagoon is the fluctuation in water level. The lagoon's primary water supply is through a man-made channel controlled by a floodgate that is opened at different times of the year. Should the gate be opened during the nesting season, islets would probably become flooded and in turn leading to nests being destroyed.

The small nesting sites and size of the colonies justify the continued monitoring of the Agua Dulce and Xola-Paramán lagoons. In addition, further studies on the reproductive success and the main threats to the Van Rossem's Gull-billed Tern in these lagoons could help to better protect this subspecies and its nesting sites.

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