CROCODILE SPECIALIST GROUP NEWSLETTER

VOLUME 38 No. 1 • JANUARY 2019 - MARCH 2019

IUCN • Species Survival Commission

Figure 1. Speakers at symposium, from left: John Jairo Gomez (Colombia), Pierre Charruau (Mexico-France), Valerie García (Guatemala) and Miryam Venegas de Anaya (Panama).

Figure 2. Speakers and assistants at Symposium. Standing: Marco López (Mexico), Carolina Sánchez (Mexico), Valerie García (Guatemala), Laura Porras (Costa Rica), Miryam Venegas (Panama), Oris Sanjur (Panama); kneeling: Armando Escobedo (Mexico), Gabriel Barrios (Mexico), John Jairo Gómez (Colombia), Roberto Ibañez (Panama).

Figure 3. Field trip to Barro Colorado Island, the biological station of the Smithsonian Tropical Research Institute.

There were 14 presentations from Mexico, Belize, Guatemala, El Salvador, Honduras (Mario Espinal could not attend the symposium), Costa Rica and Panama. The presentations included topics from national conservation status in Mexico, Belize, Guatemala, Costa Rica and Panama, human-crocodile interactions, the use of new technologies to monitor crocodilians, to specific topics such as blood biometry and trophic ecology of the American crocodile and Spectacled caiman. It was interesting to note that women made most of the presentations.

Following the symposium, an informal working meeting, supported by STRI and SENACYT, was held at Barro Colorado Island (BCI) on 25-26 November. The main goal of this meeting was to analyze the information presented at the symposium and to establish work goals within and between countries with similar conservation problems/challenges. Participants included Marco Antonio López Luna, Gabriel Barrios Quiroz, Pierre Charruau, Armando Escobedo Galván (Mexico), Valerie Corado García (Guatemala), Miryam Venegas Anaya, Stephany del Rosario, Melciellyne Aguilar (Panama) and Laura Porras Murillo (Costa Rica). Pablo Siroski (Argentina/CSG Regional Chair for Latin America and the Caribbean) and Marisa Tellez (Belize/CSG Regional Vice Chair for LAC) were "virtual participants".

In the BCI meeting, the following issues were discussed:

1. Research initiative Mexico-Guatemala for the Usumacinta Basin.
2. Population genetics of *C. acutus* (this topic has been addressed by Miryam for over 10 years), and additional samples to be included from Chinchorro and Cozumel, Mexico (Miryam Venegas de Anaya and Pierre Charruau).
3. Development of a DNA database of samples with minimum sample information (eg date, locality-GPS, type of sample, type of sample conserve, and collector), and keep available for genetic/molecular research with a established protocol for collaboration.
4. Update from Frank Mazzotti or Kent Vliet on the current status of the book-proof on *C. acutus* coordinated by John Thorbjarnarson.
5. Standardization on a permanent marking system, as well as the encounter rate estimates to be able to compare survey data at a regional level.
6. Preparation of a proposal by Guatemala, Costa Rica and Panama to begin regional assessments.

We expect to have some of the meeting's objectives ready for the upcoming CSG regional meeting in Belize in June 2019.

Miryam Venegas de Anaya *(Technological University of Panama and Smithsonian Tropical Research Institute, Panama; dracocodrilo@hotmail.com)*, Laura Patricia Porras Murillo *(International Institute in Conservation and Management of Wildlife, National University, Heredia, Costa Rica; laura.porras.murillo@una.cr)* and Armando H. Escobedo-Galván *(Centro Universitario de Guadalajara, University of Guadalajara; elchorvis@gmail.com)*.

Brazil

MULTIPLE USES OF CUVIER'S DWARF CAIMAN, *PALEOSUCHUS PALPEBROSUS*, IN THE SEMI-ARID REGION OF NORTHEASTERN BRAZIL. Crocodilians have been used by humans around the world for a variety of purposes, especially for skins and meat trade (Thorbjarnarson 1999). They are also used in cultural interactions, such as medicinal, ornamental and religious purposes (Pooley *et al.* 2016a,b). Literature about cultural interrelationships

involving crocodilians in Brazil is scarce, except in the north and northeast. The teeth, fat and heads of *Caiman latirostris*, *C. crocodilus* and *Paleosuchus palpebrosus* have reportedly been used to protect against snake bites (Alves *et al.* 2007), and for medicinal, spiritual and religious purposes (Alves *et al.* 2012a,b).

Paleosuchus palpebrosus is widely distributed across different aquatic environments, more frequently near urbanized and populated areas (Campos and Mourão 2006; Campos *et al.* 2015; Muniz *et al.* 2015). Little is known about the environments that this species occupies in the Cerrado/Caatinga ecotone in Brazil, or the threats it faces in this region. Here, we report on the use of *P. palpebrosus* for medicinal and spiritual purpose, and discuss human occupation of the preferential habitat of the species - wet environments of *Mauritia flexuosa* palm groves regionally known as "veredas"or "brejos" - in the states of Maranhão (MA) and Piauí (PI), Brazil. This region is situated in a Cerrado/Caatinga ecotone area in which there is a paucity of aquatic environments due to low annual rainfall (Nimer 1972). In such regions, swamps and lakes represents fragile aquatic environments that are often the result of anthropic processes that have devastated the landscape (Tabarelli and Santos 2004), such as dams, artificial ponds for cattle, irrigation and palm grove exploration.

In May 2017 we visited Baixinha da Santana, a community in the municipality of São Benedito do Rio Preto, MA (3° 19'39.82"S, 43° 31'41.15"W), located near a tropical rainforest stream and its surrounding "brejos". We found *P. palpebrosus* skulls (12.2, 18.5, 16.0, 16.5 and 17.0 cm) hanging on walls facing entrance doors of three houses and a market (Fig. 1A-B), as well as inside a shed (Fig. 1C) on the banks of a stream in the municipality of Barra da Corda, MA (5° 30' 19.39"S, 45° 17'43.95"W). Some of the skulls were painted black, and their mouths left open to scare away spirits and protect the homes/market. The residents of the Baixinha community killed the *P. palpebrosus* during the dry season (October 2016) for food, and kept their skins (Fig. 2A) and heads. The feet were fashioned into keychains (Fig 2B), and the scales and bones were used as medicine after being dried and ground and placed in wine. Teeth are strung onto cords to make necklaces to scare away snakes in the municipalities of Carolina (7° 22'31.64"S, 47° 12'24.19"W) and Balsas, MA (7° 33' 18.72"S, 46° 20'34.22"W).

Besides the hunting pressure on *P. palpebrosus* in this region, the main habitats of the species are increasingly being threatened by roads (Fig. 3A), urbanization and agricultural and livestock expansion. Corroborating this threat, we found that palm groves in the municipality of Palmeira do Piauí, PI (8° 43'33.64"S, 44° 14' 15.49"W) and Brejo do Piauí, PI (8° 18' 52.27"S, 42° 52' 10" S) had been destroyed by burning and by the installation of irrigation pumps to water a cassava plantation (Fig. 3B-C). Still, we caught 6 *P. palpebrosus* (snout-vent lengths between 17.5 and 62.5 cm) walking in *M. flexuosa* palm grove habitat.

Anthropogenic pressure in this region of Brazil is high,

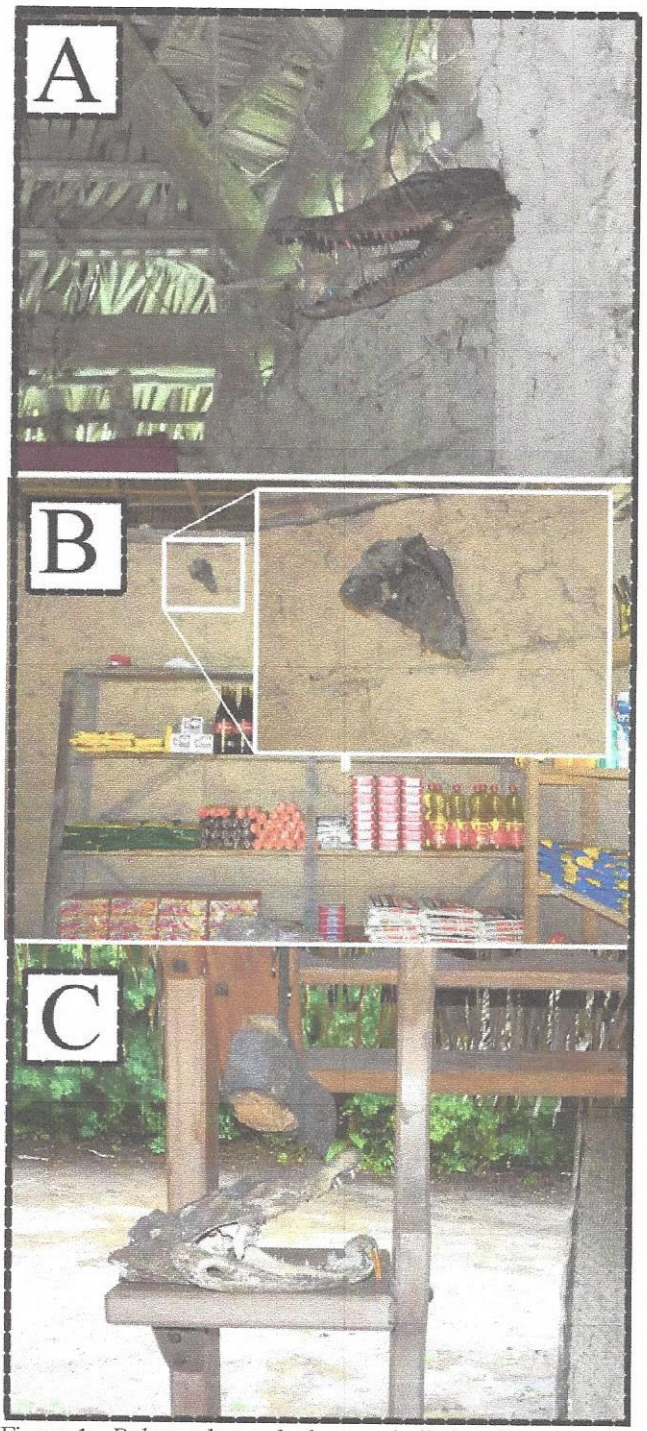

Figure 1. *Paleosuchus palpebrosus* skulls hanging on walls of a house (A) and market (B), and shed (C), in Maranhão State.

not only at the level of individuals but also at the level of destruction of their environments, which are restricted and seasonal due to the scarcity of rainfall. The cities, towns and communities in this region of Brazil are always located in the neighborhood or inside the swampy areas of *M. flexuosa* palm groves. These palm swamp environments require urgent protection to ensure the survival of groups of semi-aquatic and aquatic animals, especially *P. palpebrosus*. The multiple uses to which *P. palpebrosus* is subjected, together with

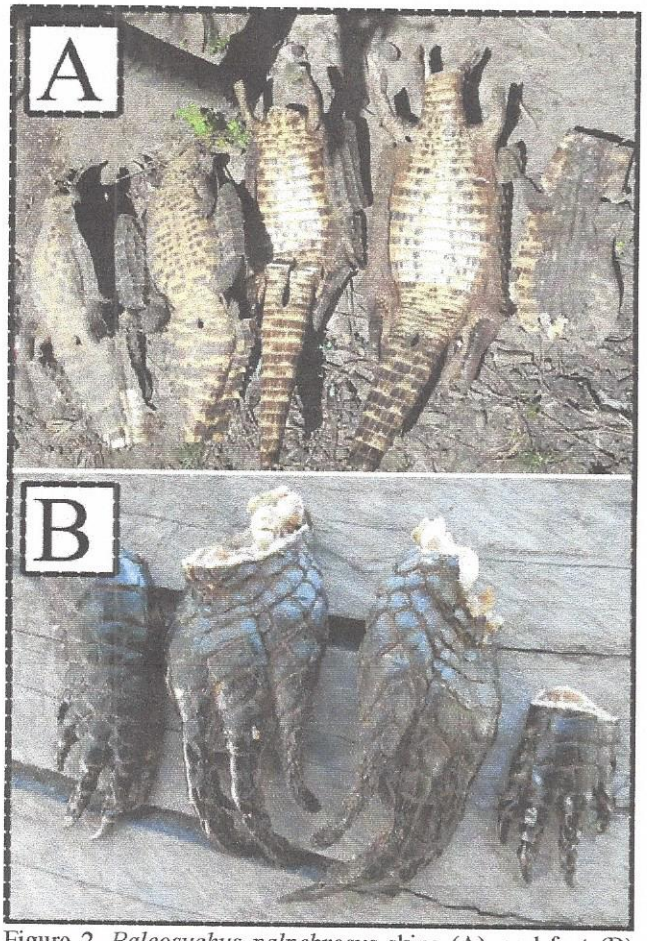

Figure 2. *Paleosuchus palpebrosus* skins (A), and feet (B) used as keychains.

the destruction of its environment, may be leading to low population levels or even local extinction.

Acknowledgments

We gratefully acknowledge the financial support of the Brazilian research funding agencies Embrapa Pantanal, Fundação Pantanal com Ciência, and FUNDECT (Mato Grosso do Sul State Foundation for the Support and Development of Education, Science and Technology). Caimans were captured under license number 138048-1-IBAMA.

Literature Cited

Alves, R.R.N., Rosa, I.L. and Santana, G.G. (2007). The role of animal-derived remedies as complementary medicine in Brazil. Bio Science 57(11): 949-955.

Alves, R.R., Rosa, I.L., Neto, N.A.L. and Voeks, R. (2012a). Animals for the gods: magical and religious faunal use and trade in Brazil. Human Ecology 40(5): 751-780.

Alves, R.R.N., Pereira Filho, G.A., Vieira, K.S., Souto, W.M.S., Mendonça, L.E.T., Montenegro, P.F.G.P. and Vieira, W.L.S. (2012b). A zoological catalogue of hunted reptiles in the semiarid region of Brazil. Journal of Ethnobiology and Ethnomedicine 8(1): 27.

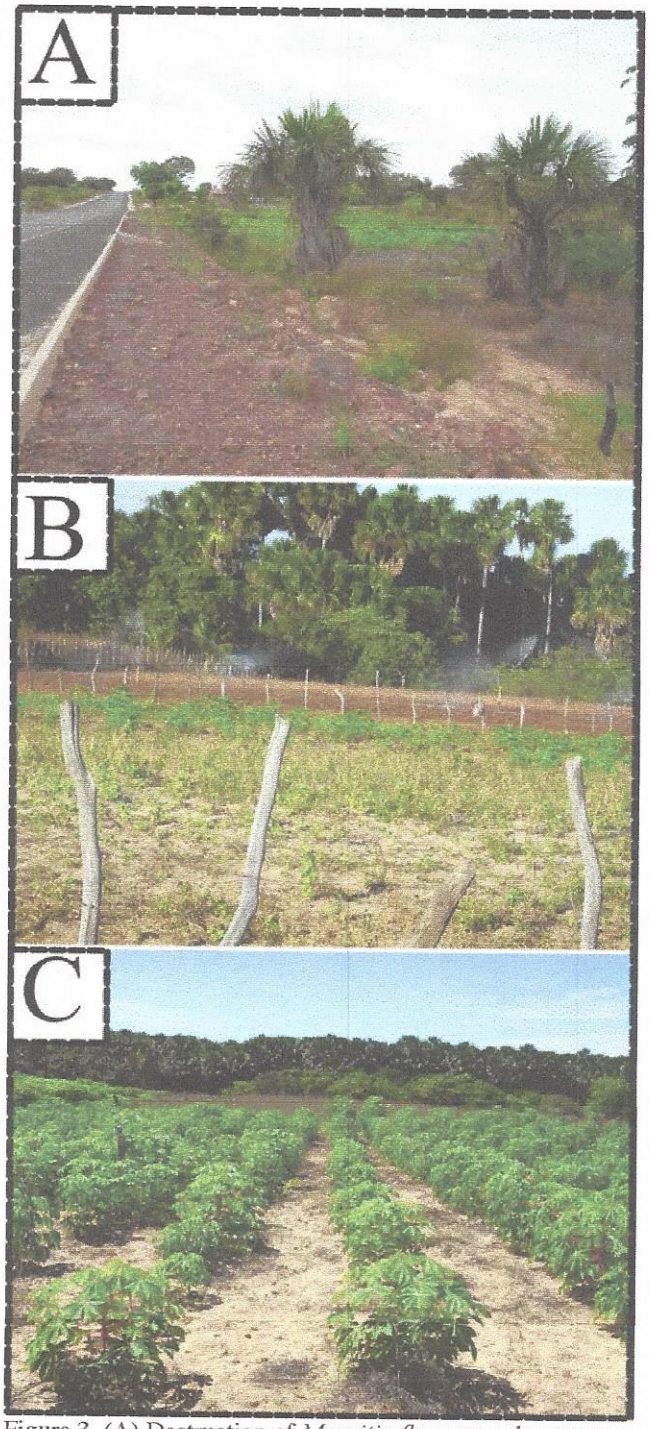

Figure 3. (A) Destruction of *Mauritia flexuosa* palm swamps in Maranhão and Piauí States; (B) use of farm irrigation water pumps in swampy areas, Piauí State; (C) cassava plantation in swampy areas of *M. flexuosa* in Piauí State.

Campos, Z. and Mourão, G. (2006). Conservation status of the Dwarf caiman, *Paleosuchus palpebrosus*, in the region surrounding Pantanal. Crocodile Specialist Group Newsletter 25(4): 9-10.

Campos, Z., Muniz, F.L., Farias, I.P. and Hrbek, T. (2015). Conservation status of the dwarf caiman *Paleosuchus palpebrosus* in the region of the Araguaia-Tocantins basin, Brazil. Crocodile Specialist Group Newsletter 34(3): 6-8.

Muniz F., Bittencourt, P.S., Farias, I.P., Hrbek, T. and Campos, Z. (2015). New records on occurrence of *Paleosuchus* in the Branco river basin, Roraima State, Brazil. Crocodile Specialist Group Newsletter 34: 8-10.

Nimer, E. (1972). Climatologia da região Nordeste do Brasil. Introdução à climatologia dinâmica. Revista Brasileira de Geografia 34: 3-51.

Pooley S.A. (2016a). Cultural herpetology of Nile crocodiles in Africa. Conservation and Society 14: 391-405.

Pooley, S.A. (2016b). The entangled relations of humans and Nile Crocodile in Africa, c.1840-1992. Environment and History 22: 421-454.

Tabarelli, M. and Santos, A.M.M. (2004). Uma breve descrição sobre a história natural dos brejos nordestinos. Pp. 17-24 *in* Brejos de Altitude em Pernambuco e Paraíba: História Natural, Ecologia e Conservação. 1st edition, ed. by K.C. Porto, J.J.P. Cabral and M. Tabarelli. Ministério do Meio Ambiente: Brasília, Brazil.

Thorbjarnarson, J. (1999). Crocodile tears and skins: International trade, economic constraints, and limits to the sustainable use of crocodilians. Conservation Biology 13(3): 465-470.

Zilca Campos *(Laboratório de vida selvagem, Embrapa Pantanal, CP 109, 79320-900, Corumbá, MS, Brazil: zilca.campos@embrapa.br)* and Fábio Muniz *(Laboratório de Evolução e Genética Animal, Universidade Federal do Amazonas, Manaus, AM, Brazil: fabiolm_bio@yahoo.com.br)*.

South Asia and Iran

India

POPULATION STATUS OF MUGGERS (*CROCODYLUS PALUSTRIS*) IN AND AROUND GIR FOREST, GUJARAT, INDIA. The Gir Wildlife Sanctuary (GWS), Gir National Park (GNP) and Pania Wildlife Sanctuary (PWS) are three protected areas that are collectively known as "Gir Forest", and which are surrounded by numerous seasonal waterbodies, including dams, rivers and streams. There are about a dozen man-made waterbodies of different scales located in and around the Gir Forest region, initially planned and built for agricultural water supply. All of these waterbodies are now habitats for Mugger crocodiles (*Crocodylus palustris*).

A literature search reveals a number of important contributions to the study of Muggers in Gir Forests (Joseph *et al.* 1975; Whitaker and Whitaker 1977; Chellam 1986; Chavan 1989; Vijaykumar 1997; Whitaker 1999, 2002), which indicate the presence of Muggers at Hiran, Singoda, Macchhuandri and Raval Dams. These four major waterbodies, within the protected area (Table 1), are lifelines of the forest, providing agricultural and water needs of the integral areas of Gir Forest. Apart from these, other waterbodies serve minor-medium irrigational purposes.

Muggers are legally protected under the *Indian Wildlife (Protection) Act-1972* as a Schedule-I species, and listed as 'Vulnerable' on the IUCN Red List. Distributed across Iran, Pakistan, India, Bangladesh, Bhutan, Nepal and Sri Lanka (Whitaker and Andrews 2003), during the early 1960s populations were largely depleted across the species' entire range, as a result of various threats, including hunting, habitat destruction, fragmentation and transformation, pollution and increased anthropogenic activities (Da Silva and Lenin 2010). However, Gir Forest has been known to harbour sizeable Mugger populations (Whitaker and Whitaker 1977).

Study Area

Gir Forest is one of the largest, dry deciduous, thorny and savanna habitats in the Saurashtra Peninsula of Gujarat State, western India (Fig. 1). This landscape is the last remaining refuge of the Asiatic Lion (*Panthera leo persica*), and so happens to be the most prestigiously Protected Area within the state, and in the country too.

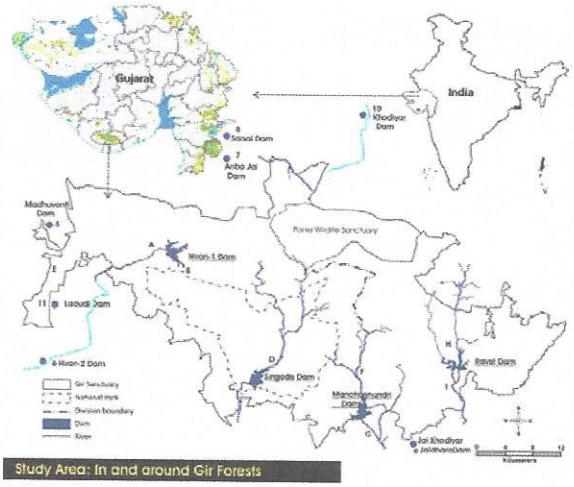

Figure 1. Location of study area within Gujarat State, showing Mugger habitat and waterbodies surveyed: 1-11 = man-made, A-I = rivers, pools and streams; see Table 2.

The study area encompasses an area of about 3200 km^2, including 1451.8 km^2 of Gir Forest (GNP 258.7 km^2, GWS 1153.4 km^2, PWS 39.6 km^2), which is a dry deciduous landscape, falling under the 5A/C1b bio-geographic subtype (Champion and Seth 1968). Further, it can be classified into six broad subtypes (Desai 1972) with dominant and notable tree species of *Tectona grandis* and *Butea monosperma* in combination with *Acacia* sp., *Zizyphus* sp. and *Anogeissus latifolia*.

The whole area topographically slopes downwards towards the southern edge with catchments forming along seven rivers (Bhadar, Ojat, Noli, Hiran, Shentrunji, Sigoda, Macchuandri). However, the area remains drought-prone, while man-made reservoirs built along these rivers suffice as perennial sources