ResearchGate

See discussions, stats, and author profiles for this publication at: https://www.researchgate.net/publication/328804204

Rediscovery of the Nubian Flapshell Turtle (Cyclanorbis elegans) in South Sudan

Article *in* Chelonian Conservation and Biology · July 2019

DOI: 10.2744/18.1.62

CITATIONS
9

READS
1,082

6 authors, including:

Gift Sarafadin Simon
Juba National University (Juba City)
34 PUBLICATIONS **92** CITATIONS
SEE PROFILE

John Sebit Benansio
AERD - Alliance for Environment and Rural Development
22 PUBLICATIONS **95** CITATIONS
SEE PROFILE

Thomas Francis Lado
Juba National University (Juba City)
22 PUBLICATIONS **128** CITATIONS
SEE PROFILE

Tomas Diagne
African Chelonian Institute
27 PUBLICATIONS **733** CITATIONS
SEE PROFILE

All content following this page was uploaded by John Sebit Benansio on 04 July 2019.

The user has requested enhancement of the downloaded file.

Chelonian Conservation and Biology, 2019, 18(1): 62–67
© 2019 Chelonian Research Foundation

Rediscovery of the Nubian Flapshell Turtle (*Cyclanorbis elegans*) in South Sudan

GIFT SIMON DEMAYA[1], JOHN SEBIT BENANSIO[1], THOMAS FRANCIS LADO[1], TOMAS DIAGNE[2], DANIELE DENDI[3,4,5], AND LUCA LUISELLI[3,4,5,*]

[1]*Department of Wildlife, University of Juba, South Sudan [gftsimon@yahoo.co.uk; sebitbenansio@yahoo.co.uk; jsuliman.lado@gmail.com];*
[2]*African Chelonian Institute, PO Box 449 33022, Ngaparou/Mbour, Senegal [africanci@gmail.com];*
[3]*Institute for Development, Ecology, Conservation and Cooperation, via G. Tomasi di Lampedusa 33, 00144 Rome, Italy [d.dendi@ideccngo.org; l.luiselli@ideccngo.org];*
[4]*Department of Applied and Environmental Biology, Rivers State University of Science and Technology, P.M.B. 5080, Port Harcourt, Nigeria;*
[5]*Département de Zoologie, Faculté Des Sciences, Université de Lomé, BP 6057 Lomé, Togo*
**Corresponding author*

ABSTRACT. – **The Nubian flapshell turtle, *Cyclanorbis elegans*, is one of the rarest turtle species in the world and has even been considered as possibly extinct because no free-ranging individuals have been recorded in recent years. Here, we report on 2 large adults (> 60 cm total carapace length) of this species captured along the White Nile River course between the towns of Juba and Mongalla in South Sudan; these specimens were found in very large stretches of the riverbed, with the presence of seasonal and permanent wetlands (ponds and swamps) in the surroundings and with abundant bank vegetation. These turtles are hunted and eaten by local communities for subsistence and traditional medicine and are under serious threat due to overfishing and habitat loss.**

The Nubian flapshell turtle, *Cyclanorbis elegans* (family Trionychidae), is a large softshell turtle (total carapace length > 700 mm) and is the largest and least ossified member of the flapshell subfamily Cyclanorbinae (Branch 2007). This highly aquatic species historically occurred in large rivers of the Sahelo-Sudanese belt, from the Mole River in northern Ghana to the Sobat River of South Sudan (Baker et al. 2015, 2016). Despite its wide historical distribution, information on its ecology and natural history is extremely scarce (summarized by Baker et al. 2015). Some details of its natural history can be obtained from general books (Branch 2007; Gramentz 2008) and articles (Hughes 1979) or inferred from phylogenetically similar and much more common species that presumably share similar ecological characteristics (e.g., *Cyclanorbis senegalensis*; see Akani et al. 2018).

Cyclanorbis elegans is a critically endangered species (Baker et al. 2016; Turtle Taxonomy Working Group 2017; International Union for Conservation of Nature [IUCN] 2018), with no individuals currently in captivity and fewer than 10 individuals observed and reported in the wild during the past 50 yrs (Baker et al. 2015). It is considered among the most threatened chelonian species in the world (Stanford et al. 2018) and the most threatened African chelonian (Luiselli 2009), and it has been suggested as possibly extinct (Baker et al. 2015; Stanford et al. 2018). Indeed, the last known captive individual died in 2012 in a private collection in the United States, whereas this species has been searched for without success throughout its historical range in West and Central Africa (more specifically in Ghana, Togo, Benin, Nigeria, Chad, and Burkina Faso; L.L. et al., unpubl. data, 1995–2019; for some historical records in the region, see Trape et al. 2012). The only indirect data of presence were obtained in 2012 from the White Nile in South Sudan (Baker et al. 2015). In this area, several local fishermen showed evidence of knowing the species well and were even able to make accurate drawings of the unique main morphological characteristics of this giant turtle (Baker et al. 2015). Therefore, we surveyed a study area situated along the White Nile River in the years 2017–2018 in the vicinities of the localities where fishermen reported the species' presence during Baker's 2012 interviews. Our surveys were successful, and we here report the synopsis of the collected data on the current distribution and natural history of *C. elegans* on the basis of both our original observations and interviews with local fishermen.

Methods. — The present study is based on opportunistic field data collected from August 2017 to September 2018 at several localities situated along the banks of the White Nile River in South Sudan, with Mongalla and Juba being the main urban centers of the area (Fig. 1). We conducted field surveys by means of random walks in a suite of different freshwater habitat types available to turtles along the White Nile River course and inspected fishermen's catches. Because of sociopolitical instability in the region, we were unable to carry out rigorous representative surveys along the entire river. Instead, we focused our surveys on areas where the presence of these turtles was suspected based on previous interview surveys (Baker et al. 2015).

When a turtle was observed, it was identified to species level (Branch 2007), measured for carapace length with a tape, and sexed by examination of secondary sexual characters (cloacal morphology). For confirming identification, photos and movies of the observed *C. elegans* specimens were taken and sent to 3 independent experts of African softshells: Dr. Peter Meylan (United States), Prof. G.H. Segniagbeto (Togo), and Prof. G.C. Akani (Nigeria). All of them agreed that these individuals were obviously *C. elegans*. Relevant photos and videos were deposited in

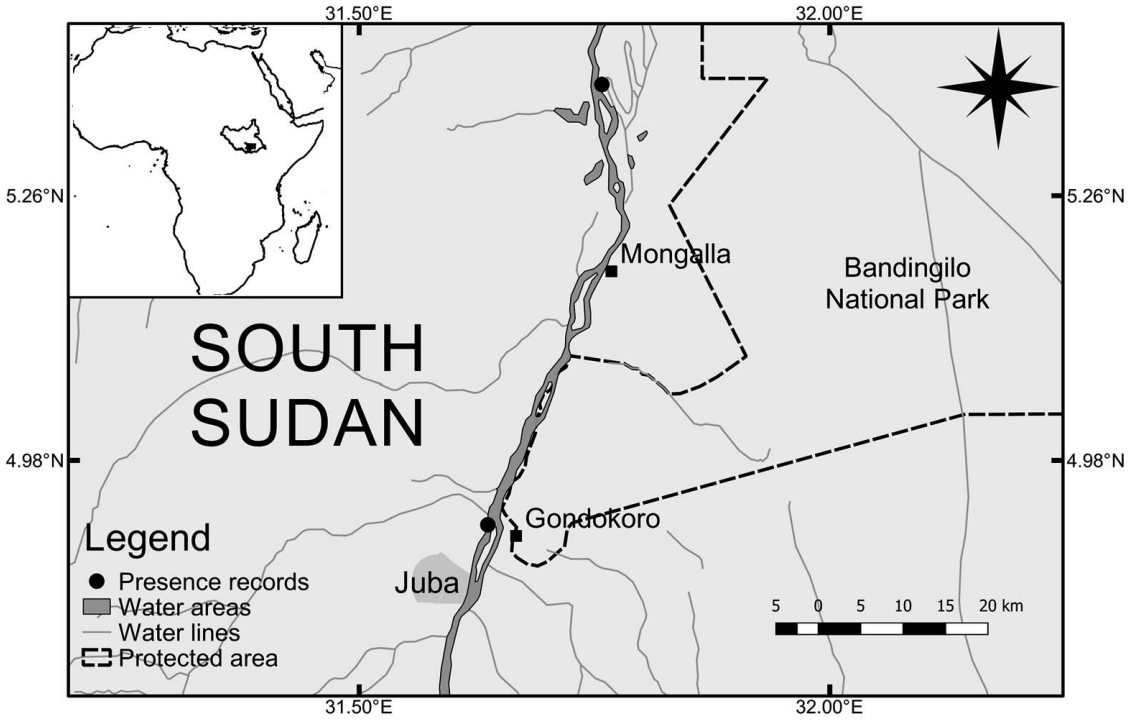

Figure 1. Map of the area around Juba in South Sudan, including the reach of the White Nile River where Nubian flapshell turtles were recorded and Bandingilo National Park. Gray filled in area = White Nile; gray lines = tributary streams.

the archives of IDECC (Rome) and the University of Juba data repository.

The geographic position of each turtle individual was recorded by GPS. These geographic coordinates are not provided in this article for conservation reasons but were made available to the IUCN/SSC TFTSG data repository (via Anders Rhodin). In addition, we recorded the main habitat features at the site of capture. We also obtained qualitative information on 1) the apparent local abundance of the species and 2) some aspects of its natural history by means of nonstructured interviews with fishermen and local hunters. These data may provide useful baseline information for further studies on the biology of the species or for its conservation status assessment.

Results and Discussion. — During our field surveys, we recorded 2 adult *C. elegans* individuals collected on 17 August 2017 and 7 September 2018 (Fig. 2). The first specimen (Fig. 2B) was captured by a fisherman in a locality situated about 10 km N of Juba along the White Nile River course. This specimen was still clearly identifiable to species level because of the combination of 1) very large body size (60-cm bony carapace length, without considering the cartilaginous parts that would have made the individual much larger than that, at least 64–65-cm length) (Fig. 2A); 2) structure of the granulations on the shell bones (Fig. 2A) that were clearly different from the equivalent granulations of the shell bones of sympatric *Trionyx triunguis* (Fig. 2E); and 3) head coloration (Fig. 2B). Much of the meat was already removed from the carcass of the animal, both in the shell and in the head and legs. The second specimen, a large female (74-cm curved carapace length; Fig. 2C–D) with 27 oviductal eggs (largest vitellogenic follicle being 5.1-cm length), was observed in the Juba area, along the White Nile River course. She was still alive at the time of capture but was almost dying (drowned) when the researchers arrived at the capture site. She died within minutes after she was observed by the authors. This female was a fishery bycatch captured with a hook net. This specimen was in perfect condition, and its main diagnostic characteristic (presence of only 2 large plastral callosities; Baker et al. 2015) was perfectly visible (Fig. 2C). In this individual, the left hind limb was missing due to an apparently old injury. This individual was also butchered, after which measurements were made by the researchers (Fig. 3).

The habitats of these 2 specimens (Fig. 4) were very large stretches of the riverbed, with the presence of ponds and swamps in the surroundings and abundant bank vegetation dominated by *Acacia siberiana*, *Mangifera indica*, *Cyperus papyrus*, *Phragmites* spp., *Typha* spp., and grassy floodplains. The river in this area does not experience great seasonal changes in water flow or depth, and the river current speed was high. The type of habitat where we recorded our specimens was consistent with the anecdotal report that *C. elegans* inhabits large rivers of the Sudanian savanna (Gramentz 2008). In addition, our data came from the White Nile River north of Juba and not far from Mongalla, the locality where Werner (1908) obtained *C. elegans* shells from Bari fishermen. In these swampy areas and along the main river course and banks, we also

Figure 2. Two specimens of Nubian flapshell turtle (*Cyclanorbis elegans*) recorded from the White Nile River, 1 in August 2017 (A and B [portrait of the head]) and 1 in September 2018 (C and D). Note the structure of the granulations on the shell bones (in A) in comparison with the granulations on the shell bones of *Trionyx triunguis* (E), a large, sympatric species.

Figure 3. Butchering of a Nubian flapshell turtle along the White Nile River, South Sudan.

observed *C. senegalensis*, *T. triunguis*, *Pelomedusa subrufa*, *Pelusios adansonii*, *Stigmochelys pardalis*, and *Kinixys belliana*.

Because our field research is currently ongoing, we do not present data here on either the population size or the density of *C. elegans* along the White Nile River course. According to local fishermen and hunters, *C. elegans* is rare, much rarer than *T. triunguis* or other smaller turtle species. However, in the 2 sites of capture reported herein, the fishermen reported being able to capture 1–2 individuals per year with a peak, at the same study area where the second specimen reported in this study was found, of 4 individuals per year. They also reported being able to catch well over 100 individuals per year of *T. triunguis* as well as the other smaller-sized freshwater turtle species.

There are no data on population size or density of *C. elegans* in the available literature. However, Girgis (1961) anecdotally stated that the study species was "rather rare" in the vicinity of Khartoum (Sudan) but relatively common in southern Sudan (now South Sudan).

At our study areas, the remnant *C. elegans* populations are under multiple serious threats. With the tremendous increase in the human population in Juba due to continuous security instability in the other cities of South Sudan (Gorsevski et al. 2013), human activities have increased in intensity and variation with detrimental effects on the fauna, flora, and physical structure of the region. Among these activities, we can cite heavy fishing in the water bodies of the studied areas that is carried out by the local communities and internal displaced persons (Lovell-Hoare and Lovell-Hoare 2013). Both *C. elegans*

Figure 4. The view of the main White Nile River course at the western side of Gondokoro Island, Juba, in the surroundings of the 2 sites of capture of *Cyclanorbis elegans* in South Sudan.

specimens recorded in our study were indeed captured by local fishermen. A potential threat may also be the heavy grazing; subsistence agriculture and farming; utilization of vegetation for building, firewood, and charcoal along the riverine banks; and pollution of riverine waters. Nevertheless, the major problem with existing wild populations of turtles in the river villages appears to be caused by hunting for subsistence (bushmeat) and even for traditional medicinal reasons despite the fact that all turtles are officially legally protected in South Sudan. Indeed, many communities in South Sudan believe that eating turtle meat is a good treatment to increase longevity. In this regard, our study confirms that the flesh and cartilaginous portions of *C. elegans* shell are consumed in South Sudan (as well as in Ghana; Baker et al. 2015). In South Sudan, it has also been reported that turtle eggs are collected by pastoralists who bring their cattle to feed on the *toic* grasslands that form when the floodwaters of the Nile recede (Baker et al. 2015). This point was also confirmed by the interviewed fishermen, who claimed that they can locate turtle eggs (*T. triunguis* and *C. elegans*) on sandy banks of rivers by observing the activity of monitor lizards (*Varanus niloticus*), which are very efficient turtle egg predators at the study area.

Given the ongoing sources of threats for the remnant populations of this turtle and given that no effective protection at legal level is guaranteed (the nearby Bandingilo National Park and the Mongalla Game Reserves do not include the White Nile River in their protected territories; see Fig. 1), we consider that the creation of a new or expanded protected area for *C. elegans* should be an urgent conservation priority. In addition, it would be necessary to work jointly with the riverine communities to enlist their collaboration with a conservation program. This could be done by, for example, offering monetary incentives for the provision of live specimens for study and release as well as for nests and nest sites (but not for dug-out eggs). In addition to a protected area, establishment of a captive assurance colony should also be realized, and the University of Juba has already provided a parcel of land where the captive assurance colony could be housed and managed. The authors of the present note are currently carrying out a project on community conservation and creation of a new *C. elegans*–oriented protected area and on the establishment of a captive assurance colony with the government of South Sudan (Ministry of Wildlife Conservation and Tourism and Ministry of the Environment) and under the financial support of the Rainforest Trust (Warrenton, VA).

Acknowledgments. — Projects on *C. elegans* in Africa (including South Sudan) by L.L. and T.D. were supported over the years by the Rainforest Trust (Warrenton, VA), AERD—Alliance for Environment and Rural Development (Juba, South Sudan), IDECC (Rome, Italy), 2 grants from the Mohamed Bin Zayed Species Conservation Fund (Abu Dhabi Emirate), and 3 grants from Turtle Conservation Fund through Conservation International (Washington, DC) and Global Wildlife Conservation (Austin, TX). We are grateful to Dr Anders Rhodin and Dr Craig Stanford for useful collaboration and exchange of information concerning the *C. elegans* project in South Sudan and to 2 anonymous reviewers for critical comments on the submitted draft. We are especially grateful to the staff of the University of Juba, in particular Prof John A. Akec (vice chancellor), Prof Salah Khatir Jubarah (dean), and Prof John Leju Celestino Ladu (deputy dean) for much scientific and logistic assistance and to Dr Malik Doka Morjan (Ministry of Wildlife Conservation and Tourism) and Dr Andrew L. Athiba (Western Equatoria Technical College for Agriculture and Forestry) for various kinds of assistance.

LITERATURE CITED

AKANI, G.C., ENIANG, E.A., AMADI, N., DENDI, D., HEMA, E.M., DIAGNE, T., SÉGNIAGBETO, G.H., DI VITTORIO, M., GBEWAA, S.B., CHIRIO, L., AND LUISELLI, L. 2018. Macrohabitat and microhabitat niches of softshell turtles (*Trionyx triunguis* and *Cyclanorbis senegalensis*) in West and Central Africa. Herpetological Conservation and Biology 13:642–651.

BAKER, P.J., DIAGNE, T., AND LUISELLI, L. 2015. *Cyclanorbis elegans* (Gray 1869)—Nubian flapshell turtle. In: Rhodin, A.G.J., Pritchard, P.C.H., van Dijk, P.P., Saumure, R.A., Buhlmann, K.A., Iverson, J.B., and Mittermeier, R.A. (Eds.). Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group. Chelonian Research Monographs 5:089.1–7. doi:10.3854/crm.5.089.elegans.v1.2015, http://www.iucn-tftsg.org/cbftt.

BAKER, P.J., LUISELLI, L., AND DIAGNE, T. 2016. *Cyclanorbis elegans*. The IUCN Red List of Threatened Species 2016: e.T6004A3086539. http://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T6004A3086539.en.

BRANCH, B. 2007. Tortoises, Terrapins and Turtles of Africa. Cape Town: New Holland Publishers, 128 pp.

GIRGIS, S. 1961. Observations on the heart in the family Trionychidae. Bulletin of the British Museum (Natural History) Zoology 8:73–107.

GORSEVSKI, V., GEORES, M., AND KASISCHKE, E. 2013. Human dimensions of land use and land cover change related to civil unrest in the Imatong Mountains of South Sudan. Applied Geography 38:64–75.

GRAMENTZ, D. 2008. African Flapshell Turtles. *Cyclanorbis* and *Cycloderma*. Frankfurt: Edition Chimaira, 191 pp.

HUGHES, B. 1979. Occurrence of the freshwater trionychid turtles *Cyclanorbis elegans* and *C. senegalensis* in Ghana. Bulletin de l'Institute Francais de l'Afrique Noire 41:193–205.

INTERNATIONAL UNION FOR CONSERVATION OF NATURE. 2018. The IUCN Red List of Threatened Species. Version 2018-1. http://www.iucnredlist.org (5 July 2018).

LOVELL-HOARE, S. AND LOVELL-HOARE, M. 2013. South Sudan. New York: Bradt Travel Guides, 224 pp.

LUISELLI, L. 2009. A model assessing the conservation threats to freshwater turtles of sub-Saharan Africa predicts urgent need for continental conservation planning. Biodiversity and Conservation 18:1349–1360.

STANFORD, C.B., RHODIN, A.G.J., VAN DIJK, P.P., HORNE, B.D., BLANCK, T., GOODE, E.V., HUDSON, R., MITTERMEIER, R.A.,

CURRYLOW, A., EISEMBERG, C., FRANKEL, M., GEORGES, A., GIBBONS, P.M., JUVIK, J.O., KUCHLING, G., LUISELLI, L., SHI, H., SINGH, S., AND WALDE, A. 2018. Turtles in Trouble: The World's 25+ Most Endangered Tortoises and Freshwater Turtles—2018. Ojai, CA: IUCN SSC Tortoise and Freshwater Turtle Specialist Group, Turtle Conservancy, Turtle Survival Alliance, Turtle Conservation Fund, Chelonian Research Foundation, Conservation International, Wildlife Conservation Society, and Global Wildlife Conservation.

TRAPE, J.-F., TRAPE, S., AND CHIRIO, L. 2012. Lézards, Crocodiles et Tortues d'Afrique Occidentale et du Sahara. Marseille: IRD Editions, 503 pp.

TURTLE TAXONOMY WORKING GROUP [RHODIN, A.G.J., IVERSON, J.B., BOUR, R., FRITZ, U., GEORGES, A., SHAFFER, H.B., AND VAN DIJK, P.P.]. 2017. Turtles of the world: annotated checklist and atlas of taxonomy, synonymy, distribution, and conservation status. Eighth edition. In: Rhodin, A.G.J., Iverson, J.B., van Dijk, P.P., Saumure, R.A., Buhlmann, K.A., Pritchard, P.C.H., and Mittermeier, R.A. (Eds.). Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group. Chelonian Research Monographs 7:1–292.

WERNER, F.J. 1908. On some interesting reptiles collected by Dr. C.M. Wenyon on the Upper Nile. Third Report of the Wellcome Tropical Research Laboratories at the Gordon Memorial College, Khartoum, pp. 169–172.

Received: 8 September 2018
Revised and Accepted: 6 November 2018
Published Online: 12 June 2019
Handling Editor: Peter V. Lindeman

View publication stats