

Crocodile Specialist Group Steering Committee Meeting

Skukuza, Kruger National Park, South Africa

22 May 2016

Regional Report: Europe

Within the European Association for Zoos & Aquarias Reptile Taxon Advisory Group there is a subgroup crocodilians led by Fabian Schmidt (Zoo Leipzig). Samuel Martin (La Ferme aux Crocodiles, Pierrelatte) is the veterinary advisor for this group. In total there are 5 programs, one EEP (European Endangered Species Programs) and four ESB (European Studbook).

These are:

- EEP for Chinese Alligators (*Alligator sinensis*) kept by Norbert Fritsch (Zoo Neunkirchen, Germany)
- ESB for Cuban Crocodiles (*Crocodylus rhombifer*) kept by Mike Bungard (Paignton Zoo, UK)
- ESB for Philippine Crocodiles (*Crocodylus mindorensis*) kept by Thomas Ziegler (Cologne Zoo, Germany)
- ESB for African Dwarf Crocodiles (Genus *Osteolaemus*) kept by Fabian Schmidt (Zoo Leipzig, Germany)
- ESB for Tomistoma (*Tomistoma schlegelii*) kept by Jesus Recuero (Bioparc Fuengirola, Spain)

The evaluation of the Chinese Alligator EEP showed that the results were insufficient. Hence during the reporting period there was a change in EEP coordinator. Randers Regnskov in Denmark refrained from keeping the studbook and Norbert Fritsch at Neunkirchen Zoo took over and started to compile the first dataset for this studbook.

During the CSG Working Meeting in Lake Charles, the contacts between the ESB for Cuban crocodiles and the Texas Tech University were re-established, so the genetic screening for the European population for crocodiles could be restarted. The studbook for the Philippine crocodiles was very actively supporting ongoing research, mainly on genetic screening of the European population but also regarding the social behaviour of the animals in Cologne Zoo. In addition training of the animals progressed and results on this were published as well. The collection in Europe increased mainly through breeding success at several different locations. The increase is so strong that breeding has to be reduced due to a relatively low request for this species. Consequences of genetic research on running of breeding programs have been published in the International Zoo Yearbook with the study case of the African Dwarf crocodiles. In the meantime more than 95% of the registered European population is screened and further hybridization is avoided. By active studbook management the percentage of pure *O. tetraspis* has been increased from 47 to 66% and the percentage of hybrids has been reduced from 34 to 19.6%.

At the 3rd CSG West and Central African Regional Meeting in Abidjan, the European studbook offered that genetically pure and socially compatible animals can be produced upon request for exportation to range states for reintroduction, reinforcement, farming or tourism

purposes. In addition, together with La Ferme aux Crocodiles, a location in Bénin was visited and first discussions with NGOs and the responsible ministries regarding a restoration project were held. In the Tomistoma ESB there was a change of studbook keeper as well. After many years of excellent work Gonzalo Fernandez Hoyo left the services of Bioparc Fuengirola and its owner Rainforests Ltd. We want to thank Gonzalo for the excellent work he did for many years. Jesus Recuero took over and as he assisted Gonzalo in the past years already this was a very smooth transition. The population grew, but unfortunately not through new breeding results, but mainly due to animals that have been imported into Europe recently or have not been registered before. Breeding this species remains the biggest challenge of this studbook.

The ESB established and supported financially a population and habitat survey in Sabangau Peat Swamp Forest in central Kalimantan (Indonesia), which was supported by Bioparc Fuengirola, Zoo Leipzig, Chester Zoo, Zoo Dvur Kralove, SOS Crocodiles and Taipei Zoo.

All programs published studbooks in the reporting period with the exception of the two in which the coordinator changed. The current populations of the species are as follows:

Crocodylus mindorensis: 10.16.28 in 7 institutions as of 31 December 2015; 23 hatchlings in 2 institutions in 2014, 4 hatchlings in 2 institutions in 2015

Crocodylus rhombifer: 4.21.7 in 16 institutions as of 1 August 2015; 7 hatchlings in 1 institution in 2013

Osteolaemus sp.: 57.79.109 in 80 institutions as of 31 December 2014; 60 hatchlings in 9 institutions in 2014

In addition to these programs we try to screen the genetic status of further African crocodile species, for which there is currently no EAZA program. Thomas Ziegler came across a West African Crocodile (*Crocodylus suchus*), which was supposed to be a Philippine crocodile, but his studies revealed the real taxonomic status of this old animal. Following this finding Thomas Ziegler also screened several Nile crocodiles and found a small population of West African crocodiles present in Europe. Following the study of Shirley *et al.* (2014) that describes the differentiation between West and Central African slender-snouted crocodiles (*Crocodylus cataphractus*) it was reasonable to check the European population for these taxonomic differences. Unfortunately there is no breeding program established so far, but Vivarium Lausanne Switzerland volunteered to monitor this species in Europe and to initiate a research project for the coming years to identify the taxa of the animals living in European collections.

Another species kept rarely kept in European zoos and actually deserving more attention is the Siamese crocodile (*Crocodylus siamensis*), but we lack staff volunteering to initiate the establishment of a program in European zoos. Ziegler *et al.* (2015) rediscovered this species in Khammouane, Lao PDR, and now efforts are made together with Laotian and Vietnamese partners to create a reserve for this population. Additionally animals of this population shall be screened in cooperation with University Braunschweig and University Hanoi and it is planned to include also animals kept in captivity in Vietnam in the future.

During the CSG Working Meeting in Lake Charles (May 2014), for the first time a special session on “Zoo Contributions to Crocodylian Conservation“ was organised. This was a very good chance to demonstrate the impact of the work done by zoos on the conservation of crocodylians. The session was organised by Kent Vliet, the AZA Crocodylian TAG Chair and Chair of the CSG Zoo group. In this session, Fabian Schmidt represented the European region

with a lecture on Developing Regional Studbooks – Genetic and Demographic Analysis of Small Populations“ co-authored by Thomas Ziegler.

Fabian Schmidt did also participate in the AZA Crocodylian TAG Meeting at Atlanta Zoo in April 2015 to consolidate the good contacts between zoos of the North American and European regions in questions of crocodylian husbandry. Lectures on the husbandry of *Tomistoma*, on the studbook of African dwarf crocodiles and natural rearing of crocodiles were given. The European region was represented by Fabian Schmidt, Zoo Leipzig and Samuel Martin, La Ferme aux Crocodiles Pierrelatte at the 3rd West and Central African CSG Regional Meeting in Abidjan. The European studbook for African dwarf crocodiles (*Osteolaemus tetraspis*) was presented and it was offered that genetically pure and socially compatible animals can be produced upon request for exportation to range states for reintroduction, reinforcement, farming or tourism purposes. La Ferme aux Crocodiles Pierrelatte is active in this region since many years and renewed its offer to help and support in establishing *in-situ* conservation projects for *Osteolaemus* in the region.

In the reporting period the EAZA Reptile TAG had four meetings: in spring 2014 in Alphen (NL) in autumn 2014 in Budapest (HUN), in spring 2015 in Fuengirola (E) and in autumn 2015 in Wroclaw (P). Apart from updates of the running studbook programmes, conservation initiatives supported by these programmes, and summaries of other meetings, lectures on the husbandry, transport and behaviour of *Tomistoma* were given. Skansen Akvariet (S) informed about returning young Cuban crocodiles (*Crocodylus rhombifer*) bred in their institution to the Zapata Swamp in Cuba.

Another issue getting increasing attention within the European zoo community is the way of rearing crocodiles: An increasing number of zoos do no longer hatch crocodile eggs artificially and hand-rear the juveniles, but start to let the eggs develop in their nests in the enclosures. This encourages the natural defensive nesting behaviour of the females, sometimes even the parents. In several cases also the juveniles were not caught after hatching for hand-rearing, but left with their mother or even parents, so the animals had a chance to naturally guard their offspring and zoo visitors can see family groups and by that learn about the parental care of juveniles in this taxon. Such displays can be seen in Europe now in African dwarf crocodiles (*Osteolaemus tetraspis*) in Leipzig, Gossau (CH) and Bristol (UK) as well as in Philippine crocodiles (*Crocodylus mindorensis*) in Cologne. This natural method of rearing crocodiles is still not usual in European zoos but the success in the institutions mentioned before was published in several articles and in lectures mostly in conferences and journals, that are not specifically herpetologically oriented, but rather do contain more general zoo-relevant topics in order to spread the word about this method of rearing crocodiles in the European zoo community.

Within EAZA a new database was developed containing information on conservation projects supported by its member zoos. The Reptile TAG completed the templates regarding the crocodiles. In this database one can find information on the genetic screening of the European studbook population of African dwarf crocodiles (genus *Osteolaemus*) by Leipzig Zoo, the support of European zoos for *in situ* conservation of the Philippine Crocodile by Mabuwaya coordinated by Cologne Zoo, the *Tomistoma schlegelii* population and habitat survey in Sabangau Peat Swamp Forest, Central Kalimantan, Indonesia by Bioparc Fuengirola and the genetic screening of *Crocodylus rhombifer* population within EAZA by Paignton Zoo.

The International Zoo Yearbook is one of the most important publications in the international zoo community. The general topic in the issue 49, published in 2015 was “Reptile conservation” edited by the guest editors Jeff Ettling from St. Louis Zoo (USA) and Fabian

Schmidt, Leipzig Zoo. From the 15 published articles, 5 dealt with crocodylian topics. Input partly from Europe articles was given in the following articles: “The importance of the genetic research in zoo breeding programs for threatened species: the African dwarf crocodiles (genus *Osteolaemus*) as a case study“ by F. Schmidt, F. Franke, M. Shirley, K. Vliet and V. Villanova; “Conservation of the Sunda gharial *Tomistoma schlegelii* in Lake Mesangat, Indonesia” by R. Stuebing, R. Sommerlad and A. Staniewicz and “Conservation of the Indian gharial *Gavialis gangeticus*: successes and failures” by C. Stevenson. Additional crocodile articles were “Conservation of the Philippine crocodile *Crocodylus mindorensis* (Schmidt 1935): *in situ* and *ex situ* measures” by R. Manalo and A. Alcala and “The Crocodile Museum at Zoologico Regional Miguel Alvarez del Toro (ZooMAT), Mexico: How to exhibit a bullfrog put into reality” by L. Sigler.

In 2014 one of the founding and long-standing CSG members, who influenced the CSG from Europe for many decades was rewarded with a special honour: Rene Honegger was honoured by the veterinary faculty of the University Zurich with the honorary doctor degree for his efforts for the conservation of reptiles, in particular crocodiles.

In 2015 we lost an influential European member of the CSG. On 11 June 2015 Ralf Sommerlad passed away in Frankfurt, Germany. For many decades he was a very active member in the CSG, especially in the European region and in the Tomistoma Task Force, the crocodylian species that was closest to his heart. For many years he was the main contact between European zoos and the CSG, and it was one of his main goals to sensitize European zoos for the conservation of crocodiles. He will be dearly missed.

Crocodile working group T. Ziegler, Report 2014-2015 (2016)

Research

- social behaviour of Philippine crocodiles under zoo conditions (see Schneider *et al.* 2014)
- continued genetical screening *Crocodylus mindorensis* in cooperation with Prof. Dr. Miguel Vences, University Braunschweig (see Ziegler, Hauswaldt *et al.* 2015)
- continued genetical screening *Crocodylus suchus* in cooperation with Prof. Dr. Miguel Vences, University Braunschweig (see Ziegler, Hauswaldt *et al.* 2015)
- rediscovery *Crocodylus siamensis* in Khammouane, Laos (see Ziegler, Luu *et al.* 2015a, 2015b)
- set up of genetical screening *Crocodylus siamensis* in Khammouane in cooperation with Prof. Dr. Miguel Vences, University Braunschweig/Dr. Minh D. Le, University of Science, Hanoi, Vietnam

Lectures for students

ZIEGLER, T. & A. RAUHAUS: The development of an *ex situ* conservation breeding of the Philippine crocodile in Europe: The European Studbook (ESB) for *Crocodylus mindorensis*. Given every year for students of the zoo biology university courses 1) bachelor of science, 2) masters of education, University of Cologne.

ZIEGLER, T. & A. RAUHAUS (19 November 2015): Advanced herpetological husbandry course: crocodiles, within the diversity student's course of the Institute of Ecology and Biological Resources (IEBR), Hanoi, Vietnam.

Supervision of student theses

LUEG, B. (2015): In-situ und ex-situ Krokodilschutz unter besonderer Berücksichtigung von Auswilderungsprojekten [In-situ and ex-situ crocodile conservation under special consideration of release projects]. - State examination thesis, University of Cologne: 1-133.

FUISTING, P. (2015): In-situ und ex-situ Krokodilschutz unter besonderer Berücksichtigung von Auswilderungsprojekten [In-situ and ex-situ crocodile conservation under special consideration of release projects]. - State examination thesis, University of Cologne: 1-133.

Public awareness

- Compilation of a Competence Manual for crocodile husbandry (see SOMMERLAD *et al.* 2014)
- Compilation of a crocodile book for young people including sections about importance of zoos, conservation breeding, to be published in spring 2016 (see ZIEGLER in press)

Conservation

- Engagement together with Laotian and Vietnamese cooperation partners (National University of Laos, Vientiane; Natural Resources and Environment Department, Khammouane, Lao PDR; Vietnam Forestry University, Hanoi, Vietnam; Institute of Ecology and Biological Resources, VAST, Hanoi, Vietnam) in creation of a reserve for the rediscovered Siamese crocodile in Khammouane Province, Laos
- Planning of a genetical screening of captive *C. siamensis* in Vietnam in cooperation with Dr. Minh D. Le, University of Science, Hanoi
- Conservation breeding of the Philippine crocodile (ESB) (see report below)

Husbandry improvement

- practice and development of target training with Philippine crocodile (see RAUHAUS & PLOETZ 2014)
- induced natural breeding of Philippine crocodiles in public exhibit of the Cologne Zoo (see ZIEGLER, RAUHAUS & NIGGEMANN 2015, ZIEGLER & RAUHAUS 2015)

Administrative assistance

Theoretical and practical crocodile husbandry training for the staff of the Saigon Zoo, Vietnam:

ZIEGLER, T. & A. RAUHAUS (10. November 2014): Introduction into the biology and husbandry of crocodiles. Symposium Saigon Zoo, Ho Chi Minh City

Theoretical and practical crocodile husbandry training for the staff of the Hon Me Rescue Station of Wildlife at Risk, Vietnam:

ZIEGLER, T. & A. RAUHAUS (15 November 2014): Crocodile husbandry. Hon Me Station, Wildlife at Risk (WAR), Vietnam.

Theoretical crocodile husbandry training for the staff of the Vietnam National Museum for Nature:

ZIEGLER, T. & A. RAUHAUS (19 November 2015): Advanced herpetological husbandry course: crocodiles, within the Herpetological Symposium “Development of a rescue station” of the Vietnam National Museum for Nature (VNMN), Hanoi.

Further presentations

SCHMIDT, F. & T. ZIEGLER (27 May 2014): Developing Regional Studbooks – Genetic and Demographic Analysis of Small Populations based on the Examples of the European Studbooks for the African Dwarf Crocodile (*Osteolaemus tetraspis*) and the Philippine Crocodile (*Crocodylus mindorensis*). Crocodile Specialist Group Meeting ‘The Impact of Zoos on Crocodylian Conservation and Biology’ in Lake Charles, Louisiana.

SCHMIDT, F., ZIEGLER, T. & M. ANSERMET (September 2014): The mysteries of African crocodiles. EAZA conference Budapest.

ZIEGLER, T. & A. RAUHAUS (6 May 2015): Philippine crocodile (*Crocodylus mindorensis*) ESB update, 13. EAZA Reptile TAG Meeting Fuengirola, Spain.

Update on the Philippine crocodile (*Crocodylus mindorensis*) ESB

At the end of 2015 the European Studbook (ESB) contained 54 purebred, living Philippine crocodiles, distributed among seven collections (in alphabetical order): Bergen Aquarium (1.1), Cologne Zoo (1.3.2), Danish Crocodile Zoo (2.2.15), London Zoo (1.1.5), Paignton Zoo (1.1), Protivin Crocodile Zoo (3.7.6), and Zurich Zoo (1.1). Of these 5.7.7 (n = 19) are held in the core ESB population (crocodiles kept in EAZA zoos), and 5.9.21 (n = 35) in the extended ESB population (non-EAZA institutions, viz., Danish Crocodile Zoo in Esbjerg, Denmark; Protivin Crocodile Zoo, Czech Republic). In 2014, 6 juveniles hatched at London Zoo, and subsequently 17 in the Danish Crocodile Zoo, of which one has died in 2014. In 2015, 3 juveniles hatched at Cologne Zoo, and subsequently 1 in the Protivin Crocodile Zoo. Each one juvenile has died in Cologne Zoo, London Zoo, and in Danish Crocodile Zoo in 2015. As Chester Zoo cannot take back the couple held on an interim basis by Paignton Zoo, and also the latter zoo is no longer able to keep that species, both mentioned zoos will step back from the ESB. The transfer of the adult couple from Paignton to a new participating institution, La Ferme aux Crocodiles (Pierrelatte, France), has been approved by the Philippine authorities. Furthermore it is intended to send three juveniles from London, and three juveniles from Esbjerg to another new participating institution, Blue Planet Aquarium (Kastrup, Denmark). It is also intended to send two juveniles from Esbjerg to another new participating institution, Crocodiles of the World (Brize Norton, UK). Concerning the planned transfer of a juvenile from Protivin (offspring of crocodiles imported by Protivin from Aviron Zoo in Manila under a Memorandum of Agreement) to Zoological Garden of Zagreb (Zagreb, Croatia), a separate agreement between Protivin and Zoo Zagreb will be explored. In addition to the aforementioned intended transfers, the following surplus (n = 21) is still available and must be placed in other zoological gardens in the future: 2 juveniles from Cologne (from 2013), 4 juveniles from Protivin (from 2013), 10 juveniles from Esbjerg (from 2014), 2 juveniles from London (from 2014), 2 juveniles from Cologne (from 2015), and 1 juvenile from Protivin (from 2015). With sufficient offspring currently available and only few

interested institutions participating the project and taking over surplus Philippine crocodiles no breeding is recommended for the time being. Optimum placement and combination not only of existing offspring but also certain mature individuals has priority at time.

ZIEGLER, T., RAUHAUS, A. & D. KARBE (2014): Philippine Crocodile (*Crocodylus mindorensis*). European Studbook (ESB), second edition. – Kölner Zoo: 1-38.

ZIEGLER, T. & A. RAUHAUS (2015) Philippine Crocodile (*Crocodylus mindorensis*). – European Studbook (ESB), third edition. Kölner Zoo: 1-31.

ZIEGLER, T. & A. RAUHAUS (2016): Philippine Crocodile (*Crocodylus mindorensis*). – European Studbook (ESB), fourth edition. Kölner Zoo: 1-29.

Crocodile publications in 2014

RAUHAUS, A. & F. PLOETZ (2014): Targettraining bei Krokodilen im Aquarium des Kölner Zoos und im Tropen-Aquarium Hagenbeck [Target training with crocodiles in the Aquarium of the Cologne Zoo and in the Tropical Aquarium Hagenbeck]. – Arbeitsplatz Zoo 3, 2014: 7-14.

SCHNEIDER, M., KLEIN, B., KRÄMER, D., KNEZEVIC, K., TIFLOVA, L., VOGT, S., RAUHAUS, A., VAN DER STRAETEN, K., KARBE, D., SOMMERLAD, R. & ZIEGLER, T. (2014): First observations on the courtship, mating, and nest visit behaviour of the Philippine crocodile (*Crocodylus mindorensis*) at the Cologne Zoo. - Journal of Zoo and Aquarium Research 2(4): 123-129.

SOMMERLAD, R., KARBE, D., VAN DER STRAETEN, K., RAUHAUS A. & T. ZIEGLER (2014): Krokodile. In: Sachkunde Gefährliche Reptilien [Crocodiles. In: Competence Manual deangerous reptiles]. – VDA/DGHT Sachkunde GbR, Mannheim: 84-135.

Crocodile publications in 2015

ZIEGLER, T., HAUSWALDT, S. & M. VENCES (2015): The necessity of genetic screening for proper management of captive crocodile populations based on the examples of *Crocodylus suchus* and *C. mindorensis*. – Journal of Zoo and Aquarium Research 3(4): 123-127.

ZIEGLER, T., LUU, V. Q., SOUDTHICHAK, S. & T. Q. NGUYEN (2015): Proof of a so far overlooked population of the Siamese crocodile in Lao PDR. Update on WAZA Project 10007. - WAZA News 3/15: 35.

ZIEGLER, T., LUU, V. Q., SOUDTHICHAK, S. & T. Q. NGUYEN (2015): Rediscovery of the Siamese crocodile (*Crocodylus siamensis*) in Khammouane Province, central Lao PDR. – Crocodile Specialist Newsletter 34(3): 11-13.

ZIEGLER, T. & A. RAUHAUS (2015): Induced natural breeding of the Philippine crocodile (*Crocodylus mindorensis*) at the Cologne Zoo. – Crocodile Specialist Newsletter 34(3): 9-11.

ZIEGLER, T., RAUHAUS, A. & C. NIGGEMANN (2015): Erstmals natürliche Aufzucht der vom Aussterben bedrohten Philippinenkrokodile (*Crocodylus mindorensis*) in Europa

gelungen [First natural breeding of the endangered Philippine crocodile in Europe]. –
Reptilia 20(5): 72-75.

Crocodile publications in 2016

ZIEGLER, T.(in press): Entdecke die Krokodile [Discover crocodiles]. – Natur und Tier
Verlag, Münster: 1-64.

Prepared by: Thomas Ziegler & Fabian Schmidt.

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