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Status update on Arnold´s giant tortoises *Aldabrachelys gigantea arnoldi* (Bour, 1982) at Silhouette, Seychelles

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Abstract: As with previous years, Silhouette island was visited in December 2018 in order to investigate both the adult free-ranging Arnold's giant tortoises *Aldabrachelys gigantea arnoldi* (Bour, 1984) at Grand Barbe and the four juveniles from that group. All adult found at Grand Barbe, including two male Arnold's tortoises were considered as healthy and in good condition. The four juveniles, which were found at Grand Barbe in 2017, were transferred to a newly built enclosure at the Hilton Labriz hotel and mixed with five older juveniles of the Aldabra giant tortoise *A. g. gigantea* (Schweigger, 1812). All four juveniles *A. g. arnoldi* grow well and thus are considered as healthy. In a few years, all nine juveniles are intended to be released at Grand Barbe, once they have reached an appropriate size and weight which prevents them from poaching. Nevertheless, the current co-culture of juveniles from both subspecies under natural outdoor conditions allows for a direct comparison of the morphological carapace differences, which are considered as distinct at this stage of development.

Introduction

Once established as a breeding group at the Nature Protection Trust of Seychelles (NPTS) on Silhouette island, the adult Arnold giant tortoises *Aldabrachelys gigantea arnoldi* (Bour, 1982) were transferred to Grand Barbe in 2007 (Gerlach 2003, Pawlowski & Krämer 2010, Wüthrich 2003). Grand Barbe was found suitable for an even a larger number of giant tortoises as the village at this site is almost abandoned and the access to this area is from both the land and sea is rather limited (Fig. 1). Aspects which are still considered relevant in order to prevent the tortoise from poaching. The

Fig. 1. Undisturbed bay of Grand Barbe.

adult group was considered as actively breeding at the time of its release into the wild and continuous monitoring during the following years indicated successful nesting at Grand Barbe, however no hatchlings or juveniles could have been detected (NPTS 2009, 2010). It took about ten years until the first offspring from *A. g. arnoldi* where discovered in the wild in 2017 (Pawlowski & Gerlach 2018). Once found, the four juveniles were transferred to a safe place at La Passe to remain there until they have reached an adequate size to be reintroduced at the area of Grand Barbe. In December 2018, Silhouette island was visited once again and the status of both adult and juvenile *A. g. arnoldi* was observed.

Status of adult tortoises at Grand Barbe

During the past eleven years, the total number of adult giant tortoises released to Grand Barbe is thought to have been ten: five of these are the *A. g. arnoldi* subspecies, whereas the other five belong to the Aldabran-form *A. g. gigantea*.

By the end of 2018, eight of them survived consisting of two males and six females. In fact, one male and one female died during the years before. The current subspecies status of the tortoise remaining at this site remains unclear, as not all of them have been found recently. The tortoises were numbered according to the date of their introduction at Grand Barbe; no. 1 to 5 refer to *A. g. arnoldi*, whereas no. 6 to 10 refer to *A. g. gigantea*. During the excursion to Grand Barbe in December 2018, two adult male Arnold's tortoises (i.e. "Hector" and "Stan") were found grazing at the urbanised grassland area of the former village at about 8:45 h (Fig. 2). A female Aldabra tortoise (no. 6), which had not been observed in previous years, was found seeking shelter from the sun in the denser vegetation area (Fig. 3).

Fig. 2. Adult male *A. g. arnoldi* grazing.

Fig. 3. Adult female *A. g. gigantea* in its shelter.

Fig. 4. Growing vegetation at Grand Barbe.

Both female *A. g. arnoldi* as well as the third male of the same subspecies ("Adrian"; presumably dead?) could not be found at this site in 2018. However, the overall low number of tortoises and thus the low pressure on the vegetation due to tortoise grazing and browsing resulted in a continuous increase and growth of the coastal vegetation, which made the location of adult tortoises in 2018 even more difficult than during the years before (Fig. 4). Taking this into account, finding juveniles or even hatchlings seems to be almost impossible and walking outside the grassland area may even result in serious damage of well camouflaged small tortoises due to unintended stepping on these small and soft-shelled animals.

Status of juvenile *A. g. arnoldi* at La Passe

By December 2018, the four juvenile *A. g. arnoldi* has been moved to the new outside enclosure, located within the Hilton Labriz area (Fig. 5). In addition to these four tortoises, five older and thus larger *A. g. gigantea* from an Aldabran breeding group on the outer Seychelles island of Desroches were kept in that enclosure (Fig. 6). The carapace length of the Arnold´s tortoises was estimated to be in the range of about 15 to 20 cm, whereas the Aldabran ones were considered to range from about 25 to 35 cm. Both subspecies are intended to grow up at this place until they have reached a sufficient size so that they all can be released at Grand Barbe in order to enlarge the already existing group of giant tortoises within the western side of the island.

Fig. 5. Enclosure for juvenile tortoises at Hilton, Labriz.

Fig. 6. Group of juveniles from *A. g. arnoldi* and *A. g. gigantea*.

The enclosure itself had both shady and sunny areas, as several large coconut trees provide sufficient shelter from the sun. Any growing coconuts were typically removed from the trees within the hotel area for precautionary reasons (i.e. injury of people due to fallen coconuts), which also includes the tortoise enclosure. The ground consists of sandy areas, but also of a small grassland area. Furthermore, a solid, concrete based shallow water pool was present, allowing the tortoises to regulate their water requirements and also to manage their body temperature during high daily temperatures. A wooden lockable cage was also present at one side of the area, in which the young tortoises were transferred during the night to protect them from poaching. The *A. g. arnoldi* were marked with a number on their carapace, whereas the *A. g. gigantea* had a combination of number and letter on their shell, so that both subspecies can be easily distinguished from each other. However, differences in sizes and markings were not the only difference, if the tortoises were observed more closely. In fact, the shape of the carapace differs significantly between both subspecies: it was much narrower for the *arnoldi* form, compared to the round shaped Aldabran form (frontal view; Fig. 7a, b). In addition, the juvenile *A. g. arnoldi* tortoises lacked the flattened shape of the back of the carapace (and angle of about 45 °) which is typical for *A. g. gigantea* tortoises (lateral view; Fig. 8a). Also, maximum carapace height in *A. g. arnoldi* juveniles was located more posteriorly than central, compared to the Aldabran form. Taking this into account, the carapace appeared somehow more elongated in *A. g. arnoldi* juveniles, compared to that of the *A. g. gigantea* juveniles (Fig. 9).

Fig. 7. Frontal view of *A. g. arnoldi* (left) and *A. g. gigantea* (right) juveniles.

Fig. 8. Lateral view of *A. g. arnoldi* (left) and *A. g. gigantea* (right) juveniles.

Fig. 9. Top view of *A. g. arnoldi* (left) and *A. g. gigantea* (right) juveniles.

The feed consists of various plants such as *Ipomea pes-caprae* and *Scaevola sericea*, *Artocarpus altilis* and grass, similar to the vegetation consumed by the adults at Grand Barbe (Fig. 10).

Discussion and conclusion

The current observations of adult and juvenile *A. g. arnoldi* revealed that all the tortoises found are in a good, healthy condition. The area at Grand Barbe still provides plentiful and varied feed, so that the adult tortoises within that area showed only little

movement. Especially, the two male Arnold tortoises were found closely to or directly on the grassland area of the old village, feeding on grass, old and fresh leaves and fruits from nearby breadfruit trees. In contrast, females were rather shy and were found mostly within the higher and more dense vegetation away from the grassland area. They may access the grass plain during grazing, but are considered to be more mobile than the males, which makes it difficult to find them during the daytime when they hide in the rather dense coastal vegetation and associated marshland (Pawlowski 2016).

Although juveniles were found in 2017 accidently, finding possible additional juveniles or even hatchlings in nowadays is considered highly unlikely, given the large number of possible shelters within the vegetation. Searching for adult tortoise outside of the grassland area may even lead to serious damage of young tortoises by accidental trampling, as they are well camouflaged in the dense vegetation.

Thus, the almost abandoned area at Grand Barbe can be considered as a suitable area for an independent living group of adult tortoises, although the mixing of two subspecies may not be considered appropriate. However, the large number (> 50) of old, corroded diesel barrels is a potential serious harm to the wildlife of this area due to the contamination of the associated marshland (fuel residues in the barrels) and the coral reefs in front of Grand Barbe. Furthermore, sharped-edged corrosive metal pieces from these barrels may also lead to serious injuries of adult tortoises if ingested along with the feed. The barrels once transferred to Grand Barbe (by boat) as energy supply for generators, where not shipped back to the main island, Mahé, but were dumped within the coastal forest and marshland area. In order to prevent this area from further

Fig. 10. Two juvenile *A. g. arnoldi* feeding on breadfruit.

contamination with carcinogenic diesel fuel, it is strongly recommended that these barrels are collected and removed from this area and recycled appropriately.

The new enclosure for the juvenile Arnold tortoises provides an excellent area for adequate growth under semi-controlled conditions, especially as poaching or damage due to rats can be almost excluded. However, given the current number of juvenile tortoises a further extension may become necessary due to the increased size of the juveniles. Although, the juvenile Arnold tortoises are currently kept together with slightly larger Aldabra tortoises, the co-culture allows for a direct comparison of the distinct morphological features of both subspecies, which are evident even at this stage of age development (see also Gerlach 2011). This comparison concluded that the four juveniles found at Grand Barbe in 2017 differ significantly from the Aldabra-juveniles and thus confirms them as offspring from Arnold tortoise breeding group.

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