

Non-invasive genetic sampling of the Zebra population in NamibRand Reserve, Namibia

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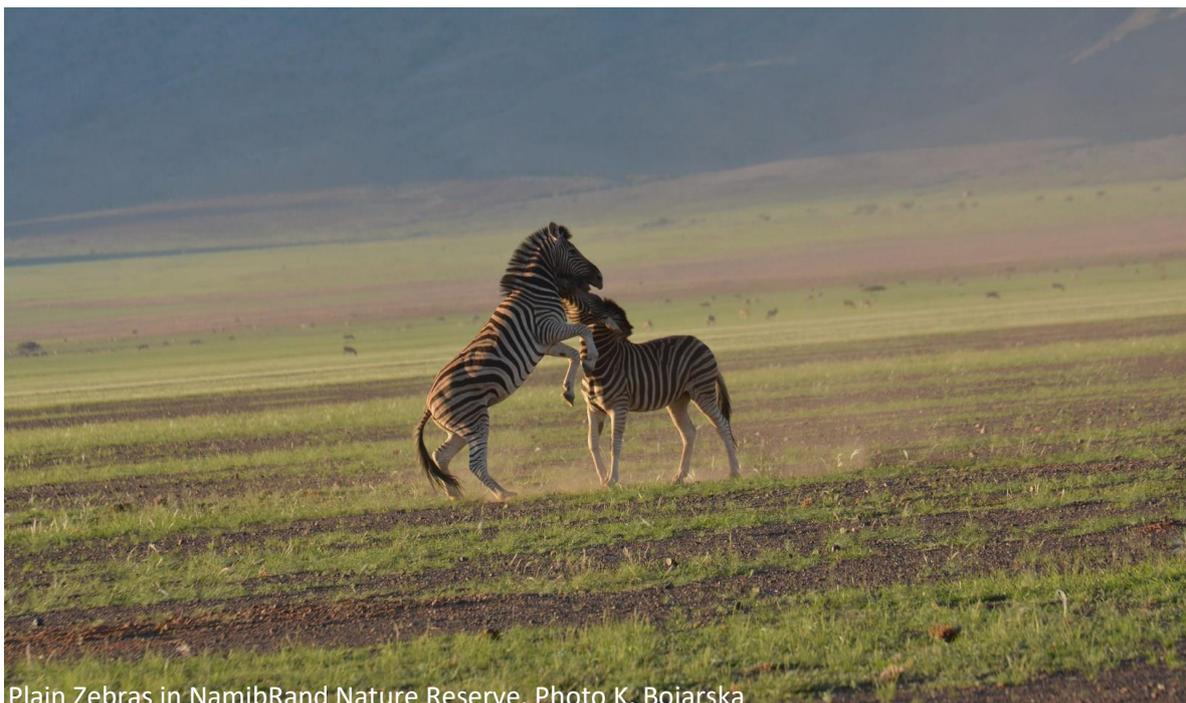
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Plain Zebras in NamibRand Nature Reserve. Photo K. Bojarska

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Background

Hartmann's Mountain Zebra is an endemic species to Namibia's Escarpment region and overlaps with Plains Zebra in northern part of its range. Due to the creation of artificial waterholes acting as gathering points and the restriction of their natural movement due to fencing of communal farmland and protected areas, time and probability of the encounter of both species and the possibility of hybridization has increased. Mixed herds of Mountain and Plain Zebras have been observed, as well as individuals that show characteristics of Mountain Zebras as well as Plain Zebras, suggesting increased intermixture of the two species. This has brought up concerns, that current conditions might favor hybridization between both species and increase the threat of extinction for the Mountain Zebra. Therefore, our pilot project, entitled "Establishing a methodological toolbox for non-invasive genetic monitoring of Plains Zebra, Hartmann's Mountain Zebra and their hybrids" aimed at establishing a non-invasive genetic sampling design of both zebra species based on scats. Non-invasive genetic monitoring in combination with phenotypic observations are a powerful tool to increase the knowledge about hybridization and to support conservation strategies for the Hartman's Mountain Zebra. Our plan was to collect samples of scats in the core areas of occurrence of Plain Zebra and Hartmann's Mountain Zebra and their overlapping zone, and when possible, tissue samples of dead zebras.

The trip to NamibRand Nature Reserve

We arrived at NamibRand Nature Reserve on 10 March. On 11 March in the morning, after kick-off meeting with Murray and Lee Tindall at Keerveden lodge (Fig. 1), we headed off together with Murray in search for zebra's scats. We collected samples at two sites where only Plain Zebras occur (PZ1 and PZ2 in Fig. 2). When we spotted a group of zebras, we slowly approached them, looking for fresh scats. Sometimes it was possible to see from which individual the scat came from (Fig. 3), which was valuable because we could relate the genotype of defecating animal to its appearance.

The fences around the NamibRand NR are an obstacle for animal migration, but many species learnt to use holes in those fences to get through. To investigate what species and how often use holes in the fences, we raked the sand at five holes (to monitor fresh footprints in sand) and placed photo-traps at two other holes in the fence surrounding NamibRand NR from the east (Fig. 4).

In the evening, we also observed a Mountain Zebra male in a group of Plain Zebras (Fig. 5 top). This individual has been staying with Plain Zebras for several years (M. Tindall, pers. communication). We sampled scats of this stallion along with Plain members of his group. This day, the male showed little interaction with other zebras.

In the evening, we visited area where both Plain and Mountain Zebras occur (PZ&MZ in Fig. 2). No zebras were present at the time, but we sampled a carcass of Plain Zebra.



Figure 1: Kick-off meeting at Keerveden lodge with Murray and Lee Tindall, Roman Gula and Ralph Kuehn.



Figure 2: Locations of Zebra scat samples: areas where only Plain Zebras occur (PZ1 and PZ2), where Plain Zebras are accompanied by a Mountain Zebra stallion (PZ&1MZ), where Plain Zebras coexist with Mountain Zebras (PZ&MZ), and where only Mountain Zebras occur (MZ).



Figure 3: Top: Murray, Ralph and Roman approaching a group of Plain Zebras (top) to sample fresh scats. Bottom: Observation of defecating zebras enables collection of very fresh samples for genetic analysis and identification of possible hybrids.



Figure 4: Katarzyna Bojarska raking the sand at hole in the fence surrounding NamibRand NR to investigate what animals cross it based on footprints; a fence-killed Gemsbok in the background.





Figure 5: A Mountain Zebra male in a group of Plain Zebras in the evening (top) and playing with them the next morning (bottom).

On 12 March early in the morning, we observed again the group consisting of Plain Zebras and Mountain Zebra male. This time, the stallion was actively participating in the group's social interactions, playing and chasing with other zebras (Fig. 5 bottom). Genotyping the samples which we collected from this group will answer the question whether he also participates in breeding.

Next, Murray led us to the north-eastern part of the NamibRand Nature Reserve in search for Mountain Zebras. This zebra species lives in less accessible, mountainous parts of the Reserve, so finding them was more of a challenge. When we finally spotted a group of Mountain Zebras (Fig. 6), they were high up in the mountains, out of our reach. Luckily, we were able to access another group close to a waterhole (MZ in Fig. 2), where we collected a sufficient number of scats.

On 13 March, we checked the fence holes that we raked two days before, and collected the photo-traps. We found out that Gemsboks and Black-backed Jackals were using the holes most frequently. Gemsboks are not good jumpers (M. Tindall, pers. comm.), so they prefer to crawl under the fence where possible (Fig. 7). One of the holes monitored with a photo-trap was quite busy, during 1.5 day we recorded six Gemsboks successfully crossing the fence and several others trying to cross but resigning from it.

During our stay in NamibRand, we collected 63 scat samples of both zebra species in four locations, and one tissue sample from a dead zebra.



Figure 6: Mountain Zebras are not easy to spot from the distance. A group of Mountain Zebras (on the left) being observed by Murray, Ralph and Roman (on the right).

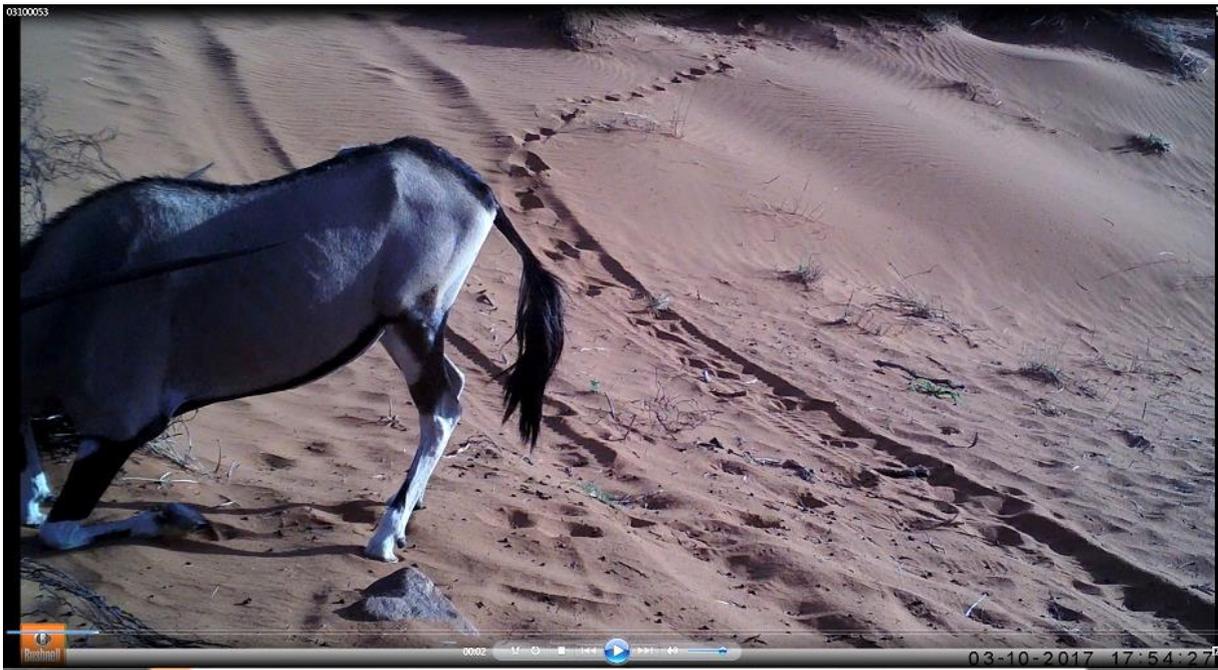


Figure 7: A Gemsbok recorded on a photo-trap trying to get through a fence hole.

Acknowledgements

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Plain Zebras in NamibRand Nature Reserve. Photo K. Bojarska