

The Battle for Breeding Rights – male behaviour at Ziwa Rhino Sanctuary

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Ziwa Rhino Sanctuary covers 64.2 km² in Nagasongola District, central Uganda. The fully fenced area received its first four white rhinos, two subadult males and two subadult females, in July 2005. In September 2006, a young adult female and sub-adult male were added to form the founder population. To date there have been 25 births with one death.

The rhinos at Ziwa are held under heavy 24-hour security by armed guards and monitoring rangers, who follow the animals on foot from a distance but keep them in sight as much as possible. Ziwa is almost unique for a rhino sanctuary as it has no predators, such as lions, or dangerous wildlife, such as elephants and buffaloes.

During the hours of darkness, the rangers have torches which they use to observe the rhinos whenever they hear any sound of activity and at least at 15-minute intervals to check on the rhinos. During full moon periods the rhinos are easily observed without the need for torches.

Since June 2010, in order to better understand the behaviour and movements of the rhinos, the monitors have kept an hourly record of the location, by sector and block, and key activities, including mating, of each rhino.

In order to obtain a more detailed understanding of the use of space by the rhinos, since January 2019, monitors have collected daily location data using simple hand-held GPS units. In addition, a specialist team of tracking rangers daily locate any male which was not with a monitored group, also recording the GPS location. The data is then mapped in Microsoft Excel.

This paper examines the development of male breeding performance which, to the end of 2019, contributed 25 calves in addition to the current use of space by the adult males.

Results

Table 1 shows the number of matings recorded by each of the three current breeding males (Taleo, Moja and Augustu) between 2010 and the end of 2019.

Table 1. The number of matings recorded by each of the three current breeding males for the years 2010 to 2019.

Year/Male	TALEO	MOJA	AUGUSTU
2010	4	0	0
2011	0	0	0
2012	10	0	0
2103	0	0	0
2014	4	7	0
2015	2	13	1

2016	0	12	0
2017	5	10	0
2018	1	2	6
2019	7	2	5

Up until 2013, Taleo exhibited dominance over its nearest male rival Moja. Taleo was 8 years and 2 months old when he fathered the first calf born at the sanctuary with conception estimated to have been in February 2008.

Dominance of Taleo over Moja, maintained by fighting, became particularly serious in 2011 (Patton et al 2017). Moja responded by moving to areas where Taleo did not visit resulting in Taleo being the only breeding male and fathering the first nine calves to be born in the sanctuary (confirmed by DNA analysis).

In February 2013, Moja became stuck in mud at a dam that was drying out. It took a struggle of 17 hours before he was rescued. On recovery, the behaviour of Moja changed from being passive to becoming assertive. This led to renewed fighting with Taleo but, this time, Moja was dominant resulting in Taleo yielding to Moja. They then shared breeding rights.

The mating data shows Moja fathered his first calf at 14 years old and was the father of six of the seven calves born between 2015 and 2017.

In May 2018, the young male Augustu was observed mating for the first time at 8 years and 6 months old. He is believed to be the father of the first calf of the female Waribe, conceived in that month, and the second calf of Uhuru but this is yet to be confirmed by genetic analysis. Augustu has been observed mating a total of 11 times through to the end of 2019.

Use of Space by the breeding males

Detailed GPS location data has only been collected since the beginning of 2019. Before this, general location data by sector and block, (for map see Patton *et al.*, 2012), was collected. The data presented in Table 2 shows that when breeding started, Taleo travelled throughout the sanctuary in the areas used by the females while Moja avoided these areas so as not to come into contact with Taleo.

Table 2. Location of conception matings

Sector/Block	Taleo	Moja	Augustu
W2	2	0	0
L1	4	1	4
L2	4	0	0
L3	0	8	0
R2	1	1	1
R3	0	2	0

When Moja started mating, he did so in the central area of the sanctuary, particularly sector/block L3 with Taleo maintaining the western area, particularly sector/block L2 and W2. Most of the females moved around both areas. The eastern area was not used by the females but was a safe haven, along with other peripheral areas, for the fast-growing sub-adult males Augustu and Obama.

As shown in table 3, up until the end of 2019, only Taleo, Moja and Augustu had mated with the females.

Table 3. Parentage of the calves born in Ziwa Rhino Sanctuary based on observed matings

Female/Calf	1st	2nd	3rd	4th	5th	6th
Nandi	T	T	T	M	M	M/T?
Bella	T	T	T	M	M	T/A?
Kori	T	T	T	M	M	T
Donna	T	T				
Malaika	M	M	M			
Laloyo	M					
Luna	M					
Uhuru	M	A				
Waribe	A					

T = Taleo M = Moja A = Augustu

Detailed location data is presented in Figure 1 which shows the use of space by the males in the first six months of 2019. Taleo had a territory in the west; Moja had a territory in the middle area of the sanctuary; Augustu ranged around the eastern area.

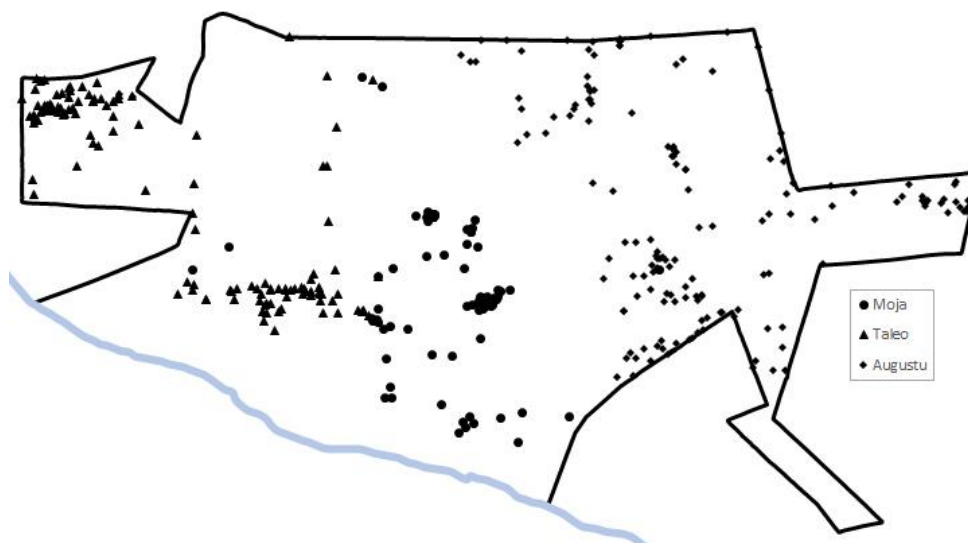


Figure 1. Use of space by three males for the period January to June 2019

The use of space by the three males in the second six months of 2019 is shown in figure 2. The significant change from the previous six months was that Augustu moved into the territory of Moja. This was the result of a series of five fights between the two during a period from July 29th to August 15th.

After these fights Moja was observed with bad face wounds. The front horn of Augustu caused facial injuries to Moja as, following dehorning, the flat horn tip was not smoothed down leaving a

sharp edge that tore the skin of Moja. Inflicting a painful injury gave an advantage to Augustu in a fight. This led to Moja allowing Augustu to stay in his territory to avoid further injury.

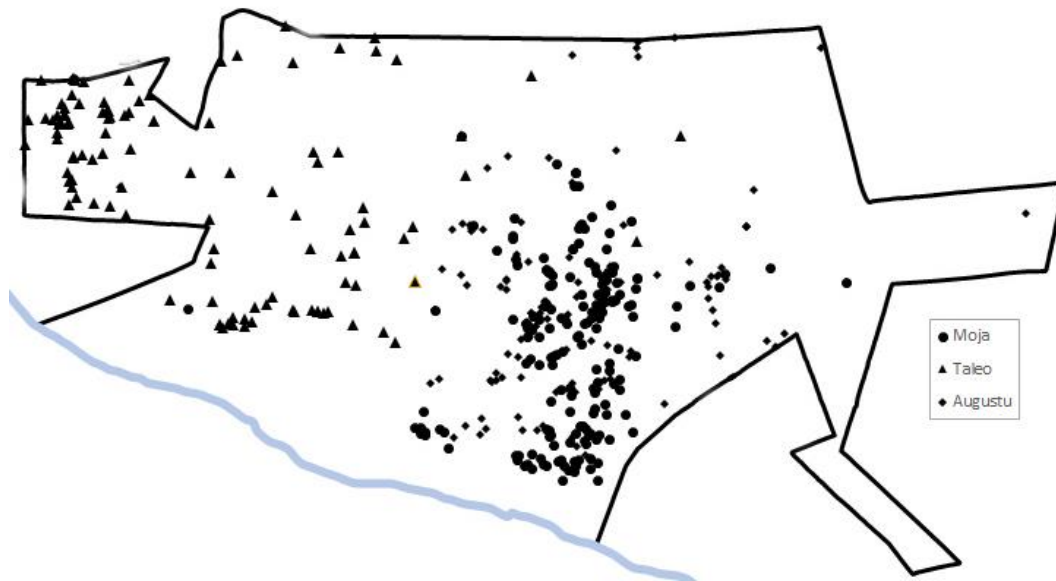


Figure 2. Use of space by three males for the period July to December 2019

Figure 3 shows that between the eight main breeding females a large part of the sanctuary was being utilised with the rhinos largely found within the territories of Taleo, Moja and Augustu as shown in Figures 1 and 2.



Figure 3. Use of space by eight breeding females during the year 2019

Overview

The data presented represents the development of white rhino male social organisation at Ziwa Rhino Sanctuary. Initially there was a single, dominant, breeding male with the whole sanctuary

being his territory. He was eventually challenged by a second male who took over partial breeding rights, splitting the single territory into two territories. When of sufficient size and strength, a younger male challenged one of the two existing territorial males initially sharing its territory. Whether this develops into a 'territory takeover' or a split into two separate territories or continues as a shared territory is the subject for further investigation.

References

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