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CASE REPORT

Operation Sahel: translocation and reintroduction of West African giraffe (*Giraffa camelopardalis peralta*) in Niger

RJ Harvey,[1] S Ferguson,[2] J Fennessy[2,3]

[1] *Independent Wildlife Veterinarian, United Kingdom*
[2] *Giraffe Conservation Foundation, Namibia*
[3] *School of Biological and Environmental Science, University College of Dublin, Ireland*
Corresponding author, email: *harvey.jrichard@gmail.com*

The West African giraffe (*Giraffa camelopardalis peralta*), a subspecies of the northern giraffe (*G. camelopardalis*), naturally only inhabited one unprotected area in Niger. West African giraffe are a conservation success story as their population has grown from ~ 49 individuals to > 600 as a direct result of efforts by the Niger government and NGOs. Along with improved legislation, enhanced monitoring, and community engagement, establishing a satellite population within their historic range has been a major success. Giraffe translocations are technically and logistically difficult, and may require immobilisations, which add additional challenges. Such translocations are commonly undertaken in southern and East Africa with specialised equipment and experienced teams. However, with good planning and preparation, giraffe can be translocated with a small, effective team and locally constructed equipment. This case report describes the translocation of 12 West African giraffe (eight female and four male) to the Gadabedji Biosphere Reserve, Niger, using locally constructed equipment. All giraffe were immobilised in the field and taken to a temporary holding boma for acclimatisation. The translocations took place in 2018 and 2022, interrupted by the COVID-19 pandemic. The giraffe spent between 24 hours and six weeks in the holding boma, and the former group received a low-dose of water-based perphenazine for tranquillisation and possible anxiolytic effects. Transport was by road using a modified 20-foot open-topped shipping container with strategic stops for feeding and rest. Giraffe were hard released into the reserve. No mortalities occurred during the operation and post-translocation; five calf births were recorded by the end of 2023.

Keywords: West African giraffe, translocation, reintroduction, Niger

Introduction

Historically ranging across north-western Africa, the West African giraffe (*Giraffa camelopardalis peralta*), a subspecies of the northern giraffe (*G. camelopardalis*) (Fennessy et al. 2016; Winter et al. 2018), was more recently restricted to the unprotected "Giraffe Zone" region of south-west Niger (Gasparova et al. 2024). Almost extinct in the 1990s with a population of ~ 49 individuals, the population increased to > 550 in 2018 and was downlisted to *Vulnerable* on the IUCN Red List from *Endangered* (2008) following continued conservation efforts of the Niger government and NGOs (Fennessy et al. 2018; Gasparova et al. 2024). The "Giraffe Zone" is a heavily populated, unprotected, communal area (Gasparova et al. 2024). Based on the low but enhancing population numbers and risk of a stochastic event(s), the National Giraffe Conservation Strategy of Niger (UEMOA, 2016) proposed that additional West African giraffe populations within protected areas are needed for their long-term protection. After detailed assessments, it was decided to establish a satellite population of these unique giraffe in Gadabedji Biosphere Reserve (GBR), Niger. This reintroduction was spearheaded by the Giraffe Conservation Foundation (GCF) for the Niger's Ministry of Wildlife in collaboration with Sahara Conservation and Wild Africa Conservation.

Giraffe translocations are extremely difficult and require specialised equipment and an experienced team. Giraffe may be mass captured with a helicopter, experienced pilot and ground team, and specialised enclosed crates or trucks (Fennessy et al. 2022). Alternatively, giraffe can be individually immobilised, loaded onto a field chariot (a modified trailer) (Fennessy et al. 2022) and then into a crate for transport or brought to an enclosure (boma) for acclimatisation. Giraffe immobilisation is high risk with reported mortality rates of ~ 35% (Paterson 2016; Muller et al. 2020; Kreeger et al. 2023). Giraffe translocations occur frequently in southern Africa, and to a lesser extent in East Africa, where specialised equipment, helicopters, and experienced capture teams, are readily available, and such moves are supported by legislation. However, to effectively support the conservation of the most threatened giraffe, there is a need to safely translocate giraffe in remote regions where there are limited resources and no large, specialised teams. This case report describes the translocation of West African giraffe in Niger, with limited equipment and personnel. It highlights that with proper planning and appropriate experience, translocations can be achieved in less-than-ideal circumstances.

Case history

Signalment

Twelve subadult West African giraffe (eight female, four male) were reintroduced to GBR in three groups of four: two loads in November 2018 and one in November 2022, delayed due to the COVID-19 pandemic and local security threats. There was good quality browse availability with trees in full leaf, with weather conditions dry and temperatures reasonable. Vegetation, environmental conditions and water availability were similar at source and release sites. Subadult giraffe (approx. 3 m) were selected for ease of transport during the translocation, avoidance of pregnant females, and better adaptation to a new area (Fennessy et al. 2022:15–17). The time of year for the moves was selected for best capture conditions and browse/water availability.

Immobilisation

Individual giraffe were immobilised with either etorphine (Captivon; Wildlife Pharmaceuticals) and hyalase (5000IU/giraffe), or a combination of etorphine and thiafentanil (Thianil; Wildlife Pharmaceuticals) by intramuscular injection, using a 2 ml dart and 50 mm side-ported needle (Capchur dart, Capchur Inc. or P-Type; Pneudart Inc.), and a CO_2 dart projector (JM Special 25; DANiNJECT, Kolding, Denmark). In 2018, males received a dose of 12 mg and females 10 mg of etorphine (approx. 0.02–0.04 mg/kg). Induction times ranged from 3–6 minutes. In 2022, each animal received 6 mg etorphine plus 6 mg of thiafentanil, a total opioid dose of 12 mg/giraffe (approx. 0.03 mg/kg), with induction times between 4–8 minutes. All animals were darted from the ground with vehicle support. Once in lateral recumbency and manually restrained, giraffe were immediately reversed with naltrexone (Trexonil; Wildlife Pharmaceutical) intravenously at a dose of 200–250 mg/giraffe (approx. 0.45 mg/kg) (10 mg per mg of thiafentanil, and 20 mg per mg of etorphine). A blindfold, head-harness and earplugs were placed, before genetic samples were taken and tracking devices fitted; solar-powered GPS-UHF satellite tail units (Savannah Tracking) and solar-powered GPS satellite ear tags (Ceres Trace). Darts were removed and 1 000 mg oxytetracycline (Terramycin Injectable; Zoetis) administered IM directly into the dart site. Ropes were placed around the neck and between the forelegs for guiding into the field chariot (Fennessy et al. 2022).

Transport to enclosure

After each giraffe was loaded into the field chariot (Fennessy et al. 2022; for loading technique and chariot design) they were brought to a boma. The chariot was constructed from a local single-axel horsebox and modified for purpose (Figure 1). The blindfold and ear plugs remained in place for the duration of the transport (5 min–1.5 hours). In 2022, prior to release into the boma, 20 mg total dose water-based perphenazine (100 mg/ml; Novecy Compounding Pharmacy) was given IM to each giraffe.

Enclosure adaptation

In 2018, giraffe were kept in a boma for six weeks to ensure habituation and good body condition prior to translocation. Personnel were present 24/7 to monitor and care for the giraffe. Due to the COVID-19 pandemic and increased security risks, the 2022 giraffe were only held briefly until four individuals were caught (2.5 days for the first captured animal, 0.5 days for the last). Giraffe received ~15 kg/giraffe of fresh browse daily as well as ad libitum bean hay, fresh melons and clean water.

Translocation

The transportation crate, fixed to a government owned 6x6 military truck, was a modified shipping container (Figure 2). The roof was removed, and the rear door closure modified. Water troughs, forage containers and wooden poles, were affixed high to the sides using ladders attached to the side to help provide browse, and the floor filled with sand for stability.

The translocation route was scrutinised in advance and chosen based on the best road conditions, shortest distance and least number of hazards. It was driven prior to the first move. Axes, saws, and wooden "Y" poles were used during the moves to remove any hazards such as tree branches and power lines that could harm or kill giraffe. The animals were driven on a strict "4–6 hr on, 2–3 hr off" schedule. As giraffe can be unstable in

Figure 1: Field chariot. A modified horsebox, it was made fit for purpose with the addition of the following: standing rails along each side to allow access to the giraffe and enable staff to travel with the animal. Rear door modified to ramp (from swing) with mesh grating added for efficient loading and to reduce slipping. Modified, simplified and more robust door closure latches. Additional guard railings at giraffe head/neck height on sides and front to better protect the animal when moving. Two horizontal rear removable bars which allow the animal to be secured safely whilst the door is closed and opened. Two removable lateral internal bars which allow the internal dimensions to be reduced depending on giraffe size to stop the animal turning around in the chariot and to give better lateral stability. A variable height and "distance-from-front" padded front bar to give the giraffe additional stability whilst reducing chance of chest injury, and to reduce the ability for giraffe to turn around in the crate. A strengthened towing arm with integrated tool kit, better able to handle rugged terrain and with all the necessary tools in case of puncture. Contact GCF for schematics.

Figure 2: Transportation crate. A modified shipping container, it was made fit for purpose with the addition of the following: Roof removed. Door closure modified to have removable top cross strut to allow loading of animals, but which retains structural integrity and strength during transport. All sharp edges smoothed with grinder. Painted white to reflect heat. External ladders welded onto crate to provide access to top of crate for feeding and monitoring. Wooden pole attachment points. Short wooden poles for hanging browse. Wall mounted cut 200 L drums for water during transport (edges made smooth and a cutout to make access more comfortable for giraffe). Two rear horizontal poles to enable the giraffe to be secured whilst the doors are being closed/opened and the cross-strut replaced (also short pole guides externally, poles also locked in place by pins attached to wall of crate). Two short vertical rear poles at each side of door from which a dual cross line is strung to hang and pull a curtain, used when loading to prevent escape whilst the rear poles are fitted and the door secured.

transportation crates and easily fatigue, they can develop exertional myopathies on unsteady terrain, and need time to rest and recover. They were fed and watered at each stop with copious fresh browse (cut during each stop), melons, bean hay, and fresh water. There were two longer stops of five hours and nine hours overnight, with the final longer stop after a period of very rough road to allow sufficient recovery. The total journey time was 45–50 hours and the distance approx. 850 km.

Release and monitoring

In 2018, the giraffe were "hard-released" (released directly off the truck into the reserve). Seven of the eight giraffe stayed as a group, but one female ran 120 km east of the reserve and was subsequently herded back by Tuareg eco-guards. In 2022, the giraffe were held for one hour in a 15m x 15m boma to allow them to settle, drink and browse before leaving as a group. Interestingly, these giraffe joined the now resident population within five-minutes post-release. All individuals were monitored using GPS-tracking devices, as well as eco-guards who weekly visualised the giraffe to ensure their wellbeing.

Outcome

All giraffe were captured and translocated successfully with no mortalities. Post-translocation, the giraffe adapted well with five calves born by the end of 2023.

Discussion

Giraffe translocations are difficult under the best of circumstances and become exponentially more so in remote and less developed countries. However, it is often in these locations where conservation is most pressing and where translocations can be the most impactful means of conserving a species, especially when moving individuals into a protected area. Sharing information of operations performed under less-than-ideal conditions is valuable for building a knowledge base for future conservation efforts in Africa. This move has demonstrated that basic solutions can be workable with experienced staff and diligent preparation.

The initial plan had been to move 16 giraffe over two years, as eight giraffe were unlikely to constitute a minimum viable population (Lee et al. 2020). However, the second phase of the project was delayed by the COVID-19 pandemic. The 2022 operation was further impacted by increased insecurity in Niger, which made it impossible to allow for an acclimatisation phase prior to transport as veterinary staff could not monitor the animals overnight in the field. Multiple shuttles of giraffe were also not possible for security reasons. These constraints dictated the schedule and number of giraffe that could be safely translocated. Adding four female giraffe to the new population was a worthwhile conservation endeavour and helped to establish a solid founder population. Further supplementation in future should be assessed once the security situation stabilises.

Interestingly, there was a lack of noticeable difference in the behaviour of the giraffe translocated in 2018 and 2022, despite the difference in the boma period, especially with regards to eating and drinking. All animals regularly ate and drank during the moves, and there was no noticeable difference in the later non-habituated group. West African giraffe naturally inhabit community areas and are somewhat habituated to people, greatly influencing their behaviour (Gasparova et al. 2024). Additionally, the giraffe in 2022 were given water-based perphenazine, which may have resulted in tranquillisation and anxiolysis, although whether perphenazine has anxiolytic effects is questionable. Further studies are necessary to understand the magnitude and duration of these effects, for if the calm behaviour was predominately due to the perphenazine this would be an important tool for translocations, importantly reducing stress and costs.

Translocations are an important and valuable tool for species conservation but must be carefully considered and planned to be successful (IUCN/SSC 2013). There are many factors which contributed to the success of these giraffe translocations. It is important to note that these translocations engaged many partners in collaborative discussions, involving due diligence both remotely, through desktop analyses, and on the ground, and were thoroughly planned well in advance of the actual operations. Although the materials used were basic and locally sourced, the designs were well thought out and implemented with due consideration to lessons learned in translocations in other regions. Various experts were consulted and the in-house expertise in GCF was invaluable in making these translocations a success. A very strong team attitude, with plans well communicated, good quality briefings and engagement of the entire team, always being mindful of animal welfare during the operation, ensured that good decisions were made for the best chance of success. The environmental conditions at the time of the translocations were ideal for capture and the quality of vegetation in both source and release site was good, meaning animals were in good condition when caught and had good quality nutrition at the release site; this certainly played an important role in the success of these translocations. The timing of such translocations is a crucial aspect of mission planning which is critical to success. Lastly, the animals themselves, being already habituated to people, also likely played a large role in the calmness of these animals during transport, which is important for success, and is likely why the less boma-adapted animals still travelled very well, eating and drinking in the crate.

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Conflict of interest

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Ethical approval

The author/s declare that this submission is in accordance with the principles laid down by the Responsible Research Publication Position Statements as developed at the 2nd World Conference on Research Integrity in Singapore, 2010.

ORCID

RJ Harvey https://orcid.org/0009-0007-3943-9837

S Ferguson https://orcid.org/0000-0002-8086-6706

J Fennessy https://orcid.org/0000-0001-5871-8267

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