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Describing habitat and finding colour rings of Black-tailed Godwits (*Limosa limosa*) in the Brakna region (Mauritania) and in the Senegal River Valley between Djoudj/ Diawling NP and Kaédi (Senegal and Mauritania) from 23 October – 5 November 2019

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Document Version

Publisher's PDF, also known as Version of record

Publication date:

2019

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Hooijmeijer, J., Howison, R., Piersma, T., & Sidi Cheikh, M. A. (2019). *Describing habitat and finding colour rings of Black-tailed Godwits (*Limosa limosa*) in the Brakna region (Mauritania) and in the Senegal River Valley between Djoudj/ Diawling NP and Kaédi (Senegal and Mauritania) from 23 October – 5 November 2019*. University of Groningen.

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Describing habitat and finding colour rings of Black-tailed Godwits (*Limosa limosa*) in the Brakna region (Mauritania) and in the Senegal River Valley between Djoudj/ Diawling NP and Kaédi (Senegal and Mauritania) from 23 October – 5 November 2019

Expedition report, University of Groningen & Global Flyway Network, The Netherlands

November 2019

Jos Hooijmeijer, Ruth Howison, Mohamed Ahmed Sidi Cheikh & Theunis Piersma



Introduction

The Black-tailed Godwit (*Limosa limosa*; BTG) is a meadow bird (Verstrael 1987; Thijsse 1904). The current Dutch population is estimated at fewer than 40.000 breeding pairs (Kentie et al. 2016) and represents an important part of the total continental BTG population *Limosa limosa limosa*. However, the number of breeding pairs have declined rapidly over the last decades, as compared to the 120.000 pairs in the 1960s (Mulder 1972). This is mainly caused by a change in agricultural land use. Intensification and rationalisation have led to degradation of the breeding habitat, resulting in low reproduction. The population in the Netherlands cannot produce enough chicks for a stable population (Vickery et al. 2001; Newton 2004; Tscharnke et al. 2005; Teunissen & Soldaat 2006; Roodbergen et al. 2012; Kentie et al. 2018). After the breeding season godwits migrate to southern Europe (Spain and Portugal) and West-Africa where they stay for wintering (Márquez-Ferrando et al. 2009; Hooijmeijer et al. 2013).

Demographic research Southwest Friesland

To measure the changes in population numbers and the causes, in 2004 the University of Groningen started a long-term research in the south-western part of Friesland, The Netherlands. In 2007 the research area expanded up to 8400 hectares and in 2012 increased again with another 1600 hectares (Groen et al. 2012). A colour-marked population of godwits was set up to make them individually recognizable. The knowledge that has been collected with this research has been implemented by policy makers and nature conservation organisations.

Migration and wintering sites Black-tailed Godwit

In 1983-1984 the wintering sites of godwits were explored for the first time. At that moment most godwits were wintering in rice areas along the West-African coast in Senegal, Gambia, Guinea-Bissau and further. Big numbers of godwits also occurred in the inner Niger delta in Mali (Altenburg & van der Kamp 1985), but they probably belonged to the eastern European population. Recently, the wintering behaviour has partly changed with an increasing number of godwits deciding to winter in Southern-Spain at National Park Doñana. In the 1980s during the first counts, only 4% of the NW-European population used this area as a wintering site but recent estimations suggest a big change with up to 23% of the population wintering in Spain (Márquez-Ferrando et al. 2011). The most important reason for this is probably the creation of new artificial fishponds and rice fields. It is remarkable that this increase is not driven by climatic changes in the Sahel zone of West-Africa (Márquez-Ferrando et al. 2013). For godwits, staying Iberia can be advantageous because they can skip a 3000 kilometre (v.v.) travel over the Sahara, a potentially dangerous migration route and save their fat stores for the next breeding season (Loonstra et al. 2019).

Conservation

The change in wintering grounds is remarkable and an important reason why we want to do (demographic) research in West-Africa. We know now that juveniles are more likely to make these kind of shifts than adults (Verhoeven et al., 2017), but not how they develop their individual migration strategy and perhaps thereby change the migration pattern of the species. These changes may also have consequences for the survival rate of both adults and juveniles. Moreover they can lead to differences in reproductive success, for example due to differences in body condition upon arrival on the breeding grounds. Both are demographic parameters that can rapidly influence population dynamics. A better understanding of these processes is therefore also important from a conservation point of view; the Black-tailed Godwit qualifies since 2006 as “Near Threatened” on the IUCN Red List.

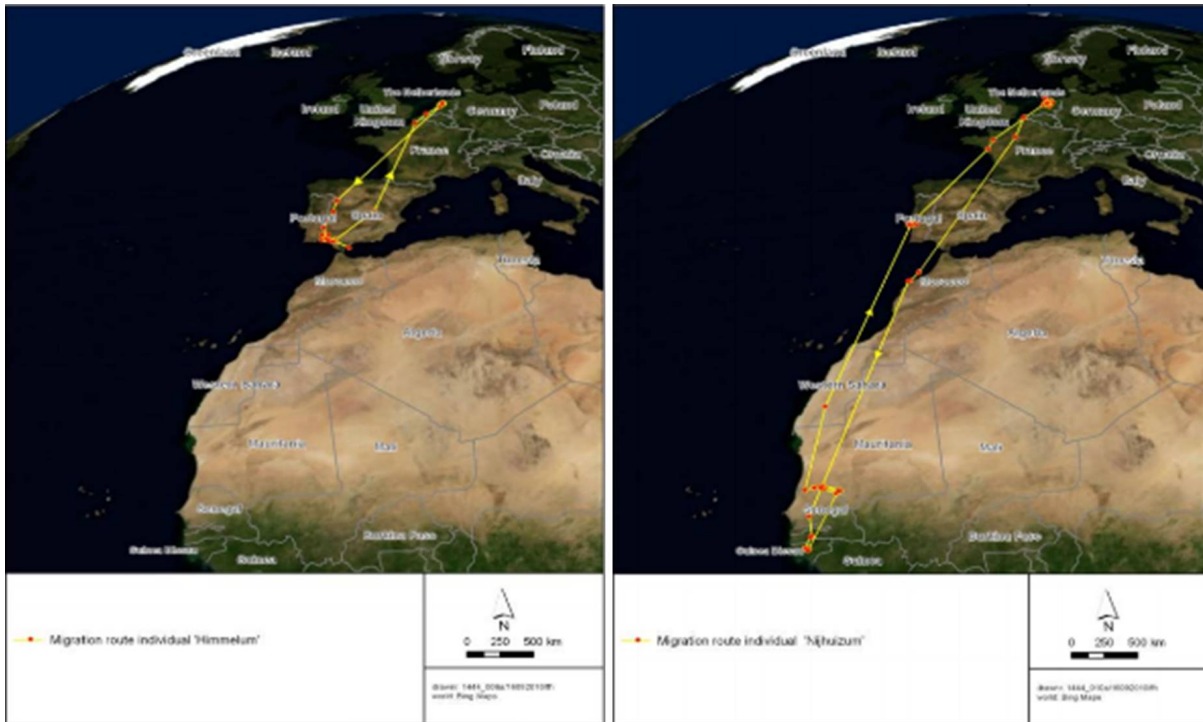


Figure 1. Two migration routes of satellite tagged birds in 2009. The left map shows the route of an Iberian wintering bird. On the right an African wintering bird. Iberian wintering birds save a 6000 km flight and don't need to cross the Sahara twice (Hooijmeijer et al. 2011).

Until now, West-Africa is the only area along the migratory flyway from where we don't receive many observations of colour-marked individuals. Only small numbers of colour-ringed birds have been reported, mainly by birdwatchers and, recently, by local scientists. Unfortunately the numbers of sightings are too small to make demographic comparisons between wintering sites.

Expeditions West-Africa and Iberia

In November 2014 the University of Groningen, in cooperation with Global Flyway Network and financially supported by Birdlife Netherlands, embarked upon their first expedition to the wintering grounds in West-Africa and since then we visited the area 2-3 times per year. We aim to set up a demographic research project in this area in close cooperation with local scientists, volunteers and conservation organisations. The most important goal of the first missions was to get a good overview of the wintering grounds, resighting conditions, local facilities and knowledge and to make a start with setting up a dataset of individually recognizable godwits that winter in West-Africa. Secondly we made a pilot study of habitat choice and prey choice. At this moment comparable research is done in NP Doñana (Spain), Extremadura (Spain) and the Tejo/Sado estuaries near Lisbon (Portugal). The last two are used as staging sites in February. Therefore it is mandatory to continue our research at all these locations to find links between wintering sites, stop-over sites and breeding sites. Research questions we want to get into in the future with our work in West-Africa, Spain, Portugal and the Netherlands are:

- What is the overall difference in adult mortality between birds wintering in West-Africa and Iberia? And where along the flyway do these differences occur?
- Can birds change their wintering strategy during their life? And is this age-dependent?
- Does reproductive success determine where birds winter?
- Has the wintering strategy consequences for their migration and breeding phenology? And are there consequences for their reproductive success?

Habitat study

Anthropogenic alteration of natural wetlands is having a major impact worldwide with consequences (both negative and positive) for migratory species such as continental black-tailed godwits. The majority of continental black-tailed godwits breed in grassland meadows situated in north-west and Eastern Europe (March – July) after which they migrate southwards for the non-breeding period (mid July – February), finding forage resources within wetlands and agricultural rice fields. On their migratory route black-tailed godwits pass through France and either stage or spend the non-breeding period in southern Spain and Portugal. Many will make the Saharan crossing to overwintering sites in West Africa, namely; the Senegal Delta and coastal region of Senegal, The Gambia, Guinea-Bissau, Guinea, Sierra Leone and central Mali.

Concentrating our efforts in Senegal, we used remote sensing products (Sentinel C-SAR1 12-day, and Modis EVI 16-day time series) (Howison et al. 2018) and 5 years of good quality locations of black-tailed godwits (equipped with PTT satellite tags) to generate a spatially and temporally explicit habitat prediction model using MaxEnt modelling. We found that during the non-breeding period black-tailed godwits show a preference for stable habitats within a relatively low productivity range (EVI value 0.1-0.2), which are associated with open wetlands, low vegetation cover and shallow surface water. However, remote sensing data is difficult to interpret without accurate ground-truthing information. Additionally, godwits spend much of their time foraging either on the mudflats of saline mangrove wetlands or in wet rice fields, and little is known of the nature of the prey items or the chemical residues left in the sediment drained from agricultural lands, at different times of the year. In this study we aimed to conduct a survey categorizing and describing habitats, measuring environmental variables such as water salinity and soil penetration pressure, feeding efficiency of the godwits, their body condition and carefully searching the substrate to establish the identity of godwit prey items.

Between 23 October and 5 November 2019 we visited the most important areas in the Senegal River valley in both Senegal and Mauritania from Djoudj and Diawling NP all the way inland towards Kaédi and beyond Lake Aleg (Brakna region) to record resightings of individual birds and describe godwit habitat. In this report we present a daily overview of our findings with photos, locations we visited, numbers present and the first conclusions and recommendations.

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Summary

Consecutive trips to West-Africa at different moments in the godwit annual cycle have allowed us to build up our knowledge of their itinerary, and learn about how godwits not only rely on manmade landscapes in their breeding grounds but also in rural Africa.

During this expedition we wanted to explore the intermittent wetlands in the Senegal River Valley in both Senegal and Mauritania and the Brakna region southeast of Lake Aleg in Mauritania. Our goal was to find colour ringed individuals, count godwit numbers and to make detailed habitat descriptions. From the many locations of satellite tagged birds we knew already for years that this must be an important wintering and stopover site for Black-tailed Godwits. Based on information of sat-tagged birds, peak numbers occur here from mid October to mid November. Many birds will continue further north to spend the rest of the European winter in southern Europe and not further south in West Africa as was previously assumed.

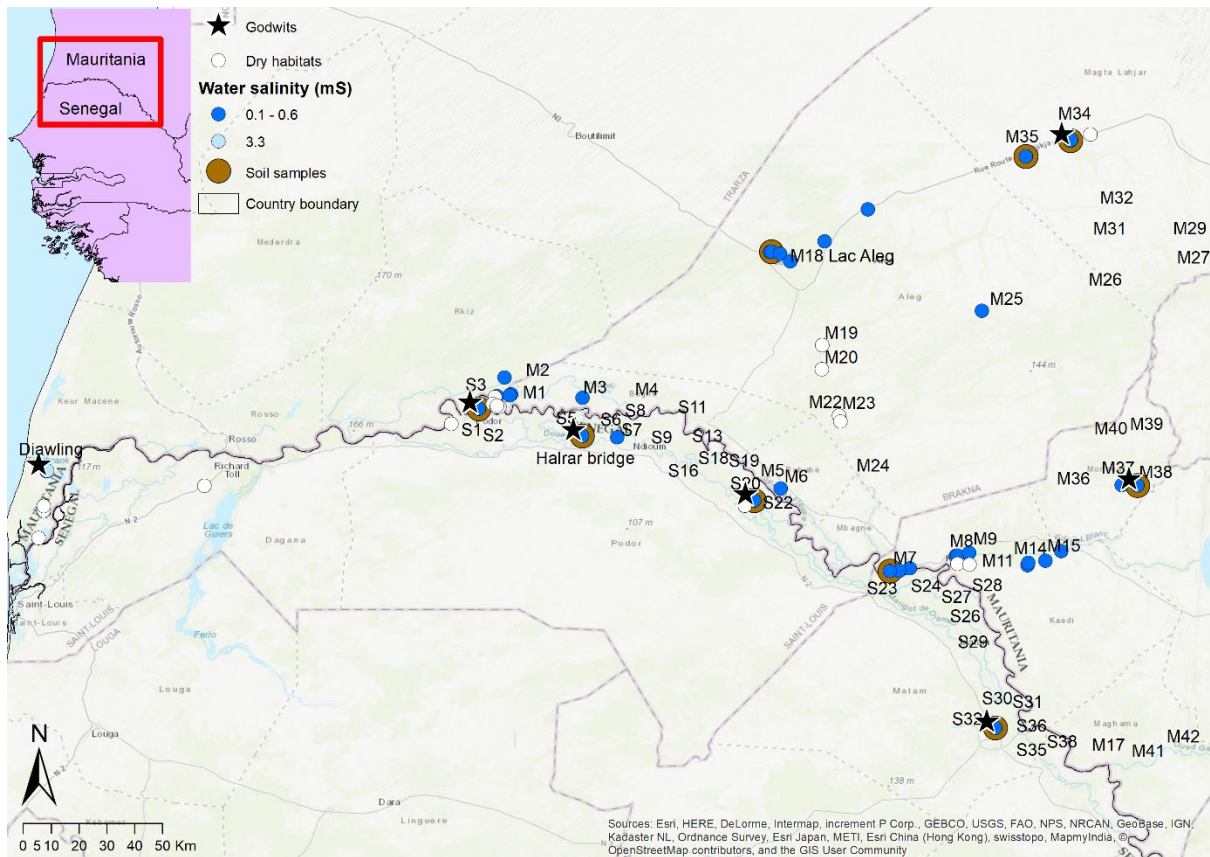
We arrived in south-east Mauritania at the end of the rainy season. After the rains, shallow lakes form in low lying catchment areas. These water bodies contain water for a longer period but, with air temperatures reaching above 40°C each day, slowly dry out over a number of weeks. These resources are only temporarily available: places that had been visited by godwits within a week previously had moved on to a different area since the water had dried. As the water dries up, the people from the surrounding areas start to cultivate the receding floodline, mostly with mixed crops of sorghum and beans. At some locations water retention dikes were constructed, creating a more reliable source of water both for agriculture and for godwits. Godwits use these lakes as can be seen from the recent satellite locations, however there appears to be a tolerance limit to the amount of disturbance from the activities of the farmers. In Mauritania we encountered the largest group of godwits (850 individuals) at the barrier lake of Lehneikatt (M38; see map below), where agricultural activities were limited to the western border of the lake. The shoreline was previously used for cropping, but at this time was in a resting period and grazed by a large herd of cattle and goats. In lakes where there were many farmers close to the water edge the godwits had already moved off. Cropping agriculture is highly restricted to the receding floodlines of the temporary lakes. Our guide said that the water completely dries up by December, which also explains the end of the godwit peak in mid November. The majority of the people are semi-nomadic pastoralists with large herds of goats and cattle. In general the grazing herds were in good condition at this time of the year due to the abundance of forage and fresh water. But we saw large numbers of carcasses of animals that must have died in the last months of the dry season when food was getting scarce. Their insides had rotted away, but the skin was still intact indicating that no scavengers like vultures or mammalian scavengers, including domestic dogs, were around to pull the carcasses apart.

In Senegal we found the biggest group (3500) at Ndioum in a set aside ricefield complex. In years with a lot of rain this site floods completely, creating a small lake. When it dries up, new foraging opportunities become available for the godwits all the time. Downside of this site is the disturbance by (illegal?) hunting. In total we counted 1152 godwits in Mauritania and 3623 in Senegal. It is hard to say what this figure says about the real numbers present. The area is vast, locations are only suitable for a limited amount of time and there are many options for godwits to choose from. But this trip undoubtedly shows that this is an important area for godwits. As said, the birds can cope with the current levels of human activity, but we have also seen several places where these

intermittent wetlands were converted into more intensive agricultural practices, especially commercial rice farming, where godwits were entirely absent.

Water quality throughout the temporary wetlands in this region was very fresh with an average salinity of 0.2 mS (average salinity of sea water is 30 mS). Only when we reached Diawling we measured a slightly higher salinity 3.2 mS, but then we were considerably closer in proximity to the west coast. Penetration pressure of the surface mud varied widely between sites, with harder soils found in sandy areas where 1000's of cattle, goats and transport animals such as donkeys and horses, compacted the soil at the water edge while drinking. Almost zero penetration resistance was measured in wet clay soils. At locations where we saw godwits, we took soil samples to analyse their diet. At Lehneikatt (Mauritania) it was clear that they were eating some sort of small earth worms (12 mm long 2mm diameter) and at Ndioum (Senegal) we found large amounts of Chironomids. Like on previous expeditions, their diet predominantly consisted of animal prey items. The fat scores at both sites were strikingly different: 2,19 at Lehneikatt versus 3,46 at Ndioum on a 1-5 scale: despite that birds were much more disturbed at Ndioum, they appeared to be in a better condition.

Conditions for ring reading were excellent because of the low humidity of the air (no heat waves), birds were relaxed and easy to approach in the areas where no active hunting was taking place. We resighted 68 godwits with colour ring combinations. Amongst those were 4 individuals from the head-starting project in the UK, in which godwit eggs are collected from the wild population and the chicks released when they have fledged. No less than 49 (42 different individuals) were from our own schemes. The overall ring density was 1:96, which is lower than the 1:60 we get in Iberia. This is an important increase of our sample size of trans-Sahara migrants and a valuable contribution to the dataset to calculate differences in survival between birds that do or don't cross the Sahara. Of those 42 birds, only 15 were previously seen in Africa (44 resightings). 77% of these sightings came from the Senegal delta, mainly Djoudj. The rest were from Sine Saloum (4) and Casamance (6). No birds had ever been seen in Guinea Bissau. 86% of these African resightings were from June-October. Of course we realise there is an observer bias towards Djoudj but the fact that so few have been seen after October, suggests that many of the birds we saw are in fact already on their way to Europe. This could, however, not be confirmed by resightings in October-December of individuals we saw during this expedition: only 2 were seen in these months in Europe in previous years. The birds that make the trip all the way to Guinea Bissau might very well decide to stay for a longer period in West Africa till December- January before flying north. The only way to test these hypotheses properly is by analysing the movements of satellite birds.



Map of the areas visited, godwits encountered, and variation in salinity values of wetlands during the expedition

Acknowledgements

This expedition was funded by Birdlife Netherlands, University of Groningen, the Spinoza premium (NWO) to TP, Gieskes-Strijbis fonds and supported by Global Flyway Network. We thank Abdoulaye Ndiaye, Abou Gueye, Zeine El Abidine Sidatt, Issa Sidibe, Wim Mullié, Fred Marret and Bram Piot for their great help organizing this expedition and their professional guidance in the field. Birdlife International (Geoffroy Citegetse and Solange Lamb) we thank for help with arranging visa. The direction of PN Banc d'Arguin (Maître Aly Ould Mohamed Salem and dr. Lemhaba Ould Yarba) and PN Diawling (dr. Daf Ould Sehla Ould Daf), the director of Parcs Nationaux Senegal (Col. Boucar Ndiaye) and the Senegalese Ministry of Environment and Sustainable Development (Mr. Amadou Lamine Guissé) supported our mission. Finally thanks to our colleagues Heinrich Belting, Johannes Melter and Jürgen Ludwig for their great company!

Daily reports

23 October 2019

We travelled with Air Maroc from The Netherlands to Casablanca airport in Morocco and from there onwards to Nouakchott where we arrived at our hotel at 2:20 am. We were picked up by a taxi arranged by our hotel Auberge Diaguili where we slept our first night. Great place to stay!

24 October 2019

The start of a hot day with temperatures running up fast to 40 °C in an almost cloudless sky. At breakfast we met our German colleagues Heinrich Belting, Johannes Melter and Jürgen Ludwig that will participate in this expedition. They had arrived earlier after a meeting in Dakar, discussing an EU LIFE proposal with Ibrahima Gueye, of the Ministry of Environment in Senegal. We shared the latest information about visa applications (impossible to get a multiple entry visum at the airport) and money exchange (empty cash machines, limited withdrawals) and met Abou Gueye who will be our guide in Mauritania during this trip, and Mohamed Sidi Cheikh, PhD at University of Groningen who helped us a lot organizing this mission. After changing more money at a Money Gram office (great rate, much better than at the airport) and a brief visit at the Europcar office that supplied us with cars and drivers, it was time to split up: the German team will go to Diawling NP and from there cross over to Senegal to start on the south side of the river and we will start in Mauritania. The plan is to meet halfway the expedition at Rosso to change sides of the river and guides/ drivers. At first we wanted to cross at Mattam but this crossing proved too difficult to be arranged. After some shopping and buying sim-cards (much easier and cheaper in Mauritania than Senegal) we could finally hit the road going straight east to Lake Aleg through desert country. There were several police checkpoints but they did not cost a lot of time as long as you had copies of your passports ready. The majority of the landscape was managed by pastoralists and their semi-nomadic herds. We did not see any cropland or international subsidy signs along the route.

We arrived at Lake Aleg at 15:00. We spent the afternoon checking the northern and eastern borders of the lake but found no godwits. Lake Aleg is a 15x3 km big lake that grows after the rains from July till October and shrinks again in the dry season. When we were there it was filled till the rim and access to the shores was limited making it difficult to get a good overview; we easily could have missed godwits because the habitat looked all right and we saw other waders like some 50 Ruffs and 100 Pratincoles accompanied by flocks of Garganey, Eurasian Coot, Glossy Ibis, 1 Eurasian spoonbill and several tern species. We spent the night in Aleg at Auberge Espoirs. Lake Aleg is very fresh with salinity measures ~0.4 mS and the mud at the edge of the lake is sandy and very compacted. The compaction is probably due to the many herds of cattle, goats and transport horses that come to the lake edge to drink. Close to the edge of the lake were outcrops of Senna plants in yellow flower about 20 – 40cm tall. Acacia/ Mesquite trees were scattered both in the lake, more towards the flooded rim and in the surrounding area of the lake, creating a mixed habitat for both waders and savanna bird species.



Lake Aleg, soils at the water edge were sandy clay and compacted from the large grazing herds visiting the lake to drink.



Lake Aleg, large areas of the lake were covered by bourgou (floating grasslands)

25 October 2019

To avoid the heat we started at 7:00 to find out that the weather had changed. After the rains of last night humidity had gone up and there was a permanent haze over the landscape. With almost no wind temperatures still went up to about 38 °C.

Our goals of today were the intermittent lakes along the N3, between Aleg and Sangrave. On the north side of this roads is desert with sand dunes but on the south side you can find small lakes and lush green places in this time after the year. With the recent and what seems to be frequent rains the water is just below the soil surface and wherever there are shallow depressions the water comes above the soil surface creating many scattered shallow (<10cm deep) pools. Many of the lakes are completely fenced out allowing to grow crops in the vicinity of fresh water and blocking the cattle out. We found that these fences were funded by aid projects. However, maintenance is an issue and in some places you can still see the poles but the mesh fencing missing. The availability of water is probably too low and unpredictable for large scale crop farming. The first stop at Chogar (M35, see map) did not bring any godwits although other wader species like Ruff, Spotted Redshank, Stilts were present here. We had more luck at the village of Maghtalihjar (M34). Behind the cemetery was

a nice wetland with at least 290 godwits. Although we could check about 200 birds, we only found 3 ringed birds from the Spanish (2) and German (1) scheme. This was the muddiest place we visited so far. The birds seemed to be foraging on worms: when they found one, it often broke in several parts, at least that is how we interpreted the swallowing and foraging behaviour we observed. However, we did not find any obvious preys in the samples we took. We continued along the N3 till we reached Tachott (M33) where we checked another lake. There was a flock of at least 300 Pratincoles and more than 50 Ruff but no godwits.

There was still time left and we went south to Lac de Mal (M25). No godwits in the main lake which is probably too deep but behind the village there were was a flooded area with other waders but no godwits. On the way back we stopped at Tertouguen where transmitter bird Tsjerkemar had been the day before yesterday. We found 12 godwits, without rings. All the birds we saw today seemed to be in good condition; we did not take abdominal profile samples but most birds were 3-4 on a 1-5 scale with 1= extremely lean and 5= very fat.

All salinity measures throughout the area sampled today indicate very fresh conditions 0.06 mS, and the penetration pressure depended strongly on the soil type. Sandy soils tended to be very hard and compact with only the top 5cm being water logged and soft, whereas silty clay soils with almost no penetration pressure and no perceived compaction layer within the top 11cm sampled.

Twelve hours after we left we were back in Aleg where we spent the night.



Just outside the village of Maghtalihjar (M34), behind the cemetery was a nice wetland with at least 290 godwits.



Shallow lake at Tertouguen where transmitter bird *Tsjerkemar* had been two days previous. We found 12 godwits, without rings.

26 October 2019

With less haze and clear skies we reached 41 °C in the afternoon. We left again at 7:00 to head south towards the Senegal river. We did not take the highway between Aleg and Boghé but took the inland road via El Mericha- Balaol- Bababé. Along this road are several temporary wetlands that have been used by godwits in previous years. However, all of them (M19-M23) were completely dry. There was some sparse vegetation but apparently it did not rain anymore after the first rains in July-August. A characteristic plant species in these temporary wetlands is a broad leafed *Calatropis porcera*, it occurs in a regular pattern of about 20m apart throughout the floodline of the wetland area. The plant contains a milky toxic sap which explains why it is not grazed by the many cattle and goats. Another recognizable characteristic when we came near to the outer edges of the wetlands is the appearance of a fence surrounding the entire wetland. Abou said the fences serve both to prevent the grazing herds from reaching the crops and to protect against the nomadic pastoralists bringing their herds into the croplands. Although maintenance of the fences seems to be problematic with gates removed and broken sections in the barbed wire strands.

The lake just south of M23 turned out to be a fairly dense wetland forest and was obviously not suitable for godwits. We reached Bababé at noon and visited a large wetland a few km west of the village (M5-6). Here the water body had shrunk to a small lake with some Greenshanks taking shelter for the intense heat but no godwits. On the edges of the wetlands people were planting crops in the soil that had been flooded recently. They made small holes in which they planted beans and sorghum together; the soil will remain moist enough till the harvest. After a quick lunch under a huge *Balanites*-tree we headed south towards Kaédi. A few km before the city there is a turn off south towards the river leading to a series of wetlands (M7). We saw waders like Ruff (20) and Black-headed Lapwings and a distant group of 150 Eurasian spoonbills but no godwits today! All wetlands that still contained water, even almost drying out, were fresh (~0.1 mS) and the soils in the floodline, also used for bean/sorghum crops, were soft, silty and quite deep. These soils would make ideal wader foraging patches when they are flooded with a shallow layer of fresh water after the temporary floods. However, as the floodline recedes, the godwits seem to move off to other wetlands, the reasons could be twofold, 1) the receding floodline no longer contains sufficient prey, or 2) the arrival of the local people working the land for planting the bean/sorghum crops may bring too much disturbance for the godwits to remain in the area. We slept in Kaédi at hotel Yewty.



All of the water catchment areas we passed were surrounded by fences, some subsidised through Europe, to help protect the cultivated crops from wandering grazing herds.



Along the inland road via El Mericha- Balaol- Bababé were several temporary wetlands that have been used by godwits in previous years. However, all of them (M19-M23) were completely dry. A signature plant species (*Calotropis procera*), indicating low lying water catchment areas.



Forest wetland at the lake just south of M23, mostly dried out with a few remaining muddy patches.



Farmers cultivate the receding flood line of the temporary lakes. The farmers create small bowls where the seeds are sown. Here the area is cultivated with a mixture of beans and sorghum. There is just enough water for one growing season and the cultivation is restricted to within the flood line of the lakes.

27 October 2019

We left Kaédi at first light and travelled NE to the village of Monguel. From there we tried to find a 25 km track straight east through the desert towards 3 distant lakes where 3 transmitter birds have been present in the past 3 weeks. On the map and even on Google Earth it seemed to be a mission impossible because the terrain looked rough and there were no obvious tracks. But we found a route that led us through a pebble desert and Acacia savanna to our first stop, the village of Bekel (M37). Here a professionally built barrier dike prevented the water from running away into the desert fast, creating a small lake. On the shores that had just fallen dry, at least 50 people were managing the land, ploughing and seeding. There were waders like Ruff (50; foraging in the water apparently on Chironomids), hundreds of Little Stints, Ringed Plover, Curlew Sandpiper (mainly feeding on flies on the wet mud) and several Tringa-species but no godwits. So we moved on to the next spot, the barrier lake of Lehneikatt (M38), where we found the gold pot: a group of 850 Black-tailed Godwits, that all started foraging in the 5 hours we were there. The lake is shallow, surrounded by grasslands and thousands of waders were present, mainly the same species as at Bekel but also some Shovelers, Garganey and hundreds of Greenshanks and Spotted Redshanks. This is definitely an important wetland, fulfilling the Ramsar Site prescription of 1% of the flyway population for Black-tailed Godwits. We took a lot of ring density samples and scored abdominal profiles that averaged 2,19 (n=62), which means that the birds were quite lean. Fortunately the birds were mostly foraging in shallow water and we scored no less than 11 ring combinations, including 6 from our own scheme and an English head started bird (raised in captivity for conservation measures). Habitat measures revealed a lot of air trapped in the mud, almost no penetration pressure, fresh water conditions (0.2 mS) and thin earthworm type invertebrates living in the top layer of the mud.

At 17:15 we really had to get back if we wanted to find our way back through the desert before sunset. We took a wrong turn and ended up in an area with unpassable dry streambeds and almost got lost. But fortunately we had kept the track of this morning in our GPS and managed to get back on track. We arrived at the main road to Kaédi when it was getting dark and the drive home should be a good advice not to drive at dark with cows sleeping on the road, unlighted horse carts and an army truck that almost ran over us. Good to be back at the hotel after a great day!



Bone dry pebble desert



Near Bekel, a dike slows water loss in the temporary lake, at least 50 people were cultivating the receding flood line.



850 Godwits at the barrier lake of Lehneikatt (M38). A herd of cattle and goats were grazing on the lake edges, which had been cultivated in previous years but were currently in a resting stage. Cultivation was taking place only on the north-western boundary. The Black Kites in the background are scavengers and hardly ever disturbed godwits.



We searched the mud for forage items and found small thin earthworm type invertebrates in the mud.



Goats grazing on the green vegetation along the lake edge with godwits foraging in the background.

28 October 2019

A warm day again with temperatures up to 40 °C but the good news is that we are slowly getting used to it! On the program for today is a tour around the 40x5 km big barrier lake east of Kaédi. We started in the SW corner at site M8 and M9. From the barrier dam you have a great view over the lake which has open water with trees growing in it and large parts are covered with a *Spartina*-like floating grass (bourgou). On the inner side of the dam there are agricultural fields, mainly for rice, but at least 75% of them were abandoned/ set aside. Our guide, Abou, told us that the rice agriculture was abandoned because the nutrients in the soils were depleted which resulted in failed crops. It appeared that the land was not cultivated for many years already.

Unfortunately the water level appeared to be too high to offer any foraging habitat for waders. Later in the year large parts will fall dry and create better opportunities for them. No transmitter birds were currently present whereas they have used this lake a lot in previous years. We tried to follow the barrier dam but had to return because the road was overgrown and in a bad state. We took a track 5 km down the main road towards Talhaya, which led through dry *Acacia*-savanna woodland. At M14 we reached the lake again. Here the water level was lower and on the waterline we found 300 Ruffs and a few other waders and ducks. At M15 and M16 the situation was no different and we ended the day with not a single godwit seen. This is undoubtedly an important wetland for godwits, but not so much at this time of the year. The lake is fresh water (0.1 mS) and the edges are grazed down by large herds of cattle and goats, as well as transport animals such as donkeys, horses and camels. We took the national road to Boghé where we spent the night.



Around the 40x5 km big barrier lake east of Kaédi, we found the water was too deep on the western boundary and often large areas were covered in reeds and grasses. A few areas were shallow with herds of grazing animals nearby the water edge.

29 Oktober 2019

Another hot day, close to 40 °C, with clear skies and a little wind. On the final day in inland Mauritania, we checked the points M1-M3; we skipped M4 because there were no recent data points from birds with transmitters. At M3 near Dar El Barka, and also on the west side of the village, we found out that the wetland had already dried up completely and people were in the field everywhere, ploughing and sowing. Habitat conditions appear to change really rapidly because until the 20th there were still transmitter-birds in this area, and now 9 days later it hardly resembles godwit habitat. M2 opposite the village of Magham Ibrahim turned out to be impossible to reach because it is completely surrounded by branches of the Senegal river; a pity because there were transmitter birds recently in this area. With a bit of luck we hoped to find them at M1, near Lecceiba. It was difficult to reach this place from the south because it was recently turned into a rice cultivation area, and new boundary fences have been built which prevent access to the wetland. But after some searching around the perimeter of the wetland, we managed to find a track that made it possible to approach from the north. We arrived at a huge rice field complex where water had been channelled from the Senegal River creating the possibility for irrigation of the adjacent land. Big pumps were flooding the fields. There were a few set aside fields (not cultivated this year) that might have been used by godwits until earlier this week but now they were dry and without godwits. We only saw a handful of other waders in the pools and canals in between the fields. We moved on to Rosso where we found the prize of today: a satellite transmitter of a Dutch Marsh Harrier that apparently died in an uncultivated ricefield. Several other Marsh Harriers and 2 Black-shouldered Kites were present here. After that we had to hurry for the ferry to Senegal, said goodbye to Abou and Ahmed after the usual hassle with customs and people that want something from you, we quite easily reached the other shore of the river where we found our Senegalese guide Issa Sidibe waiting for us. He led us through the customs, which was much easier than on the Mauritanian side. We arrived at our hotel Auberge de de la Cité in Richard Toll where met the German team and exchanged a lot of information. Great to see them again!



At M3 near Dar El Barka, and also on the west side of the village, we found out that the wetland had already dried up completely. Until 1 week previously a satellite tagged godwit had been using the area.



Near Lecceiba there is a huge intensive rice complex with canals channelling water to the rice fields from the Senegal river.



In the surrounding floodplains large areas of Acacia were being cleared and burned for charcoal. The area appears to be cleared for large scale cultivation. Similar areas in the neighbourhood had recently been fenced. The wetlands were replaced with intensive rice agriculture, in line with Senegal's commitment to strive for food security and independence in Senegal through rice agriculture.

30 October 2019

At 7:30 Issa brought the German team to the ferry and it took quite a while to get them through customs. When he returned we discussed the plan for this week, did some shopping and left Richard Toll. We decided to start 180 km east at Madina Ndiatebe where we arrived only at 16:00, still in time for some field work. In town we headed towards the river and searched several wetlands along the road to Kaskas, including the southern part of S20. Here a group of godwits including two satellite birds were present, at least until the 25th but unfortunately all but 3 godwits had left the area. The conditions still seemed favourable with shallow fresh water (0.1 mS), wet soft mud, open landscape and other birds present including 500 Ruff and 275 Eurasian Spoonbills. It soon became dark and we returned to the Adunam hotel just outside the village. We will not go further east this

week because there were no satellite birds present for weeks which is usually a good indication that the circumstances are not optimal.



Along the road to Kaskas, including the southern part of S20, conditions still seemed good for godwits, but unfortunately the satellite birds that had been in the area had already left.

31 October 2019

Another day with temperatures around 40 °C with a sometimes moderate, hot Harmatan wind from the east. At first light we left our hotel and returned to the floodplain on the other side of the bridge at Madina Ndiatèbe. We checked several small lakes but found no godwits and decided to check the S20 once more but now from the north side. When we arrived there, we discovered a major leak in the fuel system of our car that needed to be fixed as soon as possible. We drove back to have it fixed in Ndioum. After a short stop at the garage, we could go back to the field and checked a site west of the Halrar bridge. This is a remarkable place: just after the rains the place looks like a normal intermittent lake but as soon as the water drops, a rice field complex emerges. At the time we arrived, only the first 300 meter had dried up. On the just emerged rice fields at least 2000 godwits and 5000 Ruffs were actively foraging on Chironomids in fresh water (0.1 mS). They were accompanied by at least 3000 Garganeys and hundreds of Ringed Plovers. The numbers were hard to count because they were scattered over a large area, which was hard to get an overview of. On top

of that, the birds were continuously in the air because of the presence of raptors and people and difficult to approach; a good indication that hunting might be an issue in this area. Nevertheless we scored 14 ring combinations, of which 11 were from our own program and also again a head-started chick from the UK. When it became dark we returned to our hotel, Jardin du Fouta, in Gamadji Sare.





West of the Halrar bridge, Ndioum, we encountered 3500 godwits foraging in a set aside rice complex. The fields were still flooded from the recent rains and the entire area was packed with water birds. It appears that the local people use the area for hunting since the birds were very difficult to approach. Searching the mud for potential prey items revealed many Chironomids.

1 November 2019

Weather similar to yesterday, cloudless and reaching 40°C. In the morning we returned to the group at Halrar bridge. The birds were closer to the road now and we made a new estimate: at least 3500 godwits present. But again, it was hard work to get your resightings. We were pleased with another 11 resightings (only 1 overlap with yesterday) from our scheme and 5 from other schemes, including 2 new English head-starters. Fatscores were considerably higher than at the M38 site earlier this week in Mauritania: 3,46 (n=58). Later in the morning they started to forage more in deeper water and when some Marsh Harriers caused panic, they all flew off to a roost in the centre of the lake or went to inaccessible places. In the afternoon we checked the intermittent lake at S7. From the locations of satellite birds we already knew that was another important site to check. However, access was difficult and getting close to the birds impossible. In the late afternoon we saw 120 birds arriving from the direction of Halrar bridge which suggested that this might be a night time roost. We already suspected this from satellite location information. At sunset we returned to Gamadji Sare.



3500 godwits and 5000 Ruffs!!



Cattle and goats permitted to freely graze within the rice complex since it was not cultivated this year.



The wetland at S7, connected to the site at Halrar bridge. Access was difficult and many trees in the water obscured our view, but we saw 120 godwits arriving from the direction of the Halrar bridge which indicates that this area is a night time roost.

2 November 2019

No change in the weather. After breakfast, we went straight back to Halrar Bridge and spent the whole morning scanning the flocks for rings. The birds were extremely vigilant and often went up in

the air for no apparent reason. We already suspected that they were so skittish because hunting/poaching might be an issue and we finally got confirmation of this: we saw people running through the field with at least 5 White-faced Whistling ducks, found a cartridge and a ripped off head of a White-faced Whistling duck and saw a man running with something that looked like walk-in traps. We also saw these people actively searching the ground in wet grasslands and we suspected that they were controlling if their snares had caught something. They broke their wings to prevent them from flying away. So, this is an attractive but also dangerous place for birds. In previous years none of the satellite birds had ever used this specific site but they were in the general area. This might have to do with it that the fields do not seem to be used for rice cultivation this year: there was no agricultural activity and only stubble in the field. Perhaps the farmers had set the fields aside, as they often do in this area to give the soil rest and time to regenerate; a true example of nature inclusive farming!

The first bird we saw today was satellite bird Hortas and at the end of the morning we had improved the day record of this week with 20 rings from our own scheme and 3 from other schemes; 6 of our birds were already seen on the previous days.

In the afternoon we went west to Podor but soon we had to make a stop to get the fuel leak properly fixed. After 45 minutes and African inventiveness, we were on the road again. Our next stop was at the S3 site NW of Podor. Most satellite data points came from the mudflat but we did not manage to get behind the impenetrable zone of trees and mud. But we found 120 godwits, 900 Ruffs and at least 500 Garganeys in the set aside rice fields on the northern edge of the S3 site and scored even a colour ring, improving again our day record. Water was fresh (0.1 mS) and the soil was a hard sandy clay, with many acacias/ mesquite trees (3.5 m tall) growing on the perimeter of the rice fields.

At sunset we drove to our hotel in Niandane, 15 km from Podor.



Last day checking the huge group at Halrar bridge, we wanted to be sure that we maximized the opportunity to record as many ringed godwits as possible in order to increase our knowledge of birds using the eastern ephemeral wetland region.



A necessary stop to fix leaking diesel fuel injectors.



Site S3 NW of Podor. Most satellite locations came from the mudflat but we did not manage to get behind the impenetrable zone of trees and soft mud. Nevertheless, we did find 120 godwits , 900 Ruffs and at least 500 Garganeys in the set aside rice fields. The rice complex was not cultivated this year.

3 November 2019

Today we travelled from Niandane to Diawling NP. As we drove west towards the coast, the temperature went down and in the afternoon, we had some clouds. The travel from Niandane to Diama went smoothly, we passed through huge areas under intensive sugar cane production just outside Richard Toll, and then saw that huge tracts of land were being cleared for what looks like future rice farming on the banks of the Senegal River. The Acacia trees were being cut down and brought to central piles and burned for charcoal. As we travelled west, bringing us closer to the west coast, we could see that the receding flood lines of rain water pools next to the road were turning white indicating an increase in salinity.

At the border crossing, we had to say goodbye to our guide Colonel Issa Sidibe; it was a pleasure working with him! At the Diama dam Zeine Sidatt, the conservator of Diawling NP picked us up and

led us through customs and police facilities; quite a difference with the hassle at Rosso! In the afternoon there were just a few hours left for a quick scan of Diawling. This year it has been raining a lot and all the vegetation was still green and grass cover was high: a big difference with the situation we encountered earlier this week at many sites, especially in Senegal suggesting that grazing pressure in the reserve must be considerably lower. It was also striking to see how at ease the birds in the park were because hunting is forbidden; even gamebirds like ducks and geese could be approached at close range, quite a difference with the situation at Ndioum. We visited the site where the German team had seen 150 godwits last week but we only found 2 now. Water quality now shows the closer proximity to the coast increasing to 3.2 mS. We slept at the campsite of Diawling NP.



Heading westwards towards Diawling, just after passing through Richard Toll, the receding flood lines of shallow lakes next to the road showed salt crusting, indicating an increase in salinity.



Open landscape with shallow water in the Diawling reserve, where the German team and Zeine had located 150 godwits 2 weeks previous.

4 November 2019

The car of Zeine had a brake problem that needed to be fixed immediately. Therefore there was unfortunately no time for another field visit to find godwits. After breakfast we left Diawling and arrived in Nouakchott at Auberge Bienvenue in the afternoon. The German team had also arrived just before us. We had a lot to discuss about this memorable expedition! We slept in Nouakchott and in the next morning woke up early to catch our flight at 7:20 back to Amsterdam where we arrived in the late afternoon.



Sunset in the Diawling reserve with hundreds of pelicans, storks, cormorants, a few spoonbills and grebes.



Jürgen, Heinrich, Jos, Ruth, Johannes. Back in Schiphol, and Heinrich lost his luggage (again!)



Ahmed our Mauritanian driver



About our Mauritanian guide observing waders from a shady vantage point



Lunch with Issa our guide and driver in Senegal