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Why should Black-tailed Godwits still winter in West -Africa if Southern Iberia is just as good?

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Black-tailed Godwit Demographic project

Why should Black-tailed Godwits still winter in West-Africa if Southern Iberia is just as good?

Expedition report NP Djoudj 2015 and 2016, Senegal.



Photo: Hajje Valkema

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September 2016



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Contents

Introduction.....	3
Demographic research Southwest Friesland.....	3
Migration and wintering sites Black-tailed Godwit.....	3
Djoudj National park	5
Fieldwork in the Djoudj 2015 - 2016	5
Visited Areas 2015.....	Error! Bookmark not defined.
Visted areas in 2016	12

Introduction

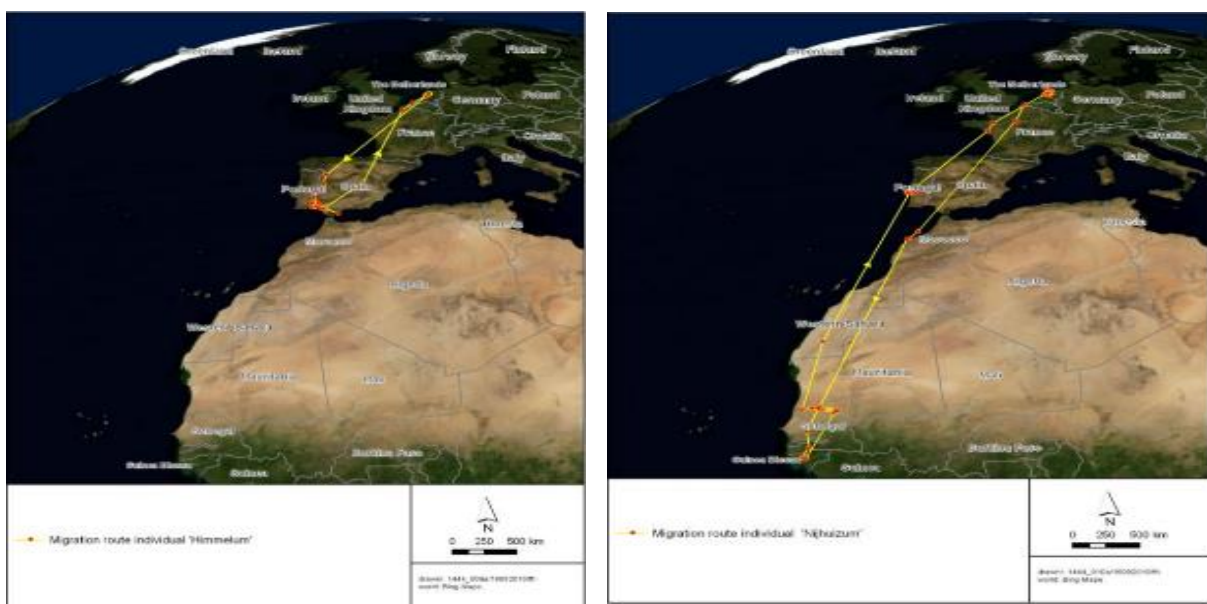
The Black-tailed Godwit (*Limosa limosa*; BTG) is a meadow bird (Verstrael 1987; Thijse 1904). The current Dutch population is estimated at 40.000 breeding pairs and represents an important part of the total continental BTG population *Limosa limosa limosa*. However, the number of breeding pairs has 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 major cause of the decline is the simple fact that the total 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). After the breeding season godwits migrate to southern Europe (Spain) and West-Africa where they stay for wintering. (Márquez-Ferrando et al. 2009; Hooijmeijer et al. 2011).

Demographic research Southwest Friesland

To measure the changes in population numbers and the causes, the University of Groningen has started a long-term research since 2004 in the south-western part of Friesland, The Netherlands. Since 2007 the research area has expanded up to 8400 hectares and since 2012 it 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. Big numbers of godwits also occur in the inner Niger delta in Mali (Altenburg & van der Kamp 1985), but they belong probably to the eastern European population. Only recently, the wintering behaviour has partly changed because an increasing number of godwits decide to winter in South-Spain at National Park Doñana. In the 1980s during the first counts only 4% of the NW-European population



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).

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. (Figure above)

Conservation

The change in wintering grounds is remarkable and an important reason why we do demographic research in West-Africa. This change can have consequences for the survival rate of adults. Moreover this change can lead to differences in reproductive success, for example due to differences in body condition upon arrival on the breeding grounds. Both factors 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. Until a couple of years ago, West-Africa was the only site along the migratory flyway from where we didn't receive many observations of colour-marked individuals. Only small numbers of colour-ringed birds have been reported before, mainly by birdwatchers and by local scientists.

Since 2014 the University of Groningen started a research program to get a better view on the issues given above. In November the first expedition to West-Afrika was performed, in cooperation with Global Flyway Network, Nature Communauté Développement (NCD) and financially supported by Birdlife Netherlands. We aim to set up a long term demographic research project in this area. Most important goal of our first mission 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, prey choice, energetics and time budget. 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 stop-over sites in February. We aim 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:

1. 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?
2. Can birds change their wintering strategy during their life? And is this age-dependent?
3. Does reproductive success determine where birds winter?
4. Has the wintering strategy consequences for their migration and breeding phenology? And are there consequences for their reproductive success?

Djoudj National park

The Djoudj national park is located in the north-western part of Senegal and is a part of the Senegal River Delta. The national park was set up in 1971, covering a surface of 16.000 hectares. The floodgate and the closing of the Diama dam in 1986 have stopped the flow of salt water coming from the stretch of the Senegal River, Djoudj, into the park. This event leads to a system that attracts godwits. In total 130 adult godwits and 160 juvenile godwits are tagged with a transmitter (different types) in the past years; these birds give us a rough view of the patterns and (stopover) sites that godwits use during migration. During June-September birds use the Djoudj national park as a stop-over site and afterwards they migrate further southwards. The same pattern, but fewer birds, use this area again in December-March as a stopover site, and migrate further northwards towards their breeding grounds. Between these periods some birds stay also in this area.

Fieldwork in the Djoudj 2015 - 2016

The University Groningen (RUG) in cooperation with Global Flyway Network (GFN), Birdlife Netherlands (Vogelbescherming Nederland, VBN) and our local partner Nature Communauté Développement (NCD) visited in the past years (2014-2016) the Djoudj NP, Senegal (16.398537, -16.230864). The main goal during these visits was to understand more about the distribution of godwits (*Limosa limosa limosa*) during their autumn migration and wintering. Moreover data was collected about habitat preferences, food intake rates, habitat description and the space-use of godwits in the Djoudj NP system. However this data did not lead to a complete understanding of the system; ideas about the possibilities and the restrictions of data sampling for the future is given in this report. The data that was collected also contributed to fill up gaps in the knowledge of the complete wintering strategies of godwits. Especially it gave important information about the variety of wintering strategies and the consequences of this during the breeding season.

In 2014 this area was visited in November; in this report we describe the results of the visits in 2015 and 2016. In both years we visited this area in July. We witnessed that this area changes during this month from a very dry mudflat to a wet lake. This change is not a slow process but is caused by human water management, by opening an inlet near Tiguet. The Diama Dam keeps the water in the Djoudj River. For this reason the water level in the river starts to rise caused by the start of the rain season in Guinea (starting in June). If the water level is at a certain point they open this inlet. This happens normally in mid-July. The lower parts start to flood quickly afterwards and during winter they reach a water depth of 70 cm. When the Djoudj area starts to fill, a huge area (10-15 km²) has a water level of 1-20 cm. For a certain period this is a suitable habitat for godwits to forage. If the water level becomes too high for godwits to forage (>20 cm) in the lower parts the available habitat to forage decreases again. Only a small area is still wet in the beginning of July when the first birds arrive. At that moment the inlet is still closed. There is a good spot to watch birds near the biological station; the water level is of 1-30 cm all year round due to a small inlet that is not connected with the Djoudj national park. Other (small) areas where birds can forage are wet because rice farmers let the water out of the rice fields into retention basins in preparation to harvest the rice.

In 2015 we visit the Djoudj in late July, at that moment a huge surface was suitable for godwits because the inlet was already open. In 2016 we visited the area in early July, before the inlet was open.

Areas Visited in 2015

The following areas were visited (see Map 1-3 in the Appendix for the exact locations and number of godwits counted):

1. Northern Ricefields Djoudj NP

No godwits present at this area (16.50N / -16.25W). Rice fields are owned by locals. Harvest, seeding and ploughing is done by hand. In late July all rice fields are dry.

2. Djoudj Inlet Area

This area (16.41N / -16.30W) is the first place that starts to become wet at 13 July. Due to opening the inlet water from the Djoudj River start to flow in to this area. Idrissa Ndiaye (local bird guide) observed 1100 godwits at 17 July. The forage in spread flocks at this place. In the end of July no godwits were present here. Although this place seemed to be interesting for godwits (suitable water levels on the edges of the river stream).

3. Grand Lac (Great Lake)

The Grand Lac area is a lake with a size of 5-15 km². In the end of July the lake is already 5 km² and during the rainy season the size grows. The lake is artificially filled by opening the Djoudj inlet. This creates an excellent habitat for godwits with water levels between 5-10 centimetres (figure below). 2000 Black-tailed Godwits and 16.500 Ruffs were present here. To approach the birds for reading colour rings, you need to walk into the lake. Because there is an absence of cover birds fly away at a distance of approximately 200 meters. Because the area is big, the flocks are very wide spread and due to heat waves it is very hard to read colour rings.



4. Marigot du Khar

Area N of the road to the inlet. No godwits present, water level too deep for godwits.

5. Biological Station

The biological station of the Djoudj has a small pool that is surrounded by a gravel road. During noon only 50 godwits were around at this place. From 14.00 until sunset godwits come to this place to forage and rest for the night. The total maximum number of birds observed here was at 21-7-2015: a thousand individuals. The first hour after sunrise godwits leave this place again and fly in the direction of the Grand Lac (mentioned at area 3). The only bird that was observed with colour rings at the Grand Lac was also observed at the Biological Station. However the numbers of godwits are higher at the Grand Lac, so not all birds seem to rest in this area. Birds forage at this place non-stop until sunset, mainly on mosquito larvae. In the result section a more detailed description is given. Until the last day of the field work birds peaked at 1.000 individuals just before sunset.



6. Southern Ricefields Djoudj (managed by locals and France Company (CASL))

In the Senegal Delta nearby NP Djoudj, a French company (CASL) owns 600 hectares rice fields (16.32N / -16.24W). This company grows rice twice per year. In February/March they seed rice in irrigated wet fields. In July these fields get harvested; due to the absence of rain in this period the fields are completely dry during harvest in this period. The size of the fields is around 10 hectares per field. The goal of the Senegalese government is to expand the rice agriculture and to become self-sustainable; this will eventually stop the import of rice from other countries.



The fields are harvest by big machines and combines, this method is comparable with the method for rice harvest in Spain/Portugal:



The stems of the rice plants can be used for food for cattle/goats. Another way to get rid of this waste material is to burn it:



Fields are ploughed by big machines after harvesting:



After ploughing they first start to become wet again in July. This is effectuated by artificial flooding with water from the Djoudj river. After irrigating the rice fields, the rice get sown again. The first fields are sown by the end of July and at the end of August all rice fields have been sown again:



Beside the rice fields owned by the French company (CASL), local people are owning rice fields as well. These rice fields are located near the fields of the CASL. The size of the fields is comparable with the French company. The only difference is that the work is mainly done by manual labour instead of machines. Rice is harvested and seeded by hand. The rice fields did not look different compared with the fields that which were managed by machines but here the rice was stored on the fields:



Use of rice habitats by bird species

In the period 21 July – 26 July the rice fields have been visited twice. The main focus was to locate godwits, but not a single individual was found. People from the CASL company had never seen a godwit in their rice fields. Notable was the presence of immense numbers of Red-Billed Quelea (*Quelea Quelea*) (picture below). The exact number of this bird is unknown, but the population is estimated at 2 million individuals. During the night they roost near the Biological Station in the Typha reedbeds near the river. During day time they forage mainly in the rice fields of the French Company. Since 2000 the size of the rice fields has grown, and at the same time the number of Red-Billed Quelea's also seems to grow.



To protect the rice, gas canons produce big bangs to scare off the birds. Although birds seem to be scared off a bit by the bangs (Figure 7), due to habituation this method is not very effective. Another way to protect the crops is to scare them off by humans, this seem to be more effective. The problem is that the size of the fields is too big to cover every place. Red-Billed Quelea's find therefore enough places to forage on rice kernels.



7. Gainth area

This natural lagoon is filled by water from the Djoudj River. The size is a couple of hectares, 10 godwits were present here:



8. Tilene Ricefields

No Godwits present, rice fields were completely dry. Red-billed Quelea's were not present here. Harvesting had not started yet.

9. Ross Béthio Ricefields

Same as Tilene Rice fields.

10. Drain 1 (Ndiael Reserve)

Drain 1 (16.28 N / -16.08 W) is part of the Ndial Reserve, located south-east of Ross Béthio. At this location 20 godwits and 20 ruffs were present. They forage mainly in a wet pond that was filled by water from the river.

11. Technopole

The Technopole area is located in Dakar. No godwits were present here. The size of the area is approximately 10 hectares. It is characterized by fresh water pools with water levels of 5-20 centimetres. In late February 2015 a small flock of 25 godwits were observed by Idrissa Ndiaye. They forage on burned grass tubers and use the pool to drink:

Daily Report 2015

Monday 20 July 2015

I traveled from Amsterdam to Dakar. My transfer in Casablanca was badly delayed due to engine problems with the aircraft. After 3 hours I continued my travel to Dakar and arrived at 3 o'clock local time in my hotel.

Tuesday 21 July 2015

I met my colleague Idrissa Ndiaye in the morning in my hotel. He was accompanied by Issa Sylla, former Director of the National Parcs in Senegal. We rent his car for this trip. After a good conversation we went to the airport of Dakar to change euros for local CFA. Our first stop was close to the airport; Technopole in Dakar. According to Idrissa this was an area where small flocks of birds show up during migration. Unfortunately we could not find any godwits. Idrissa showed me burned grass tubers; he observed godwits in February/ March that eat this. At 10.30 we drove straight to the Djoudj NP. We arrived here at 17.30. Straightforward I walked to the small mudflat that is located next to the Biological Station, our accommodation for the whole period. The light circumstances started to become bad after 18.00 and for this reason it was not possible to read all color-ringed godwits. I read 3 combinations from our own scheme, a French and a Spanish combination. I estimated the total groupsize around 1000 individuals, all foraging until sunset.



The Technopole; located in Dakar. During migration this area is used by godwits, foraging on burnt tubers during spring migration.

Wednesday 22 July 2015

After breakfast we started the day with data collection at the estuaries of the biological station. Remarkable was that the majority of the godwits left this area in the early morning in north-northeast direction (Grand Lac?), but also small numbers flew in west-northwest direction



The estuaries near the biological station

(Diawling?). At 9.00 only 193 godwits were present at the biological station. Approximately 400-600 birds moved to other areas. These movements were not caused by disturbance from people or birds of prey. Birds of prey seemed completely absent during the end of July, not a single Marsh-harrier, Peregrine Falcon etc. was observed. We saw in the morning 3 different color ring combinations. In the afternoon we went to the inlet area of the Djoudj but there were no godwits present. Two weeks ago the inlet was still closed and godwits were present here in small flocks at the river banks. At 16.00 we continued the data collection at the biological station, numbers raised until sunset up to 660 godwits. Godwits started to roost around sunset. We saw 14 different combinations.

Thursday 23 July 2015

At sunrise we started again at the estuaries of the biological station where we saw a comparable situation as the day before: godwits left the area. The challenge was to read a particular combination before it left, sometimes frustrating. At 9.00 157 godwits were still present, the others had left the area. At 10.00 we left and moved to the rice fields north of Tilene and Ross Bethio; according to Idrissa these areas contain small numbers of godwits sometimes. The ricefields were mostly dry, since most fields were already harvested (and not ploughed) it was not crowded with people in these fields. Every now and then a pool with water (suitable for godwits to forage) was found but not a single godwit was seen in these fields. We moved to the Ndiael reserve towards a new area called 'Drain 1'. According to the locations of the transmitter birds, there were godwits in this area. Indeed we found a group of 20 godwits in a natural estuary (a floodplain of the river). Unfortunately we could not find any ringed individuals, nor the transmitter godwit that was supposed to be here in this

area. In the afternoon we went back to continue the data collection in the estuaries of the biological station. The same pattern as the day before was observed, godwits returned from other locations between 16.00 and sunset. Numbers maximized at sunset up to 650 birds. We observed 13 different combinations, only 3 combinations were not observed the days before.

Friday 24 July 2015

At 9.00 111 godwits were foraging in the estuaries of the biological station, with the same amount of birds as last days departing towards other areas. It was a bit frustrating that we could not find out where these birds were foraging during day time. In the late morning and afternoon we checked the areas Gainth, Khar and the northern and southern rice fields of the Djoudj. The Khar and Gainth area are natural mudflats with a suitable water level for godwits. Due to the opening of the inlets these areas hold water and are surrounded by small bushes and trees. We found only 10 godwits in the Gainth area. The ricefields were bone dry. At the edges of the rice fields were small flooded areas that seemed suitable for godwits to forage but we did not find any godwits. A highlight in during this survey was a new location of a breeding colony of Gull-billed Terns; we counted 156 nests. In the late afternoon we call it a day in the estuaries of the Biological station again and counted 620 birds at sunset. We saw 11 combinations, 3 combinations were not observed the day before.



Dry rice fields with cracked soil. In July ready to get harvested.

Saturday 25 July 2015

Numbers continued to drop in the estuaries of the biological station; at 9.00 93 were foraging in this area. We went to the Grand Lac later in the morning and finally located the 'missing' godwits during daytime. The water level of this area was 1-15 cm, a perfect water level for godwits. We estimated the number of godwits between 1500-2000, but more spectacular were the 16.5000 Ruffs present in this area, fantastic! The birds were foraging in a mixed flock and it was very hard to approach them. Due to heat waves and the far distance we only could read one color ring combination,

disappointing! Interesting was the fact that this particular bird was observed the days before in the estuaries of the biological station, so this explained the absence of birds during day time. Probably the majority of the birds is in this area during day time. We stayed in this area for a couple of hours and afterwards we returned to the field station again to take prey intake data. We counted how many successful probes each godwit had within 2 minutes. Notable was that godwits foraging in deeper water found more prey than godwits that forage in 'knee-deep' water. We call it a day with 520 birds at sunset and 9 color ring combinations. Unfortunately without any new observed combination.

Sunday 26 July 2015

Because we had problems to read color rings in the afternoon yesterday due to heatwaves we decided to start in the early morning at the Grand Lac. We were not lucky because the group of birds moved to the other side of the lake and for this reason we lost 45 minutes. The result was that we could start color ring reading at 9.30 (after a long walk through the water). At that moment of the day the heat waves were already a problem and so we did not read any color ring combinations. This was a big frustration, also because it was our last day to do field work. At the beginning of the afternoon we checked the northern rice fields once more to hopefully find some godwits but again we could not find any birds. At 16.00 we went back to the biological station where we continued with reading color rings in the estuaries. The group had decreased again at sunset to 440 birds. We observed no new combinations from our scheme.



Monday 27 July 2015

Traveling back to Dakar and depart on Tuesday 28 July in the early morning.

Daily Report 2016

Sunday 3 July 2016

After a full day of travelling I woke up in Dakar; here I met Issa Sylla in the morning. For every expedition in Africa we rent his car. During the travel to the North of Senegal (Djoudj) I had the impression that rainfall was early this year, the landscape looked quite greenish, especially in the surrounding of Dakar. More up to the north I saw less green acacia forest. We picked up Khady Gueye in her hometown. She joined us for the full week. She expected to finish her PHD in October, with help of a new professor (Cheirhtdiane Bâ) to finalize her analyses. She is planning to collect more data in Palmarin this year. In the end of June this year she found a flock of 300 godwits there, but without a lot of color ringed godwits. When we arrived at the biological station we met Idrissa Ndiaye. We started at 16.00 in the estuaries near the biological station to read color rings. We managed to observe nine different combinations. Unfortunately I had a fever so I needed to stop after one hour of fieldwork. Idrissa and Khady continued until sunset and made some ring density samples. At sunset they counted the total group size precisely; 1030 birds. Birds from the direction of Diawling and the Southern rice fields fell in with small flocks until sunset. Idrissa was explaining two local bird guides (Vieux N'Gom and Bressy Fall) how to read color rings of godwits.

Monday 4 July 2016

We started at 6.30 to read color rings at the estuaries of the biological station; all birds were actively foraging. Until 9.30 most birds foraged in belly deep water. For this reason it was hard to read color rings. Later birds started to rest at the waterline of the small islands and it made the job easier. We did some sampling of color ring densities and read 25 different color rings including schemes from



abroad. Afterwards we went near the biological station to start with the vegetation structure sampling. Firstly we needed to get used with the protocol, but after a while it was clear and fast to perform. We continued until 12.00 and took lunch. Since it still was Ramadan, Khady and Idrissa could not eat or drink during day time, so I took lunch on my own. In the afternoon we went to the Khar area and surroundings. We saw a completely dry world without any sign of water, what a different habitat compared to last year (end of July). This area is also artificially flooded by opening the Djoudj inlet but at the moment it is still closed. We went to a new area where the pelican breeding colony is located and found a small stream with water. Not surprisingly a lot of birds (pelicans, shorebirds, African ducks/geese) were present here. We found a small flock of 30 godwits, mostly foraging alone or in small groups. We could read one color ring combination of a Spanish bird. Also a code flag was observed, but it was impossible to read the code due to distance and heat waves. We went back to the estuaries of the Biological station and read color rings between 17.30 and 19.00. Most birds foraged again in deep water. For this reason it was hard to read the rings. We saw two new combinations from our own scheme. Meanwhile I had a talk with the director of the Djoudj NP and talked about their way of education and training new guides. He told me that he is responsible for the timing of the opening of the Djoudj inlet. This year it will be open around 15 July, a comparable timing as last year. He had satellite images from 1971 and onwards of the Djoudj NP to monitor vegetation development the park. At 19.00 we counted 1285 godwits, I had the feeling that we did not observe every color ring, so a good reason to continue working hard the coming days.

Tuesday 5 July 2016

We started in the morning at 6.45 with the data collection near the biological station. At 7 o'clock 300 godwits flew away in the direction of the Djoudj river. Until 10.30 we continued our work and read good numbers of color rings. Due to the high water level it was hard again to check all the godwits for color rings. Between 9.00 and 10.30 a lot of godwits started to rest outside the water, a



good moment to read the color rings.

Khady told me that she will start a project in cooperation with the NCD and Birdlife Netherlands in July at the Toc-toc reserve. Because godwits cause serious damage on the rice fields here, local people increase their hunting activities on godwits. Khady saw people hunting and killing godwits in the past years. The focus of this project is to count birds in this area (godwits) and to create a reserve for godwits. Moreover education about the negative effects of hunting must avoid further increase of the killing of godwits. In cooperation with a local birder (name unknown) she will do fieldwork for the coming 10 months in this area. She occasionally visits this area (probably each month).

Furthermore a program from the NCD will start in the Casamance to train local birders in recognizing and counting birds. Also godwits and reading color rings of godwits will be a part of this program. At this moment Khady will perform this job, but maybe Idrissa will get involved too. Apparently his contacts with the NCD are not so good. They did not cooperate in projects with him in recent years. The final thing Khady will do is to visit Guembeul and Palmarin occasionally and collect data for her PhD.

In the afternoon we checked the Djoudj River from the inlet and drove 2 km downstream. Near the inlet a flock of 35 godwits were foraging wide spread on the river banks. Downstream godwits were individually foraging on the river banks. I suggested to Idrissa to check the whole river next week by motorcycle. We had the idea that spread over the total length of the river maybe hundreds of godwits might be foraging widespread. Also the area that we visited yesterday (the Pelican colony) is connected with the river. We continued to a location in the southern part of the Djoudj NP. A transmitter bird was located here. After some searching we found a group of at least 400 godwits mixed with Gambian Geese. Because the hunting on Gambian geese is popular here by Frenchmen, the geese were scarred and flew away very soon together with the godwits. It made it impossible to check a single leg. We did a vegetation protocol and went back to the biological station. We continued reading color rings until sunset. We counted 2600 godwits, a huge increase compared to yesterday. We call it a day at 19.30 and entered data until 22.30.

Wednesday 6 July 2016

We started the day at 6.45, approximately 1000-1200 birds left until 08:00 upstream to the Senegal River. A group of 1500 godwits stayed at the estuaries of the biological station during daytime. It took us until 12:00 to read most color rings. It was hard again to read the rings due to the high water level. A huge surprise was the observation of the transmitter bird 'Alcochete'. Afterwards we went to the Grand Lac to check the habitat, not surprisingly it was complete dry because they did not open the inlet yet. It was like a desert with 45 degrees, amazing how different it looks like in the end of July and November (last visits). At 16:00 we started to read color rings again at the biological station until 19.30. By sunset the group had increased up to 2100 and still groups were falling in after sunset. It seemed like some birds used it as a roost while others kept using it as foraging habitat as well. In the late afternoon we saw a small amount of new color ring combinations but we also still observed birds that we saw in the morning. It was highly probable that we missed color rings that arrived just before sunset and left already in the early morning. We are not sure if birds kept to one strategy. Maybe this differed per individual per day. Another highlight was that we saw the first juvenile godwit, unfortunately without rings.

The Grand Lac in early July 2016 (top) and late July 2015 (bottom): what a difference!



Thursday 7 July 2016

At 6.30 we started the fieldwork near the biological station. After breakfast we continued until 12.00 to read color rings. Afterwards I talked with Idrissa about his work for the coming weeks. We made the plan that he would focus on reading color rings in the morning until 10-11 o'clock. In the afternoon he would collect data for the vegetation structure sampling in wet habitats (rice fields and if the inlet would get open also at Grand Lac and Khar). Furthermore he would try to sample around 300 individuals for color rings each day in the morning or in the evening. At 16.00 until sunset he would read rings of godwits again, preferably at the estuaries of the biological station. In the afternoon we collected data about vegetation structure in the rice fields. It was a pity that we lost a lot of time to arrange permission to sample on the rice fields of the CASL company (French company; see also Trip report 2015). At 15.00 we had permission but it was too late to start because we needed to go back to read color rings at the biological station. We continued until sunset. Interesting was that hundreds of godwits flew away in the direction of Saint Louis just before sunset (further southward migration?). The numbers dropped down again until 1400 birds. We called it a day with some new combinations of color rings again.



Godwits at the Biological Station

Friday 8 July 2016

At 6.45 we read color rings until 10.00 near the biological station. The numbers of godwits had dropped to 840 in the morning. Afterwards we collected habitat structure data. We collected the data in the rice fields in front of the CASL rice fields (owned by local people). Afterwards we took lunch and at 14.00 we had a quick stop at the Djoudj inlet area. Still the same number of godwits were foraging here; about 60 birds. We went back to the biological station and observed color rings again. At sunset we counted 1050 birds.



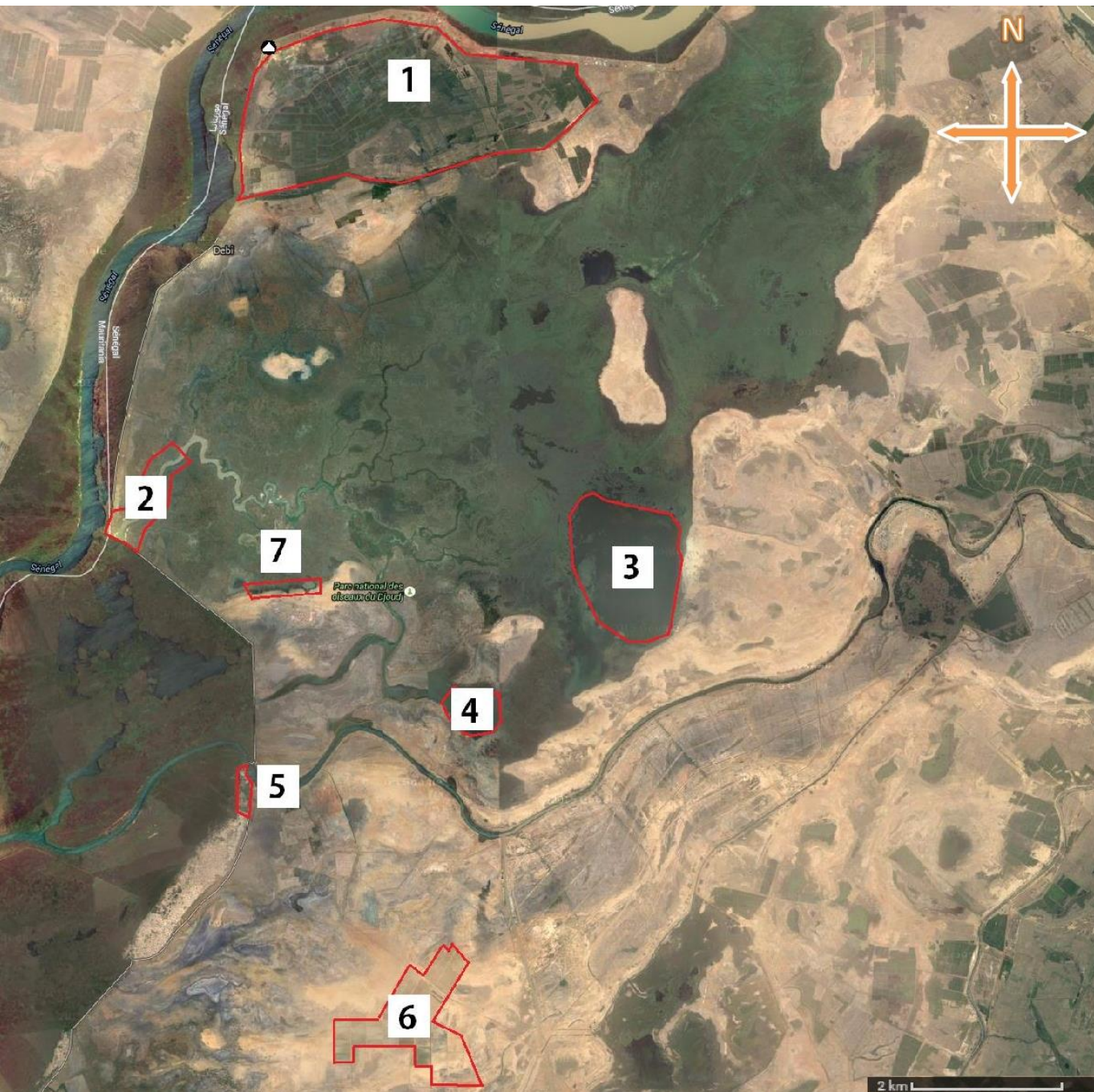
Vegetation structure sampling

Saturday 9 July 2016

Travelling back to Dakar, flight departed at midnight to the Netherlands.

Conclusions

- In the July the Djoudj National park changes from a dry to a huge wet mudflat
- This change is caused by opening the inlet of the Djoudj River, every year around 15-25 July
- Before the inlets are open godwits use the small stream of the river that is crossing the NP and provides the mudflats with water. Other habitats are artificially flooded areas, flooded by leftovers from rice fields.
- Rice fields start getting flooded in July as well but no godwits have been observed in these areas, people that work in these fields don't know this bird.
- Godwits have fewer opportunities to forage before the inlets are open; for this reason they can be found in higher densities at a limited amount of spots.
- Still the area of the Djoudj NP is enormous and thousands of godwits easily be overlooked. The locations provided by the satellite birds are a good tool to find these spots.
- After the inlets are open it seems to be harder to observe birds because the available areas to forage are limitless.
- The Grand Lac seems to be a good place to find godwits just after the inlets are open but only a few hours per day are suitable for reading rings because of heat waves. The godwits mix with other waterbirds that are more easily scared off taking the godwits with them when they fly off. Therefore approaching godwits close enough is a tough job at this site.



MAP 1

National Park Djoudj and surrounded areas

Visited 21/07/2015 - 26/07/2015

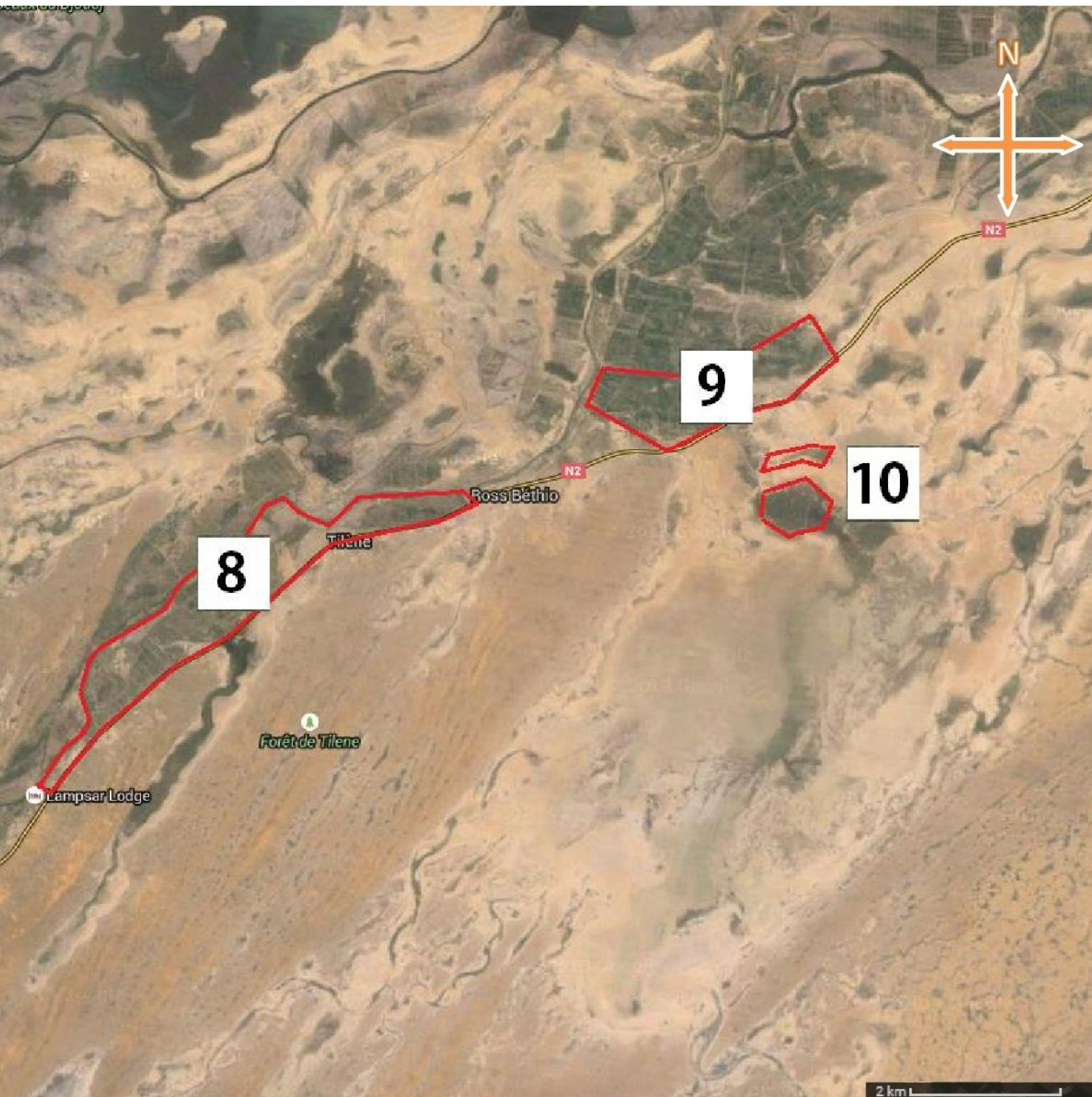
AREAS

1. Northern Ricefields Djoudj_NP
2. Djoudj inlet area
3. Grand Lac
4. Khar
5. Biological Station
6. Southern Ricefields Djoudj NP
7. Gainth Area

MAX NR. GODWITS COUNTED

1. No godwits present
2. No godwits present
3. 1.500
4. No godwits present
5. 1.000
6. No godwits present
7. 10





MAP 2

Ross Béthio and surrounded area

Visited 23/07/2015

AREAS

- 8. Tilene Ricefields
- 9. Ross Béthio Ricefields
- 10. Drain 1 (Ndiאל Reserve)

MAX NR. GODWITS COUNTED

- 8. No godwits present
- 8. No godwits present
- 9. 20





MAP 3

Dakar

Visited 22/07/2015

AREA

11. Technopoole

MAX NR. GODWITS COUNTED

11. No godwits present






Results

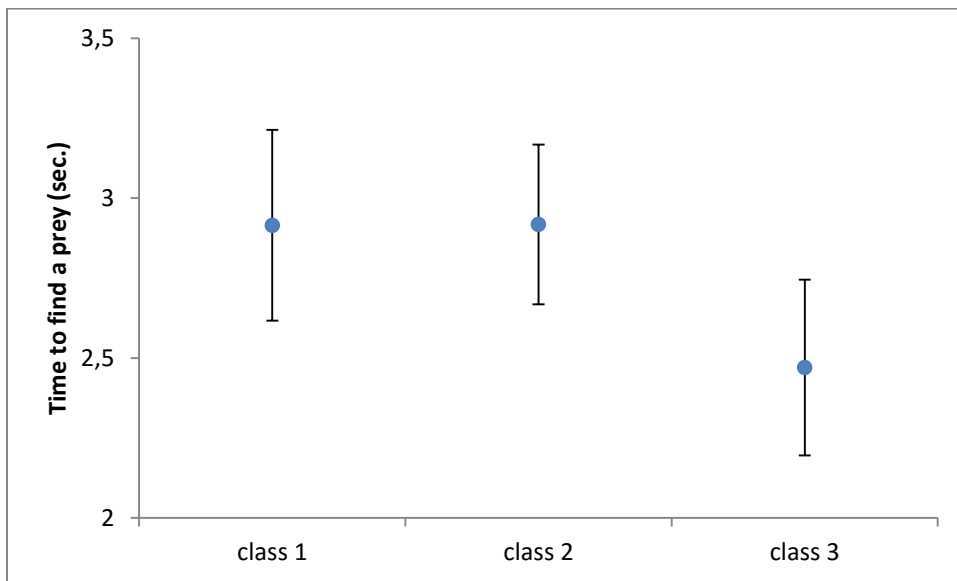
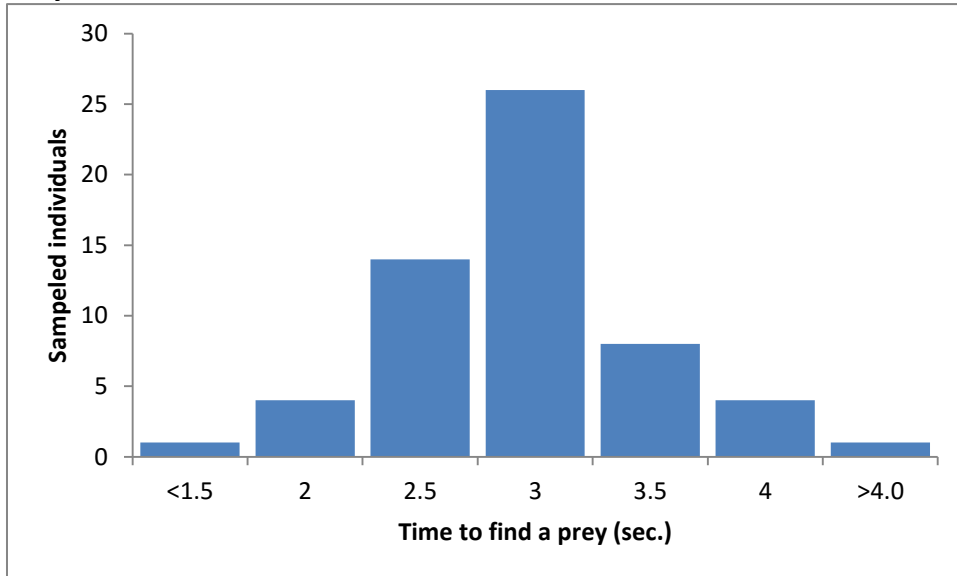
Observed Individuals

ID	21-jul	22-jul	23-jul	24-jul	25-jul	26-jul
NOF-NG	observed	observed	observed	observed	observed	observed
B5BYLY	observed	observed	observed	observed	observed	not observed
BWF-ARB	observed	observed	observed	missed (observed day later)	observed	not observed
B6BYLR	observed	observed	not observed	not observed	not observed	not observed
Y3RRYY	observed	not observed	not observed	not observed	not observed	not observed
B1YYRB	not observed	observed	observed	observed	observed	observed
1LLKUB	not observed	observed	observed	observed	observed	observed
B3RRYR	not observed	observed	observed	observed	observed	observed
R2BYRL	not observed	observed	observed	missed (observed day later)	observed	observed
Y6RLLL	not observed	observed	observed	observed	not observed	not observed
B6BYLR	not observed	observed	observed	observed	not observed	not observed
B5YYYL	not observed	observed	observed	not observed	not observed	not observed
B3RLYL	not observed	observed	not observed	not observed	not observed	not observed
B3BLLR	not observed	observed	not observed	not observed	not observed	not observed
WFW-BRM	not observed	observed	not observed	not observed	not observed	not observed
R3BLYY	not observed	not observed	observed	observed	not observed	not observed
Y5RRYB	not observed	not observed	observed	not observed	not observed	not observed
R3RYYB	not observed	not observed	observed	not observed	not observed	not observed
OOf-OR	not observed	not observed	not observed	observed	observed	observed
R2BLRB	not observed	not observed	not observed	observed	observed	not observed
Y6LYBL	not observed	not observed	not observed	observed	not observed	not observed
OWf-AWB	not observed	not observed	not observed	not observed	not observed	observed

Number of diferent birds seen: 22

-  = observed
-  = missed (observed day later)
-  = not observed

Prey intake:



Fat scores

Date	Sample Size	Fat 1	Fat 2	Fat 3	%Fat 1	%Fat 2	%Fat 3
22-7-2015	33	4	16	13	12%	48%	39%
22-7-2015	210	32	112	66	15%	53%	31%
24-7-2015	20	3	12	5	15%	60%	25%
24-7-2015	69	12	47	10	17%	68%	14%

Colour ring density

Appendix I – Raw Data Prey intake

Date	Time	Preys (per two minutes)	Prey (per minute)	Catogory	Sec. per prey	Colourcode
24-7-2015	15:19	40	20	0	3,00	
24-7-2015	15:25	44	22	0	2,73	
24-7-2015	15:29	53	26,5	0	2,26	
24-7-2015	15:41	46	23	0	2,61	
24-7-2015	15:43	74	37	0	1,62	
24-7-2015	15:48	47	23,5	0	2,55	
24-7-2015	15:51	68	34	0	1,76	
24-7-2015	15:54	45	22,5	0	2,67	
24-7-2015	15:58	59	29,5	0	2,03	
24-7-2015	16:01	58	29	0	2,07	
24-7-2015	16:04	51	25,5	0	2,35	
24-7-2015	16:07	94	47	3	1,28	
24-7-2015	16:15	43	21,5	2	2,79	
24-7-2015	16:18	42	21	2	2,86	
24-7-2015	16:24	51	25,5	3	2,35	
24-7-2015	16:34	40	20	2	3,00	
24-7-2015	16:37	44	22	2	2,73	
24-7-2015	16:41	48	24	2	2,50	
24-7-2015	16:52	50	25	3	2,40	
24-7-2015	16:55	49	24,5	3	2,45	
24-7-2015	17:00	46	23	2	2,61	
24-7-2015	17:05	69	34,5	3	1,74	
24-7-2015	17:07	54	27	3	2,22	
24-7-2015	17:11	42	21	1	2,86	
24-7-2015	17:14	52	26	3	2,31	
24-7-2015	17:24	40	20	1	3,00	
24-7-2015	17:27	33	16,5	1	3,64	
24-7-2015	17:31	37	18,5	1	3,24	
24-7-2015	17:38	32	16	2	3,75	
24-7-2015	17:41	24	12	2	5,00	
24-7-2015	17:44	35	17,5	2	3,43	
24-7-2015	17:49	44	22	2	2,73	
24-7-2015	17:53	59	29,5	2	2,03	
24-7-2015	17:56	33	16,5	1	3,64	
24-7-2015	18:04	50	25	3	2,40	NOF-NG
24-7-2015	18:07	40	20	3	3,00	
24-7-2015	18:16	44	22	2	2,73	
24-7-2015	18:19	48	24	3	2,50	
24-7-2015	18:22	65	32,5	3	1,85	
24-7-2015	18:26	42	21	2	2,86	
24-7-2015	18:31	32	16	3	3,75	
24-7-2015	18:43	39	19,5	3	3,08	

Date	Time	Preys (per two minutes)	Prey (per minute)	Category	Sec. per prey	Colourcode
24-7-2015	18:48	44	22	2	2,73	
24-7-2015	18:52	42	21	2	2,86	
24-7-2015	18:54	50	25	2	2,40	
24-7-2015	18:56	36	18	2	3,33	
24-7-2015	18:59	42	21	2	2,86	
24-7-2015	19:02	44	22	1	2,73	
24-7-2015	19:05	43	21,5	1	2,79	
25-7-2015	10:10	60	30	1	2,00	
25-7-2015	16:14	48	24	2	2,50	
25-7-2015	16:17	46	23	3	2,61	
25-7-2015	16:20	41	20,5	3	2,93	
25-7-2015	16:27	50	25	1	2,40	
25-7-2015	16:36	42	21	1	2,86	
25-7-2015	16:47	45	22,5	3	2,67	
25-7-2015	16:49	44	22	2	2,73	
25-7-2015	16:55	42	21	2	2,86	1LLKUB