

Black-tailed Godwits (*Limosa limosa*) in Southwest Spain from Rio Barbate to Rio Odiel, habitat description and finding ringed birds from 1 – 11 October 2021

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

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Jos Hooijmeijer, Rienk Fokkema & Theunis Piersma



Godwits in an agricultural water reservoir

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Contents

The items I. – VI. in this report are based on and partly identical to the items in previous reports about searching and finding Black-tailed Godwits in Spain.

0. Summary, conclusions and recommendations

I. Introduction

II. Demographic research Southwest Friesland

III. Migration and wintering sites Black-tailed Godwit

IV. Conservation

V. Expeditions West-Africa and Iberia

VI. Habitat study

VII. Literature

VIII. Birds and habitat, daily overviews 1 – 11 October 2021

Appendix A & Appendix B: sites visited and life histories of the recorded ‘Dutch’ godwits

0. Summary and conclusions

The main goal of this week of fieldwork was to get as many resightings as possible in exactly the first half of October. The reason for the timing of this fieldwork was that in these two weeks one has the best chance to identify godwits that do not migrate to Africa at all, but stay in Europe for the entire non-breeding season. Based on tracks from geolocators and satellite tagged godwits we know now that godwits start returning from sub-Saharan Africa on a continuous scale between October and March, and that when the first ones are arriving the last ones are still on their way there. Thus, the first half of October is the best period for correct identification of godwits as a non-trans-Saharan migrants; that is: the least chance to misidentify a bird. You could safely say that these birds winter in Europe but a trans-Saharan migrant is not automatically a bird that winters in Africa!

Resighting godwits in early October is not particularly easy: the birds spend a lot of time resting (on one leg in dense flocks) and since the ricefields have not been mown yet, they only forage in shallow water where they find Chironomid larvae. Yet, if the water is not shallow enough, one will end up staring at swimming godwits without seeing any legs. The weather can be a spoiler too; we had at least 5 days when reading rings between 12:00 and 17:00 was almost impossible due to heat haze.

Despite these conditions, we were much more successful compared to previous years. Within a period of 10 days, we collected 325 resightings of 134 different individuals; compare that to 2018, the last year when JH was here (so no observer effect) when we had 64 resightings of 52 individuals (in 6 days). One reason for that is the increase in numbers: 3000 in Veta la Palma (1200 in 2018), 1000 in Bonanza and Algaida salt pans (600 in 2018), but no birds at Dehesa de Abajo (1200 in 2018). Again, there was some exchange between these groups. New was the flock of 640 south of Villamanrique de la Condesa in a newly built water storage basin. And we checked Odiel NP this year: 900 birds present. In addition to birds of the University of Groningen projects, we made 44 resightings of 24 individuals from other ringing projects.

Only four birds that we observed during our trip had ever been seen in sub-Saharan Africa. Were those misidentifications or early returning birds? The data we collected will hopefully add to our understanding of whether not crossing the Sahara is beneficial for their survival or not. If so, one can expect an increase in birds that don't go to Africa anymore in the long run, a trend that is occurring since the 1980s. In 2021, the reproduction of godwits in The Netherlands was generally good, especially in the north of the country with many chicks fledging. We were wondering if we could find back a lot of those juveniles in the flocks we checked. If so, this could suggest that juveniles prefer to stay in Europe instead of migrating to Africa, leading to a potential major shift in wintering site in the future. However, we only found 2 juveniles, which is 1.5% of all individuals seen. Assuming a 50% mortality since ringing in spring, a quick and dirty analysis would suggest around 10% juveniles. So, either many more juveniles already died, or they did not choose for the sites we visited.

Abdominal profile indexes as a proxy for body condition were on average 2.59 (n=104) on a 1-5 scale, where 1 is very lean and 5 extremely fat. That was slightly less than in previous years: 2.68 (n=570). Intake rates were also slightly less compared to previous years around 18.7 ingestions per minute (n=37; 19.9 in 2018).

A second goal of this trip was to gather information on habitat selection and to recognize threats and opportunities in these wintering sites of the godwits in Spain. The revelation of this trip was to find godwits in the gigantic, newly constructed water reservoirs built in Veta la Palma and south of Villamanrique de la Condesa (see front page). At this time of the year they are almost dry but the remaining water seems an interesting additional option for foraging and roosting godwits. Godwits, but also other waders and waterfowl were using them. Nevertheless, the reasons for building them is dramatic. As the summers are getting hotter and dryer, there is simply not enough water for all the large scale agricultural monocultures around Doñana NP anymore. The area used for the

cultivation of rice has been reduced by the government and farmers are shifting towards other crops than rice such as quinoa, cereals and almonds; we even saw quite some set-aside fields. The problems with drought for the natural marshlands inside the NP are getting bigger and bigger. This means that Veta la Palma is the single safe haven for many species. Despite the fact that the marshlands in the northern part of Veta la Palma have meanwhile been converted completely into arable land now, there is also good news. In Veta la Palma they will stop the intensive pisciculture in the small netted ponds completely and the focus again will be on ecological sustainable fishery in large semi natural ponds with much more opportunities for biodiversity.

In Odiel National Parc the situation seems to be unchanged: it is well-protected and has favourable conditions for godwits. Bonanza saltpans are disturbed by motorbikes even though there are warning signs that they are not allowed to come there; we found a lot of fresh tracks right along the edges of the saltpans where waders forage. And on the main track youngsters were racing. At la Coda de Esparraguerra the intensive fishery in netted ponds seems to be increasing; the owners have closed the path to a formerly public bird hide. Finding godwits in the huge saltmarshes and saltpans in the Cadiz area is problematic but what we understand from local experts is that the numbers are generally low at this time of the year.

All in all, during our trip we were happy to encounter a record number of godwits on their wintering sites in Spain and that we could identify many of the individuals for whom these areas are important. This information is vital for our demographic models and estimating the consequences of their migration choices. Additionally, we learned of new human-induced changes occurring in these areas that can have direct effects on the godwits depending on them; less rice could mean less opportunities for godwits to forage. Agriculture in Spain is still focusing on large-scale water-demanding agro-industry instead of now making the transition to become resilient to expected droughts. Climate change could lead to further drastic changes in land and water management in which godwits and other species for which we have responsibility should not be forgotten.



Godwits and flamingo's in Veta la Palma

I. Introduction

The Black-tailed Godwit (*Limosa limosa*; BTG) is a meadow bird (Verstrael 1987; Thijse 1904). The current Dutch population is estimated at fewer than 30.000 breeding pairs (extrapolated from Kentie et al. 2016) but still 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). After the breeding season godwits migrate to southern Europe (Spain and Portugal) and West-Africa where they stay for wintering (Márquez-Ferrando et al. 2011; Hooijmeijer et al. 2013).

II. Demographic research Southwest Friesland

To measure the changes in population numbers and the causes, the University of Groningen started in 2004 a long-term research in the south-western part of Fryslân, The Netherlands. In 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. Since 2020, the project has expanded into the Godwit Landscapes Project, still studying the Godwit as a main focal species, but in context of the whole food-web of which it is part.

III. 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. 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. 2014). 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.

IV. 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 can 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.

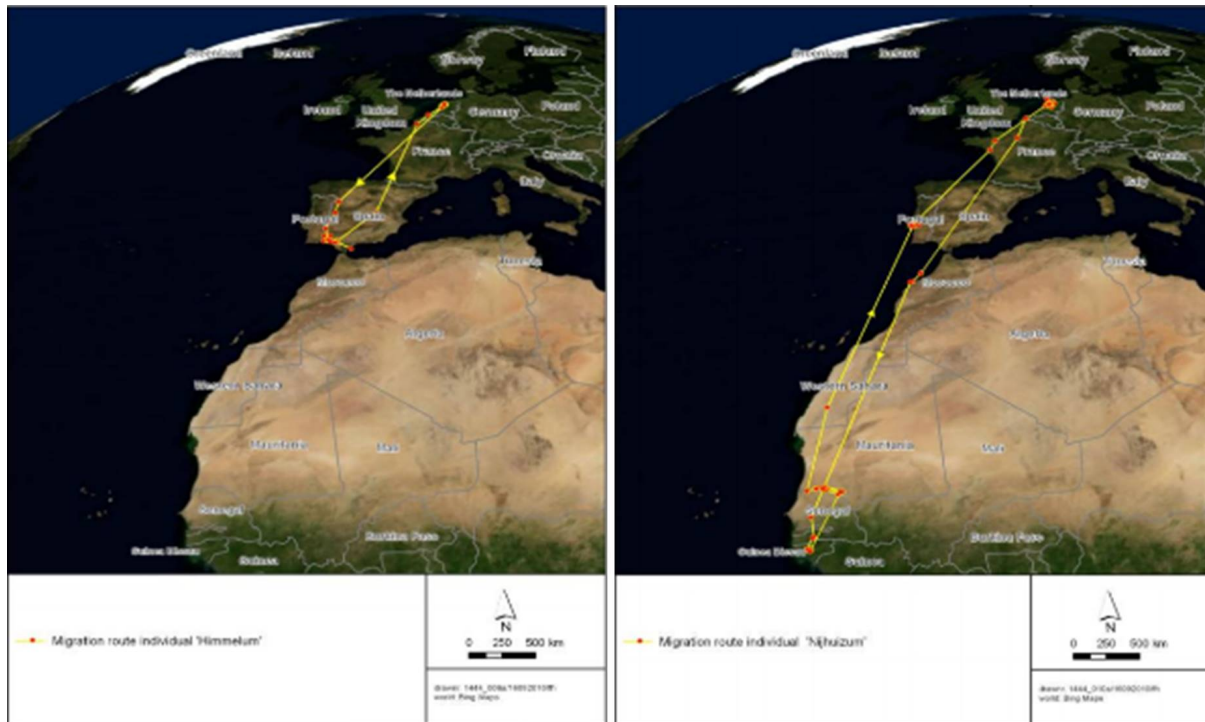


Figure 1. Two classical migration routes of Black-tailed Godwits based on satellite tracking. The left map shows the route of an Iberian wintering bird. On the right an African wintering bird. Iberian wintering birds save a 6000 km flight and don't need to cross the Sahara twice (Hooijmeijer et al., 2013).

V. Expeditions West-Africa and Iberia

Until recently, West-Africa was the only area along the migratory flyway from where we didn't have many observations of colour-marked individuals. In the past, only small numbers of colour-ringed birds have been reported, mainly by birdwatchers and, more recently, by local scientists. Therefore, 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 region 2-3 times per year till 2019. This has yielded a great number of resightings. In the near future we will 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 stop-over sites in February. We hope 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 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?

VI. 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. 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. In all these countries godwits are heavily dependent on man-made habitats like water buffers, fish farms, salt pans and rice fields.

With remote sensing techniques and the locations indicated by godwits with satellite transmitters, we found out 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. Additionally, godwits spend much of their time foraging either on the mudflats of saline mangrove wetlands or in wet rice fields, however little is known of the nature of the prey items at different times of the year. However, remote sensing data is difficult to interpret without accurate ground-truthing information. In the past 7 years we conducted surveys categorizing and describing habitats, measuring environmental variables such as water salinity and soil penetration pressure, feeding efficiency of the godwits and carefully searching the substrate to establish the identity of godwit prey items.

In a recent expedition between 1 and 11 October 2021 we visited the most important areas in Southwest Spain from the Rio Barbate estuary to Odiel NP. Our aim was to resight individual colour marked birds, describe the habitats godwits used and to gain information on threats and opportunities by field observations and meetings with local experts. In this report we present a daily overview of our findings with photos, locations we visited, numbers present and the first conclusions and recommendations.

VII. Literature

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Veta la Palma, sunset at D3 pond

VIII. Birds and habitat, daily overviews 1 – 11 October 2020

1 October 2021

Sunny all day but with a light breeze, max 29 C

The start of this fieldwork trip was in the Rio Barbate estuary, in the far south of Spain close to Tarifa. This estuary east of Barbate consists of (former) saltworks and a large area is covered nowadays for pisciculture. The fishponds are covered by nets making them unsuitable for larger waders and waterfowl. But a large area is still available for them. The main area for waders seems to be on the eastside of the estuary where they are accompanied by large numbers of gulls and flamingo's. I found two flocks of in total 110 godwits; they were actively foraging on what appeared to be Chironomids (intake scores of 32, 33 and 35 per minute; n=3 individuals) and seemed to be in good condition with abdominal profiles between 3 and 4. I was quite lucky to find 4 birds from the RuG scheme in this group. A good start of the trip!



Rio Barbate estuary

In the afternoon I continued to the huge saltmarshes and saltpans near Cadiz. Francisco Hortas had arranged permission to visit to one of the best sites for godwits in the area: Salinas de Cetina near Puerto Real. This is a large area with saltworks and partially open to the public. I found a flock of 10 and later another 135 godwits. It cost the whole afternoon to scan this group thoroughly as they were in deep water at first but in the end a Marsh Harrier made them fly up and when they stood on a sand ridge, all of a sudden all legs were visible. Unfortunately no full ring combinations at all but I managed to get 1 green code flag, a chick ringed in 2013 and seen in the area also in 2015.



Godwits at the Salinas de Cetina

Before heading north to our home base for this trip in Villamanrique de la Condesa, I visited another famous site, the La Tapa salt pans near Puerto Real. I made a long walk into the former salt pans on the eastside of the active saltworks but did not find a single godwit. The fact that the local rifle association was having their practicing evening on the edge of the salt pans probably did not do any good....

2 October 2021

Sunny after a foggy start, light breeze, max 28 C

At first light, I travelled to Veta la Palma where I arrived an hour after sunrise. On the way there I noticed that the first farmers had started harvesting the rice and were even ploughing recently harvested fields. Could be interesting for godwits later this week! Between Villamanrique and Isla Mayor, most of the rice was still standing but other fields appeared to be set aside as fallow land or had been used for other crops. Shortage of (irrigation) water is the main reason as we learned in 2019. The government now decides how many and where parcels can be used for rice cultivation. But another water-intensive crop, cotton, seemed to have become more important?

In Veta la Palma I first went to an unknown location in the north of the area, indicated by 2 godwits with a transmitter in the past weeks. No idea what to expect because when I visited Veta la Palma two years ago, it was just recently reclaimed saltmarsh. It turned out to be a huge water basin with high dikes covered with plastic. The size was enormous: 125 hectares! I learned later this week that three of these gigantic structures have been set up in Doñana Natural Park (the mainly agricultural surroundings of the National Park). They serve as water buffers for the large scale intensive agriculture that is in high demand for water in a region that is getting drier and drier due to climate change. We wondered if this has consequences for the hydrology of the National Park.



New 125 ha water basin at Veta la Palma

We heard from Miguel Medialdea, biologist of Veta la Palma that this will not be the case for this basin. It will be filled with rainwater and if necessary and possible with water from the river Rio Guadalquivir, a river that is no longer important for flooding the marshlands of the NP. But if these water basins collect rainwater that otherwise, at least partially, would have reached the NP marshlands through the groundwater flow systems, we wonder if this aggravates the desiccation problems of the NP that are already huge through the many pumps for agricultural irrigation that deprive this precious system of sufficient ground water flows? Miguel told us that the water basin in Veta la Palma is just there to facilitate enough water for the older rice fields and recently set up agriculture in the north of Veta la Palma. The crops here are mainly winter barley and wheat, and sunflowers, all cultivated without pesticides (except for weed control along the canals, as we saw). The run-off water will be collected in natural water bodies as Lucio Cuquero Grande and Lucio del Bocón to improve the habitat for waders and water birds. Water quality and – quantity will be monitored.



Godwits at the bottom of the water buffer

In the front end of the basin was shallow water that had attracted a variety of waders including 50 godwits, all unringed. They were foraging on Chironomids with high efficiency: 30, 22, 35 prey items per minute (n=3 individuals).

Since I was in a new area anyway, I tried to find a way to reach Lucio Real from the north. This Lucio is a shallow natural water body that usually holds water and attracts godwits in autumn. It can be seen from the perimeter dike surrounding the fish ponds but is normally very hard or even impossible to read rings from there due to the distance. There turned out to be a path through saltmarshes with cattle and horses that eventually ended at Lucio Real; would not recommend it after rainy weather because you likely will get stuck. At the Lucio were 170 godwits and they could be approached very well. Most of them were foraging in belly deep water but in the end I had seen a fair share of them; unfortunately just 3 ring combinations; all from other projects. Foraging efficiency on Chironomids: 16, 19, 14 (n=3 individuals). I returned to the main road and headed for Lucio Cuquero Grande, good for thousands of godwits in spring but now completely dry and hence no birds.



Lucio Real at Veta la Palma

On the way there it struck me that the entire northern part of Veta la Palma has now changed from natural saltmarsh to large scale agroindustry, even including a field of solar panels. We heard from Miguel Medialdea that the remaining saltmarsh will stay unaffected as agreed with the government at the establishment of Veta la Palma. These areas give Veta la Palma so much more ecological status. The contrast in biodiversity between these newly made agricultural fields and the original saltmarsh almost hurts. In The Netherlands we have done the same with our natural and traditional agricultural landscape and we have a word for that deep feeling of loss: "landscape pain", when the rich natural and cultural world you knew, no longer exists.

I continued along a dry A1 and B1 towards the south. One of the biggest flocks of White-headed Ducks I have ever seen (44) were in A2 and B2 but too deep for godwits. I found 200 godwits in A5 but all at a large distance and sleeping in the middle of the pond and I had no luck in finding rings there. I was more successful in A6 where 190 godwits were foraging and some did so in shallow water. Here I observed the first birds from our scheme; foraging efficiency was a constant 21, 20, 20 prey items per minute ($n=3$ individuals). I continued and scanned all ponds on the east side of the middle road but found no birds. Back at the office buildings it was already getting late, so I turned for a quick scan of the eastern ponds. I did not get further than the first one: 530 godwits under perfect conditions in C1! I stayed there till night fall to read as many rings as possible. In the end I had 25: 14 from our own scheme, 5 code flags and 6 from other schemes. Not a bad day at all! Back in Villamanrique dinner at Spanish times: 22:15; finishing the report, entering resightings in the database and off to bed.....



Overview of Veta la Palma and the numbering of the ponds.

3 October 2021

Cloudy from the start and showers in the afternoon, 4 Bft wind, 21C maximum

No Veta la Palma today but a visit to the Bonanza salt pans between Trebujena and Sanlúcar de Barrameda. It is a 2 hrs drive but in fact it is just opposite Veta la Palma on the other side of the river Guadalquivir! The road to the best spot had been fenced off, probably to exclude quads and motorbikes, a growing pest in many areas. Fortunately, it was still possible to walk the 1.2 km to the pump house. Like in other years, this place was favoured by godwits and at least 400 were foraging on Chironomids (20, 18, 20/ minute; n=3 individuals). Ring reading was a bit troublesome with dark weather, many birds in deep water and a fairly low ring density: 1 ring combination in a flock of 185 birds.



Salinas de Bonanza, godwits foraging at close range but in deep water

After an hour it started raining as well. Between the showers I still got 2 more rings before I headed back to car, soaking wet. One of them was GPS tracked bird Sietse, ringed in the Krimpenerwaard and already present in the area for some time. The rain continued the whole afternoon and at 16:00 I decided to give up for today and headed for Trebujena, El Codo de la Esparraguera. This area is more and more claimed for pisciculture with many netted ponds. Along the CA-9027, two large water bodies remain available for waterbirds, although one of them was largely dry now. From this road, in terrible condition, I found a small flock of 25 godwits, including 1 ringed bird. They were foraging on Chironomids (21, 11, 11/ minute; n=3 individuals). The entrance to the former public bird hide had been fenced off by the owner of the fish farm, another area lost for the public. The machinery on the premises suggested that more reclamations and an extension of the commercial activities can be expected. On the way back I made a stop at Dehesa de Abajo near Coria del Río. This nature reserve is important for waders and waterbirds but not now: it was completely dry! In 2020 the shallow lake was also dry but in October 2018 it was good for 1200 roosting godwits. On

the way back I wanted to check the recently ploughed rice fields near Villamanrique but the area was fenced off and from the public road the low sun made it impossible to scan the area. Back at home I found out that one GPS transmitter bird had moved from Huelva to this exact spot; how do they know it!

4 October 2018

Nice day with sunny weather and a light breeze, 27C maximum

This morning I headed for Odiel NP near Huelva. In the morning I met the director, Mr. Enrique Martinez Montes, Director Conservador PN Marismas del Odiel and his colleague Victor Fiscal. We talked a bit about our research and to my surprise Victor had freed up the whole morning to join me in the field and show me the best places to find godwits this year.



Odiel NP, Isla de la Liebre

We soon found the first godwits at Isla de la Liebre, a sparsely vegetated shallow lagoon with many waterbirds and waders. This place is used as a high tide roost and as the tide came in when we were there, more and more godwits arrived. At low tide they can forage on the banks of the Rio Odiel and Rio Tinto but at high tide these sites are unavailable and they look for a place to stay. Some of them continue to forage in Isla de la Liebre on Chironomids (16, 16, 20/ minute; n=3 individuals) but others sleep most of the time. This leaves little opportunity to find rings as many birds are in deep water and others stand sleeping on one leg. We checked the whole area and counted about 900 godwits. Most of them were in Isla de la Liebre but about 150 individuals were in one of the salt pans. In previous years these salt pans had many godwits but the water level was too high for them this time. In the afternoon I continued and by the end of the day I had observed 6 birds of our scheme, 2 foreign schemes and also 10 spoonbills with rings.

In the evening I picked up my colleague Rienk Fokkema at the airport who will join me till the end of this expedition.

5 October 2021

Mostly sunny day, a bit cloudy in the afternoon, light breeze, 27C maximum

One of our GPS transmitter birds had indicated that on the 3rd of October it had been present in the rice fields south of Villamanrique. At first light we headed for this location, a freshly harvested and ploughed rice field. A friendly farmer granted us access to the fields but unfortunately we did not find a single godwit.



No godwits at the recently ploughed rice fields south of Villamanrique (cotton fields on the left)

We decided to go back to Odiel NP today. The best chance to find many birds there is at high tide but the chance to read rings is less optimal during the hottest hours of the day when many birds are just resting on one leg and the heat waves reduce visibility. Later this week the hours with options to read rings would be more and more during these hot hours and therefore we tried our luck again. We were however not very successful at first. We observed just one new bird at Isla de la Liebre, but fortunately we found 3 more on the edge of one of the salt pans. At Isla de la Liebre we scored intake rates: 13, 12, 12 Chironomids/ min; 3 individuals.

We decided to go for Veta la Palma to get our quota of resightings but we could not find any big groups at any of the sites they were on Saturday. Driving around and checking small groups we still improved our score for today to 9 godwit ring combinations read. Tomorrow we will try to find them back in Veta la Palma.

6 October 2021

Sunny and hot all day, no wind and only 31C ;-)

Today we spent a full day in Veta la Palma. In the early morning we first checked the water basin but no birds were there this time. After that we took the long drive through the saltmarsh to Lucio Real and found 82 godwits of which 2 were ringed with our scheme. After some time they flew up and we saw them land in fish pond D3. We drove all the way back, scored a few more rings in C1 but the hotspot of today was definitely D3: 1760 godwits were present in shallow water with almost all legs visible. We started scoring ring combinations enthusiastically but D3 is a huge fishpond and most birds were quite far away. The increasing heat of the day, intense sun and the lack of wind made it almost impossible to read rings due to heat haze between 14:00 and 18:00. We passed those hours talking and having lunch in the field with our colleagues from the University of Groningen, Theunis Piersma and Petra de Goeij who were on a 'working holiday' and had come over to help us with this big group. At 18:00, we decided to split up and they drove to D4 because a part of the godwits had joined other godwits over there (we estimated that in total about 2600 godwits must have been present in total). Between 18:00 and 19:45 the weather conditions allowed for great ring reading again. At the end of the day we had >40 ring combinations in our books: a great score!



Great opportunities to score rings at D3

7 October 2021

Nice cooler morning with some wind, hot afternoon with almost no wind and sometimes strong gusts of wind, 29C

Today we got up a bit earlier to be at Veta la Palma just after sunrise. We went straight to basin D3 where 2600 godwits were present. Overall we estimated from going through the area this morning

that about 3000 godwits were present in Veta la Palma. At basin D3, the majority of the birds were resting, but a good portion were still foraging and conditions were ideal to read quite some rings. At Veta la Palma in basin D3 we scored intake rates: 8, 10, 10 Chironomids/ min; 3 individuals. At 11:30, conditions became difficult for ring reading due to heat and haze and we decided to go on a small round through the area. The smaller roads with shrub cover were a challenge with the car, but it was worth it as we could read some rings in a smaller group present in C4 and C1. After this, we went back to the main office in the early afternoon and had a very interesting meeting with Miguel Medialdea who told us many interesting new facts about Veta la Palma and its management (incorporated in the post of 2 October). We were happy to hear that fish farming in Veta la Palma will hopefully become more extensive in the near future with the removal of the more intensive fish farming parts of small ponds covered with nets. Focus will be on farming shrimps and mullets under natural conditions in large ponds. In the end, this will be more cost effective for the company. In the afternoon, we decided to check up on the location of two GPS tracked birds which were detected yesterday in agricultural fields nearby. We suspected the birds may have found recently harvested rice fields and larger groups of godwits may be present. On arriving at the location we already saw the smoke plumes caused by the burning of the stubble and remains after harvesting the rice.



Harvested and burned ricefields south of Villamanrique de la Condesa

Thus indeed the godwits had detected an area where rice was being harvested. At the location we first thought we could not get in as the road was closed with a big fence. However, by chance the owner was just arriving and kindly granted us permission to go in. In driving to the exact location of one of the GPS tracked birds we realized that it was not in a rice field, it was located again in a massive water basin! (see front page; now named by us after the owner 'Embalse de José Cargonel'). We found our way there and to our joy observed a group of 640 godwits at the bottom of the basin with dry areas dispersed with small pools of water. This may be an ideal resting place for the godwits

during the day, while possibly foraging for spilled rice in the night. We stayed with the godwits on this new location until sunset and conditions, even though it was hot, were ideal to read rings. There was limited heat haze and we could work from high on the dyke surrounding the basin. The farmer even returned to us to ask if we had found our birds and we explained in Spanish and with hands and feet about our godwit project. He confirmed the serious lack of water in the area and told us that all his rice fields next to the basin were pesticide free. We were very happy to have found this new location due to the GPS of the godwits and it yielded 17 ring combinations. We also saw at least 5 juveniles at this location that were most likely *Limosa l. islandica*: very reddish birds and not a single feather moulted of the juvenile plumage. Combined with the 15 we saw in Veta la Palma in the morning this gives a daily total of 32 ring combinations.

8 October 2021

Fog in the morning, later hot and no wind, 29C

We got up early to avoid the heat but the rice fields behind Isla Mayor were covered in fog. After 9:30 the fog cleared up and till 11:00 it was possible to read colour rings. By that time almost all birds had gone to sleep in several dense flocks in the middle of the D3 pond, making reliable resightings impossible. However, we were not unhappy with 22 resightings in 1.5 hrs. We drove around in the eastern half of Veta la Palma in search for spoonbill Camilla, that is carrying a GPS transmitter that indicated that she had landed in that part earlier that morning. Unfortunately we could not find her but we scored several colour-ringed spoonbills. By 13:00, the heat made it impossible to read rings even at close range and we decided to go home, eat something and come back later in the afternoon.

At 17:30, we were back in Veta la Palma. The conditions to read rings were absolutely ideal: a little bit of wind, no haze, all legs visible and many active birds. We spent our time at D3 till sunset and got 87 resightings, of which 42 different birds from our scheme, an all-time record for this time of the year. At 20:00, all 2800 birds started foraging on Chironomids in D3 and they stayed there till it was dark.



Our "Bonanza" of ringed birds in D3 today

9 October 2021

Fog in the morning, later hot and no wind, 29C

An early start to be at Bonanza salt pans at dawn (1:45 hrs drive). When we arrived the fog had cleared up and we started a tour through the salt pans that lasted till 13:30. After the white pump station a small flock was present: only 192 birds. Almost all of them were foraging in deep water and no rings were visible. We took an intake rate sample at 9:50: 26, 23, 19 Chironomids per minute ($n=3$) and one at 10:35: 25, 21, 21. We scored their fat levels, which on average were 2.7 ($n=58$; abdominal profile index API; scale 1-5, 1 = very lean and 5 is very fat). Walking the path behind the white pump station along the salt pans, we noticed many tracks of motorcycles. It is clear that, although forbidden, the area is much used by them.



Fresh motorcycle tracks at Bonanza salt pans

The tracks were very fresh so perhaps an early motorcyclist had scared off the majority of the birds. Later we saw a flock of 820 birds far behind in the salt pans up north, away from the walking track and motorbikes; 280 of them were resting together with Shoveler ducks and 540 were foraging in deep water. By then it was 12:00 and the hard backlight and distance made it impossible to see rings. Moreover, a Peregrine falcon made them all fly off and we lost track of them; after that we decided to head back to Veta la Palma for an evening ring reading session. We only saw 2 colour rings at Bonanza. It is a long drive and there is always a risk they are in deep water or far away. Highlight was that we found our transmitter bird Feandyk, alive and healthy.



GPS tracked godwit "Feandyk" (left) at Bonanza salt pans; the antenna of the transmitter is barely visible

The evening session at D3 was again fantastic and a copy of yesterday evening with at least 39 different birds from our own scheme and 5 from foreign programs. Average API here was 2.5 (n=46) but intake rates were low: 8, 13, 12, 8 (17:30). At 20:00, the light faded and most birds started foraging in D3.

10 October 2021

Sunny from the start, later hot and no wind, 29C

Today we met with Rocio Márquez Ferrando in the morning in Isla de Mayar. Rocio did a postdoc in our project from 2011 until 2017 on the habitat use of wintering godwits here in the area. So it was great to catch up and meet with her. After a quick cup of coffee we set off to Veta La Palma. The vast majority of the group of godwits (around 2500) were again at D3 and 500 in Lucio Real. In D3 the group was a bit further from the shore and mostly resting already when we came (around 09:30), but we could read rings by patiently waiting for birds to wake and show their legs while preening or walking. At around 11:30, more and more birds became active and started foraging in another corner of D3. There the birds were closer to the shore and overall we could read rings from at least 20 different birds from our scheme and 1 from a foreign program (a German GPS transmitter bird). At 13:00, we ended our observation session to get Rocio back to her car in time and this also

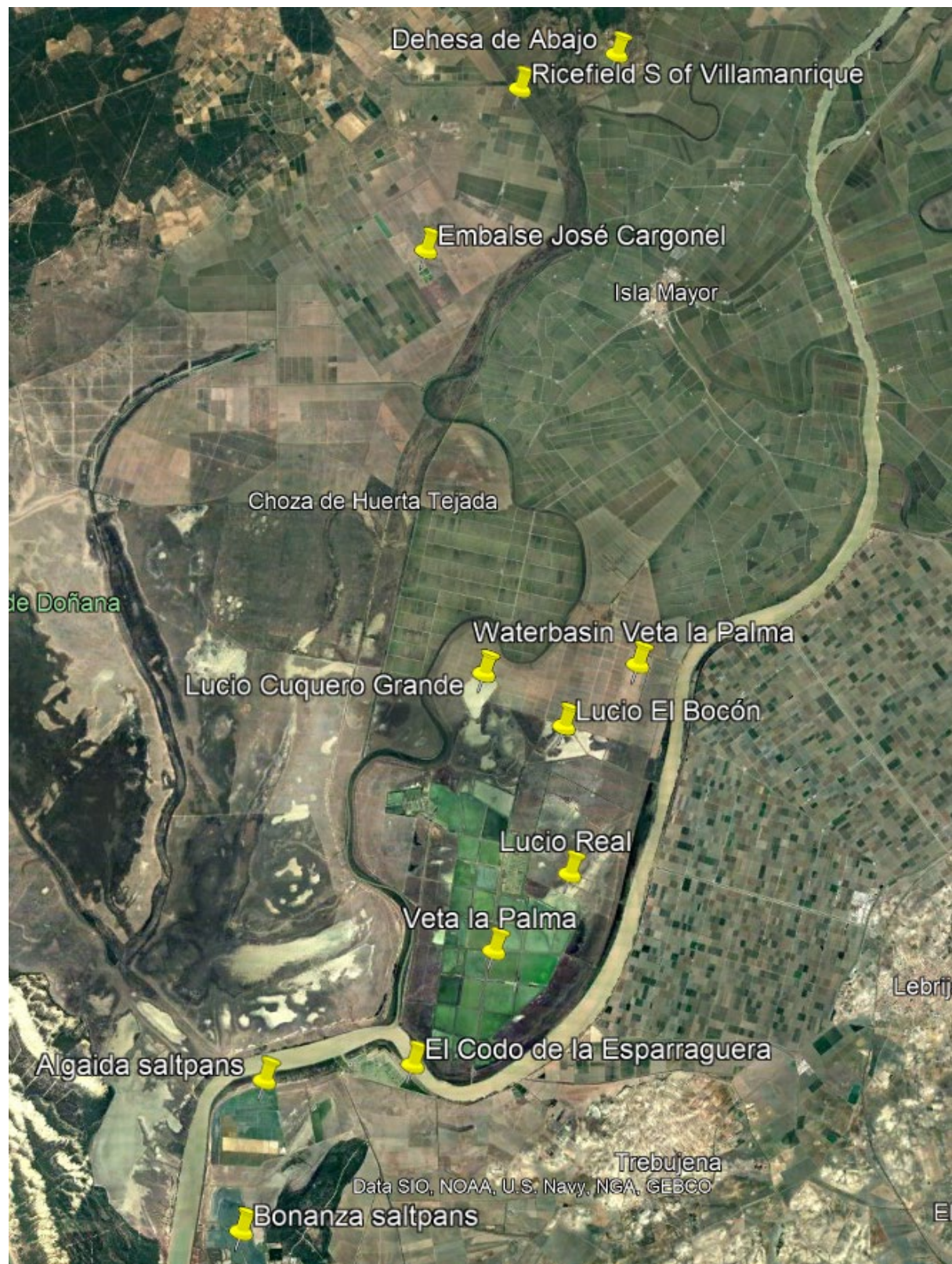
concluded our observation week here in Spain. Now time for the last tasks of washing the dust of the car and the floor of our apartment, processing the final data and then tomorrow flying back to The Netherlands. We had a great observation period here with many resightings and are very happy with the data obtained and the experiences gained.



With Rocio at the Veta la Palma water buffer



Appendix A: Locations visited (see text)







Appendix B: life histories of the observed birds