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# Describing habitat and finding colour rings of Black-tailed Godwits (*Limosa limosa*) in Doñana, Spain, from 3 – 10 October 2018

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

October 2018

Jos Hooijmeijer, Ruth Howison & Theunis Piersma



## **Introduction**

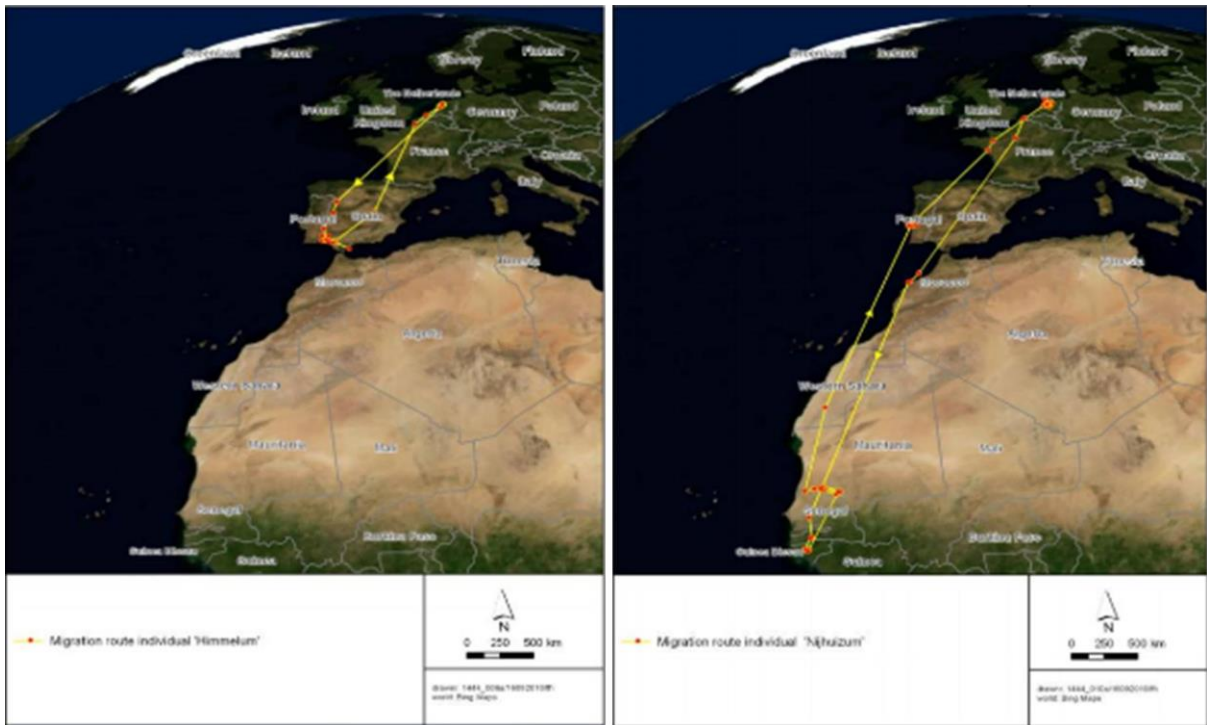
The Black-tailed Godwit (*Limosa limosa*; BTG) is a meadow bird (Verstrael 1987; Thijse 1904). The current Dutch population is estimated at fewer than 40.000 breeding pairs (Kentie et al. 2016) and represents an important part of the total continental BTG population *Limosa limosa limosa*. However, the 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). 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 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 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. 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 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., 2013).

### 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.

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 stop-over 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 (Modis EVI 16 day time series) and 3.5 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, however little is known of the nature of the prey items 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 and carefully searching the substrate to establish the identity of godwit prey items.

Between 3 and 10 October 2018 we visited the most important areas in Doñana in South Spain 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.

### **Literature**

- Groen, N.M., Kentie, R., Goeij, P. de, Verheijen, B., Hooijmeijer, J.C.E.W., Piersma, T.. 2012. A modern landscape ecology of black-tailed godwits: habitat selection in Southwest Friesland, The Netherlands. *Ardea* 100:19-28.
- Hooijmeijer, J. C. E. W., Senner, N. R., Tibbitts, T. L., Gill, R. E. Jr, Douglas, D. C., Bruinzeel, L. W., Piersma, T.. 2013. Post- breeding migration of Dutch- breeding black- tailed godwits: Timing, routes, use of stopovers, and nonbreeding destinations. *Ardea*, 101, 141–152.

- Kentie, R., Senner, N. R., Hooijmeijer, J. C. E. W., Márquez-Ferrando, R., Masero, J. A., Verhoeven, M. A., Piersma, T.. 2016. Estimating the size of the Dutch breeding population of Continental Black-tailed Godwits from 2007–2015 using resighting data from spring staging sites. *Ardea*, 104, 213–225. <https://doi.org/10.5253/arde.v104i3.a7>
- Márquez-Ferrando, R. Hooijmeijer, J. Groen, N. Piersma, T. Figuerola, J.. 2011. Could Doñana, SW Spain, be an important wintering area for continental Black-tailed Godwits *Limosa limosa limosa*? *Wader Study Group Bulletin* 118: 82-86.
- Mulder, T. De Grutto in Nederland. 1972. Wetenschappelijke mededelingen van de Koninklijke Nederlandse Natuurhistorische Vereniging. Nr.90. Hoogwoud: KNNV.
- Newton, I. 2004. The recent declines of farmland bird populations in Britain: an appraisal of causal factors and conservation actions. *Ibis* 146: 579-600.
- Roodbergen, M., van der Werf, B. & Hötker, H. 2012. Revealing the contributions of reproduction and survival to the Europe-wide decline in meadow birds: review and meta-analysis. *Journal of Ornithology* 153: 53-74.
- Teunissen, W., Schotman, A., Bruinzeel, L.W., Holt, H. ten., Oosterveld, E., Sierdsma, H., Wymenga, E., Melman, D.,. 2012. Op naar kerngebieden voor weidevogels in Nederland. Feanwâlden: Sovon-rapport 2012/21, A&W rapport-1799, Alterra-rapport 2344.
- Teunissen, W. & Soldaat, L.. 2006. Recente aantalsontwikkeling van weidevogels in Nederland. *De Levende Natuur* 107: 70-74.
- Thijsse, J.P.. 1904. Het Vogeljaar, Nederlandse vogels in hun leven geschetst. Amsterdam: W. Versluys.
- Thorup, O.. 2006. Breeding waders in Europe2000. *International Wader Study Group* 14.
- Tscharntke T., Klein A. M., Kruess A., Steffan-Dewenter I., &Thies C.. 2005. Landscape perspectives on agricultural intensification and biodiversity - ecosystem service management. *Ecology Letters* 8: 857-874.
- Verhoeven, M.A., Loonstra, A.H.J., Hooijmeijer, J.C.E.W., Masero, J.A., Piersma, T., Senner, N.R. 2018. Generational shift in spring staging site use by a long-distance migratory bird. *Biology letters* 14(2): 20170663.
- Verstrael, T.J.. 1987. Weidevogelonderzoek in Nederland. 's-Gravenhage: Contactcommissie Weidevogelonderzoek.
- Vickery, J.A., Tallwin, J.R., Feber, R.E., Asteraki E.J., Atkinson, P.W., Fuller, R.J., Brown, V.K. 2001. The management of lowland neutral grasslands in Britain: effects of agricultural practices on birds and their food resources. *J. Appl. Ecol.*: 38: 647-664.

## Summary and conclusions

The main goal of this week of fieldwork was to get as many resightings as possible in exactly the first week of October. The reason behind this timing was, that in this week one has the best chance to identify godwits that do not migrate to Africa at all, but stay in Europe. Based on tracks from geolocators 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. The first week 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 Chironomids. But if the water is not shallow enough, you will end up staring at swimming godwits without seeing any legs. That was in short the story of this week. You really had to grab the few opportunities you got. After 6 days, I had 64 resightings of 52 different individuals. That is not bad but quite frustrating when you know that below the water surface many ring combinations remain invisible. I found good numbers: 1200 in Veta la Palma, 600 in Bonanza and Algaida saltpans and another 1200 in Dehesa de Abajo but there was some exchange between these groups. That gives an average of 1:60 ringed individuals which is not a bad result after all. More than 80% of these birds had been seen in the area between September and November in previous years and these are without any doubt true European wintering birds. Only two birds had ever been seen in Africa, as a matter of fact one even last September. Were those misreadings or early returning birds? The data I collected this will hopefully add to our understanding if not crossing the Sahara is beneficial for their survival or not.

A second goal of this trip was to gather ground truthing information for our study on habitat selection along the flyway. At all sites I collected information on pH, conductivity, penetrability of the sediment, foraging efficiency (number of preys swallowed per minute), sediment composition, and prey choice. At all locations more or less saline conditions were encountered (3-65 mS) and where Chironomids the obvious prey they were after (on average 19,9 (13-31) preys per minute). In Bonanza and Algaida, the majority of the birds was foraging during daytime but in Veta la Palma they slept most of the day and only started foraging 2-3 hours before sunset at the same site or they flew up to go somewhere else. Why foraging at night, is the question to be answered. We have seen before that they also forage during the night in the ricefields after the harvest, so this really seems to have something to do with the Veta la Palma area. Are they avoiding depredation risks during daytime? It is true that Veta la Palma fishponds are a bit unclear because of the vegetated edges of the fishponds. Especially on the edges where the water is a bit shallower and easier to forage, the omnipresent Marsh Harriers can easily get you by surprise. The more open saltpans of Bonanza might therefore be safer. Intriguing!

## Daily reports

### 3 October 2018

Travelling to Sevilla. I arrived late in the evening at our traditional accommodation in Cañada de los Pajaros, a few kilometers behind Puebla del Rio, where I would stay the rest of the week.

### 4 October 2018

Sunny all day but with a light breeze, max 34 C

On the way to Isla Mayor, I drove through endless ricefields that were getting yellow; in a few days the harvest will be in full swing. The vegetation density of the riceplants is enormous and incomparable to what we have seen in the coastal rice fields in Senegal and Guinea Bissau but comparable to some parts of the large-scale, agro-intensive fields in the Senegal delta. Here in Spain there is no space for godwits in the ricefields in early October!



Huge ricefields near Isla Mayor, ready to be harvested.

I spent the whole day scanning the fishfarm complex of Veta la Palma south of Isla Mayor, a well know wintering site for Black-tailed Godwits. The conditions were predictable as ever: the rain-fed lucio's like Cuquero Grande were dry but the large extensive semi-natural fishponds provided suitable habitat to forage and rest with a range of water depths . The first 100 birds were found around noon; they were in small flocks or as solitary individuals, mainly in the A6 and B6 ponds. 80% was resting and the others up to their belly foraging in deeper water in the middle of the B6 pond. Bigger flocks were found however in the C4 pond around 14:00: more than 1200 birds were present here. 90% of them were sleeping on one leg and the others foraging up to their belly in the water. Not optimal for reading rings! I decided to continue scanning the rest of the eastern part of Veta la Palma. The big ditch on the outer perimeter of Veta la Palma had several small groups that could be checked for rings. But the big surprise was a group of 440 birds in the saltmarshes on the outside of



the big fence that surrounds Veta La Palma, called Lucio Real. Most of the birds were sleeping here as well but I found a few colour ringed birds. After scanning the rest of the area, I returned to C4 at 18:00. The birds were more active now and started preening and foraging in C4. But small groups flew off to the South or other parts of Veta la Palma. Despite that most of them were foraging in deep water, I managed to get a few more rings before sunset at 20:00. By that time 75% of the birds had left C4 and the remaining 30% was mainly still resting. So it seems that the birds become active in the late afternoon and some of them fly off to forage (?) somewhere else. It is hard to believe that they go to the ricefields like they do later in winter after the harvest. Perhaps they forage in other places of Veta la Palma or on the river banks.

In total I read 8 rings from our scheme, a bird from Extremadura, several Spoonbills, an Avocet and an Osprey. The total number of godwits counted in Veta la Palma was 1822.



Godwits in Veta la Palma, roosting during daytime with poor conditions to see rings

### **5 October 2018**

Sunny all day but with a light breeze, max 33 C

At first light I travelled to Veta la Palma where I arrived an hour after sunrise. I went straight to all the places where I found godwits yesterday and hoped they would still be active a few hours in the morning. The contrast could not be bigger: more than 98% of the birds was deep asleep and mostly on one leg and/ or in deep water. Ringreading was tough with a lot of incomplete sightings. After several fruitless attempts I stopped at 12:00 to have a brief talk with Miguel Medialdea, the biologist of Veta la Palma. He told me that the new large-scale arable fields behind the main entrance will be used for cereals later on. Despite the loss of more or less natural habitat, the good news is that the new fields will get water through a new inlet from the river and this will also be used to keep the northern Lucio's filled with water, including Cuquero Grande. This will provide ideal habitat for wintering godwits and other waterbirds; right now they are completely dry.



The creation of new large-scale arable fields, mainly for cereals in the north of Veta la Palma; here the drainage pipes are being installed.

I left Veta la Palma to have a meeting with Rocio Márquez Ferrando, our colleague that worked at the EBD on godwits. I returned to Veta la Palma 2 hours before sunset just in time to see all birds waking up. They started preening and walking around and this provided better opportunities to get some resightings. At 20:15, a quarter after sunset, >98% had flown off or was foraging in C4. Thanks to these last 2 good hours, I still scored 11 godwits today (only 1 overlap with yesterday); 4 of these were originally ringed in Veta la Palma by Rocio c.s..

### **6 October 2018**

Sunny and warm all day, 32C maximum

No Veta la Palma today but a visit to the Algaida and Bonanza saltpans between Trebujena and Sanlúcar de Barrameda. It is an 1,5 hrs drive but in fact it is just opposite Veta la Palma on the other side of the river Guadalquivir! In the Algaida ponds, 120 godwits were standing in the abandoned saltpans. At 10 a.m. they were almost all asleep but at noon most of them were awake and foraging. Unfortunately was the water too deep and only half of them could be checked for rings after observing them for 1 h; they seemed to be foraging on Chironomids with an intake rate close to 0,9/2 sec. The backroad to Bonanza was too bad for a non-4wd and I went back to go to Sanlúcar de Barrameda via the main road to enter the Bonanza saltpans. These pans are partially still commercially exploited and not accessible but the big pans in the north are a well-known site for waders and gulls in the area and open for the public. Even though it was Saturday, I met just one birder. But it was far from quiet: 25 youngsters from town use the reserve as a motor cross circuit. The birds didn't seem to bother much as long as they did not come too close to the water. At least 550 godwits were present and although, again, a lot of them were asleep or foraging in deep water, after 4 hours, I got 4 ring combinations: they don't come for free this week! I also spent some time to make habitat descriptions and take sediment samples. Guess what: the soil of the pans was full of ..... Chironomids, what else! It struck me that the birds in this area seem to be much fatter than at

the other side of the river in Veta la Palma; almost half (?) of them had an API of 4 which was a rarity in VLP. At 21:45 I was back at Cañada de los Pajaros.



Godwits foraging on Chironomids in Bonanza salt pans; again tricky ringreading!

## 7 October 2018

First fog, later warm and sunny, 33C maximum

The day started with a dense fog until 10:30. I used the morning to have a look in the ricefields between Isla Mayor and Veta la Palma. These fields are huge and seem even bigger with the rice still on. I found one field that had been harvested and afterwards the stubble burned. For the rest it was all standing crops, dense and of excellent quality. After driving around for 1,5 hrs I did not find a single failed field that would have been suitable for godwits. Before the harvest, this area is not interesting for godwits at all.



Everywhere dense rice crops with literally no space for godwits.

In the early afternoon I scanned the by now well known spots in Veta la Palma. As was found earlier, the birds were for more than 99% inactive with poor chances to see rings. So I decided to do a habitat sampling in B6 where a small group was foraging. The penetrability (no soil resistance) and conductivity (salty: 49 mS) were very much like in the old saltpans of Bonanza. And the prey they were after turned out to be similar as well: Chironomids again! Intake rates were also comparable: 0,30 prey items/ s. After that it was about time to scan the flock in C4 for rings. The wind had picked up and had blown the water to the far side of the pond. These few extra cm's of leg visibility made a big difference: with 20 resightings, I almost doubled the number of sightings of the first three days! At sunset, 90 % of the birds were foraging and running into deeper water or had flown away. Not a bad day at all!



On 7 October the wind blew away the water in Veta la Palma: excellent for ringreading!

### **8 October 2018**

Another sunny day, 31C maximum

The day before yesterday, there was a group of 5-600 godwits in the Bonanza saltpans. Since I did only get 5 rings out of this group, I decided to travel again the 2 hrs to Sanlucar de Barrameda. The group was fortunately still there and very actively foraging till 13:00; later more birds started roosting on the edge of the saltpans (in contrast to Veta la Palma where most birds only became active shortly before sunset). Like before, the water was too deep for easy ringreading but after 3 hrs I had 4 combinations (3 new). I travelled back to Veta la Palma hoping for better reading conditions like yesterday but this time the water level was higher again and the birds were not at all cooperative: >95% was sleeping and resting till it became too dark to identify the rings and then started foraging. I still got 7 combinations but I had already seen 5 of them earlier this week. Was I already reaching the saturation point? But the final one was a nice one though: this bird was seen 2 days earlier in the Algaida saltpans, proving the connectivity between the 2 sites on both sides of the river.

### **9 October 2018**

Sunny all day, only 29C ;-)

On this final day, I started by going to Dehesa de Abajo which I did not see this week yet. On the way there it became clear that rice harvest had really started; there were big combines harvesting the rice everywhere. The decision to go to Dehesa de Abajo turned out to be a big surprise: no less than 1200 godwits were present! About half of them was resting in the middle of the lake, too far and too inactive to see any rings. The rest was foraging in the shallow water close to the road on the south side of the lake. However, they were almost swimming with hardly any chance to see legs. Therefore I spent my time taking a full suite of habitat-descriptions, including intake rates (close to 0,23/ sec).

Like earlier this week, they were foraging on Chironomids. The density might have been high because they were even sticking to the tip of the penetrometer. I left the area at 12:30 to have lunch in Sevilla with Jordi Figuerola of the Estacion Biologica of Doñana. After catching up on the latest research gossip, I went back to Doñana where I arrived at 15:30. My original plan was to go back to Veta la Palma but since yesterday evening was not a big success there, I decided to try my luck at Dehesa de Abajo again. That turned out quite well. In the beginning most of the birds were still on the big roost in the center of the lake but when it was getting later, more and more birds started foraging close to the road. Now they also came to the more shallow parts near the water edge which gave some better opportunities to see legs. At 20:15 the light became too low but with 9 ring combinations, I was not unhappy. One bird had been seen earlier this week in Veta la Palma, highlighting the exchange between the areas.

## 10 October 2018

Travelling back to The Netherlands



By the end of the week, the rice harvest was in full swing

Appendix I: habitat descriptions of the areas that were visited this week

Nr	Name area	Date	NB	WL	Photo	Penetrometer mm, lightest spring, thick point	pH	Temperature	Conductivity	Soil samples	Intake rate items swallowed per 2 min
1	Algaida	6-10-2018	36.88687	-6.34246	Y	0, 0, 3	-	-	-	N	53, 62, 38
2	Bonanza	6-10-2018	36.84492	-6.33476	Y	0, 0, 0	"(13,52)"	30.8	65,1 mS	Y	40, 37, 55
3	Veta la Palma B6	7-10-2018	36.91768	-6.2478	Y	0, 0, 0	"(12.69)"	28.9	49.0 mS	Y	38, 37, 34
4	Dehesa de Abajo	9-10-2018	37.19946	-6.17839	Y	0, 0, 0	8.71	23.5	3,41 mS	N	30, 30, 25
	Remarks										
	1 unreliable measures of pH and conductivity										
	2 pH unreliable; together with conductivity/ in salt water does not work										
	3 pH unreliable; together with conductivity/ in salt water does not work										
	4 firm layer of clay after 10 cm of very light mud										