Discovery of Plain Swift breeding in mainland Portugal

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As a breeding bird, Plain Swift *Apus unicolor* has long been considered to be restricted to the Canary Islands and Madeira (Chantler & Driessens 2000). Its estimated world population is 7500-20 000 breeding pairs, of which the majority is found on Madeira (59%; 5000-10 000 pairs), and the remainder in the Canary Islands (41%, 2500-10 000 pairs) (BirdLife International 2015). The species is present year round in both archipelagos although numbers are much lower in winter. In the Canary Islands, those that remain do so around their coastal colonies (Martín & Lorenzo 2001). Most birds however leave the Canary Islands from September onwards and return in December-January (Martín & Lorenzo 2001).

Following my observations of small flocks of unidentified swifts in Porto, Portugal, during the winters of 2019/20 and 2020/21, and later in spring and summer 2021, I review first the recent knowledge of movements and vagrancy of Plain Swift. Second, I discuss my sightings of the mystery swifts in Porto and their identification in more detail.

Movements and vagrancy

Since the winter of 1962/63, observations of dark swifts along the coast between Mauritania and Morocco have been attributed to Plain Swift (eg, Smith 1968, Meininger et al 1990, Vernon 2002). The first records of Plain in Morocco were however as recent as 2009 (Bergier et al 2011), with a first mention of breeding between Imsouane and Tillit, north of Agadir, in 2017 (Aourir et al 2017). Along the coast of north-western Africa, numbers have always been small. Recently, Norton et al (2018) made progress in identifying the main migration routes and wintering grounds of Plain. They fitted 16 birds with geolocators on Tenerife, Canary Islands, in 2013 of which two could be recaptured the following season. It appeared that both had spent the winter in eastern Liberia in equatorial West Africa. At least one of both had passed Western Sahara and Mauritania during its migration, confirming the likelihood of previous observations of Plain in these regions.

Observations in Porto, Portugal

For 10 min on 22 December 2019, we (Paulo Belo and Bárbara Morais) observed and photographed two swifts in Parque da Cidade do Porto (Porto City Park) (https://ebird.org/portugal/checklist/S62540558). They were foraging low above the ground in the vicinity of some trees. The small size and flight mode (with fast changes in direction), as well as the late date for a swift, intrigued us, leading us to consider Plain Swift. A quick reference to Svensson et al (2015), which describe Plain as 'best identified by more agile and erratic flight with clearly quicker wingbeats', seemed to point in this direction. However, since no records of this species existed for continental Portugal, more evidence had to be secured that eliminated both Common Swift *A apus* and Pallid Swift *A pallidus*. We informed local birders, of whom Rui Ferreira and José Luís Sequeira photographed them in January and February 2020. On 2 February 2020, PB and BM saw the birds again and managed to video-record them. They were last seen on 24 February 2020 by RF. All evidence appeared to corroborate the hypothesis of these birds being Plain.

From 7 November 2020, swifts with the same size and flight characteristics were again seen. During winter of 2020/21, at least 16 birds could be counted as they entered their roost underneath a roof. There, data could be collected about behaviour, size could be determined and vocalisations could be recorded. This data led to a firm identification as Plain Swift.

Description and identification of Porto swifts

While identifying the Porto swifts, we excluded Pallid Swift due to structural differences, the dark colour without marked contrasts and lack of a throat patch of the Porto swifts. Therefore, we focus in the discussion on Common Swift and Plain Swift.

Size

On 6 January 2021, when the swifts were seen flying into the roost, measurements could be obtained of three of them by using Aragoj software as described by Aleixo et al (2020). Measurements




128-129 Plain Swift / Madeiragierzwaluw *Apus unicolor*, Parque da Cidade, Porto, Portugal, 6 August 2021 *(Bárbara Morais)* **130-131** Plain Swift / Madeiragierzwaluw *Apus unicolor*, Parque da Cidade, Porto, Portugal, 18 April 2021 *(Bárbara Morais)*. Birds returning to roost at end of day.

obtained corresponded better to the wingspan of Plain Swift than to Common Swift (figure 1). On 18 August 2021, comparable measurements from better photographs of birds at another site in Porto resulted in identical results, again indicating Plain (figure 2).

Plumage

In virtually none of the photographs the Porto swifts showed a defined throat patch, which would be visible in Common Swift (Cramp 1985, Chantler 1993, Snow & Perrins 1998, Chantler & Driessens 2000). There was, however, one exception. One of the birds photographed by Luís Rodrigues on 30 November 2020 (https://ebird.org/checklist/S76911138) showed the well-defined throat patch that could indicate Common. Particularly worn individuals of Common with a dull mottled throat-patch, and Plain with a larger whiter throat-patch can be extremely difficult to tell apart (Chantler 1993). Analysis of the photographs obtained of the Porto swifts was suggestive for Plain but not enough for conclusive identification.

Vocalisations

On 17 January 2021, we sound-recorded the swifts for the first time during their arrival at the roosting site at the end of the day. These vocalisations can be heard on the eBird checklist (https://ebird.org/portugal/checklist/S79471674). The recorded calls strongly indicate Plain Swift. Comparison of the sonagrams of the Porto swifts (figure 3) with that of Plain on Madeira recorded by Magnus Robb (figure 4) shows the same structure, duration and frequency of the calls.

Flight behaviour

In the field, the birds looked similar to Common

132 Plain Swift / Madeiragierzwaluw *Apus unicolor*, Parque da Cidade, Porto, Portugal, 25 June 2021 *(Bárbara Morais)*. Transporting food for young. **133** Plain Swift / Madeiragierzwaluw *Apus unicolor*, Parque da Cidade, Porto, Portugal, 25 May 2021 *(Bárbara Morais)* **134-135** Plain Swift / Madeiragierzwaluw *Apus unicolor*, Rua de Sá da Bandeira, Porto, Portugal, 11 September 2021 *(Bárbara Morais)*

FIGURE 1 Measurements of wingspan from three photographs of Plain Swift *Apus unicolor* with program Aragoj, with results: 36.25 cm, 36.86 cm and 35.93 cm.

Swift but they had a different flight behaviour, which can be described as more erratic and with a higher wing beat frequency. To try to objectively quantify this field impression, a frame by frame analysis of videos of the Porto swifts in foraging flight was performed and carefully compared with those of Common. Only videos of the two species obtained under similar flight conditions, in foraging flight, without wind and at low altitude (20-40 m), were selected. Videos were recorded with a 4K definition, 60 fps, and shutter speed of 1/1000, which allowed a rigorous data analysis. An edited

FIGURE 2 Measurements of wingspan from one photograph of Plain Swift *Apus unicolor* with program Aragoj, with result: 37.95 cm. This photograph, with better quality than figure 1, portrays same method; measurements and aspects such as angles, distances and other references were used for calculation. Photograph from 18 August 2021, Rua de Sá da Bandeira, Porto, Portugal *(Bárbara Morais)*

version of the video can be seen on https://youtu.be/LWj0bDBDgEg. Compared with Common, the Porto swifts proportionally spent less time gliding and more time with active wing beats and, in active wing beat, a greater frequency was noted in the Porto swifts. The Porto birds flew 50 times with a frequency higher than nine times per second and six times with a frequency lower than nine times per second, while Common flew five times with a frequency higher than nine times per second and 31 times with a frequency lower than nine times per second.

Roosting behaviour

While monitoring the Porto swifts, we soon discovered that they returned daily to roost at dusk (plate 130-131). In all follow-ups (eight times during January and February 2021), birds were always seen entering the roof of a house. These observations were made during days of dry and calm weather but also during days of cold temperatures, rain, hailstorms or strong wind. On such days, a smaller number of birds was observed entering the roost. Roosting behaviour between Plain Swift and Common Swift seems to differ. Plain appears to roost at their breeding sites during the year (Cramp 1985, Snow & Perrins 1998). On the other hand, roost sites of Common have never been found during the non-breeding season in Africa (Hedenström et al 2016). Indeed, data from loggers with an accelerometer showed that Common remained airborne for more than 99% of the time during their 10-month non-breeding period (Hedenström et al 2016). Some individuals would never settle, although most individuals occasionally showed flight inactivity.

The fact that during their non-breeding season the Porto swifts were regularly using a roost site instead of remaining airborne may therefore indicate that these concern Plain Swift rather than Common Swift.

Discussion

That Plain Swifts occur in winter in continental Portugal was already highly unexpected. It was gratifying that first impressions of differences in flight behaviour and size were confirmed by the analysis of their sound recordings. The similarity of the vocalisations between the swifts from Porto and the Plain Swifts on Madeira secures the identification.

Monitoring in 2021 of the birds throughout the year revealed their continued presence at the same site and the arrival of more birds in April. The number of Plain Swifts increased from 16 to c 30. The larger number of birds in the breeding season corresponds with the arrival of birds wintering elsewhere. In April, breeding was confirmed: swifts were observed to transport feathers to their nests, and in the following months, also to transport food to their young several times (plate 132). It was estimated that 10-14 occupied nests were present.

Historical records of other observers

In the light of our observations, the sightings in the 1990s of unidentified swifts in the south-west of

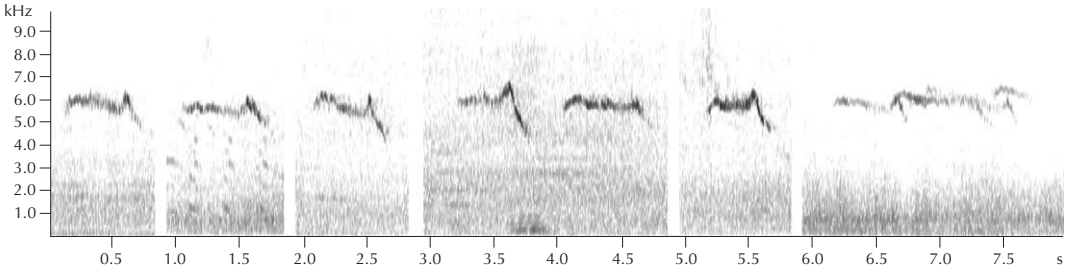

FIGURE 3 Plain Swift / Madeiragierzwaluw *Apus unicolor*, Parque da Cidade, Porto, Portugal, 17 January 2021 *(Paulo J S Belo)*. Sonagram of call.

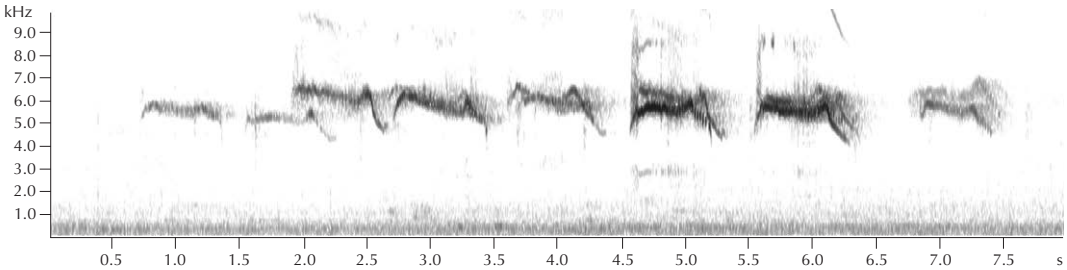

FIGURE 4 Plain Swift / Madeiragierzwaluw *Apus unicolor*, Ponta de São Jorge, Madeira, 23 October 2006 *(Magnus S Robb/The Sound Approach)*. Sonagram of call.

Portugal by Frank Walker should be mentioned (Carlos Noivo pers comm). In autumn, Walker registered the passage of some '*Apus*' uniformly dark and smaller, 'more slim, and frenetic...', moving in opposition to the migratory flow, late in the season of every year. This was in contrast to other swifts that typically fly south in the area at that time of year.

Since the 1980s, out-of-season swifts were observed in various parts of Portugal, from November to February, often identified as Common Swift. Now that Plain Swift is known to occur in continental Portugal, some of these records may have in fact referred to Plain too, and Plain may have been present in continental Portugal for several decades.

Climate comparability between Porto and Madeira

The highest densities of Plain Swift occur in the northern part of its range, on Madeira, which is closest to the Iberian Peninsula (Barone & Lorenzo 2007, BirdLife International 2015). Fagundes (2018) mentions that in the winter season, there is a significant abundance of Plain in the northern part of Madeira. In the Canary Islands, it is more common on the western islands but scarce in Lanzarote and Fuerteventura, further east (Barone & Lorenzo 2007). According to the climate classification system by Köppen-Geiger (Chazarra et al 2011, IPMA 2021), the Porto region has the same climate as much of Madeira as well as the western islands of the Canary Islands. It is helpful to understand its appearance in mainland Portugal because of the comparability of the climate in Porto with the climate where it predominantly occurs in its known distribution area.

Future monitoring

In August 2021, we found a new, smaller colony, with two pairs feeding their young, in the historic centre of Porto, 6 km from the first colony we found (https://ebird.org/checklist/S94539748). Recently, in November 2021, based on strange observations of out-of-season swifts, Magnus Robb identified a new group of eight Plain Swifts at Estádio Universitário, Lisboa. This location is 270 km south from the colonies found in Porto (https://ebird.org/checklist/S97593749).

It is important to continue documenting further records to better understand this species' presence in continental Portugal. The regularity of records and the behaviour of the birds deserve further attention that may lead to observations of Plain Swift at other sites and eventually new colonies.

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Samenvatting
Ontdekking van Madeiragierzwaluw broedend op vasteland van Portugal Op 22 december 2019 zagen Paulo Belo en Bárbara Morais twee gierzwaluwen *Apus* in Parque da Cidade, Porto, Portugal, die zij niet direct konden determineren. Op basis van grootte, vlieggedrag en kleedkenmerken dachten zij aan Madeiragierzwaluw *A unicolor*, een soort die niet eerder was vastgesteld op het vasteland van Europa; het is een broedvogel van Madeira en de Canarische Eilanden waarvan de belangrijkste overwinteringsgronden vermoedelijk in westelijk Afrika liggen. Tot 24 februari 2020 volgden er diverse waarnemingen van deze vogels op dezelfde locatie. Ze werden gefotografeerd en op video vastgelegd maar de determinatie kwam niet rond. Vanaf 7 november 2020 werden opnieuw tot ten minste 16 exemplaren gezien en gefotografeerd. Door de vogels te volgen werd vastgesteld dat zij sliepen onder een dak van een huis. Op 17 januari 2021 kon hun geluid worden vastgelegd. Deze geluidsopnames toonden een treffende gelijkenis met geluidsopnames van deze soort gemaakt op Madeira en bevestigden de determinatie als Madeiragierzwaluw. Metingen van de grootte van de vogels leidden tot de conclusie dat de vogels te klein waren voor Gierzwaluw *A apus* maar juist overeenkwamen met Madeiragierzwaluw. Ook vlieggedrag en kleedkenmerken, met name de donkere keel, wezen op Madeiragierzwaluw. Ten slotte wees het regelmatige rusten onder een dak op Madeiragierzwaluw omdat van Gierzwaluwen bekend is dat ze gedurende de winter bijna alleen in vlucht slapen. Bij het volgen van deze vogels in voorjaar en zomer van 2021 bleek dat er sprake is van een gevestigde kolonie, met 10-14 broedparen. Dit is de eerste bekende kolonie van Madeiragierzwaluw in continentaal Europa. Waarnemingen van ongedetermineerde gierzwaluwen in najaar en winter in Portugal in de jaren 1980 en 1990 geven aan dat de soort mogelijk al langer op het vasteland van Portugal voorkomt. In augustus 2021 werd een tweede, kleine kolonie van twee broedparen gevonden in het centrum van Porto, op 6 km van de eerste kolonie. In november 2021 werd een groep van acht Madeiragierzwaluwen gevonden bij Estádio Universitário, Lissabon, op 270 km van de kolonies in Porto.

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