Zino's Petrel (*Pterodroma madeira*) off North Carolina: First for North America

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Abstract

This paper analyzes three photographs of a gadfly petrel (*Pterodroma* sp.) taken 16 September 1995 off Hatteras, North Carolina, and concludes, consonant with other recent publications, that the bird is identifiable as Zino's Petrel (*P. madeira*). The petrel was recorded at the time of the sighting as a Fea's Petrel (*P. feae* sensu lato), assumed because of its larger population size and emerging pattern of spring occurrence to be far more likely to occur in the western North Atlantic than Zino's, then a little-known species whose field identification had not been elucidated. Since 2008, however, Zino's Petrels have been observed at sea regularly off the species' only breeding island, Madeira, and results of studies published since 2010 provide reliable criteria for its at-sea identification. There are no previous or subsequent records of Zino's Petrel from North America.

Figure 1. When first spotted by Patteson, the Zino's Petrel was in flight, approaching the boat's bow on the starboard side. The bird's small size, small bill, and underwing pattern—mostly pale, with a thick black carpal-ulnar bar—immediately suggested Bermuda Petrel, which looks very similar in the ventral aspect. It was clear that the bird was molting the flight feathers (this image shows the inner primaries have been dropped, most visible in the right wing), a condition not observed in the Fea's Petrels documented 1991-1995 off Hatteras nor in the Fea's Petrel photographed off Virginia one week before the Zino's was photographed. This photograph shows very well this bird's overall proportions: the petite head and bill, small, rather dumpy-looking body, and compact wings compared to Fea's Petrel. *Photograph by Brian Patteson.*

Field encounter

On 16 September 1995, Patteson organized and conducted a pelagic birding excursion leaving Hatteras Inlet, North Carolina, aboard the *Miss Hatteras*. The guides aboard were Grayson Pearce, Hass, and Brinkley. The highlight of the day was a small gadfly petrel (*Pterodroma* sp.) spotted by Patteson at 14:07 EDT. The bird's location was recorded as 34° 37.15' N, 75° 33.91' W (about 63 kilometers south-southeast of Hatteras Inlet), where water depth was about 500 meters; the sea surface temperature was recorded as 27° C. Weather conditions were moderate to choppy, with winds from the south-southeast at 15-20 knots (7.7-10.3 m/s); wind/sea conditions were recorded as Beaufort Force 3 at midday. Air temperature was about 25.6° C, and visibility in the afternoon was good.

The bird approached at the starboard bow, showing the ventral aspect, and Patteson first suspected a Bermuda Petrel (*P. cahow*), owing to the small bill and underwing pattern. However, on seeing the dorsal surface, with entirely pale tail, he identified the bird as a Fea's Petrel (*P. feae*) and alerted everyone on board. The bird circled the boat once and then departed. It was observed at relatively close range (under 100 m) by nearly all on board, including Todd Pusser, Jeff Pippen, Keith Camburn, and Heathy Walker, for roughly a minute, and was photographed by Patteson (Figures 1, 2, 3).

We noted that the underwing pattern, with whitish midwing panel of greater primary and secondary coverts, was unlike that of Fea's Petrels observed annually in spring since 1992, but we assumed that this pattern was a result of the bird's condition (primary molt was obvious in the field) or to variation in the species. We also considered it possible that we had encountered a subspecies unfamiliar to us: at that time, we had no information about whether plumages differed between the two subspecies of Fea's Petrel (*deserta* and nominate *feae*). Recent authors have treated these allopatric taxa as full species, Cape Verde Petrel, *P. feae*, nesting only in the Cape Verde Islands, and Desertas Petrel, *P. deserta*, nesting at Bugio in the Desertas Islands (see, e.g., Robb et al. 2008, Jesus et al. 2009, Shirihai et al. 2010). We did not consider Zino's Petrel (*P. madeira*), first proposed as a full species in the previous decade (Bourne 1983), to be a likely candidate, owing to its small population; moreover, its at-sea identification had not been studied at that time.

Context

At the time of our observation, the only other western North Atlantic reports of Fea's Petrel in autumn were of one near Norfolk Canyon off the Virginia coast found by Patteson, Pearce, Brinkley, and party a week earlier, on 9 September 1995 (Brinkley et al. 2003; photograph by Patteson in the Virginia Avian Records Committee Archive), and one seen by J. Christopher Haney and party 145 kilometers east of St. Catherine's Island, Georgia 9 November 1984 (Haney et al. 1994). Fea's Petrel had been detected regularly in North Carolina waters only since 1992, chiefly in spring, but probably valid sight records were made earlier by David S. Lee off North Carolina 3 June 1981 (Lee 1984) and by Pearce and Brinkley on 24 May 1981 (Patteson and Brinkley 2004).

Despite multiple encounters in the early 1990s, our familiarity with this complex of petrels was still low in 1995, and the literature on this group was limited and contained sometimes conflicting, controversial, or unsupported claims (see summaries in Harrop 2004, Flood and Fisher 2013). In the ensuing 18 years, however, Patteson and company have studied a further 95 Fea's Petrels off the coast of North Carolina (Brinkley and Patteson 1998, Patteson and Brinkley 2004, Howell and Patteson 2008, Patteson and Sutherland 2009, Patteson and Sutherland 2013; records published in *North American Birds* and *Chat*). Up to four Fea's Petrels per

day have been recorded on these trips.

Away from North Carolina, there are at least nine other documented records of Fea's Petrel in North America, mostly of single birds observed at sea. In addition to the records above there are records from: waters over The Gully, a submarine canyon, ca. 71 kilometers east-southeast of Sable Island, Nova Scotia 7 July 1997 (Hooker and Baird 1997); 170 kilometers south of the Burin Peninsula, Newfoundland 13 August 2000 (Mactavish 2000); 353 kilometers east of Rudee Inlet, Virginia Beach, Virginia 19 June 2011 (C. Vogel, in litt.); ca. 177 kilometers east of Ossabaw Sound, Georgia 22 June 2012; and in the same vicinity as the last record, Nathan Dias and party recorded 2 Fea's Petrels 10 June 2013 (N. W. Dias, in ms.). Other observations of Fea's Petrels made from research vessels have not yet been made public. Probable Fea's Petrels (some identified as Fea's/Zino's Petrels) have been recorded ca. 101 kilometers southeast of entrance buoy to the Charleston, South Carolina harbor 18 May 1988 (D. Forsythe, eBird); south of the Burin Peninsula 9 July 2007 (K. Eckert, B. Mulrooney; Mactavish 2008); over the Hudson Canyon, 241 kilometers due east of Stone Harbor, New Jersey 14 June 2011 (C. Vogel, in litt.); and ca. 14 kilometers southeast of Montauk, New York 19 June 2012 (Paxton et al. 2013). One Fea's Petrel wrecked inland at a reservoir in Mecklenburg County, Virginia during the passage of Hurricane *Fran* 6 September 1996, but the bird was observed only in flight, and no corpse was recovered (Brinkley et al. 2001).

Figure 2. As the Zino's Petrel banked to show its dorsal aspect, particularly the pearly gray tail and uppertail coverts, it was clear that it was not a Bermuda Petrel, and so it was quickly announced to the boat as a Fea's Petrel. *Photograph by Brian Patteson.*

Re-evaluation of the photographs

In 2006, when researching wing molt in Fea's Petrel (see Howell and Patteson 2007), Patteson and Steve N. G. Howell noted that the September 1995 North Carolina petrel conformed closely to then-evolving but as yet unpublished criteria for Zino's Petrel, including its state of primary molt. In the mean time, Brinkley had visited Madeira in April 2003 and April 2004, in an effort to locate Zino's Petrel at sea, finally succeeding on 27 April 2004, when his party of six aboard the *Torpedo III* out of Funchal studied a Zino's at close range about 8-9 kilometers south of the airport, an area not far south of where Jon Hornbuckle (in litt. to Brinkley) had reported seeing a good candidate for this species from a seawatch in April 1990. This represented the first at-sea record of the species, and notes were published electronically (Brinkley 2004), which spurred renewed interest in looking for the species offshore there, particularly in the month of April, before Desertas Petrels return to breed.

With Francis Zino and others, Hadoram Shirihai investigated areas off the southeastern coast of Madeira beginning in April 2008 (Shirihai 2008). Using large blocks of frozen chum, they found Zino's Petrels relatively easy to attract and photograph closely. The results of their extensive field studies of Zino's Petrels, as well as Cape Verde and Desertas Petrels, were published two years later (Shirihai et al. 2010). Since that time, more and more people have been taking trips specifically to observe gadfly petrels and other seabirds around Madeira and Bugio. Photographs of Zino's Petrels at sea have since become relatively commonplace online, and critical familiarity with the species and information on its identification have both spread. Shirihai has studied the photographs of the September 1995 petrel and indicates (in litt. to Patteson and Howell) that it represents an "easy and straightforward" identification as Zino's Petrel.

In conducting research for *Petrels, Albatrosses, and Storm-Petrels of North America: A Photographic Guide*, Howell travelled to Madeira in May 2010, observing and photographing Zino's Petrels at sea. After this field experience, and correspondence with authorities on eastern North Atlantic gadfly petrels, he was satisfied that the September 1995 North Carolina petrel was identifiable as a Zino's Petrel, and he was the first to publish it as such (Howell 2012). Bob Flood, who has also studied and filmed Fea's and Zino's Petrels at sea in recent years, has published an extensive concurring analysis of the 1995 North Carolina petrel as a Zino's (Flood and Fisher 2013).

Figure 3. This photograph of the Zino's Petrel was taken on its closest pass by the *Miss Hatteras*. Both sets of greater coverts in the underwing—the secondary coverts and the primary coverts—are mostly white, both scoring >3.5 on Shirihai's (2010) scale and thus well outside the range of Fea's Petrel (both subspecies). In fact, birds with this much white in these coverts appear to be in the minority (ca. 12%) of Zino's Petrels. This image nicely depicts the bird's compact, delicate proportions in bill, head, body, and wing, which recall Bermuda Petrel. *Photograph by Brian Patteson.*

Although our encounter with the bird was relatively brief, and field notes minimal, the photographs support identification as Zino's Petrel for the following reasons:

- As indicated earlier by Howell and Patteson (2007), the bird's missing two innermost primaries would indicate the commencement of the molt of primaries; among members of the *feae–deserta–madeira* complex, this timing fits the molt cycle of Zino's Petrel, which for adults begins at the end of the breeding cycle, in late September, with subadults beginning primary (second prebasic, third prebasic, etc.) molt a bit earlier. Adult Cape Verde Petrels would begin primary molt in May, and adult Desertas Petrels begin in December, with subadult Desertas Petrels perhaps commencing primary molt as early as October (Howell 2012, Flood and Fisher 2013).
- The bird's underwing pattern fits only Zino's Petrel, with the greater coverts of both secondaries and primaries showing extensive white (Shirihai et al. 2010). Flood and Fisher (2013) note that the North Carolina petrel scores 3.5-4.0 in the extent of white plumage in these coverts, which places the bird near the extreme for Zino's: Shirihai et al. (2010) note that of 60 individual Zino's (representing perhaps 20% of the population), only 12% show this much white in these coverts. More importantly, this pattern is unrecorded in Cape Verde Petrel or Desertas Petrel, which score mostly in the

0.0-2.0 range, based on studies of 68 Cape Verde Petrels and 129 Desertas Petrels, also relatively robust sample sizes (Shirihai et al. 2010, Flood and Fisher 2013). Most Zino's Petrels exhibit less white in these coverts than did the North Carolina petrel, and some slightly more, but the bird is well out of the area of overlap between Zino's and the larger congeners in the *feae–deserta–madeira* complex (see Shirihai 2010, Graphs E and F, p. 251). Although it is possible to photograph a Desertas Petrel or Cape Verde Petrel at an angle such that the lighting briefly illuminates greater coverts in the underwing—as is true of essentially all Procellariids' plumages, which reflect light in curious ways—a pattern of truly white coverts like the 1995 North Carolina individual is unknown in either Desertas or Cape Verde Petrel.

- The bird's bill appears both small and shallow; although no measurements can be adduced from the photographs, the dovelike appearance of the head/bill fits Zino's Petrels observed by Howell, Flood, Brinkley, and others.
- In addition to the small head and bill, the bird is lightly built in the body and compact through the wings. In Cape Verde Petrel and Desertas Petrel, the impression is of a sturdier body and longer (and sometimes more sharply pointed) wings. Although impressions of proportions are subjective, observers with extensive comparative experience are able to distinguish Zino's readily from the larger species, just as experienced hawkwatchers identify hawks in the genus *Accipiter*, for instance. The visible differences in bulk, bill dimensions, wing length, and wing shape between these petrel species are well supported by all morphometrics (Zino et al. 2008; see also images and videos included in Flood and Fisher 2013).

Discussion

The distribution of Atlantic gadfly petrels at sea has been little known for most species, although Lotek geolocational dataloggers have been attached to breeding adults of several species, and researchers have begun mapping typical ranges of adults, with many surprising results. The movements of nonadults, however, are still unknown, and such birds might be expected to wander beyond the range limits attributed to breeding adults. In recent years, several Desertas Petrels and Zino's Petrels have been outfitted with dataloggers, and a Desertas Petrel so outfitted was found to have wintered off the southeastern United States (Ramírez et al. 2013). Thus far, no breeding adult Zino's Petrel has been tracked into North American waters (Zino et al. 2011), but ongoing studies of this type may confirm that the species visits the western North Atlantic. The discovery of new breeding cliffs in 2005, and the species' increasing population, provides some hope that this species will again be documented in North American waters, perhaps most likely in fall.

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