

# Hybridization between Madagascan Red Fody *Foudia madagascariensis* and Seychelles Fody *Foudia sechellarum* on Aride Island, Seychelles

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## Summary

On islands where populations of the endemic Seychelles Fody *Foudia sechellarum* and the introduced Madagascan Red Fody *F. madagascariensis* coexist, previous studies have concluded that the two species are reproductively isolated. On Aride Island, Seychelles, one female *F. sechellarum* became established within a population of *F. madagascariensis* and produced at least two hybrid offspring. This paper describes the first known case of hybridization between the two species and highlights the possible biological consequences.

## Introduction

The Ploceine genus *Foudia* is endemic to the western Indian Ocean and is represented by five extant species. Within the granitic islands of the Seychelles, two species of *Foudia* are present. The Madagascan Red Fody *F. madagascariensis* was introduced from Madagascar to the granitic Seychelles last century and is now one of the most abundant and widespread passerine bird species in the islands (Penny 1974). The endemic Seychelles Fody *F. sechellarum* is confined as a breeding species to the islands of Frégate, Cousin and Cousine in the granitic group of islands. In 1965, the Bristol Seychelles Expedition introduced five birds to D'Arros in the Amirantes (Gaymer *et al.* 1969) but this population was thought to have died out until an estimated 100 pairs were discovered on the island in May 1995 (A. Skerrett pers. comm. ). Historically, the Seychelles Fody was also found on Praslin, La Digue, Marianne and Aride (Collar and Stuart 1985). The species's extinction on these islands has been attributed to a combination of deforestation and the introduction of rats *Rattus* sp., mice *Mus musculus* and cats *Felis domesticus* (Crook 1961) although Diamond and Feare (1980) considered habitat change to have had a minor effect as Frégate Island holds four endemic bird species, is predator free and yet the vegetation is 95% exotic. On account of its limited distribution and evident susceptibility it is treated as "Vulnerable" by Collar *et al.* (1994).

Competition from the introduced *F. madagascariensis* has been thought responsible for the localized distribution of *F. sechellarum* (Vesey-Fitzgerald 1940, Moreau 1960), however no such evidence has been found (Crook 1961). On

Frégate, feeding observations revealed that *F. sechellarum* was predominantly insectivorous, with insects forming 72% of the diet, seeds 25% and rotting fruit 3%. *F. madagascariensis* was predominantly granivorous with 82% of feeding observations being on seed and 16% on insects (Crook 1961). On Cousin, Bathe and Bathe (1982) also found *F. sechellarum* to be predominantly insectivorous with 51% of the diet formed by insects, 38% by fruit and 11% by nectar.

Aride Island is the northernmost of the granitic Seychelles islands and is owned and managed as a nature reserve by the Royal Society for Nature Conservation (RSNC). Historically, Aride is thought to have had a resident breeding population of *F. sechellarum* (Diamond and Feare 1980) but it is uncertain when this population became extinct, although it must have been prior to 1940 when the species could only be found on Frégate, Cousin and Cousine (Vesey-Fitzgerald 1940). Aride does, however, have a resident breeding population of the introduced *F. madagascariensis*. It is not known when *F. madagascariensis* colonized Aride, although the species did not become established on Cousin until after 1940, or Cousine until 1958 despite both islands being less than 5 km from Praslin which was colonized in 1908 (Penny 1974). It is thus possible that populations of the two *Foudia* species have never coexisted on Aride. In August 1988, an immature *F. sechellarum* was discovered on Aride (Bullock 1989). It was assumed that strong southerly winds had blown the bird over from either Cousin or Cousine which lie approximately 20 km to the south of Aride. This bird was trapped and ringed in August 1993 and seen regularly until May 1994. In July 1994, another female *F. sechellarum* was found. This bird was caught and ringed in September 1994.

Hybridization has been recorded within the genus *Foudia*. In Madagascar, *F. madagascariensis* hybridizes with the Red Forest Fody *F. eminentissima* in areas where forest clearance has allowed *F. madagascariensis* to colonize areas previously only inhabited by the forest dwelling *F. eminentissima* (Dee 1986). In Mauritius, hybrids between *F. rubra* and *F. madagascariensis* have been reported and such a specimen is held at the British Museum (Moreau 1960). However Safford (1991) found no evidence of hybridization between the two species. In Seychelles, however, on the three islands where populations of both *Foudia* species coexist, comparative studies have concluded that both species coexist in complete reproductive isolation with no evidence of hybridization (e. g. Crook 1961). This paper describes the first example of hybridization between *F. madagascariensis* and *F. sechellarum*.

### Hybridization on Aride

The presence of hybrid birds was first suspected in 1990 when one possible hybrid was noted (Castle and Mileto 1991). In December 1992, a young hybrid bird, presumably from a recent nesting attempt was seen begging from and being fed by a female *F. sechellarum*. Two subsequent nesting attempts by the female *F. sechellarum* were recorded. The first nest was constructed in January 1993 but was abandoned soon after completion with no signs of incubation noted. The second nest was built in July–August 1993 and the female was seen to be incubating. On 16 September 1993, the nest was examined and was found to contain two infertile eggs. The female was the only bird seen in close

proximity to the nest and it is not known whether the bird was paired to a male *F. madagascariensis*.

In early 1993, a hybrid took up residence near the island's settlement and was seen regularly. It seemed to form a loose association with some of the resident *F. madagascariensis* although it was often seen chasing them, perhaps suggesting territorial behaviour. A second, different hybrid was later seen in the same area. On 9 September 1994, a hybrid was seen in the hill woodland. All previous sightings of hybrid birds, and indeed of *F. sechellarum*, had been on the coastal plateau. No signs of breeding behaviour by the hybrids were noted.

Visually, the hybrids resembled a drab female *F. madagascariensis*. The breast and flanks were dull brown, typical of *F. sechellarum*, but the back and mantle feathers had the prominent buff fringes giving the streaked back of *F. madagascariensis*. The hybrids had the facial markings of *F. madagascariensis*, including a prominent white supercilium which *F. sechellarum* lacks. Structurally, the hybrids were more akin to *F. sechellarum*. *F. sechellarum* is a dumpy-looking species with a comparatively short tail and a long stout bill. *F. madagascariensis* is much sleeker and longer-tailed with a shorter, almost conical bill. Figure 1 illustrates the structural and plumage differences between *F. madagascariensis*, *F. sechellarum* and the hybrid. Behaviourally the hybrids were similar to *F. sechellarum*. The hybrids displayed the characteristic wing-flicking behaviour of *F. sechellarum* and did not associate with the more gregarious *F. madagascariensis* or with other hybrids. The only vocalization heard was a sharp "tic-tic" not dissimilar to the European Robin *Erithacus rubecula*. *F. sechellarum* makes a similar call, a hollow sounding "tok-tok" whereas *F. madagascariensis* makes a variety of calls, the most common being a high-pitched trilling.

On 15 August 1993, one of the hybrids was mist-netted, photographed, measured and ringed. Biometrics of the hybrid, *F. madagascariensis* and *F. sechellarum* are presented in Table 1. The hybrid was heavier, had a shorter wing-length and a longer tarsus than both *F. madagascariensis* and *F. sechellarum*. The most striking difference was in bill shape. *F. madagascariensis* has a short, stubby bill whereas *F. sechellarum* has a longer, stouter bill to suit its largely insectivorous diet. The length of the hybrid's bill was intermediate between *F. madagascariensis* and *F. sechellarum*, but was narrower.

## Discussion

The phenomenon of an introduced species interbreeding with an indigenous one can be cause for concern. In Spain, the White-headed Duck *Oxyura leucocophela* is in danger through interbreeding with the introduced Ruddy Duck *O. jamaicensis*, more so because the resultant hybrids are fertile (del Hoyo *et al.* 1992, Green and Anstey 1993). In the granitic islands of the Seychelles, the endemic subspecies of Malagasy Turtle Dove *Streptopelia picturata rostrata* is extinct through interbreeding with the introduced nominate form *S. p. picturata* (Penny 1974).

As hybridization between *F. sechellarum* and *F. madagascariensis* has never been noted on islands where breeding populations of both species coexist, it could be argued that the events on Aride are largely a result of a single female *F.*

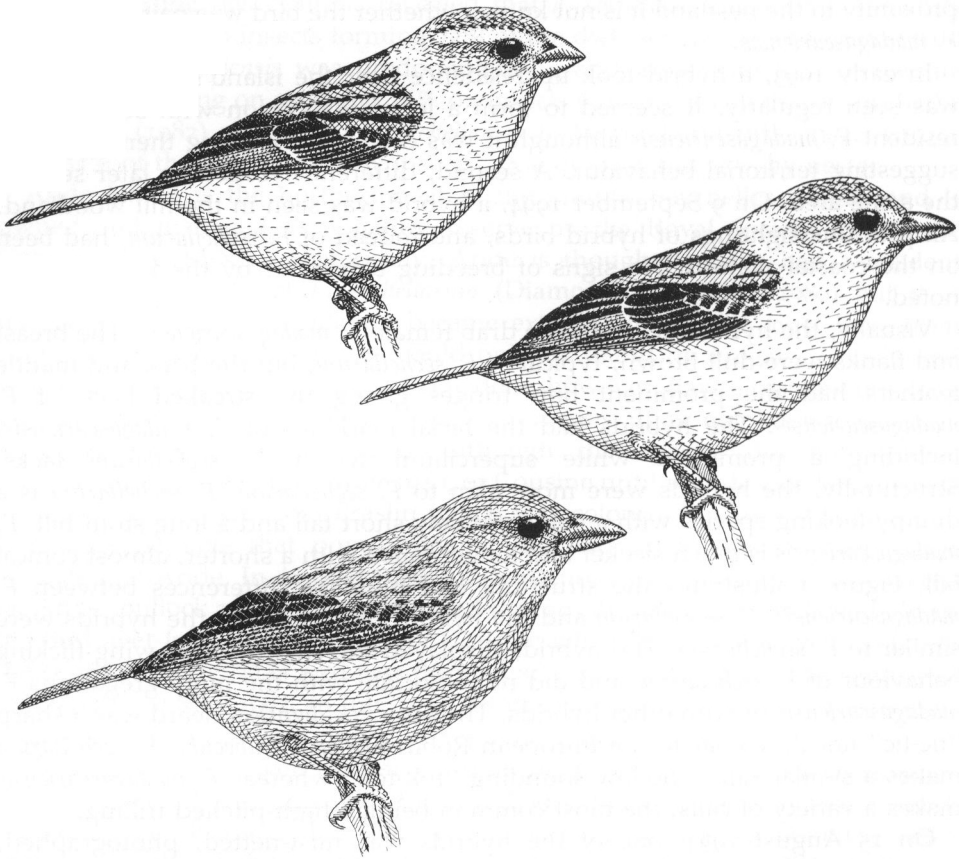


Figure 1. Scale illustrations of female *F. madagascariensis* (top), hybrid (middle) and *F. sechellarum* (bottom).

Table 1. Biometrics of *F. madagascariensis*, *F. sechellarum* and hybrid.

	<i>F. madagascariensis</i>	<i>F. sechellarum</i>	Hybrid
Weight (g)	15.2 (13.5–16.5)	16.9 (15.9–19.1)	19.9
Wing length (mm)	68.2 (63.5–69.0)	70.1 (64.0–74.2)	67.5
Tail length (mm)	45.4 (41.1–48.4)	45.5 (42.3–48.0)	46.0
Tarsus length (mm)	17.5 (16.3–18.9)	17.9 (16.5–20.0)	20.1
Bill length (mm)	13.0 (9.2–13.8)	16.3 (12.3–18.3)	15.1
Bill depth (mm)	10.4 (9.7–11.1)	10.9 (9.2–14.0)	7.9

Numbers in parentheses indicate minimum and maximum ranges. *F. madagascariensis* and *F. sechellarum* biometrics from Crook (1961).

*sechellarum* within an established population of *F. madagascariensis*. As the dynamics of a natural recolonization process can be very slow indeed, it is likely that this situation on Aride will persist for many years.

In the two breeding attempts observed between November 1992 and November 1994, one resulted in no eggs being laid and the other in the laying of infertile eggs. However, hybridization can occur between the two species

since two and possibly three hybrids were seen. Island forms are typically long-lived and it is possible that more hybrids may be produced in the future. The problem is compounded as it is unknown whether the hybrids themselves are fertile. If they are, this could endanger any future for *F. sechellarum* on Aride, and on neighbouring islands.

An essential first step should be to capture and destroy the hybrid birds. The removal of the female *F. sechellarum* would only be a short term solution as the arrival of further female birds cannot be ruled out. The most sensible long-term and lasting solution would be to translocate the basis of a viable, self-sustaining population of *F. sechellarum* to Aride, as recommended by Collar and Stuart (1985).

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