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IS THE PIN-TAILED WHYDAH *Vidua macroura* A BROOD-PARASITE OF THE BLACK-FACED GRASSQUIT *Tiaris bicolor* ON PUERTO RICO?

by Robin Restall

Summary

Several species of African weaverbirds (Ploceidae) and waxbills (Estrildidae) have become established on the Caribbean island of Puerto Rico. One of these, the Pin-tailed Whydah *Vidua macroura*, is a brood parasite whose African host species are common waxbills of the genus *Estrilda*. It is also known to occasionally use other estrildid finches and is reported as using species from other families as hosts (see e.g. Friedmann, 1960). A formal agricultural report that listed the exotic species established on Puerto Rico, included a list of species used as hosts by the Pin-tailed Whydah (Camacho Rodriguez et al. 1999). The list included the native Black-faced Grassquit *Tiaris bicolor*. This appeared to confirm anecdotal but unconfirmed reports from local birders. Despite the apparent similarities between the Neotropical grassquits and the estrildid finches of the Old World tropics, it is not logical and ought not to be possible for the Pin-tailed Whydah to successfully brood-parasitize the grassquits. Jürgen Nicolai (1964) in a seminal paper on the subject stated baldly that it is, "impossible for (a viduine) to parasitize other bird groups." The present paper deals with the avicultural techniques and resources used by the author to test the hypothesis of the Pin-tailed Whydah using a Neotropical non-estrildid species as host, together with the conclusions.

Introduction

The Pin-tailed Whydah is the commonest and best known of the parasitic weaverbirds. It occurs across most of Africa south of the Sahara in grassland and almost any other habitat where grasses are growing. It is about the size of a grassquit or *Sporophila* seedeater, with the adult male in nuptial plumage being easily recognised by his black-and-white plumage, sealing wax-red bill and long trailing rectrices (up to 20cm (7¾in) in length). The female

and male in non-breeding plumage are buffy-brownish with black lines along the head and blackish striations on the upperparts, but the juvenile's plumage is not striated, and is rather similar to that of an estrildid finch. During the breeding season in Africa the Pin-tailed Whydah is usually found in small groups that consist of a dominant, constantly singing and displaying adult male in full nuptial plumage, together with several birds that may be juveniles, immatures, females, and males is delayed plumage maturation. Outside the breeding season, flocks are larger and may contain several adult males in various stages of plumage development. On Puerto Rico it seems that the population level is too small for groups of significant size to assemble - undoubtably a reflection of the population densities of the waxbills. The Pin-tailed Whydah is a tame bird that shows little fear or apprehension in the vicinity of man and may even be seen foraging on garden lawns (Rafy Rodriguez pers. comm; pers. obs.).

The female Pin-tailed Whydah lays a single white egg in the host species' nest, and this can be identified by its slightly larger size. The host estrildid usually raises the nestling alongside its own young without any problems. Once fledged and weaned to independence, the young whydah leaves the company of the estrildids to join the company of the whydahs. The female whydah apparently ovulates upon watching the selected host species nest building. She is stimulated by the song and display of the male estrildid (Friedmann, 1960; Restall, 1975), but mates with the dominant male of a whydah group in response to that bird's song and display.

The Pin-tailed Whydah's commonest host species across its range in Africa is the Common Waxbill *Estrilda astrild.* Unlike other parasitic whydahs, it also often lays in the nests of other *Estrild* waxbills. It appears that other species are chosen mostly in response a scarcity or absence of the Common Waxbill (MacDonald, 1980; Mines, 1989; Payne 2005; Schuetz, 2005). Those whose nestlings have palate markings most similar to those of the Common Waxbill nestling are the preferred substitutes. The Black-rumped Waxbill *E. troglodytes*, Orange-cheeked Waxbill *E. melpoda*, Crimson-rumped Waxbill *E. rhodopyga*, Fawn-breasted Waxbill *E. paludicola*, Swee Waxbill *E. melanotis*, Red-billed Firefinch *Lagonosticta senegala* and Bronze Mannikin *Lonchura cucullata* are most commonly listed as hosts in Africa (Roberts, 1984; Borrow & Demey, 2001; Stevenson & Fanshawe, 2002; Redman et al. 2009). The percentage of non-*Estrild* hosts is extremely small compared to that of *Estrild* waxbill hosts. Species from other families have occasionally been recorded as hosts, and there is little doubt that the female whydah can be quite catholic and opportunistic in her choice of host, even occasionally indiscriminate, but it is extremely doubtful that any of these apparent non-estrildid hosts ever succeeded in

hatching and rearing a whydah chick.

The use of various host species is consonant with the songs of the male. Other parasitic whydahs are usually host-specific and the song of the male whydah contains elements of the song of the host species. This has proved very helpful to field workers in the past when host species have been identified by analysis of the song of the whydah in question (Payne, 2005). In the case of the Pin-tailed Whydah, however, the song is not like that of any particular waxbill, and the female responds to the song of several different waxbills (Nicolai, 1964). "The species associations of *Vidua* and estrildid hosts result from histories of host shifts by the *Vidua*," wrote Payne (2005). This sugggests to me that the Pin-tailed Whydah has an above expectation built-in propensity to use alternative species, a supposition supported by the lack of host species song mimicry.

Of the known estrildid host species, the Black-rumped and Orange-cheeked Waxbills, Bronze Mannikin, Tri-coloured Munia *L. malacca* and Nutmeg Finch or Spice Bird *L. punctulata* vary from common to uncommon on Puerto Rico (Raffaele, 1989). No fewer than nine estrildids are established on the island, of which six are established in the locality where the Pin-tailed Whydah is commonest. It is likely that the two *Estrild* waxbills are favoured, but it is quite possible that all may be used as host species, including the munias *L. malacca* and *L. punctulata* (Rafy Rodriguez pers. comm.).

There are two species of grassquit commonly found on Puerto Rico, the Black-faced Grassquit *T. bicolor* and the Yellow-faced Grassquit *T. olivacea*. The former is widespread and commonly found in scrub, loose open woodland and in gardens - even trespassing into open kitchens to forage on the floor for fallen crumbs. The Yellow-faced Grassquit is less widely distributed on the island. Both species are common in the area where the Pin-tailed Whydah is found. In other parts of the Yellow-faced Grassquit's range in Central and northern South America, it can be as common and confiding as the Black-faced Grassquit.

Hypothesis

The hypothesis is that for a chosen host species to successfully hatch the eggs of and rear the nestlings and fledglings of the brood-parasite species, it must have similar breeding behaviour to those host species known to be continually and habitually successful. The *Estrild* waxbills obviously fit that description, and the mannikin squeezes in. Superficially, the *Tiaris* grassquits also appear to fit the bill - they forage and feed in a similar manner to the estrildid finches in the same habitat and I have seen them foraging together in the south-western part of the island. They build a covered nest and lay two or three eggs and go on to rear the young on a similar diet to that of the waxbills. If the report is accurate, it implies that a grassquit can incubate,

hatch and raise whydah chicks and, therefore, it must be equally possible that it could brood, hatch and raise estrildid chicks. So placing estrildid eggs (as legitimate substitutes for whydah eggs) and/or nestlings (as legitimate substitutes for whydah nestlings) under breeding grassquits would be a valid test. In addition, placing estrildid Bengalese eggs under a canary would provide a distinct additional dimension to the experiment.

Methods

From personal experience of studying grassquits in the field on Puerto Rico and similar projects elsewhere, I knew that an investigation which required detailed and prolonged observations of both the Pin-tailed Whydah and the various host species in the field would have required time and resources not available to me. However, combining some 60 years of experience with estrildid finches and 15 years with grassquits, both in the field and in captivity, with the full avicultural resources at my disposal, allowed this hypothesis to be constructed and tested. The purpose of the experiment was to introduce eggs and/or estrildid nestlings into the nest of a breeding pair of grassquits to see whether they would be accepted and, if so, whether the nestlings would be reared successfully.

I had successfully bred the Black-faced Grassquit several times in the garden aviary adjoining my birdroom laboratory, and the species is common in my garden and the neighbourhood. I therefore established a breeding pair of grassquits in the aviary and another in a Terenzani breeding cage measuring 1m x 0.5m x 0.5m (approx. 3ft 3in x 1ft 7¾in x 1ft 7¾in). To represent the estrildid/viduine group I used pairs of Bengalese, the domesticated descendant of *L. striata swinhoei* (Restall, 1996), which were also placed in Terenzani breeding cages. I also had a free-breeding pair of small canaries, the Timbrado breed, which is similar to the Roller canary in Europe, and is normally used to supply the pet trade here in Venezuela. I included these as a control.

During the following year (in the rainy season, when local finches and others breed), I was able to place a fertile egg of the estrildid Bengalese in the nest of the grassquits in the aviary (those in the cage failed to breed). On another occasion I was able to exchange newly-hatched grassquits with newly-hatched estrildines. As a control I placed Bengalese eggs in the canary nest.

I was able to find an active grassquit nest in the neighbourhood and as soon as both of the eggs had hatched, was able to take the nestlings and replace them with two recently hatched Bengalese.

Results

The canary incubated and hatched the Bengalese eggs, but failed to rear the nestlings past the second day. The Bengalese incubated and hatched

the first clutch of grassquit eggs, but also failed to rear the nestlings past the second day. The grassquits in the aviary deserted their nest when the Bengalese egg was added. The local grassquits in the park deserted their nest and I found the Bengalese nestling dead and overrun with ants. The Bengalese deserted the nest in which I had replaced their own young with grassquit nestlings. It was not possible to tell whether the desertion caused the death of the grassquit nestlings, or if it was their death that caused the Bengalese to desert. Desertion of any nest by Bengalese is rare. Like Zebra Finches *Taeniopygia castanotis*, they are quite likely to simply add some nest material on top of the dead nestlings and lay a fresh clutch of eggs.

The Bengalese when left alone subsequently raised a healthy and strong brood of four young. The grassquits in the aviary eventually built a new nest and raised both chicks from a second clutch of two eggs.

Discussion

The adult birds used in the experiment were healthy and subsequently bred perfectly normally. During the experiment though, it was painfully apparent that they were unable to feed the other birds' nestlings. I sat and watched the canary feed herself and then go to the nest, looking in on the Bengalese nestlings and even making head movements that led me to think that the chicks were being fed, but on examining them later I found that she had not fed them.

A characteristic of estrildid waxbills is that the nestlings have a contorted sideways twist to the neck when begging for food. The more hungry the nestling, the more it contorts and twists its head, shows its palate and increasingly moves its tongue from side to side. Freshly-hatched estrildids beg like other small passerines, but soon begin the neck-twisting behaviour, apparently on the second day in the case of *Estrild* waxbills (although the Zebra Finch does not begin to do so until the fourth or fifth day (Zann, 1996) and the Cut-throat Finch *Amadina fasciata* does not develop the behaviour at all (Goodwin, 1982)). The neck-twisting is most easily seen when fledgling Zebra Finches beg for food from their parents.

No doubt this eccentric behaviour is an adaptation enabling the brood of nestlings to obtain food from the attendant parent within the confines of the small, enclosed nest. The adult enters from the side of the speroid and stands in a horizontal position and the nestlings twist around in order to present their gape in the most inviting position possible. In contrast, it is a characteristic of nestlings hatched in open, cup-shaped nests, to reach directly upwards, the strongest or hungriest nestling reaching the furthest and getting first attention from the food-bearing parent. In the case of estrildid nestlings it seems that the hungriest bird - the one with the widest gape showing the most palate markings - is the attention-claiming equivalent of

the upward-reaching nestling.

Tiaris grassquits make a covered nest that superficially resembles an estrildid nest and it would be easy to assume that the nestlings beg in a similar manner to estrildid nestlings. However, this illusion was shattered by a photo Rafy Rodriguez sent me showing a female Puerto Rican Black-faced Grassquit standing at the entrance of her nest and feeding a clutch of hungry nestlings. The entrance was actually a loose and fairly large opening, almost as so a slice had been cut at an angle from the upper front of the spheroid, rather than having a porch, tunnel-like opening at the side, typical of the waxbills. Furthermore, the grassquit nestlings were at the front edge of the opening and begging directly upwards, just like nestlings in an open, cup-shaped nest. The forward edge of the roof of the nest was above and slightly behind the heads of the gaping nestlings. A careful examination of the design of several Black-faced Grassquit nests in the vicinity of my home showed that the nest in the photo was a typical example of a nest built by this species.

Much has been written about the role of the luminous spots and globules in and at the gape edges of estrildid nestlings, and that every species has its own specific pattern of markings. The palate markings of the waxbills in the genus *Estrilda* are usually similar, with the palate markings of the Pin-tailed Whydah mimicking those the Common Waxbill perfectly. The palate markings of the two common *Estrilda* waxbills on Puerto Rico, the Black-rumped and the Orange-cheeked species, are similar to those of the Common Waxbill. The whydah nestlings behave just like estrildid nestlings, complete with twisting begging motions, as can be seen from newly-fledged whydahs twist-begging from their waxbill foster parents. It is interesting that the palate markings of the Bronze Mannikin are different from those of the waxbills. It has a horseshoe-shaped bar instead of five spots and it is significant that this species is only occasionally used as a host in its native Africa (22 times out of 79 parasitized nests in one field study (Mines, 1989)). The palate markings of the Tri-coloured Munia are different yet again and, in simple design terms, are possibly midway between those of the Bronze Mannikin and the Common Waxbill.

Tiaris grassquits do not possess palate markings, neither is the gape luminous, there is no need for it to be, as the nestlings gape in clear, open light, whereas the estrildid and viduine nestlings do so in darkened, enclosed nests. The palate and gape flanges of the grassquit nestling are a uniform pale creamy colour.

The main function of the palate markings is to signal to the parent, "feed me", and the hungrier the nestling, the more it will contort, open the gape wider and increasingly move the tongue from side to side. It follows that