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## HIGH DIVERSITY OF INVASIVE PASSERIDS AT A PARK IN SOUTHEAST TEXAS

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**ABSTRACT.** —We report high diversity of invasive Passeridss in Bear Creek Park, Harris County, Texas, including the Orange Bishop (*Euplectes franciscanus*), Pin-tailed Whydah (*Vidua macroura*), Orange-cheeked Waxbill (*Estrilda melpoda*), Zebra Finch (*Taeniopygia guttata*), Bronze Mannikin (*Lonchura cucullata*) and Nutmeg Mannikin (*Lonchura punctulata*). All but the Zebra Finch probably result from imports of invasive populations into Puerto Rico for the pet trade. Only the Nutmeg Mannikin and perhaps the Orange Bishop will potentially become established long-term; while the Bronze Mannikin appears to be breeding, its overall abundance is much lower. Whydahs require specific hosts for nesting, Zebra Finches appear too domesticated to survive in nature, and Orange-cheeked Waxbills likely require a warmer winter climate to persist over time. This Passerids community is perhaps structured by size assortment (diminishing chance of similar-sized species being able to coexist), but detailed ecomorphological analyses await study specimens from the region. Similarly, coexistence studies between Nutmeg Mannikins and Orange Bishops await further elucidation of these species' niches.

Three different models predict ecological and evolutionary forces that mold avian communities (Brooks 1998): 1) Size Adjustment—evolutionary shifts in morphological characteristics that species undergo to minimize competition (Case and Sidell 1983), 2) Size Assortment—the diminishing chance of similar-sized species being able to coexist (Case and Sidell 1983), and 3) Species Packing—community diversity may be enhanced by inserting species within established ecomorphological space, reducing the average distance between species niche size or increasing niche overlap (MacArthur 1972).

Self-colonizing island Passerids communities are structured by size adjustment (character displacement), such as the case of Galapagos finches (Grant 1968). Human-introduced island Passerids communities are structured by size assortment as seen in Hawaii (Moulton and Pimm 1986), similar to the force driving naturally evolved Passerids communities on tropical mainlands in the Paraguayan Chaco (Brooks 2003).

In 1878 Alfred Russell Wallace noted animal life is, on the whole, far more abundant and varied within the tropics than in any other part of the globe, first

highlighting the inverse relationship between species richness and latitude. The position of Texas in the subtropics permits more species of birds than any other state in the nation. The chance for invasive Passeridss to occur in species rich guilds (functionally associated units of organisms) is limited however, as the number of invasive species is often limited in a given region (Brooks 2009). Herein we document a case of several species of Passeridss occurring in Bear Creek Park, Harris County, Texas and discuss the implications and potential outcomes of this event.

### METHODS

In June 2008 a citizen-science study, the Texas Invasive Bird Project, was initiated to target 6 avian species invading the state. A questionnaire ([hmns.org/files/invasivebirds.doc](http://hmns.org/files/invasivebirds.doc)) was circulated among multiple bird watchers to provide unbiased data as citizen-scientists. Through this forum, Greg Page's (hereafter GP) data alerted Daniel Brooks (DMB) of the high diversity of Passeridss recorded at Bear Creek Park, just west of Houston (Fig. 1).

Unless otherwise noted all birds were observed by GP, who monitored the area 2-3 times/wk for 3 h

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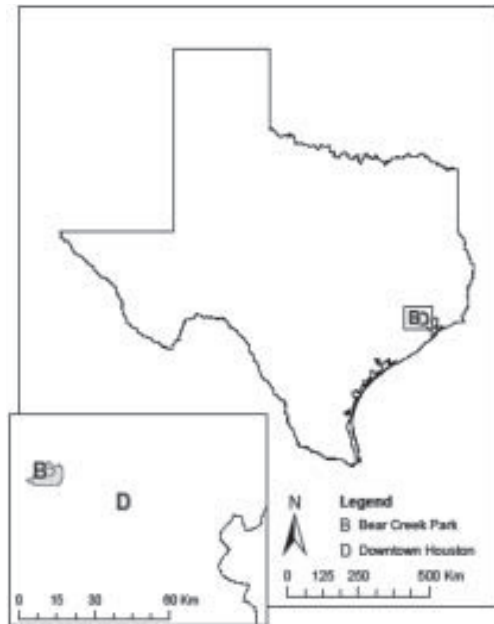


Figure 1. Map depicting location of Bear Creek Park, west of downtown Houston.

in the morning between March 2010–October 2012. Invasive Passeridss were observed 27–29 September and 1 and 8 October 2010, 12 January and 21 March 2011, and 20 October 2012. GP observed birds during morning walks near the golf course (29° 49' 25.75" N, 95° 38' 12.92" W) at ~ 0800 h, with the exception of the whydah which was seen at ~ 1100 h next to a creek by the first bridge on the Equestrian Trail. DMB identified many birds from photos or video clips submitted by GP (Figs. 1–4) and other observers (see Acknowledgments). Species accounts are provided below, and include additional regional documentation when available.

#### SPECIES ACCOUNTS

##### *Orange Bishop (Euplectes franciscanus)*

On 27 September 2010 a flock of 8 bishops was observed for 15 min with 2 Orange-cheeked Waxbills in 1 m high weeds next to woods at the edge of the golf course. The birds were observed on the ground eating seeds and perched in trees preening. This was likely the same flock seen on 1 October with 2 Nutmeg Mannikins in addition to the bishops and waxbills.

On 21 March 2011, a single female was observed for 5 min with a Zebra Finch in an open area with

recently mowed grass at the edge of the woods across the street from the golf course. The 2 birds first perched in a tree then both flew to the ground before flying out of the area.

On 11 November 2012, a single bishop was observed resting in a tree and preening for 10 min by Harry Forbes. This bird was associated with  $\geq 15$  Bronze Mannikins that were observed for 90 min in a clearing surrounded by small trees bordering a golf course with lots of seedy plants covering the ground.

Over 50 reports for this species were sent to DMB between June 2008–March 2013 as part of the Texas Invasive Bird Project. Bishops prefer overgrown weedy fields with masting seed heads ~ 3 m in height. Such habitat is ephemeral, as it is rarely permitted to remain dense for very long before being developed for real estate interest. Consequently this may reflect the limited number of reports for this species when compared to the Nutmeg Manikin (see below). Bishops will also occupy ponds and river banks with high densities of reeds, which is similar to the preferred habitat of this species in sub-Saharan Africa (D. Brooks unpubl. data). There were other reports from Bear Creek Park, perhaps the same birds. Most of the reports were from west Houston in appropriate habitat paralleling Beltway 8, as well as other areas around Houston, Bryan/College Station, and Austin. Since ca. 2010 the birds began to move away from their preferred habitat with increasing regularity to attend feeders, which will likely result in more reports in the future.

##### *Pin-tailed Whydah (Vidua macroura)*

On 12 January 2011, a solitary male in eclipse plumage (dark facial markings) was observed for 10 min. The habitat was recently mowed grass with some clover and dead leaves and surrounded by woods. The bird flew into a tree 5 m above the ground when GP got too close, but returned to the ground after 2 min to resume foraging. Similar to behavior of this species in sub-Saharan Africa (D. Brooks unpubl. data), the whydah scratched in the dirt with both feet like a towhee; after closer examination of photos, it was apparently eating small ants (Fig. 2) and possibly small seeds.

On 4 November 2011, a solitary male transitioning out of breeding plumage (still had a long tail) was observed by Michael Rinehold at Bear Creek Park approximately 17 m south of the Brandt Dr. and Sullins Way intersection on the west



Figure 2. Male Pin-tailed Whydah (*Vidua macroura*) in eclipsed plumage eating ants. Photographed at Bear Creek Park by Greg Page.

side of the road. The bird was first seen at 08:40 h and seen intermittently until 10:40 h (~ 20 min total observation). The habitat was urban parkland and the bird was in 5 cm high St. Augustine grass foraging on small seeds with a flock of Chipping Sparrows (*Spizella passerina*), which the whydah frequently tried unsuccessfully to displace. Although 11 months later, it is possible this was the same bird seen by GP (see above), as it was < 5 km from the first bridge on the equestrian trail.

On 11 April 2012, a third whydah was observed in Tomball by David Martin at 1500 h. This bird was approximately 50 km north of Bear Creek Park and could not have been the same bird as mentioned above since it was a female.

On 20 and 23 February 2013 an eclipsed male whydah was observed in west Houston by Bernice Hotman at her feeder hosting > 25 Nutmeg Mannikins. This bird was < 15 km southeast of Bear Creek Park; while it is possible it was the same bird observed in November 2011, it was at least 15 months later.

A single bird from Bryan was reported in 1998, as well as a male in transitional plumage in Austin on 21 May 2008 by Isaac Sanchez.

#### *Orange-cheeked Waxbill (Estrilda melpoda)*

On 27 September 2010, as mentioned above, 2 waxbills were observed for 15 min with a flock of 8 orange bishops in 1 m high weeds next to woods at the edge of the golf course. The birds were observed on the ground eating seeds and perched in trees preening. An attempt was made to relocate the birds the following 2 days (28-29 September) but only a single bird was seen, which was photographed and identified as a sub-adult Orange-cheeked Waxbill (Fig. 3). However, what was likely the same original flock of bishops and waxbills was seen again on 1 and 8 October with the addition of 2 Nutmeg Manikins.

Fred Collins reported seeing an escaped waxbill as early as 1963 in east Houston in a weedy wooded corner of Diez Park. Other reports indicate waxbills were seen in Austin as early as 9 September 1995 (R.



Figure 3. Juvenile Orange-cheeked Waxbill (*Estrilda melpoda*) photographed at Bear Creek Park by Greg Page.

Fergus), and in Houston with 1-2 birds at El Franco Lee Park 12 and 21 August, and 11 Nov 2011 (S. Lorenz and M. Westev); 2 birds (presumably a pair) in Katy near Buffalo Bayou where it intersects South Mason Road on 10 September 2011 at a water feature (B. Parker); and more recently 2 birds at Addicks Reservoir on 6 April 2012 (K. Poetzl). Habitat reported by John Berner at El Franco Lee was 3 m high cane and 0.7 m grassy slope at Addicks, with both sites near the marshy edge of a slope banked pond, so not inundated. El Franco Lee Park is > 50 km southeast of Bear Creek Park, suggesting these were different populations of waxbills. The sites in Addicks and Katy are < 10 km east and west of the Bear Creek Park border respectively, although the time span ranges 1-1.5 years from the sighting at Bear Creek Park.

Bob Honig and Marie Asscherik reported waxbills during the Buffalo Bayou Christmas Bird Count (14 observers total) at 2 locations in Memorial Park on 30 December 2012. Three adult birds were seen near the big pond on the east side of the Houston Arboretum and Nature Center (HANC) singing and foraging low on grass seeds before flying away. A second group

of 2 adults was seen in a high-grassy/brushy power line corridor immediately west of the railroad tracks between Memorial Drive and Interstate 10 (~1 km east of Loop 610), associating with American Goldfinches (*Carduelis tristis*) and 5 Nutmeg Mannikins. On the following day (31 December) Candy McNamee and John Berner reported 3 adults at 0800 h in ~ 0.6-1 m high grass at the HANC pond site, foraging on dry grass seeds with American Goldfinches, Swamp (*Melospiza georgiana*) and Song Sparrows (*M. melodia*). The second site had 5 adults at 0915 h in ~ 1 m high grass between the path and railroad tracks, foraging on dry grass seeds.

On 12 January 2013, Jason Bonilla reported 2 adult birds (presumably a pair) in Woodland Park (Houston, Harris Co.), foraging about 1 m off the ground on a bushy vine in the wooded area near Little White Oak Bayou. Although Memorial and Woodland Parks are < 15 km from the eastern border of Bear Creek Park, the time span is > 2 years, suggesting these are a different population of waxbills than those observed at Bear Creek Park.

#### *Zebra Finch (Taeniopygia guttata)*

On 21 March 2011 as previously mentioned, a grey pied (captive-bred mutation) Zebra Finch was observed for 5 min with a single female bishop in an open area with recently mowed grass at the edge of the woods across the street from the golf course. The 2 birds first perched in a tree then both flew to the ground before flying out of the area. As evidenced from the photograph (Fig. 4), this bird was stressed and unhealthy and likely did not survive more than a couple of days after the photograph was taken.

#### *Bronze Mannikin (Lonchura cucullata)*

On 2 January 2012, a flock of ~ 16 adult and juvenile mannikins was observed by Ken Hartman at Bear Creek Park on the Equestrian Trail head. At least 2 were adult Bronze Mannikins but all were difficult to distinguish. The birds were observed intermittently for ~ 15 min total. The habitat was urban parkland, a transition between 4 cm high St. Augustine grass and dead leaves along the edge of a woodland tract.

On the morning of 15 October 2012, Nina Rach observed a flock of 7 (2 adults, 5 juveniles) Bronze Mannikins immediately east of the intersection of Golbow and Bear Creek Drive, just north of the equestrian trail parking area. This observation of adults with juveniles suggested breeding activity.



Figure 4. Grey pied Zebra Finch (*Taeniopygia guttata*) in stressed condition photographed at Bear Creek Park by Greg Page.



Figure 5. Bronze Mannikin (*Lonchura cucullata*) photographed at Bear Creek Park by Greg Page.

The birds were stripping seeds from grasses and preening in low scrubby trees. Presumably the same flock of birds was observed by John Berner the following day (8-10 birds at midday), on 20 October by GP (8 birds at 0830 h, Fig. 5), and 11 November by Harry Forbes ( $\geq 15$  birds with a single orange bishop 0900-1030 h). GP noted the birds flew in a tight flock and landed in a tree right in front of him, where they commenced preening and hopping along branches, moving further back in the trees until they were out of view (total observation time  $\sim 5$  min). The flock was in close contact the entire time, and the tree they landed in was within a cluster of trees and brush ( $\sim 20$  m x 35 m) that was straddled by a small grassy area on one side and the golf course on the other. A road and more extensive woods with a small creek were on the far side of the grassy area. HF observed the single bishop resting in a tree and preening for 10 min of the 90 min observation period of mannikins, which alternated between resting, preening, and eating grass seeds. It is possible this flock was of the same group reported above by Hartman in January.

A singleton was reported by Tina Mathis in late May 2012 in the 9400 block of Beechnut St. at a feeder hosting a very large resident flock of Nutmeg Mannikins. Jim Sigmund reported a second feeder hosting Nutmeg Mannikins in Cypress with at least nine Bronze Mannikins (including at least one subadult, suggesting breeding) visiting in early March 2013. These two sites are  $< 15$  km southeast and northwest, respectively, of Bear Creek Park borders and may represent individuals originating from the same population.

#### *Nutmeg Mannikin (L. punctulata)*

On 1 October 2010, as reported above, two Nutmeg Mannikins were seen near the golf course with 2 waxbills and a flock of bishops. The mannikins were not seen in this flock of birds on 27 or 28 September however.

Over 150 reports for this species were sent to DMB from June 2008-March 2013 as part of the Texas Invasive Bird Project. Nutmeg Mannikins preferred weedy fields and detention ponds. There were other reports from the region, most of which were from west Houston in appropriate habitat parallel to Beltway 8, as well as other areas around Houston and Austin. Mannikins frequently attend feeders, which is likely the main reason there were more reports for this species than for any other invasive bird in Texas (D. Brooks unpubl. data).

## DISCUSSION

With the exception of the Zebra Finch, all of the species were invasive to Puerto Rico (ebird.org, accessed on 9 May 2012) and were frequently wholesaled to U.S. pet suppliers (Fred Collins pers. comm.). The Zebra Finch is widely domesticated and bred for the U.S. pet industry and is perhaps the most abundant species of companion bird (Susan Clubb in litt.).

It is interesting to note that bishops were observed flocking with every species in this report except for the whydah. While bishops breed in appropriate habitat from southeastern to central Texas, it is uncertain whether they will persist long-term. Most of populations are ephemeral due to the short-lived condition of the dense, tall weedy fields they prefer. However, with increasing numbers at feeders it is possible bishops will become better established with a more permanent food source.

It is doubtful whydahs will ever become established since they are obligate nest parasites of waxbills (*Estrilda*, Fry and Keith 2004), which would necessitate the host being well established, which they are not. Thus it is assumed the whydahs reported herein are wild-caught birds that escaped from an aviary.

The fact that a sub-adult Orange-cheeked Waxbill was identified suggests either this species is breeding in the area or, more likely, a sub-adult bird was released or escaped. While the species is periodically reported and breeding is even possible, it is unlikely this species will become firmly established in the area because they require a warmer climate (Clement et al. 1993, Fry and Keith 2004) and therefore are less likely to survive very cold winters.

Despite their abundance in captivity, the single Zebra Finch was the only evidence of this species in the wild in Texas as of January 2013, and this individual likely did not survive very long after being photographed. Perhaps this highly domesticated species can not adapt well to natural conditions, indicative of the reason for no reports generated. Zebra Finches have never been successful in the wild outside their native habitat (Robin Restall in litt.).

Aside from the more established bishop and Nutmeg Mannikin, Bronze Mannikin was the only species reported to exhibit groups of juveniles, suggesting successful breeding. Nonetheless there are few reports of this species in the state compared to bishops and Nutmeg Mannikins. It is possible that this species will become more broadly distributed like the bishop and Nutmeg Mannikin, but currently

it is not as abundant. However, Bronze Mannikins were seen in more than 1 region, with evidence of breeding over the duration of approximately one year. This is a species to watch for potential colonization, even though it may only be a recent invasive species.

It is likely the Nutmeg Mannikin is already established and based on numbers reported it may be on the verge of a population explosion. Numbers at a given site may reach several hundred individuals (Carter Hood pers. comm.) and they are common at feeders. On a positive note they are passive and not aggressive towards other species at feeders, and utilize a vacant niche space of weedy field and detention ponds as preferred habitat.

Similar to introduced Passerids communities on islands (Moulton and Pimm 1986) and naturally occurring situations on tropical mainlands (Brooks 2003), the community in Bear Creek Park is perhaps also structured by size assortment since only 1 or 2 species are present in high numbers. Rigorous ecomorphological analyses await study specimens collected from the region (Brooks 1998). The parameters permitting Nutmeg Mannikins and Orange Bishops to coexist are likely different habitat preferences. However both species coexist commensally with one-another as well as native species at feeders (D. Brooks unpubl. data) where food resources are often unlimited. Factors permitting co-occurrence awaits future testing as more thorough investigation of these species' niches are available.

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