

First description of the nest and eggs of Arabian Waxbill *Estrilda rufibarba* (Al-Baha province, southwest Saudi Arabia)

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The Arabian Waxbill *Estrilda rufibarba* is one of Arabia's most enigmatic endemic birds and one of the most difficult Arabian endemics to find in Saudi Arabia. Almost nothing has been reported of the breeding biology or foraging ecology of this estrildid finch. Indeed, less is known about the breeding biology of this species than perhaps any other Arabian endemic (Jennings 2010). Although an estimated 35 000 annual breeding pairs of Arabian Waxbill exist (30 000 in Yemen, 5000 Saudi Arabia), not a single nest has ever been reported in the literature. As noted by Jennings (2010 p667) "no nest has been described in detail and its siting and construction is unknown, no clutch or brood has been reported and there are no records concerning the care of young and interactions between adult and fledgling. While this is a social species at all times of year, it is not clear whether it nests communally." Here we provide the first description and photographs of an Arabian Waxbill nest and provide brief preliminary observations of nest building and incubation behavior based on a total of four hours of digital video recordings filmed over 11 days in March 2016.

The Arabian Waxbill (Plate 1) is endemic to southwest Saudi Arabia and Yemen. It has been reported from Wadi al Sailah just north of Taif and Makkah in Saudi Arabia south to Ta'izz and Aden in Yemen. While it has been recorded from near sea level to 2700 m, it is more often found above 1000 m. It prefers dense vegetation across a range of habitat types, including highland juniper forests, subtropical forests, cultivated terraced slopes, rocky scrubby hillsides, and scrub-filled wadi basins. It drinks regularly and thus is usually found near freshwater, such as reedbeds, boggy ground, and adjacent to irrigated, cultivated areas (Jennings 2010).

The Arabian Waxbill is highly social and generally found in small groups sometimes containing up to 30 individuals that roost communally (Scholte 2010). Anecdotal observations suggest Arabian Waxbills feed principally on seeds of various native and cultivated grasses, eg sorghum, rushes and grains of *Jatropha*, *Chenopodium*, *Tamarix*, and *Aerva javanica* (Christensen & Porter 1987, Jennings 2010). Some populations may wander seasonally depending on climatic conditions, perhaps moving to higher altitudes in summer. At both Wadi Turaba (Newton *et al* 1994) and Malaki dam (J Babbington pers com) in Saudi Arabia, Arabian Waxbills have been observed to be much more common in winter and spring than summer.

Arabian Waxbills show some slight sexual dimorphism in plumage. While the male has a lovely scarlet eyestripe and lores (Plate 1), the female's eyestripe and lores can be duller (even appearing almost black in some individuals). Further the female is often darker buff on the belly (Payne 2018). Roughly 10 cm tall (Payne 2018), the dimensions of only one bird, in Yemen, have been reported: the individual weighed 8.5 g (Dymond 1996). If this individual is representative then the Arabian Waxbill is the smallest Arabian endemic species.

NEST OBSERVATIONS

A single nest of Arabian Waxbill was discovered by AA-O on 2 March 2016, c10 km northeast of Al Makhwah at 19.799206° N, 41.498318° E and 549 m asl. The nest site was



Plate 1. A male Arabian Waxbill, northeast of Al Makhwah, southwest Saudi Arabia, 1 March 2016. © Ahmed Al-Omari

located in human-modified habitat that consisted of cultivated fields of wheat surrounded by banana, cacao and papaya trees a few metres up the slope from a wide flat wadi bottom. The surrounding wadi slopes contained relatively thick patches of native woodlands comprised largely of acacia and ghaf *Prosopis cineraria*. The nest was found c100 m from the nearest residence and c10 m from a small track. No other Arabian Waxbill nests were observed in the visible vicinity of the nest.

The nest was built on the ground and pressed against the base of a terrace wall between two cultivated fields. Native trees surrounded the nest site; hence the nest was well shaded. The nest was briefly inspected visually and noninvasively to minimize disturbing the nesting attempt. A digital video camera was placed on a tripod that was permanently stationed c7 m in front of the nest. Footage was taken opportunistically by AA-O on six occasions (2, 3, 6, 8, 12 and 13 March 2016) for a minimum of 17 min and a maximum of 51 min/session totalling 3 hours and 55 min of footage. Nest behaviour was recorded only during daylight hours. To film the nest, AA-O would walk up and fix the camera to the tripod, commence recording and then walk away from the area until it was time to end the recording session. The digital recordings were analyzed and significant behaviours were recorded to the nearest second. In addition, once the clutch was completed a noninvasive digital photograph was taken of the nest interior by placing the camera lens at the nest entrance, at the end of a video session, and then immediately leaving the site with the camera.

Filming the nest did not appear to excessively disturb the birds, which usually recommenced normal nesting behaviour soon after the recording session began. For example, in one instance a bird entered the nest only 56 s after recording was initiated. The



Plate 2. A partially constructed Arabian Waxbill *Estrilda rufibarba* nest showing nest entrance, c10 km northeast of Al Makhwah, southwest Saudi Arabia, 1 March 2016. © Ahmed Al-Omari

average time until birds arrived at the nest after recording commenced was 6.6 min, with the longest interval (15.5 min) occurring immediately after the video camera and tripod was first set up on 2 March.

The video analyses revealed that a pair attended the nest. Although the birds were not individually color banded, one of the birds (the presumed female) had a small but distinct blemish on the red eye stripe on the right side of the face, which enabled unequivocal individual identification at every filmed nest visit ($n = 122$). The female also appeared to have more buff on the belly and a less intense red eye stripe (although these traits were not always visible in the footage, particularly during times of low light; therefore the blemish on the eye stripe was especially valuable).

At the time of its discovery, the nest consisted of a rather messy, globular bundle made entirely of grass stems with a small opening at the lower front of the nest and a rudimentary platform constructed on the upper surface of the nest mass. The upper platform was built using the same grass species as the rest of the nest (Plate 2). Over the next five days, additional material was gradually added. Eventually the upper platform was completed to form an open dome, which served as a false nest on top of the main nest. The false nest was decorated with small pieces of aluminum foil, pieces of thin grey plastic, downy grey feathers, and thin wispy seed pods all of similar earthy colours (Plate 3). No material was brought in to line the nest (Plate 4).

Both sexes contributed to nest building but appeared to have clearly defined roles: the female was never observed collecting nest material. Instead, she remained inside the nest chamber while the male repeatedly brought her soft, fine, pliable, grassy material. The male would stay inside the nest for a few seconds and then leave, allowing the female to weave material into the internal walls of the nest. Thus, during nest building, the female entered the nest on only five occasions, remaining in the nest for a total of 39.4 min with each stint in the nest lasting an average of 7.9 min (range 40 s–21.2 mins). Conversely,

the male entered the nest on 26 occasions remaining in the nest for a total of 6.5 min but averaged only 15.5 s/visit (range 3–60 s).

Both male and female contributed to building the false nest. The female was recorded contributing to the false nest on four occasions, averaging 118 s/visit, while the male was recorded contributing to the false nest on eight occasions, averaging 98 s/visit. Both birds would take considerable time to place the 'decorations' in the false nest, fussing and repeatedly relocating the objects. The fact that the female contributed to the upper dome indicates that it probably served as a false nest used to deceive potential predators rather than a 'cock's nest' used in mate attraction. Indeed, it is interesting that the false nest was lined with feathers and decorated with grey-white materials, which gave the false nest the appearance of a used and abandoned nest complete with false fecal matter perhaps to dissuade a predator's interest.

To avoid disturbing the breeding attempt, the nest was not measured directly. Nonetheless, the completed nest mass was estimated to be c20 cm wide×20 cm high×25 cm deep. The nest entrance was roughly circular and only c3 cm in diameter. Meanwhile the false nest was apparently c10×10×10 cm.

No copulations or obvious courtship displays were observed. The completed clutch consisted of five rather bright white ovoid (almost spherical) eggs (Plate 4). Thus, this clutch is typical of most waxbills, which usually lay four or five eggs (del Hoyo *et al* 2017). Both the male and female were involved in incubation. The duration of incubation was recorded once for the female (20.9 min), and twice for the male (9.8 and 29.8 min). It was not clear whether incubation had commenced before the clutch was completed.

Over the course of the 235 min of recorded nest activity (building and incubating), the male and female spent around the same total amount of time actually inside the nest. The female entered the nest on six occasions with stints lasting from 40 s–21.2 min and spent a total of 60.3 min inside the nest, which amounted to 26% of recording time in the nest. The male entered the nest on 32 occasions but his nest visits were more variable in duration, ranging from 3 s–29.8 min, and totaled 55.6 min in the nest or 24% of total recorded time.



Plate 3. The completed Arabian Waxbill *Estrilda rufibarba* nest including false nest on top containing debris and feathers, c10 km northeast of Al Makhwah, southwest Saudi Arabia, 12 March 2016. © Ahmed Al-Omari



Plate 4. The completed clutch in the unlined nest of the Arabian Waxbill *Estrilda rufibarba*, c10 km northeast of Al Makhwah, southwest Saudi Arabia, 12 March 2016. © Ahmed Al-Omari

Both the male and female were recorded performing a distinctive tail flicking behaviour where the bird would swing the tail from side to side in quite exaggerated and rigid movements often lasting more than two min. This behaviour was noted 11 times (male = 9; female = 2), and appeared to be more likely to occur after some sort of nest disturbance (such as the sound of a nearby tractor or the alarm calls of other birds), suggesting it is an alarm display.

Five days after the last egg had been laid, a farmer cleared the vegetation surrounding the nest and inadvertently destroyed the nest. Thus there are still no observations of the nestling or fledging phases of Arabian Waxbills. If the Arabian Waxbill exhibits similar nesting behaviour to other *Estrilda* waxbills (which have been relatively well studied and show considerable similarities in their nest behaviours), then one might expect Arabian Waxbills to have an incubation period of c11–13 days followed by a nestling phase of c18–21 days, with juveniles obtaining foraging independence around 14–35 days after fledging (del Hoyo *et al* 2017).

Additionally, on a separate trip by CB, Jem Babbington and AA to the Asir mountains on 16 June 2016, an Arabian Waxbill was observed repeatedly carrying long grass stems into a patch of dense bushy vegetation at 18.197429° N, 42.409310° E beside a large stone wall within a terraced field in Raydah reserve at 2424 m asl c11 km west of Abha. This site contained similar habitat to the nest site described above, including stone terraces amongst cultivated fields surrounded by a mixture of native and exotic tree species. To avoid disturbance, no attempt was made to locate the nest. Nonetheless, the observation is interesting as it shows that this species can breed in the early summer months and demonstrates nesting behaviour at a higher elevation, at 2424 m.

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