

The Jambu Fruit Dove

Observations on Courtship, Nest-building and Nesting

(*Ptilinopus jambu*)

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The Jambu Fruit Dove (*Ptilinopus jambu*) is a member of an Old World branch of the large family Columbidae. This branch is sometimes referred to as the sub-family Treroninae, the fruit pigeons and fruit doves (Peters 1937). The fruit doves of the genus *Ptilinopus* are found in the Australasian faunal region. Most species are predominantly green in color, with bands and patches of contrasting color and pink or purple caps (Goodwin 1983; see color plate in Skutch 1991).

The Jambu Fruit Dove has a fairly wide distribution in the wild. It inhabits forests and other wooded areas in the Malay Peninsula, Sumatra, Bor-



Photo by Mike Greer

Male Jambu Fruit Dove brooding seven-day-old chick.

neo, and nearby smaller islands. It is at least partly migratory, often coming to grief by landing near lighthouses, on ships, or in cities (Goodwin 1983).

Despite occurring in a populous region of Asia and being described in regional bird guides (Smythies 1960; King and Dickinson 1975), little is known of courtship displays or other nesting behavior in the wild. Roberts (1991) provides excellent descriptions of some courtship behaviors and some displays at the Memphis Zoo and Aquarium; however, since their birds did not build their own nests no description of nest building was

included.

The Chicago Zoological Society (Brookfield Zoo) received its first pair of Jambu Fruit Doves in May of 1987. The birds were imported from Thailand, with the male estimated to be two years old on the basis of his plumage. After the loss of the female the male bird was sent to the St. Louis Zoo in early 1988 on a breeding loan. He was returned to Brookfield in early 1989 and paired with a new wild-caught female.

The birds were housed in the free flight exhibit, a large (52' x 32' x 30' high) mixed species aviary with an

Photo by Mike Greer



Jambu Fruit Doves allopreening. This behavior is usually initiated by the female (right).

Photo by Jim Schulz



Jambu Fruit Dove chick walking out of nest for the first time at 10 days old.

earth floor. The exhibit was heavily planted with several mature *Ficus* of various species along with lower vegetation, and contained a small stream with a series of pools.

Several nest platforms of a design used successfully at the St. Louis Zoo were installed and the male bird showed interest in them almost immediately. He sat on one of the platforms and rearranged the sticks and other nest materials we had provided. He also called off and on, usually from a perch in the lower canopy of the *Ficus* trees. When calling, the male tucked his head down into his semi-erected neck feathers, his throat swelling impressively with each "coo-coo." We noted that when the exhibit exhaust fans were operating, the soft voice of the male was drowned out, corroborating Roberts' observation of background noise interfering with his hearing of the Jambu calls (Roberts 1991).

The male made impressive flights around the exhibit, flying in a stereotyped pattern and usually landing within one foot of the female. He was regularly observed on or near the nest platforms. He also was seen attempting to preen the female, and attempting to give her dead twigs that he had broken from the *Ficus* trees. The female, unfortunately, never responded to any of these courtship displays and stayed by herself much of the time. After approximately one year this female was trapped from the exhibit and shipped to the Memphis Zoo. In trade we received a seven month old female.

The new female was bred and parent-reared at Memphis. She appeared interested in the male immediately upon release into the exhibit, staying with him constantly. The male continued to call off and on and soon was seen attempting to break off *Ficus* twigs and flying rapid patterns around the exhibit. When he landed near the female she immediately began to preen his breast feathers, concentrating her attentions on the bright pink patch on the male's upper breast. The male responded by briefly preening the female's breast.

Two weeks after her release into the exhibit the female was observed sitting on a *Ficus* branch. She had pulled the closest leafy twigs under her breast and appeared broody. After a few minutes sitting quietly on her "nest," she flew away and spent the

rest of the day with the male.

The female had apparently chosen this branch as her nest site. The next day the male searched the exhibit all day for dead *Ficus* twigs, which he broke off and took to the female. The female took the twigs from the male and inserted them into her nest platform. Goodwin (1983) states that arboreal pigeon males collect twigs from trees and shrubs and bring them to the nest site, where the female does the building. Our birds always followed this pattern. Many of the twigs fell, and though several were caught in branches and leaves below the nest none were ever retrieved by the male. He also never used any of the twigs, straw, moss, and other materials that were provided for the other nesting birds in the exhibit.

This behavior pattern continued during the four days that the pair worked on the nest. The female stayed on the nest virtually all day, arranging the twigs that the male brought to her. Most of the twigs continued to fall, and this may be what precipitated their abandoning of this nest site.

A few days later a second nest site

was chosen, as evidenced by the female sitting on a high branch in another *Ficus* tree with the male sitting quietly next to her. The next day the male performed several of his display flights and began to play with twigs, but didn't bring any to the female until two days later. The birds followed the previous pattern of the female doing all the nest building using materials provided solely by the male. Though, in general, pigeons have not developed the art of nest-building to a high degree (Skutch 1991), this time, after three days, a fairly sturdy little platform was built. On the third day, after the birds ceased construction of the nest, the male spent the entire day on the nest and appeared broody. The female sat near him on the nest branch off and on all day.

During the next nine days the pair established a pattern of the male sitting during the day and the female sometimes on the nest early in the morning but always sitting by late afternoon. This incubation schedule has been observed in most pigeons studied (Roberts, pers. comm.; Skutch 1991), though one pair of Jambus at



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Memphis Zoo changed off several times daily (Roberts 1991).

No egg was ever visible, so our assumption was that the birds were broody and sitting on an empty nest. In hindsight (and in comparison with later nests) we now believe that the birds had an egg which fell from the nest at nine days into incubation. This nest was quite high in the canopy and not observable from above. We have found that the birds envelop the egg with the breast feathers. Therefore, when an observer is stationed below the nest, the egg is not visible even through the open latticework of the nest platform.

Roughly a week after the failure of their second nest, the birds were observed copulating. This followed a bout of allopreening, after which the female simply crouched and the male mounted. When the copulation was completed, the birds continued to allopreen. One day later they began building their third nest, a few inches down the branch from their first nest. This nest also took three days to build, and on the fourth day the male was observed on the nest.

The birds reestablished the pattern of the male incubating during the day with the female relieving him in late afternoon. The female usually had to physically displace the incubating male by gently pushing him off the egg. The male would then spring into flight from the nest and the female would quickly settle onto the egg. The non-incubating bird always stayed away from the nest except at changeover.

The egg finally was observed on day five of incubation when the female shifted position. It was a typical white pigeon egg, quickly covered as the female enveloped it in her breast feathers. Incubation continued to day ten, when the nest collapsed overnight and the egg disappeared.

A new behavior was noted from the female while the pair was building their fourth nest. When the male landed next to the female she quivered her wings as the male gave her the twig. This behavior exactly resembled the begging behavior later observed from Jambu Fruit Dove chicks, and we observed it off and on during nest building bouts from that point on (see also Skutch 1991). The fourth nest collapsed after three days.

The fifth nest was situated on the

same branch and in approximately the same location as nests one and three. The male appeared to lead the female to this site in the morning. He then turned around, treading with his feet and making "tucking" motions under his breast with his beak. The female spent approximately 20 minutes preening the male's breast and feet, after which he flew away. The female moved to the same spot occupied by the male and, as he brought her twigs, built a nest. The pair worked on this nest for the usual three days with the egg appearing on the fourth day (as evidenced by the male incubating in the morning).

Unfortunately, this egg was discovered broken under the nest on day nine of incubation. It contained a well-developed embryo and had a very thin shell. We became concerned that the female was laying thin-shelled eggs, which the birds were puncturing or crushing as they attempted to incubate and then throwing from the nest. We later learned that thin-shelled eggs appear to be common for this species (Herb Roberts, pers. comm.).

At this point the birds had been paired for two months and had attempted to nest five times, producing three eggs. We were concerned about the female producing so many eggs in a fairly short period. Pigeons in the wild are subjected to heavy predation on eggs and nestlings, and have thus developed short incubation and nestling periods. The small brood — one chick! — of the Jambu is quickly reared if all goes well, and if lost to predation, is quickly replaced as long as food is plentiful. Any one brood is therefore expendable (Goodwin 1983). Since our birds were well-nourished on the Brookfield Zoo frugivore diet (diet formulation available on request), we assumed that rapid egg production for a limited time would not hurt the female.

The apparent inability of the birds to build a sturdy nest was another problem. We had tried inserting wire platforms under the previous nests, but either the platforms caused the birds to desert the area or they normally choose a new site for each nest. Each site provided good horizontal support, but the birds built the typical pigeon's nest consisting of a flat pile of loosely interwoven twigs with a slight central depression (Goodwin 1983; Skutch 1991). The eggs either rolled off the

nests or fell through the openings between the sticks. This problem has also been reported in the Black-naped Fruit Dove (*Ptilinopus melanospila*) (Morris 1991).

While we discussed our options, the birds moved around the exhibit apparently investigating nest sites. No obvious signs of courtship were noted, but one morning the female was found sitting in a broody posture on a large, moss-covered platform that had been installed in the exhibit for Sunbitterns (*Eurypyga helias*). When the male relieved the female on the "nest" we were sure that she had laid. The birds had not built any nest or added any material to the platform. This egg fell from the nest the next day, presumably during changeover of incubation duties.

The birds immediately began courting again, and five days after the loss of the last egg the female had chosen a new nest site. This nest was built on a fairly low *Ficus* branch in the front part of the exhibit, right above the perch of the resident Green-winged Macaws (*Ara chloroptera*). The Jambu Fruit Doves never appeared nervous or bothered by their proximity to the visiting public or the macaws, even when the noise level became excessive. This nest site also allowed much closer observation by the keeper staff. After four days of building, the female laid an egg at approximately 1:00 p.m. The male began to incubate almost immediately after the egg was laid.

After the loss of the first four eggs, we decided to artificially incubate this one. We were ready with a dummy egg prepared from a Sun Conure (*Aratinga solstitialis*) egg which was filled with plaster. The male was sitting so tightly that he had to be gently pushed from the nest before the eggs could be switched. At the same time we reinforced the nest. Because the birds had rejected nests in the past that had been reinforced with wire, this nest was reinforced with a platform of glued together *Ficus* twigs. We also assumed that the attraction of the egg would outweigh the disturbance we were causing, which was proven true when the male returned to the nest less than ten minutes after we left the exhibit.

Ironically, when the birds switched off incubation in late afternoon they dislodged the egg. The female was discovered on the nest about

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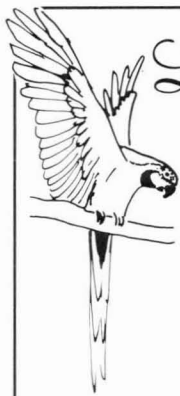
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5:00 p.m. peering down at the dummy egg on the sand below. The undamaged egg was returned to the nest and more *Ficus* twigs added as reinforcement. The female returned to incubate fifteen minutes later.

The entire 18-day incubation passed without further incident, with the nest holding up well and the dummy egg staying where it belonged. Meanwhile, the genuine egg was developing normally in a 99.5%, 54-56% humidity incubator. Pigeons take a day or more to hatch (Skutch 1991), and our chick was no exception. It pipped on day 17 and was fully hatched by the midmorning of day 18. The chick was allowed to dry for about an hour and then was placed in the nest with both halves of the egg and the dummy egg removed. The male was first to return to the nest and he cautiously approached the chick but did not step onto the nest. The female then landed next to the male. She was bobbing her head very excitedly and appeared to be anxious to get to the chick. She finally hopped over the male and onto the nest, immediately settling onto the chick and brooding. She fed it for the first time one hour after it was placed into the nest.

The parents switched off more often while tending the chick than they did while incubating eggs. Roberts (1991) describes the appearance, growth and development of Jambu Fruit Dove chicks at the Memphis Zoo. Our chick followed the same developmental stages. The chick first walked out of the nest at ten days old and flew for the first time at 12 days old. By five weeks of age he was about half the size of his parents and still being tended by them.

The parent birds began allopreening and copulating approximately three weeks after the chick fledged. From this nest attempt on we have not interfered to reinforce the nests or to artificially incubate the eggs. The birds have lost some nests and eggs but have also raised several chicks. All nesting attempts have followed the same basic pattern as described above.

In summary, it took seven nests and five eggs in a three month period before our Jambu Fruit Doves successfully raised their first chick. With one exception, the birds built their own nests and would not utilize any arti-

cial nest platforms. After a brief courtship consisting mainly of allopreening, the female built all the nests by herself using materials provided by the male. The one time the birds did not build any nest at all was probably because the female was physiologically ready to lay before the birds had selected a nest site. We discovered that the birds would accept augmentation of a nest they were using if it was done with natural materials (twigs) and if an egg was present. Roberts reported that birds at the Memphis Zoo will also accept an augmented nest, but only after the female had laid (Herb Roberts, pers. comm.). Finally, our birds have continued to build their own nests, losing eggs occasionally but successfully rearing several chicks.

Observations made upon birds in captivity, particularly those in seminatural enclosures, can reveal behavior patterns difficult to observe in the wild state. "Little recorded of its habits" and "Display: no information" are all that Goodwin (1983) reports of the Jambu Fruit Dove, despite his extensive lists of references. Aviculturists have a responsibility to record and report courtship, breeding, and nesting behavior observed in their captive collections. In these days of shrinking budgets for animal behavior studies in the wild and rapidly disappearing natural habitats, we may be the only ones who will ever be able to observe and record this information.

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