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Palms are Preferred Hosts for Baya Weaverbird Colonies

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The baya weaverbird (*Ploceus philippinus* Linn.), noted for its complex, retort-shaped, dangling nest woven from strips of palm leaves and grass blades, is familiar throughout India. It is also widespread in Bangladesh, Burma, Bhutan, Nepal, Pakistan, Sikkim, Sri Lanka, Thailand, Malaysia and Indonesia. Three other species, *P. manyar* (Less.), *P. megarhynchus* (Hume) and *P. benghalensis* (Linn.) are distributed in Asia, but the majority of weaverbirds are native to Africa.

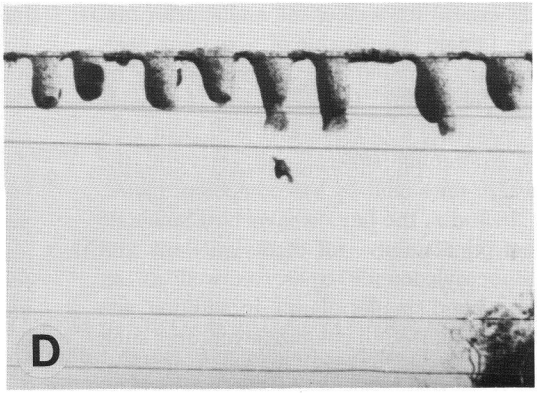
The adult male baya is a brown-streaked, sparrowlike bird with a thick bill and short, rounded tail (Fig. 1A). The baya is sexually dimorphic during the breeding season when the male acquires golden-yellow plumage on the head and breast. He is a skilled weaver, architect and builder. The female baya is similar to a hen sparrow except for a stout bill and shorter tail. The female is incapable of weaving a nest, contrary to what has been reported by some observers. However, she is capable of selecting a durable and well built nest by examining several and rejecting the weaker ones built by less competent males.

In India, the baya weaverbird builds its nest on a number of dicotyledonous and monocotyledonous trees, as well as on shrubs and smaller plants. In addition, the bird is reported to colonize structures such as the eaves of rural houses and compound walls (Jerdon 1863, Davis 1971a), the sides of irrigation wells (Ali 1931, Crook 1960, 1963), telegraph lines (Ambedkar 1964, 1970), and power lines (Davis 1971b). Among the sites where nests were observed, palms were the most common trees for colonies, especially in peninsular India and extending north-eastward to Assam.

Importance of Palms for the Baya Weaverbird

A survey covering most of the Indian States to determine the host plants and structures colonized by the baya weaverbird has revealed that at least 11 species of palms are used for building nests. These accounted for more than one-half the colonies recorded on all trees, bushes and manmade structures (Table 1). The data from one state or region cannot be directly compared with those from another because I may not have covered the same amount of area in each. Nevertheless, the survey has brought out clearly how in different states different trees are preferred for siting nests. The map of India (Fig. 2) shows the important nesting palms in different regions. In areas where palms do not occur naturally, especially in the northwestern part of India, *Acacia* spp. are the main nesting trees for the baya.

The tall swaying trunk of *Cocos nucifera*, the smooth slippery trunk of the introduced *Roystonea regia* and the stems of *Phoenix sylvestris* and *Borassus flabellifer* with their thorny leaf-bases and spiny protuberances help protect the nests. The fact that the last two palms may be in standing water for a considerable length of time each year adds to their attractiveness for establishing baya colonies. The



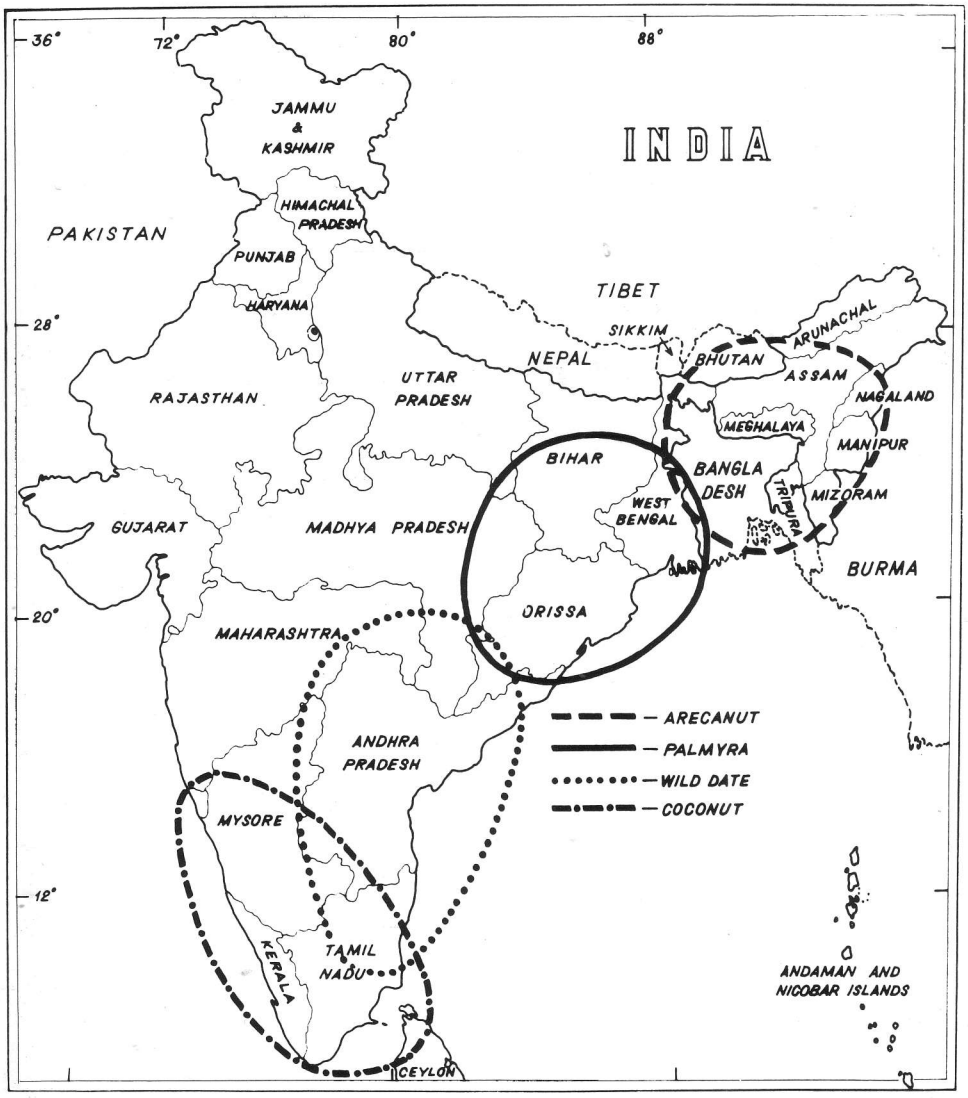
1. A, Male baya weaverbird in breeding plumage, perched on a partially built nest, awaits a female searching for a mate; B, A relatively short *areca* palm near Gauhati (Assam) with more than 25 baya nests attached to the leaves; C, *Caryota urens* with six nests in a forest area of Assam; D, Baya nests having no suspension and with short entrance tubes, attached to a telegraph line in Assam. Nests are built close to each other and connected by wads of fiber.

Table 1. Baya weaverbird colonies on palms and other trees/structures in different regions of India.[1]

Palms and Other Nesting Plants and Structures	Assam Region	Andhra Pradesh	Bihar State	Gujarat State	Haryana & Delhi	Jammu & Kashmir	Kerala & Karnataka	Madhya Pradesh	Maharashtra	Orissa State	Punjab State	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal	Total
1. *Phoenix sylvestris*																
2. *Borassus flabellifer*	3	242	7	—	29	1	—	20	5	9	2	—	16	33	—	367
3. *Areca catechu*	—	32	16	—	—	—	17	—	4	15	—	—	21	12	64	181
4. *Cocos nucifera*	119	—	—	—	—	—	—	—	—	—	—	—	—	—	—	119
5. *Phoenix farinifera*	8	3	—	—	—	—	64	—	—	3	—	—	28	—	3	109
6. *Roystonea regia*	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	3
7. *Caryota urens*	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	3
8. *Hyphaene dichotoma*	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2
9. *Phoenix dactylifera*	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	2
10. *Arenga pinnata*	—	—	—	—	1	—	—	—	—	—	—	—	—	1	—	2
11. *Livistona chinensis*	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
12. Other trees and structures	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	1
	37	119	10	43	66	19	17	46	20	4	53	54	25	209	11	733
Total	170	399	33	45	96	20	98	66	29	31	56	54	90	255	81	1,523

N.B. In Rajasthan no palm could be seen bearing baya nests.

[1] Includes North Bengal, Assam, Meghalaya, Nagaland, Manipur, Tripura, Mizoram and Arunachala.



2. Map of India: in the south and east coastal regions of India, palms are the chief hosts for baya colonies. Important hosts are *Areca catechu*, *Borassus flabellifer*, *Cocos nucifera*, and *Phoenix sylvestris*.

massive well-spread fronds of *Cocos*, *Phoenix*, *Areca* and *Roystonea* also provide the essential nest-weaving material for building the dangling nests. Furthermore, because palms are evergreen they offer shelter for the birds and provide nest-weaving fiber throughout the year. By comparison, grasses are seasonal, especially cereal grains that constitute additional sources of nesting fiber in the northern and northwestern parts of India. However, sugarcane yields nesting fiber continuously for about 8 months during its vegetative phase.

In Assam, *Areca catechu* is the most common host tree. Table 1 shows that

119 of the 170 colonies observed in the region were found on areca palms (Fig. 1B). This species does not appear to be ideal for attaching nests because it is unarmed and moreover its stem is not slippery due to the presence of prominent nodes. Hence predators can easily climb the short stem. Even though fiber-strips from areca leaves are liberally used for weaving nests, they are of poor quality. In fact, many bayas use strong coconut fiber for establishing the foundation for the nest (where coconut palms are present nearby) and weave the remainder of the nest from areca leaf fiber. The lack of physical barriers discouraging predators is compensated for by the fact that most areca palms grow near houses. Furthermore, the people offer the baya needed protection since they consider the bird to bring good luck. The Brahmaputra River supports groves of areca palms within which there are numerous hamlets; this creates an intimate association between baya colonies and rural houses. Another unique feature of Assam is that the greatest number of baya colonies on telegraph lines were observed there. Nests established on telegraph lines differ structurally from those built on areca palms by not having any suspension and by the absence of a long entrance tube (Fig. 1D).

Only in this region were *Caryota urens* (Fig. 1C) and *Arenga pinnata* found as hosts for the baya. The leaflets of *C. urens* are so hard and thick that the bird is unable to strip them into strands. Moreover, they are short and of irregular shape. A lone *Arenga pinnata* near Gauhati had 5 baya nests. One of the illustrations of *Arenga* sp. in Corner (1966) has an incomplete nest of the baya.

In Orissa, Bihar and the southern portion of West Bengal, *Borassus flabellifer* is the most popular host for baya nests (Fig. 3A). In these locations, about 66% of the colonies observed were on *Borassus*. It is difficult to understand why the bird prefers *Borassus* in areas where there are many *Phoenix sylvestris* and *Cocos nucifera* palms for nesting. One characteristic favoring *Borassus* seems to be that the distal portion of its segments is very strong and stiff and serves as a suitable substratum for the foundation of a nest. Another is that the petiole of *Borassus* is strongly armed.

In Andhra Pradesh, *Phoenix sylvestris* is the most important tree for siting baya colonies. Moreover, in all but four of the states or regions surveyed, baya colonies were observed on the wild date palm. In fact, about one-half of all colonies found on palms were on *Phoenix sylvestris* (Fig. 3C). Apparently, this species is very important because of its spininess. Sharp leaf-bases, leaflet spines on the petiole and the spine-tipped leaflets themselves together prevent even marauding monkeys from climbing the trees. The wild date palm can withstand flooding for long periods, and the baya favors trees surrounded by water which keeps away non-swimming predators such as snakes and rodents. *Phoenix sylvestris* also supplies a plentiful amount of nesting fiber, although it is very short in length. The baya prefers this very short fiber for filling up the dome of the nest. Where it is available, the bird uses long coconut fiber for the suspension of the nest and for the entrance tube. In order to increase the strength of nests woven with short fiber, the male baya applies cementing agents such as mud, cattle dung and even human feces at vantage points (Davis 1972). An overwhelming majority of colonies established on palms in Andhra Pradesh were on the wild date palm, although the most common palm of the state is *Borassus*, followed by the coconut palm.

In Kerala, and in parts of Tamil Nadu and Karnataka, the coconut palm is more frequently used by the baya than any other tree for building colonies. Usually tall coconut palms are selected for nesting (Fig. 3D). One characteristic of nests built on the coconut is that they have a very long

3. A, Young colony on *Borassus* in rural east Benghal. Many incomplete nests, each having two openings, can also be seen in the photograph. B, Normal and multi-storied nests of baya weaverbird, lower left, a normal nest, upper left, nest having a long entrance tube. The multi-storied nest at the extreme right had at least nine females during one season. C, Several baya nests on *Phoenix sylvestris* growing in a pond. The leaves are partially defoliated for weaving nests. D, Early stage of large colony of baya on a coconut palm.

entrance tube (Fig. 3B), which keeps tree snakes from entering the nest and eating the eggs or young. Coconut leaf fiber is the strongest and longest available in India for the baya, and it gives strength and elegance to nests made with it.

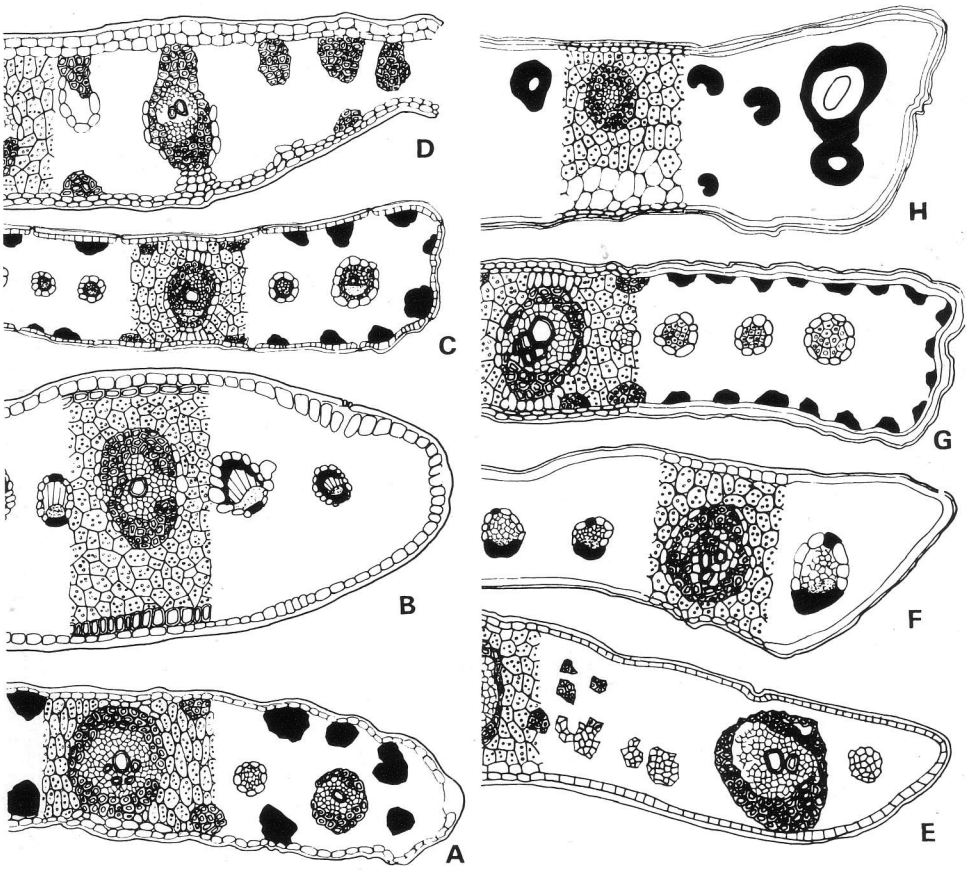
The remaining species of palms selected for siting colonies by baya birds in India are *Phoenix farinifera* (Mathew 1972), *P. dactylifera*, *Livistona chinensis*, *Roystonea regia* and *Hyphaene dichotoma*. Apparently the leaves of *P. dactylifera* and *H. dichotoma* are too hard for the bird to extract fiber strips. The numerous nests of a baya colony on a *P. dactylifera* growing in Uttar Pradesh were woven entirely from grass blades. The only other colony observed on this species was on a tree growing in the campus garden of Delhi University. A group of closely-spaced *Livistona chinensis* near Chandigard (Punjab) carried a baya colony. Two colonies were observed on wild *Hyphaene dichotoma* palms growing in the Kutch region of Gujarat state.

Discussion

The typical roofed or domed nest of weaverbirds, and many other families of tropical birds with altricial young, affords protection against high predation, excessive rainfall and intense solar radiation (Collias and Collias 1963). Among weaverbirds, the dangling nest of the baya provides more efficient protection against predators than do the ball or cup nests of other birds which are fixed on more immobile branches or reeds. Since most baya nests have a narrow suspension they can be attached conveniently to the tip of a palm leaflet, beyond the reach of nearly all predators. The palm crown is such that leaves develop from the crowded heart portion and radiate in all directions. The tip of one leaf hardly touches another. Taking advantage of this unique arrangement, the baya usually builds its nest at the tips of the distal leaflets. When a male baya carrying fiber, or a female with feed for the young, approaches the colony, the nest is entered directly without alighting first on a leaf or branch. This is facilitated when nests are built at the tip of a palm leaf. By contrast, baya nests with fairly long entrance tubes built on *Acacia* trees often become choked with thorns from adjoining shoots of the host plant so that entry into the nest is very difficult or impossible.

The male baya is capable of changing the nest structure to suit differing ecological niches and thereby safeguarding the survival of the nestlings. The absence of suspension and a long entrance tube in nests attached to telegraph or power lines is striking evidence (Fig. 1D). In parts of Assam, during the same breeding season, the same male baya builds one type of nest on telegraph lines and a very different one on nearby palms, thus making the best of both situations. A long entrance tube is woven under circumstances where the tree snake is a potential predator. This fine sleeve can be woven only with long, strong fiber such as that provided by the coconut leaf. Thus, palm fiber directly helps reduce predation in baya colonies. When only short fiber is available, as in the wild date, the bird resorts to the use of cementing materials to fortify the nest.

The structure of leaflets of *Borassus flabellifer*, *Phoenix dactylifera*, *Caryota urens* and *Livistona chinensis* is shown in Figure 4. The male baya is unable to tear these leaflets into strands because the many sclerenchymatous strands make them too thick and hard. Nevertheless, these same palm species are used as safe sites for establishing colonies. Among palms, the quality of the leaf fiber varies. For example, the fiber from *Roystonea regia* and *Areca catechu* is clearly inferior to that derived from *Cocos nucifera* and *Phoenix sylvestris* (Fig. 4). The amount of time required to extract and



4. Camera-lucida drawings of transverse sections of leaflet tips of A, *Livistona chinensis*; B, *Caryota urens*; C, *Phoenix dactylifera*; D, *Borassus flabellifer*; E, *Phoenix sylvestris*; F, *Cocos nucifera*; G, *Areca catechu*; H, *Roystonea regia*.

weave long fiber is greater than to tear and weave short fiber (Davis 1974). Hence, males incorporate the lengthier, stronger coconut leaf fiber into making the suspension and entrance tube portions of the nest and fill the dome with the short fiber of the wild date palm. Such strong nests permit the attachment of one nest below another (Fig. 3B); these multi-storied nests have been reported by Ambedkar (1980) and Davis (1982).

Although the female baya is incapable of weaving, she makes a major contribution by selecting the most durable and well-constructed nest. This selection is vital to the survival of the young because the male departs as soon as the female starts to brood her eggs, and she is not capable of repairing a damaged nest. Palms are preferred nesting trees because they provide the baya with many of the requirements necessary for successfully rearing chicks.

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NOMINATIONS AND ELECTIONS

The Charter of the Society provides that:

> ARTICLE IV, Sec. 1—. . . the new Board of Directors shall appoint a three-member Nominating Committee, including at least one Board Member, . . . and announce their names to the general membership. Members may send names to the Nominating Committee for consideration as candidates for the next election.
>
> Sec. 2—The slate of candidates prepared by the Nominating Committee shall be made known to the membership in time to permit the nomination of additional candidates to appear on the final ballot. Such additional nominations must be made in writing to the Secretary of the Society by a member in good standing. It must be accompanied by the written consent of the proposed candidate to serve if elected, and must be seconded, in writing, by another member. If the above conditions are met, the Secretary shall forward the candidate's name to the Nominating Committee for inclusion on the final ballot.
>
> Sec. 3—Voting shall be by mail only. Ballots shall be mailed in time for the results to be announced at the Biennial Meeting.

The appointed members of the Nominating Committee are: Jim Cain, Texas, Garrin Fullington, California, and Teddie Buhler, Florida, Chairman. The Secretary of the Society is Jim Mintkin, California.