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LIFE HISTORY NOTES ON SOME ALDABRAN LAND BIRDS

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LIFE HISTORY NOTES ON SOME ALDABRAN LAND BIRDS

by

C.B. Frith[1]

Introduction

The following observations were made during one year's residence (April 1972 - April 1973) on Aldabra Atoll, Indian Ocean (latitude 9° 24' S, longitude 46° 20' E) while I was a member of the Royal Society Research Station scientific staff. Although collection of the data presented here was incidental to other studies, daily nest inspections were made when possible and form the basis of this work. Notes made on the endemic weaverbird *Foudia eminentissima aldabrana* are not included here as they form a separate more comprehensive study (Frith, in press). Feeding data for most of the species listed also form another study and only a brief outline is given here. Data on *Centropus toulou insularis* are reported elsewhere.

Benson and Penny (1971) completely summarised the existing knowledge of land birds found on Aldabra and emphasized points requiring attention. The status of the species was found to be as given by Benson and Penny unless otherwise indicated. For the location of places given in this text I refer to a recent paper by Stoddart (1971).

Malagasy Kestrel, *Falco newtoni*

Sparse throughout the atoll, one or two birds being seen each day at various locations about the islands. Although being recorded as not found on Ile Michel by Benson and Penny three birds were seen in June and a pair with young were observed on this small island in October.

Coconut palm, *Cocos nucifera*, and stands of *Casuarina equisetifolia* trees appear to be favoured breeding sites, no nests being found in any other situation during this, or previous, studies. Benson and Penny expressed the view that the kestrel possibly colonized Aldabra subsequent to the introduction of palm trees by man. They concluded

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this as the only known nest at that time was found in the crown of a palm tree. *Casuarina* trees are, however, equally used and there is some doubt as to whether this tree was introduced or is naturally present on Aldabra.

Feeding

The two endemic geckos, mostly the diurnal species *Phelsuma abbotti*, and the endemic skink, *Ablepharus boutonii*, plus various large insects form the basis of the diet. Twice I saw a kestrel eating a small rat (*Rattus rattus*). Benson and Penny suggest that small birds are taken but I did not see any evidence of this, nor did I see a small bird showing any fearful reaction to kestrels.

Behaviour

Unlike the observation of Benson and Penny more than two individuals in close association were seen. Three adult birds were observed flying and gliding together in a playful fashion in strong winds during June. During an inspection of an active nest the resident pair was assisted by a neighbouring pair (which had recently lost a clutch to predators) in mobbing me, all four birds flying at, and sometimes striking me. Pied Crows, *Corvus albus*, and vagrant Eleonora's Falcons, *F. eleonorae*, and Broad-billed Rollers, *Eurystomus glaucurus*, were mobbed by kestrels.

Breeding

On 18 August a pair was seen to copulate in the upper dead branches of a tall *Casuarina* tree in palm grove. Both birds held wings extended and dropping and called continuously.

A pair was found nesting in the crown of a palm tree at Anse Mais on 28 October but the tree could not be climbed. Another nest containing one egg was found thirty feet high in the crown of a palm near Old Settlement on 28 August: on being examined twenty days later it was found to be empty. A nest found on Ile Michel on 21 October was in a hole in a Casuarina tree approximately forty feet high. It contained three nestlings in off-white down, the youngest being three or four days old.

A fourth nest was located on 10 September when the remains of one egg were seen to be carried from it by a Pied Crow. On the 11 September this nest contained three eggs, the original clutch with little doubt, therefore, consisted of four. The eggs were laid in a hole in a large *Casuarina*, formed by the loss of a large bough, approximately forty feet above the ground. The tree was situated in the centre of human dwellings, directly between two occupied houses. The history of this nest follows:

10 October 1972	3 eggs
12 "	1 egg, two nestlings
13 "	3 nestlings
21 "	Empty, almost certainly predated by Pied Crows.
9 November	1 egg
12 December	1 egg
22 December	Empty

The incubation period for the original clutch was at least 31 days. Throughout this pair's breeding attempts they were continuously disturbed by Pied Crows, causing them to spend much time in nest defence. The population of crows about Old Settlement is relatively very dense (ca.40) and is supported by food made available by man. One parent kestrel was so continuously chased and attacked by crows at the nest that it fell into a fresh-water tank and nearly drowned. It was helped out of the water by a woman then spent several days perched at the nest entrance recovering.

White-throated Rail, *Dryolimnas cuvieri aldabranus*

Feeding

I have little to add to what Penny and Diamond (1971) published save one or two observations confirming more unusual food items.

An immature rail was seen to kill and eat a small ghost crab, *Ocypode cordimana*, measuring approximately one inch across the carapace. Odd legs detached during killing were swallowed first, the remainder being swallowed whole.

Five rails were watched attacking and eating Green Turtle hatchlings, *Chelonia mydas*, which had erupted from a sandy beach in bright sunshine (Frith, in preparation). Unhatched turtle eggs, exposed by me, were also immediately taken by rails and eaten. The turtle hatchlings were not eaten whole but were pecked about the carapace and eaten in small pieces. The hatchling turtles broke surface at the same spot and their appearance was anticipated by the rails, the birds standing over the hatching point and probing the sand to the full length of the bill. Such probing was performed with an open bill, with the nictitating membrane covering the eye during deeper thrusts. Upon contact with a submerged turtle the bill was tightly closed about the prey, the head shaken sideways and the turtle extracted vertically. Details of this activity were obtained by simulating erupting turtles. This I did by burying an extended leg

in the beach sand with my toes pointing upward several inches beneath the surface. By slowly wagging my toes a very slight movement in the surface sand was caused and attracted four rails from up to 3 metres away. They rushed to the disturbed spot and probed in the above described way. Two individuals returned to the spot after an absence of several minutes and probed again, without any movement being produced to attract them.

I once saw a rail disturbing the nest of a red wood ant, *Camponotus maculatus*, by pecking at it and feeding upon eggs, larvae and some adults.

Behaviour

The White-throated Rail apparently thrives in areas supporting considerable numbers of introduced rats, *Rattus rattus* (Penny and Diamond). I observed one interaction between these two animals. An adult and a large immature rail were observed feeding upon camp scraps when a large male rat appeared and slowly approached the food. As soon as it was observed by the rails the adult bird walked directly at it and pecked it severely on the nose. This action was attempted at each advance of the rat but after the initial peck the rat avoided further physical contact and slowly retreated, finally leaving altogether. Throughout this eviction the immature rail continued to feed, showing no fear of the rat a couple of feet away.

Short copulation sequences were witnessed twice in May (out of breeding season) performed by the same two birds, the ceremony being the same in both instances. The female bird had the brighter pink bill base which agrees with the findings of Penny and Diamond. The apparent soliciting posture of the female consisted of spreading and lowering the white outer tail feathers and lowering the bill until the tip touched the ground. The male mounted and dropped a wing either side of the female, gave two or three thrusts of the body and hopped down. Upon dismounting the male walked about the female with head held stretched forward and downward and wings spread and slightly raised. As active nesting is recorded for November and December (Penny and Diamond; C. Huxley, *pers.comm.*) it is considered unlikely that the above copulation postures had anything to do with reproduction. Of a number of copulations observed by Penny and Diamond only two were followed by a display, apparently identical to the above described. These were performed by a male after mounting a female to which he was not paired. It would seem possible, therefore, that some ritualised mounting takes place between unpaired birds which is directly followed with a postcoital display from the male. This is supported by the fact that other copulations between known paired birds were followed by no displays, the birds simply separating to feed (Penny and Diamond). Penny and Diamond suggests the postcoital display is connected with the status of a male as an intruder in an occupied territory.

Penny and Diamond recorded that the White-throated Rail was never seen to use the feet as weapons but referred to an account by Abbott, in Ridgway (1895) of birds "flying at each other like game cocks". An instance of the latter was observed once. The two birds concerned were of the same brood, being ringed as large young in the company of an adult on 17 April 1972. The fight took place on 30 May 1972 and was apparently a dispute for presence in the immediate area of some resting people and their food scraps (i.e. feeding territory). The birds faced each other, a foot apart, with bill lowered and giving an occasional low grunt accompanied by a short upward flick of the bill. Suddenly, both would leap at the other feet first, beating the wings and vigorously kicking. Should one bird get a good grip both tumble the ground severely pecking at each other. Fights such as this could result in permanent damage. Whilst marking one bird my hand was quite deeply cut as a result of the kicking action. It is possible the bastard wing claw of this species is utilized during fights, particularly as wing beating was conspicuous.

Notes

During the period October 1967 - February 1968 Penny and Diamond ringed 23 birds at Middle Island Camp and 13 at Anse Coco. During the term of the present study the author and other workers visited the two localities fairly frequently, usually for at least several days at a time. Only one marked bird was noted at each location. The individual seen at Anse Coco in May 1972 was marked as an adult during June 1968. The marked bird seen at Middle Island in October 1972 was originally ringed in October 1967 as an adult. Thus these two birds had lived at least five and six years respectively. Lack of sightings of any other marked birds is not necessarily indicative of mortality. Penny and Diamond found that the rail population was to some degree transient. It is also possible the camps of these workers attracted large numbers of rails which, after the departure of the men, dispersed from the area and would not have again been attracted to the smaller, more temporary, camps since.

Comoro Blue Pigeon, *Alectroenas sganzini minor*

The Blue Pigeon is noticeably more common at localities as close to West Island as Anse Mais and Anse Polymnie than at the former locality. It is possible this is due to a lack of suitable foods on West Island but it is equally possibly due to predation by man in the recent past. Small flocks were commonly seen on the lagoon islands, Ile Michel and Ile Esprit, and were to be frequently seen flying strongly about the atoll. Of particular note (at least during August) were very large numbers of birds flying from Middle Island to South Island, across East Channel, in the morning and returning in the evening. Birds flew across the channel singly or in small flocks of

up to fifteen, at a height of approximately 25 to 40 feet. Many hundreds of birds performed these flights daily.

Feeding

This species was never seen on the ground. Lone birds and flocks of up to twenty were observed feeding on various fruits and berries which were picked from the plant. The arboreal feeding of this species considerably limits any competition between it and the only other pigeon on Aldabra, *Streptopelia picturata coppingeri*, which is a ground frequenting seed eater.

Behaviour

When not feeding birds were typically seen in bare, higher, branches. A type of display was observed, given by one bird to another, on two occasions (once in upper bare branches of *Casuarina* in April and once in mangrove in May). One bird flew to perch a foot or two from the other, lowered the head gently until horizontal with its feet, raised the rather elongate feathers of the neck, and shook the head. The head was shaken perhaps one inch either side of the normal position, and was reminiscent of a pigeon regurgitating food. No distinct bowing of the whole body took place, but a low grunt-like "weow-weow" was uttered. This was undoubtedly a directed display which is possibly a ritualized regurgitation, or feeding, action or ritualized nest building ("nodding" Goodwin, 1967). Benson and Penny record nesting during January and February (1968) and it is therefore probable that the above display was given toward the end, or after, breeding.

Notes

Two individuals observed feeding closely were seen to have slightly aberrant plumage. Both had a noticeable amount of white in the upper wing when extended, though not extensive, and one had the central tail feathers pure white and so gave the tail the appearance of being white bordered with blue instead of uniform blue.

Aldabra Drongo, *Dicrurus aldabranus*

Feeding

Benson and Penny considered this species to show a marked preference for mangrove but my observations indicate that stands of Casuarina are equally favoured. Some authorities consider the *Casuarina* recently introduced onto Aldabra, in which case it might be used as a suitable substitute for mangroves, particularly as reptiles are available in the former but not the latter habitat.

Observed feeding activity suggests that, in habitats other than mangroves, small reptiles are eaten as much as are insects. Geckoes, skinks and larger insects are pounced upon, taken to a perch upon which they are pounded and are then ripped apart whilst held to the perch by the feet. Insects are commonly hunted in flight, often high above the tallest trees. No records of feeding in mangroves were made, possibly due to limited visibility and time spent in the habitat. Benson and Penny's suggestion that this species eats other birds is considered most unlikely. No fear of drongoes was noted.

Behaviour

Commonly seen in family parties (immatures having a grey and whitish plumage) of about four birds, feeding together by perching in exposed branches and pouncing on prey within a small area of relatively open ground. Lone birds or pairs were seen to severely mob and strike fruit bats *Pteropus seychellensis*, Green-backed Herons *Butorides striatus*, Pied Crows *Corvus albus*, kestrels *Falco newtoni* and the migrant Eleonora's Falcon *F. eleonorae* and Grey Cuckoo *Cuculus canorus* (presumably reacted to as if a falcon as the Drongo has evolved without the presence of a parasitic cuckoo) at various times of the year. Human intruders near an active nest were also mobbed and sometimes struck.

One odd observation of pair activity was made in the middle of the non-breeding season (June). Two adult birds were seen perched by a fresh water pool. They then flew to a nearby tree where one bird picked off a dead leaf and offered it to the other. The second bird took the leaf and then dropped it.

A simple display was observed to be performed by an established pair of birds involved in nest building. The smaller bird added material to the nest and then flew to perch nearby where it was joined by its mate. The birds faced each other holding the bills slightly above horizontal and shook the wings vigorously and wagged tails from side to side. During this display both birds produced soft high pitched squeaky twitterings. This was not unlike young birds begging and possibly functions in maintaining the pair bond for part, or all, of the breeding season.

Breeding

Breeding activity was first noticed in mid September and continued until at least early January after which the species was not studied due to other work. Three pairs were observed at the nest, two only temporarily but one over a period of three months. All six nests involved were built in the fork of twigs of *Casuarina* trees. Nest examinations were made by use of a 'mirror-stick'.

One nest found on 5 November 1972 was twenty-five feet above ground in palm grove, with some *Casuarina* trees, and contained a single egg. An examination on 18 November found the nest empty. Another nest was found on 4 December twelve feet high, in palm grove with Casuarinas, containing one egg. Subsequent examination on 7 December found only one egg, which was gone on 12 December.

The breeding of a pair found close to the research station is worth recording as a number of interesting points were established. The very beginning of a nest was found on 25 September 1972 in *Casuarina* woodland. It was placed twenty-five feet above the ground and consisted of spider webs attached to the supporting fork and a very sparse bowl of fine twiglets. At this early stage birds were seen to sit in the very flimsy bowl and shape it by vigorously pushing down and outward with the breast.

The (continued) persistence of this pair of drongoes was remarkable. At the start of breeding a nest was built in little more than twenty days and a clutch of three laid which was predated. A second nest was built, utilizing the last, and was completed fifteen days after predation upon the first clutch. This second nest was found under 'deconstruction' four days after previous examination and it is possible a second clutch was laid and predated in the interim. The third nest took certainly less than fifteen days to complete in which a clutch of two was laid. This nest was predated and a fourth built in a period of ten days or less in which at least one egg was laid and predated. A fifth structure was not attempted, but the fourth was added to and a clutch of two eggs produced no more than fourteen days after predation upon the previous. This final clutch was predated and no further breeding attempt by this pair was noted as the birds apparently left the area. At least four, possibly five, clutches were laid by the female of this pair. It is interesting to note that as the season progressed nests were constructed in faster time, material from the previous structure being utilized despite an apparent abundance of suitable materials in the immediate area. Also of interest is the original clutch of three followed by clutches of two.

Eggs examined agree in colour with those described by Benson and Penny. A clutch of two measured 26.2 x 19.4 and 26.3 x 19.0 mm. Nest building and incubation of eggs was observed to be carried out by both sexes, no calls or displays being given during take-over of the latter duty.

Pied Crow, *Corvus albus*

Feeding

Other than from human settlement and temporary camps food is almost exclusively obtained on the beaches, open beach crest and coastal grassland areas, where various Crustacea appear to form the basic diet (in particular ghost crabs *Ocypode* spp., and hermit crabs *Coenobita* spp.). The fact that approximately fifty per cent of the entire crow population relies upon man's discarded food suggests that natural food sources may be limited for this species. Pied Crows are extremely predatory upon eggs and nestlings of other land bird species. Diamond (in Benson and Penny) found them taking eggs of tern species. Crows were often seen perched on top of the nests of *Foudia eminentissima*, ripping through the roof of the chamber or pulling the whole structure to the ground. As described above crows severely predated upon kestrels in the vicinity of Old Settlement. They were also seen to extensively mob migrating falcons, *Falco eleonorae* chasing them to great heights and over considerable distances.

Dying and dead giant tortoises, *Geochelone gigantea*, would obviously provide temporary large food sources for crows. Pied crows were twice observed to quickly appear at the location of a daylight eruption of Green Turtle hatchlings, *Chelonia mydas*, and to eat them (Frith, 1975).

Breeding

Benson and Penny recorded a nest containing three eggs in a coconut palm during December and one inaccessible nest was seen, apparently with attendant birds, during each of November, December and January. Two nests were found on West Island during the present study, both approximately forty feet high in the tops of Casuarina trees on beach crests. One, which could not be reached, was seen to have a pair in attendance on 1 July but was considered unlikely to contain eggs or young at that time. The second nest was discovered on 9 November containing three eggs and two nestlings. On 19 November only three eggs remained one of which was smashed, these were obviously addled. The nestlings would not have been old enough to have fledged. This same nest was examined on 17 December and contained four fresh looking eggs but no further examinations were made. During twelve months casual observation of the Pied Crow population on West Island only three young birds were noted (other than nestlings), on 12 November, in close association within a large flock. Possibly limited food and longevity restricts the reproductive rate.

Souimanga Sunbird, *Nectarinia sovimanga aldabrensis*

Feeding

Feeding takes place in all habitats but to a far lesser degree in mangroves than elsewhere, food consisting primarily of flower nectar and insects in that order.

Behaviour

Out of the breeding season flocks of from three or four to approximately thirty birds, in both male and female plumage, were commonly seen engaged in some form of chasing activity. This took the form of flying in very close association swiftly through vegetation giving excited twittering calls. Such behaviour was most commonly observed just after breeding and may therefore be the result, or cause, of territorial breakdown.

Males in full breeding plumage typically perch on conspicuous twigs and sing loudly. A 'bill up' display was commonly given by males to both females and other males, facing the recipient and raising the bill to almost vertical and thrusting the chest out. This display probably functions in both territorial and initial courtship confrontations.

A simple nest-site selection ceremony was observed several times. A male and female would fly to a potential nest site and perching on, or clinging to, available material situate themselves very close to each other. The material to which the intended nest was to be attached was pecked and billed, mostly by the female. During this mutual inspection, lasting approximately two minutes, a soft twittering was produced by both birds. Suddenly both birds would leave the nest site, the male to perch nearby and the female to collect spider web for the nest foundation.

Breeding

Active breeding was observed from August 1972 through to April 1973. This very early start to breeding (compared with other passerine species) preceded the start of any increase in insect abundance (fig. 1), unlike other species more dependant upon insect food. As this species feeds predominately upon nectar its breeding possibly correlates more closely with available nectar but unfortunately the latter was not assessed in any way. It was noted however that earlier breeding attempts were less successful until, that is, insects became more numerous (for feeding young). Nevertheless several clutches were laid in early September and one brood had fledged before the end of that month.

Breeding occurs in all habitats with vegetation higher than grasses. Five successful nests were located in and upon buildings constantly in use by people, one being in an occupied bedroom and another in a noisy and well used workshop. Benson and Penny give detailed descriptions of nests and sites.

Only the female nest builds, the male often following her as she searches for material and adds it to the structure. One female observed during her first day of nest construction flew between the nest and spiders webs forty feet away thirteen times in seven minutes. Only four successful nests were timed in their construction from start to finish (egg laying), but it is interesting to note, however, that structures built earlier in the season took longer than those built during the height of it:

Nest started	No. of days to egg laying
21 August	31
11 October	21
16 November	8
9 December	9

Nests were observed to be constructed much faster than eight days, but were not timed. Nests predated early in the season were abandoned and another built closeby. Nests predated in the height, or toward the end, of the season were usually added to for a day or two and re-used.

Of twenty-four clutches examined twenty-three consisted of two eggs and the other of one egg. As predation of part clutches was found to be common it is probable that the one egg clutch was the result of predation between nest inspections. Eggs are laid at approximately twenty-four hour intervals, mostly during the early morning hours.

Males take no part in incubation. Length of incubation, from the date of second egg laying, was found in five clutches to be thirteen days, in three clutches fourteen days and in two clutches fourteen to fifteen days. These periods fall within the variation given by Skead (1967) for a single sunbird species. The usual pattern is for one egg to hatch one day and the second the next, (in one clutch only did both eggs hatch on the same day), incubation starting with the first egg. Twenty-two eggs averaged 15.7 x 11.1 mm. the variation being 14.4 - 17.4 x 10.4 - 11.6 mm.

Nestling sunbirds react to the arrival of a parent immediately after hatching, a nestling being seen to beg vigorously as the nest was touched although still freeing itself from the egg. Nestlings are fed by both parents although several hourly observations indicated that

the male contributes only a third or less to feeding visits. Nestling period varied from fourteen to seventeen days, averaging fifteen days. Young of the only two successful broods of two fledged on the same day. In four clutches one egg did not hatch and disappeared a few days after the other egg hatched. In one brood of two, produced early in the season when insects were relatively sparse (fig. 1), one nestling died of starvation.

Notes

Only a single family of sunbirds was marked with colour rings but subsequent observations of them proved interesting and indicated that established pairs return to the same breeding territory season after season. The family concerned consisted of a pair and their single nestling. All three were individually marked at the nest site on 12 April 1972 (when the young bird fledged). The immature bird was still begging on 4 May, twenty-two days later, but on 10 May appeared quite independant and was feeding itself extensively. All three birds were regularly seen, together or separately, within a hundred foot radius of the original nest location until 26 June after which the immature was absent (next being seen on 13 December 250 yards from parents' territory). The parent pair was continuously observed within their original territory, and nested again in almost exactly the same spot as the original nest, until I left the atoll.

Malagasy White-eye, *Zosterops maderaspatana aldabrensis*

Status

This bird does not benefit from the groves of coconut palms as do several other passerine species and was rarely seen in that habitat unless *Casuarina* trees or bushes and shrubs (i.e. introduced cotton) were plentiful. It was abundant in mangroves, where many other land bird species were not but, like Benson and Penny, I found no nest in mangroves.

Feeding

Diet consists predominantly of insects save for the taking of some flower nectar, fruits and a little seed. Insects are mostly taken from foliage in typical *Zosterops* fashion, being picked from the surfaces of leaves. Birds feed in loosely associated flocks of from three or four to about thirty birds and move through vegetation quickly. Benson and Penny considered the White-eye to have no particular habitat preference but data obtained by myself indicate that *Casuarina* woodland firstly and mangrove secondly are preferred feeding grounds (Frith - in preparation).

Breeding

Reproductive activity was not noted until early December (fig. 1), considerably later than *Nectarinia*, and eggs were still being laid during late March 1973. Nests have been described in detail by Benson and Penny. I found them in all habitats except mangroves, and only rarely in palm groves.

Five complete clutches consisted of three eggs. A previous record of a two egg clutch (Abbot - in Ridgway, 1895) was possibly an incomplete or part predated one. Six clutches were observed and all were predated, almost certainly all by rats (particularly abundant about the research station where the nests concerned were located). One pair of birds was observed to produce three successive clutches, a new nest being built, quite close to the last, for each clutch.

The pale green eggs are laid on successive days. Average size of nine eggs (three complete clutches) were 15.5 x 12.0 mm., the extreme length and width being 17.1 and 11.5 mm. respectively. Both sexes incubate. Average weight of twenty-two live birds was 8.3 g. varying between 7.2 and 10.2 g.

Summary

1. Various life history notes on some Aldabra land birds were collected, incidentally to other work, during a twelve month residence on Aldabra Atoll. The majority of data presented concerns breeding biology and is new or supplementary to previous knowledge.

2. Data are given for Falco *newtoni*, *Dryolimnas cuvieri*, *Alectroenas sganzini*, *(Centropus toulou)*, *Dicrurus aldabranus*, *Corvus albus*, *Nectarinia sovimanga* and *Zosterops maderaspatana*.

3. Breeding seasons of the more insectivorous bird species were found to coincide with an increase in insect abundance except in *Nectarinia sovimanga*. It is suggested that the latter species may commence breeding as a result of an increase in nectar abundance, prior to an increase in insects.

Acknowledgements

I thank all those present with me on Aldabra for bringing many and various points to my attention. In particular I thank Mr. L. Mole who utilised much unintended time on Aldabra searching for bird nests, including a total of fourteen hours spent watching activity at a coucal nest. Thanks also to Antonio Constance and Harry Charles whose observations and skill with ropes enabled me to frequently examine kestrel nests.

I am very grateful to staff of The Royal Society of London and to the staff of the British Museum (Natural History) concerned with Aldabra, and the ornithological department, for assistance in numerous respects. Thanks to Dawn W. Frith for unpublished figures of insect abundance for Aldabra.

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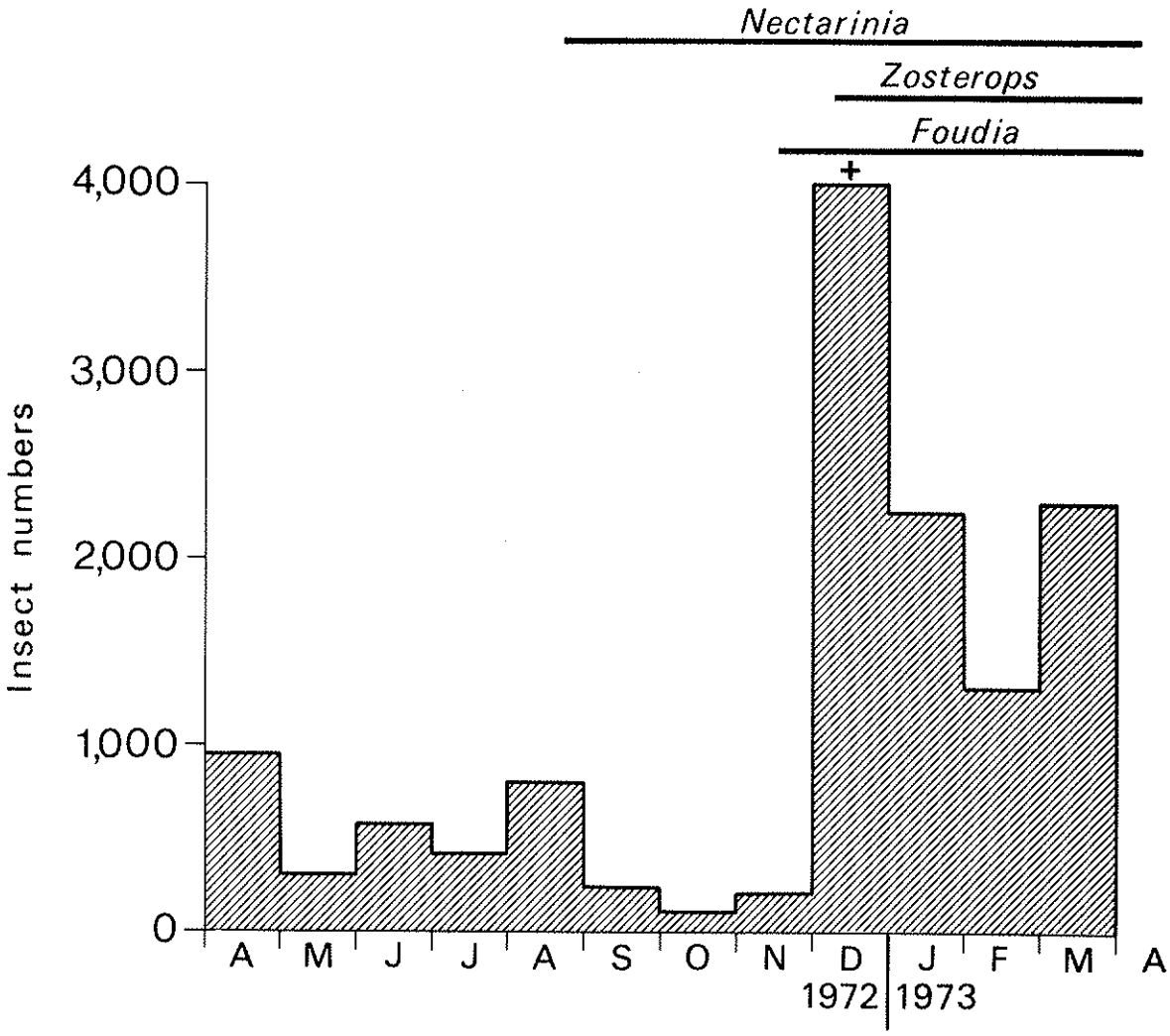
Fig. 1. Monthly insect abundance on West Island, Aldabra Atoll. Totals are numbers caught during daylight hours by a Johnson-Taylor Suction Trap during one week of each month (by kind permission of Dr. Dawn W. Frith). The breeding periods for *Nectarinia*, *Zosterops* and *Foudia* are illustrated. Note that *Foudia* and *Zosterops* commence breeding with an increase of insects but *Nectarinia* starts remarkably earlier (see text).


Nectarinia
Zosterops
Foudia
4,000
3,000
2,000
1,000
0
Insect numbers
A M J J A S O N D J F M A
1972
1973