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Preliminary Observations on the Affinities and Composition of the Insect Fauna of Aldabra

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Preliminary observations on the affinities and composition of the insect fauna of Aldabra

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Contents

Preliminary observations on the insect fauna of Aldabra are made, based primarily on the extensive collections made by the authors during the Royal Society Expedition to Aldabra 1967–8.

Information from past records, together with the available results from recent collections suggests that the total number of insect species on the atoll exceeds 1000.

Figures for the comparative affinities of the components of the Aldabran insect fauna as a whole are given and these are contrasted with a more detailed account of the affinities of the Lepidoptera Rhopalocera of the Aldabra group of islands.

The composition of the fauna is considered and factors affecting the composition and aspects of the fauna of particular interest are briefly reviewed.

1. Introduction

The insect fauna of Aldabra has, during the past 80 years, received the attention of a number of collectors. From past records based on large collections made by Abbott, Voeltzkow, Dupont, Thomasset, Fryer and Legrand and from the results of work on our collections, the total number of species is likely to exceed 1000. To keep this seemingly large figure in perspective it should be remembered that the number of insect species in the British Isles is in excess of 20 000. However, the insect fauna of Aldabra compares favourably with other atolls, and with that of the Seychelles, from which over 2100 species have been recorded; the Seychelles being a larger and far older series of islands, with a much more varied range of habitats.

The only comprehensive series of publications on the insect fauna of Aldabra is that based on the collections of J. C. F. Fryer in 1908–9. This material was included with that collected on the

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Seychelles by Dr Hugh Scott, as part of the Percy Sladen Trust Expedition to the Indian Ocean. A series of papers covering the complete range of insect orders was published between the years 1907 and 1925. Since that time, the only comprehensive work on any complete order of insects is that of Legrand (1965) on the Lepidoptera of the Seychelles and Aldabra. This was based on the large collections he made during his visits to the islands, in 1956 and 1958–60.

In many orders the state of knowledge of the fauna of the surrounding land masses is still very fragmentary. In the Diptera less than 10 % of the total range of the order has been covered for Madagascar, making any attempt to name the Aldabran species difficult and potentially misleading, and any references to endemicity should be considered in this context. As an example, of 16 species of shore flies (Diptera–Ephydridae) 12 are new to science at the species level, and one at the subspecies level. Whether such new species are endemic to Aldabra will not become apparent until the fauna of the adjacent areas, including Madagascar, has been better studied.

In the light of the previous remarks the following account must be treated as our preliminary views, and any conclusions, even of a general nature, are likely to be premature. It is worth remembering that Dr Hugh Scott had to wait over 25 years until 1932, before he was able to write his final conclusions regarding the insects collected by the Percy Sladen Trust Expedition (Scott 1933).

2. Affinities

Generally speaking the Aldabran fauna is Ethiopian in affinity, i.e. Ethiopian defined in its broadest sense, and including the Malagasy subregion. Unlike the Seychelles, with which it has been included in past reports, Aldabra has only a small element, 1.1 %, which it shares solely with the Orient.

Table 1

region or category	subdivision	percentage of total fauna	
Ethiopian	mainland	9.6	31.3
	Malagasy	12.6	
Seychelles	—	4.1	5.9
Oriental	—	1.1	
cosmopolitan and cosmotropical	—	—	14.8
insular	—	—	9.0
endemic	Aldabra	23.2	39.0
	Aldabra group	15.8	

The ratio of mainland African to Malagasy elements differs considerably, both between orders and within an order, but taken generally, over the whole class, a marked Malagasy affinity is apparent (see table 1).

The faunal affinities may be broken down into five categories, five regions of origin which, together with the endemic element, make up the total fauna.

(*a*) *African*

There appears to be some correlation between body size and place of origin between the Malagasy and African mainland elements. Insects of larger size are usually of mainland origin, often found on Madagascar but rarely derived purely from the latter. Of course, most of the insects in the cosmotropical and cosmopolitan categories, at least those not requiring passive means of transport, are large insects. Many of the species of smaller size are derived from Madagascar

and, as the predominant SE Trade winds blow from north Madagascar, small size may facilitate wind colonization. There are many exceptions to this rule, e.g. the only sand fly (Diptera: Phlebotominae), a very small insect, is recorded from East Africa and found on the windward side of Aldabra, but, as far as is known, does not occur on Madagascar.

(*b*) *Seychelles*

Only 4.1 % of the Aldabran fauna is shared with the Seychelles, the majority introduced naturally, but there is a small element which has been introduced by man, including some pests of stored products and parasites of domestic animals.

(*c*) *Oriental*

As mentioned previously the Oriental part of the Aldabran fauna, as known at present, is only 1.1 % of the whole. If the Seychelles are included with the Orient, as there may be grounds for doing, the percentage is increased to 5.9 %.

(*d*) *Cosmopolitan*

Cosmopolitan species, those common to two or more zoogeographical regions, or found throughout the tropics (cosmotropical), make up 14.8 % of the fauna. Many of the more obvious insects on Aldabra are in this category, e.g. *Musca domestica* (Linnaeus) (Diptera), *Gryllus bimaculatus* (de Geer) (Orthoptera), *Periplaneta americana* (Linnaeus) (Orthoptera), and *Danaus chrysippus* (Linnaeus) (Lepidoptera). It is impossible to decide whether such species arrived naturally, or were introduced by man. There is no reason to suppose that the majority were introduced by human agency as most insects in this category are capable of sustained flight. One species of termite *Prorhinotermes canalifrons* (Sjost.) (Isoptera), has been transported all around the Indian and Pacific oceans in floating timber, canoes, dhows, etc.

(*e*) *Insular*

This category consists of species which are not strictly cosmopolitan or even cosmotropical, but are found on Aldabra and the majority of the Indian Ocean islands, e.g. the Comoros, Mascarenes, Coetivy, Socotra, etc. Species in this category make up 9.0 % of the total.

The categories so far considered suggest a rather chaotic pattern of derivation of the insect fauna of Aldabra, although the Ethiopian influence is strongly to the fore, as expected.

The only discrete group of insects that we have so far considered that is both relatively sound taxonomically and extremely well collected and recorded over a very wide area of the world, is the butterflies (superfamilies Hesperioidea and Papilionoidea). At present 27 butterfly taxa are known from the Aldabra group, all recorded at least once during this century (see table 2). The list includes *Papilio dardanus* Brown, subspecies unknown, a specimen of which was observed by Legrand (1965, p. 174) but not captured.

Owing to the advanced state of the knowledge of the distribution of butterflies, generally even at the subspecific level, it is possible in most cases with the subspecies occurring on Aldabra to suggest their apparent source or, with the endemics, their closest surviving sister group. Notable exceptions, where the sister group is in doubt, are the pierids *Belenois aldabrensis* Holland and *Colotis evanthides* Holland.

With the exception of the four endemic forms, one species and three subspecies, the minimum number of regions from which the entire butterfly fauna can be derived is three: Madagascar,

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Comoro Islands and the Seychelles. No grouping, leaving out any of these areas can provide all 23 non-endemic subspecies. Consideration of the most likely sister-group species, or subspecies, of the four endemics suggests that the above three source areas could easily provide the entire known butterfly fauna of the Aldabra group. Table 3 gives the percentage of the fauna provided by Madagascar, Comoros and the Seychelles, either singly, or in any combination. This information is also presented as a histogram in figure 1. Figures in parentheses give additional numbers for estimates concerning sister-group origins of the four endemics.

TABLE 2. COMPOSITION AND DISTRIBUTION OF THE BUTTERFLY FAUNA OF ALDABRA

	general distribution of species										
family and species	A	B	C	D	E	F	G	Aldabra	Astove	Assumption	Cosmoledo
Papilionidae											
Papilio dardanus ?subsp.	—	—	×	—	—	—	—	×	—	—	—
Pieridae											
Eurema brigitta pulchella	—	—	—	×	—	—	—	×	—	—	—
E. floricola aldabrensis	—	—	—	—	—	—	×	×	×	—	—
Colotis evanthides	—	—	—	—	—	×	—	×	×	×	×
Belenois grandidieri	—	—	—	×	—	—	—	—	×	—	—
B. aldabrensis	—	—	—	—	—	—	×	×	×	×	—
Nymphalidae											
Danaus chrysippus liboria	—	—	—	×	—	—	—	×	×	×	×
Melanitis leda africana	—	—	×	—	—	—	—	×	—	—	×
Acraea terpsicore legrandi	—	—	—	—	—	—	×	×	×	×	×
A. ranavalona	—	—	—	×	—	—	—	×	×	—	—
Phalanta philberti	—	—	—	—	×	—	—	×	—	—	—
P. phalantha	—	—	—	×	—	—	—	×	—	—	—
Vanessa cardui	×	—	—	—	—	—	—	×	—	×	—
Junonia oenone epiclelia	—	—	—	×	—	—	—	×	×	×	—
J. orithya madagascariensis	—	—	—	×	—	—	—	×	—	×	×
J. rhadama	—	—	—	×	—	—	—	—	×	—	—
Hypolimnas misippus	×	—	—	—	—	—	—	×	—	×	×
Lycaenidae											
Hypolycaena philippus	—	—	×	—	—	—	—	×	—	—	×
Lampides boeticus	—	×	—	—	—	—	—	—	—	—	×
Syntarucus pirithous ?*insulana*	—	—	—	×	—	—	—	×	×	×	×
Euchrysops osiris	—	—	×	—	—	—	—	×	—	—	—
Zizula hylax ?*gaika*	—	—	—	×	—	—	—	×	—	—	—
Zizeeria knysa	—	—	×	—	—	—	—	×	—	—	—
Hesperidae											
Eagris sabadius aldabrensis	—	—	—	—	—	—	×	×	—	—	—
Borbo borbonica morella	—	—	—	—	×	—	—	×	—	—	—
B. gemella	—	—	×	—	—	—	—	×	—	—	—
Pelopidas mathias ?subsp.	—	×	—	—	—	—	—	—	×	—	—
total 27	2	2	6	10	2	1	4	23	11	9	9

A, Cosmotropical and cosmopolitan; B, palaeotropical; C, African and Malagasy; D, Malagasy; E, Aldabra group and Seychelles; F, Aldabra group and Comoros endemic; G, Aldabra group endemics.

Table 2 also shows the general distribution of the particular subspecific elements, grouping them in the following rather loosely defined zones: cosmotropical–cosmopolitan, palaeotropical, African–Malagasy, Malagasy, and the endemics: Aldabra group–Seychelles, Aldabra group–Comoros, and Aldabra group. Figure 2 shows the percentage composition of the fauna, as subspecies. Many other combinations of regions could be included in the tables and figures, but

those employed appear to give the most satisfactory general impression. Some simplification is of course involved, but without it the general trends are obscured.

TABLE 3. THE ZOOGEOGRAPHIC GROUPINGS REQUIRED TO PROVIDE THE ENTIRE BUTTERFLY FAUNA OF ALDABRA

Figures in parentheses indicate probable origins of endemics

region or subregion	number from region	number as percentage of total butterfly fauna
Madagascar	20 + (3)	85.2
Comoros	17 + (4)	77.7
Seychelles	10 + (1)	40.7
Madagascar and Comoros	21 + (4)	92.6
Madagascar and Seychelles	22 + (3)	92.6
Comoros and Seychelles	20 + (4)	88.8
Madagascar, Comoros and Seychelles	23 + (4)	100.0

There seems little doubt that Madagascar is the predominant single influence on the Aldabran butterfly fauna, as it is with the fauna as a whole. The weakness of this presentation lies in the fact that the influence of continental Africa is not demonstrated. It should be stressed that the general facies of the Aldabran butterfly fauna is Ethiopian, with doubtful and weak Oriental affinities. If it is assumed that of the 12 subspecies shared by the Aldabra group and the mainland (44.5 %), none arrived there directly, one could fairly describe the Aldabran fauna as a derived Ethiopian fauna. This is in so far as its principle source region is the general Malagasy region, which in turn has the African mainland as the source of its fauna. This result is essentially predictable and is in accordance with the position of Aldabra, its probable relatively short existence, and the general air flow régime of the western Indian Ocean.

3. ENDEMISM

As mentioned previously, any discussion of endemism concerning the Aldabran fauna is beset with conditions and has to be made in the light of our present rather fragmentary knowledge.

There are very few genera endemic to Aldabra that would be accepted by the majority of present-day workers. Some endemic genera, at present standing in the literature, belong to groups in which there has been no recently published revisionary work.

At the species level there is a fair degree of endemism. For those species for which we have reliable biological and distributional data, approximately 500, there is a level of endemism amounting to 23.2 %. Species endemic to the Aldabra group of islands—Aldabra, Assumption, Astove and Cosmoledo—raise the figure to 38 %.

At the subspecific level in particular we encounter the problem inherent in taxonomy of defining and interpreting the taxa as species, subspecies, variety, race or population. The majority of Aldabran insects differ in some way from the surrounding populations, usually in size, being smaller than typical forms, often with quite distinctive variations in colour. Aldabran

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species are often darker than representatives of the same species of the parent populations, and lighter than the same species on Astove and Cosmoledo, both of which appear to have had heavier rainfall in recent years. These differences in size and colour were responsible for a number of varietal and subspecific names being erected in some of the works published on the Percy Sladen Trust Expeditions. How many of these names will eventually be cleared from the literature is difficult to predict at present.

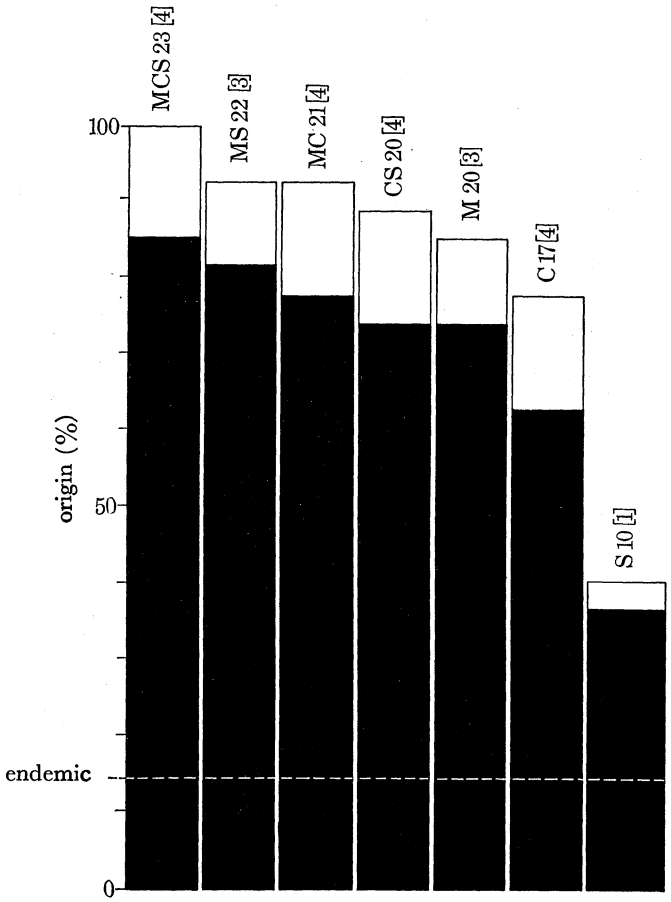

FIGURE 1

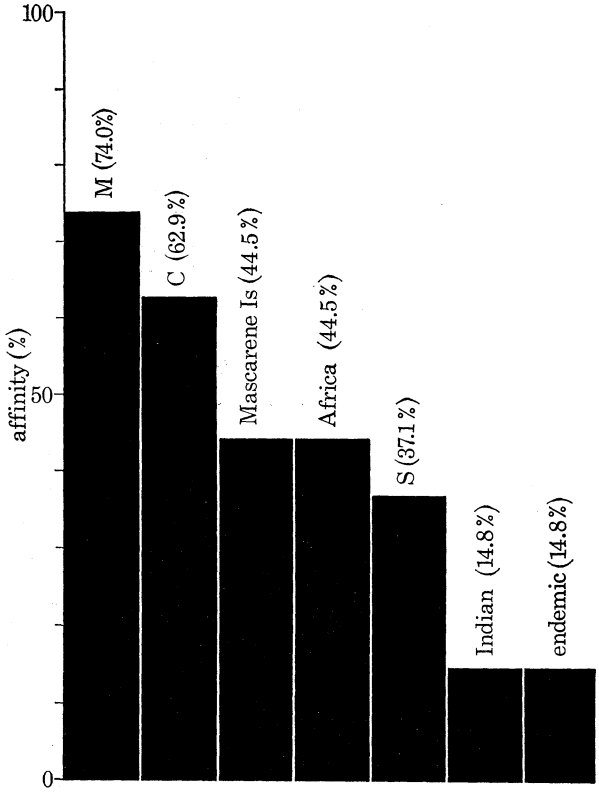

FIGURE 2

FIGURE 1. Percentage of butterfly fauna shared with Madagascar, Comoro Islands and Seychelle Islands, singly and in combination. M = Madagascar, C = Comoro Islands, S = Seychelle Islands. Numerals show number of species or subspecies (shaded area) plus, in square brackets, number after including possible sister-groups for endemic species or subspecies (open area).

FIGURE 2. The affinities of the butterfly fauna of the Aldabran group of islands. M, C and S explained in legend to figure 1.

Where possible we have attempted to trace the closest surviving related species or subspecies (sister-group) of the endemic forms, but to do this requires considerable time and a well-ordered and extensive reference collection. The majority of the detailed information that we have acquired on the relationships of the endemic species concerns the Rhopalocera, the butterflies.

The pierid species *Belenois aldabrensis* Holland and *Colotis evanthides* Holland are two distinctly isolated species, particularly the former which is endemic to the Aldabra group. *C. evanthides*

is also found on the Comoros. *Belenois aldabrensis* is of special interest as a well-defined endemic species and may suggest considerable antiquity for the islands, or it may be just a remnant of a formerly widespread species. A third possibility may be that there has been an accelerated rate of evolution of the species after its colonization of the islands, as the rigours of the Aldabran climate and topography may promote rapid changes. There is some evidence to suggest that many members of the Aldabran fauna are not established and are only maintained by fresh influxes from the source areas. Thus for permanent establishment some considerable adaptation may be necessary. The physiology of all the stages of the endemic species may be worth investigating, with a view to finding some physiological adaptations, e.g. an aestivating stage.

Colotis evanthides is interesting as it is shared only with the Comoros and because of the difficulty of deciding its sister-species. Bernardi (1954, p. 353) makes much of this species as a 'Lemurian link' with the Indian species *C. etrida* (Bouisduval). Mr R. I. Vane-Wright (personal communication) considers that this species is most likely related to *C. antigone* (Bouisduval) which has a south Mediterranean and Ethiopian distribution, but is absent from Madagascar.

Acraea terpsicore legrandi Carcasson, an endemic subspecies, is most like *A. terpsicore neobule* Doubleday from central E. Africa and the Comoros.

4. Composition

The majority of our collections, made on the third phase of the Royal Society Expedition, have received at least some attention from specialists in the taxonomy of the orders represented. Preliminary identifications to family, generic and in some cases specific level are available for the majority of the orders, more detailed investigations will have to await revisionary work on the individual families or genera in the African and Malagasy faunas.

Table 4. Numbers of families, genera and species of selected orders

order	families	genera	species	species per family
Isoptera	3	6	6	2.0
Thysanoptera	2	3	3	1.5
Coleoptera	40	127	176	4.4
Hymenoptera*	30	56	125	4.1
Diptera	41	136	184	4.6
Lepidoptera	30	—	228	7.6

* Partial records.

A brief review of the major orders for which we have data shows that, in keeping with other island faunas, there are usually only a very few species per genus and family (see table 4). In the order Diptera or true flies, 184 species were taken, in 136 genera and 41 families, giving a figure of 1.3 species per genus and only 4.6 species per family. The figures for the order Coleoptera are very similar: 4.4 species per family, 40 families being represented. The ratio in the Lepidoptera is slightly higher, 7.6 species per family and this figure probably reflects the more intensive collecting of Lepidoptera that has been carried out on Aldabra, compared to other orders. The total number of species recorded, but not necessarily named, in the three orders mentioned is 602.

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In the smaller orders, or those orders of insects only poorly represented on the atoll, there is usually a much lower number of species per family, and an even lower number of species per genus. Even in the larger orders the average number of species per genus rarely exceeds 1.3.

All the insects orders, with the exception of the Plecoptera, Ephemeroptera, Trichoptera and the small orders of very restricted distribution, are represented in the Aldabran fauna. Members of the three missing orders named probably require more permanent and extensive freshwater systems than are present on the atoll, and in fact are absent from the majority of the world's oceanic islands, with the notable exception of the Seychelles. None of the missing orders contain particularly strong flying species but this does not completely explain their absence as species of Neuroptera, with equally weak flight, are well represented on Aldabra.

A number of factors affect the composition of the Aldabran fauna, factors such as the age of the atoll, the topography and the variety of available habitats are all important in determining the form of the present ecosystem. The major factors affecting the composition and the convenient habitat categories are briefly reviewed below.

5. Environmental factors

(*a*) *Age*

The most recent estimate of the date of the last major submergence of Aldabra is in the region of 32 000 to 38 000 years ago. Those parts of the atoll which were not submerged, however, are considerably older than this, perhaps in excess of 100 000 years. Such a time period is still rather limited for colonization of the land, but there have been compensating factors in the proximity of Aldabra to the surrounding land masses and its relatively large land area.

(*b*) *Rainfall*

The annual rainfall on Aldabra appears to fluctuate considerably from year to year, and certainly over the past few years the atoll appears to have been drying out. The scarcity of rain in the years before the Royal Society Expedition in 1967–8 may account for the relative scarcity of one part of the ecosystem, namely insect parasites of plants and animals. Leaf miners among the Diptera, Lepidoptera and Hymenoptera were rare in our collections, most probably because of the lack of rain, as mined leaves are frequently the first to be shed in periods of drought. Similarly, parasitized insect larvae are usually the first to succumb under the stress of inclement conditions, and only two species of ichneumonid wasp and eight species of tachinid fly are recorded. The lack of these particular parasites may also be due to their difficulty in finding suitable hosts already on the island; in strictly host specific parasites colonization would be prevented in the absence of the correct host.

(*c*) *Aquatic environment*

Few parts of Aldabra are more than 1 km from the sea, and this has some quite marked effects on the fauna apart from the more obvious physical effects of saline spray. In any area close to the shore it was noted that the lesser fruit flies (Diptera–Drosophilidae) were actively displaced from the niche they commonly fill, i.e. fermenting fruit and vegetation, by small shore flies of the family Tethinidae. Rotting fruit in fly traps rarely produced drosophilids, but always very large numbers of the four species of Tethinidae. It is obvious that the species of Tethinidae breeding in shore litter, rotting seaweed, etc., are naturally attracted to fruity odours and the

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products of decomposition, and occur in such numbers that they are able to successfully compete with the fruit flies for the available food.

There are a large number of pools on the atoll, although many are of a temporary nature. They vary greatly in chemical and biological content and the salinity varies from the truly marine, through brackish, to fresh water. This wide range of aquatic habitats with the proximity of Madagascar must be responsible for the very rich aquatic insect fauna in comparison with other island groups. There are 16 species of water beetle (Dytiscidae, Gyrinidae, and Hydrophilidae) on Aldabra, a number that compares very favourable with the 22 species on the Seychelles and the eight species on the isolated Hawaiian islands in the Pacific. In the Diptera, 62 species, a third of the total, have aquatic larval stages or live in wet mud around the perimeter of pools. One species of *Ephydra* (Ephydridae) and one of *Aedes* (Culicidae) were recorded from small pools filled only at the highest spring tides and concentrated by evaporation during the intervening periods. These pools had a salinity reading well in excess of the surrounding sea water and a temperature of over 40 °C.

(*d*) *Plant and animal detritus*

Generally speaking the number of species of insects associated with plant detritus and animal waste products (dung, carrion, etc.) is very small. The majority of such substrates are very rapidly removed by the Giant Tortoises and a variety of land crabs—the remainder is very quickly desiccated. This rather restricts the development of the normal coprophagous and sarcophagous species and it is interesting to note that only three species of sphaerocerid flies, one aphodiid beetle and one coprid beetle, all dung breeders, were found.

Leaf litter fauna was in our experience very poor, but this may probably be directly correlated to the abnormally low rainfall that we encountered.

6. Parasites

The lack of insect parasites of the orders Diptera and Hymenoptera was previously mentioned and tentatively attributed to the dry conditions. However, with one or two notable exceptions, other insect parasites of birds and mammals were similarly scarce. Land and sea birds were examined for their ectoparasites. The land birds were relatively clear and large numbers of birds produced only small samples of one species of Hippoboscidae (Diptera) and nine species of bird lice (Mallophaga) from the seven species of land bird studied. The 'shore-birds' were more productive and the far-ranging sea birds (frigates, booby and tropic birds) were heavily parasitized by two species of Hippoboscidae, *Olfersia* spp., one species confined to the boobies and tropic birds (*O. aenescens* Thomson) and one to the frigates (*O. spinifera* (Leach)) and by ten species of bird louse. The mammalian parasites were equally scarce, the rats (*Rattus rattus* Linnaeus) had one species of flea, *Xenopsylla cheopis* (Rothschild), and of the two species of bat investigated, the *Pteropus* sp. (Pteropidae) was free from insect parasites and the Free-tailed bat, *Tadarida pusilla* Miller (Molossidae) was commonly parasitized by numbers of an interesting species of the Hemipteran family Polyctenidae (*Hypoctenes* new species). Specimens of this family are rarely taken, so that the Aldabra population may be of major importance for future work on the group. Fryer collected *Basilia blainvilli* (Leach) (as *Nycteribia fryeri* Scott) (Diptera: Nycteribiidae) on nearby Assumption on the Sheath-tailed bat, *Taphozous mauritianus* Geoffroy (Emballonuridae). This bat species has now been taken on Aldabra and so it is probable that the nycteribiid fly also occurs.

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7. Medically important insects

There are few species of insect on Aldabra that are worthy of note as being of potential medical importance. The most important is the mosquito *Aedes aegypti* (Linnaeus), the infamous vector of such diseases as Yellow Fever and Dengue. It appears to be fairly widespread on South Island of Aldabra, Cosmoledo and Astove, although never occurring in large numbers. Its numbers may be limited by *Aedes fryeri* (Theobald), a species not known to be a vector of disease, but found in large numbers anywhere within reach of the marine environment. *A. aegypti* has been accused of acting as the vector for the outbreak of malaria noted by Fryer in 1908, but it is more than likely that the species involved was *Anopheles gambiae* (Giles). The latter species was recorded from the pools around the settlement at the time of the 1930 malarial outbreak, but in 1968 it definitely was not present and in all probability has died out.

There is one species of phlebotomine sand-fly, *Sergentomyia clydei* (Sinton) (Diptera: Psychodidae). This species naturally feeds on lizards but in East Africa it transmits *Leishmania adleri*, which has been known to cause a transient skin infection in man.

Included in the general category of insects of potential medical importance are a number of species that may be termed passive transmittors: species of the genus *Musca*, especially *M. sorbens* Wiedemann and *M. domestica*. There are a number of species of the 'eye gnat', small flies of the family Chloropidae, genus *Hippelates*. In the Orient and in tropical America these flies are responsible for transmitting the organisms producing tropical ulcers, eye infections and yaws. As their name suggests they are attracted to eyes and the pus of wounds. Perhaps it would not be out of place here to mention the other land arthropod, non-entomological, which may be of medical importance, namely *Latrodectes mactans* (Fabricius), the black widow spider, which was taken on two occasions on Aldabra.

8. Introduced species

It is a most difficult problem to decide whether there have been many recent introductions, either natural or by man, on an island on which insects have been collected as spasmodically as on Aldabra. We can only rely on the published records of Fryer and Legrand, with occasional reference to the intervening period. Fryer failed to record the occurrence of three large and attractively marked species: the butterfly *Acraea terpsicore legrandi* Carcasson, the potter wasp *Eumenes maxillosa* de Geer and the large cricket, *Gryllus bimaculatus*. As all are found fairly commonly around the settlement area and elsewhere it does seem likely that they are natural recent introductions. Two much smaller species, unrecorded by Fryer, have most likely been introduced by man in recent years: *Oryzaephilus surinamensis* (Linnaeus) (Coleoptera) and *Echidnophaga gallinacea* (Westwood) (Siphonaptera). Both species occur around the settlement area of West Island, the former species in stored food and *E. gallinacea*, the stick-tight flea, on domestic chickens.

9. Conclusions

To summarize it may be said that the insect fauna of Aldabra is predominantly African in origin, a large percentage derived from the Malagasy region. Approximately 23 % of the species recorded at present are endemic to the atoll, and where information is available, it tends to suggest a majority of the endemic species are derived from Malagasy stock.

In keeping with records published concerning other isolated islands numbers of species per genus and family are invariably small, on average less than five species per family; while the number of families per order is large.

Finally it must be stressed that a great deal of work is needed to provide a basic inventory of the Aldabran fauna. Further collecting, especially during a rainy season, is desirable, although specialist collectors concentrating on one particular aspect of the fauna would probably be most successful in adding to our knowledge of the species present.

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