ENTOMOLOGICAL REPORT

C. A. Marsden and P. L. Wright

1. COLEOPTERA OF SÃO JORGE

Introduction.

Previous work on the Coleoptera of the Azores has shown the species present to be few in number and scarce in endemic forms when compared with the other Atlantic islands. The species that are present are mainly of European origin. Most of the past collections have been made on the larger, more accessible islands, in particular São Miguel, Terceira, Faial and, to a lesser extent, Flores. By making a general collection of the beetles on São Jorge it was hoped to obtain a more accurate picture of the distribution of the Coleoptera on the nine islands that form the Archipelago.

Historical Review

The first recorded entomological expedition to the Azores was made by Drouet and Morelet in 1857. Tarnier helped with the classification of the collection. The Natural History of The Azores by Godman (1870) contained the first catalogue of the Coleoptera collected on the Azores. The catalogue was compiled from the collections of Drouet, Morelet, Godman and Brewer. During the latter part of the nineteenth century several entomologists visited the islands. The Talisman Expedition of 1883 went to Faial. J. Clermont and M. Sedillot collected on São Miguel at about the same time (1887) as Nodier collected on the same island.

The visit to the Azores by L. Chopard and A. Méquignon during August and September 1930 resulted in several papers, by various authors, on specific groups of insects. The publications appeared at intervals from 1932 to 1942. Included in this series of publications was a revised catalogue of the Coleoptera made by Méquignon (1942) based upon his own collection, that of Hollands (1936) and all previous collections. Unfortunately Méquignon was unable to use the extensive collection made by Schützmayer, for Prince Torre-Tasso and the Pietro Ross Museum, during the spring of 1933. The premature death of the Prince delayed the classification of the large collection. R. Fréy and R. Storå visited several of the islands in 1933 and part of their work was incorporated into Méquignon's catalogue.

Drouet (1881) listed 60 species of Coleoptera found on the Azores; Crotch, in 1870, included 202 species in his catalogue. When Méquignon revised the catalogue (1942) he listed 279 species found in the Archipelago of which 35 were endemic. More recent additions (Bylinskyhaggart 1947) have brought the total to 296 recorded species. The paucity

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of species is a general feature of the Azorean terrestrial fauna. When the number of Coleopteran species found on Madeira and the Canary Islands are compared with the number on the Azores the former islands are shown to have a far greater number of species and a higher occurrence of endemic forms.

The concentration of work on the larger and more accessible islands is shown by reference to Table 1.

### Table 1. Distribution of Coleoptera on the Azorean Islands. June 1965

<table>
<thead>
<tr>
<th>Island</th>
<th>Area Km.</th>
<th>No Spp</th>
<th>Restricted to 1 island</th>
<th>Occurring also on (1 or more) other islands</th>
<th>Total</th>
<th>% endemic</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. Maria</td>
<td>117</td>
<td>47 (4)</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>12.7%</td>
</tr>
<tr>
<td>S. Miguel</td>
<td>747</td>
<td>224 (8)</td>
<td>15</td>
<td>8</td>
<td>23</td>
<td>10.1%</td>
</tr>
<tr>
<td>Terceira</td>
<td>506</td>
<td>93 (6)</td>
<td>1</td>
<td>7</td>
<td>8</td>
<td>8.6%</td>
</tr>
<tr>
<td>Graciosa</td>
<td>98</td>
<td>31 (6)</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>6.4%</td>
</tr>
<tr>
<td>S. Jorge</td>
<td>220</td>
<td>39 (5)</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>7.6%</td>
</tr>
<tr>
<td>Pico</td>
<td>496</td>
<td>30 (5)</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>6.6%</td>
</tr>
<tr>
<td>Faial</td>
<td>178</td>
<td>136 (7)</td>
<td>1</td>
<td>8</td>
<td>9</td>
<td>5.6%</td>
</tr>
<tr>
<td>Flores</td>
<td>169</td>
<td>93 (7)</td>
<td>5</td>
<td>6</td>
<td>4</td>
<td>14.3%</td>
</tr>
<tr>
<td>Corvo</td>
<td>13</td>
<td>28 (5)</td>
<td>0</td>
<td>4</td>
<td>4</td>
<td>12.7%</td>
</tr>
</tbody>
</table>

1. "Endemic species" refers to both full species and sub-species.
2. The bracketed figures refer to doubtful records, included in the total.

Distribution of the Coleoptera on the Azores

São Miguel has been extensively studied and this is reflected by the relatively high number of species recorded on the island. Flores with a surface area similar to Faial has fewer recorded species but a higher percentage of endemism. Pico, the third largest member of the Archipelago, has very few recorded species. There is obviously a need for systematic collections to be made on each island in order to obtain a clear picture of the distribution of the Azorean Coleoptera. However lack of sufficient exploration cannot be considered as the only reason for the differences between the nine islands.

The ancient forests, that formerly were a feature of every island, are rapidly disappearing. These forests, which contain such species as Euphorbia, Osmunda and Persea are now found only, to any great extent, on Flores and Corvo. In place of the original forests trees such as Juniperus and Pinus have been introduced. Flores and Corvo are thus of great interest as their flora and fauna are representative of that found before the colonisation of the archipelago by man. The high proportion of endemic forms unique to Flores is indicative of this idea.

The introduction, by man, of new plants has lead to the introduction of insects associated with a certain type or species of plant. Hylobates biajus was very probably introduced with coniferous wood, in which the larvae hatch. Pineapples are grown commercially on São Miguel but on no other island. Coleoptera that are found in association with pineapples are thus absent on the other islands. The importation of food materials, such as grain, has caused the introduction of such species as Tenebrio and Calandra granaria. Man has had a strong influence on the nature of the fauna of the islands.

On São Jorge the effects of man are clearly visible. Large areas of Erica have been cleared and Pinus planted in its place. Cucophilus beetles are found in large numbers in the pasture land, Orthophagus taurus in particular. Rubbish heaps, in Urzelina, yielded...
Saprinus semistriatus and Creophilus maxillosus. Genera such as Sitona, Otiorrhynchus,
Hypera and Epitrix, that are plant parasites, were found at all levels on the island. Calandra,
Hypera and Epitrix, that are plant parasites, were found at all levels on the island. Calandra,
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Harpalus (Psuedophonus) rufipes Dej. 1774.
Previous records Common on all the islands (D), São Miguel (C. M), Terceira (C), Graciosa (F. S), São Jorge, Pico (F. S. J de G), Flores, Faial (J de G).
New record São Jorge. Abundant at lower altitudes. 8, 9/65.
Distribution Madeira, North Africa (rare), Europe, Asia.

Harpalus distincticus Duf1 1812.
Previous records São Miguel (Nodier. C. M), Terceira (C), São Jorge (C), Faial (Nodier. J de G), Corvo (J de G).
New record São Jorge. Abundant at all altitudes, both craters 8, 9/65.
Distribution Madeira, Canary Islands, North Africa, Europe, Asia Minor.

"Sienophorus minutus" Schrank 1781.
Previous records São Miguel (J de G. Sédiollot. C. M), Terceira (G. C), Graciosa (J de G), Faial (G. J de G), Flores (F. S).
New record São Jorge. Found under a rock 200 ft above Ouvidor 9/65.
Distribution Madeira, Canary Islands, North Africa, Mediterranean, Europe.

Acupalpus brumneipes Sturm. 1825
Previous records São Miguel (D. G. Sedillot. C), Terceira (C), São Jorge (F. S)
Flores (G), Santa Maria (D).
New record São Jorge. 1 from Crater 2. 8/65.
Distribution North Africa, Mediterranean, Mid Europe.

Pterostichus (Largurus) vernalis Panz 1796.
Previous records Common on all the islands (D), São Miguel (G. Sedillot. M) Faial (Nodier. Talsman V. 1883).
New record São Jorge. 1 from Crater 1. 18/8/65.

T. Spain.
Previous records Terceira (G. Persson), São Jorge (F. S).
New record São Jorge. 2 from Crater 1. 8/65.
Distribution Madeira, Mid Europe.

Pristochnus (Laeosthenes) complanatus Dej. 1828.
Previous records Common on all the islands (D), São Miguel (M), Graciosa (J de G), Faial (Hollandie), Flores (G).
Distribution World-wide, Europe, North America, Australia.

Agonum rufocorne Goze 1777.
Previous records São Miguel (D. G. C. M), Terceira (Persson), São Jorge (F. S) Faial (J de G), Flores.

Amarina aenea Dej 1774.
Previous records Common on all the islands (D), São Miguel (Sedillot. J de G. C. M), Terceira (C), Graciosa (J de G), Faial (Nodier Talsman V), Flores (J de G. G).
Distribution Madeira, Canary Islands, North Africa, Europe, Siberia.

DYTISCIIDAE

"Hydroporus guerelui Reg 1891.
Previous records São Miguel (Barrois), Terceira (G), Faial, Corvo (G), Flores (G. F. S).
New record São Jorge. 3 from the pond in Crater 1. 8/65.
Distribution Endemic.
"Agabus godmani" Crotch 1887.
Previous records: Terceira (G), Graciosa (J de G), Faial (Talisman V), Flores (G).
Distribution: Endemic.

"Rhantus pulveros" Stephens 1828.
Previous records: Graciosa (J de G), Faial (Hollandse), Flores (F.S), Corvo (J de G).
New record: São Jorge. 1 from the pond in Crater 1. 8/65.
Distribution: North Africa, Europe, Asia, Australia, New Zealand, South Sea Islands, New Caledonia.

"Saginus bimastosanum" L. 1758. Nat. Syst. ed X.,
New record: São Jorge. 3 from the pond in Crater 1. 8/65.

**STAPHYLINIOIDEA**

**STAPHILINIDAE**

"Trogopilus bileatus" Steph. 1834.
Previous records: São Miguel (G.C.F), Terceira (G), Faial, Flores (G).
Distribution: Madeira, Canary Islands, Paleartic region.

"Oxytelus nitidulus" Grav. 1802.
Previous records: São Miguel (G.M), Terceira (G), São Jorge (F.S), Faial (G).
New record: Madeira, Canary Islands, North Africa, Egypt, Europe, Mid Asia, North America.

"Oxytelus complanatus" Er. 1837.
Previous records: São Miguel (G.C), Terceira (G), São Jorge (F.S), Faial (Hollandse), Flores (G).
New record: São Jorge. 1 from a rubbish heap in Urzelina. 8/65.
Distribution: Madeira, Canary Islands, North Africa, Europe.

"Stenus guttula" W.J. Mull, 1821.
Previous records: São Miguel (M.S), Flores (J de G, Stora).
New record: São Jorge. 1 found in Crater 1. 8/65.
Distribution: Atlantic regions but mainly European.

"Gyroporus punctulatus" Payk. 1779.
Previous records: São Miguel (G. Sedillot. C.M), Terceira (C).
New record: São Jorge. 1 found in Crater 1. 8/65.
Distribution: Madeira, Canary Islands, North Africa, Europe, West Asia, North America.

"Xantholinus linearis" O. 1794.
Previous records: São Miguel, Faial, Terceira (G), Corvo (J de G).
New record: São Jorge. 1 found in Crater 1. 8/65.
Distribution: Madeira, Canary Islands, North Africa, Paleartic region.

"Philonthus pollitus" L. 1758.
Previous records: São Miguel (G. Sedillot. M), Faial (G).
New record: São Jorge. 1 found under dead rat. 8/65.

"Cabrius nigritus" Grav. 1802.
Previous records: São Miguel (C.M), Terceira (G), Graciosa (F), São Jorge (F.S).
Ocyclus olenus Mull. 1764.
Previous records Common on all the islands (D), São Miguel (C. M) Graciosa (J de G), São Jorge (F), Faial (J de G).
New record São Jorge. Common at all altitudes. 8, 9/65.
Distribution Canary Islands, North Africa, Europe.

"Crepheius maxillosus" L. 1758.
Previous records São Miguel (G. C. M), Graciosa (J de G), Faial, Flores (G). São Jorge. 3 found in rubbish in Urzelina. 8/65.
New record Madeira, Canary Islands (var; canariensis Bernh), North Africa, Palearctic, St. Helena.
Distribution

"Halocerus capillaris" Grav. 1806.
Previous records São Miguel (G. M).
New record São Jorge. 2 specimens from Crater 1. 19/8/65.
Distribution Madeira, Canary Islands, North Africa, Western Mediterranean, Europe.

"Atheta (Aloconae) palustris" Kiesw, 1884.
Previous records São Miguel (M. S. F), Terceira (F. S), Faial, Flores (F. S).
New record São Jorge. 2 from Crater 1. 8, 9/65.
Distribution Madeira, Canary Islands, Western Mediterranean, Europe, Siberia, North America.

"Atheta species B.
Previous records Atheta sp have been recorded on São Miguel, Terceira, Faial and Flores.
New record São Jorge. 1 from Crater 1. 8/65.
Note There have been 13 Atheta sp recorded on the Azores. The exact classification of them is problematical.

Aleocara (Coprocheta) bipustulatum L. 1761.
Previous records São Miguel (Sedillot, G. M), São Jorge (F. S), Terceira, Faial, Flores (G).
New record São Jorge. 3 from rubbish heap and Crater 1. 8/65.
Distribution Madeira, Canary Islands, North Africa, Holartic.

HYDROPHILOIDEA

HYDROPHILIDAE

"Sphaeridium bipustulatum" F. 1761
Previous records São Miguel (G. M), Santa Maria (G), Terceira, Flores (G), Faial (F. S).
New record São Jorge. 2 found in dung at 1, 800 ft. 8/65.
Distribution Madeira, Salvage Islands, Paleartic and Neartic.

"Cercyon nigricipes" Marsh., 1802.
Previous records São Miguel (M. F. S), Santa Maria (G), Flores (G).
New record São Jorge. 2 found in rotting vegetation, Crater 2.
Distribution Madeira, Salvage Islands, Paleartic and Neartic.

HISTEROIDEA

HISTERIDAE

Sparinus semistriatus Scriba 1799.
Previous records Common on all the islands (D), São Miguel (D. M.), Faial (D. C), Flores (F. S).
New record São Jorge. 1 found in Crater 1. 8/65.
Distribution Madeira, Canary Islands, Paleartic, India.
SCARABAEOIDEA

Onthophagus taurus Schreber, 1759.
Previous records Very common on all the islands (D.G.J. de G.C.M.F.S.H).
New record São Jorge. Frequent at all altitudes. 8. 9/65.
Note Though several specimens were collected no males were found.
Mequignon (1842) noted a similar low frequency of males.

Onthophagus illyricus Scopoli 1763
New record Waste land in Urzelina 8. 9. 65.
Distribution South East Europe to Syria.

ELATEROIDEA

Previous records São Miguel (Morelet. G.M), Santa Maria (Morelet) Terceira (G.C).
New record Graciosa (F.S), Faial (J de G), Flores, Corvo (G).
Distribution São Jorge. 5 found near the laboratory. 8/65.
Endemic.

Heteroderes melliculus Cand. 1859.
Previous records Santa Maria (Morelet), Terceira (C), Faial (J de G).
New record Graciosa (F.S), Fealh (J de G), Pico (F.S).
Distribution São Jorge. 4 found in the Priest’s house. 8/65.
America, as far south as La Plata river.

Melanotus dichrous- Er. 1841.
Previous records São Maria (G), Faial (J de G), Pico (F.S).
New record São Jorge. 1 found in the Laboratory. 8/65.
Distribution North America, Portugal, West Mediterranean.

BOSTRYCHOIDEA

ANORIITIDAE

Ptilium pectinicornis L. 1758.
Previous records São Miguel (G), São Jorge (F.S), Pico (F.S).
New record São Jorge. 2 found in Crater 2. 9/65.
Distribution Madeira, North Africa.

CUCUJOIDEA

CORYLOPHIDAE

"Arthrops aequalis" Woll 1857.
Previous records São Miguel (M).
New record São Jorge. 2 found in Crater 2. 9/65.
Distribution Madeira, Spain, France and Central Europe.

COCCINELLIDAE

"Scymnus (Pullus) subvillosus Goze 1777.
Previous records São Miguel (M), Terceira (G), Faial (G).
New record São Jorge. 2 found in Crater 2. 9/65.
Distribution Madeira, North Africa, Europe, Asia, Siberia.

"Scymnus (Sethorus) miniatus Rossi, 1794.
Previous records São Miguel (Sedilitot), Faial, Santa Maria (G).
New record São Jorge. 1 found in Crater 2. 8/65.
Distribution Madeira, North African, Europe, Asia.
Coccinella undecempunctata L. 1758.
Previous records Common on all the Island (D. G. C. M. F. S.).
New record São Jorge. 2 found in Crater 1. 8/65.

Stroblia cardinalis Muls.
New record São Jorge. 1 found in Crater 1. 8/65.
Distribution Australia, now world wide due its economic use.

SCRAPTIIDAE

Anaspis (Silaria) proteus Woll. 1858.
Previous records São Miguel (G. C. M), Santa Maria (D), Terceira (F. S), São Jorge (F. S), Pico (F. S), Flores (F. S).
New record São Jorge. 1 found in Crater 2. 9/65.
Distribution Madeira and the Canary Islands.

ANTHICIDAE

"Anthicus quadruguttulus Rossi 1792.
Previous records São Miguel (M), Faial (G), Flores (G).
New record São Jorge. 3 found in Crater 2. 8/65.
Distribution North Africa and Europe.

CHRYSEMOLOIDEA

CERAMBYCIDAE

"Hylophyes bajalus L.
Previous records São Miguel (G), Faial and Flores (F).
New record São Jorge. 1 near the laboratory. 8/65.
Distribution Madeira, Canary Islands, South Africa, Europe.
Note Probably introduced with coniferous wood in which the adult breeds.

CHRYSEMELIDAE

"Chrysomela banksi F. 1775.
Distribution Europe.

"Edmonis pubescens Koch, 1803.
Distribution Europe, Western Asia.

CURCURIONOIDEA

CURCURIONIDAE

"Aplon (Aspidapion) radiolus Kirby. sub. sp. chalybepenne Woll. 1854
Previous records Faial (G. C. F. S), Flores (G).
New record São Jorge. 2 found in Crater 1, 8/65.
Distribution radiolus; Mediterranean, Western Asia.
chalybepenne; Madeira and the Canary Islands.

Otorrhyncus (Dymerus) sulcatus F. 1775.
Previous records São Miguel (Sedillo, C, G, M), Terceira (D), São Jorge (F. S) Pico (D), Faial (Hollandé).
New record São Jorge, common at all altitudes. 8-9/65.
Distribution Europe, North America, Australia, Tasmania, New Zealand.
<table>
<thead>
<tr>
<th>Species</th>
<th>Previous records</th>
<th>New record</th>
<th>Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>&quot;Otioryctes trophonius&quot; var. azoricus</strong></td>
<td>Fajal (Hollande, F. S.)</td>
<td>São Jorge. 1 specimen from Crater 1. 8/65.</td>
<td>The variety is endemic. The species is found in Sicily, Malta, Corfu and Egypt.</td>
</tr>
<tr>
<td><strong>Laparocerus azoricus</strong></td>
<td>São Miguel (G. C. F. S), Terceira (F. S), São Jorge (F. S),</td>
<td>São Jorge. Common in Crater 1. 8/65.</td>
<td>Endemic. The genus comes from Madeira and the Canary Islands.</td>
</tr>
<tr>
<td><strong>Pantomorus godmani</strong></td>
<td>Fafal (D), Flores and Corvo (J de G. F. S),</td>
<td>São Jorge.</td>
<td></td>
</tr>
<tr>
<td><strong>Sitona gressoriaus</strong></td>
<td>São Miguel (C. M), Terceira (C), Graciosa (F. S),</td>
<td>São Jorge. 2 found in a rubbish heap. 8/65.</td>
<td></td>
</tr>
<tr>
<td><strong>Sitona cambricus</strong></td>
<td>São Miguel (C. M), Terceira (C), Graciosa (F. S),</td>
<td>São Jorge.</td>
<td></td>
</tr>
<tr>
<td><strong>Sitona lineata</strong></td>
<td>São Miguel (G. C. M. F. S), Terceira (D.G.C), Faial (D. G), Pico (D).</td>
<td>São Jorge. 3 found in the region of Crater 1. 8/65.</td>
<td>Madeira, North Africa, Mid and South Europe, Siberia.</td>
</tr>
<tr>
<td><strong>Sitona flavescens</strong></td>
<td>Santa Maria (Brewer), Terceira (F. S), Fajal (F. S).</td>
<td>São Jorge. 3 found in Crater 2. 9/65.</td>
<td>Algeria, Spain, Southern France, Corsica, Corfu, West Asia, U.S.A.</td>
</tr>
<tr>
<td><strong>Hypara variabilis</strong></td>
<td>Terceira (C. F. S), Faial (F. S), Flores (F. S).</td>
<td>São Jorge. /3 found in Crater1. 8/65.</td>
<td>Madeira, Canary Islands, Europe, Introduced into U.S.A.</td>
</tr>
<tr>
<td><strong>Calandra oryzae</strong></td>
<td>São Miguel (G. C. M), Terceira (C), São Jorge (C. F. S), Pico (F. S), Faial (F. S).</td>
<td>São Jorge. 1 found in Urzélina. 9/65.</td>
<td>Cosmopolitan, transported with grain.</td>
</tr>
<tr>
<td><strong>Pseudophilochilus variabilis</strong></td>
<td>São Miguel (G. F. S. C. M), Terceira (C), Faial (G. F. S), Flores (F. S).</td>
<td>São Jorge. 1 found at the base of Crater 1. 8/65.</td>
<td>Endemic.</td>
</tr>
</tbody>
</table>
Table 3
Summary of the Coleoptera on São Jorge

<table>
<thead>
<tr>
<th>Island</th>
<th>Area Km</th>
<th>No sp.</th>
<th>No endemic</th>
<th>% endemic</th>
</tr>
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<tbody>
<tr>
<td>Azores</td>
<td>2,529</td>
<td>303</td>
<td>38</td>
<td>12.5</td>
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<tr>
<td>São Jorge</td>
<td>220</td>
<td>84 (5)</td>
<td>8</td>
<td>9.9</td>
</tr>
</tbody>
</table>

8" includes 1 that only occurs on São Jorge.
1 sub species.
1 variety.

The figure in brackets refers to the number in the total number of recorded species that are doubtful records.

Discussion

(a) New species to the Azores. Apart from Rodolia cardinalis the new records to the Azores are of European origin. Rodolia cardinalis, on account of its economic use already referred to, has a very wide distribution. *Agabus bipustulatum* was found, on three occasions, in the pond at the base of Crater 1. This species has a wide distribution, being found in Europe, Africa, and Asia but not in Madeira. In Madeira it is replaced by A. wollastonic Sharp. It appears to have successfully colonised São Jorge if not the Azores as a whole. "Epirilix pubescens" was collected frequently when sweeping the vegetation around the rim of Crater 2. This species is found in the South East of England and in Europe and Western Asia... *Chrysomela banki* is of Mediterranean origin but is now found throughout Europe. The species is found locally in England. Outhophagus illyricus seems a surprising record as it has only been found in Southern Europe to Syria but not in Spain, Portugal or Morocco.

(b) Endemic species. The major interest of the beetle fauna of São Jorge is the occurrence of endemic forms and their origins. It appears that certain of the Azorean endemic forms occur in abundance on every island whilst others are localised to a certain island, for example 40% of the endemic species found on Flores have only been found there. São Jorge has so far yielded eight endemic forms:

- *Hydroporus guernel Reg*.
- Agabus godmani Crotch
- Heteroderes azoricus Tarnier/Morelet
- Heteroderes mellicatus sub sp. moreleti Tarnier
- Ortiorrhynchus trophonius var. azoricus Uyttenb
- Cathoroxocerus lepidopterus Uyttenb
- Laparocerus azoricus Drouet
- Pseudoleiophagus variabilis Crotch.

The single endemic species found only on São Jorge is Cathoroxocerus lepidopterus a single specimen having been found by Frey on Ilho do Topo. Topo is a small island lying off the eastern tip of São Jorge. A single specimen of Ortiorrhynchus trophonius azoricus was found in Crater 1. This variety had previously been found on Fajã. The remaining endemic forms found on São Jorge have a wide distribution in the archipelago.

The genus Laparocerus is restricted to the Atlantic Islands (Azores, Madeira and the Canary Islands). The genus Heteroderes is South American and Ortiorrhynchus is Mediterranean. The remaining endemic forms, Agabus, Hydroporus and Pseudoleiophagus, have their origins in the Holarctic region.

(c) Other Coleoptera found on São Jorge. A very small group have their origin in the Atlantic region, that is the coastal areas of North West Africa and Europe northwards to the British Isles. This group includes *Stenus guttula*, *Bembidion harpaloides* and *Ptinus pectinicornis*. The Indo-Pacific area, the coastal regions of the Indian and Pacific oceans, is represented by Calandra oryzae only. *Calosoma olivieri* inhabits the semi desert regions of North Africa, Asia and the Canary Islands.
The remainder of the species found on São Jorge have their origins in Europe, have a wide distribution and many appear to have reached the Azores with man’s aid.

(d) Problems concerned with the paucity of the Fauna. Whilst being largely of European origin the Azorean Coleopterous fauna shows many gaps when compared with the fauna of Portugal, Northern Spain or Madeira. Northern Spain has a very similar climate to the Azores. The extreme isolation of the islands may account for some of the gaps. Lindroth (1960) has shown that the "catching angles" between Morocco-Madeira, Portugal-Madeira, Morocco-Azores and Portugal-Azores are very much less in the case of the Azores. This may account for some of the differences in the number of Coleoptera found on each archipelago; providing one accepts that air-dispersed insects are more likely to alight on land rather than in the sea. This is probably a fair assumption, as Lindroth points out, because the insects will be absorbed by the convective currents formed over land and most flying insects are able to direct themselves towards land. They are also able to distinguish between land and water. Another point Lindroth makes is that the direction of the prevailing winds may favour one archipelago more than another. Though it would appear that the Azores would benefit rather than Madeira, but the difference is very slight.

The Azores are still volcanically active and earlier conditions may have been unfavourable for the colonisation of the islands by plants and animals. The volcanic nature of the islands also means there is a lack of certain geophysical environments, an instance of the islands also means there is a lack of certain geophysical environments, an instance of the island and so are in great contrast to the Mediterranean area. This factor may prevent species adapted for the warm but dry climate of the Mediterranean from establishing themselves on the Azores. There are exceptions. Calosoma olivieri, typically an inhabitant of semi-desert regions, appears to be fairly common on the archipelago. An abundance of a suitable food source, in this case caterpillars, may be part account for this. Conversely the absence of plants with which certain Coleoptera are associated is another reason for the faunal poverty.

The theory of a land bridge between Europe and the American continent does not really aid the problems of the Azorean fauna. Lindroth points out that the Azores, having a mild Atlantic situation, would be expected to have a bi-continental fauna, if the theory of continental drift is correct. However the very few American species found on the Azores appear to have been introduced.

A combination of the factors mentioned, and probably some not realised, may account for the paucity of the Azorean Coleopterous fauna when compared with the other Atlantic islands and the European and African continents from whence it is mostly derived.

SUMMARY

The Coleopterous fauna of the island of São Jorge exhibits the general features of the Azorean fauna. There are few species and few endemic forms and it is of mainly European origin. The new records to the Azores are species with a wide distribution. Several factors, such as isolation, environment, prevailing winds and volcanic behaviour, have been suggested as reasons for the faunal paucity.

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References.


Colas, G.  

Crochet, G.  

Drouet, H.  

Drouet, H.  

Godman, F. du C.  

Guerra, J. de.  

Méquignon, A.  

Méquignon, A.  

Méquignon, A.  

Méquignon, A.  

d'Orchymont, A.  

d'Orchymont, A.  

Uyttenboogaart, D. L.  

Uyttenboogaart, D. L.  

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The following papers were pointed out to me shortly before going to press. As far as possible the new information has been added to my article.

Lindob.  

Landin. D.  

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2. LEPIDOPTERA COLLECTED ON SÃO JORGE

PIERIDAE

Pieris brassicae azorensis, Rebel.
Colias croesus helice, Fulmeroy.

LYCAENIDAE

Polyommatus (Lampides) boeticus, L.

SATYRIDAE

Satyrus (Eumenis) semele azorinus, Strecke.

PYRALIDAE

Diastris punctipennis, Duponchel.
Papilio manila, Hübner.

Euphyia centrostrigaria, Wallaston.

NOCTUIDAE

Noctua pronuba, L.
Mythymna unipuncta unipuncta, Haworth.
Calopha partita, Guenee.
Platysia chrysalis, L.