

REVISED LIST OF HAWAIIAN ANTS

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INTRODUCTION

The foundations of our knowledge of the Formicidae of Hawaii were laid by Forel in a short paper published in 1899 in the "Fauna Hawaiiensis". He enumerated 20 forms, but three of these do not belong to the Hawaiian fauna, namely, *Aphænogaster* (*Nystalomyrma*) *longiceps* F. Smith, a well-known Australian ant, recorded from Honolulu (Rothney) but not since taken in the islands; *Pogonomyrmex occidentalis* Cresson, a harvesting ant of the Rocky Mountains which must have borne an erroneous locality label in Forel's collection; and *Paratrechina* (*Nylanderia*) *obscura* Mayr, an Australian species cited by Blackburn and Cameron from the Hawaiian islands but probably the form later described by Forel as *P. (N.) bourbonica hawaiiensis*.

In 1913 Gulick published a useful synopsis and list of the Hawaiian ants, comprising 23 forms. As the three above mentioned were omitted, only 6 forms had been added during the 14 years since the publication of Forel's paper.

A visit to the islands during April and May, 1930, enabled me to acquire some acquaintance with the ants of the islands of Oahu and Hawaii and with the valuable collections in Bernice P. Bishop Museum, the Sugar Planters' Experiment Station, and the Federal Quarantine Station in Honolulu. Mr. E. H. Bryan of the Museum, Mr. O. H. Swezey of the Experiment Station, and Mr. E. M. Ehrhorn of the Quarantine Station gave me every assistance in studying the collections and in finding the pertinent literature. Mr. Swezey, who accompanied me on a visit to the island of Hawaii, placed at my disposal his amazing knowledge of the insects and plants of the archipelago, and Drs. F. X. Williams, H. R. Hagan and J. F. Illingworth, and Mr. C. E. Pemberton conducted me to interesting collecting grounds on Oahu. I am also indebted to Mr. R. H. Van Zwaluwenburg and Dr. Williams for interesting series of hypogaecic ants collected on the same island.

The revised list here presented as the result of all this generous assistance and my own more limited field observations comprises

35 forms and therefore shows an accession of only 12 items during the past 20 years. The area covered, however, is greater than that of previous lists, since it includes also the small windward islands, but these have yielded only two forms not recorded from the larger more southerly islands, *Ponera punctatissima schauinslandi* Emery and *Monomorium minutum* Mayr. The records of *M. minutum* may refer to the variety *liliuokalanii* Forel.

Thirty-five species, subspecies, and varieties are a meager ant fauna for an area as large as Hawaii, possessing a tropical climate, an abundance of other insects, and a magnificent indigenous and introduced flora. It is, indeed, quite as meager as and not unlike the ant faunas of Society Islands and Marquesan Islands. Nevertheless, the present list is of considerable interest, for, owing to the perseverance and acumen of the entomologists in Honolulu, it is undoubtedly more nearly complete than the ant list of any other group of islands in the Pacific. It is probable, therefore, that any further accessions will be exclusively or almost exclusively recent introductions by man.

The zoögeographical consideration of the Hawaiian ants may be facilitated by dividing them into the three following groups:

ENDEMIC SPECIES

Cerapachys (*Syscia*) *silvestrii* Wheeler
Ponera *kalakauæ* Forel
Ponera *perkinsi* Forel
Pseudocryptopone *zwaluwenburgi* Wheeler
Pseudocryptopone *swezeyi* Wheeler
Epitritus *wheeleri* Donisthorpe

ENDEMIC SUBSPECIES AND VARIETIES

Ponera *gleadowi decipiens* Forel
Ponera *punctatissima schauinslandi* Emery
Leptogenys *falcigera insularis* F. Smith
Monomorium *minutum* Mayr variety *liliuokalanii* Forel
Cardiocondyla *nuda* Mayr variety *minutior* Forel
Cardiocondyla *wroughtoni* Forel variety *hawaiiensis* Forel
Strumigenys (*Cephaloxys*) *membranifera* Emery variety *williamsi* Wheeler
Camponotus (*Tanaemyrmex*) *variegatus hawaiiensis* Forel
Paratrechina (*Nylanderia*) *bourbonica hawaiiensis* Forel

PANTROPICAL VAGRANTS

**Pheidole* *megacephala* Fabricius
 **Solenopsis* *geminata rufa* Jerdon
 **Monomorium* *floricola* Jerdon

Monomorium fossulatum seychellense Emery
 Monomorium latinode Mayr
 Monomorium minutum Mayr
 *Monomorium pharaonis Linnaeus
 *Monomorium (Parholcomymex) destructor Jerdon
 *Monomorium (Parholcomymex) gracillimum F. Smith
 *Tetramorium guineense Fabricius
 *Tetramorium simillimum F. Smith
 Tetramorium tonganum Mayr
 Strumigenys lewisi Cameron
 *Tapinoma melanocephalum Fabricius
 *Technomyrmex albipes F. Smith
 Plagiolepis exigua Forel
 Plagiolepis mactavishi Wheeler
 Brachymyrmex heeri Forel variety aphidicola Forel
 *Paratrechina longicornis Latreille
 Paratrechina (Nylanderia) sharpi Forel

The following inferences may be drawn from an inspection of these lists:

1. The six endemic species are all diminutive, blind or myopic, subterranean ants, that is, members of the interesting biocoenose which Silvestri has called the "microgenton". Furthermore, they all belong to the archaic subfamily Ponerinae, with the exception of *Epitritus wheeleri*, which is itself a member of an ancient cosmopolitan Myrmicine genus with very discontinuous distribution. These few ants may therefore be regarded as so many relics of the original, early Tertiary fauna of the archipelago and as probably owing their survival, in what must have been at times and over considerable areas a very unfavorable volcanic environment, to their exquisite hypogaic habits. All 6 species are essentially Old World forms and 3 of them, the *Cerapachys* and the 2 species of *Pseudocryptopone*, are closely related to East Indian and Papuan species.

2. With the exception of *Leptogenys insularis* and *Camponotus hawaiiensis*, the 9 forms in the second list are of small stature and 4 of them, *Ponera decipiens* and *P. schauinslandi*, *Strumigenys williamsi*, and *Monomorium seychellense* are members of the microgenton. All are subspecies or varieties of Old World species and 5, *Ponera gleadowi*, *Cardiocondyla nuda* and *C. wroughtoni*, *Camponotus hawaiiensis*, and *Paratrechina bourbonica*, are clearly of Indo-Malayan origin. *Strumigenys membranifera* variety *williamsi*, as I have shown (1933), has a very peculiar distribution, since the typical form was described from Italy, and its 4 subspecies and

varieties occur in Tunis, St. Thomas Island, West Indies, the Gulf States of North America, and Hawaii, respectively. We may regard the forms in the second list as ancient immigrants whose relatively long sojourn in the islands is attested by their development of perceptible subspecific or varietal characters.

3. The third series of 20 forms, or 57 per cent of the whole Hawaiian ant fauna, comprises pantropical waifs, or vagrants, which may be subdivided into two groups. Eleven, indicated by asterisks, are already widely distributed throughout the warmer portions of both hemispheres, whereas the others seem to be invading the same regions at a slower or more hesitant pace. All these ants belong to the Indo-Malayan or Indonesian fauna with the single exception of *Brachymyrmex hecvi* variety *aphidicola*, which is of neotropical origin and has only recently established itself in fernhouses in Honolulu. It might be omitted from the list, until it has demonstrated its ability to survive in the open country.

Honolulu, since its development as a port and naval base, has become the focus of introduction of many insects. The number of species of ants introduced with merchandise and lumber from Oriental and American ports, often as whole colonies, is remarkable. I give below a list compiled from the specimens and records of species which Mr. Ehrhorn and his assistants have succeeded in intercepting at the Quarantine Station within recent years. The countries cited as the direct source of some of the forms may not be accurate, because tropical ants not infrequently establish their colonies in the woodwork of vessels and later move into the transported lumber or merchandise.

Ants Intercepted at the Quarantine Station, Honolulu

PONERINAE

| | |
|--|--------------------------|
| † <i>Holcponera porcata</i> Emery..... | Costa Rica |
| <i>Euponera</i> (<i>Brachyponera</i>) <i>luteipes</i> Mayr..... | China, Manila |
| <i>Euponera</i> (<i>Brachyponera</i>) <i>solitaria</i> F. Smith..... | Japan |
| * <i>Odontomachus haematoda</i> Linnaeus..... | Panama, Trinidad, Manila |

MYRMICINAE

| | |
|--|----------------------|
| † <i>Pheidole hyatti</i> Emery..... | California |
| <i>Pheidole javana</i> Mayr..... | China, India, Manila |
| * <i>Pheidole megacephala</i> Fabricius..... | Japan, China |
| † <i>Pheidole punctatissima</i> Mayr..... | Central America |
| <i>Pheidole rhombinoda</i> F. Smith..... | China |

| | |
|---|--|
| * <i>Solenopsis geminata rufa</i> Jerdon..... | Java, China |
| <i>Pheidologeton affinis</i> F. Smith 2♂ ♀..... | China |
| * <i>Monomorium floricola</i> Jerdon..... | Manila, in orchids |
| * <i>Monomorium pharaonis</i> Linnaeus..... | Japan, China, Manila, Ceylon, India; San Francisco, California; Brisbane, Australia |
| * <i>Monomorium</i> (<i>Parholcomymex</i>) <i>destructor</i> F. Smith..... | Japan |
| * <i>Monomorium</i> (<i>Parholcomymex</i>) <i>gracillimum</i> F. Smith..... | China |
| <i>Crematogaster</i> (<i>Acrocœlia</i>) <i>laboriosa</i> F. Smith..... | Japan |
| † <i>Crematogaster</i> (<i>Acrocœlia</i>) <i>lineolata californica</i> Emery..... | California |
| <i>Tetramorium caespitum</i> Linnaeus variety..... | Japan |
| * <i>Tetramorium guineense</i> Fabricius..... | China, Guam |
| <i>Tetramorium pacificum</i> Mayr..... | Manila |
| * <i>Tetramorium simillimum</i> F. Smith..... | Japan, Manila |
| <i>Triglyphothrix striatidens</i> Emery..... | Manila |
| † <i>Wasmannia auropunctata</i> Roger..... | Central America |
| * <i>Strumigenys lewisi</i> Cameron..... | Japan |
| † <i>Cyphomyrmex rimosus</i> Spinola..... | Panama, Trinidad |

DOLICHODERINAE

| | |
|--|------------|
| <i>Dolichoderus</i> (<i>Hypoclinea</i>) <i>bituberculatus</i> Mayr..... | Manila |
| <i>Dolichoderus</i> (<i>Hypoclinea</i>) <i>quadripunctatus</i> Linnaeus variety..... | Japan |
| † <i>Iridomyrmex humilis</i> Mayr..... | California |
| <i>Iridomyrmex itoi</i> Forel..... | Japan |
| * <i>Technomyrmex albipes</i> F. Smith..... | Manila |
| * <i>Tapinoma melanocephalum</i> Fabricius..... | Manila |

FORMICINAE

| | |
|--|------------------------------|
| <i>Plagiolepis melanogaster</i> Emery..... | Manila, in orchids |
| <i>Lasius niger</i> Linnaeus..... | Japan, China |
| <i>Lasius niger alienus</i> Förster..... | Japan |
| † <i>Lasius niger alienus</i> variety <i>americanus</i> Emery..... | California |
| <i>Lasius</i> (<i>Chthonolasius</i>) <i>flavus</i> De Geer..... | Germany |
| † <i>Formica subpolita</i> Mayr..... | Washington |
| <i>Camponotus obscuripes</i> Mayr..... | Japan |
| <i>Camponotus</i> (<i>Tanaemyrmex</i>) <i>nicobarensis exiguoguttatus</i> Emery..... | China |
| † <i>Camponotus</i> (<i>Myrmothrix</i>) <i>abdominalis</i> Fabricius..... | Trinidad |
| <i>Camponotus</i> (<i>Myrmentoma</i>) <i>itoi</i> Forel..... | Japan |
| † <i>Camponotus</i> (<i>Myrmobrachys</i>) <i>planatus</i> Roger..... | Central America |
| <i>Polyrhachis</i> (<i>Myrmhopta</i>) <i>argentea</i> Mayr..... | Manila |
| * <i>Paratrechina longicornis</i> Latreille..... | China, Japan, Borneo, Manila |
| <i>Paratrechina</i> (<i>Nylanderia</i>) <i>bourbonica</i> Forel..... | Hongkong |
| † <i>Paratrechina</i> (<i>Nylanderia</i>) <i>parva</i> Mayr..... | New Jersey |

Of the 46 forms on this list, 12 (26.3%) are neotropical or nearctic (indicated by daggers) and 34 (73.7%) are paleotropical or palearctic. Among the latter are 13 well-known tropical vagrants (indicated by asterisks), 10 of which, as we have seen, had been previously introduced and had become established in the Hawaiian islands. It is difficult to explain the absence of one species, *Anoplo-*

lepis longipes, from all the preceding lists, because it is abundant and widely distributed not only in Indo-Malaya and Indonesia but also throughout Polynesia as far east as Samoa and Fiji, and has even established itself in one locality in western Mexico. It is almost as difficult to account for the fact that *Tetramorium pacificum* Mayr, which has much the same distribution and is on the list of species intercepted at the Quarantine Station, has not succeeded in establishing itself in Hawaii. Among the intercepted species we find also the Argentine ant, *Iridomyrmex humilis*, an originally neotropical species and the most pernicious of those recorded. Should it eventually secure a foothold in the islands, we may look forward to a repetition of what has occurred in Madeira and the Canary Islands, where it has not only exterminated *Pheidole megacephala*, but has also practically wiped out the indigenous ant fauna at elevations below 3,000 feet, just as *P. megacephala* is at present, according to Illingworth, actively displacing *Solenopsis rufa* on the island of Oahu.

The ant fauna, though meager, exhibits certain interesting peculiarities comparable in some respects with those of other faunal groups in the Hawaiian islands. These peculiarities may be briefly summarized:

1. Endemicity among the ants is rather high, though not so striking as among some other groups of insects, and the mollusks, birds, and plants. There are no endemic genera of Formicidae, but the family is represented, nevertheless, by 6 species and 9 subspecies and varieties peculiar to the islands (42.85 per cent of the whole ant fauna).

2. With the exception of the recently introduced *Brachymyrmex aphidicola*, all the forms are clearly of East Indian, Polynesian, or palearctic origin or affinities. Twenty of them (57.14 per cent) are, in fact, widely distributed forms in these regions.

3. No affinities with precinctive neotropical or nearctic forms are discernible, except in the previously mentioned *Brachymyrmex*.

4. Although very close relations have been detected between certain Hawaiian and Australian plants by Campbell (1933) and others, I am unable to find any such connections among the Formicidae. The two Hawaiian species of *Pseudocryptopone* are, however, more closely related to the Papuan than to the East Indian species. This is notably true of *P. swezeyi*, which is very closely allied to *P. tenuis* Emery and *P. mocsaryi* Szabó of New Guinea.

5. Though many of the Hawaiian ants are widely distributed over the archipelago, they have not been found to exhibit any local subspecies or varieties on the different islands like those observed in some of the ants of the Galapagos Islands (Wheeler 1920, 1924). Guppy's contention (1906) that the Hawaiian islands first appeared above the ocean in early Tertiary times and acquired their fauna and flora in the same manner as Krakatao after the eruption of 1883, is of some interest in this connection. Had the islands arisen by subsidence as so many remnants of a greater land mass already peopled by ants, we should expect a development of local subspecies or varieties of at least a few of the species on each island. But the force of this inference is weakened by two considerations: first, the time which has elapsed since the formation of the separate islands may not have been sufficiently long to produce differences of subspecific or even varietal magnitude, and second, more extensive collecting and very searching comparison of the collected material may yet show that certain species at least are actually represented by constant, though very feebly differentiated, local forms on some of the islands.

FAMILY FORMICIDAE

SUBFAMILY CERAPACHYINAE

1. *Cerapachys (Syscia) silvestrii* Wheeler.

Cerapachys (Syscia) silvestrii Wheeler: Lab. Zool. Gen. Agrar. Portici, Boll., vol. 3, p. 269, 1909, ♀. Haw. Ent. Soc., Proc.: Gulick, vol. 2, p. 306, appendix, 1913; Swezey, vol. 3, p. 281, 1917; Ehrhorn, vol. 3, p. 284, 1917.

Hawaii: Hilo, type locality (Silvestri). Oahu (Van Zwaluwenburg): Honolulu (Ehrhorn); nesting in compost heap (Swezey).

SUBFAMILY PONERINAE

2. *Ponera gleadowi decipiens* Forel.

Ponera decipiens Forel: Fauna Hawaiiensis, vol. 1, p. 118, 1899, ♀. Gulick: Haw. Ent. Soc., Proc., vol. 2, p. 306, appendix, 1913.

Kauai: on the coast, type locality. Oahu: Haw. Sugar Plant. Assoc., Exp. Sta., in compost (Swezey).

3. *Ponera kalakauae* Forel.

Ponera kalakauae Forel: Fauna Hawaiiensis, vol. 1, p. 116, 1899, ♀ ♀. Haw. Ent. Soc., Proc.: Gulick, vol. 2, p. 306, 310, 1913; Bridwell, vol. 3, p. 24, 1914. Timberlake: B. P. Bishop Mus., Bull. 31, p. 17, 1926.

Kauai: Lihue (type locality). Oahu (Van Zwaluwenburg): Honolulu (Bryan); Moanalua; Palolo; Tantalus; Waianae (Illingworth); Hauula; Kolekole Pass. Hawaii: Hilo Sugar Company (Swezey). Maui: Hana (Bryan). Molokai (Illingworth).

French Frigates Shoal (Bryan) ♀. Necker Island, ♂. Laysan Island (Fullaway) ♀.

4. *Ponera perkinsi* Forel.

Ponera perkinsi Forel: Fauna Hawaiiensis, vol. 1, p. 117, 1899, ♀ ♀ ♂. Wheeler: Lab. Zool. Gen. Agrar. Portici, Boll., vol. 3, p. 271, 1909, ergatomorphic ♂. Haw. Ent. Soc., Proc.: Gulick, vol. 2, pp. 306, 310, 1913, appendix; Perkins, vol. 1, p. 43, 1906; Illingworth, vol. 5, p. 273, 1923; Swezey and Bryan, vol. 7, p. 296, 1929.

Oahu: Tantalus, Lanihuli (Swezey, Bryan); Honolulu (Bridwell, Illingworth); Kuliouou, Palolo Valley, Kaumuahona, Kaimuki, Niu (Swezey); Nuuanu Pali (Ehrhorn). Molokai: forests (Swezey and Bryan). Maui: Haleakala (Swezey). Kauai: Summit Camp (Swezey); Koloa. Hawaii: Waimea.

"In the mountains on all the islands, generally from 2,000 to 4,000 feet" (Perkins).

5. *Ponera punctatissima schauinslandi* Emery.

Ponera punctatissima schauinslandi Emery: Zool. Jahrb., Syst., vol. 12, p. 439, 1899, ♀.

Laysan Island: type locality (Schauinsland).

6. *Pseudocryptopone zwaluwenburgi* Wheeler.

Pseudocryptopone zwaluwenburgi Wheeler: Am. Mus., Novitates, no. 672, p. 14, fig. 5, 1933, ♀.

Oahu: Honolulu (type locality); Waimanalo, Waialua, Waipio (Van Zwaluwenburg), in soil of sugar cane fields, both fallow and under cultivation. Maui: central portion, in field of growing sugar cane (Van Zwaluwenburg).

7. *Pseudocryptopone swezeyi* Wheeler.

Pseudocryptopone swezeyi Wheeler: Am. Mus., Novitates, no. 672, p. 16, fig. 6, 1933, ♀ ♀.

Oahu: Honolulu (type locality), in soil of sugar cane fields, both fallow and under cultivation (Van Zwaluwenburg).

8. *Leptogenys falcigera insularis* F. Smith.

Leptogenys insularis F. Smith: Linn. Soc. London, Zool., Jour., vol. 14, p. 675, 1879, ♀. Forel: Fauna Hawaiiensis, vol. 1, p. 118, 1899, ♀. Haw. Ent. Soc., Proc.: Gulick, vol. 2, p. 306, 1913, appendix; Bryan, vol. 7, p. 226, 1929; Swezey and Bryan, vol. 7, p. 296, 1929.

Kauai: Puu Konanae, altitude 300 feet, above Anahola River (Bryan); Lihue; Waimea.

Oahu: Koko Head, Ewa Coral Plain, Moanalua (Bryan); Kaimuki (Ehrhorn); Wahiawa, Palolo (Illingworth); Waianae Mountains (Swezey); Woodlawn, Honolulu (F. X. Williams); Aiea; Waimanalo, Honolulu, Koko Head (Swezey); Kaneohe Bay (Whitney). Molokai: sea level (Swezey and Bryan). Maui.

Drs. Illingworth and Williams find that this ant feeds on sowbugs (*Philoscia angusticauda* Budde-Lund). I have noted a similar habit in our North American *Leptogenys* (*Lobopelta*) *elongata* Buckley.

SUBFAMILY MYRMICINAE

9. *Pheidole megacephala* (Fabricius).

Formica megacephala Fabricius: Ent. Syst., vol. 2, p. 361, 1793-9, 2f.

Pheidole megacephala Forel: Fauna Hawaiiensis, vol. 1, p. 118, 1899. Perkins, Fauna Hawaiiensis, Int., pp. 83, 101, 140, 143, 217, 1913. Haw. Ent. Soc., Proc.: Perkins, vol. 1, p. 9, 1906; Kirkaldy, vol. 1, p. 100, 1907; Report, vol. 2, p. 296, 1913; Gulick, vol. 2, p. 308, appendix, 1913; Bridwell, vol. 3, p. 24, 1914; Illingworth, vol. 3, p. 24, 1914; Pemberton, vol. 3, p. 57, 1915; Warren, vol. 3, pp. 74, 78, 79, 1915; Illingworth, vol. 3, pp. 85, 113, 1915, pp. 142, 255, 1916, p. 349, 1917; Muir, vol. 3, pp. 180, 203, 1916; Bridwell, vol. 4, p. 311, 1920; Fullaway, vol. 5, p. 12, 1922; Ehrhorn, vol. 5, p. 18, 1922; Giffard, vol. 5, p. 54, 1922, pp. 184, 201, 1923; Crawford, vol. 5, p. 194, 1923, p. 361, 1924; Illingworth, vol. 5, pp. 273, 278, 1923, p. 350, 1924; Willard, vol. 5, p. 351, 1924; Illingworth, vol. 7, p. 45, 1928; Ehrhorn, vol. 6, p. 3, 1925; Illingworth, vol. 6, pp. 352, 357, 389, 396, 1927; Williams, vol. 6, pp. 426, 431, 1927; Timberlake, vol. 6, p. 556, 1927; Swezey and Bryan, vol. 7, p. 296, 1929. Timberlake: B. P. Bishop Mus., Bull. 31, p. 18, 1926.

Oahu: Honolulu (Thompson, Swezey); Manoa, Kolekole, Bishop Museum (Bryan); Waialae; Tantalus (Bridwell); Wahiawa (Illingworth); Manoa (Swezey); Kahuku, Waialua, Waianae Mountains, altitude 2,000 feet (Wheeler); Popoia Islet (Ball). Kauai: Kokee, altitude 4,000 feet, Kapaa (Kusche); Koloa; Lihue. Molokai: (Swezey and Bryan); Kaunakakai (Ball). Hawaii: Huehue and South Kona (Swezey), on *Campylotheca*; Mauna Loa

(Illingworth); Kona (Wheeler); Kohala (Fullaway); Puu Kamaoa (Meinecke).

Midway Island: (Fullaway).

“All the islands from coast to elevation of 3,000 feet” (Perkins). In the Waianae Mountains I found a large colony of this ant which had stored in its nest great numbers of a small terrestrial amphipod.

10. *Solenopsis geminata rufa* (Jerdon).

Atta rufa Jerdon: Madras Lit. Soc., Jour., vol. 17, p. 106, 1851, ♀.

Solenopsis geminata race *rufa*, Forel: Fauna Hawaiiensis, vol. 1, p. 119, 1899.

Perkins: Fauna Hawaiiensis, Int., p. 101, 1913. Haw. Ent. Soc., Proc.: Lewis, vol. 2, p. 175, 1912; Ehrhorn, vol. 2, pp. 178, 296, 1912; Gulick, vol. 2, p. 308, appendix, 1913; Ehrhorn, vol. 3, p. 86, 1915; Fullaway, vol. 3, p. 284, 1917; Illingworth, vol. 3, pp. 350, 352, 1917, vol. 6, p. 389, 1927.

Oahu: Honolulu, Waianae, abundant; Wahiawa, Koko Head (Illingworth, Wheeler); Kamehameha School (Clarke); Wawamalu Beach, near Koko Crater, Alewa Heights; Kailua, Nanakuli, Pauoa (Bryan); Kaimuki, Ewa (Swezey).

11. *Monomorium floricola* (Jerdon).

Atta floricola Jerdon: Madras Lit. Soc., Jour., vol. 17, p. 107, 1851, ♀.

Monomorium floricola, Forel: Fauna Hawaiiensis, vol. 1, p. 119, 1899.

Perkins: Fauna Hawaiiensis, Int., p. 101, 1913. Haw. Ent. Soc., Proc.: Ehrhorn, vol. 2, p. 182, 1912; Gulick, vol. 2, p. 308, 1913. Timberlake: B. P. Bishop Mus., Bull. 31, p. 17, 1926.

Oahu: Kaena Point (Swezey). Maui: Keanae and Iao Valley (Swezey).

Nihoa Island (Bryan) ♀ ♀ ♂ on *Pritchardia*, *Euphorbia* and *Sida*. Wake Island (Bryan) ♀.

Cited from “Oahu, Molokai, Lanai and Maui and probably all the islands” (Perkins).

12. *Monomorium fossulatum seychellense* Emery.

Monomorium fossulatum seychellense Emery: Soc. Ent. France, Ann., vol. 63, p. 69, fig., 1894, ♀ ♀. Haw. Ent. Soc., Proc.: Timberlake, vol. 6, p. 7, 1925; Swezey, vol. 6, p. 48, 1925, p. 219, 1926; Editor, vol. 6, p. 217, 1925.

Maui: Haiku (Swezey), in soil among sugar cane stools. Kauai: Grove Farm Plantation (Swezey). Oahu: Puuloa, ♀ ♀, in cane (Swezey); Makiki Valley (Bryan); Waialua; Honolulu, ♀ ♀ (Timberlake); Waipio, Kahuku, Puuloa (Van Zwaluwenburg). Hawaii: Honokaa ♀ (Pemberton); Haiku, at base of pineapple plants.

13. *Monomorium latinode* Mayr.

Monomorium latinode Mayr: Mus. Stor. Nat. Genova, Ann., vol. 2, 1872, ♀.
Haw. Ent. Soc., Proc.: Timberlake, vol. 6, p. 8, 1925; Editor, vol. 6, p. 217,
1925.

Oahu: Nuuanu Valley (Ehrhorn).

14. *Monomorium minutum* Mayr.

Monomorium minutum Mayr: Verh. zool.-bot. Ges., Wien, vol. 5, p. 453,
1855, ♀. Timberlake: B. P. Bishop Mus., Bull. 31, p. 17, 1926.

Laysan Island: (Fullaway) ♀. Midway Island (Fullaway) ♀.
Necker Island: (Bryan) ♀.

15. *Monomorium minutum* Mayr variety *liliuokalanii* Forel.

Monomorium minutum Mayr variety *liliuokalanii* Forel: Fauna Hawaiiensis,
vol. 1, p. 119, 1899, ♀. Haw. Ent. Soc., Proc.: Ehrhorn, vol. 2, p. 207,
1913; Gulick, vol. 2, p. 308, 1913, appendix.

Oahu: Honolulu (type locality); Manoa and Barbers Point
(Swezey); Kaimuki (Ehrhorn); Koko Head (Wheeler). Kauai:
(Illingworth). Hawaii: Hilo (Swezey).

16. *Monomorium pharaonis* (Linnaeus).

Formica pharaonis Linnaeus: Syst. Nat., ed. 10, vol. 1, p. 580, 1758, ♀.
Monomorium pharaonis, Mayr: Verh. zool.-bot. Ges. Wien, vol. 12, p. 752,
1862. Haw. Ent. Soc., Proc.: Ehrhorn, vol. 2, p. 182, 1912; Gulick, vol. 2,
p. 308, 1913, appendix; Illingworth, vol. 6, p. 237, 1926. Timberlake:
B. P. Bishop Mus., Bull. 31, p. 18, 1926.

Oahu: in houses. Hawaii: Kilauea, in fern forest (Bryan);
Naalehu, in cane; Hilo.

French Frigates Shoal: (Bryan) ♀. Wake Island, including
Peale and Wilkes islands: (Bryan) ♀. Johnston Island: (Bryan)
♀ ♀ ♂.

17. *Monomorium (Parholcomymex) destructor* (Jerdon).

Atta destructor Jerdon: Madras Lit. Soc., Jour., vol. 17, p. 105, 1851, ♀.
Monomorium destructor, Forel: Fauna Hawaiiensis, vol. 1, p. 110, 1899, ♀.
Perkins: Fauna Hawaiiensis, Int., p. 101, 1913. Ehrhorn: Haw. Ent. Soc.,
Proc., vol. 2, p. 182, 1912. Timberlake: B. P. Bishop Mus., Bull. 31, p. 17,
1926.

Kauai: Kekaha, in cane. Oahu: Honolulu (Whitney, Ehrhorn);
Kaimuki.

Laysan Island (Fullaway) ♀.

18. *Monomorium (Parholcomyrme) gracillimum* (F. Smith).

Myrmica gracillima F. Smith: Linn. Soc. London, Jour. Proc., vol. 6, p. 34, 1861, ♀. Emery: Zool. Jahrb., Syst., vol. 12, p. 438, 1899, ♀.

Laysan Island: (Schauinsland; Fullaway) ♀.

19. *Cardiocondyla nuda* Mayr variety *minutior* Forel.

Cardiocondyla nuda Mayr variety *minutior* Forel: Fauna Hawaiiensis, vol. 1, p. 120, 1899, ♀. Perkins: Fauna Hawaiiensis, Int., p. 101, 1913. Haw. Ent. Soc., Proc.: Gulick, vol. 2, p. 308, 1913; Illingworth, vol. 7, p. 45, 1928; Swezey and Bryan, vol. 7, p. 296, 1929. Timberlake: B. P. Bishop Mus., Bull. 31, p. 18, 1926.

Oahu: Honolulu (type locality); Wahiawa, Waianae (Illingworth); Palolo (Bridwell); Honolulu, Punaluu, Makaleha, Mount Kaala, Barbers Point, Mount Olympus, Waimanalo, Lanihuli, Kuliouou (Swezey); Manoa (Ehrhorn). Molokai: Kaunakakai (Swezey and Bryan). Lanai: in pineapple fields. Maui: Paia (Swezey). Kauai: Kalalau, Awaawapuhi (Bryan). Hawaii: Kilauea (Swezey, Wheeler); Hilo Sugar Company (Swezey); Kona (Wheeler).

Midway Island (Fullaway) ♀. Necker Island (Bryan) ♀. French Frigates Shoal ♀ ♀.

20. *Cardiocondyla wroughtoni* Forel variety *hawaiiensis* Forel.

Cardiocondyla wroughtoni Forel variety *hawaiiensis* Forel: Fauna Hawaiiensis, vol. 1, p. 119, 1899, ♀. Perkins: Fauna Hawaiiensis, Int., p. 101, 1913. Haw. Ent. Soc., Proc.: Gulick, vol. 2, p. 308, 1913; Swezey and Bryan, vol. 7, p. 296, 1929.

Molokai: Kaunakakai, in alfalfa fields (type locality); Kawela (Swezey); Kainalu (Swezey and Bryan). Oahu (Van Zwaluwenburg): Nuuanu Pali, in dead twig of *Pipturus*; Waialae Nui, west side of Mount Kaala, Mount Kaala, Pupukea, Tantalus (Swezey); Honolulu, Waialua (Bryan); Koko Head (Wheeler). Kauai: Kapaa (Illingworth); Koloa. Maui: Iao Valley (Swezey). Hawaii: Honaunau (Stokes); Paauilo, altitude 2,500 feet (Williams).

21. *Tetramorium guineense* (Fabricius).

Formica guineensis Fabricius: Ent. Syst., vol. 2, p. 357, 1793, ♀.

Tetramorium guineense, Mayr: Verh. zool.-bot. Ges., Wien, vol. 12, p. 740, 1862. Haw. Ent. Soc., Proc.: Gulick, vol. 2, p. 308, appendix, 1913; Swezey, vol. 3, p. 16, 1914; Perkins, vol. 1, p. 33, 1906; Ehrhorn, vol. 2, pp. 182, 1912, 207, 1913; Fullaway, vol. 3, p. 20, 1914; Bridwell, vol. 3, p. 383, 1918; Swezey and Bryan, vol. 7, p. 296, 1929. Timberlake: B. P. Bishop Mus., Bull. 31, p. 18, 1926.

Oahu: Honolulu; Ewa; Waiahole (Swezey). Kauai: (Illingworth). Maui: Kipahulu. Molokai: forests (Swezey and Bryan). Hawaii: Waiakea; Hilo; Hakalau; Pepeekeo; Papaikou.

Nihoa Island (Bryan, Cooke, Thaanum) ♂ ♀. Necker Island (Bryan) ♂ ♀ ♂. Midway Island (Fullaway) ♂. Laysan Island (Fullaway, Schauinsland, Wilder) ♂. Pearl and Hermes Reef (Fullaway) ♂. Ocean Island (Fullaway) ♂.

22. Tetramorium simillimum (F. Smith).

Myrmica simillima F. Smith: List Brit. Anim. Brit. Mus., pt. 6, Acul., p. 118, 1851, ♂.

Tetramorium simillimum, Mayr: Europ. Formicid., p. 61, 1861, ♂.

Oahu: Waianae Plantation (Swezey).

23. Tetramorium tonganum Mayr.

Tetramorium tonganum Mayr: Verh. K. K. zool.-bot. Ges. Wien, vol. 20, pp. 970-972, 1870, ♂. Haw. Ent. Soc., Proc.: Swezey, vol. 6, pp. 356, 367, 1927; Editor, vol. 6, p. 558, 1927.

Oahu: Manoa Substation, Haw. Sugar Plant. Assoc., altitude 500 feet, in sugar cane stalk bored by *Rhabdocnemis obscura* (Boisduval) (Swezey).

24. Strumigenys lewisi Cameron.

Strumigenys lewisi Cameron: Manchester Phil. Soc., Proc., p. 229, 1887, ♂ ♀. Haw. Ent. Soc., Proc.: Ehrhorn, vol. 2, p. 195, 1913 ("Japanese immigrant"); Bridwell, vol. 3, p. 383, 1918; Williams, vol. 4, p. 453, 1921.

Oahu: Palolo Valley (Bridwell); Manoa, altitude 900 feet, and Waihi Falls, Manoa Valley (Williams).

25. Strumigenys (Cephaloxys) membranifera Emery variety **williamsi** Wheeler.

Strumigenys (Cephaloxys) membranifera Emery variety *williamsi* Wheeler: Haw. Ent. Soc., Proc., vol. 8, p. 276, 1933, fig., ♂ ♀.

Hawaii: off road to Puna, south of Olaa, type locality (Williams) ♂ ♀.

26. Epitritus wheeleri Donisthorpe.

Epitritus wheeleri Donisthorpe: Ent. Record, vol. 28, p. 121, 1916, ♂. Timberlake: Haw. Ent. Soc., Proc., vol. 6, p. 7, 1925.

Oahu: Honolulu (type locality); Waimanalo, in cane stool (Swezey).

SUBFAMILY DOLICHODERINAE

27. *Tapinoma (Micromyrma) melanocephalum* (Fabricius).

Formica melanocephala Fabricius: Ent. Syst., vol. 2, p. 353, 1793, ♀.

Tapinoma melanocephalum, Mayr: Verh. zool.-bot. Ges. Wien, vol. 12, p. 651, 1862, ♀. Fauna Hawaiiensis; Forel, vol. 1, p. 120, 1899; Perkins, Int., p. 102, 1913. Haw. Ent. Soc., Proc.: Gulick, vol. 2, p. 310, 1913; Fullaway, vol. 3, p. 20, 1914; Illingworth, vol. 7, p. 45, 1928. Timberlake: B. P. Bishop Mus., Bull. 31, p. 18, 1926.

Oahu: Honolulu; Waianae (Fullaway); Kapahulu (Ehrhorn); Koko Head (Illingworth, Wheeler); Wahiawa, Waianae (Illingworth); Kaimuki; Tantalus, Ewa, Waianae (Swezey). Lanai. Molokai. Hawaii: Hilo (Ehrhorn).

Nihoa Island (Bryan) ♀. Midway Island (Fullaway) ♀. Ocean Island (Fullaway) ♀. Laysan Island (Schauinsland) ♀.

28. *Technomyrmex albipes* (F. Smith).

Formica (Tapinoma) albipes F. Smith: Linn. Soc. London, Zool., Jour. Proc., vol. 6, p. 38, 1861, ♀.

Technomyrmex albipes, Emery: Zeit. wiss. zool., vol. 46, p. 392, 1888. Haw. Ent. Soc., Proc.: Ehrhorn, vol. 2, p. 237, 1913, vol. 3, p. 14, 1914; Gulick, vol. 2, p. 310, 1913; Swezey, vol. 3, p. 56, 1915; Swezey and Bryan, vol. 7, p. 296, 1929.

Kauai: Kilauea (Swezey); Lihue. Oahu: Manoa, Maunawili (Ehrhorn); Hauula, Nuuanu, Waimano (Swezey); Laie (Ivins). Hawaii: Laupahoehoe (Swezey); South Kona (Swezey, Giffard); Hakalau; Kilauea. Molokai: forests (Swezey and Bryan).

SUBFAMILY FORMICINAE

29. *Plagiolepis exigua* Forel.

Plagiolepis exigua Forel: Bombay Nat. Hist. Soc., Jour., vol. 8, pp. 415, 417, 1894, ♀ ♀. Haw. Ent. Soc., Proc.: Ehrhorn, vol. 2, pp. 182, 207, 1913; Gulick, vol. 2, p. 310, 1913, appendix; Fullaway, vol. 3, p. 17, 1915; Report, vol. 4, p. 609, 1921.

Oahu: Makiki, Kalihi, Aiea, Tantalus. Hawaii: Naalehu.

30. *Plagiolepis mactavishi* Wheeler.

Plagiolepis mactavishi Wheeler: Am. Mus. Nat. Hist., Bull., vol. 24, p. 166, 1908, ♀. Haw. Ent. Soc., Proc.: Ehrhorn, vol. 2, p. 207, 1913; Gulick, vol. 2, p. 310, appendix, 1913; Swezey and Bryan, vol. 7, p. 296, 1929.

Oahu: (Van Zwaluwenburg); Honolulu (Ehrhorn); Koko Head (Wheeler). Molokai: forests (Swezey and Bryan). Kauai: Kapa, in pineapple fields (Illingworth).

31. **Brachymyrmex heeri** variety **aphidicola** Forel.

Brachymyrmex heeri variety *aphidicola* Forel: Deutsch. Ent. Zeit., p. 263, 1909, ♀. Haw. Ent. Soc., Proc.: Timberlake, vol. 6, p. 13, 1925; Editor, vol. 6, p. 217, 1925.

Oahu: Honolulu, in orchid baskets (Lyon).

32. **Camponotus (Tanaemyrmex) variegatus hawaiiensis** Forel.

Camponotus maculatus hawaiiensis Forel: Fauna Hawaiiensis, vol. 1, p. 122, 1899, ♀ ♀ ♂. Haw. Ent. Soc., Proc.: Kuhns, vol. 2, p. 93, 1910; Report, vol. 2, p. 296, 1913; Gulick, vol. 2, p. 310, appendix, 1913; Illingworth, vol. 6, p. 396, 1927.

Oahu: Honolulu (type locality) in and around houses; Koko Head (Illingworth, Wheeler); Ewa Coral Plain, Kolekole (Bryan); Nuuanu (Bickerton), Manoa and Honolulu (Ball); Waianae (Illingworth). Maui. Molokai: Mauna Loa, in pineapple fields (Illingworth); Kaunakakai (Ball). Hawaii (Ehrhorn): altitude 4,000 feet (Kusche).

33. **Paratrechina longicornis** (Latreille).

Formica longicornis Latreille: Hist. Nat. Fourmis, p. 113, 1802, ♀.

Prenolepis longicornis, Forel: Fauna Hawaiiensis, vol. 1, p. 120, 1899. Haw. Ent. Soc., Proc.: Gulick, vol. 2, p. 310, appendix, 1913; Illingworth, vol. 3, pp. 350, 352, 1917; Report, vol. 4, p. 609, 1921; Hebard, vol. 6, p. 302, 1926. Timberlake: B. P. Bishop Mus., Bull. 31, p. 19, 1926.

Oahu: Koko Head, Moanalua, Palolo, Waianae (Illingworth); Koko Head (Wheeler); Barbers Point, Bishop Museum (Swezey); Ewa Coral Plain, Wawamalu Beach near Koko Head (Bryan); Kaimuki (Thompson, Swezey); Aiea. Maui: Kipahulu. Kauai: Kapaa, in pineapple fields (Illingworth). Hawaii: north Kona, altitude 5,000-7,000 feet (Wilder).

Nihoa Island (Bryan) ♀.

Simultaneously with the introduction of this ant into the Hawaiian islands, two of its myrmecophiles were introduced, a small beetle, *Coluocera maderae* Wollaston and a small cricket, *Myrmecophila americana* Saussure (= *M. prenolepidis* Wasmann). These were taken in the nests at Koko Head by Dr. Illingworth and myself.

34. **Paratrechina (Nylanderia) bourbonica hawaiiensis** Forel.

Prenolepis bourbonica hawaiiensis Forel: Fauna Hawaiiensis, vol. 1, p. 120, 1899, ♀ ♀ ♂. Haw. Ent. Soc., Proc.: Gulick, vol. 2, p. 310, appendix, 1913; Swezey and Bryan, vol. 6, p. 414, 1927, vol. 7, p. 296, 1929. Timberlake: B. P. Bishop Mus., Bull. 31, p. 19, 1926.

Oahu (type locality): Honolulu, common; west Kalihi Ridge, Waimalu and Manoa (Bryan), Kaumuahona, south Waianae Moun-

tains, Mount Olympus (Swezey); Nuuanu (Bridwell); Waipio, Wahiawa (Illingworth); Koko Head and Waikiki beach (Wheeler); Ewa; Punaluu; Waimano. Molokai: Kaunakakai, altitude 2,400 feet on *Metrosideros*. Hawaii: Kilauea (Wheeler). Maui: Keanae (Swezey). Kauai: Kalalau (Bryan); Alakai Swamp (Forbes). Hawaii; Puu Kamaoa (Meinecke).

Midway Island (Fullaway) ♀. Wake Island on *Cordia* and *Pemphis* (Bryan) ♀ ♀.

35. *Paratrechina (Nylanderia) sharpi* Forel.

Prenolepis sharpi Forel: Fauna Hawaiiensis, vol. 1, p. 121, fig., 1899,
 ♀ ♀ ♂. Haw. Ent. Soc., Proc.: Gulick, vol. 2, p. 310, appendix, 1913.
 Perkins: Fauna Hawaiiensis, Int., p. 102, 1913.

Oahu: Honolulu, type locality (Lewis); "brought with plants from China" (Perkins); Kaimuki, Manoa (Swezey).

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