

Notes and New Records of Exotic Ants Introduced Into New Zealand

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Since the recent publication of W. L. Brown's "Review of the Ants of New Zealand" (1958), three additional exotic formicids have been recorded from this country. These are: *Ponera leae* Forel (Taylor, 1960), *Pheidole yarrensensis* Forel (Cumber, 1959) and *Iridomyrmex darwinianus* (Forel) (Taylor, 1959); all of Australian origin. The two former species are of special interest as their distributions appear to be restricted to the Bay of Islands area. *Ponera leae* is known only from the immediate vicinity of Paihia, where it has been collected in Berlese funnel samples of leaf mould. *Pheidole yarrensensis* is present also at Paihia (Cumber, 1959) and has been taken at Haruru Falls (February 4, 1959; R. W. Taylor) and Kerikeri (January 17, 1956; K. A. J. Wise); Cumber recalled having seen this species at Kaikohe some years ago. These distribution patterns may indicate that the ants concerned have been derived from propagules introduced directly into the Bay of Islands district by man. Neither of these species is a regular associate of human settlements or commodities, and the highly cryptobiotic *P. leae* in particular would seem unlikely to be carried on normal cargoes. It is probable that both forms were introduced in soil ballast during the early days of European settlement, when Bay of Islands ports were important trade termini. Further search in Northland could well expose other similar elements in the ant fauna.

Iridomyrmex darwinianus, on the other hand, represents one of the many ant species which have reached New Zealand on more recent cargoes, notably on Australian timber, or other stocks in trade (especially fruit and vegetables) from elsewhere. In the following paper a number of species are discussed, most of which are probably also recent introductions. Six of these ants are recorded from New Zealand for the first time. An attempt is made to assess the pest potential of these species, and in some cases their possible modes of entry into the country are discussed. The interception records cited in this respect have been gathered as part of an associated study based on the known records of apprehension of exotic ants at New Zealand ports; a summary of this work is in the final stages of preparation.

A large part of the material discussed below was collected by the author. Many records have been derived from the collections of the Plant Diseases Division, Auckland; the N.Z. Plant Quarantine

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Service, Wellington; and the Forest Research Institute, Rotorua. I wish to thank Dr. K. P. Lamb, Mr. D. C. M. Manson, and Mr. R. Zondag of these institutions for allowing the study of this material. Reference series of the species discussed will be placed in all three collections.

Subfamily PONERINAE

1. *Rhytidoponera metallica* (Fr. Smith).

Material examined. Penrose Railway Yard, Auckland, a number of series from nests under timber and stones, February 3, 1959; April 23, 1959 (R. W. Taylor).

This species is of Australian origin and has probably been introduced into New Zealand on cargoes of timber, from which a number of the smaller *Rhytidoponera* have been collected, including: *R. aspera* (Roger), *R. victoriae* Andre (Brown, 1958) and *R. chalybaea* Emery (see below). *R. metallica* itself has been collected at an Auckland wharf on sawn timber imported from Goff's Harbour, Australia (June, 1959, M. Lay). The species was recorded as an introduction into Samoa by Wheeler (1935a), but does not appear to have become established there.

In Australia this is the common "greenhead ant," one of the most widespread of all insects. It has wide ecological tolerance, being found mainly in moderately wooded or open areas, and it has been taken in the parks and gardens of some of the larger cities. *R. metallica* constructs small, rather loosely integrated nests, usually among grass roots or beneath logs or stones. It is a diurnal forager and feeds on a wide variety of insects and other small arthropods. Indeed, it has been considered beneficial in some areas, where its prey consists of a high proportion of agricultural pests (especially larval Coleoptera and Lepidoptera) and termites (Fell, 1940).

Little biological information is available concerning the New Zealand samples of this species. The nests are typical, and some of those examined contained insect remains. Winged males were taken from one colony on February 3, 1959. The most seriously undesirable feature of *R. metallica* is its highly potent sting. The Penrose population appears to be prospering and the species is almost certainly permanently established there.

2. *Rhytidoponera chalybaea* Emery.

Material examined. Otara, Auckland, a number of workers collected foraging on a clay bank, March 20, 1960 (R. Moynihan). Napier, Hawke's Bay Power Board pole dump, August 28, 1959, 5 workers (A. P. Richardson).

These two records, from such widely spaced localities, very probably indicate that *R. chalybaea* is firmly established in New

Zealand. It is entirely possible, however, that both recorded populations have been derived from separate immigrant stocks, as this species has been taken on at least two occasions from timber cargoes originating in Australia. It was reported by Manson (1959) as an interception from Australian hardwood poles, at Invercargill, and has also been collected from Australian sawn timber landed at Auckland (November 5, 1958; C. Crapp).

The Napier specimens were taken in an old established dump used for the storage of power poles imported from Australia. If *R. chalybaea* has successfully invaded this area it will almost certainly have succeeded in spreading elsewhere in Hawke's Bay. The Otara specimens are from a locality about four miles from the Penrose site where *Rhytidoponera metallica* was collected (see above).

The natural range of *R. chalybaea* is apparently restricted to forested areas of the narrow eastern "wet strip" of Australia, from just north of Brisbane to southern Victoria (Brown, 1954). The records listed above indicate that it must be common in some timber milling areas regularly supplying poles and sawn timber for export to New Zealand. The nests are usually located in rotten logs or wood fragments, but may be found in the soil under stones. Colonies are small, usually with less than 250 workers (Brown, 1954). There is little available information on feeding or foraging habits, but the above remarks concerning the possible economic significance of *Rhytidoponera metallica* can very probably be applied equally to *R. chalybaea*.

3. *Brachyponera luteipes* (Mayr).

Material examined. Penrose, Auckland, 2 workers collected from a timber yard, April 23, 1959 (R. W. Taylor).

As Brown (1958) has commented, there is considerable taxonomic confusion among the *Brachyponera* of South-Eastern Asia, Melanesia and Northern Australia. In naming the specimens recorded above I have followed Wilson's recent (1958) concept of *B. luteipes*, and concur with him the strong possibility that *B. croceicornis* Emery represents a synonymous Melanesian and Australian variant of this widespread Asian species. The specimens before me compare well with material in the Harvard Museum of Comparative Zoology collection from India, China and Japan, which was determined as *B. luteipes* by Wilson at the time of his study. I would venture the opinion that the New Zealand introduction has probably been derived from a Japanese sample of the *luteipes-croceicornis* complex. The Penrose specimens certainly do not resemble typical Australian examples, which are presently assigned to *B. croceicornis*, and it seems unlikely that their progenitors originated in Australia.

The specimen recorded from Waikino by Brown (1958) as *B. chinensis* (Emery) will almost certainly prove to be conspecific

with those recorded above, for, as Brown has suggested, *B. chinensis* is probably also a synonym of *B. luteipes*. This further record may indicate successful establishment of *B. luteipes* in New Zealand. It seems unlikely that the species will prove to have economic significance.

Subfamily MYRMECINAE

4. *Pheidole megacephala* (Fabricius).

Material examined. Newmarket, Auckland, a large sample from a chocolate factory, February 10, 1952 (D. Spiller and J. M. Kelsey). Richmond, Auckland, numerous specimens from a garden and from a food cupboard in a nearby house, January, 1959 (G. Cronin and R. W. Taylor).

This is one of the most widespread and economically important of all pest ants. It invades houses and stores and will tend homopterans injurious to garden and orchard crops. *P. megacephala* is found in most of the tropical and warm temperate parts of the world, and is widespread in the Pacific Islands (Wheeler, 1935a), and Australia (Clark, 1941). It also occurs as a pest in many parts of Europe and North America.

Judging from the above records this ant appears to be well established in the Auckland area, and to have been present there for some years. Both of the reported samples were collected from quite intensive, but very local infestations, and the species has apparently been unable to break out extensively. It could be that *P. megacephala* is climatically limited at the latitude of Auckland, or it may well be suppressed by competition with the strongly established Dolichoderine pests *Iridomyrmex glaber* (Mayr) and *Technomyrmex albipes* (Fr. Smith).

P. megacephala is fairly regularly encountered by port quarantine officers, and has been taken mainly on fruit or flowers from the Pacific Islands or Australia (Brown, 1958; Jacks, 1954; Laird, 1951; Manson, 1958, 1959). In view of the large number of recorded interceptions, and the obvious adaptability of this species, its occurrence in New Zealand is not surprising. Further outbreaks would justify the attention of control officers.

5. *Pheidole variabilis* Mayr.

Material examined. Takapuna, Auckland, six specimens from soil, May, 1959 (M. Meikeljohn); several series from soil in a garden, April, 1958, December, 1959 (A. Graham).

P. variabilis is a highly variable, and apparently fairly adaptable species, endemic to eastern Australia. It was reported by Brown (1958) as an interception from an Australian cargo at an unspecified New Zealand port. Although the above samples were taken from a limited area they nevertheless appear to indicate the presence

of an established population of this ant at Takapuna. One of the collectors, Mr. A. Graham, reported the species as very abundant in a domestic vegetable garden where its nests were common in the disturbed soil of cultivation plots. Little is known concerning the biology of *P. variabilis*, it has not been reported as a house pest, but very probably attends aphides and other homopterans. This species certainly deserves investigation as a possible pest.

6. *Monomorium pharaonis* (Linnaeus).

Material examined. Auckland, several specimens collected from food, June 2, 1955 (Auckland City Council); a number of specimens collected from a city office building, May 1, 1959 (J. S. Cameron). Rotorua, a small sample from an infestation in a new public hospital building, October, 1961 (T. White). Tamarunui, a large series from a public hospital building, April 8, 1951 (R. A. Harrison).

Monomorium pharaonis is an important ant pest which has become almost cosmopolitan through dispersal by commerce. It is apparently of Indian origin, and is common in many areas of Europe, the Americas, Australia, and the Pacific Islands, from which New Zealand receives many cargoes providing suitable transport for such ants. It has been intercepted from a parcel of German rosewood at Palmerston North (December 7, 1956; T. Flint), and from *Croton* leaves carried by air from Fiji to Whenuapai (Manson, 1958).

This ant is probably firmly introduced into New Zealand, and has been responsible for at least two major infestations; those cited above from Tamarunui and Rotorua Public Hospitals. In the former case considerable damage was done to foodstuffs and other materials in storage, and the wards were invaded. *M. pharaonis* was troublesome at Rotorua Hospital during the summer of 1960-61, but its activity was reduced during the succeeding winter. Brown (1958) has reported this ant from the Wellington district, clearly, it is widespread in the North Island, and further serious infestations may be expected.

The publications of Peacock, Hall and their associates (see Bibliography) are important references for information concerning this species. It has been shown by these authors to maintain colonies at temperatures as low as 18°C., and it is able to tolerate short periods at much lower temperatures. In the cooler parts of its range *M. pharaonis* nests indoors, in the woodwork and masonry of buildings, and it can disperse locally by active migration during the summer in warm temperate areas. It also shows considerable capacity for long range passive dispersal and has been taken on transported materials of many types, including edibles, food containers, bed linen, etc. Colonies may be founded by small immigrant

populations of simple composition. Workers are indispensable in such groups, their assistance being obligatory to founding queens. Successful colony establishment, with the production of sexuals, may be accomplished by a minimal group consisting *only* of workers and larvae. The ants are very adaptable and well able to survive the exigencies of initial establishment in a new area. The colonies are populous and may contain many queens. *M. pharaonis* is particularly omnivorous and will infest foodstuffs of all kinds, showing no special preferences for sugary or protein foods, as do some other ant pests.

7. *Mayriella abstinens* Forel.

Material examined. Grey Lynn, Auckland, many foragers and nest series from leaf litter, September 3, 1959-July, 1960 (R. W. Taylor). Mt. Albert Domain, Auckland, a nest from bark on the underside of a rotten log, September, 1959 (R. W. Taylor).

The above records, from localities separated by a distance of about two miles, indicate successful establishment of this interesting species. *M. abstinens* is a minute, cryptobiotic ant, endemic to Australia. Its natural range apparently embraces the eastern highlands, from Cape York to southern Victoria. The species is rare in collections and has generally been taken in Berlese funnel samples of leaf mould or forest floor litter.

Although this ant is abundant at the Grey Lynn site specimens have been located only within a restricted range of about 300 square yards. The site is a non-cultivated area of a domestic garden, beneath a stand of trees where there is a fairly heavy leaf litter cover. The nests observed at Grey Lynn consisted of very small, poorly defined, shallow excavations in the soil among grass roots, or beneath small wood fragments or pebbles. They normally contained about 50-100 workers and several queens. Colonies kept in captivity showed poorly developed cohesion, with groups of workers and queens continually segregating and reassembling randomly. Two separate colony groups, from opposite extremes of the population range, combined without hostility when placed in a common nest chamber. The Mt. Albert series was taken in a small cavity under bark on the lower side of a partly rotted log, lying on the ground. Nests with small crater entrances, in sand, at Cairns, Queensland, have been described by Wheeler (1935b). Freshly killed Collembola, Symphyla, and geophilid centipedes were accepted as food by observation colonies. Males were taken from nests at Grey Lynn during September, 1957.

M. abstinens seems to be a relatively innocuous ant and is unlikely to become a pest in New Zealand.

The Grey Lynn material provides the largest known single population sample of this species. The workers vary greatly in size and some of the larger ones may be ergatogynes. Variation

in colour, sculpture, and morphological characters completely encompasses the extremes which Wheeler (1935b) recognised as characterising several subspecies of *abstinens*; the synonymy of these forms is indicated. The status of *M. spinosior* Wheeler also appears to be jeopardised, particularly when Australian material collected since Wheeler's study is considered.

8. *Tetramorium grassii* Emery.

Material examined (all Auckland district). Auckland, many workers from soil, September 5, 1955 (D. Spiller). Avondale, nest from a flower pot in a glass-house, October 9, 1959 (R. W. Taylor). Grey Lynn, several nests, under stones, February 5, 1960 (R. W. Taylor). Herne Bay, several foragers from a path, July 7, 1953 (R. W. Taylor). Mt. Albert Domain, many nest series, February, 1958-August, 1960 (R. W. Taylor). Mt. Mangere, several nests, July 7, 1953 (R. W. Taylor). Takapuna, males collected at a lighted window, February, 1959 (D. R. Cowley). Te Atatu North, nest under rotten log, December, 1957 (R. W. Taylor).

This interesting species, of African origin, was first recorded from several localities in the Auckland area by Brown (1958). He listed specimens from Remuera and Panmure. Re-examination of the latter material reveals that it was collected during 1941. The presence of *T. grassii* at Paihia, Bay of Islands, in 1948, has since been reported by Cumber (1959). This species has thus been present in Northland for at least thirteen years, and in Auckland for at least twenty.

Tetramorium grassii is now a moderately common ant in parts of the Auckland district, where its local distribution appears, from the available data, to follow an interesting pattern. The species shows a strongly marked preference for dry, sheltered, but well insolated nesting sites, and in every case on which I have collected it the lie of the adjacent land has been towards the north. The Avondale record shows that, like its relatives in north temperate areas, *T. grassii* favours glass-houses as nesting locales. The foragers collected at Richmond were immediately adjacent to the outside wall of a glass-house and may have originated from a nest within it.

The apparent preference of this species for warm northerly situations is well exemplified at Mt. Albert, a small volcanic peak of about 450 feet in the Auckland suburbs. I found *T. grassii* very common there during the years 1958-1959, when nests were located under many of the logs and stones on the northern side of the mountain, but only on those slopes between about 70 degrees east and 60 degrees west of true north. This situation may not be permanent, but could merely represent a stage in the expansion of the population from an original introduction on the northern slopes. However it may well indicate that *T. grassii*, in the

Auckland area, is approaching the southern limit of its possible range, and can maintain populations only in very favourable situations. This same distributional phenomenon seems to be repeated on the nearby Mt. Mangere, and on One Tree Hill, where the ant is common on the north-facing, south side of the crater. In the latter case, however, the situation is complicated due to there being many more rocks suitable for nest cover on the warm side of the crater than on the cold side.

The distribution of *T. grassii* on Mt. Albert is in general complementary to that of the primitive Ponerine *Amblyopone australis* Erichson, which is very common on the southern side of the mountain, but rare on the northern slopes where *grassii* is dominant.

The whole situation of the distribution of *T. grassii*, and its competitive relationships with other ants, deserves further study. This could yield valuable data on micro-climatic preferences or limiting factors in the species, as well as on the general problem of biological competition.

The nests are usually shallow excavations beneath a stone or log, and the ants may utilise bubble cavities or crevices in covering stones for brood storage areas. Food remains in the nests consisted of fragments of small insects and other arthropods. Virgin queens and males were taken from colonies at Mt. Albert during mid and late summer. There seems to be no reason to consider *T. grassii* as economically important.

9. *Tetramorium guineense* (Fabricius).

Material examined. Penrose, Auckland, several nests from under timber lying on a gravel surface in a timber yard, April 23, 1959 (R. W. Taylor).

This is the first properly documented record of *T. guineense* from New Zealand. Brown (1958) was able to indicate its presence, but inadequate labelling on the specimens he examined prevented the citation of definite locality records.

T. guineense is an exceptionally widespread ant, apparently of African origin. It is found throughout the warmer parts of the world, including all states of Australia (Clark, 1941), and most of the Pacific Islands, even such remote groups as the Kermadecs and Easter Island. This species is second only to *Pheidole megacephala* in the number of known records of interceptions at New Zealand ports. I have examined specimens taken from an aircraft at Whenuapai (February 3, 1959; R. J. Prestidge); on a banana plant from Raoul Island, at Auckland; on general cargo from Australia, at Wellington; and at Rotorua on hardwood poles from Borneo, via Auckland (February 2, 1950; R. Zondag). Unlike many ants spread by commerce *T. guineense* does not appear to be a major domestic pest. In Europe and North America it has

been reported as a nuisance in glass-houses and other warm situations, where very large populations may develop. Like other members of its genus *T. guineense* tends sap feeding homopterans. It does not seem likely to become significantly troublesome in New Zealand.

Subfamily DOLICHODERINAE

10. *Tapinoma melanocephalum* (Fabricius).

Material examined. Auckland, Harbour Board shed 22, Princes Wharf, July, 1959 (P. Wilson).

This single record should perhaps be considered as that of a doubtful introduction, due to the peculiarly marginal collection site. The ants concerned were, however, contributing to a fairly serious infestation of a kitchen cupboard in the shed. They could well have been part of a population sufficiently well established to serve as a nucleus for further dispersal in the Auckland area. The sample includes many workers, several dealate queens and much brood. I have collected workers of this species previously at the Auckland City Markets, on cases of bananas imported from Tonga (July 8, 1957).

T. melanocephalum is a very serious, almost cosmopolitan, house and store pest. It is widespread in tropical America (Smith, 1936), Australia (Clark, 1941) and the Pacific Islands (Wheeler 1935a), and is undoubtedly a regular traveller on New Zealand import cargoes. Like most pest ants, this species is very adaptable and highly prolific. It may nest in buildings, under logs or stones, under bark, or in crevices of plants, etc. (Smith, 1936). It favours honeydew and is an assiduous attendant of aphides, mealy bugs, and scale insects. *T. melanocephalum* must be considered as a very serious potential domestic and horticultural pest in New Zealand.

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