CHAPTER 2
REVIEW OF LITERATURE

The word *ant* is derived from Old English *æmette*; which is derived from old German *āmeiza*. The German word means to cut. Latin the *æmette* was ablated to ‘ampte’ which was modified as ‘ant’. The family name *Formicidae* is derived from the Latin word *formica* (“ant”).

2.1 GENERAL ACCOUNTS ON THE ANT FAUNA

The first literature on ants was published by Gould (1747). He provided a general account on Five types of ants i.e.; hill ant, jet ant, red ant, common yellow ant and small black ant. No scientific name was introduced at that time. His book ‘An Account of English Ants’ is divided into nine chapters i.e., general description, variation, colour, body morphology, establishment of colony, egg laying and division of labour. All data was based upon his field observations.

Linnaeus was the first who started the systematic studies on ants. He described ants using binomial system of classification. In his book “*Systema naturae*” (1758), he described seventeen species of ants i.e., seven from Europe, two from Egypt and eight from South America. All these species were kept under a single genus *Formica*. After five years (1763) in his book “*Centuria insectorium*”, he added one more species of *Formica* from Jamaica. Forskål (1775) described six species under genus *Formica*. Fabricius (1775) added few species under *Formica*. In the year 1782 he provided the detailed description of thirty seven species on the same genus (*Formica*). Thunberg (1788) and Razoumowsky (1789) also added few species of *Formica*. Gmelin (1790) described *Formica testacea* from Europe. Olivier (1791) and added new species of *Formica*. In addition to the genus *Formica*, a new genus
named *Dorylus* was added by Fabricius (1793). Laterille (1798) studied the fauna of ants in France. Fabricius (1798) published the general characters, habitat and taxonomic description of six species of *Formica*.

Illiger (1802) described a new species of *Dorylus* (*Dorylus nigricans*) from Sierra Leone. Walckenaer (1802) provided detailed notes on the fauna of Paris and in that book he described seventeen species of *Formica*. Laterille (1802a) added a new genus *Cephalotes* from Neotropical region under the family Formicaries. Laterille in the same year (1802b) gave the name *Cryptocerus* for *Cephalotes*. Fabricius (1804) used *Cryptocerus* for *Formica atratus* Linnaeus and used *Cephalotes* as synonymy under *Cryptocerus atratus* and at the same time he erected *Lasius, Atta and Myrmecia*. In 1807 Jurine added a new genus named *Manica*. A new family group name *Dorylida* was added by Leech (1815). A new genus name *Myrmecina* was described by Curtis (1829). Lund (1831a) described two genera, *Pseudomyrmex* and *Crematogaster*. The subfamily Myrmicinae, which is the largest subfamily of ants, was added by Lepeltier (1835). The family name *Myrmicites* was based on the type Genus *Myrma*.

Since a review of the entire family of ants is beyond the scope of this thesis and not feasible, this review has been restricted to the studies on the Genus *Pheidole* Westwood only.

### 2.2 CHRONICLES OF THE WORLDWIDE STUDIES IN THE GENUS *PHEIDO*LE WESTWOOD

[In the following review initials of Brown, Smith and Wheeler were given with the names since two persons were involved under each name so as to avoid confusion. In all other names initials are not provided since it is the usual practice while revising the literature.]
The ant genus *Pheidole* erected in 1839 by Westwood, based on the type-species *Atta providens* Sykes (1835) from India. Westwood (1839) chose the Greek word *pheidolos* meaning thrifty (Wheeler G.C and Wheeler J, 1984), as the root of this genus *Pheidole*, but in terms of species richness there is nothing thrifty about this ant (Longino, 2009).

Smith F (1858a) described the first species under the real genus name *Pheidole* as *P. fervens* Smith from Singapore and *P. rugosa* Smith from Sri Lanka under the Catalogue of Formicidae in the British Museum. He also added fourteen species of *Pheidole* out of which nine species were synonymised and six were new. Smith F (1860b) recorded a new species *P. notabili* and redescribed *P. rubra* Smith, *P. plagiaria* Smith, *P. pabulator* Smith and *P. megacephala* (Fabricius) from Bachian. Smith F (1861b) prepared a Catalogue of Hymenopterous insects collected by Wallace in the three islands Celebes, Ternate and Gilolo and described two species, *P. megacephala* and *P. plagiaria* from Celebas, Indonesia. Mayr (1862) described new species, *P. excellens* from Africa, *P. sinaitica* from Frauenfeld, Switzerland, *P. laevigata* from Brazil, *P. cubaensis* from Cuba, *P. chilensis* from Chili, *P. opaca* from Amazon and *P. aspera* and *P. capensis* from Novara, Italy. Mayr (1863) published the synonyms of Formicidae. Roger (1863a) described new species *P. fimbricata* from the soldier castes, *P. sulcaticeps*, *P. latinoda*, *P. praeusta*, *P. pennsylvanica* from Rio, Paraguay. Smith F (1863a) prepared another Catalogue of Hymenopterous insects collected by Wallace in the five islands Mysol, Ceram, Waigiou, Bouru and Timor and recorded four species of *Pheidole* viz., *P. megacephala* from Timor, *P. singularis* Smith, *P. mordax* Smith and *P. penetralis* Smith from Mysol.

Mayr (1866a) added two new species *P. oceanica* and *P. tasmaniensis*. In the same year (1866b) he added three new species *P. sculpturata*, *P. innotata* and
P. punctulata from Africa. Mayr (1867a) published the general characters of Pheidole in his monograph and added the description of new species P. javana and P. divergens. He also redescribed P. ruficeps (Smith) from Batavia under Steinen. In the succeeding years more new species were described by Mayr; in (1868b) he described P. abberans, P. cordiceps, from Buenos Aires, Argentina and in the same year (1870b) he described two new species viz., P. sexspinosa and P. umbonata and also provided key to the species of Pheidole from Tuvlau, Polynesian Island.

Smith F (1874b) described new species P. fervida and P. nodus from Hyogo (Hiogo), Honshu. Mayr (1876) added six new species, P. variabilis, P. proxima, P. opaciventris, P. impressiceps, P. longiceps and P. brevicornis along with the key to the species and also recorded three species from Rockhampton, Queensland, Australia. Emery (1877b) described two new species Pheidole, P. speculifera and P. rugaticeps from Beccari (Bosnia and Herzegovina). In next year (1878a) he published the list of Formicidae from Naples which contain two species of Pheidole, P. pallidula Nylander and P. punctatissima Mayr. In another paper (1878c) Emery published a paper on the Ants of Europe; collections were done from the surrounding regions of Africa and Asia and included a single species of Pheidole, P. pallidula Nylander. Mayr (1878) published a report about a new species viz., P. minutula from Brazil. Mayr (1880) redescribed P. pusilla (Heer) from Turkestan. Forel (1881) published a paper on the Ants of the Antille St.Thomas (Cuba) and recorded two species of Pheidole, P. megacephala (Fabricius), P. fallax Mayr. In the same year Emery (1881a) reported P. punctulata Mayr from equatorial Africa.

Mayr (1884) described new species P. jelskii, P. radoszkowskii, P. exigua and P. subarmata, with the distribution of Pheidole from Cayenne, French Guiana. Mayr (1886c) published notes to the Formicidae of Mexico with the
description of three species of *Pheidole*. In another paper (1886d) he provided the distribution of *P. californica* Mayr from California, *P. pennsylvanica* Roger from New Jersey, Pennsylvania, Columbia, Virginia and Nebrasca, *P. morissi* Forel from Virigina and added synonyms for *P. bicarinata* Mayr, *P. vinelandica* Forel (from New Jersey). He also reported a new species, *P. commutata* from Florida. In the same year (1886a) Forel published new species of *Pheidole*, *P. guielmi-mülleri* from Brazil; (1886b) *P. gouldi*, *P. gertrudae*, *P. susannae*, *P. triconsticta*, *P. morrisii*, *P. stulta*, *P. absurda*, *P. maja* and three race of *Pheidole* species from America. Emery (1887) published three papers on *Pheidole*; (1887e) Catalogue of existing ants in the collections of the Museum of Genova, which includes eight species with two new species of *Pheidole*, *P. bicarinata* Mayr. Emery (1887i) described new *Pheidole*, *P. longicornis* in the Catalogue of ants in the collections of the Museum of Genova of part III. In the same year (1887) Mayr published a general account on the major workers and key to the species of *Pheidole*. He also recorded new species, *P. pubiventris*, *P. auropilosa* from St. Catherine, Spain and key to fifty two species of soldiers and forty three minor workers.

Emery’s publications dominated in the next two years. In (1888c) he published the Ants in the province of Rio Grande do Sul in Brazil, with six species of *Pheidole* with one new species, *P. hohenlohei*; (1888e) a new variety of *Pheidole* from ants of Argentina. Emery (1889b) redescribed *P. jordanica* Saulcy from Palearctic region. In (1889c) he reported three species of *Pheidole*, *P. magretti* Emery, *P. javana* Mayr, *P. megacephala* (Fabricius) from Myanmar and Tenasserim. Andre (1890) described a new species *P. occipitalis* from Africa. Emery (1890c) published a paper on “Ants of Burma” and “Tenasserim” in which some species were raised to new status. He also provided redescriptions to some species of *Pheidole*. Cameron (1891)
prepared an appendix on Formicidae and also provided a detailed description to the new species, *P. monticola* from Cayambe village (Ecuador). In the same year Forel (1891c) prepared a checklist of Madagascar ant fauna which is represented by four species of *Pheidole*. Emery (1891c) revised Formicidae of Paris and reported two species of *Pheidole, P. megacephala* (Fabricius) and *P. capensis* Mayr from Paris. Forel (1892a) described a new species of *Pheidole, P. risii*. In the same year on another publication (1892l) he described two new species, *P. madecassa, P. nemoralis* from the collections of Sikora, Madagascer and also added three new varieties.

Dalla Torre (1893) published a Catalogue of Hymenoptera on the family Formicidae with its systematic account and synonyms. At the same time Emery (1893g) recorded *P. plagiaria* Smith and *P. javana* Mayr from Malay Archipelago; (1893h) recorded four species of *Pheidole, P. pronotalis* Forel, *P. wood-masoni* Forel, *P. latinoda* Roger, *P. megacephala* which were found in the collections of Formicidae from Sri Lanka. Emery (1893i) described a new species of *Pheidole, P. simoni* from Phillippines. Forel in the same year published two papers (1893f) provided a new status for *P. variabilis* Mayr r. *ambla* new status and a new species *P. bos*. Forel (1893j) examined the specimens of Mons from St Vincent and recorded *P. fallax* Mayr, *P. radoszkowskii* Mayr, new race for *P. guielmi, P. susanna Forel, P. godmani* Forel and two new species *P. sculptior, P. orbica* and new variety for *P. submarata* Mayr and *P. flavens* Roger. He also added detailed description with habit and habitat.

Emery (1894b) recorded the distribution of *P. megacephala* from Madagascar; (1894d) published twelve species of *Pheidole* along with new species from the Neotropic region and in (1894i) he described *P. absurda* Forel, *P. radoszkowski* and two new varieties from Costa Rica. In the same
year (1894) Forel published five new species (1894a) *P. teneriffiana* from the collection of Cabrera and Dia; (1894b) *P. mayri*, *P. aeberlii*, *P. rotundata*, *P. liengmei*, from Africa; (1894e) redescribed *P. völtzkowii* Forel from Madagascar.

Forel (1895b) prepared a Catalogue of Formicidae of Brazil and listed thirty species of *Pheidole*. Emery (1895b) reported *P. speculifera* Emery from the tributaries of the Juba. Emery (1895d) published a key to the major workers of nine species of *Pheidole* including two new species from North America. In another paper (1895e) he published notes on Formicidae of Chile with redescription to *P. chilensis* Mayr; (1895m) *P javana* Mayr, *P. latinoda* Roger, *P. plagiaria* Smith, *P. megacephala* (Fabricius) and described a new species *P. fea*. In the same year (1895e) Forel described one new species, *P. lucida* from Moramanga, Madagascar.

Mayr (1896) published a new species *P. aurivillii* with a key to the species of *Pheidole* from Cameroon. Pergande (1896) published the Formicidae of Mexico and the collections were carried out in the mainland of Mexico. He also reported ten species of *Pheidole* in which seven were new species, *P. tepicana*, *P. rugifrons*, *P. subdentata*, *P. granulata*, *P. vaslittii*, *P. carbonaria*, *P. obtusospinosa* and redescribed *P. punctatissima* Mayr, new variety *P. floridana* Emery var *replanata*, new race of *P. susannae* Forel. André in that year (1896d) described new species *P. dolichocephala* from Australia and Emery (1896g) published eight new species of *Pheidole* including two new varieties from Neotropical region. Mayr (1897) studied the ants of Sri Lanka and Singapore and recorded the presence of *P. latinoda*, *P. javana* and a new variety of *P. rhombinoda* Mayr from Sri Lanka. Emery (1897b) described three new species, *P. manteroi*, *P. tetracantha*, *P. purpurascens* from New Guinea. Andre (1898) described two new species, *P. kingi* and *P. townsendi*
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Review of literature

from Mexico. Emery (1899e) published a new species of *Pheidole*, *P. grallatrix*, and reported three species of *Pheidole*, *P. oswaldi* Forel, *P. nemoralis* Forel, *P. megacephala* (Fabricius) from Madagascar.

Emery (1900b) published four new species of *Pheidole*, *P. fuscula*, *P. laminata*, *P. cryptocera*, *P. lobulata* and one new variety of *P. umbonata* Mayr from New Guinea. In the same year (1900c) he described four new species, *P. quadricuspis*, *P. modigliani*, *P. ghigii*, *P. elisae* and *P. rinae* from Sumatra. Mayr (1901a) published new species of *Pheidole*, *P. minima* and *P. buchholzi* from Cameroon; (1901b) *P. foreli* from Sunday River, Newry, Maine, United States, *P. tenuinodis* from Bothaville, Vaal River, South Africa. Forel (1901d) described new species *P. termitobia* from São Leopoldo, Brazil, *P. tolteca*, *P. optiva* and *P. laevivertex* from Mexico. In another paper (1901j) he redescribed *P. vinelandica* Forel, *P. morrisi* Forel, *P. dentata* (Mayr), *P. pilifera* Roger, *P. praeusta* Forel, *P. radoszkowskii* Mayr, *P. subarmata* Mayr, *P. megacephala*, *P. cornutula* Emery, and published new status for nine species of *Pheidole*. In that paper he also described new species, *P. tysoni*, *P. steinheili*, *P. vallifica*, *P. longiscapa*, *P. amata*, *P. arhuaca* and *P. decem* from Neotropical region. He also published a paper in the same year (1901m) providing a new name for *P. gertrudae* Forel as *P. rosae* Forel from Hamburg National History Museum. Forel (1902j) described new species of *Pheidole*, *P. froggatti*, *P. concentrifica*, *P. conficta*, *P. anthracina*, *P. myops*, *P. turneri* and redescribed *P. megacephala*, *P. impressiceps* Mayr, variety for *P. ampla* Forel, *P. bos* Forel and *P. variabilis* Mayr from Australia. In the next year, the same author (1903e) described new species, *P. barreleti* from Kandy, Sri Lanka.

Bingham (1903) published a monograph on the ‘Fauna of British India, including Ceylon and Burma’. It was the only complete work on the ant fauna.
in this region during that time. He also provided key and descriptions of all subfamilies, genera and species. Under the subfamily Myrmicinae Bingham reported fifty species of *Pheidole*. Wheeler W M (1904f) studied the ants of North Carolina and compiled the works from literature as well as from the collection carried out by Beutenmüller. He also recorded sixty one species of Formicidae in which seven species belongs to *Pheidole*, *P. pilifera* (Roger), *P. vinelandica* Forel, *P. tysoni* Forel, *P. morrisi* Forel, *P. morrisi vanceae* Forel, *P. dentata* (Mayr) and *P. crassicornis* Emery. Wheeler W M (1905j) prepared an annotated list of the ants of New Jersey and recorded a total of ninety species and four species of *Pheidole*, *P. pilifera*, *P. vinelandica*, *P. morrisi* and a new species *P. davisi*. In that year Forel published four new species of *Pheidole* in two papers, (1905e) *P. meinerti* from Bolivarian Republic of Venezuela, South America. In (1905f) he described *P. nodgii*, *P. Säoberi*, *P. treubi* from Buitenzorg, Indonesia.

Wheeler W M (1906h) published Ants of Japan and listed thirty one species of ants. His paper was based on the affinities of species with nearby region. In that paper he recorded the affinity of *P. nodus* Smith with Southern Asian *Pheidole*, *P. fervida* Smith. He (1906j) published a paper on Ants of Bermuda and recorded eleven species of ants with the discussion of the habitat and a brief note upon the view explaining the disappearance of *P. megacephala* (Fabricius) in Culbera region. He added that this species was acccidently introduced to St. Thomas and whose habitat was similar to that of Culbera as *P. megacephala* was previously found in Culbera. The absence of this ant in Culbera was stated to be the presence of Fire ant. Again he also published a paper on Ants of Grand Canon in that year (1906i) and recorded *P. ceres* Wheeler, *P. vinelandica*, *P. maricopa* Wheeler. Emery also published paper on *Pheidole* in that year (1906c) and described eleven species of *Pheidole* including four new varieties, one sub species, two new species, two unknown
species and two already reported species from Neotropical region. Forel (1907i) revised the distribution of six species of Pheidole and described new species, *P. jonas* from Comero and in another paper (1907e) he described another new species, *P. santschii* from Mecca. Forel (1908a) studied the Ants of Brazil and recorded the presence of twelve species of *Pheidole* and added two new species, *P. rochai*, *P. bimons*; In (1908c) he described two more new species, *P. biolleyi*, *P. diana* from Costa Rica. Forel (1908h) described *P. rufipilis*, *P. perversa*, *P. angusta*, *P. wolfringi*, *P. bambusarum* and *P. oxyops* from Säo Paulo, Brazil. Wheeler W M in that year (1908h) studied the Ants of Texas, New Mexico and Arizona and in that study he bought together the scattered information and previously published data from many authors and added sixteen species of *Pheidole* viz., *P. proserpina*, *P. soritis*, *P. casta*, *P. sitarches*, *P. sciophila*, *P. xerophila*, *P. barbata*, *P. pinealis*, *P. macclendoni*, *P. rhea*, *P. lauta*, *P. humeralis*, *P. marcidula*, *P. cockerelli*, *P. nuculiceps*, and *P. constipata*. He also redescribed seventeen *Pheidole* species in which new variety and new subspecies were included. Emery in that year (1908k) published a paper in which he described seven species, four new varieties, six new species, five sub species of *Pheidole* from Säo Paulo and Paraguay.

Wheeler W M (1909b) published a paper on new species of *Pheidole* viz., *P. confoedusta* from the collections of Prof F. Silvestri in Mexico and in that year (1909d) Wasmann described a new species, *P. symbiotica* from Argentina. In that report he had mentioned about the origins of social parasitism, slavery and the myrmekophilie among ants.

Forel (1910a, b, c and f) described several new species of *Pheidole*; (1910a) *P. seeldrayersi* from Colombia; (1910b) *P. deserticola*, *P. wiesei*, *P. philemon* *P. liteae*; (1910c) *P. escherichii*, *P. strator* from Ghinda, Northern Red Sea region of Eritrea, (1910f) *P. kitschneri*, *P. cuitensis*, *P. spinulosa* and
re redescribed three species of *Pheidole*, *P. foreli* Mayr, *P. schulzei* Forel, *P. buchholzi* Mayr and *P. sculpturata* Mayr from Belgium. Santschi (1910c) described three new species, *P. pulchella*, *P. concinna* and *P. squalida* from Brazzaville, Republic of Congo.

Forel (1911a) published new species *P. havilandi*, *P. plinii*, *P. aristotelis* from Singapore, (1911g) *P. transfigens* from New Guinea. In the same year Wheeler W M (1911a) published Fauna of Ants of Jamaica and listed three species and four new species of *Pheidole*, *P. caribbaea*, *P. hecate* and its new sub species. During that year Santschi published two papers describing the new species; (1911d) *P. arizonica* from Arizona which was the collections of Prof. F Silvestri and in (1911i) *P. riveti* from Perou–Equateur. Forel (1912b) described new species *P. amia*, *P. taivanensis*, *P. ernsti* from Mount Takoa and Tokyo, (1912c) *P. bakeri* from Entomological Museum in Berlin, (1912d) records the entire species distribution of *Pheidole* in Neotropical regions along with new species *P. lemur*, *P. aper*, *P. christophersenii* and he also records the new subspecies as well as new varities, (1912l) recorded the presence of *P. punctulata* Mayr from Seychelles and (1912m) *P. fervida* Smith from Tokyo

Santschi (1913h) described one new species of *Pheidole* viz., *P. riveti* along with the distribution of *P. praensta* Roger and *P. radoszkowskyi* Mayr from equatorial South America. In the same year (1913b) Wheeler W M redescribed six species of *Pheidole* from Cuba. Forel too published two papers in the same year describing new species; (1913l) *P. rabo*, *P. aglae*, *P. attila*, *P. butteli*, *P. hortensis*, *P. tandjongensis*, and eight species of *Pheidole* from Sumatra, Java and Sri Lanka, and in (1913m) *P. tetrica* from Argentina.

Bruch (1914) prepared a Catalogue of Formicidae of Argentina representing forty one species of *Pheidole*. At the same time (1914) Santschi, Wheeler and
Forel described new species. Wheeler W M (1914c) published a paper on ants based on the collection of Mann in the state of Hidalgo, Mexico and recorded seven species of *Pheidole* with two new species, *P. chalca* and *P. centeotl*. Santschi (1914d) published eighteen species of *Pheidole* with the report of new species *P. mentita*, *P. nigeriensis*, *P. tricarinata* from Australia and Africa region. Forel (1914c) described new species *P. gaigei* from Africa. Forel (1915b) studied the ants of Australia and described a new species *P. athertonensis* and listed fifteen species of *Pheidole*. At the same time (1915) Bruch prepared a Catalogue of Formicidae of Argentina. Gallardo (1915) provided a brief note on *Pheidole* and redescribed *P. cavifrons* Emery from Argentina. In the same year (1915b) Wheeler W M synonymised *P. rhea* with *P. fimbriata* Roger after comparing the species with the females, soldiers and workers of *P. fimbriata* which was collected from Vera Cruz, Mexico. Bruch (1916) described *P. bergi* Mayr, *P. spinodis* Mayr with its variety and *P. abberans* Mayr with the details of nest colony from Province of San Luis. Forel (1916) reported six species of *Pheidole* from Congo while Stitz describe new species *P. platycephala* from the same place. Emery (1916a) provided a general introductory note for the genus *Pheidole* Westwood along with the distribution of *P. pallidula* Nylander from Italy. Wheeler W M (1916c) recorded a total of six *Pheidole* with three new species *P. cramptoni*, *P. mimula* and *P. cataractae* from British Guiana, northern coast of South America during his expedition of American Museum of Natural History. Wheeler W M (1917g) described eight species of *Pheidole* including three new subspecies from Jamaica.

Luederwaldt (1918) prepared a list of ants and listed thirty five species of *Pheidole* from Paulista, Pernambuco, Brazil. Forel (1918b) studied the ants of Madagascar and described a new species *P. annemariae* from there. Mann (1919) studied the Ants of Solomon Islands and recorded *P. belli*, *P. erato*, *P.
mendanai, P. isis and P. nindi as new species. In 1921 he added six new species, P. onifera, P. vatu, P. wilsoni, P. caldwelli, P. knowlesi and P. colaënsis along with the description of five species of Pheidole from Levuka, Fijian island. Emery (1921c) ‘Genera Insectorum’ providing the details of family Myrmicinae with the genealogical tree for the subfamilies, key to the tribes of the family Myrmicinae, key to the genera, characters of genus with species description, provided synonyms for tribes, generic characters, sub generic keys and its distribution. Wheeler W M (1921f) recorded new species of Pheidole, P. tachigaliae, from Guianas. Wheeler W M (1922e) published two new species P. lacerta, P. tenerescens, and recorded the distribution of two species of Pheidole, P. fimbriata Roger and P. decem Forel and in another paper (1922j) he prepared a synonymic list of ants of the Ethiopian region and synonymised fifty seven species of Pheidole with its subspecies level and provided the type locality and distribution of each species. Mann (1922) published ants from Honduras and Guatemala and published new species of Pheidole, P. hondurensis and P. walkeri along with the distribution of four other species of Pheidole. In that year Emery published (1922c) distribution of two hundred and forty five species of Pheidole in ‘Genera Insectorum’.

Santschi (1923) published a paper entirely on Pheidole from Neotropical region with new species P. lucretii, P. impariceps, P. reichenspergeri, P. diligens, P. vafra, P. idiota, P. defecta, P. aequiseta, P. scapulata and twelve new Pheidole varieties. In (1924c) he published new species P. planifrons from France; (1925d) described P. claviscapa, P. arcifera from Brazil, (1925e) prepared a key to the species of Pheidole from Argentina; (1925f) describes new species P. pieli from China; (1925h) described new varieties for P. megacephala (Fabricius), P. sculpturata Mayr, P. tenuinodis Mayr and P. rohani new species from Angola. Wheeler W M (1924b) recorded seven
species of *Pheidole* from Neotropical region with the additions of five new species *P. quiaccana* from Bolivia, *P. vafella* from San fermin, Bolivia and Yanalomas, *P. accinota* from Matucana, *P. holmgreni* from Bolivia and *P. moseni* from Mosen in Brazil.

Menozzi (1926c) described a new species *P. eidmanni* from Brazil. Borgmeier (1927b) described the two new species *P. tijucana* and *P. strobeli* silvivada, while Smith M R (1927b) recorded eleven species of ants to the existing records of ants of Mississippi and also added one new species of *Pheidole, P. dentigula*. With this addition the total number of species from Mississippi State included eighty seven species of Formicidae. Menozzi (1927c) described four species *P. radozkowskii sub sp pugnax* Dalla Torre, *P. susannaae sub sp. obscurior* Forel, *P. punctatissima* Mayr, *P. flavens sub sp. tuberculate* Mayr from Costa Rica. Wheeler W M (1927d) described a new species *P. lighti* from Back liang, China. In the next two years Santschi published a paper each regarding new species (1928f) *P. albidula* from Ethiopia; (1929d) he described a new species *P. bucolica along* with the details of more than half a dozen of *Pheidoles* from Argentina and Brazil and in (1929f) he described *P. decarinata* from Sudan Francais. Wheeler W M (1929g) published a new name for *P. concinna* Wheeler as *P. tsailuni* in honour of Ts’ai Lun, the chinese Eunuch. He recorded *P. javana* Mayr and *P. nodus* Smith from China, and *P. rinae* Emery from Hongkong. In another paper during the same year (1929h) he described new species *P. tunkikoënsis* from Funkiko, Formosa and *P. maculifrons* from Luzon Island, Philippines. Santschi (1930a) added one new species *P. andrieui* to Ethiopia.

Carpenter (1930) studied the Ants of Florissant shale of Colorada and came across a new species *P. tertiaria*. Menozzi and Russo (1930) published the synonyms of Formicidea including *Pheidole*. Menozzi (1931d) added one
new species *P. innupta* to Costa Rica. Santschi (1932b) studied the *Pheidole* of South Africa and recorded a new species *P. hewitti*. Wheeler W M (1932a) prepared a list of ants of Florida which includes a total of ninety one species of ants with five species of *Pheidole*. Cole (1933b) added new sub species for *P. pilifera* sub sp *artemisia* and a new variety for *P. californica* Mayr.

Weber (1934a) prepared notes on Neotropical ants with the description of *P. cubaensis* Mayr var. *graii* Mann, *P. punctatissima* Mayr subspecies *jamaicensis* var. *barbouri* Wheeler. Brogmeier in the same year redescribed *P. opaca* Mayr, *P. biconstricta* Mayr sub *hybrid* Emery, and two new species *P. coffeecola*, *P. cocciphaga*. Wheeler W M (1934g) published a paper on Neotropical ants and published new species *P. skwarrae* from Cuernavace and Morelos, *P. tragica* from Mexico, *P. sagana* from Mirador along with four new subspecies. Wheeler W M (1935g) prepared a checklist of ants of Oceania and listed forty species of *Pheidole*. Cole (1936a) studied the Ants of Idaho and prepared a list of ants representing six species of *Pheidole*. Menozzi (1936b) published the life cycle of *P. pallidula* var *orientalis* from Italy and Wheeler W M (1936c) described a new species *P. darlingtoni* from Hatai and the name was given in honor of Darlington who collected the ants. Wheeler W M (1937b) described a new species *P. similigena* from Trinidad, which was collected by Darlington during his study on the distribution of Coleoptera in the Cuba mountains. Santschi (1937d) prepared a checklist of Formicidae of Angola and reported sixty three species of ants including *P. minima* Mayr, *P. corticicolis* Mayr and *P. megacephala* (Fabricius). During that year (1937)Smith M R collected ants from the Western part of Mayaguez Island of Puerto Rico and prepared a key to the subfamilies and added notes on characters of each subfamily. He also recorded *P. fallax jelskii* var. *antillensis* Forel, *P. megacephala*, *P. flavens* sub species *sculptor* Forel, *P.
moerens Wheeler, P. subarmata var. borinquensis Wheeler along with other sixty six species of ants.

Stitz (1938) described a new species P. rupicapra from New Guinea. Menozzi (1939a) prepared a key to sixteen species of Pheidole present in Italy. Santschi (1939e) described a new species P. goetschi from Argentina and Kona, United States and recorded P. fervida Smith from Japan. Wesson (1940) recorded three species of ants from South Central Ohio with the distribution and a note on habitat of P. pilifera Roger, P. tysoni Forel and P. vinelandica Forel. Cole (1942) described P. pilifera Roger, P. desertorum Wheeler, P. california Mayr, P. california oregonica Emery from Uttah. Weber (1943b) described a new subspecies P. opaca Mayr subsp apterostigmoides from the collection of ants from Venenzula. Smith M R (1943c) redescribed P. rheae Wheeler from soldier species and from worker castes collected from Nogales, United States. Wheeler G C and Wheeler E W (1944) studied the ants of North Dakota and records P. pilifera coloradensis Emery and P. vinelandica Forel and they observed the nesting site of these species and recorded the habitat.

Smith M R (1947c) published a new species of Pheidole, P. quadriprojectus. This name was given because it contains a four spatulate processes on the anterior half of the head of the soldier. Smith M R (1947f) published a synopsis on Ants of United States and provided the synonymy for the genus Pheidole Westwood with generic character and in another paper (1947h) during the same ocassion he published notes to the species of Pheidole and described a new species P. zeteki from Barro Colourado Island. Cole (1948) published a synonym for P. dentata var commutata Mayr as Leptothorax tennesseensis Cole. Cole misidentified some workers of P. dentata var commutata as Leptothorax tennesseensis. Gregg (1949a) published a note on
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_P. rhea_ Wheeler, which were collected from the same colony located near the top of a dry hillside on Washington Drive, Nogales, Arizona.

Creighton (1950a) gave an extensive key to the North American _Pheidole_, and listed sixty three species. He used the morphological characters for both major and minor workers. Brown W L Jr. (1950g) suggested a new name to _P. longiceps_ Aguayo as _P. neolongiceps_. In that year Gregg published a new species of _Pheidole_, _P. clydei_ from South West United States. Cole (1952b) described a new species _P. sitarches_ subsp. _littoralis_ from Florida and also provided the details of type locality, depository, and key to the species. Cole (1952c) published notes to _P. pilifera_ Roger and he added one subspecies to _P. pilifera_ subsp. _anfracta_ from New Mexico along with a key to subspecies. In that year (1925d) Kusnezov prepared a paper on the _Pheidole_ of Argentina with a note to genus and key to the species describing six new species, _P. haywardi, P. ogloblini, P. carapunco, P. gavrilovi, P. minutissima and P. descolei_. Gregg (1952a) described a new species _P. senex_ from Colorado, which resembles closely to _P. coloradensis_ Emery.

Cole (1953g) listed thirteen species of _Pheidole_ including few subspecies from New Mexico and also added the synonymy and habitat. In the same year Gregg (1953b) redescribed _P. clydei_ Gregg which was collected by Creighton from Anza, California. Kusnezov (1953c) listed thirteen species of _Pheidole_ from Tucumán, the provinces of Argentina. In another paper (1953f) he added five species of _Pheidole_ to Bolivia and in the same year (1953e) Smith M R described a new species _P. grundmanni_ from Ashley Creek, Vernal, Utah. Cole (1955a) described a new species _P. sciara_ with its variation and affinities

Creighton along with Gregg (1955) redescribed twelve species of _Pheidole_ and two new species from the South Western United States and Northern
Mexico. Gregg in that year (1955a) studied the specimens given by Creighton found a new species of *Pheidole, P. creightoni* from Northern slope of Siskiyou Mountains in South Western Oregon and he compared this species with five species of *Pheidole*. Smith M R (1955d) provided a key to the *Pheidole* and redescribed *P. mendicula* Wheeler from Barro Colourado Island and *P. tachigaliae* Wheeler from British Guiana. Cole (1956c) studied the *Pheidoles* of South Western U.S.A and added thirteen species of *Pheidole*. Gregg (1958) revised *Pheidole* of U.S.A and published a key to the species of *Pheidole* in U.S.A. with synonyms, type locality and description of new species.

Kempf (1964e) published a miscellaneous note on the ants of Neotropical region and provided general notes to the genus *Pheidole* with the redescription of seven species of *Pheidole*. He also gave a new name for *P. diligens* Santschi as *P. blumenauensis* Kempf. Cole (1965) published a paper on the new combination for *P. inquilina* (Wheeler), since this species was found in the nest of *P. pilifera coloradensis* Emery, which was its host species. Cole (1966b) published a key to the subfamily Myrmicinae based on workers and provided generic characters, key to the genus including five species of *Pheidole* with description, habitat and general behaviour. Creighton (1966) published a paper on the *P. ridicula* Wheeler based on the studies on seven colonies of *P. ridicula* at Texas.

Wilson and Taylor (1967b) studied the ants of Polynesia and described two new species of *Pheidole* viz., *P. aana* and *P. atua* and redescribed *P. fervens* Smith, *P. megacephala* (Fabricius) *P. oceanica* Mayr, *P. umbonata* Mayr, *P. sexspinosa* Mayr along with their distribution. During that year Hamann and Klemm recorded *P. sinaitica* Mayr from Nubia. Brown W L Jr. (1968b) described a new species of *Pheidole, P. embolopyx* which showed a phragmatic behaviour at some stages of the life cycle, which is shown by the
queen using its gaster and not by the head. Kusnezov (1969) published a new species *P. arizonica* from Arizona. Gregg (1969b) published two new species of *Pheidole* which were collected by Roy Snelling, *P. clementensis* from California and *P. dwyeri* from Nayarit, Mexico. Wheeler G C and Wheeler J (1972b) studied the ant larvae of two tribes and they described the larval characters of six species of *Pheidole* viz., *P. brevicornis* Mayr, *P. californica* Mayr, *P. guilelmimuelleri* Forel, *P. hyatti* Emery, *P. micula* Wheeler and *P. moerens* Wheeler. The same authors also prepared a key to the mature larvae of the tribes Myrmicini and Pheidolini. Kempf (1972d) studied the genus *Pheidole* in the Neotropical region and provided synonyms for recorded species. He also described new species viz., *P. dyctiota, P. camptostela* and *P. borgmeieri* from Brazil, redescribed *P. vallifica* Forel from Argentina, *P. gibba* Mayr and *P. perpusilla* Emery from Brazil. Brown W L Jr. (1973b) recorded the presence of minor workers of *Pheidole* in Mexican amber. Hunt (1975) prepared a checklist of ants of Arizona which contains twenty five species of *Pheidole*. Francoeur (1977b) prepared a checklist of ants of Idaho which contain three species of *Pheidole* including one subspecies. Kugler (1979) studied the alarm and defense behaviour as the function of the pygidial gland of *P. biconstricta* Mayr, whose content possesses a volatile component. This viscous component can be smeared directly on an enemy at a distance which acts as gumming agent and irritant.

Hölldobler and Möglich (1980) studied the foraging behavior of the harvester ant *P. militicida* Wheeler in which the ant uses the trail pheromone originating from the poison gland of the workers, which is highly species specific. Not only chemical cues but also visual guidelines seem to play a role in the directional maintenance. In that year (1980a) Onoyama prepared a checklist of ants of Japan containing a total of one hundred and seventy three ants and one fossil form and he listed five species of *Pheidole, P. fervida*
Smith, *P. indica* Mayr, *P. megacephala* (Fabricius), *P. nodus* Smith. During that year Schlee recorded the presence of *Pheidole* in Dominican amber. Brown W L Jr. (1981) published a new synonymy for seven species of *Pheidole* which are mostly Neotropical and revised the genus in that region. Donald (1981) studied the biology of *P. lamia* Wheeler and in that year Droual and Topoff studied the emigration behaviour of two species of *Pheidole P. desertorum* Wheeler and *P. hyatti* Emery.

Allfred (1982) prepared a key to the workers of *Pheidole* of Utah and redescribed nine species of *Pheidole* with distribution. Ogata (1982) published the taxonomy of seven species of *Pheidole* of Japan and he confirmed the presence of *P. fervens* Smith and recorded *P. ryukyuensis* Ogata from Ryukyus. He also provided key to the species of *Pheidole* in Japan. Droual (1983) studied the nest evacuation behaviour in *Pheidole desertorum* Wheeler and *P. hyatti* Emery. Droual (1984) also studied the anti-predator behaviour in *P. desertorum* Wheeler and its importance of multiple nest construction. Johnston and Wilson (1985) correlated the variation in the major/minor ratio of the ant, major workers of the ant *Pheidole dentata* (Mayr). Naves (1985) published ants of Florida, representing a total of nineteen species of *Pheidole* with three new species, *P. drianoi*, *P. carrolli*, *P. greggii*. He also provided a key for the identification of both major and minor and also provided scanning electron micrographs, note on biology as well as ecology of each species. Wheeler G C and Wheeler J (1985) prepared a checklist of Texas ants and reported thirty nine species of *Pheidole* from Texas.

Deyrup and Trager (1986) studied the ants of the Archbold Biological Station in the highlands of Florida and recorded one hundred and two species of ants in which eight species belongs to *Pheidole*. Feener (1986) studied the alarm behaviour in *P. milticida* Wheeler. Marsh in the same year (1986b) prepared a
checklist, biological notes including the distribution of ants in the central desert and reported one species, *P. tenuinodis* Mayr which appears to have a wide distribution in Southern Africa. Wheeler G C and Wheeler J (1986g) prepared ants of Nevada, United States and listed fourteen species of *Pheidole* with key to the species. Taylor (1987a) prepared a checklist of the ants of the southern lands of the Australian region and listed more than half dozen of species of *Pheidole*.

Donald (1987) studied the response of *P. morrisi* Forel against two species, *Solenopsis geminata* (Fabricius) and *Lasius alienus* (Föerster) and also studied the defense behaviour in this species. Zolessi (1988) published a checklist of Formicidae of Uruguay and reported nineteen species of *Pheidole*. Donald (1988) studied the foraging and defense behaviour of *P. titanis* Wheeler which is an efficient predator of termite. MacKay et al. (1988) published Gregg’s modified key to *Pheidole* with the habitat and biology of five species and new species, *P. wheelerorum* from Los Almos, New Mexico. Hölldobler and Wilson (1992) discovered a new species of *Pheidole*, *P. nasutoides* whose major workers in life astonishingly resembled those of Nasutitermes. These strange-looking ants were nesting in the low arboreal zone at the edge of secondary rain forest, in a habitat especially favoured by Nasutitermes. The authors also provided the natural history of the species.

Fowler (1993) published a paper on the representation of *Pheidole* species in the local ground assemblages of America, which showed the abundance of *Pheidole* species in that region. In that year Hohmann et al. prepared a checklist of ants, bees and wasps on Canary Islands. Fernandes et al. (1994) studied the importance of *Pheidole* in biological control programmes. They found that the native ant *P. oliveirai* Wilson was by far the most efficient
predator, accounting for 94% of the predation on *Anthonomus grandis* Bohemen. Bolton (1994) published an eminent work concerned with guide for the identification of ant genera of the world in which key to the sixteen families and two hundred and ninety six genera were provided. In next year the same author (1995a) prepared a list of Formicidae and records five hundred and forty five species of *Pheidole* in different Zoogeographical region. Ken (1995) studied the natural history of the ant *P. desertorum* Wheeler in a desert grassland habitat describing the colony structure, note to the species density, territorial behaviour and foraging habits etc. Tang et al. (1995) published a paper on the economic insect fauna of China and recorded seven species of *Pheidole*. Urbani (1995) described a new species of *Pheidole*, *P. primigenia* from Dominician amber with its description and systematic position.

Apart from taxonomy, Eguchi (1999) studied the close resemblance of two species of *Pheidole* viz., *P. multicoma* Eguchi and *P. montana* Eguchi. In that year Gulmahamad and Martinez reported the extirpation of one exotic ant species, *P. teneriffana* Forel by another ant *Linepithema humile* Mayr (Argentine ant) in Southern California. Onoyama and Terayama described new species of *Pheidole* viz., *P. susanowo* from Japan in the same year. In the same year Zhou and Zheng studied the taxonomy of the genus *Pheidole* from Guangxi and recorded thirteen species of the genus *Pheidole*. Among these three of them were new viz., *P. aphrasta*, *P. longiscapa*, *P. flaveria* and species *P. feae* Emery was recorded for the first time from China. They also provided a key to the *Pheidole* in the Guangxi. Eguchi (2000) described two new species of genus *Pheidole* viz., *P. sabahna* and *P. quinata* from Borneo, Java and Sumatra. Helms et al. (2000) studied the sex ratio determination by queens and workers in the ant *P. desertorum*, which provided the evidence that queen of those colonies substantially prevented the production of
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reproductive female. Ward (2000) re-examined the type series at United States National Museum and corrected the misidentified specimens which were not conspecific to *P. vasalitii* Pergande and corrected the species identification. Eguchi (2001a) revised Bornean *Pheidole* species and in the same year (2001b) he also revised Asian *Pheidole*.

Wilson E O (2003) published an excellent monograph on ‘*Pheidole* in the New World’ containing over six hundred species. Eguchi (2003) described the male genitalia of thirty two species of *Pheidole* along with other genera from Asia. Eguchi (2004) revised the taxonomy of two species of *Pheidole*, *P. fervens* Smith and *P. indica* Mayr and described *P. coonoorensis* Forel, *P. jacobsoni* Forel, *P. jubilans* Forel, *P. protea* Forel and prepared key to the species. Eguchi and Bui (2005) described a new species viz., *P. aspidata* from South Vietnam, which have a truncated front of head. Ward (2005) reviewed the taxonomy and composition of the California ant fauna, leading to the recognition of two hundred and eighty one species (in forty four genera), of which two hundred and fifty five are considered indigenous and thirty nine are endemic out of which twenty two species were *Pheidole*. Weeyawat and Jarujin (2005) prepared a list of known ant species of Thailand and listed forty three species of *Pheidole* with the details of distribution data. Lapollo (2005) described two new species from Guyana viz., *P. funki* and *P. schultzi*. He also provided a modified version of Wilson’s key. His study revealed the presence of eighty six *Pheidole* species in Guyana. Eguchi (2006) published six new species of *Pheidole* viz., *P. colpigaleata*, *P. fortis*, *P. foveolata*, *P. laevicolour*, *P. magna*, *P. vulgaris* from North Vietnam. Again in that year Eguchi published a paper with Hashimoto and Malsch described a new species, *P. schoedli* from North Borneo, which resembles closely to *P. parvicorpus* Eguchi.
Fadl et al. (2007) studied the ants of Egypt and published a new species *P. fadli*. In the same year Makhan described a new *Pheidole* species *P. soesilae* from Republic of Suriname, northern South America along with key to the *Pheidole* species. Moreau (2008) reconstructed the phylogeny of *Pheidole* using molecular characters from three mitochondrial genes and two nuclear genes for nearly one hundred and forty species of *Pheidole*. Eguchi (2008) revised Northern Vietnamese *Pheidole*, listed thirty species including six new species, resolved the synonymy and designated lectotype for four species. In that year Sarnat studied the ants of Fiji and described *Pheidole roosevelti* group. Most of the species belonging to this group exhibit remarkable modification of their propodeal spines, mesonotum and heads he described a total of seven species, in which five of which are new. They are *P. bula*, *P. furcata*, *P. pegasus*, *P. simplispinosa* and *P. uncagina*. Heterick (2009) reported the pest status of *P. megacephala* (Fabricius) in Australia, with a key to the fifteen major workers of *Pheidole* along with an introduction to the generic characters, checklist and glossary. Another excellent work in that year was done by Longino. He prepared a monograph on the taxonomy of New World *Pheidole*.

Özdikmen (2010) published new names for the preoccupied specific and subspecific epithets in the Genus *Pheidole*. New combinations are proposed for the species and subspecies. In the same year Taylor speculated that *P. teneriffana* Forel is a junior synonym of *P. fervens* Smith. Wetterer (2011) published worldwide spread of *P. teneriffana* Forel and stated that *P. teneriffana* is an Old World ant species and it has spread to other parts of the world through human commerce. It seems doubtful that *P. teneriffana* will develop into a major pest species like its congener. Fischer et al. (2012) studied the taxonomy of the ant genus *Pheidole* in the Afrotropical Zoogeographic region, definition of species groups and systematic revision of
the *Pheidole pulchella* group. Fischer and Fisher (2013) published a paper on the revision of *Pheidole* Westwood from the islands of the Southwest Indian Ocean and designate a neotype for the invasive of *P. megacephala* (Fabricius).

### 2.3 TAXONOMIC STUDIES ON *PHEIDOLE* WESTWOOD IN INDIA

The studies on ants was started in India by 19th century. Sykes (1835) described *Atta providens*, which was the beginning on the studies on *Pheidole*. The name *Pheidole* was given by Westwood based on this type species. This species was collected from Pune from the grass field of uncultivated area. Jerdon (1851) described several species from various localities of India. Among these three species are currently the junior synonyms of *Pheidole* species. Roger (1863b) described two new species of *Pheidole* viz., *P. latinoda* and *P. sulcaticeps*. Mayr (1879) described Indian ants and described *P. quadrispinosa* Jerdon (Jerdon described it as *Ocodoma quadrispinosa*), and three new species *P. striativentris* Mayr, *P. rhombinoda* Mayr and *P. indica* Mayr from Kolkata. Forel (1885b) prepared a note on ants of Indian Museum and listed the ants of India. In that occasion he described two new species of *Pheidole* viz., *P. jacunda* and *P. wood-masoni* from Indian museum and added a short note to *P. indica* and redescribed *P. latinoda* Roger. Rothney (1889) published extensive notes on ants of Bengal. Wroughton (1892) provided an account of ants of Maharashtra. Forel (1902g) described thirty three new species of *Pheidole* from India along with a checklist of forty species of *Pheidole*. Bingham (1903) described two new species *P. bhavanae*, *P. hospita* from India along with the details and distribution of a total fifty species of *Pheidole* from Sri Lanka, Myanmar and India. Forel (1903f) prepared and published the ants of Andaman Nicobar Islands. Forel (1906b) published ants of Himalaya and recorded ten species of *Pheidole*. Mukherjee (1934) recorded *P. rhominoda* from Noganur,

Gadekar and Nair (1993) studied ant species diversity in some selected localities of Western Ghats in Southern India and provided the first estimate of ant species richness and diversity of Indian forest, representing the diversity of twenty four species of *Pheidole*. Tak (1995) studied the ant fauna of Rajasthan and reported some species of ants of Jodhpur region including three species of *Pheidole* viz., *P. sulcaticeps* Roger, *P. roberti* Forel and *P. wroughtonti* Forel. Tak and Rathore (1996) worked out the ant fauna of Thar desert. Chhotani and Ray (1997) described the Hymenopterous fauna of Rajasthan and provided a few species of desert region. Ali and Ganeshaiah (1998) has mapped the diversity of ants in India. Tiwari (1999) conducted a revisionary work on the taxonomy of ants of Southern India representing thirteen species of *Pheidole* with synonymy and distribution of species. In the next year Mathew and Tiwari (2000) published eighteen species of *Pheidole* in the state fauna series along with the diagnosis and distribution.

Himachal Pradesh. Ghosh et al. (2005) studied the ants of Rabindra Sarovar, Kolkata and recorded two species of *Pheidole* from Kolkata.

Kaleeswaran et al. (2008) studied the biodiversity and niche of ants in Alagar hills Tamilnadu, which dealt with the ant species diversity and comparative studies on each and every identified species with the seasonal variation and altitude of their existence. In that occasion they recorded two species of *Pheidole, P. latinoda* Roger and *P. indica* Mayr. Dolly and Archana in that year studied the ant community variation in urban and agricultural ecosystems in Vadodara District of Gujarat, Western India and reported that *Pheidole* has the greatest species richness in urban ecosystems. Ghosh and Sheela (2008) studied the Formicidae of Buxa Tiger Reserve, West Bengal and recorded *Pheidole roberti* Forel.

Ramesh et al. (2010) studied the diversity, distribution and species composition of ant fauna at the atomic energy campus Kalpakkam and recorded the presence of *Pheidole latinoda* and in that year Prashanth et al. studied ants of Andaman Nicobar Islands and recorded the presence of ten species of *Pheidole* with a total of one hundred and twenty five species of ants. Bharti (2011) published on ants of India, including a total of fifty four species of *Pheidole*.

### 2.4 STUDIES ON *PHEIDOLE* WESTWOOD IN KERALA

Jerdon (1851) studied the ants of Kerala and conducted a revisionary work and presented a catalogue of ants of South India representing three species of *Pheidole* from Kerala, which was placed under the genus *Ocodoma* Jerdon. Currently these three species are known as follows: *Ocodoma malabarica* Jerdon as *Pheidole malabarica* Jerdon, *Ocodoma minor* as *Pheidole minor* Jerdon and *Ocodoma providens* (Sykes) as *Pheidole providens* (Sykes). Since then no much works were done in Kerala for a long time. After the work of
Jerdon, Forel (1902g) described on the *Pheidole* species of Kerala and he added three new species viz., *P. spathifera*, *P. fergusoni* and *P. sharpi* along with its distribution to Kerala. Bingham (1903) reported *P. fergusoni* Forel from Travancore (Trivandrum). Karmaly *et al.* (2010) published a checklist on ants on Thirunelli, Wayanad and recorded the presence of *P. spathifera spathifera* Forel in Thirunelli. Since then no paper on the taxonomy of *Pheidole* have been published from Kerala.