

FORMICIDAE (HYMENOPTERA: ACULEATA) FROM NEPAL

By

C. A. COLLINGWOOD, BRADFIELD

Nepal has been little explored faunistically and there are few published records of *Formicidae*. This paper is based on the examination of specimens kindly loaned by Professor H. JANETSCHKEK of the University of Innsbruck collected during the course of his 1961 expedition to the Khumbu Himal region of the Nepal Himalayas southwest of the Everest group. In addition to the main collection a number of specimens taken during the course of the British Museum Expedition to E. Nepal 1954 have been examined by courtesy of Dr. I. H. H. YARROW of the British Museum.

All the specimens referred to in this paper were collected at altitudes ranging from 850 m to 4500 m with subtropical species occurring up to 1500 m and the more typical mountain fauna at altitudes above 2000 m. The species recorded here fall mainly into two groups: Himalayan and Palaearctic/Indo-Malayan and subtropical. The occurrence of such mainly tropical species as *Oecophylla smaragdina* and *Carebara lignata* well to the north of their recorded ranges is of special interest.

List of species

	Altitude	General Range
Dorylinae		
<i>Dorylus (Alaeopone) orientalis</i> (WESTWOOD)	1000—2250 m	Indo Malayan
Ponerinae		
<i>Bothroponera rufipes</i> (JERDON)	1450—2000 m	Indo Malayan
<i>Brachyponera nigrita</i> EMERY	1900 m	Indo Malayan
<i>Leptogenys sarasinorum</i> FOREL	1400—2500 m	Indian
Pseudomyrminae		
<i>Sima (Tetraponera) rufonigra</i> JERDON	1000 m	Indo Malayan
<i>Sima (Tetraponera) allaborans</i> (WALKER)	1450 m	Indo Malayan
Myrmicinae		
<i>Myrmica bactriana</i> FOREL	2800 m	Himalayan
<i>Myrmica kozlovi</i> RUZSKY	2670 m	Himalayan
<i>Myrmica everesti</i> DONISTHORPE	2300—2850 m	Himalayan
<i>Myrmica rupestris</i> FOREL	1900 m	Himalayan
<i>Myrmica ritae</i> EMERY	2000 m	Indo Malayan
<i>Aphaenogaster (Attomyrma) smythiesi</i> FOREL	1830—2000 m	Himalayan
<i>Aphaenogaster (Attomyrma) prudens</i> FOREL	2900 m	Himalayan
<i>Aphaenogaster (Attomyrma) pachei</i> FOREL	3900—4800 m	Himalayan
<i>Ceratopheidole bhavanae</i> BINGHAM	3000 m	Himalayan
<i>Pheidole indica</i> MAYR	1000—1200 m	Indo Malayan
<i>Pheidole himalayana</i> FOREL	1400—2000 m	Himalayan
<i>Pheidole sagei</i> FOREL	2000—4500 m	Himalayan
<i>Crematogaster (Orthocrema) binghami</i> FOREL	1000 m	Himalayan
<i>Crematogaster (Sphaerocrema) sp.?</i>	1700 m	?

	Altitude	General Range
<i>Carebara lignata</i> WESTWOOD	1000 m	Indo Malayan
<i>Meranoplus bicolor</i> GUÉRIN	1750 m	Indian
<i>Pristomyrmex</i> sp. ?	1500—2900 m	Local
Dolichoderinae		
<i>Bothriomyrmex dalyi</i> FOREL	2900 m	Indian*
Formicinae		
<i>Formica fusca</i> L.	2830 m	Holarctic
<i>Coptiformica</i> sp. ?	2000 m	Himalayan
<i>Anacantholepis watsoni</i> FOREL	1900—2800 m	Burma, Siam
<i>Acantholepis lunaris</i> EMERY	1650—3000 m	Indian
<i>Prenolepis navroji</i> FOREL	830—1900 m	Indian
<i>Paratrechina (Nylanderia) indica</i> FOREL	1700—3500 m	Indian
<i>Oecophylla smaragdina</i> (FABRICIUS)	1150 m	Indo Malayan
<i>Camponotus (Myrmosericus) dolendus</i> FOREL	830—1450 m	Himalayan
<i>Camponotus (Myrmosericus) rufoglaucus</i> (JERDON)	1000 m	Indian
<i>Camponotus (Myrmosaurus) singularis</i> (SMITH)	830 m	Indo Malayan
<i>Camponotus (Tanaemyrmex) compressus</i> (FABRICIUS)	830—2300 m	Indo Malayan, Middle East
<i>Camponotus (Tanaemyrmex) lamarcki</i> FOREL	1000 m	Himalayan
<i>Camponotus (Dinomyrmex) angusticollis</i> (JERDON)	2000 m	Indian
<i>Camponotus (Myrmentoma) wroughthoni</i> FOREL	1690—4000 m	Himalayan
<i>Camponotus (Myrmentoma) himalayana</i> FOREL	3000 m	Himalayan
<i>Polyrachis (Myrma) mayri</i> ROGER	830 m	Indo Malayan
<i>Polyrachis (Myrmopla) simplex</i> MAYR	1000 m	Indian, Middle East
<i>Lasius niger</i> L.	1830 m	Holarctic
<i>Lasius (Chthonolasius) crinitus</i> (SMITH)	2700 m	Himalayan

All of the above except *Aphaenogaster pachei* are probably first records for Nepal. In the following notes the localities listed are from the JANETSCHKE collection April to June 1961 except where the collectors name is given.

DORYLINAE

Dorylus (Alaeopone) orientalis WESTWOOD

Banepa: Kathmandu: Namdu, 1400 m; Sikri, 2250 m.

A series of workers was taken on the way from Sikri to Jarsa at about 2250 m which is a high altitude for this species group. At the other localities, males were taken at light and since they are probably capable of long flight may not be truly representative.

Range: Malaya, Burma, Ceylon, India, China.

PONERINAE

Bothroponera rufipes (JERDON)

Namdu, 1450 m. Jarsa, 2000 m.

This species is abundant through Burma and the lower Himalayas.

Range: Malaya, Burma, India, China.

Brachyponera nigrita EMERY

Jiri, 1900 m; Kabre, 1750 m.

This species is recorded from the neighbouring country of Sikkim.

Range: Sikkim, Burma.

Leptogenys (Lobopelta) sarasinorum FOREL

Tamba Kosi (Namdu), 1400 m; Phewa Tal (Pokhara), 830 m, J. Quinlan, 5/54.

Examples were taken from a file of ants in a wood of Sal trees at Tamba Kosi. The Indian representatives of this genus are said to be termitophagous.

The specimens are 7.5—9 mm in length and are probably referable to *L. sarasinorum* which FOREL (1901) described as a larger subspecies of *L. diminuta* (Smith) a wide ranging variable species with a number of described related forms. FOREL described the type from Ceylon but it has also been recorded by BINGHAM (1903) from Sikkim.

Range: Malaya, Burma, India, China.

Sima (Tetraponera) rufonigra (JERDON)

Cha Khola valley, 1000 m; Pokhara, 1000 m; J. Quinlan, 4/54.

This is an abundant Indian species famous for its aggressiveness and painful sting.

Range: Malaya, Burma, India, China.

Sima (Tetraponera) allaborans (WALKER)

Namdu, 1450 m.

This is another common Indian species with a similar range.

Range: Malaya, Burma, India, China.

MYRMICINAE

MYRMICA

There are a wealth of Himalayan species mostly collected from high altitudes. Most are very similar in general appearance being predominantly black by contrast with the pale brownish red colours of European species. None of the recorded Himalayan species have geniculate scapes and as a group they appear to have most morphological resemblances to *Myrmica rugulosa*, *bergi* and *sulcinodis*. Many are distinguished by rather small differences in sculpture and petiole shape but these kinds of distinctions have been found consistently valid for the much studied members of the European fauna.

Myrmica bactriana RUZSKY*M. smythiesi* var. *bactriana* RUZSKY 1915

Ringmo-Junbesi, 2800 m; Yaral (Pangboche), 3900 m; Thate, 2900 m.

This species has hitherto been recorded from Tibet. It is distinguished from *M. smythiesi* by the subtruncate petiole node.

Range: Tibet.

Brachyponera nigrata EMERY

Jiri, 1900 m; Kabre, 1750 m.

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Range: Sikkim, Burma.

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Myrmica everesti DONISTHROPE

Siklis, 2330 m, K. M. Hyett, 6/54; Ulleri, J. Quinlan, 5/54 2650 m.

Gurjakhani, 2833 m, K. M. Hyett 7/54.

This species is represented by two alate queens from Gurjakhani. At Sikhim workers were taken from peaty turf. The subspinal area is striated and the petiole rugulose punctate above.

Range: Tibet.

Myrmica kozlovi RUZSKY

Resangu: Mingbo: Mandsua, 4000 m; Sikha, 2660 m; J. Quinlan, 5/54.

This another species hitherto recorded only from Tibet. The JANETSCHKEK specimens were taken on river banks. It is distinguished by its thick cubical postpetiole and abundant tibial hairs.

Range: Tibet.

Myrmica rupestris FOREL*M. smythiesi* var. *rupestris* FOREL 1902

Range: Sikhim

Myrmica pachei FOREL

No specimens were included in the collections studied but apart from *Aphaenogaster pachei* below this is the only other ant species recorded from Nepal.

Range: Sikhim, Kashmir.

Myrmica ritae EMERY

Ulleri, 2000 m; J. Quinlan, 5/54.

This species is characterised by the unusually long head, body, petiole segments and appendages. EMERY when describing this ant alluded to its *Aphaenogaster* like shape but it has the characteristic tibial spurs of a *Myrmica*. Specimens taken in Burma including a queen measuring 11.5 mm were unfortunately described by COLLINGWOOD (1962) as a new species of *Aphaenogaster* (*Nystalomyrma*) *gigantea* which is a synonym of *Myrmica ritae* EMERY.

Range: Burma, Borneo.

Aphaenogaster

The subgenus *Attomyrma* is fairly well represented in the Himalayan fauna and like most of the *Myrmica* species tend to occur at the higher altitudes. *A. pachei* and *A. prudens* here are treated as distinct species rather than varieties or subspecies of *A. sagei* and *A. smythiesi* respectively.

Aphaenogaster (*Attomyrma*) *smythiesi* FOREL

Sikri Jarsa, 2000 m; Bakhri Kharka, 1833 m; J. Quinlan, 5/54.

This species is recorded from the N. W. Himalayas. My friend Mr. L. WEATHERILL kindly

loaned me specimens taken at Simla in 1942. It has also occurred in the mountains of North East Afghanistan (COLLINGWOOD, 1961; PISARSKI, 1967) at altitudes of 2000 m or more.

Range: Himalayas.

Aphaenogaster (Attomyrma) prudens FOREL

A. smythiesi var. *prudens* Forel 1902.

Thate, 2900 m; Siklis, 2333 m; K. M. Hyett, 4/54.

In these specimens the epinotal spines are reduced to very short denticles. At Thate workers were trapped in sunk formalin jars; at Siklis they occurred in sandy turf.

Range: Himalayas.

Aphaenogaster (Attomyrma) pachei FOREL

A. sagei subsp. *pachei* Forel 1906.

Pangpoche, Yaral: Taboche (Mingbo Valley), 390 m — 4800 m.

Likhu-Khola, 1690 m.

This was the most abundant ant taken at high altitude during the JANETSCHEK expedition. The species mostly occurred on the Mingbo river banks and among dwarf rhododendron and dwarf bush heath. The specimens are almost uniformly spining black and markedly rugulose compared with *A. sagei* FOREL of which it was described as a subspecies from Tseran E. Nepal (FOREL, 1906).

Range: Nepal.

Ceratopheidole bhavanae BINGHAM

Pokhara, 1000 m; J. Quinlan, 4/54.

This species was described by BINGHAM from Sikhim where it was collected at 850 m.

Range: Himalayas.

Messor

No representatives were present in the collections from Nepal but at least one species *M. himalayanus* is widely distributed and common through the Himalayas from Sikhim and Darjeeling to the western fringes as far as the mountains of Afghanistan. In Afghanistan itself there are at least 10 species (COLLINGWOOD, 1961; PISARSKI, 1967) and an additional species from Herat was overlooked from the earlier paper. This is *M. similis* KUZNETZOV-UGAMSKIJI, 1927 similarly coloured to but duller than *M. meridionalis* with scattered short hairs over the dorsum of the gaster.

Pheidole

This genus is represented by only three species in the collections but many more have been recorded from the Himalayan area although few are characteristically high altitude species. Thus in Afghanistan, *P. arenarum* ranges from 900 m up to at least 4000 m in the Koh I Baba mountains while *P. sagei* and *P. himalayana* have a similar altitude diversity in the Himalayas.

Pheidole indica MAYR

Tamba Kosi, 1150 m; Zarange Khola, 1800 m; Rishengu.

Range: India, Burma.

Pheidole himalayana FOREL

Jiri, 1900 m; Likhu Khola, 1690 m; Sikri, 200 m; Kathmandu.

In *P. himalayana* the soldier caste has the head more rectangular with the striae not diverging laterally on the occipital lobes. It is generally treated as a race of *P. indica* e. g. PISARSKI (1967) but is probably best regarded as an independent species. It occurs throughout the Himalayas and PISARSKI (1967) has recorded it from E. Afghanistan. At Sikri specimens were taken from a raised earth nest 10 cm high with crater apertures in the flattened surface.

Range: Himalayas, Afghanistan.

Pheidole sagei FOREL

Jiri, 1900 m; Taboche, 4550 m.

The specimens correspond well with the description of FOREL (1902) and with BINGHAM's keys. It has only previously been recorded from Dharmasala in the N. W. Himalayas. At Taboche examples were taken from soil in dwarf brush heath on a southwest slope.

Range: Himalayas.

Crematogaster

Only two individual specimens were taken in the collections although there are many species recorded from the Himalayan area including *C. sagei* and *C. himalayana* that range to high altitudes.

Crematogaster (Sphaerocrema) spec.

Likhu Khola, 1700 m.

A single somewhat mutilated alate queen was taken on the way to Likhu Khola. The postpetiole has the upper surface without impression; the petiole is broadly trapezoidal above; the eleven segmented antennae have a three segmented club. The epinotum has two strong subparallel spines; the petiole nodes are coarsely longitudinally rugulose and the head which is broader than long is longitudinally striate. The colour is light reddish brown with the gaster and back of head darker. Length 6 mm. Long yellow suberect hairs are present on the head and gaster and the appendages and gaster are clothed with long sparse adpressed pubescence. There are no species of this subgenus listed in CHAPMAN and CAPCO (1951) for Asia.

Crematogaster (Orthocrema?) binghami FOREL

Zharangje Khola, 1800 m.

A single worker was taken with *Pheidole* specimens. It is shining yellow with punctulate head and gaster and faintly sculptured thorax. The body and appendages are clothed with abundant long semi-erect hairs; on the scape their length exceeds the maximum scape width. The head is approximately square, the scape barely reaching the occiput; the four segmented antennal club has the last two segments much larger than the preceding two. The thorax is somewhat narrow with a deep meso-epinotal furrow, linearly margined mesonotum and the epinotum emarginate between the lateral angles.

The petiole is bluntly peaked above, longer than broad somewhat rectangular in outline but with convex margins, the postpetiole is spherical without dorsal impression but has a faint median

line; length 3,3 mm. The species is in some respects close to *C. (Physocrema) physothorax* EMERY but somewhat narrower and smaller, considerably paler and more shining, with characteristic abundant long hairs and more abrupt antennae club and is listed by CHAPMAN and CARCO (1951) in the subgenus *Orthocrema*.

Range: Sikkim.

Carebara lignata (WESTWOOD)

Hetaura, W. PETERS, 5/54.

The giant alate queen of this species was taken.

Range: China, Burma, Malay.

Meranoplus bicolor GUERIN

Kabre, 1750 m.

The two specimens representing this species were taken from under a stone. Workers of this species (*Meranoplus bicolor*) were seen to excrete anally a whitish substance which stiffened into threads when they were caught, these threads then building up into foam-like material rather as in *Philaenus (Cicadina)*. Anal repellent excretions are known in certain species of *Crematogaster* — J. S. SUDD (*person. commun.*) describes a similar sticky fluid exuded by *Crematogaster stadelmanni* in Nigeria — but this has not hitherto been recorded for *Meranoplus*.

Range: India.

Pristomyrmex (Pristomyrmex) spec.

Likhu Khola, 1700 m; Thate, 2900 m.

A few small workers were taken; b. 3 mm. The prothorax is smoothly rounded and not dentate; the twelve segmented antennae are short and the specimens are smaller with relatively shorter appendages than *P. pungens* the most widely distributed species. The only recorded *Pristomyrmex* from the Indian subcontinent is *Odontomyrmex sulcata* EMERY with spined pronotum from Burma and the above specimens probably represent an undescribed species.

FORMICINAE

Oecophylla smaragdina (FABRICIUS)

Zharange Khola: Tamba Kosi, 1150—1450 m.

Typical examples of the weaver ant of India were taken on the high mountainside of Tamba Kosi in Sal and Pinus woods. The leaf nests were sited in the Sal trees. This latitude is well north (27°) of the tropic of Cancer which approximately delineates the northern boundary of this mainly tropical species according to WHEELER (1922). GUPTA (1965, 1966) however has observed populations of this ant at Hardawar (lat. 29° 6) and has demonstrated its ability to survive temperatures as low as 1° C. According to Gupta, temperatures at Hardawar from December to February may average 18° C and there is some activity throughout the year but the Nepal records are at considerably higher altitude and presumably there the species must undergo some form of hibernation for periods of at least some weeks in mid winter.

VANDERPLANK (1960) suggests that the oriental *O. smaragdina* (FAB.) is conspecific with the Ethiopian *O. longinoda* (LATR.) but there is a constant and characteristic difference in petiole

shape between the two populations apart from other minor differences enumerated by WHEELER (1922) and these differences together are considerably more than the slight differences ascribed to several varieties within each of the two species groups. So far as is known at present there is a clear geographic break between the distribution of *Oecophylla* in Africa and India with no connecting forms for example from Southern Arabia where this genus has not been recorded.

Range: India, Burma, Ceylon, S. China, Malaya, New Guinea, N. Australia.

Formica

DLUSSKY (1965) critically reviewed the Mongolian and N. E. Tibetan species but did not include material from the Himalayas where ants have been identified as *F. rufibarbis*, *F. rubescens* (*cunicularia*) and *F. fusca* from Europe but are probably referable to other species such as *F. glauca* and *F. clara* which replace the former two species in Asia. True *F. fusca* does occur in the Himalayas but BINGHAM (1903) refers to his recorded specimens as dull fuscous red with dense silky pubescence and these at least must be another species. In the Afghanistan mountains *F. sanguinea*, *F. fusca*, *F. clara* and *F. glauca* have all been recorded (COLLINGWOOD, 1961, PISARSKI, 1967) and in addition *F. subpilosa* and *F. pamirica*. *F. pamirica* was incorrectly identified as *F. bipilosa*, a synonym of *F. subpilosa* (in COLLINGWOOD, 1961). The ant was subsequently named *F. subpilosa* subsp. *pamirica* (PLUSSKY, 1965). Since both forms occur together in the same locality in N. Afghanistan (Polichroni) and are well contrasted morphologically in all three castes they must be regarded as fully independent species and accordingly the synonymy becomes:

Formica pamirica DLUSSKY Nov. Stat.

F. subpilosa subsp. *pamirica* DLUSSKY, 1965

F. bipilosa COLLINGWOOD, 1961.

Distribution: Pamir and Alai river valleys in Turkestan and Afghanistan.

Among other Himalayan *Formica* the oriental form of *F. picea* is common at high altitudes in Kashmir and another similar species *F. kozlovi* DLUSSKY from Mongolia probably reaches into Tibet.

Formica fusca L.

Gurjakhani, 2830 m, K. M. HYETT, 1965

Some workers were taken in rotten barley husks; the specimens appear as fairly typical of this holarctic wide ranging species. According to DLUSSKY (1965) *F. fusca* has been verified at the western end of the Himalayas but appears to be replaced in Tibet by *F. kozlovi* DLUSSKY a species with sparsely pubescent more shining gaster. *F. fusca* sensu BINGHAM (1903) occurs in the western Himalayas above Mussoorie and above Sikkim east of Nepal but his description suggests that the records are based on some other species in this group.

Range: Holarctic N. America, Eurasia to Japan.

Formica (Coptoformica) spec.

Jarsa, 2000 m

A single male was included in ants collected at Jarsa camp. Two species are described from Tibet by DLUSSKY (1965). They are *F. brunneonitida* DLUSSKY and *F. fossilabris* DLUSSKY of which the males are as yet unknown. Other *Coptoformica* from the Himalayas have been recorded as

F. exsecta NYL. but are probably referable to one of DLUSSKY'S species. The head of the present specimen is elongate rectangular with the occiput narrowing posteriorly to a shallow excision. The scale is broad without excision. The eyes are copiously haired and there are scattered standing hairs on the head, thorax and scale but not on the first two gastric segments where the posterior borders only have long fringing decumbent hairs. The inner surfaces of the tibiae are clothed with short subdecumbent hairs. The clypeus has long hairs towards its anterior margin, slight transverse depression seen in profile and faint anterior emargination. Overall length 5 mm.

Plagiolepis (Anacantholepis) watsoni FOREL

Jiri, 1900 m; Ringmo-Junbesi, 2800 m.

Males and alate females were collected at these sites; length 3.2 and 5 mm respectively. They are probably referable to *P. watsoni* FOREL. The clypeus is distinctly carinate in the female which has the antennae slender with funiculus segments 3 to 7 twice as long as broad; the decumbent pubescence is fairly thick but not obscuring the cuticular shine; colour of both sexes is dark brown to black with the appendages testaceous brown.

Range: Burma, Siam.

Acantholepis lunaris EMERY

A. capensis MAYR subsp. *lunaris* EMERY 1895

Jiri, 1900 m; Ringmo-Junbesi, 2800 m; Ghai, 2700 m; Thate, 2900 m; Likhu Khola, 1690 m.

A number of workers were collected and are probably referable to *A. lunaris* described as a subspecies of *A. capensis* MAYR. They are jet black, shining with coarse epinotal teeth and strongly bidentate petiole as described and keyed for *A. capensis* MAYR in BINGHAM (1903); the tarsi and articulations are yellowish brown and the body is clothed in long pale erect hairs especially abundant on the gaster. According to BINGHAM (1903) this species occurs from Ceylon to the Himalayas up to 5000 ft.

Range: India.

Prenolepis navrojii FOREL

Hukse, 1000 m; Jiri, 1900 m; Bakhri Kharka, 1800 m; J. QUINLAND; Pokhara, 830 m, J. QUINLAND.

This species occurred in the lower hills south of the high Himalayas. According to BINGHAM (1903) it has been recorded from the Northwest Provinces.

The specimens have the long scapes; long body and appendage setae and large eyes characteristic for the species. The body is variable pale brown, polished and shining.

Range: North India, Assam.

Paratrechina (Nylanderia) indica FOREL

Thaksindu, 3500 m; Likhu Khola, 1690 m; Ringmo-Junbesi, 2800 m; Thate, 2900 m.

This is a small *Plagiolepis* like species characterised by the short thick abundant short hairs

over the whole body. The Nepal record is well to the north of previous records given by BINGHAM (1903) as Bengal, West and Central India and Ceylon.

Range: India.

Lasius

There are two endemic Himalayan forms *L. alienoflavus* and *L. crinitus* but in addition several elements of the European fauna notably *L. brunneus*, *L. niger*, *L. carniolicus*, *L. fuliginosus* and at least one species of the *Lasius umbratus* complex extend into the area. This genus therefore contrasts considerably with others, in particular *Myrmica* where all the Himalayan species recorded and verified are non-European.

Lasius (Lasius) niger (L.)

Bakhri Kharka, 1830 m, J. QUINLAND.

The specimens are typical of this very common wide ranging holarctic species. Neither BINGHAM (1903) nor CHAPMAN and CAPCO (1951) list this species for the Indian continent and the nearest certain record is that of WILSON (1955) for Shirparek, Afghanistan.

Range: Holarctic.

Lasius (Chthonolasius) crinitus (SMITH)

Junbesi, 2700 m.

Males and queens of this local Himalayan species were taken in the house of a sherpa. They have the characteristic long curved body hairs which are specially thick on the scale of the petiole. The male mandibles are strongly toothed.

Range: Kashmir, Sikkim.

Camponotus

This genus is well represented and include a few species such as *C. compressus*, *C. angusticollis* and *C. singularis* that range widely beyond the Himalayas. Others including *C. wroughtoni*, *C. himalayana* and *C. dolendus* are characteristic high Himalayan species. *C. buddhae* previously recorded from Karakorum and Lahoul is given a wide range by PISARSKI (1967) to include the mountains of central Asia, Pamirs and Afghanistan. This species has abundant body and appendage hairs and may be easily confused with *C. fedtschenkoi* also a high mountain species from Central Asia. The head of the worker *media* however is rectangular above and angled in profile contrasting with the more or less smoothly rounded head of *C. fedtschenkoi* in all worker sizes. Such examples so named in COLLINGWOOD (1961) from Afghanistan were referred by PISARSKI (1967) to *C. buddhae* but they correspond in all castes with a series of *C. fedtschenkoi* kindly sent by Dr. G. M. DLUSKY, Institute of Animal Morphology, Moscow.

Camponotus (Myrmosericus) dolendus FOREL

Hukse; Namdu, 1450 m; Phewa Tal near Pokhara, 830 m. J. QUINLAND.

This is a dense black species known from Sikkim and the Northwest Himalayas.

Range: Himalayas.

Camponotus (Myrmosericus) rufoglaucus JERDON

Pokhara, 1000 m; J. QUINLAND.

This is a common Indian species with several races distributed throughout Africa.

Range: India.

Camponotus (Myrmosaulas) singularis (SMITH)

Phewa Tal, Pokhara, 830 m. J. QUINLAND.

A specimen from Burma was wrongly attributed to *Cataglyphis* and described as *C. birmana* (COLLINGWOOD 1962) owing to its somewhat *Cataglyphis* like facies and long maxillary palps. BROWN (1967) has corrected this mistake. It is a characteristic species from S. E. Asia including Sikkim.

Range: Sikkim, Burma, Malaya.

Camponotus (Dinomyrmex) angusticollis (JERDON)

Jarsa, 2000 m.

A single worker minor, length 12 mm, is attributed to this large species. The specimen is reddish corresponding to the form described as *sanguinolentus* FOREL.

Range: West and Central India, Assam, Burma.

Camponotus (Tanaemyrmex) compressus (FABRICIUS)

Chyaubas, 2000 m.; Siklis, 2300 m.; J. Quinla; Phewa Tal, 830 m. J. QUINLAND.

This is a common species throughout India.

Range: India, Burma, Ceylon, Arabia, Borneo, Philippines.

Camponotus (Tanaemyrmex) lamarcki FOREL

Pokhara, 1000 m. J. QUINLAND.

This is a dark species recorded from Northern India and Sikkim.

Range: North India.

Camponotus (Myrmentoma) wroughtoni FOREL

Likhu Kola, 1690 m; Yaral, 3900 m; Pangpoche, 4000 m; Thangpoche, 3500 m.

The worker media are testaceous brown to shining black, glabrous with the thoracic outline strongly arched, the epinotum with an abrupt declivous face and the petiole node biconvex; the tibiae are slightly compressed with an indistinct shallow channel without setae or spines; the keeled clypeus has the median lobe very slightly produced and rounded with a flat emargination; the mandibles are 5-toothed; length 8 mm.

Range: Himalaya and Upper Burma.

Camponotus (Myrmentoma) himalayana FOREL

Thaksindu, 3500 m.

The specimens are tentatively referred to the above species but are more uniformly black than in BINGHAM's description. The scapes bear erect setae.

Range: N. W. Himalayas.

Polyrachis (Myrma) mayri (ROGER)

Phewa Tal, Pokhara, 830 m. J. QUINLAND.

This is a common Indonesian species recorded also from Sikkim.

Range: India, Burma, Malaya, Philippines, China.

Polyrachis (Myrmhopla) simplex MAYA

Pokhara, 1000 m, J. QUINLAND.

This species was also taken by L. WEATHERILL in Baigachi, Bengal. It is the most westerly ranging of the Indian species.

Range: India, Burma, Afghanistan, Middle East.

DOLICHODERINAE

Bothriomyrmex dalyi FOREL

Thate, 2900 m.

This is a more pubescent, longer headed form of *B. wroughtoni* FOREL which it otherwise resembles and probably merits specific rank as BINGHAM (1903) indicated. PISARSKI (1967) treats them as subspecies but records both from Northeast Afghanistan. The ants of this genus are generally supposed to be dependant on *Tapinoma* species for colony initiation. Four species of *Bothriomyrmex* have been described from a number of localities throughout India yet there are only two recorded endemic species of *Tapinoma*, *T. wroughtoni* FOREL from Kashmir, India and Afghanistan and *T. indicum* FOREL of more general distribution.

Species Distribution by Altitude

3900—4800 m.

Localities: Yaral, Pangpoche, Taboche, Mingbo.

Myrmica bactriana, *M. kozlovi*, *Aphaenogaster pachei*, *Pheidole sagei*, *Camponotus wroughtoni*.

2500—3500 m.

Localities: Thaksindu, Thangpoche, Ringmo, Junbesi, Thate, Mandsua, Ulleri, Gurjakhani, Ghat.

Myrmica bactriana, *M. kozlovi*, *M. everesti*, *M. ritae*, *Aphaenogaster prudens*, *Pristomyrmex* sp., *Bothriomyrmex dalyi*, *Nylanderia indica*, *Plagiolepis watsoni*, *Acantholepis lunaris*, *Lasius crinitus*, *Formica fusca*, *Camponotus himalayanus*, *C. wroughtoni*.

1300—2500 m.

Localities: Zharange Khola, Likhu Khola, Tchyaubas, Kathmandu, Bakhri, Kharka, Siklis, Jiri, Sikri, Jarsa, Namdu, Thate, Tamba Kosi.

Myrmica everesti, *M. rupestris*, *Aphaenogaster prudens*, *A. smythiesi*, *A. hachei*, *Pheidole himalayana*, *P. sagei*, *Meranoplus bicolor*, *Sphaerocrema* sp., *Crematogaster binghami*, *Pristomyrmex* sp., *Dorylus orientalis*, *Bothroponera rufipes*, *Brachyponera nigrata*, *Lobopelta diminuta*, *Sima alloborans*, *Nylanderia indica*, *Plagiolepis watsoni*, *Prenolepis navrojii*, *Acantholepis lunaris*, *Lasius niger*, *Oecophylla smaragdina*, *Coptoformica* sp., *Camponotus dolendus*, *C. compressus*, *C. angusticollis*, *C. wroughtoni*.

850—1250 m.

Localities: Pokhara, Phewa Tal, Hukse, Hetaurea, Rishengu, Tamba Kosi.

Pheidole indica, *Ceratopheidole bhavanae*, *Carebara lignata*, *Lobopelta diminuta*, *Sima rufonigra*, *Prenolepis navrojii*, *Oecophylla smaragdina*, *Camponotus rufoglaucus*, *C. dolendus*, *C. compressus*, *C. lamarcki*, *C. singularis*, *Polyrachis mayri*, *P. simplex*.

Species found mainly or exclusively

above 2000 m	below 1500 m
<i>Myrmica bactriana</i>	<i>Tetraoponera rufonigra</i>
<i>Myrmica kozlovi</i>	<i>Carebara lignata</i>
<i>Aphaenogaster pachei</i>	<i>Pheidole indica</i>
<i>Aphaenogaster prudens</i>	<i>Oecophylla smaragdina</i>
<i>Pheidole sagei</i>	<i>Camponotus singularis</i>
<i>Bothriomyrmex dalyi</i>	<i>Camponotus rufoglaucus</i>
<i>Lasius crinitus</i>	<i>Camponotus lamarcki</i>
<i>Formica fusca</i>	<i>Polyrachis mayri</i>
<i>Camponotus himalayanus</i>	<i>Polyrachis simplex</i>
<i>Camponotus wroughtoni</i>	

The following table lists all the 183 species so far recorded for the Himalayan area as a whole excluding those which are entirely low altitude or subtropical. It will be seen that the principal genera are *Camponotus*, *Myrmica*, *Crematogaster* and *Pheidole* which together account for 40% of the recorded species. Of the 34 Nepalese species listed, 12 are generally distributed over the whole Himalayan area, 12 are eastern Himalayan and the remainder western Himalayan (8) or endemic to Nepal (2).

Species	Afghanistan	Kashmir and W. Himalayas	Nepal	Sikkim and E. Himalayas	Tibet	N. Burma
<i>Dorylus orientalis</i> WESTWOOD			*	*	*	*
<i>Aenictus sagei</i> FOREL		*	*			
— <i>montana</i> FOREL		*			*	
<i>Cerapachys risi</i> FOREL				*		*
<i>Myopone moelleri</i> BINGHAM				*		*
<i>Harpegnathus venator</i> JERDON				*		*
<i>Lioponera parva</i> FOREL				*		*
<i>Diacamma scalptratium</i> SMITH				*		*

Species	Afghanistan	Kashmir and W. Himalayas	Nepal	Sikhim and E. Himalayas	Tibet	N. Burma
— <i>sculptum</i> JERDON			*		**	
— <i>vagens</i> SMITH					*	
<i>Bothroponera rufipes</i> SMITH			*	*	*	*
<i>Ectomomyrma javanus</i> MAYR					*	*
<i>Brachyponera nigrita</i> EMERY				*	*	*
<i>Leptogenys sarasinorum</i> FOREL				*	*	
— <i>lucidula</i> EMERY					*	
— <i>moelleri</i> BINGHAM					*	
— <i>punctiventris</i> MAYR					*	
<i>Sima birmani</i> FOREL					*	*
— <i>nigra</i> JERDON					*	
<i>Myrmica aimonis-sabaudiae</i> MENOZZI		*	*			
— <i>bactriana</i> FOREL						
— <i>cachmiriensis</i> FOREL			*			
— <i>dicapriacoi</i> MENOZZI			*			
— <i>everesti</i> DONIS			*	*	*	
— <i>exigua</i> RUZSKY					*	
— <i>fortior</i> FOREL			*			
— <i>furva</i> RUZSKY					*	
— <i>khamenensis</i> RUZSKY					*	
— <i>kozlovi</i> RUZSKY			*	*	*	
— <i>lutescens</i> FOREL			*		*	
— <i>mekongi</i> RUZSKY					*	
— <i>pachei</i> FOREL			*	*		
— <i>rugosa</i> MAYR			*		*	
— <i>rupestris</i> FOREL				*	*	
— <i>smythiesi</i> FOREL			*		*	
— <i>specularis</i> DONISTHORPE					*	
— <i>subalpina</i> RUZSKY					*	
— <i>subbrevispinosa</i> RUZSKY					*	
— <i>tibetana</i> MAYR	*				*	
— <i>ritae</i> EMERY				*		*
<i>Aphaenogaster raphidiiceps</i> MAYR	*					
— <i>cristata</i> FOREL			*			
— <i>haarlovi</i> COLLINGWOOD	*					
— <i>pachei</i> FOREL				*		
— <i>prudens</i> FOREL			*	*		
— <i>rothneyi</i> FOREL			*		*	
— <i>sagei</i> FOREL			*		*	
— <i>smythiesi</i> FOREL	*		*	*	*	
<i>Messor himalayanus</i> FOREL	*		*		*	
— <i>aphaenogasteroides</i> MENOZZI	*				*	
— <i>reticuliventris</i> KARAWAJEV	*					
<i>Caratopheidole bhavana</i> BINGHAM				*	*	
<i>Pheidole dharmasalana</i> FOREL			*			
— <i>fossulata</i> FOREL					*	
— <i>grayi</i> FOREL					*	
— <i>himalayana</i> FOREL	*		*	*	*	
— <i>jucunda</i> FOREL					*	
— <i>arenarum</i> RUZSKY	*				*	
— <i>malinsii</i> FOREL					*	
— <i>proutalis</i> FOREL					*	
— <i>rogersi</i> FOREL			*		*	
— <i>templaria</i> FOREL			*		*	
— <i>wood-masoni</i> FOREL			*		*	
— <i>roberti</i> FOREL					*	
— <i>stella</i> FOREL					*	
— <i>sagei</i> FOREL			*	*		

Species	Afghanistan	Kashmir and W. Himalayas	Nepal	Sikkim and E. Himalayas	Tibet	N. Burma
<i>Cardiocondyla nuda</i> MAYR		*	*		*	
<i>Crematogaster binghami</i> FOREL				*	*	
— <i>biroi</i> MAYR		*			*	
— <i>buddhae</i> FOREL			*		*	
— <i>dalyi</i> FOREL					*	
— <i>ebenina</i> FOREL					*	
— <i>flava</i> FOREL					*	
— <i>himalayana</i> FOREL			*		*	
— <i>ransonetti</i> MAYR					*	
— <i>rogenhoferi</i> MAYR					*	*
— <i>rothneyi</i> MAYR					*	
— <i>sagei</i> FOREL			*		*	
— <i>subdentata</i> MAYR	*					*
— <i>kaschgarensis</i> FOREL	*		*			
— <i>walshi</i> FOREL					*	
— <i>afghana</i> PISARSKI	*		*			
— <i>bogojawlenski</i> PISARSKI	*					
— <i>hezaradjaticus</i> PISARSKI	*					
<i>Monomorium gracillimum</i> SMITH		*				*
— <i>atomus</i> FOREL		*	*		*	
— <i>barbatulum</i> MAYR		*				
— <i>flavum</i> COLLINGWOOD		*				
— <i>luisiae</i> FOREL			*			
— <i>orientale</i> MAYR			*		*	*
— <i>sagei</i> FOREL	*		*		*	*
<i>Holcomyrme criniceps</i> MAYR			*		*	*
<i>Lophomyrme bedoti</i> EMOZ					*	*
<i>Meranoplus bicolor</i> GUÉRIN				*		*
<i>Pristomyrme</i> sp.				*		
<i>Leptothorax pamirica</i> RUZSKY			*			
— <i>desioi</i> MENOZZI			*			
— — <i>pallidus</i> COLLINGWOOD		*				
— <i>cornibrevis</i> COLLINGWOOD		*				
— <i>rothneyi</i> FOREL						
<i>fultoni</i> FOREL					*	
— <i>wroughtoni</i> FOREL			*			
<i>Tetramorium caespitum</i> L.		*	*			
— <i>armata</i>		*				
— <i>christei</i> FOREL					*	
— <i>elizabethae</i> FOREL			*			
— <i>nursei</i> BINGHAM			*			
— <i>salvatum</i> FOREL			*			
— <i>scabrum</i> MAYR					*	*
— <i>striativentre</i> MAYR	*					
— <i>kabulistanicum</i> PISARSKI	*					
<i>Dolichoderus affinis</i> FOREL					*	*
— <i>bituberculatus</i> MAYR					*	
— <i>fae</i> EMBRY					*	
— <i>moggridgei</i> FOREL					*	*
<i>Iridomyrme anceps</i> ROGER					*	
<i>Technomyrme brunneus</i> FOREL					*	
<i>Tapinoma wroughtoni</i> FOREL			*			
— <i>karawaievi</i> EMERY		*				
<i>Bathriomyrme dalyi</i> FOREL		*	*	*		
— <i>myops</i> FOREL			*		*	
— <i>walshi</i> FOREL					*	
— <i>wroughtoni</i> FOREL		*	*			
<i>Plagiolepis balestrieri</i> MENOZZI			*			

Species	Afghanistan	Kashmir and W. Himalayas	Nepal	Sikhim and E. Himalayas	Tibet	N. Burma
— <i>dichroa</i> FOREL					*	
— <i>moelleri</i> BINGHAM			*			
— <i>pontii</i> MENOZZI		*	*			
<i>Prenolepis navroji</i> BINGHAM			*	*		
<i>Nylanderia aseta</i> FOREL					*	
<i>Anacantholepis watsoni</i> FOREL				*		*
<i>Acantholepis lunaris</i> EMERY			*	*	*	
— <i>sericea</i> FOREL	*		*			
<i>Camponotus cachmiriensis</i> FOREL			*			
— <i>buddhae</i> FOREL	*		*			*
— <i>fedtschenkoi</i> MAYR	*		*			
— <i>compressus</i> FABRICIUS	*		*	*		
— <i>angusticollis</i> JERDON				*		*
— <i>taylori</i> FOREL			*		*	
— <i>badius</i> SMITH					*	*
— <i>himalayana</i> FOREL			*	*	*	
— <i>wroughtoni</i> FOREL			*	*	*	*
— <i>japonicus</i> MAYR					*	
— <i>nicobarensis</i> MAYR					*	
— <i>lamarcki</i> FOREL					*	
— <i>oblungus</i> SMITH					*	
— <i>dolendus</i> FOREL				*	*	
— <i>paria</i> EMERY				*	*	*
— <i>singularis</i> SMITH				*	*	*
— <i>siemsseni</i> FOREL			*			
— <i>basalis</i> SMITH			*			
— <i>paradichroa</i> EMERY			*			
— <i>socrates</i> FOREL	*		*			
— <i>kattensis</i> FOREL			*			
— <i>wasmanni</i> EMERY					*	*
<i>Polyrachis dives</i> SMITH					*	
— <i>mayri</i> ROGER				*	*	
— <i>simplex</i> MAYR	*			*		
— <i>menelas</i> FOREL			*			
— <i>striata</i> MAYR			*			
<i>Pseudolasius emeryi</i> FOREL					*	
<i>Lasius niger</i> LINNE	*		*	*	*	
— <i>brunneus</i> FOREL			*	*	*	
— <i>alienoflavus</i> BINGHAM			*	*	*	
— <i>flavescens</i> RUZSKY	*					
— <i>bicornis</i> FOERST			*			
— <i>crinitus</i> SMITH			*	*	*	
— <i>carniolicus</i> MAYR			*			
— <i>fuliginosus</i> LATRELLE			*			
<i>Formica fusca</i> L			?	*	?	
— <i>clara</i> FOREL	*					
— <i>glauca</i> RUZSKY	*					
— <i>picea</i> NYLANDER			*			
— <i>kozlovi</i> DLUSSKY						*
— <i>sanguinea</i> FABRICIUS	*		*			*
— <i>truncorum</i> FABRICIUS			*			
— <i>sentchuensis</i> RUZSKY			*			*
— <i>fossilabris</i> DLUSSKY				?	*	*
— <i>brunneonitida</i> DLUSSKY					*	
— <i>rufolucida</i> COLLINGWOOD						*
<i>Cataglyphis cugiae</i> MENOZZI			*			
— <i>aenescens</i> NYLANDER	*					

Species	Afghanistan	Kashmir and W. Himalayas	Nepal	Sikkim and E. Himalayas	Tibet	N. Burma
— <i>emeryi</i> KARAWAIEV		*				
— <i>aterrima</i> KARAWAIEV		*				
		41	71	34	81	21
						25

SUMMARY

This paper is based on the examination of *Formicidae* collected during the 1961 expedition of Prof. Dr. H. JANETSCHKEK, Innsbruck, in the course of the RESEARCH SCHEME NEPAL HIMALAYA and taken during the course of the British Museum Expedition to East Nepal 1954. All the specimens referred to in this paper were collected at altitudes ranging from 850 m to 5500 m with subtropical species occurring up to 1500 m and the more typical mountain fauna at altitudes above 2000 m. The species recorded here fall into two groups: Himalayan and Palaearctic/Indo-malayan and subtropical.

In two lists the species distributions by altitude and by geographical regions are shown. One table lists all the 183 species so far recorded for the Himalayan area as a whole excluding those which are entirely low altitude or subtropical. The principal genera are *Camponotus*, *Myrmica*, *Crematogaster* and *Pheidole* which together account for 40% of the recorded species. Of the 34 Nepalese species listed 12 are generally distributed over the whole Himalayan area, 12 are eastern Himalayan and the remainder western Himalayan (8) or endemic to Nepal (2).

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Present address:

C. A. COLLINGWOOD, OXFORD HOUSE, BRADFIELD, ENGLAND.

KHUMBU HIMAL

ERGEBNISSE DES
FORSCHUNGSUNTERNEHMENS NEPAL HIMALAYA

HERAUSGEGEBEN
VON
PROF. DR. WALTER HELLMICH
MÜNCHEN

Khumbu Himal, Ergebn. Forsch.-Unternehmen Nepal Himalaya

Band 3, Lieferung 3, Seite 313—468, München, 1. Oktober 1970



UNIVERSITÄTSVERLAG WAGNER GES. M. B. H.,
INNSBRUCK — MÜNCHEN

1970