Mem. Myrmecol. Soc. Jpn., 1 : 25 - 48. April 10, 1999

The Ant Genus *Camponotus* Mayr (Hymenoptera: Formicidae) in Japan

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Abstract. Six new species of the genus *Camponotus* Mayr are described from Japan: *C. kaguya, C. monju, C. bishamon, C. daitoensis, C. yambaru, C. shohki. Camponotus albosparatus* BINGHAM and *C. friedae* FOREL are recorded for the first time from Japan. A key to the Japanese species of this genus is also presented.

Introduction

The genus *Camponotus* MAYR includes around 600 described species (BOLTON, 1995a). It is widely distributed from the tropics to cool temperate areas of the globe. Nesting habits vary from subterranean to arboreal. Foraging workers are often found on the ground. Many species vary widely in size, and there is often considerable intraspecific geographical variation.

Among 23 species mentioned by TERAYAMA et al. (1991), 16 had scientific names. In this paper I describe the remaining 4 of 5 and newly discovered 2 species as new, and add two species, *C. albosparatus* BINGHAM and *C. friedae* FOREL, to the Japanese Fauna. Measurements and indices used in the paper followed those in TERAYAMA & SATOH (1990a). The holotypes are preserved in the collection of the Museum of Nature and Human Activities, Sanda, Hyogo, Japan.

Genus *Camponotus* MAYR

[Japanese name: Oo-ari-zoku]

Camponotus MAYR, 1861, *Die Europaisched Formiciden, Wien*: 31.
Type species: *Formica ligniperda* LATREILLE, 1802.
For full synonymy see BOLTON (1995b).

Diagnosis. Medium to large ants: total length of workers ranging from 2.5 mm to over 20 mm (over 4 mm long in most species). Antenna 12-segmented. Eye large; ocelli absent. Antennal insertion well separated from posterior margin of clypeus. Palpal formula 6 : 4. Dorsal outline

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of mesosoma roundly convex in profile in Japanese species. Petiole a thick scale without spines or teeth. All but two known *Camponotus* species (all Japanese species) lack metapleural glands.

On the subgenera of *Camponotus*

Camponotus has been divided into many subgenera, most of which are obscure in definition and not clearly distinguishable, so that most taxonomists are inclined to ignore them. The following *Camponotus* subgenera are tentatively recognized in Japan:

1) Subgenus *Camponotus*

[Japanese name: Oo-ari-azoku]

Worker caste polymorphic. Large ants: total length of major workers usually over 10 mm, and of minor workers over 8 mm. Mandible with 4 or 5 teeth. Anterior margin of clypeus straight; either not produced forwards or very slightly produced.

Japanese species: *C. hemichlaena* YASUMATSU & BROWN, *C. japonicus* MAYR, *C. obscuripes* MAYR, *C. sachalinensis* FOREL, *C. yessensis* YASUMATSU & BROWN, *C.* sp. 6 (sensu TERAYAMA et al., 1991).

2) Subgenus *Tanaemyrmex*

[Japanese name: Ameiro-oo-ari-azoku]

Worker caste polymorphic. Medium to large ants. Mandible with 6 or 7 teeth (a few species with 5 teeth in minor worker). Anterior margin of clypeus strongly produced and angular with a straight median border.

Japanese species: *C. albosparatus* BINGHAM, *C. devestivus* WHEELER, *C. friedae* FOREL, *C. kaguya* sp. nov., *C. monju* sp. nov.

3) Subgenus *Paramyrmamblys*

[Japanese name: Mikado-oo-ari-azoku]

Worker caste polymorphic. Large ants: total length of major workers over 10 mm, and of minor workers over 7 mm. Mandible with 4 or 5 teeth. Anterior margin of clypeus not strongly produced, and with a median notch (which is sometimes obscure in small workers).

Japanese species: *C. kiusiuensis* SANTSCHI, *C. amamianus* TERAYAMA.

4) Subgenus *Myrmentoma*

[Japanese name: Kusa-oo-ari-azoku]

Worker caste polymorphic. Small ants: total length of workers not exceeding 7 mm in majors. Anterior margin of clypeus medially concave. Scape relatively long, more than 1.1 times as long as the head width in major workers. Short erect hairs with pointed apices present on gena, clypeus and mandible.

Japanese species: *C. keihitoi* FOREL, *C. quadrinotatus* FOREL, *C.*

nipponensis SANTSCHI.

5) Subgenus *Myrmamblys*

[Japanese name: Umematsu-oo-ari-azoku]

Worker caste distinctly dimorphic. Small ants: total length of major workers not exceeding 7 mm. Anterior clypeal border not concave. Scape of major workers short, as long as the head width or shorter. Short erect hairs with truncated apices present on gena, clypeus and mandible in major workers and females.

Japanese species: *C. bishamon* sp. nov., *C. daitoensis* sp. nov., *C. itoi* FOREL, *C. nawai* ITO, *C. ogasawarensis* TERAYAMA & SATOH, *C. vitiosus* Fr. SMITH, *C. yamaokai* TERAYAMA & SATOH, *C. yambaru* sp. nov.

6) Subgenus *Colobopsis*

[Japanese name: Hirazu-oo-ari-azoku]

Worker caste distinctly dimorphic. Anterior portion of head truncated in major workers and females.

Japanese species: *C. nipponicus* WHEELER, *C. shohki* sp. nov.

On *Camponotus* (*Myrmamblys*) *nigronitidus* AZUMA

This species is described by AZUMA in 1951 based on a worker specimen. The short original description suggests that this species well resembles, and may be conspecific with *C. vitiosus* Fr. SMITH. However, since the type material was lost in fire on 6 Aug. 1945 (ONOYAMA, 1982), I have no measures to conclude about the status of this species.

Species excluded from the Japanese Fauna

The following six species are excluded in this paper in the same as "A list of the ants of Japan (1988)" since no reliable recent record is available from Japan.

C. caryae brunni FOREL, *C. haberei* FOREL, *C. ligniperdus* LINNAEUS, *C. marginatus* LATREILLE, *C. siemsseni* FOREL, *C. mitis* var. *dulcis* DALLA TORRE (= *C. variegatus* var. *dulcis* EMERY).

Key to the Japanese species of *Camponorus*
(worker)

1 Heads of major workers with an anterior, flat truncated portion. In minor workers, the fore femur remarkably broad, and the posterior corner of the propodeum approximately right-angled in profile 2

— Heads of major workers without a truncated anterior portion. In

minor workers, the fore femur always less broad, if expanded at all; posterior corner of propodeum obtusely angled in profile (with a few exception) ····· 3

2 In full face view, the upper, short part of the clypeus produced anteriorly on each side to form a small median process ····· *C.* (*Colobopsis*) *nipponicus* WHEELER

— In full face view, the upper, short part of clypeus with nearly straight anterior margin, not produced on each side, the median process very small ····· *C.* (*Colobopsis*) *shohki* sp. nov.

3 Body yellow to yellowish brown (head slightly darker in majors) ····· *C.* (*Myrmamblys*) *yambaru* sp. nov.

— Body color not wholly yellow to yellowish brown ····· 4

4 Mesothorax and propodeum red to yellow ····· 5

— Mesothorax and propodeum dark brown to black ····· 13

5 First and 2nd gastral segments wholly reddish brown ····· *C.* (*Tanaemyrmex*) *kaguya* sp. nov.

— First and 2nd gastral segments not wholly reddish brown ····· 6

6 Second gastral tergite with a pair of pale-coloured spots or a pale band ····· 7

— Second to 5th gastral tergites concolorous, without spots or bands ····· 9

7 First to 3rd or 4th gastral tergites each with a pair of pale spots or a wide pale band ····· *C.* (*Myrmamblys*) *ogasawarensis* TERAYAMA & SATOH

— First and 2nd gastral tergites each with a pair of yellow spots (those on 1st tergite often fused together); such markings absent from 3rd and 4th tergites ····· 8

8 Anteiror margin of clypeus almost straight or weakly convex, not produced ····· *C.* (*Myrmamblys*) *daitoensis* sp nov.

— Clypeus produced medially ····· *C.* (*Tanaemyrmex*) *albosparsus* BINGHAM

9 Clypeus produced anteriorly; the advanced portion with straight an terior margin; mandible with 6 or 7 teeth ····· 10

— Clypeus produced at most only slightly; mandible with 4 or 5 teeth ····· 11

10 Pronotum with more than 3 standing hairs; head and gaster also with many standing hairs ····· *C.* (*Tanaemyrmex*) *monju* sp. nov.

— Pronotum generally lacking standing hairs ····· *C.* (*Tanaemyrmex*) *devestivus* WHEELER

11 Mesosoma and legs reddish brown; a smaller species, total length less than 7 mm····· *C.* (*Myrmamblys*) *daitoensis* sp. nov.

— Mesonotum and propodeum reddish, and legs blackish; a larger species, total length more than 10 mm ····· 12

12 Prothorax black, contrastingly strikingly with the reddish mesonotum ····· *C.* (*Camponotus*) *hemichlaena* YASUMATSU & BROWN

— Both prothorax and mesothorax reddish in color ····· *C.* (*Camponotus*) *obscuripes* MAYR

13 Mesosoma dorsally with 20 or more standing hairs ····· 14

— Mesosoma dorsally with 15 or fewer standing hairs ····· 16

14 Propodeal declivity abruptly declivitous; head black, mesosoma brown, and gaster blackish brown ····· *C.* (*Tanaemyrmex*) *friedae* FOREL

— Propodeal declivity moderately declivitous; body largely concolorous black ····· 15

15 A larger species, total length 7 mm or more; in profile the dorsal mesosomal outline from mesonotum to propodeum evenly arched, without a depression ····· *C.* (*Camponotus*) *yessensis* YASUMATSU & BROWN

— A smaller species, total length less than 7 mm, even in the major workers; in profile the dorsal outline of propodeum more or less depressed ····· *C.* (*Myrmentoma*) *nipponensis* SANTSCHI

16 Larger species; body length exceeding 10 mm in majors or 7 mm in minors ····· 17

— Smaller species; body length less than 7 mm, even in majors ··· 21

17 Anterior margin of clypeus incised or emarginate ····· 18

— Anterior margin of clypeus without incision or emargination ····· 19

18 Body black, legs brown to yellowish brown; in profile posterior edge of propodeum more or less angulate ····· *C.* (*Paramyrmamblys*) *kiusiuensis* SANTSCH

— Body shiny pitch-black, legs reddish brown to black; in profile posterior edge of propodeum rounded ····· *C.* (*Paramyrmamblys*) *amamianus* TERAYAMA

19 Anterior margin of clypeus not produced medially; gastral tergites with sparse pubescences and somewhat lustrous ····· *C.* (*Camponotus*) *sachalinensis* FOREL

— Anterior margin of clypeus produced medially; gastral tergites with denser pubescences and less lustrous ····· 20

20 Short fine hairs (pubescence) on 2nd gastral tergite sparse, arranged in rows that do not overlap; these hairs 1.5-2 times as long as the mean distance separating them ····· *C.* (*Camponotus*) sp. 6 [sense TERAYAMA et al., 1991]

— Short fine hairs on 2nd gastral tergite more dense, arranged in rows that overlap each other; these hairs each 4-6 times as long as the mean distance separating them

..... *C.* (*Camponotus*) *japonicus* MAYR

21 Anterior margin of clypeus medially incised or emarginate; antennal scape of majors long, more than 1.1 times as long as the head width; size variation among workers continuous, without distinct dimorphism 22

— Anterior margin of clypeus entire; antennal scape of majors shorter, less than 1.0 times as long as the head width; workers distinctly dimorphic 23

22 Mesosomal dorsum and petiole without standing hairs; fore femur strongly expanded; metanotal depression distinct; gaster with out maculation ..... *C.* (*Myrmentoma*) *keihitoi* FOREL

— Mesosomal dorsum and petiole with standing hairs; fore femur not strongly expanded; metanotal depression absent; 1st and 2nd gastral tergites each with a pair of yellowish or whitish markings ..... *C.* (*Myrmentoma*) *quadrinotatus* FOREL

23 Dorsal profile of pro- and mesonotum flat; posterodorsal margin of propodeum angulate, the slope of its posterior face relatively steep ..... *C.* (*Myrmamblys*) *itoi* FOREL

— Dorsal profile of pro- and mesonotum arched; posterodorsal margin of propodeum more rounded, inclination of posterior face less steep 24

24 Petiole relatively thick; gaster black, without pale markings on 1st and 2nd tergites 25

— Petiole relatively thin; 1st and 2nd gastral tergites usually each with a pair of pale marks 26

25 In profile, propodeum with a dorsal depression; petiole in profile an inverted U-shape, symmetrical with respect to the axis dividing it into anterior and posterior halves
..*C.* (*Myrmamblys*) *vitiosus* Fr. SMITH (= *C. tokioensis* FOREL)

— In profile, propodeum with an almost straight dorsal outline; petiole in profile asymmetrical, with the upper edge of the anterior margin lower than that of the posterior margin
..... *C.* (*Myrmamblys*) *bishamon* sp. nov.

26 Eye strongly protruding; petiole of minors in profile relatively thin; petiole of majors seen from above relatively thin
..... *C.* (*Myrmamblys*) *yamaokai* TERAYAMA & SATOH

— Eye relatively weakly protrusive; petiole of minors in profile relatively thick; petiole of majors seen from above relatively thick
..... *C.* (*Myrmamblys*) *nawai* ITO

Camponotus (Tanaemyrmex) albosparsus BINGHAM

[Japanese name: Aka-yotsuboshi-oo-ari]

(Figs. 1-5)

Camponotus taylori var. *albosparsus* BINGHAM, 1903, *The fauna of British India, including Ceylon and Burma. Hym.* **2**: 354 [*C. maculatus* r. *taylori* var. *albosparsus* FOREL, 1894, unavailable name, BOLTON, 1995b].

Camponotus barbatus albosparsus: FOREL, 1906, *Bull. Soc. Vaud. Sci. Nat.*, **42**: 84.

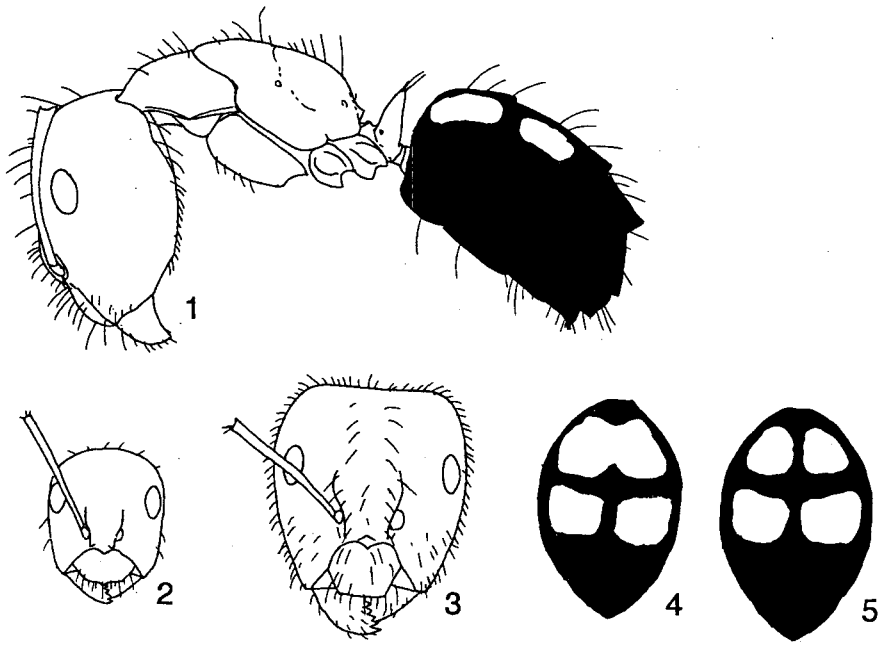
Camponotus taylori albosparsus: WHEELER, 1913, *Rec. Ind. Mus.*, **8**: 237.

Camponotus (Tanaemyrmex) barbatus albosparsus: EMERY, 1925, *In* WYTSMAN (ed.), *Genera Insectorum,* Fasc. **183**: 93.

Camponotus albosparsus: WANG et al., 1989, *For. Res.*, **2**: 327.

Camponotus sp.: TERAYAMA et al., 1991, *A Guide for the Identification of Japanese Ants (II)*: 42.

Diagnosis. Total length of workers around 4-7 mm. Head dark to blackish brown; mesosoma, petiole and legs brown; gaster black, 1st and 2nd gastral tergites each with a pair of yellow spots (often merging



Figs. 1-5. *Camponotus albosparsus* BINGHAM — 1, Body in profile, major; 2, head in full face view, minor; 3, *ditto*, major; 4, 5, gaster in dorsal view, minor.

on the 1st tergite). Anterior margin of clypeus straight. Mandible with 6 teeth. Scape short: 1.2-1.3 times the head width in minor workers, and just exceeding the posterior border of head in majors. Petiole relatively high, with an inverted V-shaped scale in profile. Head and mesosoma with relatively abundant erect hairs.

Specimens examined. Japan - 8 workers, Urauchi, Iriomote-jima, Okinawa Pref., 13. VIII. 1980, M. TERAYAMA leg.; 5 workers, Iriomote-jima, Okinawa Pref., 16. III. 1984, M. TERAYAMA leg.; 3 workers, Ishigaki-jima, 16. III. 1984, M. TERAYAMA leg.; 3 workers, Yonaguni-jima, Okinawa Pref., 10. VIII. 1979, M. TERAYAMA leg. **Taiwan** - 5 workers, Urai, Taipei, 11. VIII. 1980, M. TERAYAMA & S. KUBOTA leg.; 1 worker, Nanfen-cun, Nantou Hsien, 17. VIII. 1989, M. TERAYAMA leg.; 3 workers, Puli, Nantou Hsien, 26. III. 1989, M. TERAYAMA leg.; 3 workers, 1 male, Nanshanchi, Nantou Hsien, 11.VII. 1982, M. TERAYAMA leg.; 4 workers, Penpuchi, Nantou Hsien, 21. VIII. 1980, T. NAMBU leg.; 2 workers, Liukuei, Kaohsiung Hsien, 18. VIII. 1987, M. TERAYAMA leg.; 6 workers, Kenting, Pintung Hsien, 25. X. 1977, K. YAMAUCHI leg. **Hong Kong** - 5 workers, Hong Kong I., 31. III. 1989, M. TERAYAMA leg.; 14 workers, Tap Mun, Hong Kong, VIII. 1992, J. FELLOWES leg.

Remarks. *Camponotus* sp. [Aka-yotsuboshi-oo-ari in Japanese] in TERAYAMA et al. (1991) is conspecific with *C. albosparsus* BINGHAM, which is widely distributed from Taiwan, through southern China, Hong Kong, to India. This species nests in the soil and under stone of forest margins and grasslands. Foraging workers are found on the ground.

Distribution. Nansei Is. (Sakishima Is.); Taiwan, southern China, India.

Camponotus (Tanaemyrmex) friedae FOREL

[Japanese name: Miyako-oo-ari]

(Figs. 6-13)

Camponotus (Myrmoturba) friedae FOREL, 1912, *Ent. Mitt.*, **1**: 77.

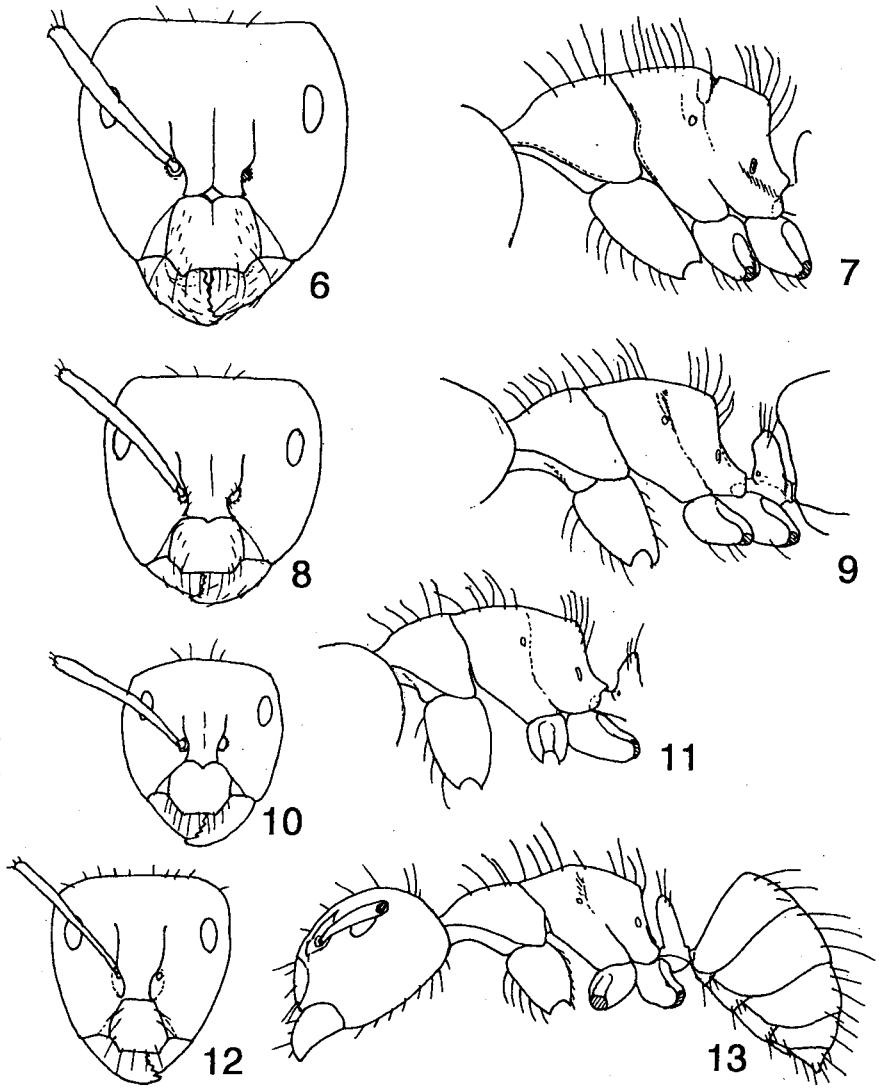
Camponotus (Tanaemyrmex) fiedae: EMERY, 1925, *In* WYTSMAN (ed.), *Genera Insectorum,* Fasc. **183**: 102.

Camponotus (Myrmoturba) friedae var. *amia* FOREL, 1912, *Ent. Mitt.*, **1**: 78. **Syn. nov.**

Camponotus (Tanaemyrmex) friedae amius: BOLTON, 1995, *A New General Catalogue of the Ants of the World*: 85.

Camponotus (Tanaemyrmax) sp. 8: TERAYAMA & KIHARA, 1994, *Distribution Maps of Japanese Ants*: 42.

Diagnosis. Polymorphic species; total length around 5 mm in minor



Figs. 6-13. *Camponotus friedae* FOREL — 6, 8; Head in full face view, major [6, syntype of *friedae*; 8, syntype of *friedae* var. *amius*]; 7, 9, mesosoma in profile, major [7, syntype of *friedae*; 9, syntype of *friedae* var. *amius*]; 10, 12, head in full face view, minor [10, syntype]; 11, mesosoma in profile, minor [syntype]; 13, body in profile, minor.

workers, and 7-9 mm in major workers. Head black; mesosoma, antenna, and legs brown; gaster blackish brown. In major workers: mandible with 6 teeth (5 in smaller individuals); clypeus produced anteriorly; anterior margin of clypeus without a median notch; scape exceeding posterior margin of head by 1/5 its length; pro- and mesonotal dorsum straight and anterior end of mesonotal dorsum forming a dull angle in profile; propodeal declivity abruptly declivitous; dorsum of mesosoma with more than 20 long erect hairs; similar hairs also present on vertex

of head, petiolar dorsum, and gaster. In minor workers: mandible with 5 teeth; clypeus produced anteriorly; scape exceeding posterior margin of head by 1/3 its length; pro- and mesonotal dorsum almost straight; propodeal declivity abruptly declivitous; mesosoma with more than 20 long erect hairs.

Specimens examined. Japan - 3 workers, Amami-oshima, Kagoshima Pref., 19. VIII. 1992, K. KINOMURA leg.; 1 worker, Miyako-jima, Okinawa Pref., 24. VIII. 1979, M. TERAYAMA leg.; 7 workers, Shimochi-jima, Miyako Is., Okinawa Pref., 22. XI. 1984, H. TAKAMINE leg. **Taiwan** - 4 workers, 1 alate queen, 1 male, Kosempo, Formosa, H. SAUTER leg. [syntypes of *C. friedae*; MHNB]; 2 workers, Shustin, Formosa, [syntypes of *C. friedae* var. *amia*; MHNB]; 25 workers, Nanshan-chi, Nantou Hsien, 24. III. 1984, M. TERAYAMA leg.; 1 worker, Nanfeng-cun, Nantou Hsien, 17-21. VIII. 1980, T. NAMBU leg.; 3 workers, Puli, Nantou Hsien, 9. X. 1977, K. YAMAUCHI leg.; 2 workers, Urai, Taipei, 11. VIII. 1980, M. TERAYAMA leg.; 10 workers, Liukuei, Kaohsiung-Hsien, 17. VIII. 1987, M. TERAYAMA leg. **China** - 2 workers, Wuyi-shan, Fuchen, 6. VIII. 1988, J. WU leg.; 2 workers, Meixi, Zhejiang Prov, 7. III. 1984, J. WU leg.

Remarks. According to the original description of FOREL (1912a), var. *amius* (*amia* in his paper) differs from the nominate species in having the much weakly shining body surface and the smaller major worker in size. However, direct comparisom between *C. freidae* syntypes and *C. freidae* var. *amius* syntypes, I have concluded that the former is not significantly different the latter in morphology. Syntype major worker of *C. friedae* var. *amius* is a relatively smaller individual within major workers. This species nests in the soil and under stone of forests, forest margins, and grasslands.

Distribution. Nansei Is. (Amami-oshima I., Miyako Is.); Taiwan; southern China.

Camponotus (Tanaemyrmex) kaguya sp. nov.

[Japanese name: Yumise-oo-ari]

(Figs. 14-20)

Camponotus sp.: TERAYAMA et al., 1991, *A guide for the identification of Japanese ants (II)*: 42.

Diagnosis. Large and polymorphic species: total length of major workers around 9-12 mm, and minor workers 5-7 mm. Head blackish brown; mesosoma, petiole, legs and 1st and 2nd gastral tergites reddish brown; 3rd to 5th gastral tergites black. Anterior margin of clypeus relatively weakly produced; slightly convex medially. Mandible with 6

teeth. Scape of minor workers long: 1.4-1.5 times head width. Mesosomal dorsum strongly convex, sloping from anterior portion of pronotum to posterior portion of propodeum. Posterodorsal corner of propodeum rounded, not angulate.

Description of holotype (Major worker). HL 2.50 mm; HW 2.60 mm; SL 2.35 mm; CI 104; SI 90; WL 3.50 mm; PW 1.70 mm; PSL 0.35 mm; PH 1.00 mm; DPW 0.63 mm; TL 10.2 mm

Head slightly wider than long, with straight posterior margin in full face view. Clypeus relatively weakly produced medially, with weakly convex anterior margin. Mandible strong, with 6 teeth. Eye 0.55 mm long. Antennal scape 0.9 times head width; 2nd antennal segment 2.9 times as long as wide; 3rd segment 1.8 times as long as wide.

Mesosomal dorsum strongly convex, sloping from anterior portion of pronotum to posterior portion of propodeum. Posterodorsal corner of propodeum rounded, not angulate. Petiole relatively thin and high; upper half of scale reversed V-shaped in profile; dorsal margin in forntal view strongly convex.

Dorsa of head and mesosoma with abundant long erect hairs; the same hairs also present on gaster.

Head blackish brown; mesosoma, petiole, legs and 1st and 2nd gastral tergites reddish brown; 3rd to 5th gastral tergites black; antennal scape blackish brown; funiculus dark brown.

Minor worker. HL 1.35 mm; HW 1.10 mm; SL 1.60 mm; CI 81; SI 145; WL 2.00 mm; PW 0.95 mm; PSL 0.25 mm; PH 0.60 mm; DPW 0.35 mm; TL 5.5 mm (A paratype from the same nest as holotype measured).

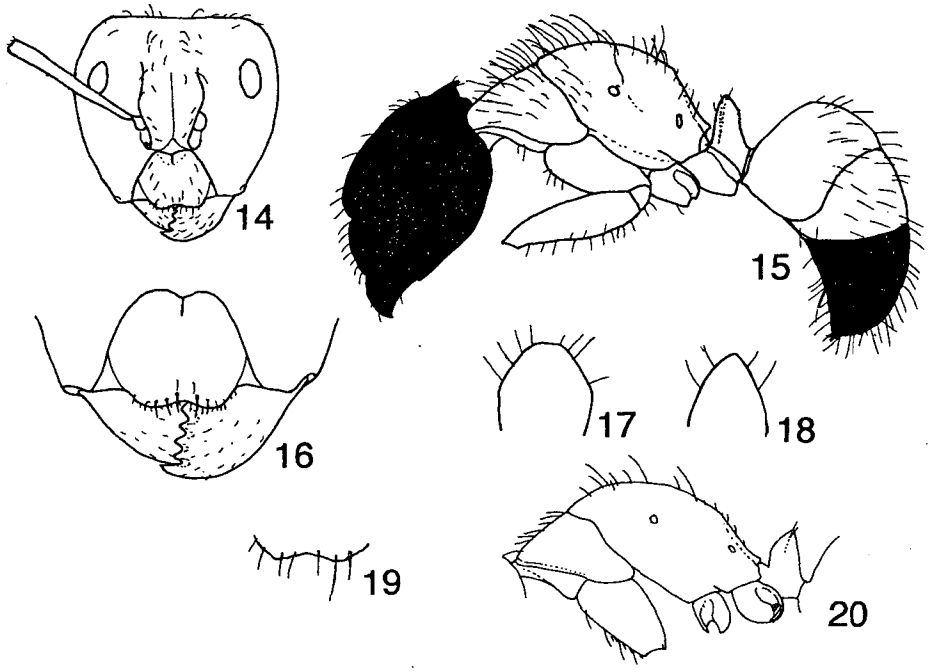
Head longer than wide, with subparallel sides and gently convex posterior margin in full face view. Clypeus produced medially, with even convex anterior margin. Mandible with 6 acute teeth. Antenna long; scape 1.5 times head length; 2nd segment 2.8 times as long as wide; 3rd segment 2.0 times as long as wide. Eye about 0.40 mm long.

Dorsal outline of mesosoma strongly convex in profile, arching from anterior end of pronotum to posterior end of propodeum; posterodorsal corner of propodeum rounded, not angulate.

Petiole relatively thick, anterior and posterior margins of scale weakly convex, scale in frontal view tapered to acutely angulate apex.

Erect or suberect hairs present on dorsa of head and gaster; mesosomal dorsum with more than 15 hairs; 2 pairs of erect hairs present on petiolar scale.

Head blackish brown; antenna, clypeus and mandible brown; mesosoma and petiole reddish brown; 1st and 2nd gastral segments reddish brown and the rest blackish brown; coxae and trochanters reddish brown; femora, tibiae, and tarsi brown.



Figs. 14-20. *Camponotus kaguya* sp. nov. — 14, Head in full face view, major; 15, body in profile, major; 16, clypeus and mandibles, major; 17 petiolar scale in frontal view, major; 18, *ditto*, minor; 19, anterior margin of clypeus, minor; 20, mesosoma and petiole in profile, minor.

Holotype. Major worker, Sashiki-son, Okinawa-jima, Okinawa Pref., 27. XII. 1989, M. TERAYAMA leg.

Paratypes. 10 workers, same data as holotype; 1 worker, Itokina, Amami-oshima, Kagoshima Pref., 28. VII. 1963, Y. KUROSAWA leg.; 1 worker, Akuseki-jima, Tokara Is., Kagoshima Pref., 4. VII. 1984, K. TOMIYAMA leg.

Remarks. This species is found in grasslands and nests in the soil.

Distribution. Nansei Is. (Akuseki-jima I., Amami-oshima I., Tokunoshima I., Okinawa I.).

Camponotus (Tanaemyrmex) monju sp. nov.

[Japanese name: Kebuka-ameiro-oo-ari]

(Figs. 21-23)

Camponotus (Tanaemyrmex) sp. 2: TERAYAMA et al, 1991, *A Guide for the Identification of Japanese Ants (II)*: 42.

Diagnosis. Total length of workers around 7-11 mm. Head and gaster dark brown to blackish brown; mesosoma, petiole and legs brown to dark brown. Head slender; antennal scape long. Head and

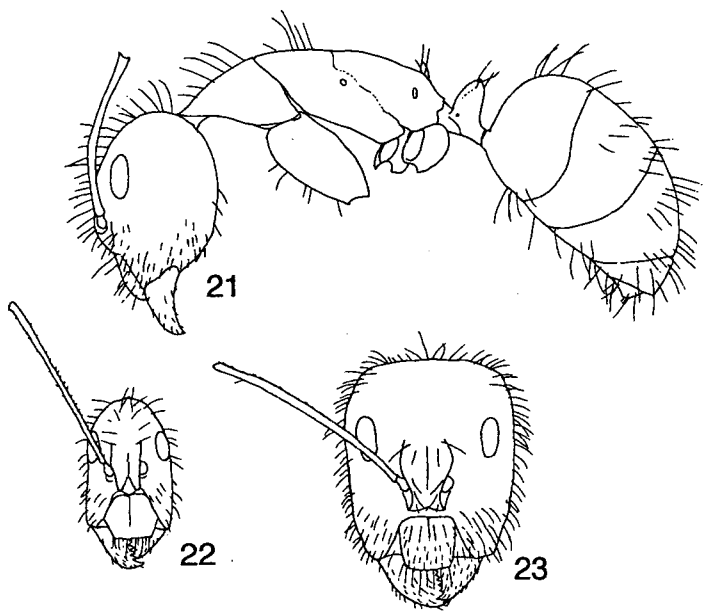
gaster with abundant erect or suberect hairs; dorsa of pronotum and mesonotum with 6-14 and 2-6 erect hairs, respectively; propodeal dorsum with more than 6 erect hairs; anterior surface of fore coxa with 4-6 erect hairs.

Description of holotype (Minor worker). HL 2.30 mm; HW 1.30 mm; SL 3.35 mm; CI 177; SI 258; WL 3.80 mm; PW 1.20 mm; PSL 0.40 mm; PH 0.76 mm; DPW 0.48 mm; TL 8.8 mm.

Head slender, 1.8 times as long as wide, widest at anterior end of head capsule in full face view; side of head behind eye convergent posteriorly. Mandible with 6 teeth. Clypeus with a median longitudinal carina; median projection of anterior clypeal margin rectangular, with straight anterior margin. Antenna remarkably long, scape 1.5 times head length and exceeding posterior margin of head by 3/5 its length; 2nd segment 4.5 times as long as wide; 3rd segment 4.7 times as long as wide. Eye moderately convex, 0.54 mm in maximum diameter.

Mesosoma slender, with weakly convex pro- and mesonotal dorsum and almost straight propodeal dorsum in profile; posterodorsal margin of propodeum bluntly angulate. Petiole row and relatively thick, with weakly convex anterior and posterior margins; dorsal margin of scale in frontal view convex.

Head and gaster with abundant erect or suberect hairs; dorsum of pronotum with 6, mesonotum with 4, and propodeum with 8 erect hairs; anterior surface of fore coxa with 5 long erect hairs and several short



Figs. 21-23. *Camponotus monju* sp. nov. — 21, Body in profile, major; 22, head in full face view, minor; 23, *ditto*, major.

hairs.

Head and gaster dark brown to blackish brown; mesosoma, petiole and legs brown.

Major worker. HL 3.30 mm; HW 2.53 mm; SL 3.00 mm; CI 130; SI 119; WL 4.10 mm; PW 1.70 mm; PSL 0.50 mm; PH 1.10 mm DPW 0.65 mm; TL 11.0 mm (A paratype from the same nest as holotype measured).

Head long, with subparallel sides and even convex posterior margin in full face view. Mandible with 6 teeth. Antenna long; scape 0.9 times head length, exceeding posterior margin of head by 1/3 its length

Mesosoma with convex dorsal margin. Petiolar node thick and row, with weakly convex anterior and posterior margins in profile; dorsum carinate; dorsal margin in frontal view strongly convex.

Head with abundant suberect hairs; dorsa of pronotum and mesosotum each with more than 10 long erect hairs; dorsum of propodeum with several long erect hairs; gaster with abundant long erect or suberect hairs.

Color as in minor worker.

Holotype. Worker, Yonaha-dake, Okinawa-jima, Okinawa Pref., 25. VIII. 1991, M. TERAYAMA leg.

Paratypes. 9 workers, 1 queen, same data as holotype; 6 workers, 1 queen, Kunigami-son, Okinawa-jima, Okinawa Pref., 21. VIII. 1991, M. TERAYAMA leg.; 5 workers, Amami-oshima, Kagoshima Pref., 31. VIII. 1982, M. TERAYAMA leg.; 16 workers, Omoto-dake, Ishigaki-jima, Okinawa Pref., 16. III. 1984, M. TERAYAMA leg.; 2 workers, Banna-dake, Ishigaki-jima, Okinawa Pref., 30. IV. 1985, M. NISHIMURA leg.; 2 workers, Iriomote-jima, Okinawa Pref., 25. VII. 1985, M. NISHIMURA leg.

Other specimens examined. Japan - 3 workers, Unzen-dake, Nagasaki Pref., 18. VIII. 1983, M. TERAYAMA leg. **Taiwan** - 16 workers, Nanshanchi, Nantou Hsien, 11. VII. 1982, M. TERAYAMA leg.; 6 workers, same locality, 21. VIII. 1987, M. TERAYAMA leg.; 6 workers, Shitou-shan, Nantou Hsien, 10. X. 1977, K. YAMAUCHI leg.; 2 workers, Wushe, Nantou Hsien, 7. X. 1977, K. YAMAUCHI leg.; 3 workers, Liyutan, Nantou Hsien, 10. VI. 1989, S. AOKI leg.; 4 workers, Penpuchi, Nantou Hsien, 21. VIII. 1980, T. NAMBU leg.

Remarks. This species resembles *C. devestivus* WHEELER from Japan, *C. pseudoirritans* WU & WANG from southern China, and *C. mitis* Fr. SMITH from southern China, Sri Lanka, and India. However, it is distinguished from *C. devestives* by the much more abundant erect hairs on the head and dorsum of pro- and mesonotum, and from *C. pseudoirritans* and *C. mitis* by the rectangular head in major workers.

Distribution. Kyushu (Unzen), Nansei Is.; Taiwan.

Camponotus (Myrmamblys) bishamon sp. nov.

[Japanese name: Hoso-umematsu-oo-ari]

(Figs. 24-30)

Camponotus (Myrmamblys) sp. F : Onoyama, 1976, *In* IKEHARA S. (ed.), *Ecological Studies of Nature Conservation of the Ryukyu Islands - (II)* : 126.

Camponotus (Myrmamblys) sp.: TERAYAMA & SATOH, 1990, *Bull. Biogeogr. Soc. Japan.*, **45** : 120.

Camponotus sp. 6: TERAYAMA et al., 1991, *A Guide for the Identification of Japanese Ants (II)* : 44.

Diagnosis. Total length of major workers around 5-5.5 mm, and minor workers around 4-4.5 mm. Body black excepting pronotum dark brown. This species resembles *C. vitiosus,* but is distinguished by the straight or very weakly concave dorsal margin of its propodeum and the thin and asymmetrical shape of its petiolar scale (the anterior margin of the petiolar scale is shorter than the posterior margin in profile).

Description of holotype (Major worker). HL 1.61 mm; HW 1.55 mm; SL 1.00 mm; CI 96; SI 64; WL 1.75 mm; PW 1.03 mm; PSL 0.63 mm; PH 0.19 mm; DPW 0.48 mm; TL 5.3 mm.

Head almost as long as wide, with subparallel sides and almost straight posterior margin in full face view. Mandible with 5 teeth. Anterior margin of clypeus slightly convex. Eye flat, 0.33 mm in maximum diameter. Antennal scape exceeding the posterior margin by about 1/5 of its length.

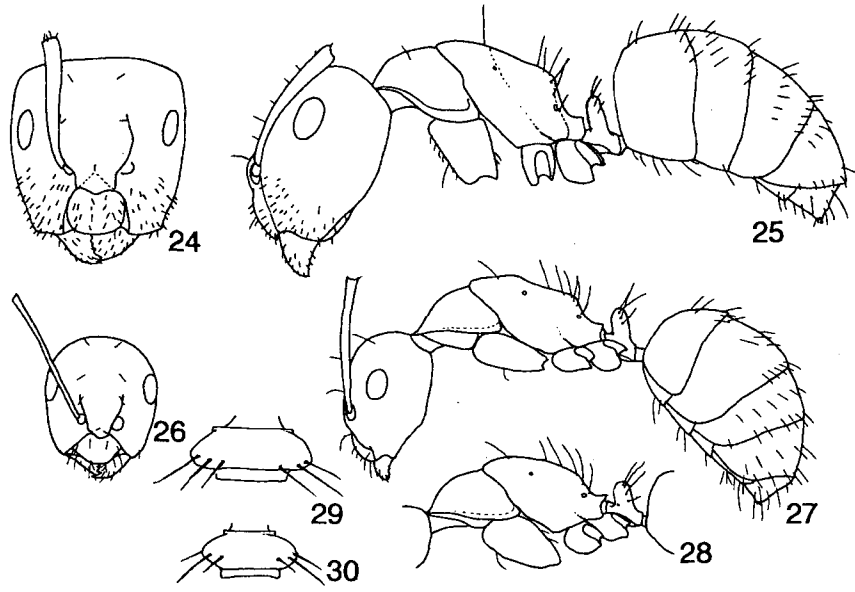
Mesosoma in profile with slightly convex pro- and mesonotal dorsum and straight propodeal dorsum; posterodorsal corner forming a blunt angle. Petiolar scale relatively thin and high, turned forward, posterior margin higher than anterior margin in profile; scale in dorsal view 0.4 times as long as wide.

Lower half of head and mandible with short erect hairs; pronotal and mesonotal dorsa each with a pair of erect hairs; propodeum with several erect hairs; petiolar scale with 4-5 pairs of erect hairs; gaster with suberect hairs which are moderately spaced.

Body black excepting pronotum dark brown; mandible and legs blackish brown.

Minor worker. HL 1.10 mm; HW 0.95 mm; SL 1.00 mm; CI 87; SI 150; WL 1.45 mm; PW 0.70 mm; PSL 0.13 mm; PH 0.45 mm; DPW 0.25 mm; TL 4.5 mm (A paratype from the same nest as holotype measured).

Head oval, with convex posterior margin in full face view; posterolateral corner rounded, not angulate. Mandible with 5 teeth.



Figs. 24-30. *Camponotus bishamon* sp. nov. — 24, Head in full face view, major; 25, body in profile, major; 26, head in full face view, minor; 27, body in profile, minor; 28, *ditto*, minor; 29, petiolar scale in dorsal view, major; 30, *ditto*, minor.

Anterior margin of clypeus convex. Antennal scape exceeding the posterior margin by about 1/3 of its length. Eye weakly prominent, 0.25 mm in maximum diameter.

Mesosoma in profile with slightly convex pro- and mesonotal dorsum and straight propodeal dorsum; propodeum relatively long; posterodorsal margin not angulate. Petiolar scale relatively thick, truned forward, posterior margin higher than anterior margin in profile; scale in dorsal view 0.4 times as long as wide.

Pronotal dorsum without hair; mesonotal dorsum with a pair of hairs; propodeal dorsum with several hairs.

Head, mesothorax, propodeum, petiole and gaster black; pronotum, antenna, and legs dark brown.

Holotype. Major worker, Urauchi, Iriomote-jima, Okinawa Pref., 19. III. 1984, M. TERAYAMA leg.

Paratypes. 14 major workers, 8 minor workers, same data as holotype; 4 major workers, Ishigaki-jima, Okinawa Pref., 13. VIII. 1978, M. TERAYAMA leg.; 2 major workers, 4 minor workers, Yonaguni-jima, Okinawa Pref., 1. VIII. 1989, H. TAKAMINE leg.

Remarks. This species resembles *C. vitiosus* Fr. SMITH from the Japanese mainland and Korea, and *C. jejuensis* KIM & KIM from Cheju Island, Korea. However, it is separated from the latters by the straight or very weakly concave dorsal margin of its propodeum in minors and majors (distinctly concave in *C. vitiosus* and *C. jejuensis*), and the thin

and asymmetrical shape of its petiolar scale in majors (thick in *jejuensis*; thick and almost symmetrical in *vitiosus*). *C. bishamon* is an arboreal species commonly found in the Nansei Islands.

Distribution. Nansei Is.

Camponotus (Myrmamblys) daitoensis sp. nov.

[Japanese name: Daito-oo-ari]

(Figs. 31-34)

Diagnosis. Total length around 4 mm in minor workers, and 5.5-6 mm in major workers. In major workers: head, mesosoma, and legs reddish brown; 1st gastral tergite yellowish brown excepting posterior margin blackish brown to black; 2nd to terminal segments blackish brown to black (2nd tergite with a pair of small yellow spots in a few individuals). Dorsum of mesosoma moderately convex in profile; pronotal dorsum with several relatively short erect hairs; mesonotal dorsum with 4-6; propodeum with more than 10 erect hairs; petiolar scale thin and high. In minor workers: head, mesosoma, and legs light yellowish brown; coloration of gaster as in major worker.

Description of holotype (Major worker). HL 1.60 mm; HW 1.60 mm; SL 1.28 mm; CI 100; SI 80; WL 1.90 mm; PW 1.00 mm; PSL 0.23 mm; PH 0.63 mm; DPW 0.50 mm; TL 6.3 mm.

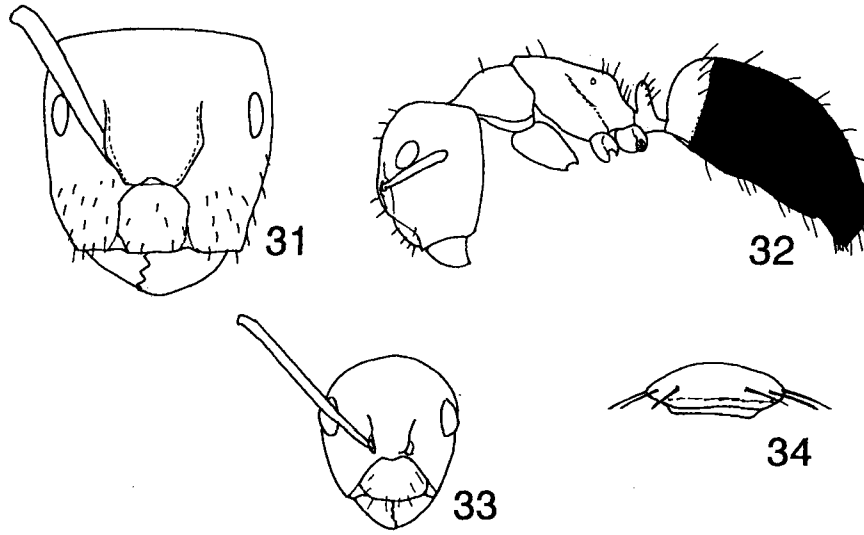
Head as long as wide, with almost straight posterior margin in full face view; posterodorsal corner forming a blunt angle. Mandible with 5 teeth. Anterior margin of clypeus straight, without a median notch. Antennal scape exceeding posterior margin of head by 1/5 its length in full face view. Eye 0.35 mm in maximum diameter.

Dorsum of pronotum moderately convex in profile; mesonatal and propodeal dorsum largely straight; posterodorsal corner of propodeum bluntly angulate. Petiolar scale thin and high; in dorsal view 0.5 times as long as wide.

Pronotal dorsum with several relatively short erect hairs; mesonotal dorsum with 4-6; propodeum with more than 10 erect hairs; gastral tergites each with 2 rows of erect hairs; short suberect hairs abundant on lower 1/3 of head.

Head, mesosoma, and legs reddish brown; 1st gastral tergite yellowish brown excepting posterior margin blackish brown to black; 2nd to terminal segments blackish brown to black.

Minor worker. HL 1.10 mm; HW 0.95 mm; SL 1.30 mm; CI 86; SI 137; WL 1.55 mm; PW 0.75 mm; PSL 0.18 mm; PH 0.51 mm; DPW 0.40 mm; TL 4.2 mm (A paratype from the same nest as holotype



Figs. 31-34. *Camponotus daitoensis* sp. nov. — 31, Head in full face view, major; 32, body in profile, major; 33, head in full face view, minor; 34, petiolar scale in dorsal view, major.

measured).

Head oval, slightly longer than wide, with convex posterior margin in full face view; posterodorsal corner rounded, not angulate. Mandible with 5 teeth. Anterior margin of clypeus weakly convex. Antennal scape exceeding posterior margin of head by 1/3 its length in full face view. Eye 0.30 mm in maximum diameter.

Dorsal outline of mesosoma moderately convex; posterodorsal corner of propodeum bluntly angulate in profile. Petiolar scale thin and high.

Pronotal dorsum without hairs; mesonotal dorsum with a pair of erect hairs; propodeum with about 12 erect hairs; gastral tergites each with 2 rows of erect hairs.

Head, mesosoma, and legs light yellowish brown; coloration of gaster as in major worker.

Holotype. Major worker, Minami-daito-jima, Okinawa Pref., 24. VI. 1975, H. TAKAMINE leg.

Paratypes. 10 major workers, 17 minor workers, same data as holotype.

Remarks. This is an arboreal species which nests in dead twigs on trees. Coloration of 2nd gastral tergite varies from uniform black to with a pair of small yellow spots.

Distribution. Nansei Is. (Minami-daito-jima I.).

Camponotus (Myrmamblys) yambaru sp. nov.

[Japanese name: Usuki-oo-ari]

(Figs. 35-41)

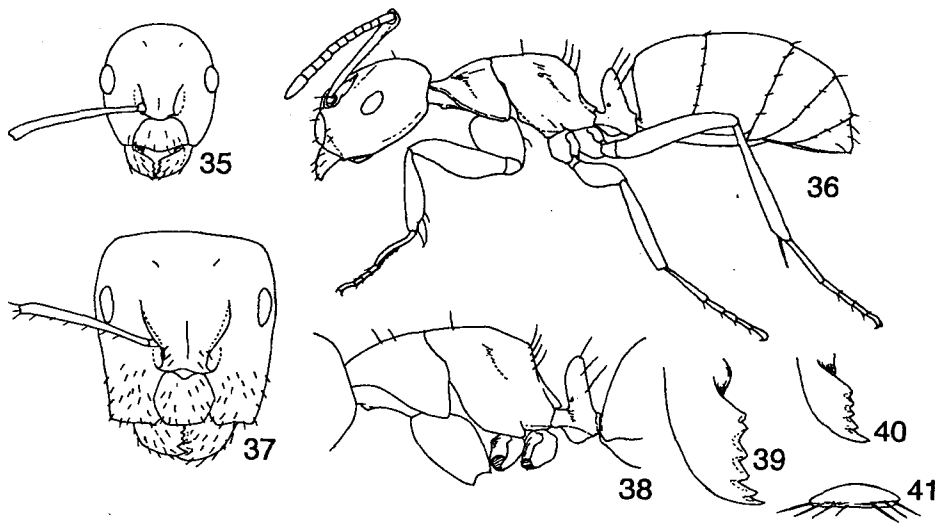
Camponotus (Myrmamblys) sp. 7: TERAYAMA & KIHARA, 1994, *Distribution maps of Japanese ants*: 40.

Diagnosis. Total length around 3.5 mm in minor workers, and 5 mm in major workers. Body color yellowish brown. In major workers: head somewhat darker than mesosoma and gaster. Propodeal declivity abruptly declivitous; dorsum of pro- and mesonotum each with 2-4 erect hairs; propodeum with about 10 erect hairs; petiolar scale thin, with hairs dorsally.

Description of holotype (Major worker). HL 1.43 mm; HW 1.35 mm; SL 0.90 mm; CI 95; SI 67; WL 1.65 mm; PW 0.93 mm; PSL 0.18 mm; PH 0.68 mm; DPW 0.58 mm; TL 5.5 mm.

Head slightly longer than wide, with subparallel sides and weakly convex posterior margin in full face view. Mandible strong, with 6 teeth; basalmost tooth small. Anterior margin of clypeus almost straight, without a median notch. Antennal scape short, just reaching the posterior margin of head. Eye 0.30 mm in maximum diameter.

Mesosoma relatively short; pro- and mesonotal dorsum almost straight in profile; dorsum of pronotum flat, 0.57 times as long as wide in dorsal view; propodeal declivity abruptly declivitous. Petiolar scale



Figs. 35-41. *Camponotus yambaru* sp. nov. — 35, Head in full face view, minor; 36, body in profile, minor; 37, head in full face view, major; 38, mesosoma and petiole in profile, major; 39, mandible, major; 40, *ditto*, minor; 41, petiolar scale in dorsal view, major.

thin and high, with convex anterodorsal margin and straight posterior margin in profile; scale in dorsal view 0.3 times as long as wide, with weakly convex anterior margin.

Dorsum of pro- and mesonotum each with 2-4 erect hairs; propodeum with about 10 erect hairs; petiolar scale with several erect hairs dorsally; gaster with relatively short erect hairs.

Body yellowish brown; head somewhat darker than mesosoma and gaster; antenna and legs yellowish brown.

Minor worker. HL 0.90 mm; HW 0.90 mm; SL 0.85 mm; CI 100; SI 94; WL 1.15 mm; PW 0.65 mm; PSL 0.15 mm; PH 0.40 mm; DPW 0.35 mm; TL 3.8 mm (A paratype from the same nest as holotype measured).

Head round, with convex dorsal margin in full face view; posterodorsal corner rounded, not forming an angle. Mandible with 5 teeth. Anterior margin of clypeus convex. Antennal scape exceeding posterior margin of head by 1/3 its length; Eye 0.20 mm in maximum diameter.

Mesosoma short, pro- and mesonotal dorsum flat in profile; propodeal declivity abruptly declivitous. Petiolar scale relatively thin and high.

Pronotal dorsum without erect hairs; mesonotal dorsum with a pair of erect hairs; propodeum about 10 erect hairs; petiolar scale with erect hairs dorsally; gastral tergites each with short erect hairs.

Body including head yellowish brown; antenna and legs yellowish brown.

Holotype. Major worker, Yonaha-dake, Okinawa-jima, Okinawa Pref., 25. VIII. 1991, M. TERAYAMA leg.

Paratypes. 24 major workers, 40 minor workers, same data as holotype.

Remarks. This is an arboreal species which nests in dead twigs on trees and bamboos.

Distribution. Northern part of Okinawa Island.

Camponotus (Colobopsis) shohki sp. nov.

[Japanese name: Aka-hirazu-oo-ari]

(Figs. 42-49)

Camponotus sp. 2: TERAYAMA et al., 1991, *A Guide for the Identification of Japanese Ants (II)*: 44.

Diagnosis. Total length around 2.5-3 mm in minor workers and around 4.5-5 mm in major workers. Head and mesosoma yellowish

brown to blackish brown; gaster black. Major worker: head length exceeding 1.10 mm; anterior margin of head, with a pair of blunt projections in full face view.

Description of holotype (Major worker). HL 1.18 mm; HW 1.05 mm; SL 0.60 mm; CI 89; SI 57; WL 1.20 mm; PW 0.73 mm; PSL 0.14 mm; PH 0.48 mm; DPW 0.45 mm; TL 4.5 mm.

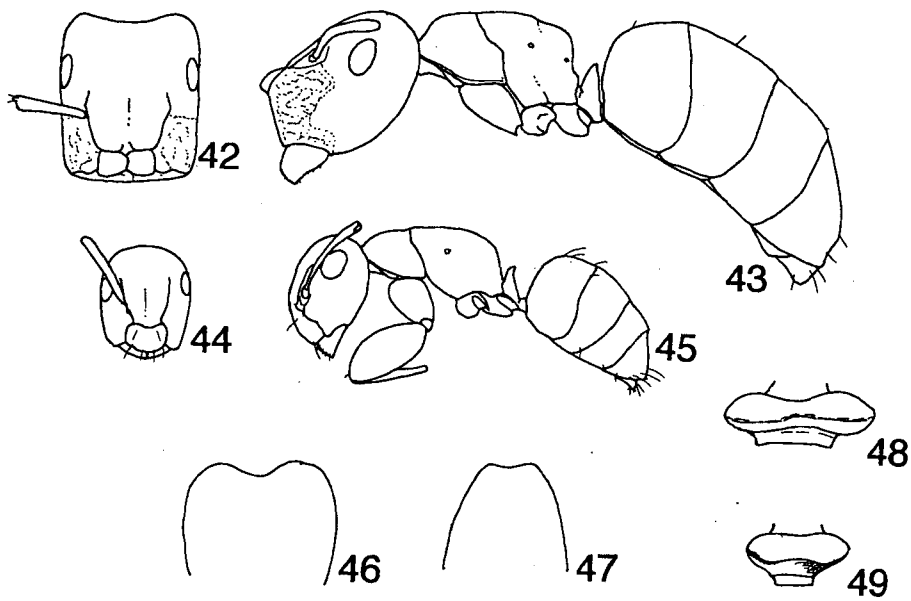
Head 1.12 times as long as wide, with parallel sides and slightly convex posterior margin in full face view; anterior margin truncated, with a pair of blunt projection. Mandible with 5 developed teeth. Antennal scape short, 0.6 times head width. Eye flat, 0.30 mm in maximum diameter.

Pro- and mesonotal dorsum straight; posterodorsal corner of propodeum forming a distinct angle; propodeal declivity abruptly declivitous. Petiolar scale thin and high, with convex anterior margin and concave posterior margin in profile; tip acutely angulated; in frontal view dorsal margin concave; scale in dorsal view thin, with concave anterior and posterior margins.

Gaster massive and long, ca. 2.0 times mesosomal length.

Head without hairs excepting a pair of erect hairs on vertex; mandible scattered with hairs; mesosomal dorsum and petiole without erect hairs; gaster scattered with short erect hairs

Head, mesosoma, and petiole yellowish brown and somewhat red-



Figs. 42-49. *Camponotus shohki* sp. nov. — 42, Head in full face view, major; 43, body in profile, major; 44, head in full face view, minor; 45, body in profile, minor; 46, petiolar scale in posterior view, major; 47, *ditto*, minor; 48, petiole in dorsal view, major; 49, *ditto*, minor.

dish; gaster black.

Minor worker. HL 0.76 mm; HW 0.68 mm; SL 0.60 mm; CI 89; SI 89; WL 0.70 mm; PW 0.48 mm; PSL 0.10 mm; PH 0.38 mm; DPW 0.29 mm; TL 2.8 mm (A paratype from the same nest as holotype measured).

Head oval, with gently convex sides and convex posterior magin in full face view; posterodorsal corner not forming a distinct angle. Mandible with moderately convex outer margin and 5 teeth. Anterior margin of clypeus convex. Antennal scape distinctly exceeding posterior margin of head in full face view. Eye 0.23 mm in maximum diameter.

Dorsal outline of mesosoma convex in profile; posterodorsal corner of propodeum forming a right angle; propodeal dorsum thin in dorsal view; propodeal declivity abruptly declivitous. Propodeal scale thin and high, with an acutely angulated tip; scale in frontal view with slightly concave dorsal margin.

Mandible and clypeus with several hairs; vertex with a pair of erect hairs; dorsum of mesosoma and petiole without hairs; gaster with sparse short erect hairs.

Head and mesosoma yellowish brown; gaster blackish brown.

Holotype. Major worker, Yonaguni-jima, Okinawa Pref., 10. VIII. 1979, M. TERAYAMA leg.

Paratypes. 3 major workers, 10 minor workers, same data as holotype; 1 major worker, 2 minor workers, Kobama-jima, Okinawa Pref., 11. V. 1984, K. YAMAUCHI leg.; 3 major workers, 7 minor workers, Syuri, Okinawa Pref., 14. IX. 1981, M. TERAYAMA leg.; 1 major worker, 2 minor workers, Sueyoshi, Naha-shi, Okinawa Pref., 13. V. 1984, K. YAMAUCHI leg.; 4 major workers, 13 minor workers, Okinoerabu-jima, Kagoshima Pref., 18. III. 1980, M. TERAYAMA leg.

Remarks. This species is distinguished from *C. nipponicus* WHEELER by the much longer head of its major workers (head length exceeding 1.10 mm, versus 1.00-1.05 mm in *C. nipponicus*), and the shape of the anterior margin of the head, with a pair of blunt projections in frontal view. An arboreal species.

Distribution. Nansei Is. (Tokuno-shima I. and southwards).

Acknowledgements

I am grateful to the following persons who provided me with valuable materials: S. AOKI (Rissho Univ.), J. FELLOWES (Hong Kong), Y. HASHIMOTO (Mus. Nature & Human Activities), K. KINOMURA (Gifu), S. KUBOTA (Tokyo), T. NAMBU (Saitama), M. NISHIMURA (Tokyo), H. SATOH (Tokyo Univ. of Agr. & Tech.), A. SHINOHARA (Nat. Sci. Mus.), H. TAKAMINE (Okinawa), Sk. YAMANE (Kagoshima Univ.), and K. YAMAUCHI (Gifu Univ.). Drs. C. BESUCHET (Muséum d'Histoire

naturelle, Genève) and M. BRANCUCCI (Naturhistorisches Museum, Basel) are kindly lending me the type material. Thanks are also due to Dr. R. W. TAYLOR (CSIRO, Canberra) for his helping the improvement of several parts of the manuscript.

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