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Vietnamese species of the genus *Acanthomyrmex* EMERY, 1893 – *A. humilis* sp.n. and *A. glabfemoralis* ZHOU & ZHENG, 1997 (Hymenoptera: Formicidae: Myrmicinae)

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Abstract

Two species of the ant genus *Acanthomyrmex* EMERY, 1893 are recognized from Vietnam. *Acanthomyrmex humilis* sp.n. is described based on the major worker, minor worker and ergatoid queen. The major worker, queen, "dwarf queen", and male of *A. glabfemoralis* ZHOU & ZHENG, 1997 are also described for the first time, and the minor worker of this species is redescribed. Notes on the colony structure are given.

Key words: *Acanthomyrmex*, Indo-China, Vietnam, *A. humilis* sp.n., *A. glabfemoralis*, taxonomic description, colony structure.

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Introduction

The myrmicine genus *Acanthomyrmex* was established by EMERY (1893). Eleven species were recognized in a modern revisional study by MOFFETT (1986), and five species have been added from Indonesia, Thailand and China (TERAYAMA 1995, ZHOU & ZHENG 1997, TERAYAMA & al. 1998). The range of the genus is restricted to the Oriental region. *Acanthomyrmex* species nest in cavities in dead twigs and wood fragments, under or between stones and in litter on the forest floor, and their colony size is usually small (MOFFETT 1985, TERAYAMA & al. 1998, EGUCHI & al. 2004). We often encounter patches in which colonies are aggregated. Because reproduction by ergatoids is dominant in some species of *Acanthomyrmex* (TERAYAMA & al. 1998), such aggregation of colonies may be caused by the low dispersal ability of the ergatoid founder. The species in this genus are worker-dimorphic: the major worker is a seed-miller (MOFFETT 1985).

In the course of our inventory project on Vietnamese ants, we have recognized two species of *Acanthomyrmex*. In this paper we describe *Acanthomyrmex humilis* sp.n. based on the major worker, minor worker and ergatoid queen; and we describe the major worker, normal queen, "dwarf queen", and male of *A. glabfemoralis* ZHOU & ZHENG, 1997 for the first time, and we redescribe the minor worker of that species.

Methods

In the present study we examined colony-based specimens (nest series) collected from Vietnam and other parts of the Oriental Region, including 54 majors, 142 minors, 17 normal queens, 19 "dwarf queens" and 19 males of *A. glabfemoralis* and 8 majors, 16 minors and 2 ergatoid queens of *A. humilis* sp.n. Colonies collected by K. Eguchi are given a colony code, like Eg01-VN-001 or Eg01vi05-01; those by Sk. Yamane like VN01-SKY-01; those by K. Eguchi and T.V. Bui like B&E03-1.

Abbreviations of public institutions and private collection are as follows: IEBR, Entomological Collection of the Institute of Ecology and Biological Resources, Hanoi, Vietnam; MCZC, Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA; MHNG, Muséum d'Histoire Naturelle, Geneva, Switzerland; MSNV, Museo di Storia Naturale di Verona, Verona, Italy; NHMW, Naturhistorisches Museum, Wien, Austria; ACEG, Ant collection of Katsuyuki Eguchi (see his contact address given under the title of this article); SKYC, Ant collection of Seiki Yamane, temporarily housed in Faculty of Science, Kagoshima University, Japan.

The following measurements and indices are frequently used in the present article:

HL Head length: maximal length of head capsule. In cases where anterior margin of clypeus and posterior margin of head are concave the measurement is taken from the mid-point of a transverse line spanning the anteriormost and posteriormost projecting points.

HW Head width: maximal width of head capsule excluding eyes.

SL Scape length: length of antennal scape excluding basal condylar bulb.
MNH Mesonotal height: height of mesonotum of gyne and male, measured from the highest point of mesoscutum to the lowest point of mesopleuron in lateral view.
MSW Mesoscutum width: maximal width of mesoscutum of gyne and male.
HFL Length of hind femur: maximum length of hind femur, measured from junction with trochanter to junction with tibia.
CI Cephalic index: CI = HW / HL × 100.
SI Scape index: SI = SL / HW × 100.
MNI Mesonotal index: MNI = MSW / MNH × 100.
MSI Mesoscutal index: MSI = MSW / HW × 100.
HFI Hind femur index: HFI = FL / HW × 100.

Multi-focused montage images were produced using Helicon Focus 4.03 Pro (MP) from a series of source images taken by a Nikon Coolpix 8400 digital camera attached to a Nikon AZ100 microscope. When fine hairs and other parts which were not recognized automatically were found, the focused parts from the source images were copied to the montage image using retouching function of Helicon Focus. Artifacts (ghost images) and unnecessary parts (unfocused appendages, insect pin, etc.) surrounding or covering target objects were erased and cleaned up using the retouching function of Helicon Focus. Finally, the background was cleaned up, and the color balance, contrast and sharpness were adjusted using Adobe Photoshop CS2.

Vietnamese species of *Acanthomyrmex*

Acanthomyrmex glabfemoralis ZHOU & ZHENG, 1997

Acanthomyrmex glabfemoralis ZHOU & ZHENG, 1997: 47-48.

Type material. Holotype (minor): China: Guangxi: Huaping Natural Conservation, 8.VII.1995, leg. Shanyi Zhou. We were unable to borrow the type material, but we examined two majors and two minors [Da Yao Shan N.R., Guangxi, China, 18.IX.1998, leg. S. Zhou] determined as *A. glabfemoralis* by S. Zhou who is the first author of the original description of the species.

Non-type material examined. China: Guangdong: Da Qiao Town, Ruyuan County, 18.X.2007, leg. Latella, 3 minors, 1 dealate normal queen (MSNV). China: Guangxi: Da Yao Shan N.R., 18.IX.1998, leg. S. Zhou, 2 majors, 2 minors (IEBR, ACEG, SKYC). Vietnam: Lao Cai: Van Ban (Liem Phu Area, 300 - 650 m alt.), 26. - 29.IX.2006, leg. K. Eguchi, 19 majors, 26 minors, 15 "dwarf queens" (Eg 26ix06-15; Eg27ix06-08, -11, -14, -17, -24; Eg28ix06-11, -15, -24; Eg29ix06-03) (IEBR, ACEG, SKYC); Van Ban (Nam Xe Area, 500 - 840 m alt.), 3.X.2007, leg. K. Eguchi, 4 majors, 6 minors, 3 "dwarf queens" (Eg03x06-08, -10) (IEBR, ACEG). Vietnam: Bac Giang: W. Yen Tu N.P. (= Tay Yen Tu N.P.: 21°10 - 11'N, 106°43'E, 170 - 455 m alt.), 28. - 30.III.2003, leg. V.T. Bui & K. Eguchi, 2 majors, 29 minors, 4 dealate normal queens, 1 "dwarf queen", 1 male (B&E03-27, -38, -46, -47) (IEBR, ACEG, SKYC); W. Yen Tu N.P. (21°10 - 11'N, 106°43'E, 190 - 210 m alt.), 25. - 27.III.2003, leg. K. Eguchi, 4 majors, 18 minors, 1 dealate and 2 alate normal queens, 7 males (Eg03-VN-004, -055) (IEBR, ACEG); W. Yen Tu N.P. (21°09 - 10'N, 106°43'E, 330 - 400 m alt.), 24.V.2004, leg. K. Eguchi, 2 majors, 4 minors, 1 dealate normal queen (Eg04-VN-092) (IEBR, ACEG, SKYC). Vietnam: Quang Ninh: Ky Thuong N.R., 8. - 10.IV.2003, leg. K. Eguchi, 4 majors, 6 minors, 1 dealate normal queen (Eg03-VN-205, -223, -234, -237, -242, -245) (ACEG); Chua Yen Tu (21°09'N, 106°43'E, 520 - 725 m alt.), 18. - 19.V.2004, leg. K. Eguchi, 5 majors, 13 minors, 2 dealate normal queens (Eg04-VN-008, -012, -032) (IEBR, ACEG, SKYC). Vietnam: Ninh Binh: Cuc Phuong N.P. (20°14'N, 105°36'E, ca. 370 m alt.), 9.XI. 2001, leg. K. Eguchi, 3 majors, 14 minors, 1 dealate and 1 alate normal queens, 8 males (Eg01-VN-164) (IEBR, ACEG, SKYC); Cuc Phuong N.P. ("Cay Bang Co Thu" Trail), 10. - 12.VI.2005, leg. K. Eguchi, 3 majors, 7 minors (Eg10vi05-12, Eg12vi05-04) (IEBR, ACEG); Cuc Phuong N.P. ("Khu Trung Tam"), 15.VI.2005, leg. K. Eguchi, 2 majors, 5 minors, 1 dealate normal queen (Eg15vi05-12) (IEBR, ACEG). Vietnam: Nghe An: Pu Mat N.P. (18°58'N, 104°49'E, 200 - 350 m alt.), 17.III.2006, leg. K. Eguchi, 2 majors, 3 minors (Eg17iii06-05) (IEBR, ACEG); Pu Mat N.P. (18°58'N, 104°49'E), 18.III.2006, leg. K. Eguchi, 2 majors, 6 minors, 2 dealate normal queens, 3 males (Eg 18iii06-11, -25) (IEBR, ACEG).

Measurements and indices.

Major (5 nontypes). HL 2.60 - 3.00 mm; HW 2.25 - 2.56 mm; SL 1.10 - 1.28 mm; HFL 1.33 - 1.40 mm; CI 84 - 88; SI 48 - 50; HFI 55 - 59.

Minor (5 nontypes). HL 0.92 - 1.08 mm; HW 1.04 - 1.18 mm; SL 0.95 - 1.10 mm; HFL 0.99 - 1.19 mm; CI 108 - 113; SI 92 - 97; FI 96 - 102.

Normal queen (5 nontypes). HL 1.80 - 2.08 mm; HW 2.00 - 2.33 mm; SL 1.08 - 1.23 mm; MNH 1.60 - 1.95 mm; MSW 1.38 - 1.61 mm; HFL 1.40 - 1.56 mm; CI 108 - 112; SI 52 - 55; MNI 83 - 87; MSI 69 - 73; FI 67 - 71.

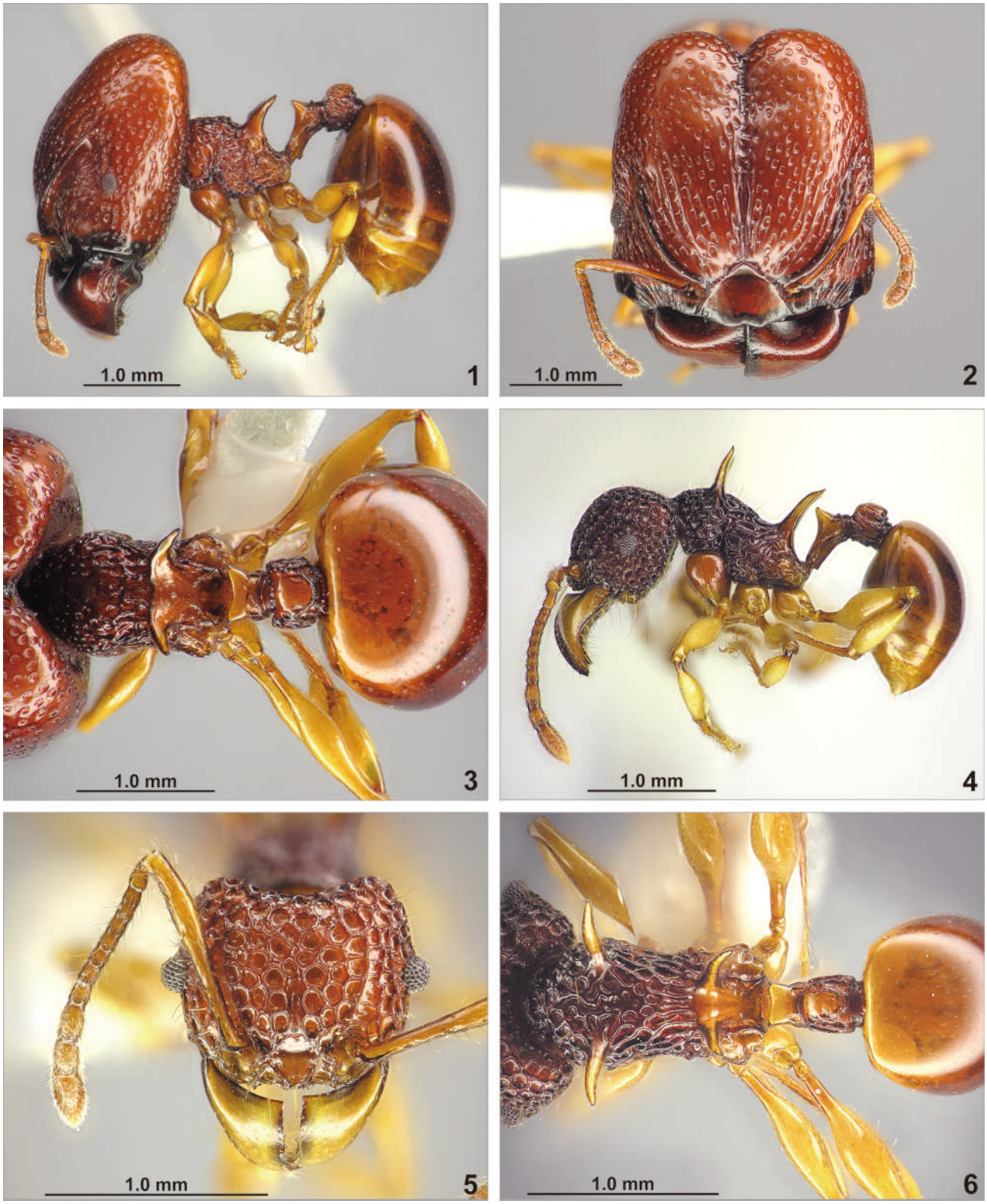
Dwarf queen type A (1 nontype). HL 2.14 mm; HW 2.24 mm; SL 1.18 mm; MNH 1.28 mm; MSW 1.08 mm; HFL 1.48 mm; CI 105; SI 53; MNI 84; MSI 48; FI 66.

Dwarf queen type B (3 nontypes). HL 1.68 - 1.73 mm; HW 1.76 - 1.83 mm; SL 1.06 - 1.11 mm; MNH 1.05 - 1.13 mm; MSW 0.81 - 0.86 mm; HFL 1.29 - 1.30 mm; CI 103 - 108; SI 58 - 62; MNI 73 - 80; MSI 44 - 48; FI 71 - 73.

Male (3 nontypes). HL 0.71 - 0.80 mm; HW 0.93 - 1.15 mm; SL 0.17 - 0.22 mm; MNH 0.88 - 1.09 mm; MSW 0.88 - 0.93 mm; HFL 0.99 - 1.13 mm; CI 130 - 144; SI 18 - 19; MNI 83 - 100; MSI 80 - 95; FI 98 - 108.

Description.

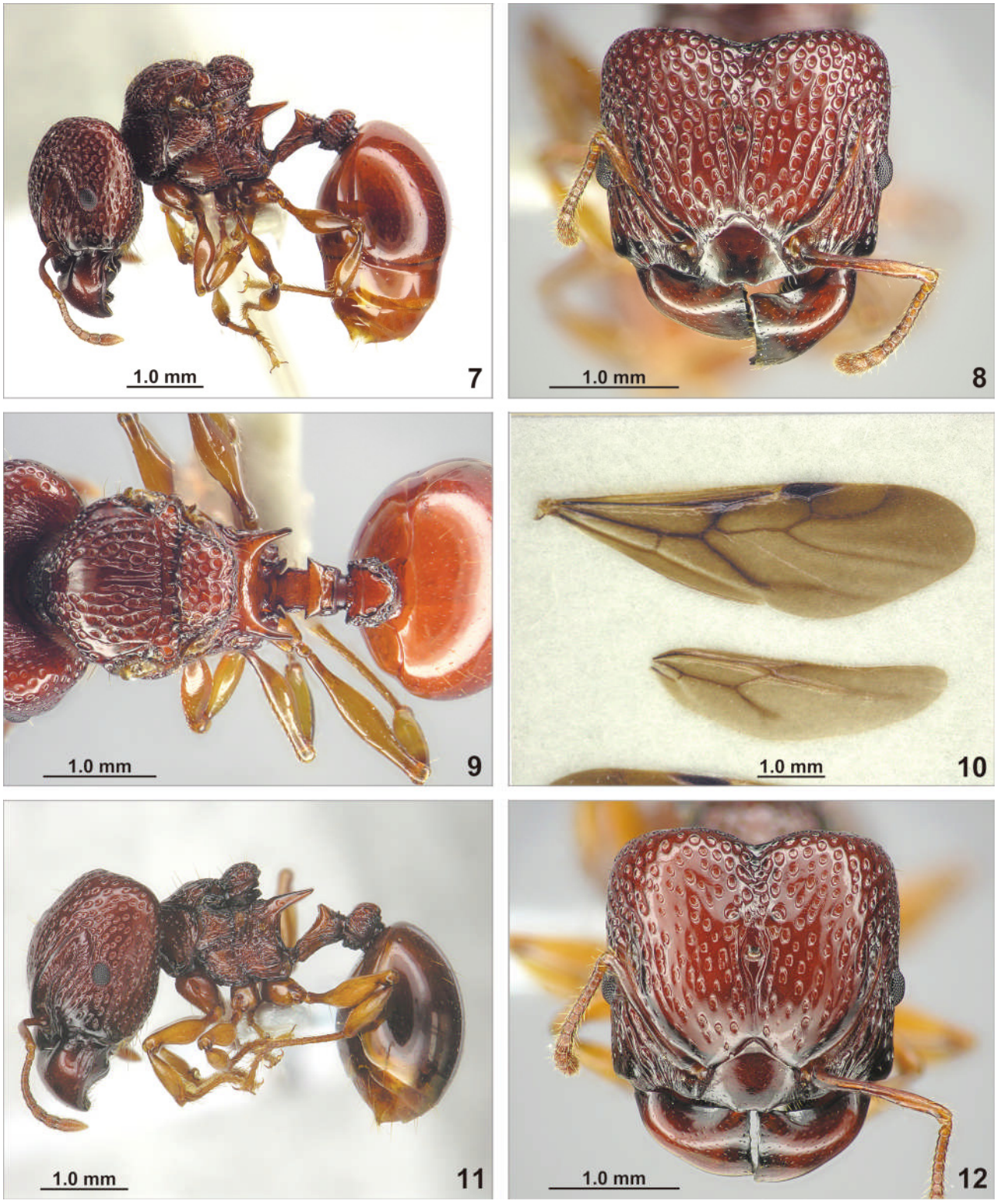
Major. Body reddish brown to dark reddish brown; legs and often antennae and apical part of gaster paler. Body sculpture basically as in Figs. 1 - 3, but with a certain amount of variation. Head in full-face view at least with weak posteromedian emargination; dorsal and lateral faces of cranium at most with a few standing hairs; frontal lobe poorly developed, only partly concealing antennal socket; frontal carina conspicuous; antennal scrobe deep and conspicuous, posteriorly bent anteroventrad to form a "funicular scrobe" above compound eye; median part of clypeus produced anteriad, with weak to inconspicuous emargination at middle of anterior margin, usually lacking a median seta and lateral setae (or rarely having a thin and short median seta); antenna 12-segmented with 3-segmented club; shaft of antennal scape when laid backward not extending beyond midlength of head; leading edge of the shaft forming a low longitudinal lobe a little apically to



Figs. 1 - 6: *Acanthomyrmex glabfemoralis*, Eg03-VN-055. (1 - 3) Major worker; (4 - 6) minor worker. (1, 4) Body in lateral view; (2, 5) head in full-face view; (3, 6) mesosoma and waist in dorsal view.

encircling basal flange; outer surface of mandible smooth (sparsely with tiny punctures which usually bear very short appressed hairs); masticatory margin of mandible almost edentate (teeth having been worn down to nothing, but apical and preapical teeth often inconspicuously present).

Mesosoma shortened and stout; its dorsum with a few standing hairs; promesonotal suture present as a weak groove dorsally; pronotal spine absent; metanotal groove present as inconspicuous broad impression just anteriorly to base of propodeal spine; the groove sometimes bordered



Figs. 7 - 12: *Acanthomyrmex glabfemoralis*. (7 - 10) Normal queen, wings removed, Eg03-VN-055; (11, 12) dwarf queen type A, B&E03-46. (7, 11) Body in lateral view; (8, 12) head in full-face view; (9) mesosoma and waist in dorsal view; (10) right wings.

anteriorly with low ridge; metapleural lobe well developed, angularly projecting posterodorsad; propodeal spine in lateral view relatively broad basally and weakly downcurved or slightly sinuate, without standing hairs but with a few very short decumbent to appressed hairs. Dorsum of each femur without standing hairs. Petiole in lateral view with long anterior pedicel; petiolar node in lateral view moderately raised, with relatively acute apex, in posterior view with concavity between acute lateral angles or short and stout spines (rarely angles round as in the major of Eg18iii06-11); "post-nodal" face behind apex of petiolar node till articulation with postpetiole consisting of a

steep slope followed by a very short horizontal face in lateral view; subpetiolar process present as a small dent; postpetiole in lateral view moderately raised dorsally, with blunt anteroventral angle, much shorter than high and (much) shorter than broad (excluding helcium). First gastral tergite at most with a few long hairs, but with many very short appressed hairs.

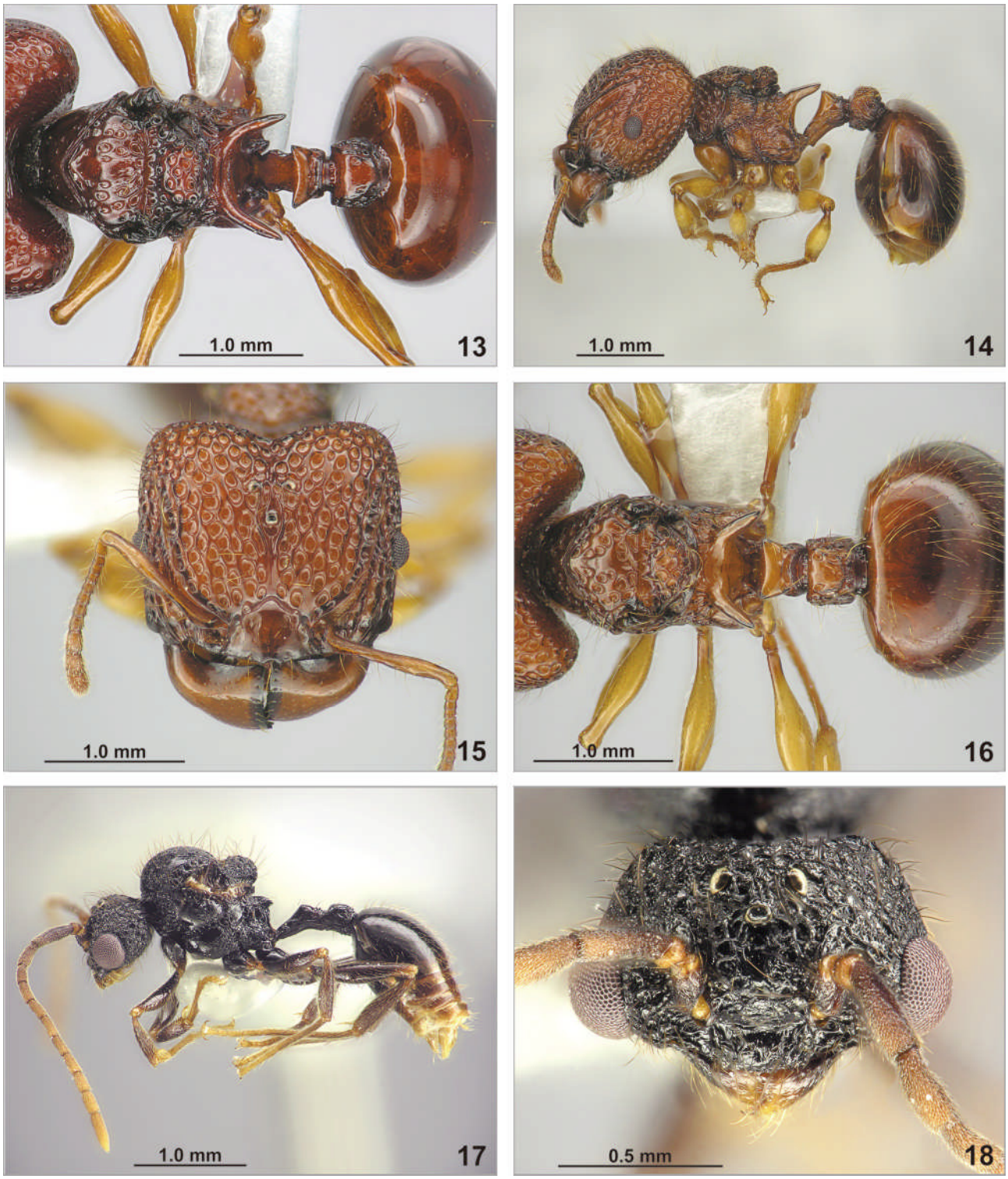
Minor (redescription mainly based on the Vietnamese material). Body reddish brown to dark reddish brown; mandibles, antennae, apical part of pronotal and propodeal spines, legs, apical part of gaster usually paler. Body sculpture as in Figs. 4 - 6. Head with standing hairs, in full-face view with its posterior margin broadly concave; frontal lobe poorly developed, only partly concealing antennal socket; frontal carina conspicuous; antennal scrobe shallow but conspicuous, posteriorly not bent anteroventrad; anterior clypeal margin with a conspicuous median seta, and usually with conspicuous lateral setae, in middle with four processes (two located between median and lateral setae, and the other two lateral to lateral setae); oblique-longitudinal ridge running backward from each process; eye in full-face view strongly convex, located a little behind midlength of head; antenna 12-segmented with 3-segmented club; the shaft of antennal scape when laid backward usually extending a little beyond posterolateral corner of head; leading edge of shaft forming a low longitudinal lobe a little apically to the encircling basal flange; masticatory margin of mandible with relatively small apical and preapical teeth followed by small denticles that are relatively broadly separated. Mesosoma in lateral view slenderer than that of the major; its dorsum sparsely with standing hairs; promesonotal dome in lateral view convex gently; promesonotal suture absent dorsally; pronotal spine slender, without standing hairs but with several very short decumbent to appressed hairs; metanotal groove almost absent; metapleural lobe well developed, angularly projecting posterodorsad; propodeal spine long, in lateral view slender and usually down-curved or sinuate in apical part, without standing hairs but with a few very short decumbent to appressed hairs. Dorsum of each femur without standing hairs. Petiole in lateral view with relatively long anterior pedicel; petiolar node in lateral view moderately to strongly raised, with relatively angulate apex, in posterior view with concavity between acute lateral angles or spines; "post-nodal" face behind apex of petiolar node till articulation with postpetiole consisting of a steep slope followed by a very short horizontal face in lateral view; subpetiolar process present as a small angle or dent; postpetiole in lateral view moderately raised dorsally, shorter than high and (a little) broader than long (excluding helcium). First gastral tergite without standing hairs, but with many very short appressed hairs.

Normal queen. Head and mesosoma reddish brown to dark reddish brown; antennae, legs and apical part of gaster usually paler. Body sculpture basically as in Figs. 7 - 9 (sculpture on head and mesoscutum weaker in queens from Pu Mat). Head in full-face view subrectangular, with lateral margins weakly diverging posteriad; posterior margin weakly concave medially; dorsum of cranium sparsely with standing hairs; frontal lobe poorly developed, only partly concealing antennal socket; frontal carina conspicuous, ending a little anteriorly to midlength between posterior margin of compound eye and posterior margin of head in lateral view; antennal scrobe deep and conspicuous, posteriorly bent anteroventrad to form an inconspicuous "funicular scrobe"; median part of clypeus produced anteriad, with weak emargination at middle of anterior margin, virtually lacking median and lateral setae; ocelli present; median ocellus in full-face view located a little behind level of posterior margin of compound eye; antenna 12-segmented with 3-segmented club; antennal scape when laid backward extending beyond midlength of head; masticatory margin of mandible almost edentate (teeth having been worn down to nothing, but apical and preapical teeth often remaining inconspicuously). Mesosoma short and high; its dorsum with standing hairs; pronotal spine absent; mesoscutellum in lateral view strongly raised dorsoposteriad (but relatively weakly raised in queens from Pu Mat), in dorsal view subtrapezoidal, very weakly concave posteromedially; metapleural lobe well developed, angularly projecting posterodorsad; propodeal spine in lateral view straight or down-curved, relatively broadly based, without standing hairs, but with a few very short appressed hairs. Venation of wings basically as in Fig. 10 (but in a queen of Eg01-VN-164 medio-cubital cross-vein located at or near base of radial sector + media). Dorsum of each femur usually without standing hairs. Petiole in lateral view with long anterior pedicel; petiolar node in lateral view relatively low but with relatively angulate apex, in posterior view with concavity between lateral angles or horns; "post-nodal" face behind apex of petiolar node till articulation with postpetiole consisting of a steep slope followed by a very short horizontal face; subpetiolar process present as a small dent or angle; postpetiole in lateral view strongly raised dorsally, with anteroventral angle, much shorter than high and much shorter than broad (excluding helcium). First gastral tergite with several standing hairs among very short appressed hairs.

"Dwarf queen type A" (based on a single specimen collected in Yen Tu). Head and mesosoma reddish brown to dark reddish brown; antennae, legs and apical part of gaster paler. Body sculpture as in Figs. 11 - 13. Head as in the normal queen (see Figs. 7 and 8). Mesosoma, though having main sclerites as in Figs. 11 and 13, reduced in volume as compared to that of the normal queen (especially so concerning mesonotum); wings absent. Waist segments and gaster as in the normal queen.

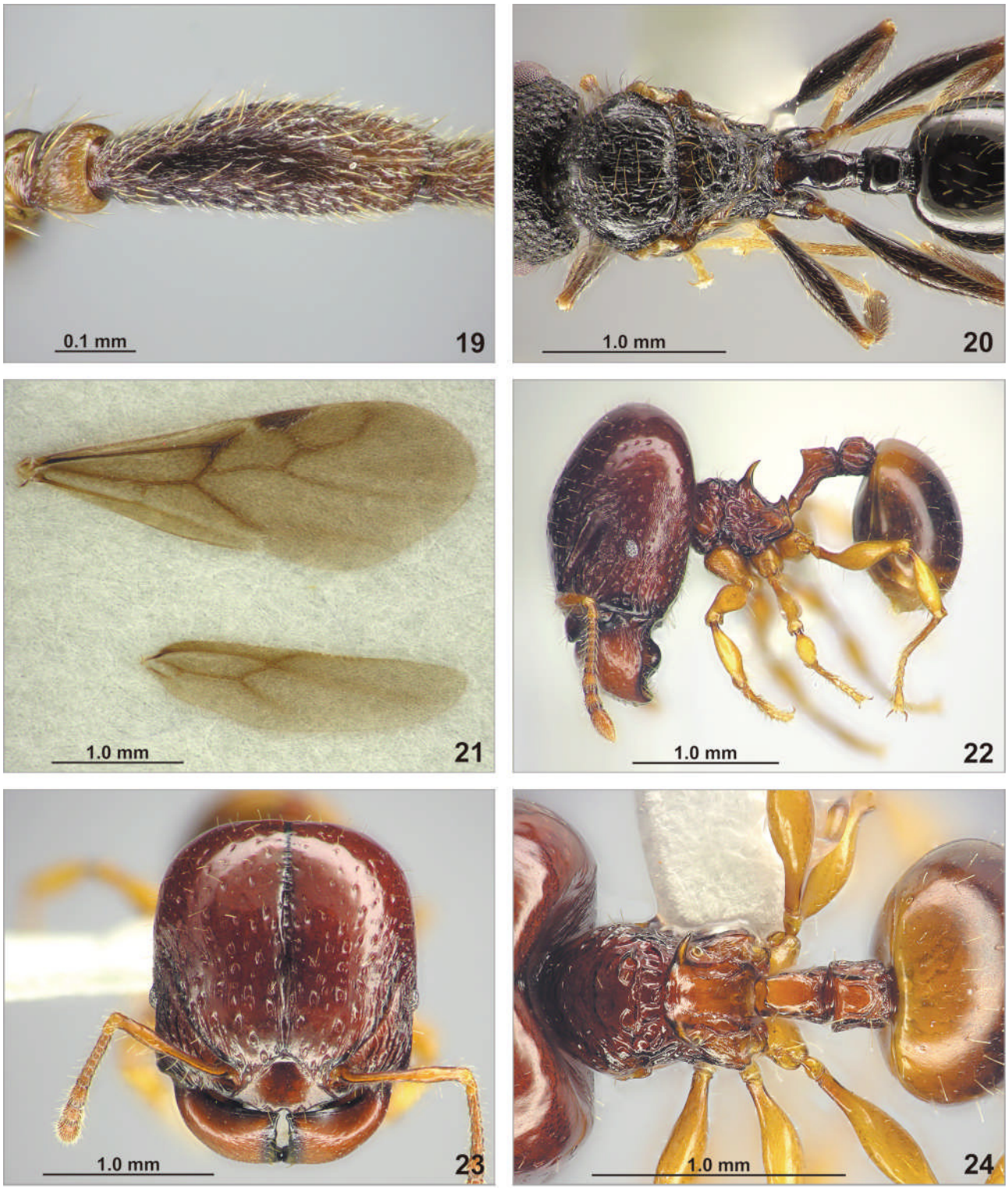
"Dwarf queen type B" (based on specimens from colonies collected in Van Ban). Head and mesosoma reddish brown to dark reddish brown; antennae, legs and apical part of gaster paler. Body sculpture basically as in Figs. 14 - 16. Head basically as in the normal queen, but with the following distinct differences: dorsal and lateral faces of head covered with many standing hairs; sculpture more similar to the minor worker than to the normal queen; median part of clypeus often with a median and/or lateral seta(e); median ocellus often located in front of level of posterior margins of compound eyes. Mesosoma, though having main sclerites as in Figs. 14 and 16, reduced in volume as compared to that of the normal queen (especially so concerning mesonotum); wings absent. Waist segments and gaster basically as in the normal queen, but with denser standing hairs (Figs. 14 and 16).

Male. Body black, but apical part of antennae, legs and gaster dark yellow. Sculpture and pilosity on body as in Figs. 17, 18 and 20. Head in full-face view broadened-



Figs. 13 - 18: *Acanthomyrmex glabfemoralis*. (13) Dwarf queen type A, B&E03-46; (14 - 16) dwarf queen type B, Eg27ix06-24; (17, 18) male, wings removed, Eg03-VN-055. (13, 16) Mesosoma and waist in dorsal view; (14, 17) body in lateral view; (15, 18) head in full-face view.

subpentagonal, in profile strongly raised in anterior part of vertex (or moderately raised in males from Pu Mat), with posterolateral part very weakly produced posteriad (but not produced in males from Pu Mat); anterolateral part of head in which compound eye is located well produced laterally; frontal lobe, frontal carina and antennal scrobe absent; median part of clypeus produced anteriad, with truncated anterior margin, with a conspicuous median and rather thin lateral setae; ocelli present, with diameter less than distance between them; median ocellus in full-face view located a little behind level of posterior margins of compound eyes; antenna 13-segmented without club; antennal scape very short; when laid backward its apex located far anteriorly to median ocellus; antennal segment II very short;



Figs. 19 - 24: (19 - 21) *Acanthomyrmex glabfemoralis*, male, wings removed, Eg03-VN-055; (22 - 24) *Acanthomyrmex humilis* sp.n., holotype (major worker), Eg04-VN-691. (19) Antennal segment III in outer view; (20, 24) mesosoma and waist in dorsal view; (21) right wings; (22) body in lateral view; (23) head in full-face view.

III much longer than broad, longer than IV - XII, and almost as long as XIII (but shorter than XIII in males from Pu Mat), somewhat flattened (Fig. 19); IV - XIII much longer than broad; IV very weakly flattened and weakly bent, or almost cylindrical; masticatory margin of mandible with relatively large apical tooth followed by several distinct teeth. Mesosoma short and high; pronotal spine absent; mesoscutellum in lateral view strongly raised dorsoposteriad, in dorsal view straight or hardly concave posteriorly; metapleural lobe well developed, projecting posterodorsad; posterolateral part of propodeal dorsum in profile forming a triangular process or at least a blunt angle; pro-

podeal spiracle directed backward; venation of wings as in Fig. 21. Petiole in lateral view with long anterior pedicel; petiolar node in lateral view very low and roundly raised, in posterior view straight or hardly concave dorsally (but roundly convex in males from Pu Mat); "post-nodal" face behind apex of petiolar node till articulation with postpetiole long and very gently sloping in lateral view; subpetiolar process absent or vestigial; postpetiole in lateral view very weakly raised dorsad (moderately raised in males from Pu Mat N.P.), without anteroventral angle, almost as long as or a little shorter than high, and a little shorter to a little longer than broad (excluding helcium).

Taxonomic remarks. Most North Vietnamese specimens agree very well with the South Chinese specimens determined as *A. glabfemoralis* by S. Zhou. The specimens from Pu Mat (Nghe An Province), however, show differences as mentioned above. There is some possibility that the Pu Mat population is a sibling species of *A. glabfemoralis*.

In this genus the male was previously described only for *A. ferox* EMERY, 1893 by MOFFETT (1986). By comparing the morphology of the male of *A. glabfemoralis* with his description of *A. ferox* male, we found the following characters which may be useful in taxonomy at the species or species group level.

- Shape of head in full-face view (in *A. ferox* male anterolateral part of head on which compound eye is located poorly produced).
- Shape and relative length of each antennal segment (in *A. ferox* male scape very long, when laid backward extending far beyond the median ocellus; segments II and VIII about as long as broad; segments III - VII each about a third the length of scape; segment III cylindrical; segments IV and VI somewhat compressed, and VI curved).
- Distances between ocelli (in *A. ferox* male ocelli located relatively close to each other).
- Shape of posterior margin of mesoscutellum (in *A. ferox* male the margin laterally with a short and stout horn).
- Direction of propodeal spiracle (in *A. ferox* male the spiracle directed posterolaterad).

Bionomics. This species nests in cavities of rotting twigs, wood fragments and logs, in cracks and cavities of stones, and under stones on the forest floor. Although many small seeds are usually stored in nest chambers (e.g., Eg03-VN-055, -205, -223, -245; Eg04-VN-032; Eg26ix06-15), animal matter is also gathered (see EGUCHI & al. 2004).

Both the normal queen and the dwarf queen probably contribute to the reproduction (we did not confirm this by observing the condition of the ovaries and spermathecae of fresh material), but we have not yet found any colony which had both normal (dealate and/or alate) and dwarf queens. Geographical variation of colony structure was also observed. All of the colonies which we found in West Yen Tu N.P. (excluding colony B&E03-46 with a dwarf queen instead of a normal queen), Chua Yen Tu, Ky Thuong, Cuc Phuong and Pu Mat colonies had a single dealate queen (or queenless probably due to sampling errors), on the other hand those in Van Ban had a single or multiple dwarf queen (or were queenless). Circumstantial evidences suggest a possibility that *A. glabfemoralis* remains in a transitional stage toward the reproduction system in which the colony foundation and growth are exclusively done by ergatoid(s) (as seen in *A. minus* TERAYAMA, ITO & GOBIN, 1998, *A. padanensis* TERAYAMA, ITO & GOBIN, 1998 and *A. sulawesiensis* TERAYAMA, ITO & GOBIN, 1998 (TERAYAMA & al. 1998) and *A. humilis* sp.n. described below). A few cases of geographical variation in colony composition have been known in other ants. For instance, DALECKY & al. (2005) comprehensively studied polygyny in the plant-ant *Petalomyrmex phylax* SNELLING, 1979 and concluded that the latitudinal cline in monogyny/polygyny may have resulted from historical processes such as selection for a more dispersive strategy along a colonization front (i.e., monogyny may have been favored along the front of the southward expansion of *P. phylax*). Although *Gnamptogenys bicolor* (EMERY, 1889) adopts worker reproduction in most of its geographical range, we found colonies with alate queens in North Vietnam, the northern border of its range (K. Eguchi & T.V. Bui, unpubl.). Vietnam provides good material for understanding evolution of ergatoid and worker reproduction and mechanisms maintaining geographical variation in colony composition (fresh colonies of *Acanthomyrmex glabfemoralis* as well as *Gnamptogenys bicolor* are easily obtained in some areas of North Vietnam).

Acanthomyrmex humilis sp.n.

Type material. Holotype (major): Vietnam: Dong Nai: S. Cat Tien N.P. (Crocodile Lake Trail, < 160 m alt.), 17.X. 2004, leg. K. Eguchi, (colony: Eg04-VN-691). Paratypes: 3 majors, 7 minors, 1 ergatoid queen from the same colony to which the holotype belonged (IEBR, MCZC, MHNG, NHMW, ACEG, SKYC).

Non-type material examined. Vietnam: Dong Nai: S. Cat Tien N.P. (Crocodile Lake Trail, < 160 m alt.), 16. - 17. X.2004, leg. K. Eguchi, 4 majors, 9 minors and 1 ergatoid (Eg04-VN-670, -687).

Measurements and indices.

Holotype major. HL 1.73 mm; HW 1.55 mm; SL 0.85 mm; HFL 0.84 mm; CI 90; SI 55; FI 54.

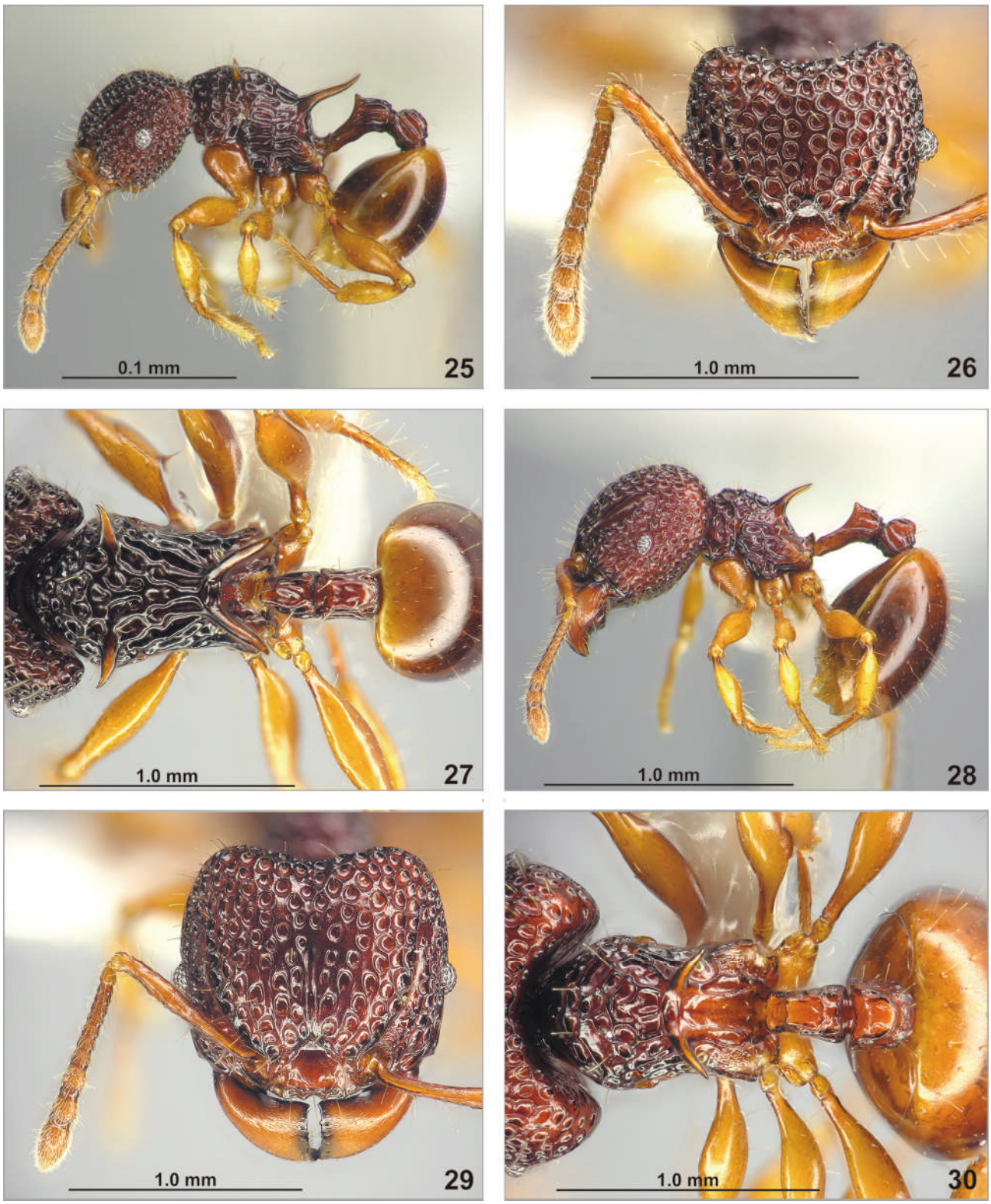
Major (1 paratype and 2 nontypes). HL 1.68 - 1.88 mm; HW 1.50 - 1.69 mm; SL 0.81 - 0.86 mm; HFL 0.82 - 0.88 mm; CI 90 - 91; SI 50 - 54; FI 52 - 55.

Minor (1 paratype and 2 nontypes). HL 0.83 - 0.85 mm; HW 0.88 - 0.91 mm; SL 0.80 - 0.82 mm; HFL 0.80 - 0.83 mm; CI 104 - 107; SI 88 - 92; FI 88 - 94.

Ergatoid (1 paratype and 1 nontype). HL 1.10 - 1.11 mm; HW 1.17 - 1.19 mm; SL 0.83 - 0.84 mm; HFL 0.85 - 0.86 mm; CI 106 - 109; SI 70 - 71; FI 71 - 73.

Description.

Major. Body reddish brown to dark reddish brown; antennae, legs, basal and apical part of gaster light brown to yellowish brown. Body sculpture as in Figs. 22 - 24. Head in full-face view roundly convex posteriorly, at most with inconspicuous posteromedian concavity; dorsal and lateral faces of cranium sparsely with standing hairs; frontal lobe poorly developed, only partly concealing antennal socket; frontal carina conspicuous; antennal scrobe deep and conspicuous, posteriorly bent anteroventrad to form an inconspicuous "funicular scrobe" above compound eye; median part of clypeus produced anteriad, with median emargination on anterior margin; median and lateral setae of anterior clypeal margin short and thin, or absent; antenna 12-segmented with 3-segmented club; antennal scape when laid backward reaching or extending a little beyond



Figs. 25 - 30: *Acanthomyrmex humilis* sp.n., paratypes, Eg04-VN-691. (25 - 27) Minor worker; (28 - 30) ergatoid. (25, 28) Body in lateral view; (26, 29) head in full-face view; (27, 30) mesosoma and waist in dorsal view.

midlength of head, basally with weak leading edge; outer face of mandible shagreened or dimly rugose; masticatory margin of mandible almost edentate (teeth having been worn down to nothing, or inconspicuous apical and preapical teeth often recognizable). Mesosoma in lateral view short and stout; promesonotal suture absent dorsally; pronotal spine absent; metanotal groove present as inconspicuous broad impression just anteriorly to base of propodeal spine; metapleural lobe well developed, angularly projecting posterodorsad; propodeal spine in lateral view downcurved, without standing hairs (but with a few very short decumbent to appressed hairs). Dorsum of each femur with

a few standing hairs. Petiole in lateral view with very long anterior pedicel; petiolar node in lateral view low but with relatively angulate apex, in posterior view narrowly raised with truncate apex which is often emarginate weakly (as in the holotype); "post-nodal" face behind apex of petiolar node till articulation with postpetiole long and gently sloping in lateral view, with low step near articulation (Fig. 22); subpetiolar process vestigial; postpetiole in lateral view weakly raised dorsally, (a little) shorter than high and (a little) shorter than broad (excluding helcium). First gastral tergite sparsely with erect hairs.

Minor. Body dark reddish brown; mandibles, antennae, legs, basal and apical part of gaster light brown to yellowish brown. Body sculpture as in Figs. 25 - 27. Head with standing hairs, in full-face view with its posterior margin broadly concave; frontal lobe poorly developed, only partly concealing antennal socket; frontal carina conspicuous; antennal scrobe shallow but conspicuous, posteriorly not bent anteroventrad; anterior clypeal margin armed with several teeth, with conspicuous median and lateral setae; posteromedian part of clypeus broadly inserted between frontal lobes; eye in full-face view strongly convex, located around or a little behind midlength of head; antenna 12-segmented with 3-segmented club; antennal scape when laid backward reaching or extending a little beyond posterolateral corner of head; masticatory margin of mandible with relatively small apical and preapical teeth followed by small denticles that are relatively broadly separated. Mesosoma in lateral view relatively stout; its dorsum sparsely with standing hairs; promesonotal dome in lateral view convex moderately; promesonotal suture absent dorsally; pronotal spine relatively short; metanotal groove absent; metapleural lobe well developed, angularly projecting posterodorsad; propodeal spine long, in lateral view slender and weakly sinuate, without standing hairs but with a few very short appressed hairs. Dorsum of each femur with scattering standing hairs. Petiole in lateral view with very long anterior pedicel; petiolar node in lateral view low but with relatively angulate apex, in posterior view narrowly raised, with round or truncate apex; "post-nodal" face behind apex of petiolar node till articulation with postpetiole very long and gently sloping in lateral view (Fig. 25); subpetiolar process vestigial to absent; postpetiole in lateral view weakly raised dorsally, almost as long as high, and almost as long as broad (excluding helcium). First gastral tergite sparsely with standing hairs.

Ergatoid. Body reddish brown; mandibles, antennae, legs, basal and apical part of gaster light brown to yellowish brown. Body sculpture as in Figs. 28 - 30. Head with standing hairs, in full-face view weakly concave posteromedially; frontal lobe poorly developed, only partly concealing antennal socket; frontal carina conspicuous; antennal scrobe conspicuous, posteriorly bent anteroventrad to form an inconspicuous "funicular scrobe" above compound eye; anterior clypeal margin armed medially with four projections, with a conspicuous median and lateral setae; compound eyes located a little in front of midlength of head; ocelli absent; antenna 12-segmented with 3-segmented club; antennal scape when laid backward not reaching posterolateral corner of head; masticatory margin of mandible with relatively small apical and preapical teeth followed by small denticles (teeth often having been worn down to nothing). Mesosoma more strongly shortened than that of the minor; its dorsum sparsely with standing hairs; promesonotal suture absent dorsally; pronotal spine much reduced to a dent; metanotal groove present as inconspicuous broad impression just anteriorly to base of propodeal spines; metapleural lobe well developed, angularly projecting posterodorsad; propodeal spine in lateral view very weakly sinuate, without standing hairs but with a few very short decumbent to appressed hairs. Dorsum of each femur with a few standing hairs. Petiole in lateral view with a very long anterior pedicel; petiolar node in lateral view low but with relatively angulate apex, in posterior view narrowly raised, with truncate or very weakly concave apex; "post-nodal" face behind apex of petiolar node till articulation with postpetiole relatively long and gently sloping in lateral view, with low step near articulation (Fig. 28); subpetiolar process vestigial to absent; postpetiole in lateral view relatively highly raised dorsally, much shorter than high and shorter than broad (excluding helcium). First gastral tergite with standing hairs among very short appressed hairs.

Taxonomic remarks. This small-sized species should be included in the *A. notabilis* (F. SMITH, 1860) group defined by MOFFETT (1986). It may be misidentified as *A. careoscrobis* MOFFETT, 1986, *A. concavus* MOFFETT, 1986, *A. foveolatus* MOFFETT, 1986 or *A. mindanao* MOFFETT, 1986 if one carelessly uses MOFFETT's keys, and it is rather similar to *A. minus* and *A. padanensis*. It is, however, characterized among the known *Acanthomyrmex* species by the unique shape of petiole in the major, minor and ergatoid mentioned in the description: anterior pedicel of petiole very long; petiolar node very low, with the apex at most very weakly emarginated medially in posterior view; postnodal face in lateral view long and gently sloping.

Bionomics. This species nests in cavities of rotting twigs and wood fragments. The normal queen has not yet been found.

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Zusammenfassung

Wir teilen die Existenz von zwei Arten der Ameisengattung *Acanthomyrmex* EMERY, 1893 in Vietnam mit. *Acantho-*

myrmex humilis sp.n. wird anhand der Major-Arbeiterin, der Minor-Arbeiterin und der ergatoiden Königin beschrieben. Erstmals beschrieben werden auch die Major-Arbeiterin, die Königin, die "Zwerg-Königin" und das Männchen von *A. glabfemoralis* ZHOU & ZHENG, 1997; die Minor-Arbeiterin dieser Art wird wiederbeschrieben. Zusätzlich machen wir Angaben zur Koloniestruktur von *A. glabfemoralis*.

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