Eight New Species and Three Newly Recorded Species of The Ant Genus *Temnothorax* Mayr (Hymenoptera: Formicidae) From the Chinese Mainland, With a Key

by

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ABSTRACT

Eight new species of the ant genus *Temnothorax* Mayr are described, i.e. *T. angulohumerus* sp. nov., *T. orchidus* sp. nov., *T. maoerensis* sp.nov., *T. striatus* sp. nov., *T. ruginosus* sp.nov., *T. shannxiensis* sp. nov., *T. zhejiangensis* sp. nov. and *T. leyeensis* sp. nov. Three previously described species are newly recorded from China, i.e. *T. koreanus* (Teranishi), *T. pisarskii* Radchenko, and *T. mongolicus* (Pisarski). A key to the known species of *Temnothorax* from the Chinese mainland is provided, based on the worker caste.

Key words: Hymenoptera, Formicidae, *Temnothorax*, new species, Chinese mainland

INTRODUCTION

The ant genus *Temnothorax* was established by Mayr in 1861 based on the type species *Myrmica recedens* Nylander (=*T. recedens* (Nylander)). For many years the genus was regarded by different authors either as a good genus (Bernard 1967; Arnol'di & Dlussky 1978; Dlussky & Fedoseeva 1988; Atanasov & Dlussky 1992) or as a subgenus of *Leptothorax* (Forel, 1892; Ruzsky 1905; Wheeler 1901, 1922; Emery 1915, 1924; Bondroit 1918; Donisthorpe 1943), or even was considered to be a junior synonym of *Leptothorax* (Forel 1890; Baroni Urbani 1971; Brown 1973; Bolton 1994; Terayama & Onoyama 1999). Recently it was revived as a good genus (Bolton 2003, 2007; Radchenko 2004).

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Temnothorax is a large genus, which contains more than 300 species in the whole world (Bolton 2007). 187 species are known in the Palaearctic region, more than 120 species in the New World, and only 15 known species in the Afrotropical and Oriental Region (Radchenko 2004).

Prior to this study 19 species had been recorded from China (Wu & Wang 1995; Wang 1998; Zhou 2001; Chang & He 2001; Xu 2002; Huang *et al.* 2004; Huang & Zhou 2006; Terayama 2009), among which were 12 species distributed over the Chinese mainland. When we studied the material deposited in the Collection of Guangxi Normal University, we discovered eight undescribed species and three species that had not been recorded previously from China. All the undescribed species are different from the species described by Terayama from Taiwan in 2009. Thus there are now 30 species of *Temnothorax* in China, of which 23 species occur on the Chinese mainland. Eleven species are hereby added to Chinese ant fauna. Descriptions of these new species follow and a key to the known species of the genus *Temnothorax* from the Chinese mainland, based on the worker caste, is provided.

MATERIAL AND METHODS

This study is based on the specimens of the genus *Temnothorax*, which are deposited in the Collection of Guangxi Normal University, collected by the authors and their students, from several provinces of the Chinese mainland.

Measurements and indices used in this paper mostly follow Radchenko (2004):

HL (head length). Length of the head in full face view, measured in a straight line from the middle of the anterior clypeal margin to the middle of the occipital margin.

HW (head width). Maximum width of the head in full face view behind the eyes.

CI (cephalic index). HL/HW.

SL (scape length). Maximum straight-line length of the antennal scape in profile.

SI_1 (scape index 1) SL/HL.

SI_2 (scape index 2) SL/HW.

PW (pronotal width). Maximum width of pronotum in dorsal view.

ML (mesosoma length). Length of mesosoma in profile, from the neck shield to the posterior margin of propodeal lobes.

PL (petiole length). Maximum length of the petiole in dorsal view.

PH (petiole height). Maximum high of the petiole in profile.

ESL (propodeal spine length). Straight length of the propodeal spine in profile, from the base to the tip of the spine.

ESLI (propodeal spine index). ESL /HW.

KEY TO THE KNOWN SPECIES OF *TEMNOTHORAX* FROM THE CHINESE MAINLAND BASED ON THE WORKER CASTE

1. Humeri in dorsal view distinctly marked and angulate 2
— Humeri in dorsal view widely rounded 4
2. Antennae 11-segmented; humeri slightly angulate (Hubei) ..... ***T. koreanus* (Teranishi), newly recorded in China**
— Antennae 12-segmented; humeri strongly angulate 3
3. Antennal scape longer (SI_1 >0.86, SI_2 >0.96), pronotum in profile strongly convex, its anterior face steeply inclined forward, color yellowish-brown (Hunan) ..... ***T. angulohumerus* sp. nov.**
— Antennal scape shorter (SI_1 <0.80, SI_2 <0.93), pronotum in profile gently convex, color dark brown (Yunnan) ..... ***T. orchidus* sp. nov.**
4. Propodeum unarmed, forming a blunt angle between dorsum and declivity (Hunan) ..... ***T. hengshanensis* (Huang *et* al.) com. nov.**
— Propodeum with spines, or denticles, or acutely triangular 5
5. Propodeum acutely triangular; occipital border and middle frons of head with indistinct longitudinal rugulosity, appearing smooth; pronotum with central plate smooth (Guangxi) ..... ***T. maoerensis* sp.nov.**
— Propodeum with spines; dorsum of head and pronotum sculptured or punctuate, appearing dull 6
6. Propodeum with short spines or with sharp denticles only, ESLI<0.28 7
— Propodeum with long, sharp spines, ESLI>0.33 14

7. Whole body concolorous reddish-brown to black 8
— Mesosoma yellow to brownish-yellow, contrasting with darker head and gaster, or whole body concolorous ochreous-yellow 9
8. Petiolar node in profile with wide, slightly convex dorsal plate. Frons with longitudinal rugae and coarse punctures, remaining part of dorsum of head punctuate. Antennae and legs of the same color as body (Yunnan, Guangxi) ..... *T. congruus* (F. Smith)
— Petiolar node in profile very narrowly rounded, subtriangular. Dorsum of head only finely and densely punctuate, striation present only near eyes; a central longitudinal band on frons smooth and shining. Antennae and legs yellowish, contrasting with much darker body (Beijing, Hebei, Hunan) . ..... *T. wui* (Wheeler)
9. Whole body concolorous ochreous-yellow 10
— Mesosoma yellow to brownish-yellow, contrasting with darker head and gaster 11
10. Propodeal spines shorter, ESLI<0.20; Petiole lower, PI<1.30, petiolar node with widely rounded dorsum; dorsum of mesosoma with longitudinal striations (Ningxia, Hubei, Henan) ..... ***T. striatus* sp. nov.**
— Propodeal spines longer, ESLI>0.24; Petiole higher, PI>1.45, petiolar node with narrowly rounded dorsum; dorsum of mesosoma with coarse reticulations (Shannxi) ..... ***T. shannxiensis* sp. nov.**
11. First gastral tergite coarsely punctuate, opaque (Ningxia) ..... ***T. opaciabdomin* (Chang *et* He) com. nov.**
— First gastral tergite not punctuate, smooth and shining 12
12. Dorsum of head densely longitudinally striate (Ningxia) ..... ***T. brevispinus* (Chang *et* He) com. nov.**
— Dorsum of head densely punctuate 13
13. Mesosoma and waist ochreous-yellow to brownish-yellow, dorsum of head of the same color as mesosoma, gaster brown with basal one-fourth of first tergite yellow (Liaoning, Heilongjiang, Hebei, Shannxi) ..... ***T. pisarskii* Radchenko, newly recorded in China**
— Mesosoma and waist ochreous-yellow to brownish-yellow, dorsum of head brown, distinctly darker than mesosoma, gaster entirely brown, without pale spot at base of the first tergite (Hebei) ..... ***T. mongolicus* (Pisarski), newly recorded in China**

14. Whole body concolorous ochreous-yellow..... 15
— Body reddish-brown to dark brown or bicolored, with mesosoma distinctly lighter than head and gaster..... 16
15. Size smaller, ML<1.0; dorsum of head and mesosoma densely punctuate (Zhejiang)..... ***T. zhejiangensis* sp. nov.**
— Size larger, ML>1.5; dorsum of head and mesosoma longitudinally rugose or striate (Hunan)..... ***T. ruginosus* sp.nov.**
16. Mesosoma and waist orange, head and gaster reddish-black; occiput with transverse coarse rugosities (Guangxi)..... ***T. leyeensis* sp. nov.**
— Mesosoma and waist yellow to brownish-yellow, dorsum of head and gaster brown to dark brown or whole body concolorous reddish-brown to dark brown; occiput without transverse coarse rugosities..... 17
17. Mesosoma yellow to brownish-yellow, dorsum of head and gaster brown to dark brown..... 18
— Whole body concolorous reddish-brown to dark brown 21
18. Propodeal spines in dorsal view curved inward (Sichuan) .....
..... *T. reduncus* (Wang *et* Wu)
— Propodeal spines directed backward and outward, not curved inward in dorsal view 19
19. Striations on frons coarse; Petiolar node in profile with angular dorsal plate, not massive (Beijing, Hebei, Liaoning, Henan, Shannxi, Ningxia, Fujian, Guangxi)..... *T. argentipes* (Wheeler)
— Striations on frons fine; petiolar node in profile with rounded dorsal plate, massive..... 20
20. Longitudinal striations on frons of head reaching occiput; propodeal spines sharp (Beijing, Shannxi)..... *T. nassonovi* (Ruzsky)
— Longitudinal striations present on frons of head, occiput reticulate; propodeal spines blunt or even truncate (Ningxia) .....
..... ***T. reticulatus* (Chang *et* He) com. nov.**
21. Petiole with long anterior peduncle (PI>1.75), anterior face in profile strongly concave (Hunan, Fujian, Guangdong, Guangxi, Hainan).....
..... *T. taivanensis* (Wheeler)[Note]

Note: The species *T. spinosior* that many Chinese authors have reported in Southern China belongs to *T. taivanensis*. *T. spinosior* is distributed over Central, Northern and North-Western China.

—Petiole with short anterior peduncle (PI<1.6), anterior face in profile very weakly concave 22

22. Propodeal spines shorter (ESLI<0.43). Petiole relatively lower and longer (PI>1.50), Petiolar node massive, with broadly rounded dorsum. Antennal scape somewhat shorter (SI_1<0.75, SI_2<0.90) (Beijing, Hebei, Heilongjiang, Shandong, Henan, Shanxi, Shannxi, Ningxia, Hubei, Hunan..... ..... *T. spinosior* (Forel)

— Propodeal spines longer (ESLI>0.49). Petiole relatively higher and shorter (PI<1.40), Petiolar node less massive, with narrowly rounded dorsum. Antennal scape longer(SI1>0.75, SI2>0.90)(Jiangxi) .... *T. eburneipes* (Wheeler)

DESCRIPTIONS OF NEW SPECIES

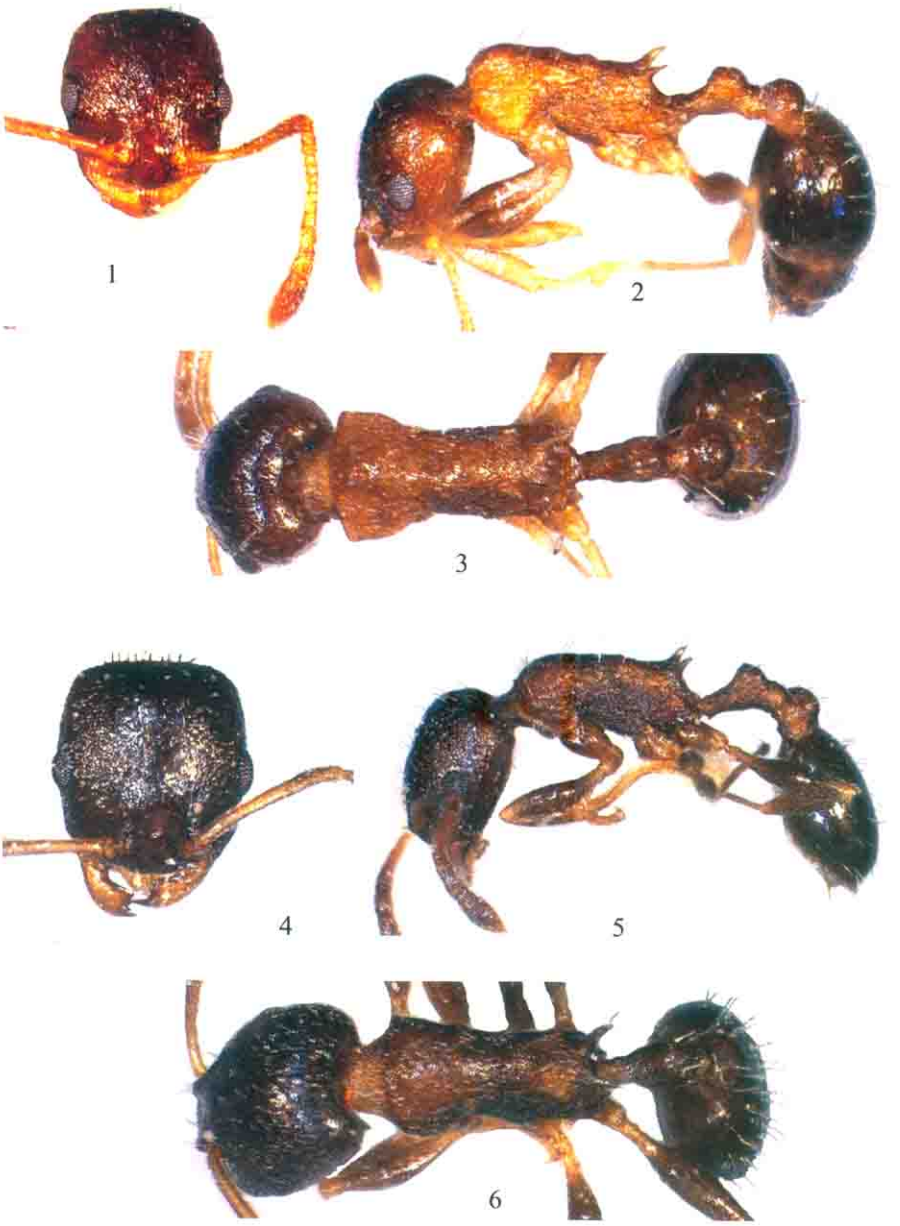
Temnothorax angulohumerus sp. nov.
(Figs. 1-3)

Holotype worker. HL 0.60, HW 0.54, SL 0.52, PW 0.42, ML 0.88, PL 0.20, PH 0.18, ESL 0.12. Head longer than broad (CI=1.10-1.15), with convex sides, almost straight occipital margin. Anterior clypeal margin broadly rounded. Antennae 12-segmented, antennal scape relatively long, slightly surpassing occipital margin (SI_1=0.86-0.94, SI_2=0.96-1.03).

Mesosoma with strongly convex pronotum, in profile its anterior face steep. Metanotal groove shallow and indistinct. Propodeum with short, basally wide, sharp spines (ESLI=0.18-0.22). Humeri in dorsal view distinctly angulate. Petiole slightly longer than high (PI=1.10-1.11), with long anterior peduncle; petiolar node in profile with distinct concave anterior face and broadly rounded dorsum. Postpetiole as high as petiole, subglobular.

Dorsum of head with fine striations, spaces between striations finely reticulate, central part of frons unsculptured, appearing smooth. Anterior margin of pronotum marginate, its central plate smooth, mesonotum irregularly longitudinally striate, dorsum of propodeum transversely rugulose. Sides of pronotum longitudinally rugulose, mesopleura and sides of propodeum longitudinally rugulose and coarsely punctuate, appearing dull. Petiole finely punctuate, postpetiole dorsum and gaster smooth and shining.

Occipital margin and dorsum of mesosoma with fine, short standing hairs. Body and appendages ochreous-yellow, dorsum of head and gaster darker.



Figs 1-6. *Temnothorax angulohumerus* and *Temnothorax orchidus* workers. 1-3: *T. angulohumerus* sp. nov.; 4-6: *T. orchidus* sp. nov. 1, 4: head in full face view; 2, 5: body in profile: 3, 6: alitrunk in dorsal view.

Paratype workers. HL 0.60-0.66, HW 0.54-0.60, SL 0.52-0.62, PW 0.40-0.44, ML 0.88-0.90, PL 0.20-0.22, PH 0.18-0.20, ESL 0.10-0.12 (2 specimens measured).

Holotype worker. China: Qianjiadong Nature Reserve, Jiangyong County, Hunan Province, 19 September, 2004 (*Jianhua Huang*). Paratypes, 2 workers, data as holotype.

Queens and males are unknown.

Ecology. Unknown.

Etymology. The species is named after its angular humeri.

This species is similar to *T. cuneinodis* Radchenko but differs from the latter by head with convex sides and almost straight occipital margin, longer antennal scape which slightly surpasses occipital margin, petiole with long anterior peduncle.

Temnothorax orchidus sp. nov.

(Figs. 4-6)

Holotype worker. HL 0.68, HW 0.60, SL 0.54, PW 0.40, ML 0.94, PL 0.20, PH 0.20, ESL 0.12. Head longer than broad (CI 1.13), with slightly convex sides and almost straight occipital margin. Anterior clypeal margin broadly rounded. Antennae 12-segmented, antennal scape relatively long, almost reaching occipital margin (SI_1=0.78-0.80, SI_2=0.88-0.93).

Mesosoma in profile with gently convex pronotum, flat mesonotum and posteriorly inclined propodeum. Metanotal groove indistinct. Propodeum with short, basally widened, sharp spines (ESLI=0.17-0.20). Humeri in dorsal view distinctly angulate. Petiole as long as high (PI=1.00), with long anterior peduncle; petiolar node in profile with distinct concave anterior face and broadly rounded dorsum. Postpetiole as high as petiole, subglobular.

Dorsum of head with fine striations, which are very feeble in the central area of the frons. Area between frons and eyes finely reticulate. Anterior margin of pronotum marginate, pronotum with concentrated fine striations, mesonotum and propodeum with short, transverse striations. Sides of pronotum with longitudinal rugosities, mesopleura and propodeum coarsely punctuate. Whole mesosoma appears dull. Petiole finely punctuate, postpetiole and gaster smooth and shining.

Occipital margin and dorsum of mesosoma with sparse, moderately long, slightly curved standing hairs. Antennae, mesosoma, petiole, postpetiole and legs brownish-yellow, head and gaster dark brown.

Paratype workers. HL 0.66-0.70, HW 0.58-0.62, SL 0.53-0.55, PW 0.38-0.42, ML 0.90-0.94, PL 0.19-0.20, PH 0.19-0.20, ESL 0.10-0.12 (4 specimens measured).

Holotype worker, China: Tengchong County, Yunnan Province, 1655m, N 24°53′, E 98°43′, 21 March, 2008 (*Zhongjian Liu*). Paratypes, 4 workers, data as holotype.

Queens and males are unknown.

Ecology. Nested in the trunk or branch of *Schima wallichii*, feed on nectar of the orchid.

Etymology. The species is named after its host plant, an orchid.

This species is very similar to *T. angulohumerus* sp. nov., but differs from the latter by antennal scape shorter, pronotum not strongly convex, whole mesosoma with coarse sculpture, and with different color.

***Temnothorax maoerensis* sp.nov.**

(Figs. 7-9)

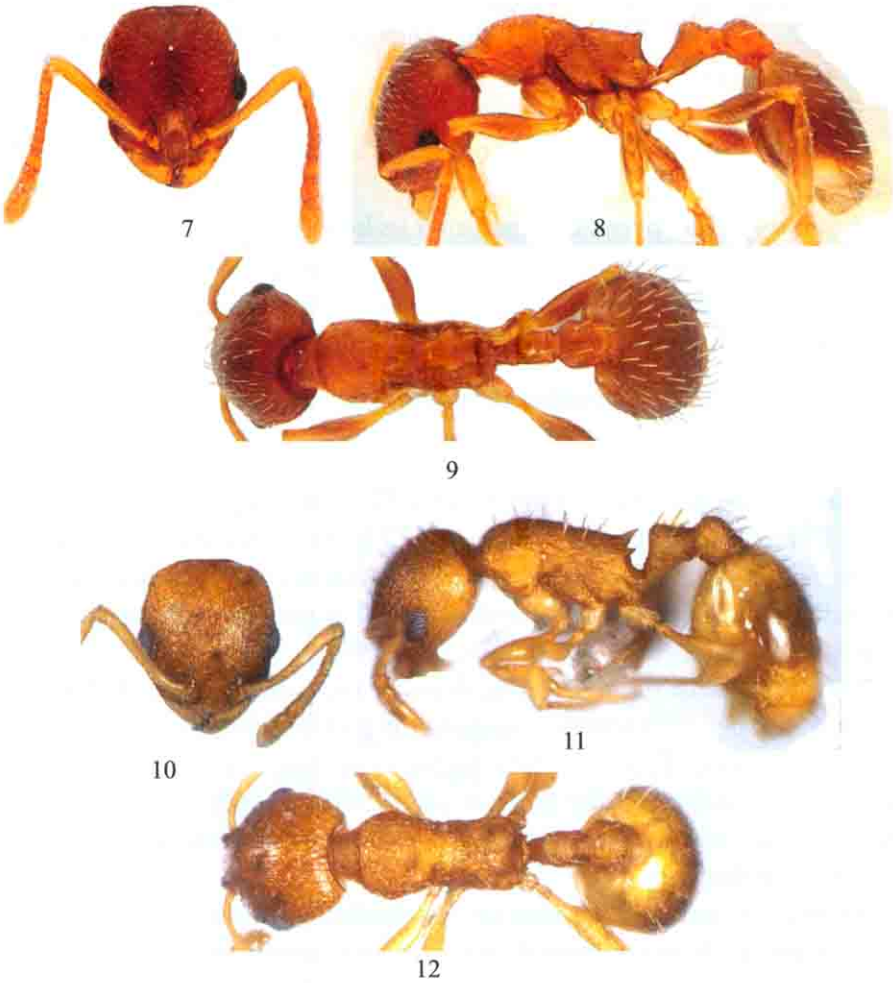
Holotype worker. HL 0.76, HW 0.64, SL 0.58, PW 0.36, ML 1.00, PL 0.16, PH 0.22. Head longer than broad (CI 1.18), with convex sides, occipital margin, and rounded occipital corners. Anterior clypeal margin slightly rounded. Antennae 12-segmented, antennal scape relatively long, almost reaching occipital corner (SI_1= 0.76, SI_2= 0.90).

Mesosoma with slightly convex dorsum, metanotal groove shallow but distinct. Propodeum acutely triangular in profile. Humeri in dorsal view broadly rounded. Petiole slightly higher than long (PI= 0.72), with long anterior peduncle; petiolar node in profile with slightly concave anterior face and narrowly rounded dorsum. Postpetiole as high as petiole or slightly lower, subglobular.

Dorsum of head with indistinct fine longitudinal striations, and fine reticulations in the area between frontal carinae and eyes, appearing smooth. Central plate of pronotum smooth, anterior margin and sides with concentrated striations; dorsum of mesonotum and propodeum with discontinuous, curved longitudinal rugosities. Sides of pronotum with indistinct, fine longitudinal

striations, appearing smooth; mesopleura and sides of propodeum with coarse longitudinal rugosities and punctures, appearing dull. Dorsum of petiole sparsely punctuate, sides of petiole and postpetiole punctuate. Dorsum of postpetiole and gaster smooth.

Occipital margin and dorsum of mesosoma with moderately long, slightly curved standing hairs. Body and appendages concolorous ochreous-yellow.



Figs 7-12. *Temnothorax maoerensis* and *Temnothorax striatus* workers. 7-9: *T. maoerensis* sp.nov.; 10-12: *T. striatus* sp. nov. 7, 10: head in full face view; 8, 11: body in profile: 9, 12: alitrunk in dorsal view.

Paratype workers. HL 0.76-0.78, HW 0.64-0.66, SL 0.58-0.62, PW 0.36-0.40, ML 1.00-1.20. PL 0.16-0.20, PH 0.22-0.25 (5 specimens measured).

Holotype worker. China: Maoer Mt. Nature Reserve, Guangxi Autonomous Region, 1100m, 31 January, 2007 (*Jianhua Huang*). Paratypes 5 workers, data as holotype.

Queens and males are unknown.

Ecology. Unknown.

Etymology. The species is named after its type-locality, Maoer Mt.

This new species is similar to *T. singularis* (Radchenko) but with different pilosity and shorter antennal scapes. Moreover, the new species is located in S. China and is certainly not *singularis* (Radchenko, personal communication).

***Temnothorax striatus* sp. nov.**

(Figs. 10-12)

Holotype worker. HL 0.60, HW 0.52, SL 0.48, PW 0.36, ML 0.76, PL 0.28, PH 0.22, ESL 0.110. Head subrectangular (CI=1.15-1.18), with subparallel sides, weakly convex occipital margin and narrowly rounded occipital corners. Anterior clypeal margin broadly rounded. Antennae 12-segmented, antennal scape relatively long, reaching occipital margin (SI_1=0.75-0.80, SI_2=0.89-0.92).

Mesosoma with slightly convex dorsum, metanotal groove indistinct. Propodeum in profile with short, basally widened, sharp spines (ESLI=0.17-0.20). Humeri in dorsal view broadly rounded. Petiole longer than high (PI=1.27-1.30), with short anterior peduncle; petiolar node in profile subtriangular, with slightly concave or almost straight anterior face and narrowly rounded dorsum. Postpetiole as high as petiole, subglobular.

Dorsum of head with fine longitudinal striations and sparse fine punctures, sides finely reticulate. Dorsum of mesosoma with sinuous longitudinal striations; mesopleura, sides of propodeum and waist densely punctuate.

Occipital margin and dorsum of mesosoma with moderately long, slightly curved standing hairs. Whole body concolorous ochreous-yellow.

Paratype workers. HL 0.58-0.64, HW 0.50-0.54, SL 0.46-0.48, PW 0.34-0.40, ML 0.72-0.80, PL 0.26-0.28, PH 0.20-0.22, ESL 0.10-0.11 (5 specimens measured).

Holotype worker, China: Guamagou Forest Management Area, Liupanshan Nature Reserve, Ningxia Autonomous Region, 1 July, 2008 (*Chang Lin*). Paratype 1 worker, data as holotype; 1 worker, Longtan Forest Management Area, Liupanshan Nature Reserve, Ningxia Autonomous Region, 28 Jun, 2008 (*Chang Lin*), 2 workers, at the same location, 25 July, 2009 (*Shanyi Zhou*); 1 worker, Jiugongshan Nature Reserve, Hubei Province, 10 August, 2005 (*Zhefeng Jiang*); 2 workers, Baiyunshan Nature Reserve, Henan Province, 20 July, 2002 (*Jianhua Huang*).

Queens and males are unknown.

Ecology. 2 workers collected in Longtan Forest Management Area, Liupanshan Nature Reserve, Ningxia Autonomous Region were in rotten wood.

Etymology. The species is named after its character of striations on the head and mesosoma.

This new species resembles *T. pisarskii* Radchenko but differs from the latter by head and mesosoma with distinct striations, petiole longer than high, whole body concolorous ochreous-yellow.

***Temnothorax ruginosus* sp.nov.**

(Figs. 13-15)

Holotype worker. HL 0.66, HW 0.56, SL 0.53, PW 0.42, ML 1.84, PL 0.30, PH 0.22, ESL 0.20. Head longer than broad (CI=1.18-1.23), with convex sides, slightly convex occipital margin and rounded occipital corners. Anterior clypeal margin broadly rounded. Antennae 12-segmented, antennal scape relatively long, almost reaching occipital margin (SI_1=0.78-0.80, SI_2=0.94-0.98).

Mesosoma with slightly convex dorsum, without metanotal groove. Propodeum with very long, slightly down-curved, sharp spines that are not widened basally (ESLI=0.32-0.35). Humeri in dorsal view broadly rounded. Petiole distinctly longer than high (PI=1.36-1.56), with distinct anterior peduncle; petiolar node in profile with almost straight or slightly concave anterior face and narrowly rounded dorsum. Postpetiole as high as petiole, subglobular.

Dorsum of head with coarse longitudinal rugosities, sides with coarse reticulations. Mesosoma with coarse sinuous longitudinal rugulosities, sides of pronotum, petiole and postpetiole densely punctuate.

Occipital margin and dorsum of mesosoma with long, thin, slightly curved standing hairs, which are longer than the maximum eye diameter. Whole body concolorous ochreous-yellow.

Figs. 13-18. *Temnothorax ruginosus* and *Temnothorax shannxiensis* workers. 13-15: *T. ruginosus* sp.nov.; 16-18: *T. shannxiensis* sp. nov. 13, 16: head in full face view; 14, 17: body in profile: 15, 18: alitrunk in dorsal view.

Paratype workers. HL 0.64-0.66, HW 0.52-0.56, SL 0.50-0.53, PW 0.38-0.42, ML 1.80-1.82, PL 0.26-0.30, PH 0.18-0.22, ESL 0.17-0.20 (5 specimens measured).

Holotype worker, China: Jiangyong County, Hunan Province, 18 September, 2004 (*Jianhua Huang*). Paratypes 12 workers, data as holotype. 5 workers, Changde City, Hunan Province, 1 October, 2003 (*Jianhua Huang*). 3 workers, Mayanghe Nature Reserve, Guizhou Province, 1 October, 2007 (*Fang Qian*).

Queens and males are unknown.

Ecology. Unknown.

Etymology. The species is named after the characteristic form of the sculpture on dorsum of head.

This new species resembles *T. basara* (Terayama *et* Onoyama) but differs from the latter by petiolar node shape and sculpture on dorsum of head. It differs from *T. zhejiangensis* sp. nov. by dorsum of head and mesosoma with distinct longitudinal rugosities, the spaces between rugosities smooth.

***Temnothorax shannxiensis* sp. nov.**

(Figs. 16-18)

Holotype worker. HL 0.66, HW 0.58, SL 0.52, PW 0.40, ML 1.90, PL 0.32, PH 0.22, ESL 0.14. Head longer than broad (CI=1.13-1.18), with weakly convex sides, almost straight occipital margin and rounded occipital corners. Anterior clypeal border slightly rounded. Antennae 12-segmented, antennal scape relatively long, almost reaching occipital corner (SI_1 =0.75-0.78, SI_2 =0.89-0.90).

Mesosoma with slightly convex dorsum, metanotal groove shallow but distinct. Propodeum in profile with short, basally wide, sharp spines (ESLI=0.24). Humeri in dorsal view broadly rounded. Petiole longer than high (PI=1.45-1.50), with short anterior peduncle; petiolar node in profile with straight anterior face and widely rounded dorsum. Postpetiole as high as petiole, subglobular.

Dorsum of head with dense, but not coarse, sinuous longitudinal striations on frons, sides and occiput densely reticulate. Sides of pronotum with longitudinal striations and punctures. Mesosoma dorsum coarsely reticulate. Petiole punctuate, postpetiole finely punctuate. Gaster smooth and shining.

Occipital margin and dorsum of mesosoma with long, thin, slightly curved standing hairs. Whole body concolorous ochreous-yellow, antennae, legs and gaster paler.

Paratype worker. HL 0.64, HW 0.54, SL 0.48, PW 0.38, ML 1.84, PL 0.30, PH 0.20, ESL 0.13.

Holotype worker. China: Qinling Nature Reserve, Shannxi Province, 20 July, 2005 (*Chao Wang*). Paratype 1 worker, data as holotype.

Queens and males are unknown.

Ecology. Unknown.

Etymology. The species is named after its type-locality, Shannxi.

This new species resembles *T. striatus* sp. nov. but differs from the latter by propodeal spines longer, petiole higher, petiolar node with narrowly rounded dorsum; mesosoma dorsum with coarse reticulations.

Temnothorax zhejiangensis sp. nov.

(Figs. 19-21)

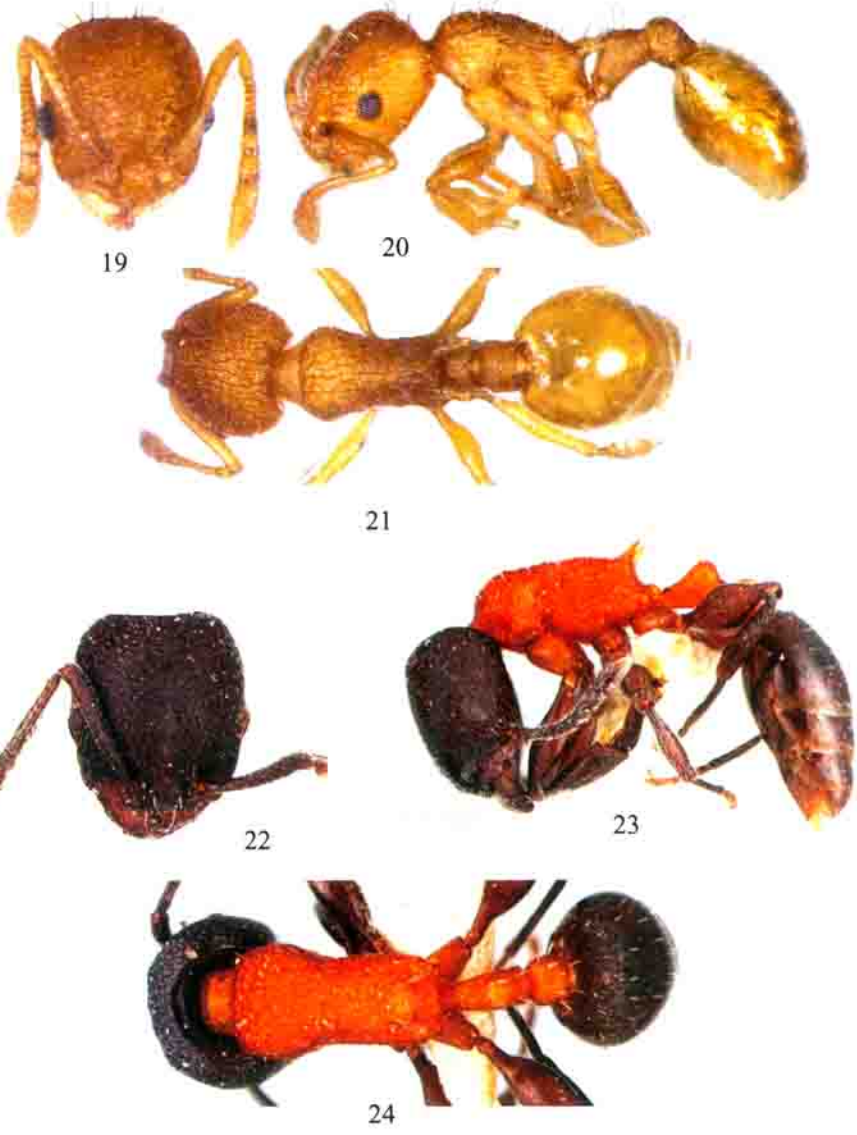
Holotype worker. HL 0.58, HW 0.50, SL 0.44, PW 0.34, ML 0.66, PL 0.24, PH 0.17, ESL 0.15. Head longer than broad (CI= 1.16-1.19), with weakly convex sides and occipital margin, rounded occipital corners. Anterior clypeal margin slightly rounded. Antennae 12-segmented, antennal scape relatively long, almost reaching occipital corner (SI_1 = 0.75-0.78, SI_2 = 0.88-0.93).

Mesosoma with slightly convex dorsum, metanotal groove indistinct. Propodeum in profile with very long, slightly down-curved, sharp spines that are not widened basally (ESLI=0.28-0.30). Humeri in dorsal view broadly rounded. Petiole longer than high (PI=1.33-1.41), with a very short anterior peduncle; petiolar node in profile subtriangular, with weakly concave anterior face and narrowly rounded dorsum. Postpetiole as high as petiole, subglobular.

Dorsum of head densely punctuate, appearing dull, fine striations indistinct, present on frons. Mesosoma, petiole and postpetiole densely punctuate, appearing dull. Dorsolateral parts of mesosoma with fine longitudinal striations.

Dorsum of head with short standing hairs, dorsum of mesosoma with longer standing hairs. Whole body concolorous brownish-yellow.

Paratype worker. HL 0.50, HW 0.42, SL 0.39, PW 0.30, ML 0.56, PL 0.20, PH 0.15, ESL 0.12.



Figs 19-24. *Temnothorax zhejiangensis* and *Temnothorax leyeensis* workers. 19-21: *T. zhejiangensis* sp. nov.; 22-24: *T. leyeensis* sp. nov. 19, 22: head in full face view; 20, 23: body in profile; 21, 24: alitrunk in dorsal view.

Holotype worker. Wuyanling Nature Reserve, Zhejiang Province, 5 August, 2007. Zhao Tan leg. Paratype 1 worker, data as holotype.

Queens and males are unknown.

Ecology. Unknown.

Etymology. The species is named after its type-locality, Zhejiang.

This new species resembles *T. pisarskii* Radchenko in head and mesosoma densely punctuate, but differs from the later by propodeum with very long spines, whole body concolorous brownish-yellow.

***Temnothorax leyeensis* sp. nov.**

(Figs. 22-24)

Holotype worker. HL 1.00, HW 0.92, SL 0.72, PW 0.60, ML 1.72, PL 0.42, PH 0.30, ESL 0.22. Head longer than broad (CI 1.11), with slightly convex sides and slightly concave occipital margin, rounded occipital corners. Anterior clypeal margin broadly concave. Antennae 12-segmented, antennal scape fails to reach occipital margin by about one fifth of its length (SI_1 = 0.72, SI_2 = 0.78).

Mesosoma with convex dorsum, without metanotal groove. Propodeum with long, sharp spines that are weakly widened basally (ESLI = 0.24). Humeri in dorsal view broadly rounded. Femora of hind legs strongly swollen. Petiole distinctly longer than high (PI = 1.40), with a distinct anterior peduncle; petiolar node in profile with weakly concave anterior face, weakly convex and slightly rounded dorsal plate. Postpetiole lower than petiole, subglobular.

Dorsum of head very densely punctuate and finely longitudinally striate, occiput with transverse striations, whole head appears dull. Dorsum of pronotum coarsely reticulate, sides sinuously longitudinally striate; dorsum of metanotum and propodeum densely punctuate. Mesopleura and sides of propodeum with irregular longitudinal rugosities and punctures. Petiole and postpetiole finely and densely punctuate. Base of first gastral tergite very finely striate and punctuate, remainder of the gaster smooth and shining.

Occipital margin and dorsum of mesosoma with sparse, short, blunted standing hairs. Head, antennae and gaster reddish-black, legs brownish-red, mesosoma and waist orange.

Holotype worker, China: Yachang Forest Management Area, Leye County, Guangxi Autonomous Region, 28 July, 2004 (*Shanyi Zhou*).

Queens and males are unknown.

Ecology. Unknown.

Etymology. The species is named after its type-locality, Leye.

This new species differs from all known Oriental and Palaearctic species by its large size, transverse striae on occiput, anterior clypeal margin broadly concave, femora of hind legs strongly swollen and body color.

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