

**Five New Species of the *Leptonyx* Group of Genus *Exallonyx*
(Hymenoptera: Proctotrupidae) From China**

ZAIFU XU,¹ JUNHUA HE,^{2,3} AND JINGXIAN LIU²

ABSTRACT: Five new species of the *leptonyx* group of genus *Exallonyx* from China are described: *Exallonyx concavus* Xu, He et Liu, n. sp., from Shaanxi, Huoditang; *E. planus* Xu, He et Liu, n. sp., from Guizhou, Fanjingshan; *E. areolatus* Xu, He et Liu, n. sp., from Zhejiang, Tianmushan; *E. longimalus* Xu, He et Liu, n. sp., from Guizhou, Fanjinshan; *E. wuae* Xu, He et Liu, n. sp., from Zhejiang, Qingyuan.

KEY WORDS: Hymenoptera, Proctotrupidae, *Exallonyx*, new species, China

The genus *Exallonyx* Kieffer, 1904 is poorly known from China, though the world species were revised (Townes and Townes, 1981). Eleven species group and 187 species of the subgenus *Exallonyx* Kieffer, 1904 were described in the world, but only five species group and 25 species of which were found in China (Townes and Townes, 1981; Fan and He, 2003; He and Fan, 2004).

Recently, we checked some collections of Chinese unidentified proctotrupids, five species of which were identified as new species of *leptonyx* group and are described below. This is the first record of *leptonyx* group from China. Before this, twenty species of *leptonyx* group were described, all of them are Neotropic.

Material and Methods

The descriptions follow the terminology used by Townes and Townes (1981) and He and Fan (2004). The measurements reported are relative except the length of front wing.

The material studied in this paper is deposited in the Hymenopteran Collection, Department of Plant Protection, Zhejiang University, Hangzhou, Zhejiang Province, P. R. China (ZU).

Results

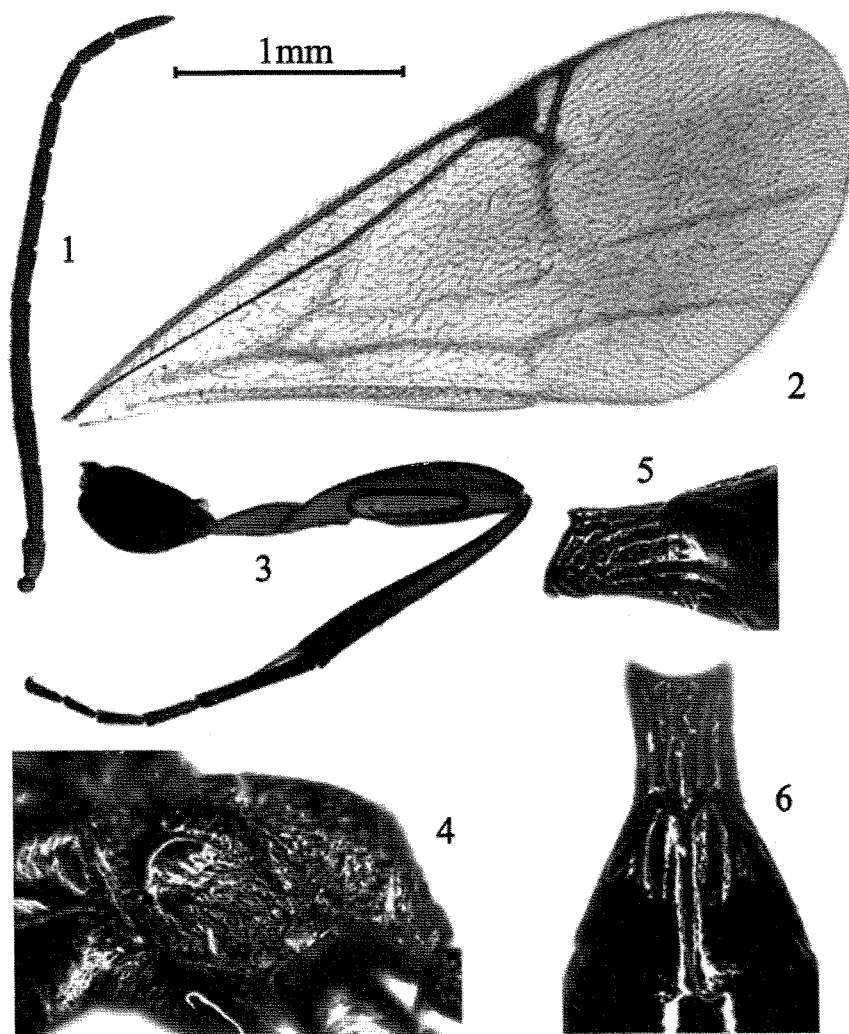
***Exallonyx concavus* Xu, He and Liu, new species
(Figs. 1–6)**

DIAGNOSIS: Similar to *E. calvescens* Townes, 1981, but differs by having two rows of hairs on upper margin of pronotum; abdominal stalk with punctate-reticulate rugae on basal 0.3 in lateral view, and six sloping ridges on apical 0.7; base of syntergite with median groove extending 1.0× space between thyridia; first thyridium 5.0× as wide as long and separated from each other by 0.1× the width of thyridium.

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Figs. 1-6. *Exallonyx concavus* n. sp: 1, Antenna; 2, front wing; 3, hind leg; 4, posterior part of thorax in lateral view; 5, abdominal stalk in lateral view; 6, abdominal stalk in dorsal view. Scale: Figs. 1-3: 1.0 \times ; Figs. 4-6: 2.0 \times .

DESCRIPTION: MALE. Front wing 3.8 mm long. Body black. Antenna blackish brown except scape, pedicel and first flagellar segment dark reddish. Labrum blackish brown. Apical half of mandible reddish brown. Palpi pale. Tegula pale fulvous. Legs reddish brown except coxae, segment 5 of front and middle tarsi, hind tibiae and tarsi black to blackish brown. Wings hyaline, tinged with fuscous. Stigma and strong veins reddish brown, weak veins light yellow. Temple 0.75 \times as long as eye in dorsal view. Cheek 0.33 \times as long as long diameter of eye. Clypeus 2.5 \times as wide as long, slightly evenly convex, with its apical margin weakly concave. Second flagellar segment 3.1 \times as long as wide. Tenth flagellar segment 3.7 \times as long as wide. Last segment 1.55 \times as long as penultimate segment. Tyloids absent. Area between antennal sockets with a strong and high carina. Occipital carina normal, high.

Pronotum with 4–5 transverse wrinkles on collar. Epomia strong. Side of pronotum without hairs behind epomia and with hairs behind carina on collar. Upper margin of pronotum with two rows of hairs, with more hairs on anterior and posterior ends of hair band. Lower corner of pronotum with two pits. Front edge of mesopleuron with a patch of hairs on upper corner and another one above the horizontal groove, bare area between these two patches $1.3\times$ as long as tegula. Speculum with sparse hairs on upper 0.5 . Lower half of mesopleuron smooth, with sparse hairs, except median area hairless and posterior margin with short parallel wrinkles. Smooth area of metapeuron flat, with some punctures and sparse hairs, $0.6\times$ as long as metapeuron and $0.86\times$ as deep as metapeuron. The rest of metapeuron with areolate-reticulate wrinkles. Upper margin of propodeum arcuate in lateral view. Upper face of propodeum smooth, with reticulate wrinkles at posterolateral margins. Median ridge of propodeum incomplete and reaching to anterior part of hind face. Hind face of propodeum with coarse transverse reticulate wrinkles. Lateral side of propodeum with areolate-reticulate wrinkles. Hind femur $3.9\times$ as long as deep. Longer spur of hind tibia $0.45\times$ as long as hind basitarsus. Stigma $1.4\times$ as long as deep, receiving radius at a point weakly distad of its middle. Costal side of radial cell $0.67\times$ as long as depth of stigma; posterodistal margin of stigma straight. First radial vein oblique, $1.5\times$ as long as wide. Second radial vein straight, meeting the first radial vein with vestigial intercubitus. Posterior margin of hind wing with a deep notch at its basal 0.35 . Abdominal stalk $1.3\times$ as long as wide in dorsal view, with five strong parallel longitudinal carinae. Abdominal stalk as long as deep in lateral view, with one sloping transverse ridge at base, punctate-reticulate rugae on basal 0.3 and six strong sloping longitudinal ridges on apical 0.7 . Base of syntergite with a median groove extending $1.0\times$ space between thyridia, on each side with two lateral grooves, $0.6\times$ as long as median groove. First thyridium $5.0\times$ as wide as long, separated from each other by $0.1\times$ the width of one thyridium. Hairs on syntergite moderately dense and long, the sockets of the lowest hairs separated from the lower margin of syntergite by $1.5\times$ length of seta. Claspers claw-like, decurve, apex sharp.

Female. Unknown.

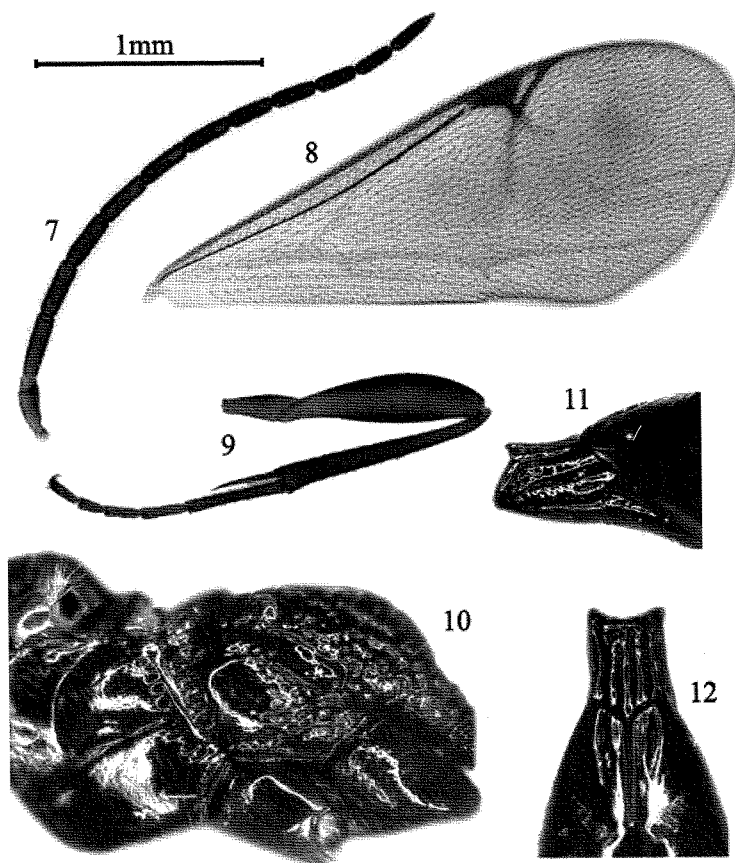
ETYMOLOGY: The specific name is derived from the Latin adjective *concavus*. It means that the clypeus of this species is concave.

MATERIAL EXAMINED: HOLOTYPE: Male, **P. R. CHINA:** Shaanxi Province: Huoditang (33.26°N , 108.26°E), 5 June 1998, by Yun MA, No. 982156 (ZU).

***Exalonyx planus* Xu, He and Liu, new species**
(Figs. 7–12)

DIAGNOSIS: Resembles *E. amplipennis* Townes, 1981, both species with moderately dense and long hairs on syntergite and the hair sockets closest to lower margin of syntergite separated from lower margin by $1.3\times$ length of seta, and flagellar segments without tyloids; but can be distinguished by having second and tenth flagellar segments $3.3\times$ and $3.2\times$ as long as wide, respectively; epomia very strong; hind femur $4.1\times$ as long as deep.

DESCRIPTION: **Male.** Front wing 3.0 mm long. Body black. Antenna dark reddish brown. Labrum and apical half of mandible reddish brown. Palpi and tegula light fulvous. Legs dark reddish brown except middle and hind coxae black. Wings hyaline, tinged with fuscous. Stigma and strong veins brown, weak veins pale yellow. Temple $0.72\times$ as long as eye in dorsal view. Cheek $0.29\times$ as long as long diameter of eye.



Figs. 7-12. *Exallonyx planus* n. sp.: 7, Antenna; 8, front wing; 9, hind leg; 10, posterior part of thorax in lateral view; 11, abdominal stalk in lateral view; 12, abdominal stalk in dorsal view. Scale: Figs. 7-9: 1.0 \times ; Figs. 10-12: 2.0 \times .

Clypeus 3.0 \times as wide as long, weakly evenly convex, apex truncate. Second flagellar segment 3.3 \times as long as wide. Tenth flagellar segment 3.2 \times as long as wide. Last segment 1.56 \times as long as penultimate segment. Tyloids absent. Area between antennal sockets with a strong and high carina. Occipital carina normal, high. Pronotum with 4-5 transverse wrinkles on collar. Epomia strong. Side of pronotum without hairs behind epomia and carina on collar. Upper margin of pronotum with a single row of hairs. Lower corner of pronotum with two pits. Front edge of mesopleuron with a patch of hairs on upper corner and a small patch above the horizontal groove, bare area between these two patches 1.25 \times as long as tegula. Speculum with sparse hairs on upper 0.5. Lower half of mesopleuron smooth, with sparse hairs, except median area hairless and posterior margin with short parallel wrinkles. Smooth area of metapleuron with sparse hairs, 0.4 \times as long as metapleuron and 0.6 \times as deep as metapleuron. The rest of metapleuron with reticulate wrinkles. Upper margin of propodeum arcuate in lateral view. Upper face of propodeum smooth. Median ridge of propodeum approximately complete and reaching nearly to lower margin of hind face. Hind face and lateral side of propodeum with reticulate wrinkles. Hind femur 4.1 \times as long as deep. Longer spur of

hind tibia $0.7\times$ as long as hind basitarsus. Stigma $1.8\times$ as long as deep, receiving radius at nearly its middle. Costal side of radial cell each $0.69\times$ as long as depth of stigma; posterodistal side of stigma straight. First radial vein approximately straight, $1.2\times$ as long as wide. Second radial vein straight. Posterior margin of hind wing with a deep notch at basal 0.35. Abdominal stalk $1.1\times$ as long as wide in dorsal view, with five strong parallel longitudinal carinae. Abdominal stalk $0.9\times$ as long as deep in lateral view, with one sloping transverse ridge at base, behind which with four sloping longitudinal ridges, strong and broad. Base of syntergite with a median groove extending $0.91\times$ space between thyridia, on each side with two lateral grooves, sublateral groove $0.5\times$ as long as median groove. First thyridium $3.5\times$ as wide as long, separated from each other by $0.6\times$ the width of one thyridium. Hairs on syntergite moderately dense and long, the sockets of the lowest hairs separated from the lower margin of syntergite by $1.3\times$ length of seta. Claspers claw-like, decurve, apex sharp.

Female. Unknown.

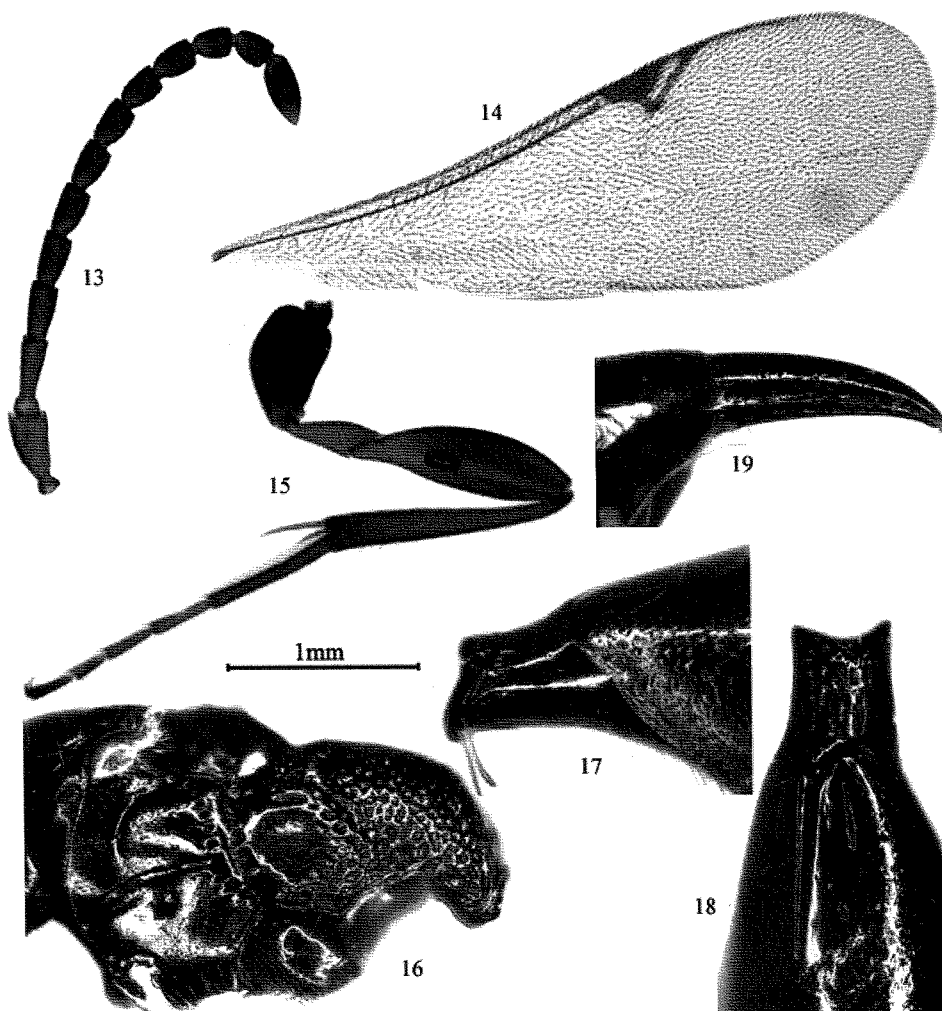
ETYMOLOGY: The specific name derived from the Latin adjective *planus*. It means that side of abdominal stalk of this species with platy longitudinal ridges.

MATERIAL EXAMINED: HOLOTYPE: Male, **P. R. CHINA**, Guizhou Province, Fanjingshan Mountain (27.55°N , 108.41°E), 11 July 1993, by Xuexin CHEN, No. 937772 (ZU).

***Exallonyx areolatus* Xu, He and Liu, new species**
(Figs. 13–19)

DIAGNOSIS: Resembles *E. truncatus* Townes, 1981 and *E. liratus* Townes, 1981, all of them with sides of abdominal stalk smooth; but differs by having metapleuron with large smooth area at anterior margin; upper face of propodeum smooth without transverse carina between hind face and dorsal face; abdominal stalk without longitudinal ridges on its upper face; base of syntergite with median groove extending $0.95\times$ space between thyridia.

DESCRIPTION: **Female.** Front wing 2.8 mm long. Body black. Antenna reddish brown. Labrum and apical half of mandible reddish brown. Palpi yellow. Tegula pale fulvous. Legs fulvous except middle and hind coxae black, front coxae dark fulvous. Wings hyaline, tinged with fuscous. Stigma and strong veins brown, weak veins colorless. Temple as long as eye in dorsal view. Cheek $0.35\times$ as long as long diameter of eye. Clypeus $2.3\times$ as wide as long, weakly evenly convex, apex truncate. Second flagellar segment $1.9\times$ as long as wide. Tenth flagellar segment $1.57\times$ as long as wide. Last segment $1.5\times$ as long as penultimate segment. Tyloids absent. Area between antennal sockets with a strong and high carina. Occipital carina normal, high, weakly reflexed. Pronotum without distinct transverse wrinkles on collar. Epomia strong. Side of pronotum without hairs behind epomia and carina on collar. Upper margin of pronotum with two rows of hairs. Lower corner of pronotum with two pits. Front edge of mesopleuron with a patch of hairs on upper corner and another above the horizontal groove, bare area between these two patches $1.3\times$ as long as tegula. Speculum with sparse hairs on upper 0.47. Lower half of mesopleuron smooth, with sparse hairs, except median area hairless, its posterior lower corner without short parallel wrinkles. Smooth area of metapleuron large, $0.7\times$ as long as metapleuron and $0.9\times$ as deep as metapleuron. The rest of metapleuron with punctate-reticulate wrinkles. Upper margin of propodeum arcuate in lateral view. Upper face of propodeum smooth, without ridge between upper face and hind face.



Figs. 13–19. *Exallonyx areolatus* n. sp.: 13, Antenna; 14, front wing; 15, hind leg; 16, posterior part of thorax in lateral view; 17, abdominal stalk in lateral view; 18, abdominal stalk in dorsal view; 19, Ovipositor sheath. Scale: Figs. 13–15: 1.0 \times ; Figs. 16–18: 2.0 \times ; Fig. 19: 3.0 \times .

Median ridge of propodeum incomplete and reaching middle part of hind face. Hind face of propodeum nearly smooth on basal half, and reticulate wrinkles on apical half. Lateral side of propodeum with reticulate wrinkles as apical half of hind face. Hind femur 3.6 \times as long as deep. Longer spur of hind tibia 0.48 \times as long as hind basitarsus. Stigma 2.4 \times as long as deep, receiving radius at nearly its middle. Costal side of radial cell 0.7 \times as long as depth of stigma; posterodistal side of stigma straight. First radial vein oblique, 1.2 \times as long as wide. Second radial vein straight, meeting the first radial without a projection. Posterior margin of hind wing with a shallow notch at its basal 0.35. Abdominal stalk 1.5 \times as long as wide in dorsal view, with punctate-reticulate rugae on basal 0.7 and smooth on apical 0.3. Abdominal stalk 1.1 \times as long as deep in lateral view, with one sloping transverse ridge at base, smooth and without ridges on the rest. Base of syntergite with median

groove extending $0.95\times$ space between thyridia, on each side with one lateral groove that $0.4\times$ as long as median groove. First thyridium 3.0 as wide as long, separated from each other by $0.1\times$ the width of one thyridium. Hairs on sytergite very spare and short, none of them close to the lower margin of sytergite. Ovipositor sheath $4.4\times$ as long as wide, $0.5\times$ as long as hind tibia, with short striae and sparse hairs.

VARIATION: Front wing $2.7\text{--}3.0$ mm long. Ovipositor sheath $4.4\text{--}4.6\times$ as long as wide.

Male. Unknown.

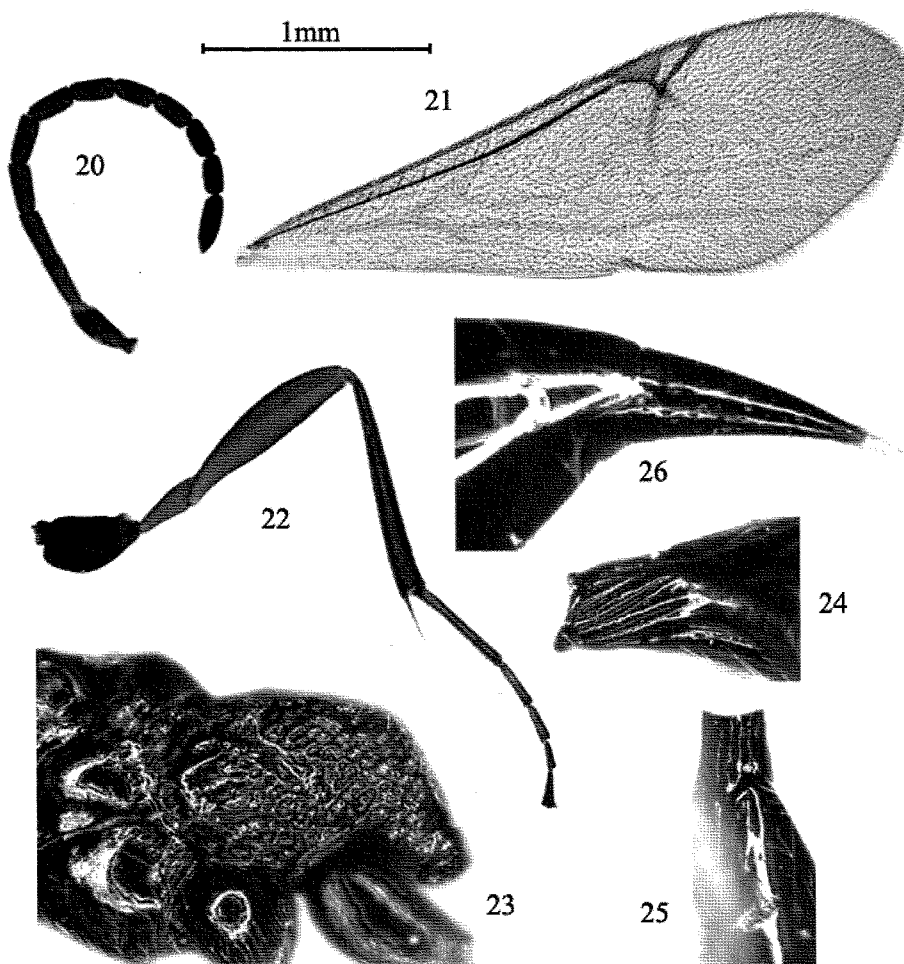
EMYTOLOGY: The specific name derived from the Latin adjective *areolatus*. It means that upper face of the abdominal stalk of this species is areolate rugae.

MATERIAL EXAMINED: HOLOTYPE: Female, P. R. CHINA: Zhejiang Province: Tianmushan Mountain (30.26°N , 119.34°E), 20 July 1998, Malaise trap, by Mingshui ZHAO, No. 992895 (ZU). PARATYPES: 5 Females, same locality as holotype, 30 May 1998, 20 July 1998, 2–3 August 1998, 23 August 1998, Malaise trap, by Mingshui ZHAO, No. 992199, 992844, 993850, 993984, 20003556 (ZU).

***Exallonyx longimalus* Xu, He and Liu, new species**
(Figs. 20–26)

DIAGNOSIS: Similar to *E. lispus* Townes, 1981, but differs by having second flagellar segment and tenth flagellar segment $2.45\times$ and $1.9\times$ as long as wide respectively; first thyridium $3.3\times$ as wide as long; ovipositor sheath smooth, with scattered sparse punctures.

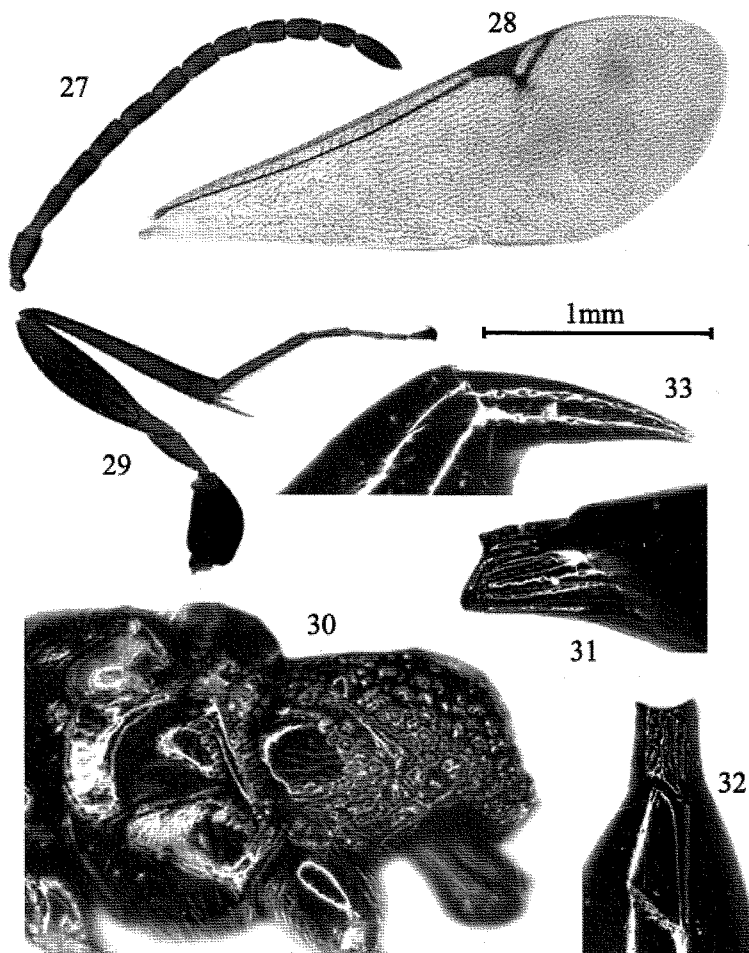
DESCRIPTION: **Female.** Front wing 3.1 mm long. Body black. Antenna reddish brown. Labrum and apical half of mandible reddish brown. Palpi and tegula yellow. Legs brown except middle and hind coxae black, front and mid tarsal segments 2–4 yellow. Wings hyaline, tinged with fuscous. Stigma and strong veins light brown, weak vein light yellow. Temple as long as eye in dorsal view. Cheek $0.76\times$ as long as long diameter of eye. Clypeus $2.9\times$ as wide as long, weakly evenly convex, apex truncate. Second flagellar segment $2.45\times$ as long as wide. Tenth flagellar segment $1.9\times$ as long as wide. Last segment $1.5\times$ as long as penultimate segment. Tyloids absent. Area between antennal sockets with a strong and high carina. Occipital carina normal, high. Pronotum with 5 transverse wrinkles on collar. Epomia strong. Side of pronotum without hairs behind epomia and carina on collar. Upper margin of pronotum with two rows of hairs. Lower corner of pronotum with two pits. Front edge of mesopleuron with a patch of hairs at upper corner and another above the horizontal groove at front end, bare area between these two patches $1.2\times$ as long as tegula. Speculum with sparse hairs on upper 0.3 . Lower half of mesopleuron smooth, with sparse hairs, except median area hairless, its posterior lower corner with parallel wrinkles. Smooth area of metapleuron with sparse hairs, $0.45\times$ as long as metapleuron and $0.55\times$ as deep as metapleuron. The rest of metapleuron with areolate-reticulate wrinkles. Upper margin of propodeum arcuate in lateral view. Upper face of propodeum smooth. Median ridge of propodeum complete and reaching to lower margin of hind face. Hind face of propodeum smooth. Lateral side of propodeum with areolate-reticulate wrinkles. Hind femur $4.8\times$ as long as deep. Longer spur of hind tibia $0.49\times$ as long as hind basitarsus. Stigma $1.92\times$ as long as deep, receiving radius at nearly its middle. Costal side of radial cell $0.83\times$ as long as depth of stigma; posterodistal side of stigma straight. First radial vein weakly oblique, $1.5\times$ as long as wide. Second radial vein straight, meeting the first radial with a stub. Hind margin of



Figs. 20–26. *Exallonyx longimalus* n. sp.: 20, Antenna; 21, front wing; 22, hind leg; 23, posterior part of thorax in lateral view; 24, abdominal stalk in lateral view; 25, abdominal stalk in dorsal view; 26, Ovipositor sheath. Scale: Figs. 20–22: 1.0×; Figs. 23–25: 2.0×; Fig. 26: 3.0×.

hind wing with a deep notch at its basal 0.35. Abdominal stalk 1.5× as long as wide in dorsal view, with punctate-wrinkles on basal 0.4 and five strong longitudinal wrinkles on apical 0.6. Abdominal stalk as long as deep in lateral view, with one sloping transverse ridge at base, behind that with five strong and broad longitudinal ridges. Base of syntergite with median groove deep and extending 1.0× space between thyridia, on each side with one lateral groove, 0.25× as long as median groove. First thyridium 3.3× as wide as long, separated from each other by 0.6× the width of one thyridium. Hairs on syntergite moderately sparse and short, the sockets of the lowest hairs separated from the lower margin of syntergite by 1.0–1.4× length of seta. Ovipositor sheath 0.34× as long as hind tibia, 3.6× as long as wide, smooth, with scattered sparse punctures and hairs.

VARIATION: Front wing 3.0–3.3 mm long. Ovipositor sheath 3.4–3.8× as long as wide.



Figs. 27–33. *Exallonyx wuae* n. sp.: 27, Antenna; 28, front wing; 29, hind leg; 30, posterior part of thorax in lateral view; 31, abdominal stalk in lateral view; 32, abdominal stalk in dorsal view; 33, Ovipositor sheath. Scale: Figs. 27–29: 1.0 \times ; Figs. 30–32: 2.0 \times ; Fig. 33: 3.0 \times .

Male. Unknown.

ETYMOLOGY: The specific name derived from the Latin adjective *longi* (long)+*malus* (cheek).

MATERIAL EXAMINED: HOLOTYPE: Female, P. R. CHINA: Guizhou Province: Fanjingshan Mountain (27.55°N, 108.41°E), 1 August 2001, by Meihua PIAO, No. 200107535 (ZU). PARATYPES: 1 Female, same data as the type, No. 200107632; 1 Female, same date and locality as the type, by Yun MA, No. 200108302 (ZU).

Exallonyx wuae Xu, He and Liu, new species
(Figs. 27–33)

DIAGNOSIS: Similar to *E. carbunculus* Townes, 1981, but differs by having median groove on base of syntergite extending 0.95 \times space between thyridia; first thyridium 4.0 \times as wide as long; ovipositor sheath without striae.

DESCRIPTION: Female. Front wing 2.8 mm long. Body black. Antenna reddish brown. Labrum and apical half of mandible reddish brown. Palpi fulvous. Tegula reddish brown. Legs light reddish brown except coxae black. Wings hyaline, tinged with light fuscous. Stigma and strong veins light brown, weak vein light yellow. Temple $0.85\times$ as long as eye in dorsal view. Cheek $0.50\times$ as long as long diameter of eye. Clypeus $2.8\times$ as wide as long, weakly evenly convex, apex truncate. Second flagellar segment $2.2\times$ as long as wide. Tenth flagellar segment $1.7\times$ as long as wide. Last segment $1.7\times$ as long as penultimate segment. Tyloids absent. Area between antennal sockets with a strong and high carina. Occipital carina normal, high. Pronotum with 4–5 transverse wrinkles on collar. Epomia strong, behind which with three weak transverse wrinkles. Side of pronotum without hairs behind epomia and carina on collar. Upper margin of pronotum with two irregular rows of hairs. Lower corner of pronotum with two pits. Front edge of mesopleuron with a patch of hairs at its upper corner and a patch of hairs above the horizontal groove, bare area between these two patches $1.5\times$ as long as tegula. Speculum with sparse hairs on upper 0.3 . Lower half of mesopleuron smooth, with sparse hairs, except for its median area hairless, its posterior lower corner with parallel wrinkles. Smooth area of metapleuron with sparse hairs, $0.5\times$ as long as metapleuron and $0.7\times$ as deep as metapleuron. The rest of metapleuron with areolate-reticulate wrinkles. Upper margin of propodeum arcuate in lateral view. Upper face of propodeum smooth. Median ridge of propodeum incomplete and reaching to middle part of hind face. Hind face with coarse transverse reticulate wrinkles. Lateral side of propodeum with areolate-reticulate rugae. Hind femur $4.3\times$ as long as deep. Longer spur of hind tibia $0.43\times$ as long as hind basitarsus. Stigma $2.1\times$ as long as deep, receiving radius at nearly its middle. Costal side of radial cell $0.67\times$ as long as depth of stigma; posterodistal side of stigma straight. First radial vein oblique, $1.5\times$ as long as wide. Second radial vein straight. Hind margin of hind wing with a deep notch at its basal 0.35 . Abdominal stalk $1.5\times$ as long as wide in dorsal view, with irregular reticulate wrinkles on basal 0.4 and seven irregular longitudinal wrinkles on apical 0.6 . Abdominal stalk as long as deep in lateral view, with one sloping transverse ridge at base, behind that with six strong longitudinal ridges, its postero-upper corner smooth. Base of syntergite with median groove extending $0.95\times$ space between thyridia, on each side with two very weak grooves, $0.1\text{--}0.25\times$ as long as median groove. First thyridium $4.0\times$ as wide as long, separated from each other by $0.26\times$ the width of one thyridium. Hairs on syntergite moderately sparse and short, none of them close to the lower margin of syntergite. Ovipositor sheath $0.34\times$ as long as hind tibia, $3.8\times$ as long as wide, smooth with sparse punctures and hairs.

Male. Unknown.

ETYMOLOGY: The species is named after the collector Miss Qiong WU.

MATERIAL EXAMINED: HOLOTYPE: Female, **P. R. CHINA:** Zhejiang Province: Qingyuan County: Fengyangshan National Nature Reserve (27.37°N , 119.04°E), 10 August 2003, by Qiong WU, No. 20034653 (ZU).

Key to Chinese species of *leptonyx* group of subgenus *Exallonyx*

- | | | | |
|---|--------|-------|---|
| 1 | Male | | 2 |
| - | Female | | 3 |

- 2 Longer spur of hind tibia $0.45\times$ as long as hind basitarsus (Fig. 3); abdominal stalk with punctate-reticulate rugae on basal 0.3 in lateral view (Fig. 5) *E. concavus* n. sp.
- Longer spur of hind tibia $0.7\times$ as long as hind basitarsus (Fig. 9); abdominal stalk with four broad ridges in lateral view (Fig. 11) *E. planus* n. sp.
- 3 Side of stalk smooth, without ridges (Fig. 17); upper face of abdominal stalk with punctate-reticulate rugae on basal 0.7 (Fig. 18). *E. areolatus* n. sp.
- Side of stalk with the usual ridges (Fig. 24, 31); upper face of abdominal stalk with longitudinal ridges (Fig. 25, 32). 4
- 4 Temple as long as eye in dorsal view; Cheek $0.76\times$ as long as long diameter of eye. *E. longimalus* n. sp.
- Temple $0.85\times$ as long as eye in dorsal view; Cheek $0.50\times$ as long as long diameter of eye. *E. wuae* n. sp.

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