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## Eight new *Orthocentrus* species from South America

(Hymenoptera; Ichneumonidae, Orthocentrinae)

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### Abstract

Eight neotropical *Orthocentrus* species are described; three from cloud forests in Ecuador: *O. nubladi* ZWAKHALS sp. n., *O. bellavista* ZWAKHALS sp. n., *O. parsonsi* ZWAKHALS sp. n. and five from the Amazon rainforest in Peru: *O. ashaninka* ZWAKHALS sp. n., *O. panguana* ZWAKHALS sp. n., *O. margarethae* ZWAKHALS sp. n., *O. nigripleuris* ZWAKHALS sp. n., *O. siegfriedi* ZWAKHALS sp. n. This leads to 36 currently known neotropical *Orthocentrus* species.

### Introduction

Until recently neotropical ichneumonid diversity was considered to be rather low, much lower than palearctic diversity, as exemplified by RODRIGUEZ-BERRIO et al. (2009) who could report only 391 Ichneumonid species from Peru whereas for Europe almost 6000 species are known (ZWAKHALS 2013).

However, in a recent study VEIJALAINEN et al. (2012) demonstrated that neotropical ichneumonid diversity is much higher and the assumed low diversity is at least partly due to lack of sampling activity. Especially in the subfamily Orthocentrinae, many new species were discovered and 27 new *Orthocentrus* species were described by VEIJALAINEN et al. (2014). This implies an increase of the number of the known neotropical *Orthocentrus* species from 1 to 28 and an increase of all known *Orthocentrus* species world wide of about 50 %.

Of the above mentioned 27 newly described species 11 were collected in lowlands, 8 of these in the Amazon rain forest of Peru. One species was found at 600-750 m in Central American wet rainforests and 15 species were from cloud forests at higher altitudes, from 1100-2800 m. Here we present five new species from the Amazon rain forest and three new species from cloud forests at 2200-2300 m.

### Material and methods

The new *Orthocentrus* species are from two very different localities:

1. Ecuador, from cloud forests at altitudes of 2200-2300m;
2. Peru, from the Amazon rain forest at about 230m.

More precisely from the research station at the “ACP Panguana” nature reserve on the southern bank of the Rio Lullapichis (= Yuyapichis) an eastern affluent of the Rio Pachitea, about 170 km south of Pucallpa. The station was founded by the German zoologist couple Maria KOEPCKE and Hans-Wilhelm KOEPCKE in 1968 and is now operated by their daughter Dr. Julianne DILLER and the Bavarian State Collection of Zoology (ZSM) in Munich, Germany. For more detailed information about Panguana see DILLER (2013) and KOEPCKE (2012).

The illustrations are the result of focus stacking photography with an Olympus SZX12 stereo microscope equipped with a ColourView I camera with AnalySIS capture software in the ZSM. Stacking of the individual photographs was done with Combine Z software (see <http://www.hadleyweb.pwp.blueyonder.co.uk>). Additional photo editing was done with GIMP (see <http://www.gimp.org>).

Of the following species we could study paratypes: *Orthocentrus saaksjarvii*, *O. onkonegare*, *O. pallidus*, *O. broadi* and *O. mishana* for comparison. Except for these, the species presented by VEIJALAINEN et al. (2014) are included in the key on the basis of their descriptions only.

## Faunistic remark

In the material collected in Paguana between 2003 and 2014 we found only two of the *Orthocentrus* species presented by VEIJALAINEN et al. (2014): one *O. pallidus* 22.11.-7.12.2008 and one *O. brevipilus* April 2012. The latter species is new for Peru. Another five species, all collected with Malaise traps, turned out to be unknown and are described now. Herewith the number of *Orthocentrus* species from Peru is increased from 8 to 14.

## Key to the Neotropical species of *Orthocentrus* based on females

The following abbreviations are used in the key and in the descriptions:

**Flg1/scape** = length of first flagellomere divided by the length of the scape

**Ifgl1** = length divided by apical width of first flagellomere, in dorsal view.

**Itrg1** = length divided by apical width of first tergite.

**Whd** = horizontal distance between outer faces of compound eyes divided by distance between front edge of eye and distal edge of occiput, in dorsal view (**A/B in Fig. 1**).

**Lateral transverse carina** = on the propodeum an apical transverse carina between the lateral longitudinal carina and pleural carina, as a continuation of the posterior transverse carina between the two median longitudinal carinae. This is carina LO in Fig. E in TOWNES (1969).

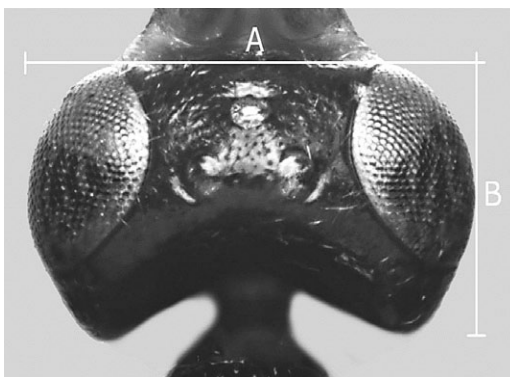


Figure 1. Relative width of head Whd = A/B

This key is given to explain the position of the newly described species in relation to the already known species.

1. Ifgl1  $\leq 1$  and flagellum on a high protruding shelf, face profile straight, areolet usually present, notauli absent ..... 2
- Ifgl1  $\geq 1$  and flagellum not on high protruding shelf, face profile curved, areolet and notauli variable ..... 9
2. Head strongly laterally compressed, whd about 1, eye glabrous, 20-21 flagellomeres, areolet elongate ..... *O. anguillae* BROAD, *O. shieldsi* BROAD
- Head not strongly laterally compressed, whd at least 1.4, eye and areolet variable, 20-27 flagellomeres ..... 3
3. Lateral transverse carina present, ovipositor without a notch ..... 4
- Lateral transverse carina absent, ovipositor variable ..... 8
4. Eye setose, ca 30 flagellomeres, face matt coriaceous pustulate, whd = 1.8. Itrg1 = 1.6, areolet square. Malar sulcus convex to occiput ..... *O. hispidus* VEIJALAINEN
- Eye glabrous ..... 5
5. 20-21 flagellomeres, face smooth, whd = 1.6. Itrg1 = 2, areolet elongate, malar sulcus very shallow ...
- 25-31 flagellomeres ..... *O. pentagonum* BROAD ..... 6
6. 30-31 flagellomeres, whd = 1.9 ..... *O. quercus* VEIJALAINEN, *O. scurra* VEIJALAINEN
- 25-27 flagellomeres ..... 7

7. Face polished with shallow punctures. Whd = 1.5. Propodeum with weak to absent carinae. Itrg1=2.2-2.6, areolet elongate ..... *O. concrispus* VEIJALAINEN
- Face finely papillate, whd = 2.1. Propodeum with strong median longitudinal carinae. Itrg1=1.5, areolet square ..... *O. nubladi* **sp. n.**
- 8 (3). Eye glabrous, areolet elongate, metasoma polished and unsculptured, first tergite without median longitudinal carinae, propodeum almost without carinae, at least 30 flagellomeres, whd 1.6-1.7, ovipositor without a notch ..... *O. teres* VEIJALAINEN
- Eye setose, areolet absent, metasoma sculptured, first tergite with median longitudinal carinae, propodeum with carinae, 23-26 flagellomeres, malar sulcus almost straight, whd = 1.9-2.0. Iflg1=1-1.3, face papillate, ovipositor with a notch ..... *O. ashaninka* **sp. n.**
- 9 (1). Mesoscutum with short notauli ..... **10**
- Notauli absent ..... **11**
10. Face pustulate, lateral transverse carina absent, areolet slightly elongate, 26-27 flagellomeres, whd = 2.0-2.1. Iflg1 = 1-1.3, ocellar-ocular distance = 1.3-1.7x ocellar diameter, Ovipositor without a notch. .... *O. bellavista* **sp. n.**
- Face smooth and polished, lateral transverse carina present, areolet absent, 19-29 flagellomeres, whd = 2.0-2.5. Iflg1 = 1.6-3, ocellar-ocular distance = 0.7-1x ocellar diameter
- a: ovipositor without a notch: ..... *O. luteoclypeus* VEIJALAINEN
- b: ovipositor with a notch: ..... *O. maculae* VEIJALAINEN, *O. rectus* VEIJALAINEN, *O. saaksjarvii* VEIJALAINEN
11. Flg1/scape  $\geq 1$ , Iflg1  $\geq 4$  ..... **12**
- Flg1/scape  $< 1$ , Iflg1  $< 4$  ..... **17**
12. Eye setose ..... *O. albihumerus* BROAD, *O. flavifrons* VEIJALAINEN (and *O. brevipilus* BROAD, *O. onkonegare* BROAD, *O. tenuiflagellum* VEIJALAINEN, if eye is considered setose)
- Eye glabrous ..... **13**
13. Propodeum without median longitudinal and posterior transverse carinae ..... **14**
- Propodeum carinate ..... **15**
14. 25-27 flagellomeres, whd = 2.0-2.2, areolet absent, second tergite and rest of metasoma smooth, polished. Ovipositor with a shallow notch ..... *O. panguana* **sp. n.**
- 39-40 flagellomeres, whd = 1.8, areolet elongate, second tergite coriaceous-strigose, ovipositor without a notch ..... *O. zebra* VEIJALAINEN
15. Second tergite coriaceous, 29-36 flagellomeres, areolet present ..... *O. pallidus* VEIJALAINEN, *O. tenuiflagellum* VEIJALAINEN
- Second tergite striate, 32-43 flagellomeres, areolet variable ..... **16**
16. Areolet absent, second tergite anteriorly without median longitudinal carinae, 32-35 flagellomeres .. *O. alboscuteillum* BROAD, *O. broadi* VEIJALAINEN
- Areolet present, second tergite anteriorly with median longitudinal carinae, 37-43 flagellomeres ... *O. albihumerus* BROAD, *O. brevipilus* BROAD, *O. insularis* ASHMEAD, *O. onkonegare* BROAD
- 17 (11). Lateral transverse carina strong, eye glabrous, 20-24 flagellomeres, whd = 2.2-2.3, no areolet, Itrg1=1.5-1.8, ocellar-ocular distance=0.5-1x ocellar diameter. Ovipositor with a shallow notch .. **18**
- Lateral transverse carina absent, eye various ..... **19**

18. Iflg1 = 1.6-2, frontal orbits up to ocelli broadly yellowish-white, mesoscutum, pro- and mesopleurum red (in a variety mesoscutum and propleurum black and mesopleurum only in lower half reddish) . . .  
 . . . . . *O. margarethae* **sp. n.**
- Iflg1 = 2.5-3, frontal orbit black, mesoscutum and mesopleurum black . . . . . *O. nigripleuris* **sp.n.**
19. Propodeum without median longitudinal carinae, 22 flagellomeres. Whd = 1.9, eye glabrous, Iflg1 = 1.2. Ovipositor very thin, needle-like, without a notch . . . . . *O. parsonsi* **sp. n.**
- Propodeum with median longitudinal carinae, at least 25 flagellomeres . . . . . **20**
20. Eye glabrous, mesosoma and metasoma brown-black, 28-31 flagellomeres, Iflg1 = 2 .. . . . .  
 . . . . . *O. mishana* VEIJALAINEN
- Eye setose . . . . . **21**
21. Second tergite with well defined transverse depression traversing centre of segment in posterior half. [Malar sulcus strongly convex to occiput, 33-37 flagellomeres] . . . . .  
 . . . . . *O. harlequinus* VEIJALAINEN, *O. wahlbergi* VEIJALAINEN
- Second tergite without a well defined transverse depression . . . . . **22**
22. Malar sulcus strongly convex to occiput, Iflg1 = 1-1.4, 25-29 flagellomeres . . . . .  
 . . . . . *O. nicaraguensis* VEIJALAINEN, *O. umbrocciput* VEIJALAINEN
- Malar sulcus straight . . . . . **23**
23. Iflg1 = 1.2-1.3, Itrg1 = 1.3, flg1/scape = 0.3, 26-28 flagellomeres, propodeum and metasoma black . .  
 . . . . . *O. bicoloratus* VEIJALAINEN
- Iflg1 = 2-3, Itrg1 = 1.6-1.9, flg1/scape = 0.5-0.7, 29-33 flagellomeres, whole body largely reddish-yellowish . . . . . *O. siegfriedi* **sp. n.**

### Species descriptions

The holotypes from Peru are deposited in Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru. All other specimens are deposited in the Bavarian State Collection of Zoology (ZSM) Munich, Germany.

#### *Orthocentrus nubladi* ZWAKHALS **sp. n.**

Figs 2A, 3A, 4A, 5A

**Holotype** female: Ecuador, Imbabura, Hazienda Piman bei Ibarra, 2200m, 2.-4.6.1977. leg. W. SCHACHT.

**Paratype:** 1 female: same data as holotype .

Fore wing: length 3 mm, with closed areolet as long as high. Nervulus slightly distad of basal vein, almost interstitial.

Face as wide as high, in lower half rather polished, in upper half superficially transverse granulate, not punctate. Face profile straight with antennal sockets on a high protruding shelf, malar space with distinct straight sulcus. Minimum distance between antennal sockets about 0.5x socket diameter. Eyes with some short scattered hairs. Maxillary palp about 2x scape. In dorsal view head rather weakly concave with rounded temples about 1/4 length of compound eye. Posterior ocellus 0.8 x diameter from eye with no groove between eye and ocellus. Front ocellus 2x its diameter from eye. Antenna thick, curled, with 26-27 transverse flagellomeres. Basal flagellomere 0.9-1x as long as wide and about 0.3 as long as scape. Frons and vertex polished.

Mesosoma polished, mesoscutum without notauli. Mesopleuron and propodeum polished and impunctate. Propodeum with two strong median longitudinal carinae and well defined area petiolaris. With lateral transverse carina present. Lateral longitudinal carina complete from base to apex.

First tergite coriaceous-rugulose, elongate, 1.4-1.6x as long as apically wide and with a pair of median longitudinal carinae from base to apex. Elongate impression present at middle of lateral field. Second tergite

matt and densely longitudinally striate from base to apex, 0.9x as long as apically wide and with a semi-circular transverse depression across distal half. Basal thyridia on second tergite about 2x as wide as long. Metasoma from tergite 3 polished, tergites 4-8 strongly compressed.

Legs slightly compressed, coxae and femora polished, tibiae and tarsi coriaceous-granulate. Hind coxa 1.2x as long as first tergite. Hind femur 3x as long as high. Hind tibia with dense decumbent long setae. Ovipositor without a dorsal notch.

Colour pattern: antenna yellowish-brown in basal half, darker in distal half, face and malar space brown, frons, vertex and occiput black. Mesosoma and propodeum black. Metasoma black with tergites 2-3 brown. Fore- and mid coxae, trochanters, femora, tibiae and tarsi yellowish white. Hind coxa, femur and tibia light brown, hind trochanter and tarsus yellowish-white. Hind coxa yellowish white at apex.

Rather difficult to place in the key in VEIJALAINEN et al. (2014). Based on the square flagellomeres and apically compressed metasoma it would run to couplet 3 in the *O. shieldsi* group but the head is not strongly compressed and the face is not punctate.

Etymology. The name refers to bosque nublado, cloud forest. It is to be used as a noun in apposition for the purpose of nomenclature.

### ***Orthocentrus ashaninka* ZWAKHALS sp. n.**

Figs 2B, 3B, 4B, 5B

**Holotype** female: Peru Dept. Huánuco, Panguana, ACP, Rio Yuyapichis, 9°37'S, 74°56'W. 260m, April 2012, Malaise Falle, leg E. DILLER.

**Paratypes:** 1 female: Peru Dept. Huánuco, Panguana ACP, Rio Yuyapichis, 9°37'S, 74°56'W. 230m 20. Sept.-6. Okt. 2013, Malaise-falle, leg DILLER; 1 female: Peru, Huanuco, M[alaise].T[rap]. Yuyapichis, Panguana, 9°37'S, 74°56'W. 260m, 14-IV-2003. leg. C.J. ZWAKHALS.

Fore wing: length 2.3-2.4 mm, without areolet. Strongly inclivous nervulus distad of basal vein, by about half its length.

Face as wide as high weakly transverse striate-punctulate, not punctate. Face profile straight with antennal sockets on a high protruding shelf, malar space with distinct almost straight sulcus. Minimum distance between antennal sockets about 0.3x socket diameter. Eyes densely setose. Maxillary palp about 2.5x scape. In dorsal view head rather weakly concave with very short temples about 1/8 length of compound eye. Posterior ocelli 0.5-0.7x their diameter from eye with a groove between eye and ocellus. Front ocellus 2x its diameter from eye. Antenna thick, curled, with 24-26 transverse flagellomeres. Basal flagellomere 1-1.1x as long as wide and about 0.3x as long as scape. Frons and vertex polished and slightly punctulate.

Mesosoma polished. Mesoscutum without notauli, slightly punctulate. Mesopleuron and propodeum polished and impunctate. Propodeum with two strong median longitudinal carinae and well defined area petiolaris. Distance between median carinae at apex about half their distance at base. No lateral transverse carina between lateral longitudinal carina and pleural carina. Lateral longitudinal carina only present distad of spiracle.

Shining but rather rugulose first tergite elongate, 1.4-1.6x as long as wide apically and with a pair of median longitudinal carinae from base to apex, converging towards apex. Elongate rugulose impression present at the middle of the lateral field. Second tergite rather shining and weakly longitudinally rugulose, 0.8x as long as wide apically and with a semicircular transverse depression. Basal thyridium on second tergite very small and about 2x as wide as long. Metasoma from tergite 3 polished and compressed.

Legs slightly compressed, coxae polished, femora, tibiae and tarsi coriaceous-granulate. Hind coxa 1.2x as long as first tergite. Hind femur 2.9-3x as long as high. Hind tibia with dense decumbent long setae. Ovipositor with a dorsal notch.

Colour pattern: antenna yellowish-brown, darker in distal third, face and malar space dark brown, frons, vertex and occiput black. Mesosoma, propodeum and metasoma black. Fore- and mid coxae, trochanters, femora, tibiae and tarsi yellowish white. Hind coxa fuscous. Hind femur, tibia and tarsus yellowish brown, femur slightly darkened

Runs to couplet 6 in the key in VEIJALAINEN et al. (2014), to *O. hispidus*. That species differs in the presence of the lateral transverse carina and areolet, malar sulcus bent towards occiput, 30 flagellomeres.

Etymology. Named after the Ashaninka people who live near the nature reserve Panguana. The name is to be used as a noun in apposition for the purpose of nomenclature.

***Orthocentrus bellavista* ZWAKHALS sp. nov**

Figs 2C, 3C, 4C, 5C.

**Holotype** female: Ecuador, Pinchincha Distr. ca 30 km NW of Quito, Bellavista Cloud Forest Res. S00° 01.589', W78° 41.419'. 2300m, 28.viii-13.ix.2012, leg. M. & S. DIETL, R. BECK.

**Paratypes:** 1 female: same data as holotype; 4 females: Ecuador, Imbabura, Hazienda Piman bei Ibarra, 2200m, 2.-4.6.1977, leg. W. SCHACHT.

Fore wing: length 3.2-3.4 mm, with closed areolet slightly longer than high. Inclivous nervulus distad of basal vein by about 0.2 of its length.

Face 1.1 as wide as high, finely pustulate, face profile rounded with antennal sockets not on a high protruding shelf, malar space with distinct, curved sulcus. Minimum distance between antennal sockets about 0.3x socket diameter. Eyes glabrous but with some tiny scattered hairs. Maxillary palp about 2.3x scape. In dorsal view head weakly concave with rather long temples about 0.4 length of compound eye. Posterior ocelli 1.3-1.7x their diameter from eye without a groove between eye and ocellus. Front ocellus 2.5x diameter from eye. Antenna rather stout with 26-27 slightly elongate flagellomeres. Basal flagellomere 1-1.1x as long as wide and about 0.4-0.5x as long as scape. Frons and vertex polished and slightly papillate.

Mesosoma polished, mesoscutum punctulate and with notauli. Mesopleuron and propodeum polished and impunctate. Propodeum with some faint microsculpture and with strong median longitudinal carinae and well defined area petiolaris. Lateral transverse carina between lateral longitudinal carina and pleural carina discernible by change in sculpture. Lateral longitudinal carina practically absent.

Matt coriaceous first tergite elongate, 1.5-1.6x as long as wide apically and without median longitudinal carinae. Strong oval impression present in lateral field at about middle of tergite. Second tergite 0.8x as long as wide apically, coriaceous, matt, without longitudinal carinae, semicircular transverse impression in apical half. Basal thyridium 2x as wide as long, second thyridium round, shining, Metasoma depressed with segments broader than long from tergite 3 onward, polished.

Legs slightly compressed, coxae and femora polished, tibiae and tarsi coriaceous-granulate. Hind coxa 1x first tergite. Hind femur 2.5-3x as long as high. Hind tibia with dense decumbent long setae. Ovipositor without a notch.

Colour pattern: antenna light brown ventrally and darker in dorsal half, face and malar space brown, frons, vertex and occiput black. Mesosoma and metasoma black. Fore- and mid coxae and all trochanters white. Fore- and mid femora, tibiae and tarsi yellowish. Fore- and mid femora brown marked ventrally. Hind femur dark brown, whitish at apex. Hind tibia dark brown with white base. Hind coxa dark brown to fuscous.

Runs to couplet 11 in the key in VEIJALAINEN et al. (2014) and then more or less to *O. luteoclypeus* but in that species the face is smooth and polished, frontal orbits are black, antennae shorter and more slender, ocelli closer to eye and there is no areolet.

Etymology. Named after the BellaVista Cloud Forest Reserve where the holotype was found. The name is to be used as a noun in apposition for the purpose of nomenclature.

***Orthocentrus panguana* ZWAKHALS sp. n.**

Figs 2D, 3D, 4D, 5D

**Holotype** female Peru, Dept. Huánuco, Panguana, ACP, Rio Yuyapichis, 9°37'S, 74°56'W. 230m, Mai 2014, Malaise Falle, leg E. DILLER.

**Paratypes:** 2 females: same data as holotype

Fore wing: length 2.3-2.5 mm, without areolet. Nervulus 0.2 of its length distad of basal vein.

Face 1.1x as wide as high, polished, impunctate, face profile rounded with antennal sockets not on a high protruding shelf, malar space with distinct straight sulcus. Minimum distance between antennal sockets about 0.7x socket diameter. Eyes glabrous. Maxillary palp about 2x scape. In dorsal view head strongly incised with very short temples about 1/8 length of compound eye. Posterior ocelli 1x their diameter from eye with a groove between eye and ocellus. Front ocellus 2x diameter from eye. Antenna slender, elongate, with 25-27 elongate flagellomeres. Basal flagellomere 4.5-5x as long as wide and about as long as scape. Frons and vertex polished and impunctate.

Mesosoma polished, mesoscutum without notauli. Mesopleuron and propodeum polished and impunctate. Propodeum almost without carinae. From lateral longitudinal carina is only a short apical stub present. The pleural carina is present as a trace. No transverse carina. Spiracle small.

Polished first tergite elongate, 1.5-2.2x as long as apically wide and with a pair of weak median longitudinal carinae from base to apex, central area between carinae smooth, polished and with some short striae at apex. Lateral area longitudinally striate. Oval impression present in lateral field at about middle of segment. Second tergite as long as wide apically, polished and with a few short central striae at base. Basal thyridium 1.5x as wide as long. Metasoma polished without any sculpture.

Legs slightly compressed, coxae and femora polished, tibiae and tarsi coriaceous-granulate. Hind coxa 1x first tergite. Hind femur 3x as long as high. Hind tibia with dense decumbent long setae. Ovipositor with a dorsal notch.

Colour pattern: antenna fuscous with scape and basal two flagellomeres yellowish brown, face fuscous brown, frons, vertex and malar space black. Frontal orbit cream in lower half. Mesosoma, propodeum and metasoma black. Fore- and mid coxae and all trochanters white. Fore- and mid femora, tibiae and tarsi yellowish. Hind coxa and femur black. Hind tibia brown with white base.

Runs to couplet 13 in the key in VEIJALAINEN et al. (2014) and then more or less to *zebra*, but *zebra* has about 40 flagellomeres, a closed areolet and is partly cream coloured.

Etymology. The name refers to the nature reserve Panguana where the species was collected and is to be used as a noun in apposition for the purpose of nomenclature.

### ***Orthocentrus margarethae* ZWAKHALS sp. n.**

Figs 2E, 3E, 4E, 5E.

**Holotype** female: Peru, Dept. Huánuco, Panguana, Rio Yuyapichis, 9°37'S, 74°56'W. 260m, Oktober 2010, Malaise Falle, leg E. DILLER

**Paratypes:** 3 females: Peru, Dept. Huánuco, Panguana, Rio Yuyapichis, 9°37'S, 74°56'W. 260m, Oktober 2010, Malaise Falle, leg E. DILLER; 1 female Peru, Dept. Huánuco, Panguana, ACP, Rio Yuyapichis, 9°37'S, 74°56'W. 230m, Mai 2013, Malaise-falle, leg. E. DILLER; 1 female: Peru, Dept. Huánuco, Panguana, ACP, Rio Yuyapichis, 9°37'S, 74°56'W. 230m, 26. Sept.-12. Okt. 2014, Malaise-falle, leg. E. DILLER; 1 female: Peru, Huánuco, M.T. Yuyapichis, Panguana, 9°37'S, 74°56'W. 260m, 8-IV-2003, leg. C.J. ZWAKHALS.

Fore wing: length 3.2-3.3 mm, without areolet. Inclivous nervulus interstitial with basal vein.

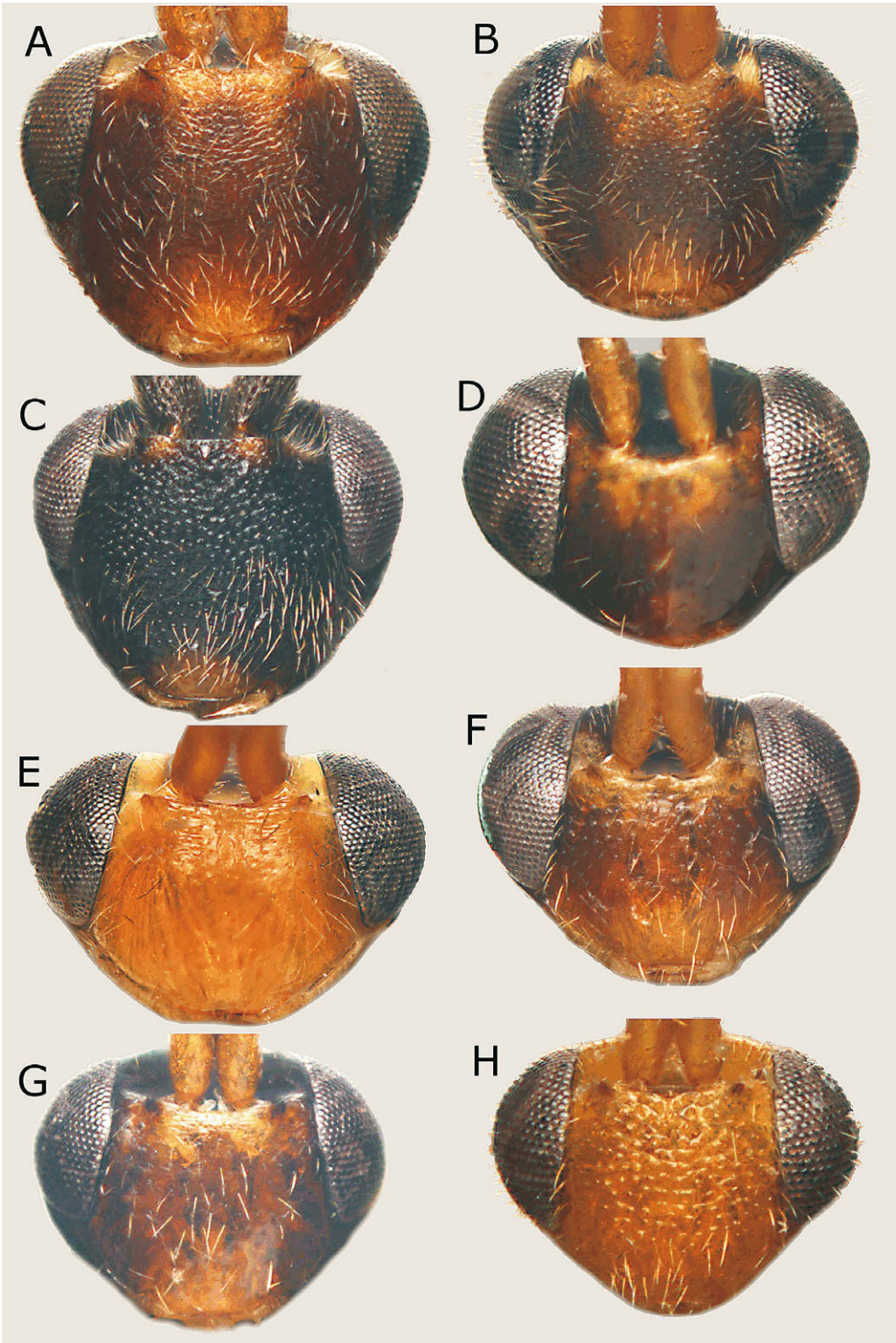
Face 1.1x as wide as high, weakly polished, impunctate, face profile slightly rounded with antennal sockets not on a high protruding shelf, malar space with strong straight sulcus. Minimum distance between antennal sockets about 0.8x socket diameter. Eyes glabrous. White maxillary palp about 2x scape. In dorsal view head weakly concave with very short temples about 0.1x length of compound eye. Posterior ocelli 0.8x their diameter from eye without a groove between eye and ocellus. Front ocellus 2.5x diameter from eye. Antenna slender, elongate, with 23-25 elongate flagellomeres. Basal flagellomere 1.6-2x as long as wide and about 0.5x as long as scape. Frons and vertex polished and impunctate.

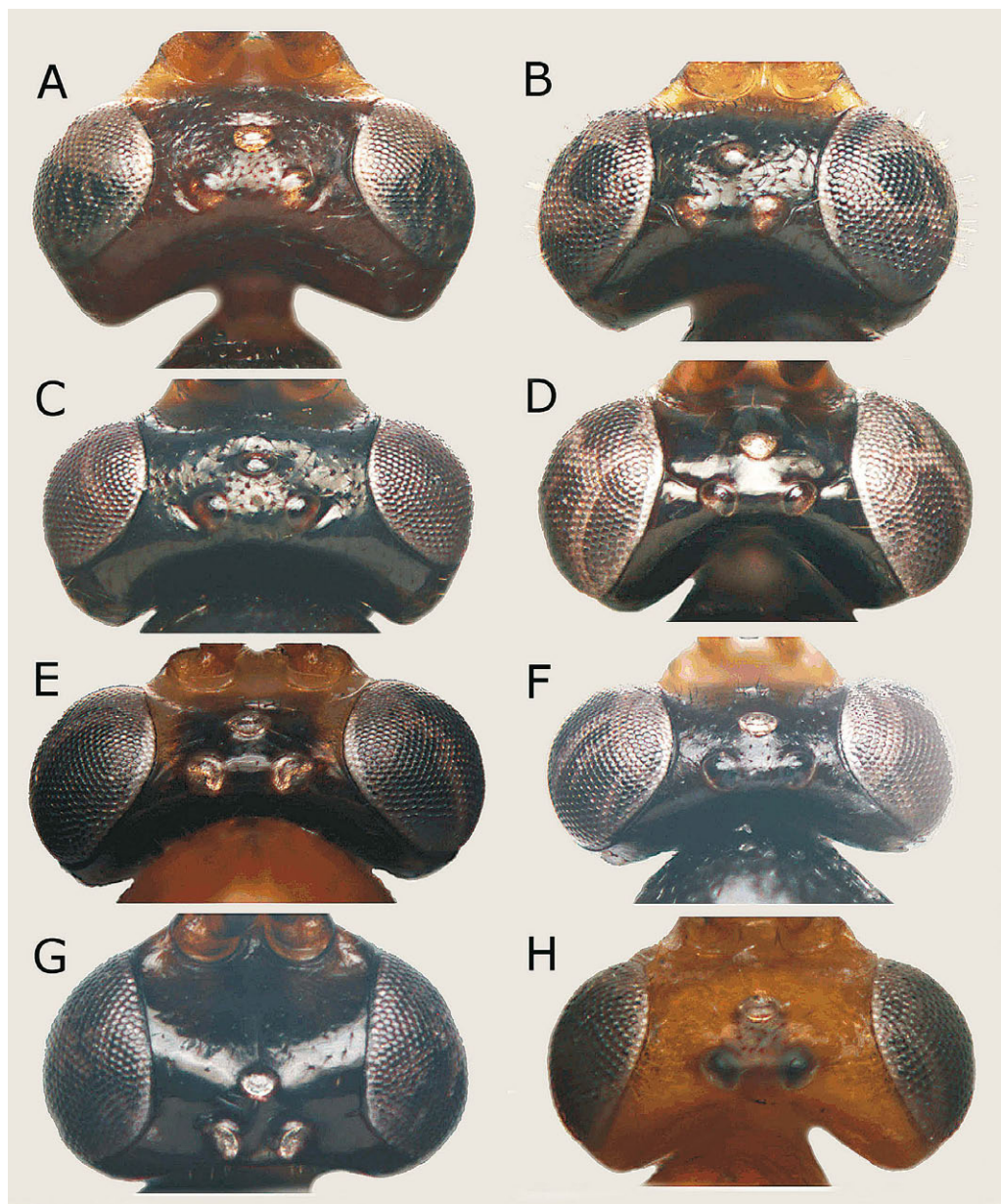
Mesosoma polished, mesoscutum without notauli. Mesopleuron and propodeum polished and impunctate. Propodeum with strong median longitudinal carinae and well defined area petiolaris. Area petiolaris dorsally bounded by high posterior transverse carina. Lateral transverse carina strongly developed, rather high. Anterior part of lateral longitudinal carina in front of spiracle absent. Spiracle large about 0.8 as wide as distance between lateral- and pleural carinae.

Shining first tergite elongate, 1.5-1.6x as long as apically wide and with a pair of median longitudinal carinae from base to apex. Strong oval impression present in lateral field half way between spiracle and apex. Area distal of impression more or less transversely rugulose, central area between longitudinal carinae slightly rugulose. Second tergite 0.9x as long as wide apically, shining and with two strong median longitudinal striae from base to apex, area lateral of median striae with diagonal impression at base which joins a curved semicircular transverse impression at middle of segment. Combined impression surrounds a slightly raised central rhombic area. Impressions slightly transversely rugulose. Basal thyridia absent. Metasoma depressed with segments broader than long, polished from third tergite onward.

Legs slightly compressed, coxae and femora polished, tibiae and tarsi coriaceous-granulate. Hind coxa 1.1x first tergite. Hind femur 2.9-3x as long as high. Hind tibia with dense decumbent long setae. Ovipositor with a rather shallow dorsal notch.

Colour pattern: antenna yellowish in basal half, fuscous in distal half, face yellowish, malar space whitish, frons, vertex and occiput black. Orbits of frons and vertex broadly yellowish white. Mesoscutum, scutellum, pro- and mesopleuron and mesosternum completely reddish. Propodeum black. Metasoma black, second tergite with yellowish margin in apical fifth. Third tergite with narrow yellowish margin at base.





**Figure 3.** Heads in dorsal view: *Orthocentrus* females. A: *nubladi*, B: *ashaninka*, C: *bellavista*, D: *panguana*, E: *margarethae*, F: *nigripleuris*, G: *parsonsi*, H: *siegfriedi*.

← **Figure 2.** Faces: *Orthocentrus* females. A: *nubladi*, B: *ashaninka*, C: *bellavista*, D: *panguana*, E: *margarethae*, F: *nigripleuris*, G: *parsonsi*, H: *siegfriedi*.

Fore- and mid coxae and all trochanters white. Fore- and mid femora, tibiae and tarsi yellowish. Hind femur yellowish white in basal half, light brownish in distal half. Hind tibia dark brown with white base. Hind coxa yellowish, partly somewhat darkened in distal half.

Comment: we have a number of specimens in which the mesoscutum is black and the mesopleuron is yellowish to reddish in ventral half only. They are considered to represent variation within the species.

Runs to couplet 25 in the key in VEIJALAINEN et al. (2014) and then more or less to *O. brevipilus* but in that species the eyes are setose.

**Etymology.** The name is in honour of Mrs. Margaretha STOCKER, Munich, whom we thank for her generous support of nature conservation of ACP Panguana. The name is to be used as a noun in apposition for the purpose of nomenclature.

### ***Orthocentrus nigripleuris* ZWAKHALS sp. n.**

Figs 2F, 3F, 4F, 5F

**Holotype:** female: Peru, Dept. Huánuco, Panguana, Rio Yuyapichis, 9°37'S, 74°56'W. 260m Oktober 2010, Malaise Falle, leg E. DILLER.

**Paratypes** 1 female: same data as holotype; 1 female: Peru, Dept. Huánuco, Panguana, Rio Yuyapichis, 9°37'S, 74°56'W. 260m, 2.10-17.10.2009, Malaise-Falle, leg E. DILLER; 2 females: Peru, Panguana, Dept. Huánuco, Rio Yuyapichis, 9°37'S, 74°56'W. 260m, Oktober 2010, Malaise-Falle, leg E. DILLER; 1 female: Peru, Dept. Huánuco, Panguana, ACP, Rio Yuyapichis, 9°37'S, 74°56'W. 230m, 26. Sept.-12. Okt. 2014, Malaise-falle, leg E. DILLER.

Fore wing: length 2.3-2.4 mm, without areolet. Inclivous nervulus interstitial with basal vein.

Face as wide as high, weakly polished, impunctate, face profile rounded with antennal sockets not on a high protruding shelf, malar space with distinct straight sulcus. Minimum distance between antennal sockets about 0.6x socket diameter. Eyes glabrous. Maxillary palp about 2x scape. In dorsal view head weakly concave with very short temples about 1/8 length of compound eye. Posterior ocelli 0.7-1x their diameter from eye without a groove between eye and ocellus. Front ocellus 2x diameter from eye. Antenna slender, with 21-23 elongate flagellomeres. Basal flagellomere 2.5-3x as long as wide and about 0.5-0.7x as long as scape. Frons and vertex polished and impunctate.

Mesosoma polished, mesoscutum without notauli. Mesopleuron and propodeum polished and impunctate. Propodeum with strong central longitudinal carina and well defined area petiolaris. Area petiolaris dorsally bounded by high posterior transverse carina. Lateral transverse carina strongly developed, rather high. Anterior part of lateral longitudinal carina in front of spiracle absent. Spiracle large about 0.8x as wide as distance between lateral- and pleural carinae.

Polished first tergite elongate, 1.5-1.7x as long as apically wide and with a pair of median longitudinal carinae from base to apex. Strong oval impression present in lateral field half way between spiracle and apex, lateral field rather rugulose. Second tergite 0.9x as long as apically wide, polished and with 2 strong median longitudinal striae from base to apex, area lateral of median striae with diagonal impression at base which joins a curved semicircular transverse impression at middle of segment. The combined impression surrounds a slightly raised central rhombic area. Impressions slightly transversely rugulose. Basal thyridia absent. Metasoma depressed with segments broader than long, polished from tergite 3 onward.

Legs slightly compressed, coxae and femora polished, tibiae and tarsi coriaceous-granulate. Hind coxa 1.1x first tergite. Hind femur 3x as long as high. Hind tibia with dense decumbent long setae. Ovipositor with a rather shallow dorsal notch.

Colour pattern: antenna yellowish brown ventrally and rather fuscous dorsally, face yellowish brown, clypeus more yellowish, malar space whitish, frons vertex and occiput black. Orbits of frons at most with short yellowish streak at base of antennae. Mesosoma and propodeum black. Metasoma black, second tergite sometimes with brownish margin in apical fifth. Fore- and mid coxae and all trochanters white. Fore- and middle femora, tibiae and tarsi yellowish. Hind femur dark brown, whitish at base. Hind tibia brown with white base. Hind coxa varying from light yellowish brown to fuscous brown, fuscous brown in holotype.

Runs to couplet 25 in the key in VEIJALAINEN et al. (2014) and then more or less to *O. brevipilus* but in that species the eyes are setose.

**Etymology.** The name refers to the black mesopleuron, a character in which this species differs from the closely related *O. margarethae*. The name is to be used as a noun in apposition for the purpose of nomenclature.

***Orthocentrus parsonsi* ZWAKHALS sp. n.**

Figs 2G, 3G, 4G, 5G.

**Holotype:** female Ecuador, Pinchincha Distr., ca 30 km NW of Quito. Bellavista Cloud Forest Res. S 00° 01.589' W 78° 41.419'. 2300m, 28-viii-13.ix.2012. leg. M. & S. DIETL, R. BECK.

Fore wing: length 2.5 mm, without areolet. Nervulus distad of basal vein by 0.2 of its length.

Face as wide as high, weakly polished, impunctate, face profile weakly rounded with antennal sockets not on a high protruding shelf, malar space with strongly curved sulcus. Minimum distance between antennal sockets about 0.25x socket diameter. Eyes glabrous. Maxillary palp short, about 2x scape. In dorsal view head weakly concave with temples about 1/4 length of compound eye. Posterior ocelli 2x their diameter from eye without a groove between eye and ocellus. Front ocellus 3x diameter from eye. Antenna slender, with 22 slightly elongate flagellomeres. Basal flagellomere 1.2x as long as wide and about 0.4x as long as scape. Frons and vertex polished and impunctate.

Mesosoma polished, mesoscutum without notauli. Mesopleuron and propodeum polished and impunctate. Propodeum polished, without median longitudinal carinae but with well defined area petiolaris. No lateral transverse carina between lateral longitudinal carina and pleural carina. Anterior part of lateral longitudinal carina in front of spiracle absent. Spiracle rather large.

Polished first tergite very elongate 2.5x as long as apically wide and without a pair of median longitudinal carinae. Strong oval impression present in lateral field at about middle of segment. Lateral field distad of that depression longitudinally striate. Second tergite as long as apically wide, polished, with traces of a curved transverse depression in distal third. Thyridiae tiny. Metasoma from tergite 3 polished.

Legs slightly compressed, coxae and femora polished, tibiae and tarsi coriaceous-granulate. Hind coxa 1x first tergite. Hind femur 2.5x as long as high. Hind tibia with dense decumbent long setae. Ovipositor without a dorsal notch.

Colour pattern: antenna yellowish brown, face brown, frons vertex and occiput black. Mesosoma and metasoma black. Fore- and mid coxae and all trochanters yellowish white. Fore tibiae and tarsi yellowish. Mid femora and tibiae brownish. Hind coxa brown. Hind femur brown, yellowish at base and apex. Hind tibia and tarsus brown with tibia white at base.

Runs to couplet 13 in the key in VEIJALAINEN et al. (2014) and then more or less to *O. zebra* but that species has 39-40 much slenderer flagellomeres, the posterior transverse carina is lacking on the propodeum and the colour pattern is quite different.

Etymology. Named after Richard PARSONS, co-founder together with his wife Gloria of the Bellavista Cloud Forest Reserve, a certified conservation area of cloud forest in Ecuador. The name is to be used as a noun in apposition for the purpose of nomenclature.

***Orthocentrus siegfriedi* ZWAKHALS sp. n.**

Figs 2H, 3H, 4H, 5H

**Holotype:** female: Peru, Dept. Huánuco, Panguana, Rio Yuyapichis, 9°37'S, 74°56'W. 260m, Oktober 2010, Malaise Falle, leg E. DILLER.

**Paratypes:** 4 females: Peru, Dept. Huánuco, Panguana, Rio Yuyapichis, 9°37'S, 74°56'W. 260m, Oktober 2010, Malaise Falle, leg E. DILLER; 1 female Peru, Dept. Huánuco, Panguana ACP, Rio Yuyapichis, 9°37'S, 74°56'W. 230m, Mai 2013, Malaise Falle, leg. DILLER.

Fore wing: length 2.1 mm, with weakly closed square areolet. Strongly inclivous nervulus distad of basal vein, by about half its length.

Face as wide as high slightly papillate, not punctate. Face profile curved with antennal sockets not on a high protruding shelf, malar space with distinct almost straight sulcus. Minimum distance between antennal sockets about 0.5x socket diameter. Eyes setose. Maxillary palp about 2.5x scape. In dorsal view head rather weakly concave with very short temples about 1/7 length of compound eye. Posterior ocelli 1.2-1.5x their diameter from eye with no groove between eye and ocellus. Front ocellus 2x its diameter from eye. Antenna slender, with 30-33 elongate flagellomeres. Basal flagellomere 2.5-3x as long as wide and about 0.6-0.7x as long as scape. Frons and vertex polished and slightly punctulate.

Mesosoma polished. Mesoscutum without notauli, slightly punctulate. Mesopleuron and propodeum polished and impunctate. Propodeum with two strong parallel median longitudinal carinae and well defined

area petiolaris. No lateral transverse carina between lateral longitudinal carina and pleural carina. Lateral longitudinal carina only present distad of spiracle.

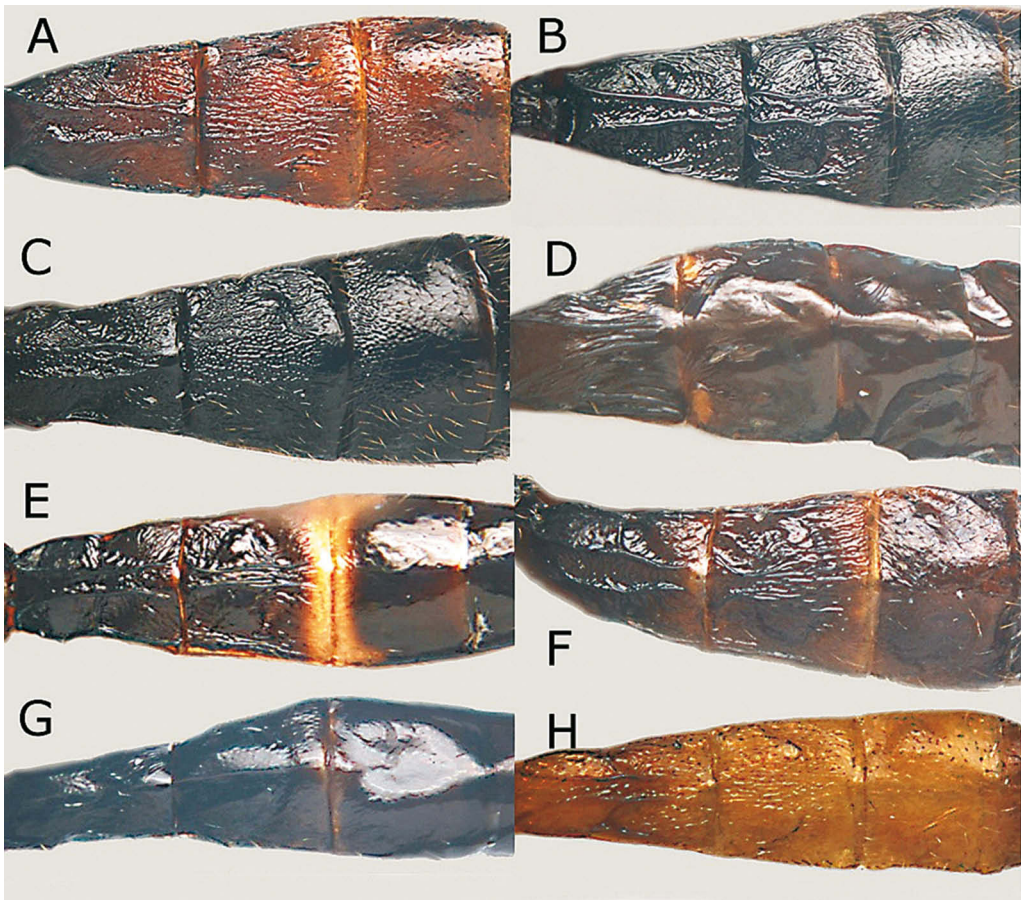
Rugulose first tergite elongate, 1.6-1.9x as long as apically wide and with a pair of median longitudinal carinae from base to apex. Elongate rugulose impression present at middle of lateral field. Second tergite weakly longitudinally rugulose, its anterolateral corners somewhat depressed. Tergite 0.9x as long as wide apically and without a transverse depression. Basal thyridiae on second tergite very small and about 2x as wide as long. Metasoma from tergite 3 rather polished and depressed.

Legs slightly compressed, coxae and femora polished, tibiae and tarsi coriaceous-granulate. Hind coxa 1.1x as long as first tergite. Hind femur 3x as long as high. Hind tibia with dense decumbent long setae. Ovipositor without a dorsal notch.

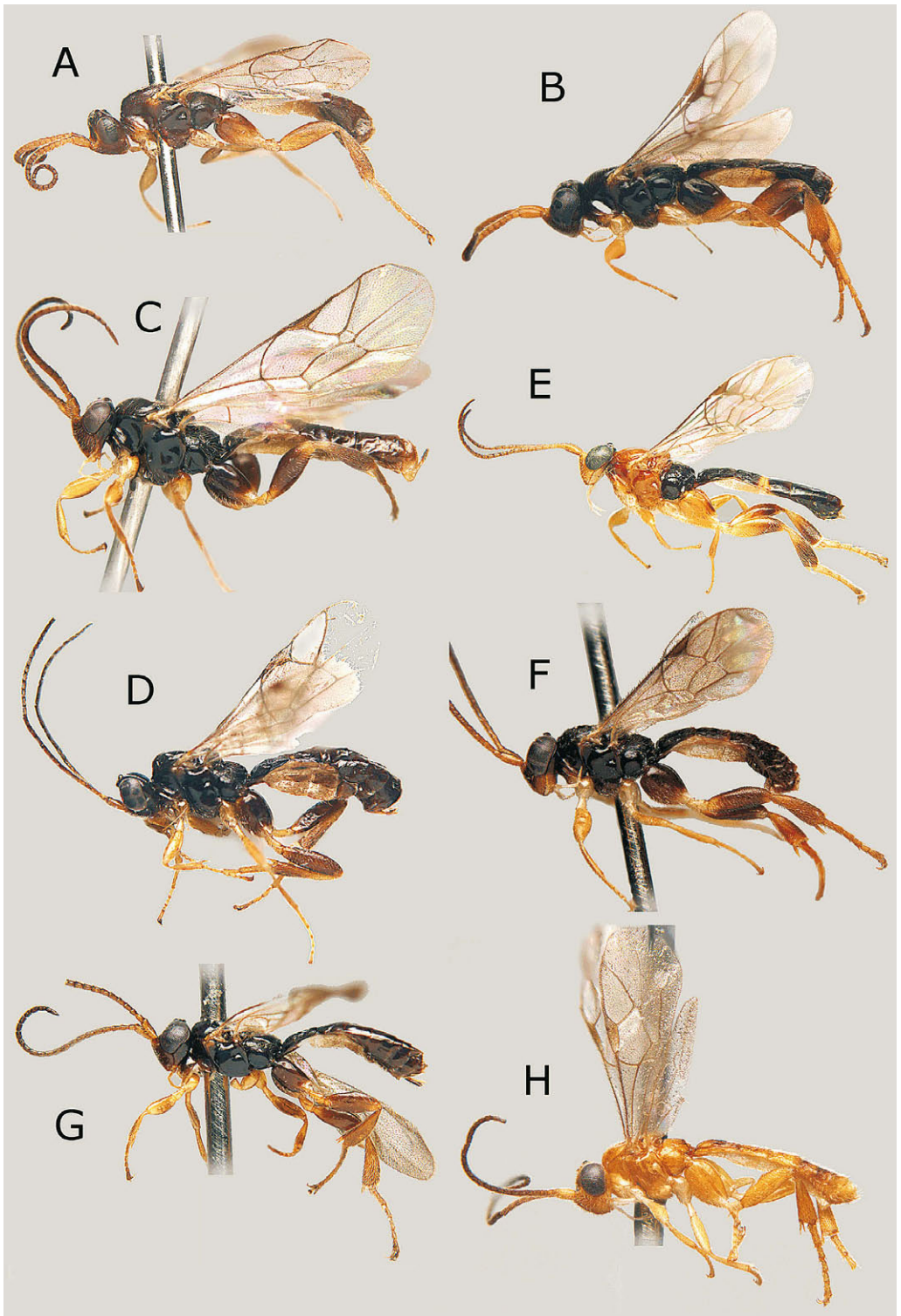
Colour pattern: Light yellowish brown, stemmaticum brown. Fore- and mid coxae, trochanters, femora, tibiae and tarsi yellowish white. Hind coxa, femur, tibia and tarsus light yellowish brown. Propodeum, first tergite and tergites 4-8 sometimes darker brown

In the key in VEIJALAINEN et al. (2014) it runs to couplet 18 but then does not match either option as the malar groove is straight but the basal flagellomere is much less than 5x as long as wide.

Etymology. The name is in honour of Mr. Siegfried STOCKER, Munich, whom we thank for his generous support of the research station Panguana. The name is to be used as a noun in apposition for the purpose of nomenclature.



**Figure 4.** Basal three tergites: *Orthocentrus* females. A: *nubladi*, B: *ashaninka*, C: *bellavista*, D: *panguana*, E: *margarethae*, F: *nigripleuris*, G: *parsonsi*, H: *siegfriedi*.



**Figure 5.** Lateral views: *Orthocentrus* females. A: *nubladi*, B: *ashaninka*, C: *bellavista*, D: *panguana*, E: *margarethae*, F: *nigripleuris*, G: *parsonsi*, H: *siegfriedi*.

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We thank G. BROAD for sending paratypes, for constructive criticism and improvement of the manuscript. We are grateful to the Peruvian Nature Conservation Authority SERFOR (Servicio Nacional Forestal y de Fauna Silvestre; formerly INRENA, DGFFS) for providing the collection and exportation permits for the biological material from Panguana, Peru (last and actual collection permit No. 007-2014-SERFOR-DGGSPFFS, exportation permit N° 0000326-SERFOR).

## Resumen

Se describe ocho especies neotropicales del género *Orthocentrus*: tres de los bosques nublados del Ecuador: *O. nubladi* ZWAKHALS sp. n., *O. bellavista* ZWAKHALS sp. n., *O. parsonsi* ZWAKHALS sp. n., y cinco del bosque tropical amazónico del Perú: *O. ashaninka* ZWAKHALS sp. n., *O. panguana* ZWAKHALS sp. n., *O. margarethae* ZWAKHALS sp. n., *O. nigripleuris* ZWAKHALS sp. n., *O. siegfriedi* ZWAKHALS sp. n. Así son conocidas actualmente 36 especies de *Orthocentrus* del Neotrópico.

## Zusammenfassung

Acht neotropische Arten der Gattung *Orthocentrus* werden beschrieben; drei aus den Nebelwäldern in Ecuador: *O. nubladi* ZWAKHALS sp. n., *O. bellavista* ZWAKHALS sp. n., *O. parsonsi* ZWAKHALS sp. n., und fünf aus dem Amazonas-Regenwald in Peru: *O. ashaninka* ZWAKHALS sp. n., *O. panguana* ZWAKHALS sp. n., *O. margarethae* ZWAKHALS sp. n., *O. nigripleuris* ZWAKHALS sp. n., *O. siegfriedi* ZWAKHALS sp. n. Hiermit sind aktuell 36 *Orthocentrus*-Arten aus der Neotropis bekannt.

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