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A detailed illustrated description of Palearctic species *Magwengiella* (=*Listrocalus*) *nycthemerops* (HEINRICH, 1978). Notes on transformation of pigmental coloration of type specimens (Hymenoptera, Ichneumonidae, Ichneumoninae, Ctenocalini)

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A b s t r a c t : Detailed illustrated descriptions of East Palaearctic species *Magwengiella* (=*Listrocalus*) *nycthemerops* (HEINRICH, 1978) is presented in the article. The problem of stability and changes of pigmental yellow-orange-red coloration of type material is co 2006nsidered.

K e y w o r d s : Ichneumonidae, Ichneumoninae, Ctenocalini, *Magwengiella* (=*Listrocalus*) *nycthemerops* (HEINRICH), taxonomy, description, image, pigmental coloration stability.

Introduction

The character of Ichneumoninae evolution led to a plenty of closely related and hard to differentiate species. Their morphological diversification is generated not by diversity of constant traits combinations, but by free, almost random combination of the same traits (RASNITSYN 1978). The establishment and identification of superspecific taxa is even more difficult than distinguishing of species. One way to facilitate superspecific taxa identification is to prepare tables of illustrations of type or the most characteristic species of genera of the subfamily, along with a standard, unified description of the morphological features of the taxon.

This was the basis for the implementation of a cycle of works, with the ultimate goal of preparing an illustrated key of genera of Ichneumoninae Stenopneusticae of Palearctic.

Tribe Ctenocalini is represented in the Palearctic by three species belonging to the same genus (BACHMAIER & DILLER 1985). Initially, this species was classified by HEINRICH (1978) to a new genus *Listrocalus* HEINRICH. Subsequently, the genus was synonymized with genus *Magwengiella* HEINRICH 1938 earlier described by HEINRICH (BACHMAIER & DILLER 1985). Thus, the genus is currently represented by five species, that were found in Africa (Madagascar, Congo), Western Europe (Spain, Turkey) and Eastern Palearctic (Kazakhstan) (YU et al. 2012).

In the process of redescription and illustration of described by G. Heinrich East

Palaearctic species *Magwengiella* (=*Listrocalus*) *nycthemerops* (HEINRICH, 1978), we encountered a number of difficulties, related primarily to the coloration of the type specimens. The samples (2 specimens), used by G. Heinrich for description of the species are not labeled by him as the holotype and paratype. Determination of the status of specimens was done by the description of geography of finds in the author's monograph (HEINRICH 1978). Coloration of the sample from the Zoological Museum of Moscow State University, that was marked by the author as the holotype, does not match the description of its coloration given in the monograph. First of all, it concerns the description of the white and yellow chromatic coloration. Much closer to the description of the given coloration is the coloration of the paratype on its photograph, courtesy of Dr. Stefan Schmidt (Zoologische Staatssammlung, Munich). The detailed description of the morphology of the holotype and the description of its coloration in comparison with the description of coloration given by G. Heinrich and coloration of paratype are presented below.

The terminology used for description of the morphology of the ichneumon flies, given in detail previously (TERESHKIN 2009).

Tribe Ctenocalini HEINRICH, 1938

Ctenocalini HEINRICH 1938 - Mem. Acad. Malg. **25**: 40-41.
Ctenocalini HEINRICH 1968 - Ichn. Stenop. of Africa **2**: 372, 377.
Type genus: *Ctenocalus* SZÉPLIGETI
Ctenocalini TERESHKIN 2009 - Linzer. Biol. Beitr. **41** (2): 1347-1348.

Genus *Magwengiella* HEINRICH, 1938

Magwengiella HEINRICH 1938 - Mem. Acad. Malg. **25**: 42.

Type species: *Magwengiella obtusa* HEINRICH

Listrocalus HEINRICH 1978 - East. Pal. Ichn.: 75-76.

Type species: *Listrocalus nycthemerops* HEINRICH

Magwengiella nycthemerops (HEINRICH, 1978) (Plate 1,2)

Listrocalus nyctemerops HEINRICH 1978 - East. Pal. Ichn.: 76-77, ♂.
Magwengiella nycthemerops BACHMAIER, DILLER 1985 – Entomofauna **6** (27): 490-491, comb.n.

M a t e r i a l e x a m i n e d : Holotype: ♂, Kazakhstan, Ural region., Dzhanybek, 13.06.1954, RAFES P.M. leg. (MSU). Paratype: ♂, Kazakhstan, lake. Chistoe at Semipalatinsk, 09.07.1957, PANFILOV D.V. leg. (ZSM).

M o r p h o l o g y :

M a l e (holotype)

F l a g e l l u m : Short, bristle-shaped, with 26 segments, reddish-brown and without white annulus; segments (7)8-14 with weakly visible tyloides; segment of flagellum slightly ribbed ventrally. Flagellum 1,5 times shorter by length then front wing and 2 times shorter than body length.

H e a d : Head contour from front roundish, 1,1 times wider than height; length of genae (malar space) equal 0,3 of eye height; eyes not big; genae and temples visible up to upper third of an eye; head contour from above transversal, 2,1 times wider than length in

middle and 1,8 times by an external contour. Vertex from lateral convex, roundly curved to occipital carina; temples long, 1,2 times longer than longitudinal diameter of an eye in the middle, temples from above swollen behind eyes, slightly and roundly narrowed backwards in hind half, from side parallel to hind margin of eye; occipital carina from above strongly roundly impressed but far not reach level of eyes and hind ocelli, sharp along the whole length, merged with hypostomal carina on the base of mandible; malar space 1,2 times longer than the mandible base width; mandible sickle-shaped, uniformly narrowed from base to apex, lower tooth moved inside and situated practically in same (horizontal) plane with upper one; clypeus transversal, almost two times wider than height, only just visible separated from middle field of face by very slight impression limiting middle field, convex at base and flattened to apex (slightly impressed) and lateral margins, with sharpened and distinctly broadly emarginated in middle front margin, lateral margins slanted, lateral angles rounded; labrum long, rounded, slightly narrower than front margin of clypeus with rather long pubescence; clypeal foveae small, rounded but distinct, area around them slightly impressed; surface of face slightly differentiated, but distinctly separated from genae, middle field of face more or less expressed, only just visible elevated in upper half above lateral fields and separated from lateral fields and clypeus by weak and very broad impressions; antennal cavities small, moderately and smoothly impressed, theirs upper borders reach level of front ocellus and lateral ones not reach borders of eyes, laterally above antennal fossae with distinct tubercles and without tubercle between antennal fossae; ocelli of normal size, diameter of lateral ocellus equal 0,6 distance to eye; ocellar triangle slightly elevated but more or less distinct. Face and base of clypeus punctured by small superficial punctures, surface between them polished, other part of head not sculpturated, smooth, polished, malar space very slightly shagreened.

T h o r a x : Collar of pronotum short with slightly rounded front margin, margin of collar above transverse furrow sharpened and high elevated, transverse furrow narrow and very deep, not interrupted by keel; margin of pronotal base slightly and uniformly curved; epomiae distinct but not sharp; pronotal ridge thickened, lateral impression far not reach upper margin. Mesonotum convex, 1,3 times longer than width; notauli distinct in front third; surface of mesonotum punctured by big smoothed irregular punctures (interspaces narrower than diameter of the punctures), shining, without microsculpture; axillary tongue not developed; prepectal carina sharp, at the top not reach front margin of mesopleurae; subalarum thick, high elevated; speculum impressed relative to front part of mesopleurae almost to level of area of mesopleural fovea, with sparce smoothed punctures, shining; area of mesopleural fovea deeply impressed relative to front part of mesopleurae; lower part of mesopleurae without distinct bend; sternauli absent; surface of mesopleurae densely punctured by smoothed punctures to smoothly wrinkly-punctured at lover hind third, shining, without microsculpture; mesopleural suture interrupted by sharp ribs; scutellum high elevated, from behind vertically abrupt to postscutellum, horizontal part strongly convex with sparse punctures, laterally bordered by leaf-like broadened at horizontal part carinae; lateral foveae on postscutellum developed. Hind margin of metanotum with triangular projections opposite lateral longitudinal carinae of propodeum. Propodeum from lateral rather short, convex, without sharp bend between horizontal and vertical surfaces, length of horizontal part 2,2 times shorter than length of area posteromedia in middle; carinae of horizontal part of propodeum developed, with exception of lacking lateral carinae of basal area and only

just marked external carina of area dentipara; lateral carinae of area posteromedia indistinct, coxal carina only just marked, practically absent; area superomedia transversal, 1,7 times wider than length in middle, almost horseshoe, costulae distinct, situated at middle of area superomedia; spiracles long, but not slit-shaped, length along external contour 2,7 times more than width in middle. Horizontal part of propodeum with big irregular punctures, except only just visible wrinkled area superomedia, shining, without microsculpture; area posteromedia sharply transversally-wrinkled; metapleurae with big irregular punctures, shining.

L e g s : Moderately short; coxae densely punctured by superficial smoothed punctures, shining; claws slightly broadened at base, curved in upper third.

W i n g s : Areolet quadrangular, asymmetrical, external veins of base some shorter than internal one and external veins of apex shorter than internal one; stigma rather narrow, light; radius practically straight; nervulus intersticial; ramulus rather long. Veins of both wings light, membrane of wings hyaline. Length of front wing 1,3 shorter than body length.

A b d o m e n : From above broadly-oval, parallelsided up to apex of 4th tergite, tergites 2-4 strongly sclerotized with sharp constrictions between them, segments 6-7 visible from above; second tergite transversal, 1,4 times shorter than breadth at apex. First tergite from lateral with smoothed transition of petiolus to postpetiolus, dorsal and dorsolateral carinae of petiolus more or less distinct, merged at base of petiolus, ventrolateral carina expressed, lateral surface of petiolus with very weak ribs at ventrolateral carina; from above petiolus very narrow, sharply and roundly transform into broad postpetiolus; distance between spiracles 1,6 times more than distance from spiracles to hind margin of tergite; middle field of postpetiolus only just marked and not limited by carinae smoothly longitudinally wrinkly-punctured; lateral fields with sparse smoothed punctures, polished. Gastrocoeli short, deep, 1,3 times less by width than interval between them; thyridia indistinct, but expressed; interval with sharp longitudinal wrinkles extend almost behind middle of tergite; lunulae in a form of weak impressions behind middle of tergite; surface of second tergite except middle punctured by big smoothed punctures; tergite 3 from base to middle medially and 4th at base roughly wrinkly-punctured, laterally both tergites punctured by small smoothed punctures; tergites 5-7 smoothed and shining with very delicate punctures. Hypopygium short, triangle with rounded apex; all sternites of abdomen with longitudinal fold.

S i z e : Body length – 8,6; front wing – 6,6; flagellum – 4,3 mm.

C o l o r a t i o n :

D i s c u s s i o n

As noted above, the description of the coloration of the holotype by the author of the original description does not correspond with coloration of sample with the geographical label of holotype. In our view, when describing the coloration of species, G. Heinrich (1978) used both the holotype and the paratype specimens. The description thus is of a compromise nature. Comparative table with description of the coloration of parts and segments of a body given by Gerd Heinrich (1978), description of the holotype coloration at present time and coloration of the paratype from Zoologische Staatssammlung, Munich done based on its photo made by Dr. Stefan Schmidt (in 2013) is given below (Table).

Comparative description of the coloration of *Magwengiella* (=*Listrocalus*) *nycthemerops* (HEINRICH, 1978)

Coloration according to HEINRICH description (1978)	Coloration of holotype	Coloration of paratype
Basic coloration of a body		
Light orange-red with abundant yellowish-white pattern.	Orange-red with white-yellow or light orange-red pattern.	Light orange-red with abundant yellowish pattern.
Black: frons around ocelli, longitudinal suture of mesothorax, base of propodeum, basal ridge of coxal area and narrowly base of tergites 5-7.	Black: ocellar triangle and middle part of antennal fossae, narrowly base of tergite 5.	Black: … base of propodeum, coxal area, basal ridge of coxal area and narrowly base of tergite 5.
Scapus		
Light orange-red with yellowish-white spot in front.	Orange-red with white-yellow spot in front.	Orange-red with yellow spot in front.
Flagellum		
Blackish, ventrally more than up to middle light ochreous.	From base ventrally up to segment 6 reddish-brown, in apical half darkened.	From base ventrally up to apical third light ochreous.
Head		
Face and clypeus entirely yellowish-white.	Face and clypeus light orange with traces of white-yellow pattern on middle field of face and lover parts of lateral fields and also (weaker) in middle and along front margin of clypeus.	Face and clypeus yellow.
Frontal orbits broadly up to level of black area at ocelli yellowish-white.	Frontal orbits broadly up to short darkened area from hind ocellus to an eye light orange with traces of white-yellow pattern in upper part.	Frontal orbits broadly up to short darkened area from hind ocellus to an eye yellow.
–	Antennal cavities except central part orange-red.	–
External orbits up to lower angle of an eye broadly yellowish-white.	External orbits up to lower angle of an eye light orange with traces of white-yellow pattern in upper part, vertex behind hind ocelli, hind part of temples with traces of white pattern, genae orange-red (reddish-brown).	External orbits up to lower angle of an eye yellow, vertex behind hind ocelli, hind part of temples and genae orange-red.
–	Mandibles yellowish with darkened apex.	–
–	Maxillary palp yellowish.	–

Coloration according to HEINRICH description (1978)	Coloration of holotype	Coloration of paratype
T h o r a x		
Upper margin of pronotum very broadly yellowish-white.	Collar of pronotum, pronotal base and upper margin of pronotum (very broadly) light orange-red; margin of pronotal base and propleurae ventrally partially with yellowish pattern.	Collar of pronotum dorsally with spot, upper margin of pronotum very broadly yellow, other part of pronotum orange-red.
Tegula with yellow spot.	Tegula and base of wing light orange-red.	Tegula and base of wing yellow.
Subalarum yellowish-white.	Subalarum and middle part of mesopleurae light orange-red; front upper part of mesopleurae with white-yellow stripe.	Subalarum broadly, hind angle of mesopleurae with spot and middle part of mesopleurae broadly yellow.
Sutellum from above and carinae before scutellum yellowish-white.	Sutellum from above, carinae before scutellum and lateral carinae light orange-red.	Sutellum from above, carinae before scutellum and lateral carinae yellow; postscutellum with yellow spot.
Metapleural areas almost entirely yellowish-white.	Carinal triangle from below and metapleurae in front with traces of white-yellow pattern, margins of metapleurae above hind coxae and margins of propodeum above base of petiolus narrowly white-yellow.	Carinal triangle and metapleurae in considerably part with yellow pattern. [Most part of yellow pattern of metapleural areas is transformed to greenish-black color]
Hind margin of area superoexterna, area dentipara entirely, area superomedia except front margin, area posteroexterna partially, yellowish-white.	Area superoexterna and area dentipara with traces of white-yellow pattern.	Hind margin of area superoexterna, area dentipara entirely, area superomedia except front margin, area around spiracles and apex of area spiraculifera, area posteroexterna partially, yellow. [Most part of surface of area spiraculifera is transformed to greenish-black color, also probably of yellow color]
A b d o m e n		
1st tergite light orange-red, postpetiolus almost entirely yellowish-white.	1st tergite light orange-red with yellowish base of petiolus and very narrow yellow-white stripe along hind margin of postpetiolus.	1st tergite light orange-red with yellow postpetiolus.
2nd tergite apically with broad white-yellow stripe broadened	2nd tergite at base broadly whitish (albescent) with traces	2nd tergite in apical third with narrowly interrupted in middle

Coloration according to HEINRICH description (1978)	Coloration of holotype	Coloration of paratype
sideways and narrowly interrupted in middle.	of white-yellow pattern laterally and very narrow white-yellow stripe along apical and lateral margins.	broad yellow stripe.
Tergites 3-4 with broad apical white-yellow stripes not interrupted in middle.	Tergite 3 broadly but indistinctly yellow, except for light orange-red base and very narrow white-yellow stripe along apical and lateral margins.	Tergites 3-4 with broad apical yellow stripes not interrupted in middle.
-"-	Tergite 4 in a most part laterally and up to apex yellow-white, in the base broadly light orange-red.	-"-
Tergites 5-7 white, except for black base.	Tergites 5 in a most part yellow-white, except for narrow dark base.	Tergites 5 in a most part yellow, except for narrow dark base.
-"-	Tergites 6-7 entirely yellow-white.	Tergites 6-7 almost entirely yellow.
L e g s		
All coxae entirely, except orange spot on external side and base of theirs internal side, yellowish-white.	Coxae of all the legs light orange-red with traces of white pattern.	All coxae entirely, except orange spot on external side and base of theirs internal side, yellow.
–	Trochanteres of front legs and middle ones partially, tibiae and tarsi of front and middle legs predominately yellow.	Trochanteres of front legs and middle ones partially, tibiae and tarsi of front and middle legs predominately yellow.

As can be seen from the table of descriptions of coloration of holotype and photo of paratype, the transformation of coloration is quite significant.

In the holotype, maximum replacement of white-yellow coloration to light orange-red one is observed. On the head capsule, the white-yellow coloration persists only as the weak traces on the lateral fields of face, middle field and clypeus, and light orange coloration in the hind part of occiput has transformed into a whitish. Coloration of thorax of insect's body and coxae of all the legs underwent the greatest transformation. White-yellow coloration almost disappears. White-yellow spots on upper margin of pronotum, tegula, subalarum, middle part of mesopleurae, yellow coloration of carinae before scutellum, lateral carinae and scutellum from above are substituted with lighter orange-red coloration. Yellow coloration on metapleurae and propodeum is noticeable only as weak traces. Moreover, most of the yellow pattern of metapleural areas and areas of propodeum of paratype transformed into a greenish black color (Fig. 1). The highest degree of white-yellow coloration is preserved in the apical part of the abdomen (cf. Plates 1, 2).

Fig 1: *Magwengiella* (=*Listrocalus*) *nycthemerops* (HEINRICH, 1978) paratype from ZSM (photo of St. Schmidt 06.09.2013).

The most radical replacement of the yellow coloration in the holotype is observed on the first and second tergites of its abdomen. The yellow coloration of the postpetiolus and of the apical half of the second tergite is almost completely replaced by orange-red. And, moreover, the base of the second tergite, orange-red in paratype, attains of a whitish color (Plate 1, 5).

Coloration of the species is a combination of orange-red and yellow-white colors. As it is known, the yellow and orange colors are determined by the pigments (carotinoids) of the same group (TYSHCHENKO 1976). The specimen of the holotype was found four years earlier than the paratype. At present it is impossible to establish methods of their fixation and chemical preparations used for the processing of collection's material in the process of storage.

From the above it can be concluded that the differences in coloration of the specimens of type material are not the result of its natural variation and are most likely a result of the impact of a clamp and storage conditions, taking into account the time factor.

Thus, the data on the transformation of a combination of orange-red and white-yellow pigmental colorations of the insect's body should be taken into account when carrying out taxonomic studies of Hymenoptera.

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Zusammenfassung

Detailed illustrated descriptions of East Palaearctic species *Magwengiella* (=*Listrocalus*) *nycthemerops* (HEINRICH, 1978) is presented in the article. The problem of stability and changes of pigmental yellow-orange-red coloration of type material is considered.

Vorliegende Arbeit bringt eine detaillierte Beschreibung der ostpaläarktischen Art *Magwengiella* (=*Listrocalus*) *nycthemerops* (HEINRICH, 1978) (Hymenoptera, Ichneumonidae). Das Problem der Stabilität bzw. das Ändern der Gelb-Orange-Rot-Färbung von Typenmaterial wird angesprochen.

Literature

BACHMAIER F. & E. DILLER (1985): Zur Taxonomie der Gattung *Magwengiella* HEINRICH, 1938 (Hymenoptera, Ichneumonidae, Ctenocalini). — Entomofauna **6** (27): 489-499.

HEINRICH G.H. (1938): Les Ichneumonides de Madagascar, part 3, Ichneumonidae, Ichneumoninae. — Mem. Acad. Malgache **25**: 7-139.

HEINRICH G.H. (1967): Synopsis and Reclassification of the Ichneumoninae Stenopneusticae of Africa south of the Sahara (Hymenoptera). — Monograph, Farmington State College Press, Maine, U.S.A. **2**: 251-480.

HEINRICH G.H. (1978): Eastern Palaearctic Ichneumoninae. — Nauka, 1-81. [in Russ].

RASNITSYN A. (1978): Introduction. — In: HEINRICH G.H. (1978), Eastern Palaearctic Ichneumoninae. Nauka, 1-81. [in Russian].

TERESHKIN A. (2009): Illustrated key to the Ichneumoninae tribes and Platylabini genera of world fauna (Hymenoptera, Ichneumonidae, Ichneumoninae). — Linzer biol. Beitr. **41** (2): 1317-1608.

TYSHCHENKO V.P. (1976): Insect Physiology. Pt.1. The physiology of metabolic systems. — Izd. Leningr. univ., 1-364. [in Russian].

YU D.S., van ACHTERBERG K. & K. HORSTMANN (2012): World Ichneumonoidea. Taxonomy, Biology, Morphology and Distribution. — URL: http://www.taxapad.com/.

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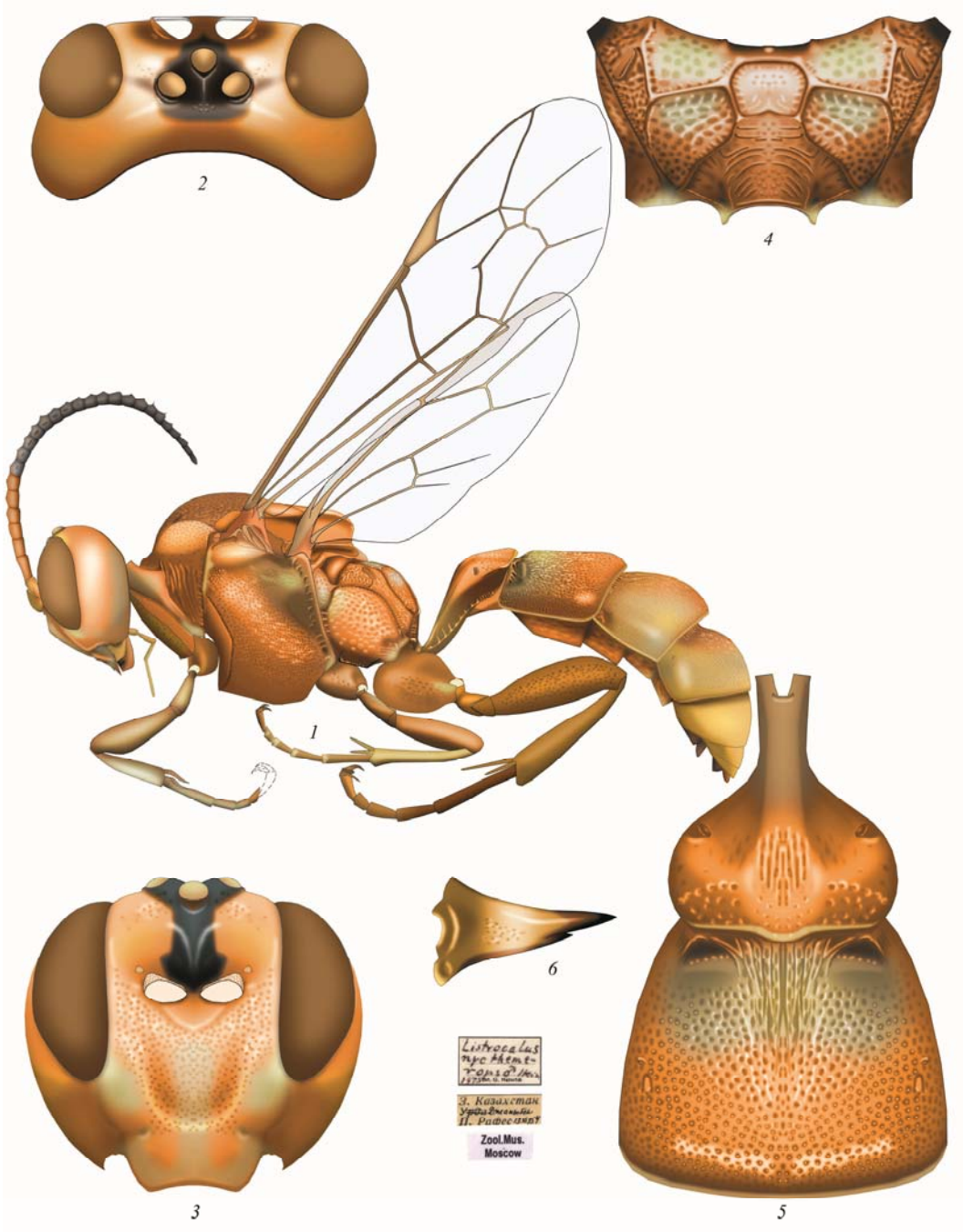

Plate 1: *Magwengiella (=Listrocalus) nycthemerops* (HEINRICH, 1978), ♂; holotype's coloration at present time. (**1**) imago; (**2**) head from above; (**3**) head from front; (**4**) propodeum; (**5**) segments 1-2 of abdomen; (**6**) mandible in front.

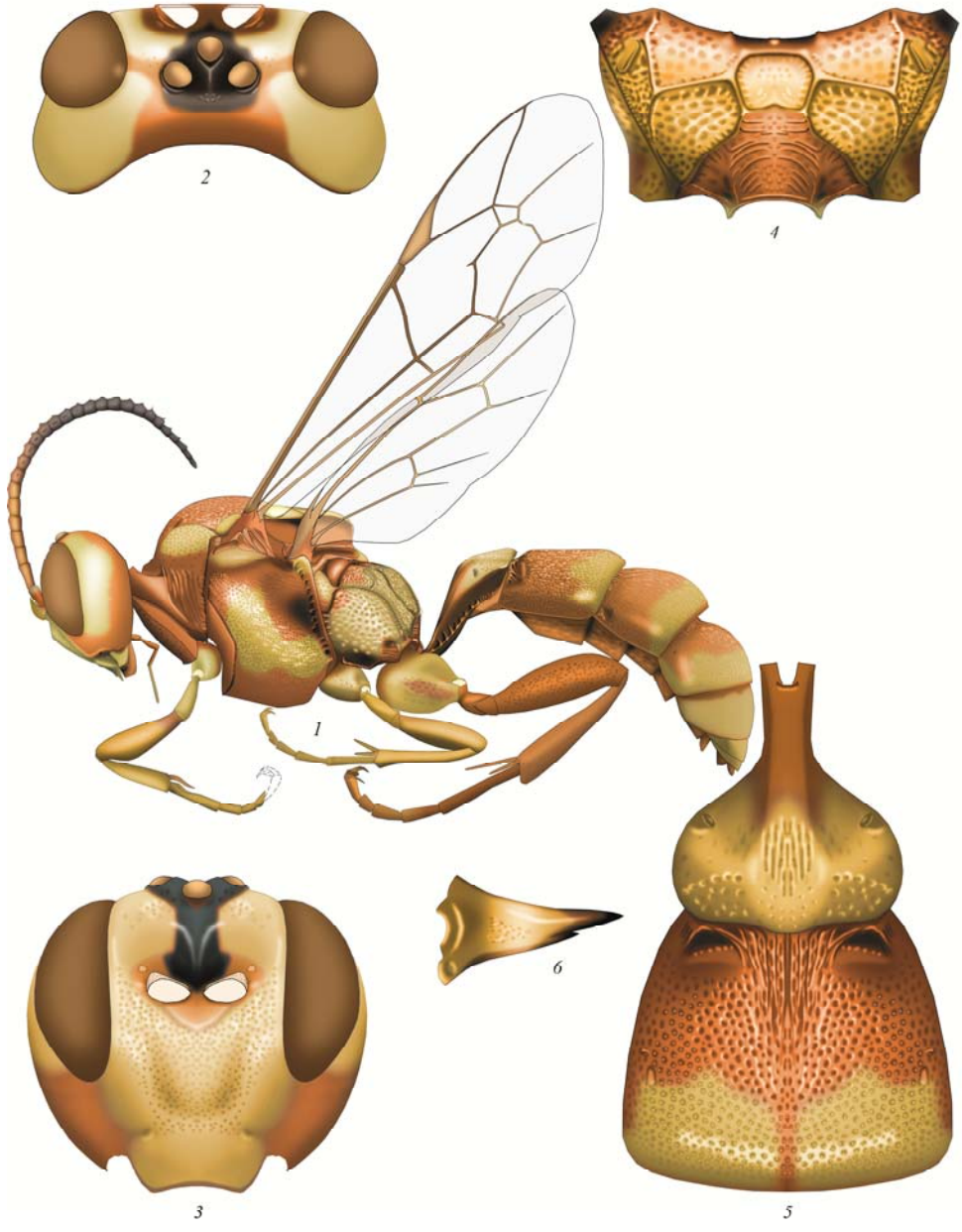

Plate 2: *Magwengiella (=Listrocalus) nycthemerops* (HEINRICH, 1978), ♂; coloration taking into account the coloration of paratype from ZSM and its description given by HEINRICH (1978). (**1**) imago; (**2**) head from above; (**3**) head from front; (**4**) propodeum; (**5**) segments 1-2 of abdomen; (**6**) mandible in front.