

THE DESCRIPTION OF THERITAS GOZMANYI
FROM THE ANDES AND ITS SPECTROSCOPIC
CHARACTERIZATION WITH SOME NOTES ON THE GENUS
(LEPIDOPTERA: LYCAENIDAE: EUMAEINI)

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A key for separating sister genera *Arcas* SWAINSON, 1832 and *Theritas* HÜBNER, 1818, plus eight nominal species placed in *Theritas* is given. Three species groups within the latter genus are distinguished. A new species, *Theritas gozmanyi* BÁLINT et WOJTUSIAK, sp. n. is described from Ecuador. The presence of a discal scent pad on the fore wing dorsal surface and spectral characteristics of the light reflected from the central part of the discal cell were used as characters for discrimination of the new species.

Key words: androconial clusters, spectroscopy, structural colours, *Theritas* species-groups

INTRODUCTION

The generic name *Theritas* was established by monotypy for the new species *Theritas mavors* by HÜBNER (1818). The genus-group name was not in general use until the revision of D'ABRERA (1995), who placed 23 species-group taxa in *Theritas* on the basis of the character “the pennent-like tail which projects outwards, and an approximate right angle from, and as a part of, a squared-off projection of the tapered h. w. [hind wing] tornus”. Subsequently D'ABRERA and BÁLINT (2001) reduced the number of species in *Theritas* to six, suggesting a narrower application. Later, ROBBINS (2004) included in *Theritas* 25 species-group taxa placing numerous taxa in new combinations. Many names used by d'ABRERA (1995) as valid were considered by ROBBINS as synonymies without arguments that could support such a point of view.

Recently, the genus *Arcas* SWAINSON, 1832 (type species: *Papilio imperialis* CRAMER, 1775; by monotypy) was identified as the sister genus of *Theritas* on the basis of an alar androconia, the character which is shared by both genera (BÁLINT 2006a: figs 2–3). This character was mentioned first as “a fold on the secondaries near the median nervure beneath” for *Theritas mavors* but not for the species of

Arcas by GODMAN and SALVIN (1887: 15), then as “a flat, but deep pouch lined with specialized scales in space 1b on the under surface of the hind wing” by ELIOT (1973: 402). The androconial fold is missing, or situated medially and not basally in many taxa classified as *Theritas* by D’ABRERA (1995) and ROBBINS (2004), but they actually belong to various other eumaeine genera (BÁLINT, *in prep.*).

Working on *Theritas* material collected recently in Ecuador a hitherto unrecognized species has been found. The new species appeared to be distinct on the basis of wing colouration and the presence of androconial clusters. In this paper (1) we provide a useful key that enables to separate the genera *Arcas* and *Theritas* as well as all the *Theritas* species we currently recognize, (2) we are describing a new taxon and (3) we discuss the values of characters used to separate the new species.

MATERIALS AND METHODS

For comparative studies we examined altogether 662 specimens of *Theritas* deposited in the Lepidoptera collections of the following European museums (in parenthesis with numbers of specimens deposited) (with acronyms used throughout the text and the name of the curators): Hungarian Natural History Museum (41) (HNHM – Budapest, Hungary), Museum national d’histoire naturelle (97) (MNHN – Paris, France; Dr JACQUES PIERRE), Naturhistorisches Museum (33) (NMW – Wien, Austria; Dr SABINE GAÁL-HASZLER and Dr MARTIN LÖDL), The Natural History Museum (445) (BMNH – London, United Kingdom; Mrs BLANCA HUERTAS and Mr PHILLIP R. ACKERY), Zoological Museum of the Jagiellonian University (16) (MZUJ – Krakow, Poland) and Zoologisches Staatssammlung des Bayerisches Staates (30) (ZSM – München, Germany; Dr AXEL HAUSMANN). The key with the indication of the general distribution for the species was composed on the basis of this material. In the descriptive text we apply the terminology used in our previous studies on eumaeine lycaenids (*cf.* BÁLINT *et al.* 2006b).

Genitalia preparations for comparative studies were made by the senior author using standard techniques and were attached to the relevant specimens in plastic microvials. However, because of lack of clear-cut characters, the genital preparations were used only for distinguishing higher categories like species-groups and not for diagnoses at species level. Only some of their measurements were used to supplement the description. Measurements were taken in lateral view with an Olympus GSWH1022 placed as microscope ocular using paratypic specimens.

Spectrographic analyses were performed by using Avantes 2048 fiber optic spectrometer working in the ultraviolet, visual, and near infrared range of wavelengths (200–1000 nm). Measurements of light reflected from the dorsal surface of fore wing at the angle of 90° in the centre of discalis just beside the scent patch, were taken for each individual. The specimens used for spectrography with their individual data are listed in the Appendix.

KEY TO THERITAS

- 1 Ground colour of hind wing ventral surface brown. Imagines sexually dimorphic, males possessing a green hue over shading ground colour when looked at from certain directions; subbasal line running between subcosta and anal vein branch of cubital vein, on hind wing CuA1 terminus with or without a tail, the length of which being equal or shorter than 1 mm
2 (*Theritas* HÜBNER, 1818)
- Ground colour of hind wing ventral surface goldish green with suffusion of black scales. No sexual dimorphism in colouration. Transverse black median band running more or less parallel to distal margin, from costa to anal margin, CuA1 on hind wing with a tail longer than 1 mm *Arcas* SWAINSON, 1832
- 2 Hind wing vein CuA1 terminus with a tail 3
- Hind wing vein CuA1 terminus without a tail (SE Brazil)
Th. triquetra (HEWITSON, 1865)
- 3 Hind wing ventral pattern with a median line running parallel to submarginal line
4 (*mavors* species group)
- Hind wing ventral pattern with a median line joining submarginal line at vein CuA2
6 (*paupera* species group)
- 4 Fore wing ventral surface with a pattern, ground colour greenish or grey 5
- Fore wing ventral surface without a pattern, ground colour brown (Meso-america)
Th. kalikimaka (CLENCH, 1944)
- 5 Ventral fore wing pattern with submarginal line (N Venezuela)
Th. lotis (GOODSON, 1945)
- Ventral fore wing pattern without submarginal line (Pan-american)
Th. mavors HÜBNER, 1818
- 6 Male dorsal fore wing without androconia, ventral surface with faint green structural colour 7
- Male dorsal fore wing with androconia, ventral surface with strong green structural colour 8
- 7 Male fore wing dorsal surface green (SW Colombia to N Peru)
Th. paupera (FELDER & FELDER, 1865)

- Male fore wing dorsal surface violet blue (Bolivia)
Th. harrietta (WEEKS, 1901)
- 8 Male fore wing dorsal surface pale blue with black scent patches in medial vein cells near discalis (SE Brazil)
Th. drucei (LATHY, 1926)
- Male fore wing dorsal surface bluish green without discocellular scent patch (Ecuador to N Peru)
***Th. gozmanyi* sp. n.**

DESCRIPTION OF NEW SPECIES

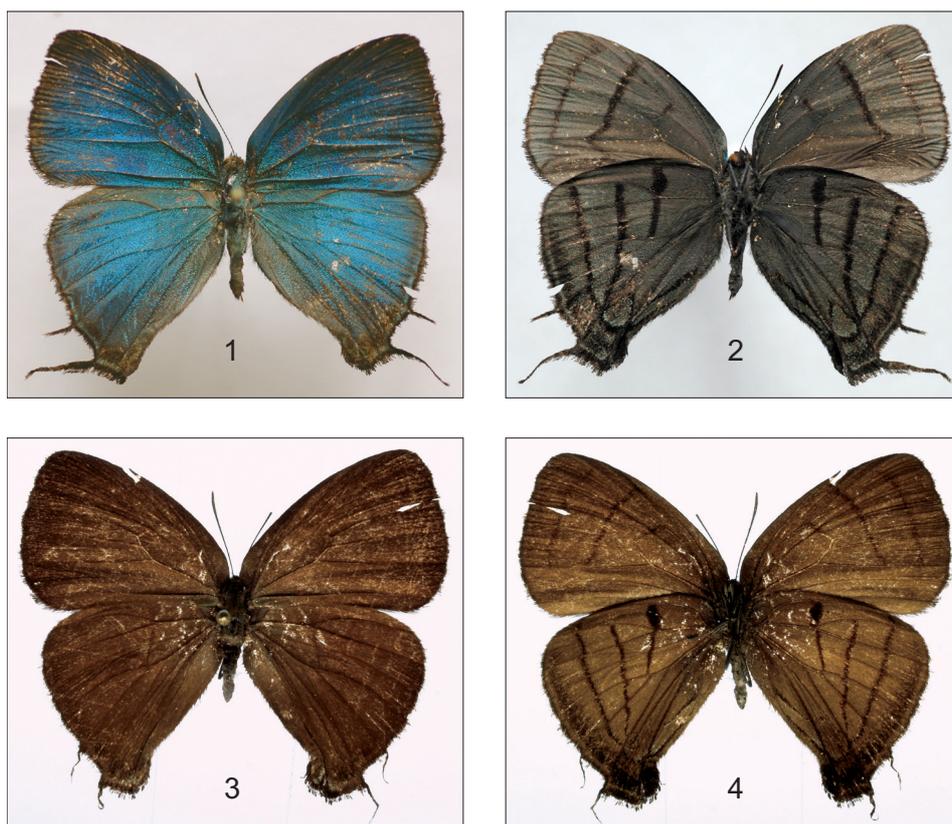
***Theritas gozmanyi* BÁLINT et WOJTUSIAK sp. n.** (Figs 1–6)

Type material. – MZUJ, holotype, male, labelled as “ECUADOR [//] Prov. Morona-Santiago; [//] 9 de Octubre n/ Macas [//] 1700 m; 08. 2001 [//] Coll. J. Wojtusiak”; set dorsally in good condition, wings slightly worn, left fore wing apical and right hind wing medial margin with minute damage, right antenna missing. Paratype nos 1–12 are all males, no. 13 is female: ECUADOR: with holotype data (nos 1–2); Morona-Santiago, Macas, 1700 m, X.2001 (no. 3) (gen. prep. BÁLINT no. 1136); Morona-Santiago, San Juan Bosco, 11.VIII.2001 (nos 4–6) (no. 5) (gen. prep. BÁLINT no. 1140); Imbabura, Lita, appr. 900 m, X. 2001 (no. 7); Cañar, Guarumales-Mendez, 2200 m, IX.2001 (no. 8); Loja, km 40 via Loja-Zamora, XI. 2001 (no. 9). PERU: Amazonas, Chachapoyas, Molinopampa-Granada, 2800 m, IX.2002 (no. 10) (gen. prep. no. BÁLINT. 1141); Molinopampa-Granada, IX. 2002, 2800 m (no. 11); Rodríguez de Mendoza, V.1994, coll. KÖNIG, no. 452 (no. 12); Chachapoyas, Molinopampa-Granada, 2800 m, IX.2002 (no. 13, female). The paratypes nos 2, 4 and 8 are deposited in the HNHM, the remaining specimens are in the MZUJ.

Diagnosis – Antennal base adjacent to the margin of the compound eye (family Lycaenidae); male prothoracic leg not greatly modified and fore leg coxa not arched upward distally (subfamily Theclinae), male fore tarsus stubby-tipped and wings only with three radial vein termini (tribe Eumaeini), male with a discocellular scent pad along medial veins and an androconial fold below the discal area along the cubital vein (*Theritas*). Reminiscent to the congener and parapatric *Th. harrietta* and sympatric *Th. paupera*, but male has two distinctive characters on the dorsal surface of the fore wings: (1) a scent pad is present in the discal cell apex (absent in *Th. harrietta* and *Th. paupera*); and (2) ground colour is bluish green (violet blue in *Th. harrietta* and green in *Th. paupera*).

Description – Male (Figs 1–2, 5–6). Head: Frontoclypeus, lateral surface of the medial segment of labial palpus and vertex with scales generating deep green colour, terminal segment short, pointed and black; eyes hairy; antennal flagella and club dorsally black with white ventral scalings in each segment, club brown.

Thorax and legs: thoracic sclerotized parts dorsally covered by gleaming green scales and short hairs, laterally and ventrally covered by short dark brown hairs; legs with femour and tibia covered by gleaming greenish blue scales laterally, inner sides black, tarsomere white. Wings: Fore wing costal margin slightly convex basally and straight distally with anal margin length; distal margin convex and somewhat shorter than costal margin, apex and tornus rounded; dorsal ground colour greenish blue, discoidal cell with the 1/3 costal margin length, discoidal scent patch situated basally to medial veins; margin with 1mm wide black border, fringes grey; ventral ground colour brown but with a gleaming green hue strongly dependent on the angle and intensity of falling light, scent pad as a small discoidal protrusion along medial veins, submedial stripe black and straight running towards tornus until vein Cu1, antemarginal stripe black and parallel to margin stopping at vein Cu1, anal wing area plain grey or brownish, fringes brown. Costal and distal margins of hind wing convex, anal margin convex with a pronounced tornal lobe, vein terminus Cu1 with shorter (< 1 mm) and Cu2 longer (> 1 mm) filamentous tail positioning along distal margin with luminous white tips; dorsal ground colour and margin as in fore wing but costal cell is paler and anal area covered with long hairs situated along cubital vein, tornal area ornamented by thin (1 mm) light blue antemarginal line; ventral sur-



Figs 1–4. *Theritas gozmanyi* BÁLINT et WOJTUSIAK, sp. n. 1 = holotype in dorsal view, 2 = *idem*, ventral view, 3 = paratype no. 13 in dorsal view, 4 = *idem*, in ventral view

face ground colour as in fore wing with wide, dark submarginal and thin light antimarginal areas, pattern composed of subbasal, submedian, submarginal and anal black stripes running towards tornus; subbasal stripe in costal cell widened resulting in an impression of an eye, crossing through medial area and ending at M3 vein terminus; submedian and submarginal lines join in tornus at vein Cu2; cell Cu2 with delicate submedian arrow head mark pointing towards base, anal cell with a delicate central and marginal black line, tornal area black; a poach present along cubital vein from its base to postbasal area opening basally and containing androconial scales.

Abdomen: dorsally and laterally gleaming bluish green, ventrally greyish, tip of aedeagus visible; genitalia commonplace eumaeine structures with brush organ: genital capsule bullet shaped with anterior sensory hairs, tegumen with a large pair of long and slender gnathos curved with pointed termini, a brush organ situated on dorso-lateral side in vincular and tegumenal border area; vinculum relatively slender with sclerotised appendix angularis, saccus very long, valvae short and small compared to tegumen and fused with membranous manica, internal side with flap pointed dorsally, aedeagus very long with more than three times the length of valva, vesica with long and S-shaped cornutus in lateral view.

Measurements – Fore wing venation (n = 3) in mm: radial vein length from base to R3 erection = 0.7, 0.7, 0.7; medial vein M1 length from erection to terminus = 1.25, 1.35, 1.49; cubital vein length from base to Cu1 erection = 0.7, 0.7, 0.75. Fore wing reflectance (n = 6): amplitudo = ~ 25 %; maximum ~ 495 nm. Male genitalia (n = 3) in mm: valve length = 0.9, 1.0 and 1.1; saccus length = 1.7, 1.5 and 1.5; internal aedeagus length = 1.4, 1.2 and 1.2; external aedeagus length = 3.5, 3.6 and 3.3; tegumen length = 1.3, 1.4 and 1.5.

Female (Figs 3–4). As male but without structural coloration in body and wings. Genitalia not studied.

General distribution – Geographical: known from Ecuadorian provinces Cañar, Imbabura, Loja and Morona-Santiago, and from Peru, department Amazonas. Presumably also occurs in south-western Colombia. Temporal: known only from type data, specimens were collected in May, August, September and October. Spatial: known from type data elevations 900, 1700, 2200, 2800 and 2900 m suggesting to be inhabiting mountain cloudforests.

Etymology – Noun, gender masculin, dedicated to the memory of late Dr. LÁSZLÓ GOZMÁNY (1921–2006), former curator of Lepidoptera in the Hungarian Natural History Museum.

DISCUSSION

Dorsal fore wing androconia

The fact that *Theritas gozmanyi* occupies a different niche than its sympatric congeners *Th. mavors* and *Th. paupera* is supported not only by the differences in wing colouration and pattern but also by the dorsal fore wing androconia which are unique in the genus. The androconia of *Th. gozmanyi* is comprised of a discoidal scent pad situated in the apical area of the discal cell and extending from the erection of the upper discocellular vein and widening slightly toward the lower discocellular (Figs 5–6). There is no scent patch beyond the discal cell in the medial area that could cover the spaces between the medial veins as in some other species in the

genus possessing this type of androconia (Figs 7–8). Moreover, some *Theritas* taxa completely lack dorsal fore wing androconia. These are *Th. harrietta* and *Th. paupera* (Figs 7–8), the closest relatives of *Th. gozmanyi* as indicated by similarities of their wing pattern and genitalia.

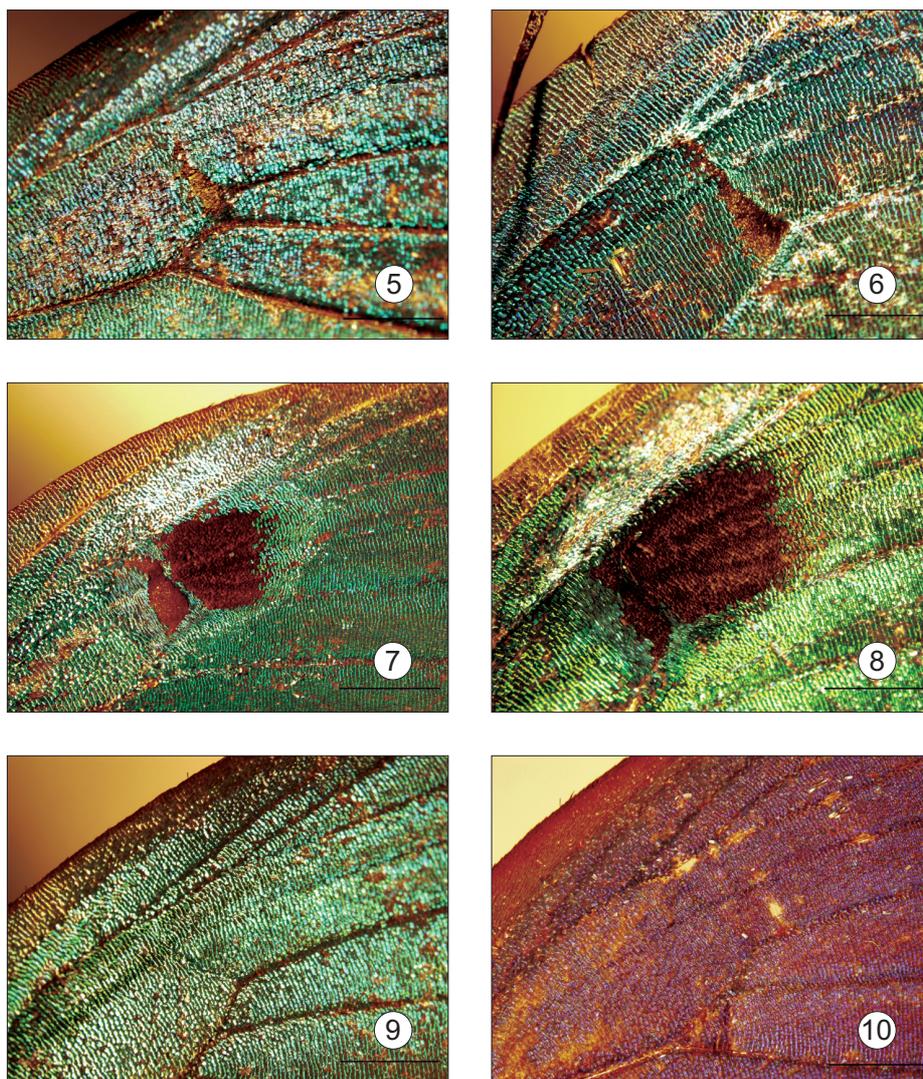
We believe that specialised scales are important characters of a species, the populations inhabit a certain ecosystem and occupy there a unique niche. In the case of neotropical riordinid butterflies (Lepidoptera: Riordinidae) it is well established that microhabitat specialisations lead evolution of highly diverse, specialised scales, including androconia (HALL & HARVEY 2002). Similar phenomenon can be observed in neotropical eumaeines. Therefore, we think that the hypothesis assuming the existence of some phenotypes of the same eumaeine species with specialised androconial scales on dorsal fore wing and some without them, is rather weak and until the present there is no evidence to support it. In the case of *Th. gozmanyi* – *Th. paupera* there are data confirming their sympatric occurrence. It is the task of future field work to clarify whether they are syntopic or paratopic.

It is an interesting question why *Th. paupera* occupying forest understory habitats (PRIETO 2006, PRIETO & DAHNERS 2006) lacks androconia on its dorsal surface of fore wings while *Th. mavors*, a mid canopy and hilltopping species (FAYNEL 2003, PRIETO 2006), has them. We may speculate that in the dark, shadowed habitat of *Th. paupera*, where the amount of light penetrating understory is significantly smaller than that above the canopy, hence the use of optical signals would not be effective to serve as a mode of communication between the sexes. Therefore it is interesting that this species did not evolve scent organs for signal-

Table 1. Distribution of dorsal fore wing androconial clusters and ventral wing structural colour in *Theritas* nominal taxa listed in alphabetic order; 1 = presence, 0 = absence; = means no measurements. All the taxa possess hind wing ventral androconia along cubital vein

Species-group name	Scent patch of ELIOT 1973 and CLENCH 1975	Visual patch of ELIOT 1973 and scent pad of CLENCH 1975	Ring of ELIOT 1973	Spectral properties (wavelength in nm / reflectance %)
<i>Th. drucei</i>	1	1	0	not measured
<i>Th. gozmanyi</i>	0	1	0	495/25
<i>Th. harrietta</i>	0	0	0	450/20
<i>Th. kalikimaka</i>	1	1	1	not measured
<i>Th. lotis</i>	1	1	1	not measured
<i>Th. mavors</i>	1	1	1	530/20
<i>Th. paupera</i>	0	0	0	510/40
<i>Th. triquetra</i>	1	1	1	495/22.5

ling, contrary to its sister taxa living in highly illuminated habitats; consequently it can be suggested that these highly specialized scales need high amount of light to perform their function.



Figs 5–10. Male dorsal fore wing surfaces in *Theritas*: 5 = *Th. gozmanyi* BÁLINT et WOJTUSIAK, sp. n. holotype, scent pad in discal cell apex; 6 = *Th. gozmanyi* BÁLINT et WOJTUSIAK, sp. n., paratype no. 6, scent pad in discal cell apex; 7 = *Th. triquetra* (HEWITSON, 1865) with discal scent pad “ring” and discocellular scent patch; 8 = *Th. mavors* HÜBNER, 1818 with discal scent pad and “ring” plus discocellular scent patch; 9 = *Th. paupera* (FELDER et FELDER, 1865), no androconia; 10 = *Th. harrietta* (WEEKS, 1901), no androconia; scale bar: 0.2 mm

There are some indications in the literature that eumaeines disseminate odours (MÜLLER 1877). However, hitherto there is no strong evidence to support the hypothesis that these clusters of scales in eumaeine lycaenids function as scent disseminating androconia (cf. ELIOT 1973: 400–402; ROBBINS 1991: 12). ELIOT (*l.c.*) described the difficulties in explaining how certain types of thecline androconia can work. He even termed the scent pad *sensu* CLENCH (1975) and ROBBINS (1991) as “visual brand” and the surrounding bright scales he termed as a “ring” (cf. Figs 7–8). The term “scent patch” was applied by ELIOT (1975: fig. 122) to the cluster of scales heavily packed with melanine. Subsequently, this group of scales was also termed as “scent patch” by CLENCH (1975) and ROBBINS (1991). The distribution of the visual brand, the ring and the scent patch in *Theritas* is tabulated in Table 1. It cannot be excluded that these eumaeine scale clusters are optical devices or support a kind of physiological function of the individual which is different than scent disseminating. In fact, the nanoarchitecture of the scales in the androconial clusters of eumaeines are resembling those which work as optical or thermal devices (BIRÓ *et al.* 2003, KERTÉSZ *et al.* 2006), or the scales present in some primitive Lepidoptera (SIMONSEN 2001).

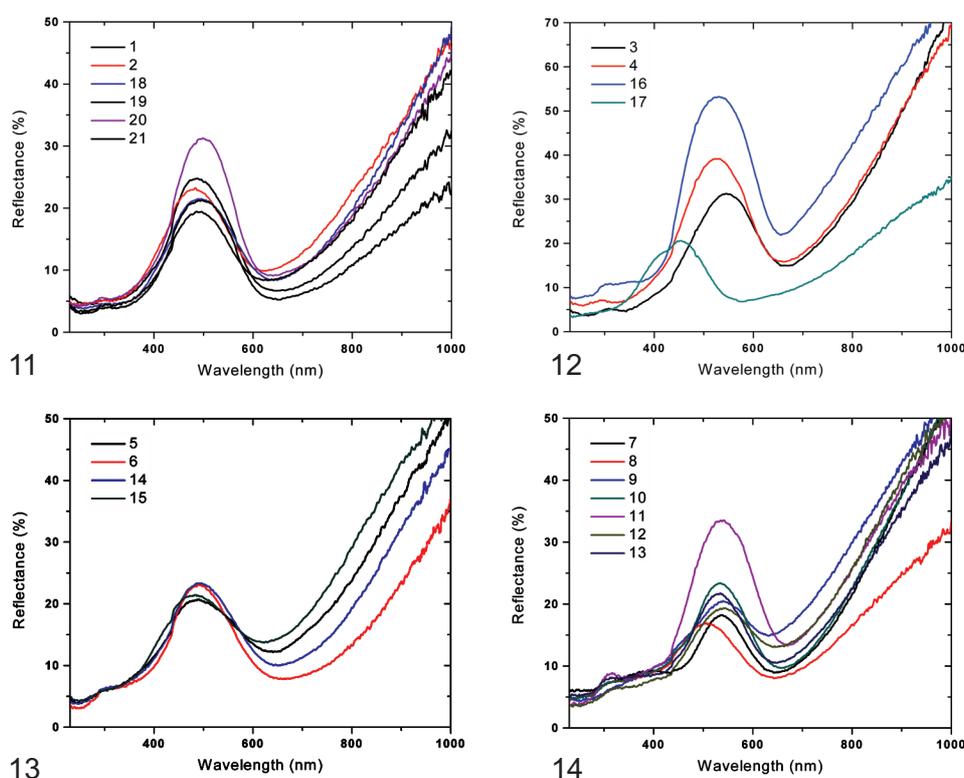
Male dorsal wing surface ground colour and spectroscopy

In some of our previous papers we emphasized the importance of spectroscopic properties of the dorsal fore wing structural colours regarding male signals (BÁLINT *et al.* 2006a, b, 2007a, b). We have conducted a similar experiment with *Theritas* measuring spectral characteristics of 21 individuals (see Appendix) to test this phenomenon. Our results are in concordance with the previous ones. The species assigned to the genus *Theritas* can be characterized on the basis of their spectral properties as it was demonstrated for other species of the family Lycaenidae.

In all five individuals of *Th. gozmanyi* the maximum of reflectance oscillated around 495 nm, with the amplitude variation between 20–30% (Fig. 11). The sympatric *Th. paupera* turned to be different in that its reflectance maxima were shifted to 530 nm, and the all measured individuals showed higher reflectivity (over 30%) compared to *Th. gozmanyi*. The single specimen of *Th. harrietta* we could measure had a peak around 450 nm with 20% reflectance (Fig. 12). Therefore, the different dorsal wing colouration accompanied with characteristic spectral properties can be a reliable tool to identify conspecific and non-conspecific individuals.

We made spectrographic analyses for another two *Theritas* species, *Th. triquetra* and *Th. mavors*. The measurements taken on four specimens of *Th. triquetra*, revealed the same figures as obtained for *Th. gozmanyi*, i.e. reflectance maxima

about 495 nm with 20–25% reflectance (Fig. 13). However, the values of the full width at half maximum of the reflectance peaks for the two species *Th. gozmanyi* and *Th. triquetra* are quantitatively different. The distribution of *Th. triquetra* is restricted to southeastern part of the South America and the species does not occur in the Andes. Measurements of seven individuals of *Th. mavors* selected from a wide geographic range of distribution (see Appendix) revealed the reflectance maximum at about 530 nm with a moderate reflectivity around 20% (Fig. 14). Such spectrographic properties guarantees *Th. mavors* an immediate recognition and



Figs 11–14. Spectral properties of five *Theritas* species measured in the centre of the right fore wing discal cell (collecting data and depositories listed in the Appendix): 11 = *Th. gozmanyi* BÁLINT et WOJTUSIAK, sp. n., six male individuals from Ecuador; 12 = *Th. paupera* (FELDER et FELDER, 1865) three male individuals from Colombia (nos 3–4) and Peru (no. 16) plus one *Th. harrietta* (WEEKS, 1901) male individual from Bolivia (no. 17); 13 = *Th. triquetra* (HEWITSON, 1865) three male individuals from SE Brazil; 14 = *Th. mavors* HÜBNER, 1818 seven male individuals from Brazil (no. 10), Bolivia (no. 11), Colombia (nos 7, 9, 12), Costa Rica (no. 13), and Peru (no. 8)

discrimination between conspecific individuals even in habitats where populations of *Th. gozmanyi* and *Th. paupera* are present. Two individuals of *Th. mavors* revealed divergent figures: The individual no. 8 was a worn specimen and lost a great amount of scale covering, resulting in a shift of the reflectance maximum to a deeper region. This observation is accompanied by the fact that this specimen showed a low reflectance. The other diverging specimen was the individual no. 11, which had similar reflectance maximum to that of *Th. mavors* specimens, but revealed slightly higher reflectivity. Therefore, looking to the results of measurements of other *Theritas* species, we believe that this low reflectivity falls well within the figures typical for *Th. mavors* reflectivity's amplitude.

Genitalia

The *Theritas* species groups can be distinguished not only by wing characters as we indicated in the key but also on the basis of differences existing in genital structures. A large brush organ of the male genitalia comprised by long and densely arranged setae covering the entire vinculum and tegumen in dorsal view present in all taxa of the *paupera* species group. The setae of the brush organ in the *mavors* group is similarly dense but shorter and cover only the vinculum. The brush organ of the monobasic *triquetra* species group is comprised by less dense delicate hairs situated in the central part of the vinculum and partly covering the lateral side of the tegumen.

The *Theritas* female genitalia is tubular (BÁLINT *et al.* 2006a: fig. 9c) and the species groups have a pair of differently shaped process at the anterior end of the ductus bursae where the duct attaches the bursa. The most sclerotized structure can be found in *mavors* supplemented by a central plate in the ventral surface while the taxa *paupera* and *triquetra* reveal a membranous process and the central part is also membranous.

More dissections have to be done to find out whether genital structures offer diagnostic characters either in qualitative or quantitative aspects for *Theritas*. According to the literature genitalia can play a secondary role in species discrimination for eumaeine butterflies (ROBBINS 2004: xxv) but there are obvious exceptions (FAYNEL 2006, 2007).

CONCLUSION

The qualitative and the quantitative characters we have given and discussed can be used for the purpose of discrimination not only of newly described species

Table 2. Checklist with distribution data of *Theritas* listed in alphabetical order using the format provided by the catalogue of BRIDGES 1994: “–” denotes synonym; main distribution types indicated by capital letters in parentheses (AM = Amazonian; AN = Andean; AT = Atlantic; GU = Guayanan; MA = Meso-American; PA = Panamerican distribution in tropical and subtropical regions)

<i>drucei</i> (LATHY, 1926)	AT	<i>mavors</i> HÜBNER, 1818	PA
<i>gozmanyi</i> BÁLINT et WOJTUSIAK, sp. n.	AN	<i>paupera</i> (FELDER et FELDER, 1865)	AN
<i>harrietta</i> (WEEKS, 1901)	AN	– <i>ella</i> (DRAUDT, 1919)	
<i>kalikimaka</i> (CLENCH, 1944)	MA	– <i>chione</i> (GOODSON, 1945)	
<i>lotis</i> GOODSON, 1945	GU	<i>triquetra</i> (HEWITSON, 1865)	AT

but also the congeners. These characters and their distribution within the genus are summarized in Table 1.

The genus *Theritas* reveals a moderate diversity (Table 2). According to our present knowledge three groups of species can be distinguished on the basis of wing characters (see the Key above):

- (1) the Panamerican *mavors* species group comprised by the taxa *kalikimaka*, *lotis* and *mavors*,
- (2) the Andean-Atlantic *paupera* species group comprised by the taxa *drucei*, *gozmanyi*, *harrietta* and *paupera*, and
- (3) the Atlantic *triquetra* species group, which is monobasic.

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APPENDIX

Individual data of *Theritas* male specimens used for spectral measurements

1. *Th. gozmanyi* – Ecuador: Prov. Morona-Santiago, San Juan Bosco, 11.VIII.2001, coll. J. WOJTUSIAK (MZUJ)
2. *Th. gozmanyi* – Ecuador: Prov. Morona-Santiago, San Juan Bosco, 11.VIII.2001, coll. J. WOJTUSIAK (MZUJ)
3. *Th. paupera* – Colombia: Caldas, Villamaria, 2000 m, 16.IX.1993, leg. F. CARDONA (HNHM)
4. *Th. paupera* – Colombia: Caldas, Villamaria, 2000 m, 16.IX.1993, leg. F. CARDONA (HNHM)
5. *Th. triquetra* – Brazil: Rio Grande do Sul, São Leopoldo, 1.XII.1995. (HNHM)
6. *Th. triquetra* – Brazil: Rio Grande do Sul, São Leopoldo, 1.XII.1995. (HNHM)
7. *Th. mavors* – Colombia: San Jose del Palmar, Choco, 800 m, 20.VII.1991, coll. GY. HANGAY (HNHM)
8. *Th. mavors* – Peru: dept. Amazonas, Molinopampa, XII.2001, coll. J. WOJTUSIAK (MZUJ)
9. *Th. mavors* – Colombien, BÖTTCHER (ZSM: 207)
10. *Th. mavors* – Brasilien (ZSM: 215)
11. *Th. mavors* – Bolivien: Songo, GARLEPP (ZSM: 213)
12. *Th. mavors* – Columbia: Cauca (ZSM: 208)
13. *Th. mavors* – Costa Rica: Bugaba, Chiriqui (ZSM: 209)
14. *Th. triquetra* – Brazil: Rio Grande do Sul, São Leopoldo, 1.XII.1995. (HNHM)
15. *Th. triquetra* – Brazil: Rio de Janeiro, 13.VII.1952, coll. E. PFEIFFER (ZSM: no. 223)
16. *Th. paupera* – Peru: Marcapata (ZSM: no. 203)
17. *Th. harrietta* – Bolivia: Yungas del Palmar, 1.XI.1950, leg. ZISCHAN, coll. E. PFEIFFER. (ZSM: no.202)
18. *Th. gozmanyi* – Ecuador: Prov. Morona-Santiago, Macas, 1700 m, X.2001, coll. J. WOJTUSIAK (MZUJ)
19. *Th. gozmanyi* – Ecuador: Prov. Imbabura, Lita, cca 900 m, X.2001, coll. J. WOJTUSIAK (MZUJ)
20. *Th. gozmanyi* – Ecuador: Prov. Morona-Santiago, 9 de Octubre n/ Macas, 1700 m, VIII.2001, coll. J. WOJTUSIAK (MZUJ)
21. *Th. gozmanyi* – Ecuador: Prov. Morona-Santiago, 9 de Octubre n/ Macas, 1700 m, VIII.2001, coll. J. WOJTUSIAK (MZUJ: holotype)