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A new sister species of *Thaeides theia* (Hewitson, 1870) from the Venezuelan Central Coastal Range (Lepidoptera: Lycaenidae: Theclinae)

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Abstract – A new butterfly species of Lepidoptera (Papilionoidea) is described on the basis of 70 type specimens mostly collected at Portachuelo Pass (Rancho Grande, Henri Pittier National Park, Aragua, Venezuela): *Thaeides yepezi* Bálint, Grishin, Romero & Costa, **n. sp**. (Lycaenidae: Theclinae: Eumaeini). The type locality, the male dorsal wing surface colouration and historical records of *Thaeides* from Venezuela are briefly discussed. With 13 figures and one table.

Key words – Androconia, Cordillera de la Costa, Francisco Fernández Yépez, Portachuelo Pass, Serranía del Litoral Central, spectral characteristics

Resumen – Una nueva especie hermana de *Thaeides theia* (Hewitson, 1870) de la Cordillera de la Costa Central de Venezuela (Lepidoptera: Lycaenidae: Theclinae): Se describe una nueva especie de Lepidoptera (Papilionoidea) sobre la base de 70 ejemplares casi todos recolectados en el Paso de Portachuelo de Rancho Grande (Parque Nacional Henri Pittier, Aragua, Venezuela):

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Thaeides yepezi Bálint, Grishin, Romero & Costa, **n. sp**. (Lycaenidae: Theclinae: Eumaeini). Se detalla la localidad tipo de la nueva especie, así como la coloración de las alas dorsales del macho y se mencionan los reportes históricos de *Thaeides* en Venezuela(13 figuras y 1 tabla).

Palabras clave – Androconia, Cordillera de la Costa, Francisco Fernández Yépez, Paso de Portachuelo, Serranía del Litoral Central, características espectrales

INTRODUCTION

Two recently published studies highlighted that *Thaeides theia* (Hewitson, 1870), considered to be a monotypic eumaeine hairstreak lycaenid butterfly with Pan-American distribution from Mexico via Central America and the Andes to Bolivia and southeastern Brazil (Godman & Salvin 1877, Draudt 1919, D'Abrera 1995; Robbins 2004), includes several different taxa at the species level. Prieto *et al.* (2024) demonstrated distinct species status for populations that live in the Sierra Nevada de Santa Marta, Colombia, described as *Thaeides ramoni* Prieto, 2024. Concurrently, Costa *et al.* (2024) studied material from the highlands of southern Venezuela (Pantepui) and determined that the specimens collected there represent a distinct species, *Thaeides hyperion* Bálint, Costa & Grishin, 2024.

This study continues our collaboration aimed at harnessing the power of genomics to discover and document new species of butterflies. The first goal of this collaboration is to provide DNA-based support for putative new species that were originally recognized on morphological grounds (but not yet formally described), and to further test the hypothesis of their distinctness at the species level. The second, perhaps more intriguing, objective is the serendipitous discovery of new species among specimens previously identified as known taxa but forming distinct clades in genome-wide phylogenetic trees.

Costa *et al.* (2024) exemplify the first approach, starting with the hypothesis that *T. hyperion* represents a Pantepui-endemic new species, which we supported through genomic sequencing. Additional *Thaeides* Johnson, Kruse & Kroenlein, 1997 specimens from the Central Coastal Range (Cordillera de la Costa Central) in Venezuela were identified as *T. theia* and sequenced to compare *T. theia* with *T. hyperion*. However, inclusion of topotypic *T. theia* specimens from Ecuador revealed that they form a well-defined clade distinct from the Venezuelan "*T. theia*," thus illustrating the second aspect of the collaboration. Genomic comparison suggested that the Venezuelan "*T. theia*" represents a separate, undescribed species. This hypothesis is further tested in the present study, which diagnoses and documents this already recognized but hitherto formally undescribed *Thaeides* species occurring in northern Venezuela.

MATERIALS AND METHODS

Nomenclature, dissecting and spectral measurement methods are identical to the ones used by Costa *et al.* (2024).

Abbreviations – CAN = Collection of Andrew Neild (St. Albans, United Kingdom); CCF = Collection of Christophe Faynel (Montaud, France); CFR = Collection of Family Romero (Maracay, Venezuela); CMC = Collection of Mauro Costa (Caracas, Venezuela); CPB = Collection of Pierre Boyer (Le Puy-Sainte-Réparade, France); HNHM = Hungarian Natural History Museum (Budapest, Hungary); MIZA = Museo del Instituto de Zoología Agrícola, Facultad de Agronomía, Universidad de Venezuela (Maracay, Venezuela); NECJU = Nature Education Center, Zoological Museum, Jagiellonian University (Krakow, Poland); SP = Spectral Peak (see descriptive texts).

Additional material used for comparison – Thaeides ramoni: COLOMBIA: Magdalena, Sierra Nevada de Santa Marta, 1900 m, above San Javier, 2023. IX. 22. (NECJU: 2 males); *Thaeides theia:* ARGENTINA: Catamarca, La Merced, 11mm, Costa del Totoral, La Merced, 2000. I. 12. (CPB: female). COLOMBIA: Magdalena, Sierra Nevada de Santa Marta, 2000 m, above San Javier, 2023. IX. 19. (NECJU: male). COSTA RICA: Heredia, 150 m, Porto Viejo, Salva Verde, 1993. II. 5. (CPB: male); Cartago, 800 m, Vallée de Tuis, 1993. II. 17 (CPB: male). ECUADOR: Pastaza, 1000 m, Puyo, 1996. VI. (CPB: female); ditto, km 25 Puyo–Tena road, 2016. XII. (CCF: male); PERU: San Martin, Jorge Chavez, 2008. III. (CCF: male). VENEZUELA: Edo. Merida, 1800–1850 m, via La Zulita, bajada de La Azulita, 2009. VIII. 1. Pyrcz T. & Zubek A. (NECJU: male). The terminology of wing venation follows the Comstock-Needham nomenclature system (Miller 1970).

In genomic analysis, the following specimens (n = 6) were used: *Thaeides annandon*, male, Brazil, Rio Grande do Sul, São Francisco de Paula, 900 m, 3. V. 1998, Moser; *Thaeides hyperion*, female, Venezuela, Bolívar, Auyán Tepui, Entre Libertador y El Oso, 2200 m, 24. XII. 2012, Costa; *Thaeides hyperion*, male, Venezuela, Bolívar, Auyán Tepui, Entre el Danto y El Peñón, 1750 m, 25. III. 2013, Costa; *Thaeides hyperion*, male, Venezuela, Bolívar, Auyán Tepui, El Dragón, 1750 m, 3. II. 2019, Costa/Benmesbah; *Thaeides theia*, female, Venezuela, Aragua, Rancho Grande, 1100 m, X. 1967, Romero; *Thaeides theia*, male, Venezuela, Aragua, Rancho Grande, Cumbre, 1100 m, V. 1995, Romero.

The protocol for genomic work followed previous publications (Li *et al.* 2019; Zhang *et al.* 2019). In brief, genomic DNA was extracted from a single leg, mate-pair libraries constructed and sequenced at 150 bp on Illumina platform. Protein-coding regions were assembled using DIAMOND (Buchfink *et al.* 2015) from the resulting sequence reads and a reference protein set of *Calycopis cecrops* (Fabricius, 1793) (Cong *et al.* 2016), and three phylogenetic trees were constructed using IQtree v1.6.12, utilizing the GTR+GAMMA model (Nguyen *et al.* 2015): (1) from autosomes in the nuclear genome, (2) from the gene

predicted to be located in the Z chromosome, and (3) from the mitochondrial genome. Ultrafast bootstrap (Minh *et al.* 2013) was used to indicate statistical support of branches.

KEY FOR *THAEIDES* SPECIES BASED ON MALE CHARACTERS

1 Dorsal wing surface colouration lighter blue with black apical colouration reaching the discal cell **2**
Dorsal wing surface colouration deeper blue with black apical colouration not reaching the discal cell **3**

2 Apical black colouration just reaches discal cell with larger oval-shaped scent pad more than 2 mm in length ..... ***Thaeides theia*** (Hewitson, 1875)
Apical black colouration partly covers discal cell with minute oval-shaped scent pad less than 2 mm in length ..... ***Thaeides hyperion*** Bálint, Costa & Grishin, 2024

3 Dorsal wing surface discal cell with a larger circular-shaped scent pad more than 2,5 mm in length ..... ***Thaeides ramoni*** Prieto, 2024
Dorsal wing surface discal cell with a smaller oval-shaped scent pad less than 2,5 mm in length ..... ***Thaeides yepezi*** Bálint, Grishin, Romero & Costa, **n. sp.**

TAXONOMY

Thaeides yepezi Bálint, Grishin, Romero & Costa, **n. sp.**
(Figs 1–2, 5–8)

Figures 1–2. Type specimens of *Thaeides yepezi* **n. sp.** in dorsal (above) and ventral (below) views (scale bar 10 mm): 1 = holotype male (MIZA 0105238), 2 = allotype female (MIZA 0105239) (photos by M. Costa).

Classification – Lepidoptera, Lycaenidae, Theclinae, Eumaeini, *Thaeides* Johnson, Kruse & Kroenlein, 1997 (type species: *Thecla theia* Hewitson, 1870).

Generic placement – Representatives of *Thaeides* can be recognized by the warm-brown forewing ventral surface with dark-brown postbasal, median, postmedian, submarginal, and marginal transverse bands or lines from wing costa to inner margin. There is no similar member of the Lycaenidae with such a phenotype in the Neotropical fauna. Males have an oval-shaped scent pad (according to Faynel & Bálint 2012) in the forewing discal cell apical area. Phylogenetic analysis based on molecular sequencing results in grouping individuals of the new species within the same clade as the type species of *Thaeides*, indicating their sister relationship (Costa *et al.* 2024, fig. 14) (see "Genomic analysis" below).

Type material – Holotype. Male (MIZA no. 0105238), set dorsally, in good condition (right forewing apex broken), forewing costa length 16 mm, labelled as "Rancho Grande [//] AR. Venezuela [//] 1100 m, *9. VII. 54* [//] F. Yepez Y." (white oblong label, printed and digits *handwritten*). Allotype. Female (MIZA no. 0105239), set dorsally, in moderate condition (left forewing apex split, right hindwing tornus broken), forewing costa length 16 mm, labelled as "Rancho Grande [//] 1100 m, E. Aragua [//] Venezuela *2. VII. 54* [//] F. Fernández-Yépez" (white oblong label, printed and digits *handwritten*).

Paratypes (n = 68). CAN paratype (n = 1): From Portachuelo Pass, 1120 m, 1984. VIII. 14., Neild A. (♀). CFR paratypes (n = 39), all from 1100 m, Portachuelo Pass, Rancho Grande (National Park Henri Pittier, Aragua, Venezuela), collected by F. Romero. Mounted specimens (n = 13): 1965. VI. (♂); 1967. X. (♀); 1969. VIII. (♀); 1972. VI. (♀); 1972. VII. (♂); 1975. VI. (♀); 1981. VI. (♂); 1987. VIII. (2 ♀); 1987. VIII. (♂); 1988. VIII. (1♀); 1995. VI. (♀); 2009. VI. (♀). Papered specimens (n = 26): 1967. IX. (♂, ♀); 1968. IX. (♂, 3 ♀); 1969. V. (♂, 3♀); 1969. VI. (3♂, ♀); 1969. IX. (♀); 1969. XII. (♀); 1970. VIII. (♀); 1972. VII. (♀); 1972. IX. (♀); 1975. VI. (2 ♀); 1975. IX. (2 ♂); 1982. VI. (♂); 1995. VI. (2 ♀). CMC paratypes (n = 2) ex CFR: Rancho Grande, Portachuelo Pass, 1100 m, VIII-1988 (♂); ditto (1 ♀); HNHM paratypes (n = 3): From the type locality, 1967. X., Romero F. (♀); ditto, 1995. V., Romero F. (♂) (Fig. 5); La Cumbre, 1100 m, 1992. VII., Romero F. (♀) (Fig. 6). MIZA paratypes (n = 20), from the type locality, 1000–1100 m, Portachuelo Pass, Rancho Grande: 1951. II. 25., Fernández-Yépez (♀); 1951. IX. 2., Fernández-Yépez (♀); 1952. IX. 18., Fernández-Yépez (♀); 1952. VII. 10., Fernández-Yépez (♂); 1952. VII. 12., Fernández-Yépez (2 ♂); 1952. VII. 31., Requena J. (♀); 1952. VIII. 10., Fernández-Yépez (♀); 1952. VIII. 30., Fernández-Yépez (♀); 1952. VIII. 31., Fernández-Yépez (♂); 1953. VI. 19., Gonzales A. J. (♂); 1970. VIII. 21., Salcedo J. & Clavijo A. J. (♀); 1971. IV. 2., Fernández-Yépez & Salcedo J. (♂); 1972. X. 3., Salcedo J. & Clavijo A. J. (♂); 1974. IX. 26., Clavijo J. (♀); 1986. VI. 19., Fernández-Yépez (♀); 1986. VI. 19., Fernández-Yépez (♀); 1986. VII. 24., Deminirles J. (♀). From Miranda state, Caracas, Quebrada Caraburi, 1000 m, 1963. IX. 27, Ayala M. (♀). NECJU paratype (n = 2): From

the type locality, 1985. IX., Pyrcz T. (♀); ditto, 2009. VII. 15–23., Pyrcz T. leg. (♀). From Edo. Vargas, El Tigre, 1400 m, route Petaquire vers Puerto Cruz km14, 2000. X. 22., Boyer P. leg. (CPB: ♀).

Diagnosis – Compared to congeners, males of *Thaeides yepezi* **n. sp.** have a deep blue, almost purple coloured dorsal wing surface (SP: ~420 nm), that is only comparable to *T. ramoni* Prieto, 2024 (SP: ~400 nm), whilst all the other congeners are lighter (SP: >450 nm). The female dorsal wing surface is green (SP: 560 nm) (see Costa *et al*. 2024, fig. 16.), whilst congeners have blue coloured females (SP: <465 nm) (Fig. 3). *Thaeides yepezi* **n. sp.** has a somewhat smaller oval-shaped scent pad in the dorsal forewing discal cell compared with the larger oval shaped *T. theia* scent pad, whilst the scent pad of *T. hyperion* is minute, and the one of *T. ramoni* is large and circular (see Table 1). Ventral forewing pattern with a transverse band, the widest amongst the five transversing pattern elements of the wing surface, whilst in other congeners this band is narrower (*T. hyperion, T. ramoni*) or equal in width with the other bands (*T. annandon, T. theia*, Fig. 4).

Male genitalia are close to other *Thaeides* but *T. yepezi* **n. sp.** has the valva terminus projecting upwards (in contrast with the downturned terminus of *T. theia*) and a large thorn-like cornutus in the aedeagus vesica (boomerang-shaped in *T. theia*) (Figs 5, 7).

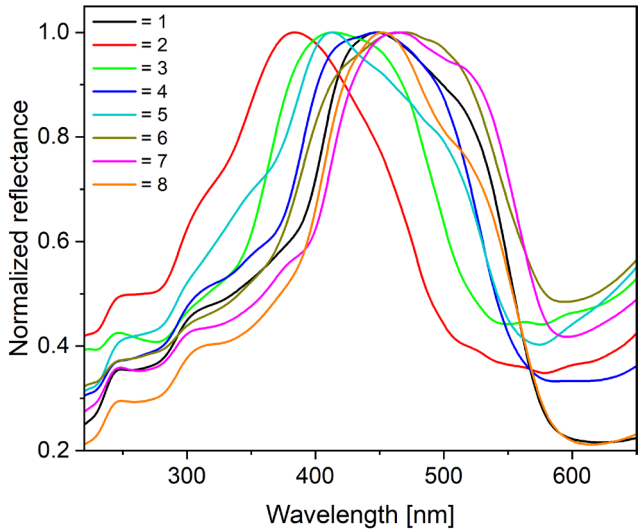


Figure 3. Normalized male reflectance spectra of *Thaeides* species measured on all four wing dorsal surfaces: 1 = *T. theia* (Colombia: Sierra Nevada de Santa Marta), 2 = *T. ramoni* (Colombia: Sierra Nevada de Santa Marta), 3 = ditto; 4 = *T. yepezi* **n. sp.** (Venezuela: Aragua); 5 = *T. theia* (Venezuela: Mérida); 6 = *T. hyperion* (Venezuela: Bolívar); 7 = *T. theia* (Ecuador); 8 = ditto (Peru) (compiled by G. Piszer and K. Kertész).

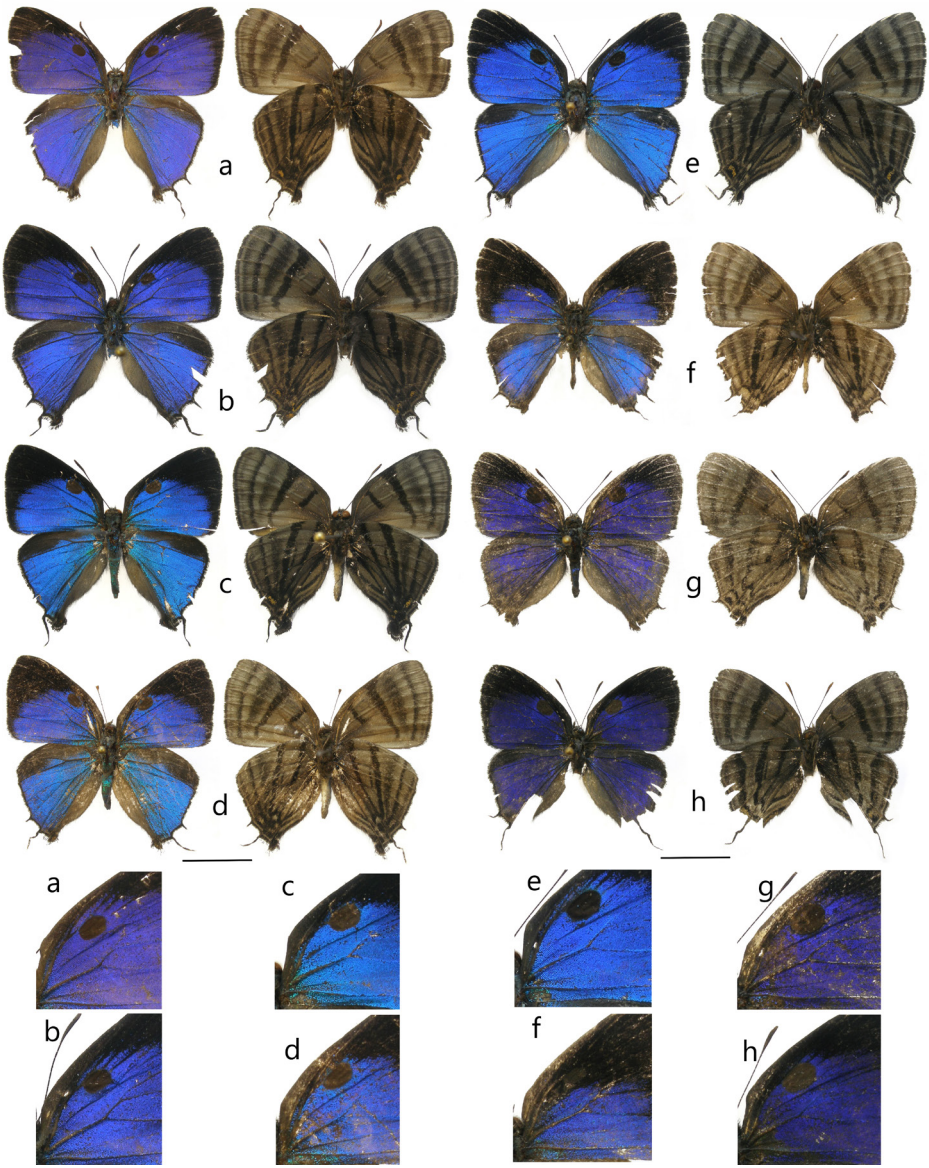


Figure 4. *Thaeides* male specimens dorsal (left) and ventral (right) views plus androconia (in the lower side of the figure): a = *T. yepezi* **n. sp.** (Venezuela: Aragua), b = *T. theia* (Venezuela: Merida), c = ditto (Ecuador), d = ditto (Peru), e = ditto (Colombia: Sierra Nevada de Santa Marta), f = *T. hyperion* (Venezuela: Bolívar), g–h = *T. ramoni* (Colombia: Sierra Nevada de Santa Marta); scale bars: 10 mm (photos and composition by G. Katona).

Table 1. Dimensions of *Thaeides* scent pad in mm measured on specimens shown in Figure 4.

Species (figure letter)	locality of the specimen	length	width	words used in diagnosis
Thaeides yepezi **n. sp.** (a)	Venezuela, Aragua	2.0	1.8	oval-shaped, smaller
Thaeides theia (b)	Venezuela, Merida	2.1	1.7	oval-shaped, smaller
Thaeides theia (c)	Ecuador	2.5	1.7	oval-shaped, larger
Thaeides theia (d)	Peru	2.5	1.5	oval-shaped, larger
Thaeides theia (e)	Colombia, Sierra Nevada de Santa Marta	2.9	1.8	oval-shaped, larger
Thaeides hyperion (f)	Venezuela, Bolívar	1.7	1.0	oval-shaped, minute
Thaeides ramoni (g)	Colombia, Sierra Nevada de Santa Marta	2.8	2.0	circular, larger
Thaeides ramoni (h)	Colombia, Sierra Nevada de Santa Marta	2.8	1.8	circular, larger

Barcode sequence of a topotypic paratype – Sample NVG-23032D11, GenBank*, 658 base pairs:

AACTTTATATTTTATTTTTGGAATTTGAGCAGGTATATTAGGTACATCCCT
AAGAATTTTAATCCGAATAGAATTAGGAACCCCAGGATCATTAATCGGAG
ATGATCAAATCTATAATACTATTGTTACAGCTCATGCTTTTATTATAATCT
TTTTTATAGTAATACCTATTATAATTGGAGGATTTGGAAATTGATTAGTAC
CATTAATATTAGGAGCTCCTGATATAGCATTTCCACGAATAAATAATATAA
GATTTTGATTATTACCCCCTTCATTAATATTATTAATTTCAAGAAGAATTG
TAGAAAATGGAGCAGGAACAGGATGAACAGTTTACCCCCCATTATCATCT
AATATCGCCCATAGAGGATCGTCAGTTGATTTAGCCATTTTTTCTTTACA
TTTAGCAGGTATTTCATCAATTTTAGGAGCTATTAATTTTATTACAACTAT
CATCAATATACGAGTAAATAATTTATCTTTTGATCAAATATCATTATTTAT
TTGAGCTGTAGGAATTACAGCTTTATTATTATTATTATCACTTCCTGTAT
TAGCTGGAGCTATTACTATATTATTAACTGATCGTAATTTAAATACCTCAT
TTTTTGATCCAGCAGGAGGAGGAGATCCTATTTTATATCAACATTTATTT

* Will be deposited after U. S. government shutdown ends and services resume.

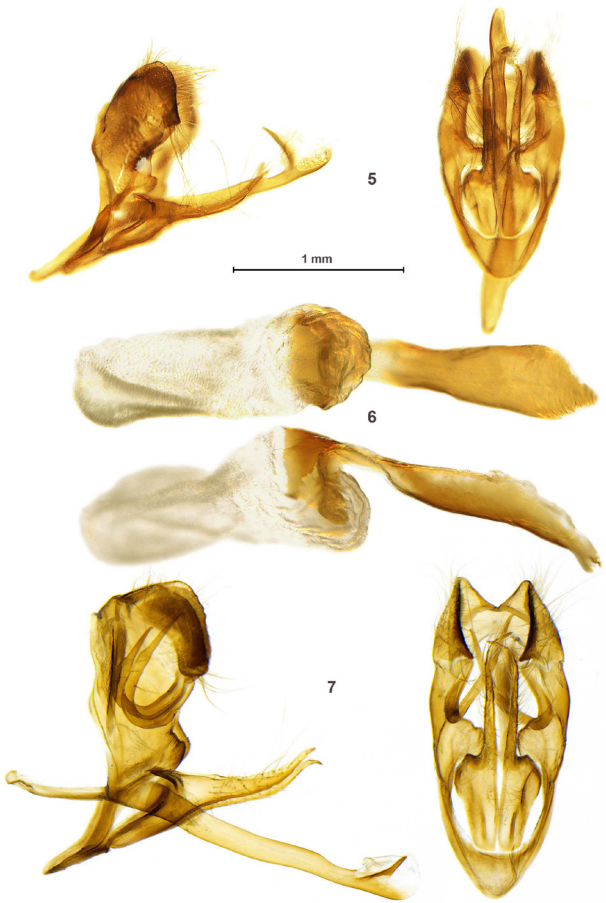
Description – Wings (Figs 1– 2): Shape: costa length measured from base to apex 15–17 mm. (n = 23); hindwing vein Cu1 terminus with tail <1 mm, vein Cu2 terminus with filamentous tail longer than 2 mm; tornal area slightly lobed. Male (Fig. 1): Dorsal wing surface: fringes dark brown; forewing ground colour deep blue (SP: 410 nm), but black in costal, apical and marginal areas; hindwing with same blue with black costa and apex, tornal lobe with orange scaling, anal fold grey. Ventral wing surface: fringes dark brown; forewing ground colour warm brown with a complicated pattern comprised of five brown coloured transverse lines or bands: (1) postbasal cell area with a short straight band, (2) median area with dark band running straight from costa narrowing progressively to inner margin, (3) postmedian area with a nebulous but wide band, fainter near costa and absent at inner margin, (4) a dark submarginal band slightly bent parallel to outer margin from costa to inner margin, and (5) a lighter antemarginal line parallel to outer margin; hindwing ground colour as in forewing but with more complicated pattern comprised of transverse bands and lines basically separated by vein Cu2 to anterior and posterior regions; anterior region with pattern similar to forewing but bands and lines running towards tornal *Thecla* spot; posterior region with veins Cu2, 1A and 2A covered by black scales forming thin lines supplemented by a delicate line between vein 1A and outer margin, all running from base to tornal *Thecla* spot; space Cu1-Cu2 in submarginal area with large orange spot, additional but less extensive submarginal orange scaling in spaces between vein Cu1 and inner margin, tornal lobe black with long fringes. Female (Fig. 2): similar to male, but wing dorsal surface ground colour light green (SP: 560 nm), hindwing antemarginal pattern more developed in both wing surfaces; ventral wing surface ground colour lighter, hindwing submarginal orange scaling more extended than in males.

Body: Male and female similar. Head: vertex and frontoclypeus covered by black hair-like scales, labial palpus with middle segment black-haired in its lower part with some white scales mixed, terminal segment short and pointed, eyes large and hairy; antennal flagellum and club dorsally black with white ventral scaling in each segment, club tip reddish brown. Thorax and legs: covered with dark hair-like scales, excluding tibia and tarsus with normal scaling. Abdomen: dorsally darker blue in male and green in female, ventrally lighter cream white in both sexes.

Variation: The degree of variation in wing size (measured via forewing length in both sexes) is 15–17 mm, therefore it is negligible. Dimensions of androconia and pattern elements are also stable, showing no particular variability. However, a similarly large sample for other *Thaeides* species is necessary for mapping the variation in other taxa.

Genitalia: Male capsule high and robust with prominent saccus and vinculum equal in length without tegumenal brush organ; tegumen large with a central depression visible only in dorso-ventral aspect, posterior parts sclerotized with a pair of strong gnathi bent 180 degrees in middle and with pointed apex,

valva extremely long and narrow in lateral view with 0.6 length of aedeagus and pointed central process, but smoother and flat in dorso-ventral view, and valve terminus pincer-like, especially evident in dorso-ventral aspect, aedeagus prominent, twice length of valva, vesica with a single large sclerotized cornutus bent in shape (Fig. 5). Female genitalia comprised of a centrally membranous but otherwise sclerotized ductus with pointed terminal plate, ductus bursae expanded and heavily sclerotized by entrance to corpus bursae, further expanded to the side in this area connecting with the ductus seminalis, and connected by a membranous area to the ductus, corpus bursae appears small, half of ductus length, signa faint (Fig. 6).



Figures 5–7. *Thaeides* genitalia in lateral (left) and ventral (right) aspects. **5** = *T. yepezi* **n. sp.** HNHM paratype male; **6** = ditto, HNHM paratype female; **7** = *T. theia* NECJU male (Venezuela: Merida); scale bar as indicated (photos by Zs. Bálint (Figs 5–6) and J. Lorenc-Brudecka (Fig. 7); plate composed by G. Katona).

Distribution – Thaeides yepezi **n. sp.** is primarily known from Henri Pittier National Park located in the Serranía del Litoral Central (Central Coastal Range), Aragua state, Venezuela. Elevation reports vary between 1000–1120 m, in the months of February, April, May, June, July, August, September and October. Despite the remarkable abundance of type locality material, very few records of *Thaeides* specimens exist from the other mountain ranges of northern Venezuela (Cordillera de Mérida, Serranía del Perijá, Tamá Massif). In the current state of knowledge, we consider that the distribution of *Thaeides yepezi* **n. sp.** is limited to the Serranía del Litoral Central until demonstrated otherwise (see discussion section, Fig. 8).

Figure 8. Physical map showing the main mountain ranges of northern Venezuela and their isolation from each other; the red dot indicates Henri Pittier National Park (Rancho Grande), type locality of *Thaeides yepezi* **n. sp.** (map by C. Brewer Carías & M. Costa).

Etymology – In memory of Dr. Francisco Fernández Yépez (1923–1986), founder of the MIZA and distinguished Venezuelan entomologist, considered the "Father" of Entomology in the country for his tireless investigative work and for promoting the study of insects in Venezuela (Fig. 9).

Figure 9. Dr. Francisco Fernández-Yépez collecting at Portachuelo Pass in 1986 (photo by A. Fernández-Badillo).

DISCUSSION

Thaeides *colouration* – In a previous paper we demonstrated that the male dorsal wing surface colouration of the analysed species are species-specific (Costa *et al.* 2024). In the diagnosis of *T. yepezi* **n. sp.** we presented new results on the spectral peaks of the various species examined based on further material. We demonstrated that the male dorsal wing surface colour of *T. hyperion* (from the tepui region of Venezuela) and *T. theia* (from the Andes of Ecuador and Peru) is brighter than the colour of *T. ramoni* and *T. yepezi* **n. sp**. The colour of the Atlantic forest population in Brazil (*T. annandon*) matches with *T. hyperion* – *T. theia*. The colour of *T. ramoni* (from Sierra Nevada de Santa Marta, Colombia) is somewhat deeper than that of *T. yepezi* **n. sp.** (Fig. 10).

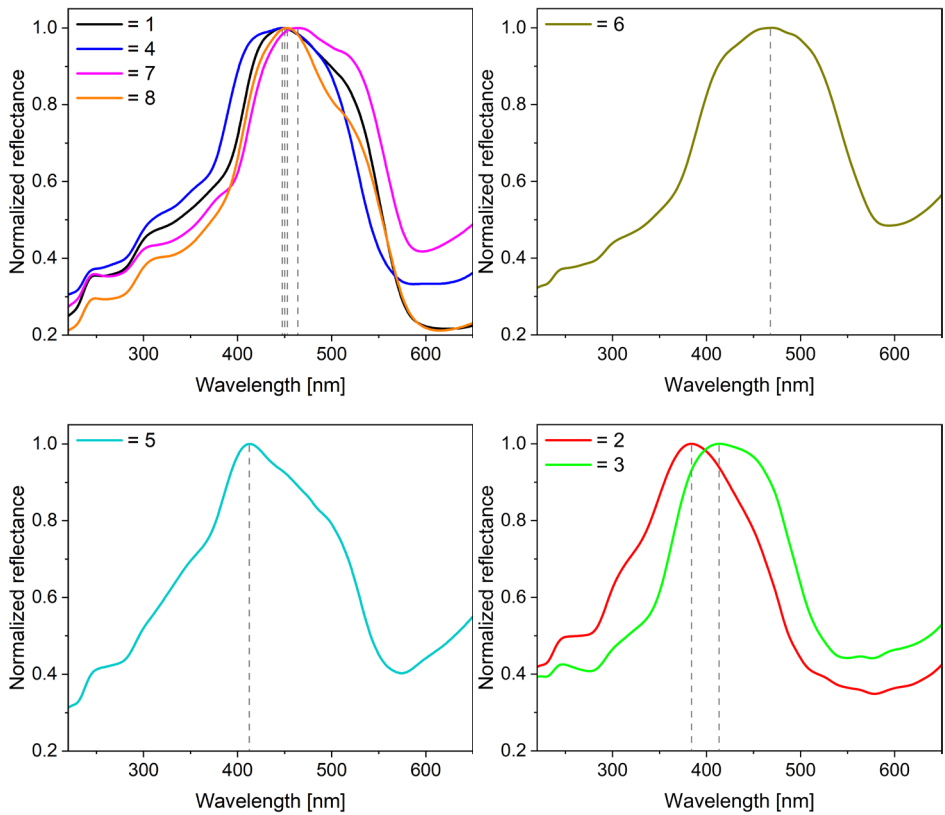


Figure 10. Normalized male dorsal forewing spectra of *Thaeides* species: 1 = *T. theia* (Colombia: Sierra Nevada de Santa Marta), 2 = *T. ramoni* (Colombia: Sierra Nevada de Santa Marta), 3 = *ditto*; 4 = *T. yepezi* (Venezuela: Aragua); 5 = *T. theia* (Venezuela: Mérida); 6 = *T. hyperion* (Venezuela: Bolívar); 7 =: *T. theia* (Ecuador); 8 = *ditto* (Peru) (composed by K. Kertész and G. Piszter).

Genomic analysis – The analysis of protein-coding regions of the autosomes in the nuclear genome, the Z chromosome, and the mitochondrial genome yields results consistent with our previous work (Costa *et al.* 2024) but provides additional insights (Fig. 11). In all three trees, *Thaeides muela* (Dyar, 1913) and *T. pyrczi* (Johnson, Le Crom & Constantino, 1997) form a clade sister to *T. theia* (the *T. theia* species group, which represents the genus *Thaeides* in the strict sense; in agreement with Costa *et al.* 2024), who placed these species in *Thaeides*. As the trees shows, *T. yepezi* **n. sp.** is strongly differentiated genetically from other species (Fig. 11a–c); for example, it differs from *T. theia* by 2.3% (15 bp) in the COI barcode. In the nuclear genome tree (autosomes), *T. yepezi* **n. sp.** is sister to *T. theia* (Fig. 11a); however, in the other two trees, *T. yepezi* **n. sp.** is sister to both *T. theia* and *T. annandon* (Fig. 11b, c). This incongruence is strongly supported statistically and suggests introgression or incomplete lineage sorting, possibly indicating the existence of yet undiscovered *Thaeides* species, perhaps in Brazil. Possible gene exchange with this species in the autosomes may contribute to the greater autosome differences between *T. annandon* and both *T. yepezi* **n. sp.** and *T. theia* (Fig. 11a vs b). Based on the genetic differentiation of a single specimen from South Brazil, as revealed by the nuclear, Z chromosome, and mitochondrial trees and by the incongruence among them (Fig. 11a–c), *T. annandon* may be a species distinct from *T. theia*—a hypothesis to be tested by genomic and morphological analyses of additional specimens.

Cordillera de la Costa – The Venezuelan Costal Range is a complex mountain system extending approximately 750 km along the northern Caribbean coast and reaching its highest elevation at Pico Naiguatá (2,765 m asl). It is divided into two large sections, the Central (mainly Serranía del Litoral + Serranía del Interior) and the Eastern (Serranía del Turimiquire + other minor mountain ranges). The Serranía del Litoral represents a biogeographic unit of notable value: its peculiar geographic location, combined with its linear extension and proximity to the sea, gives it unique characteristics that distinguish it within the mosaic of Neotropical ecosystems; to the east it is separated from the Serranía del Turimiquire by the Unare Depression and to the west, from the Cordillera de Mérida by the Yaracuy Depression.

Due to its isolation, the Serranía del Litoral is home to a significant number of endemic taxa; for example, just to indicate only a few of them: *Perisama euriclea* (Doubleday, [1847]), *Eretris neocycla* Pyrcz & Viloria, 2009, *Pronophila obscura* Butler, 1868, *Pedaliodes pisonia* (Hewitson, 1862), *Memphis maria* Pyrcz & Neild 1996, *Eresia oblita* (Staudinger, 1885), *Diaethria panthalis* (Honrath, 1884, *Zischkaia arctoa* Nakahara, 2019, *Epiphile boliviana lamasi* Neild, 1996, *Eryphanis zolvizora isabelae* Neild & De Sousa, 2014, *Oxeoschistus puerta puerta* (Westwood, 1851) (Nymphalidae); *Papilio polyxenes costarum* Orellana, 2009 (Papilionidae); *Catasticta seitzi clarita* Bollino & Costa 2007, *Catasticta prioneris araguana* Eitschberger & Racheli, 1998 (Pieridae).

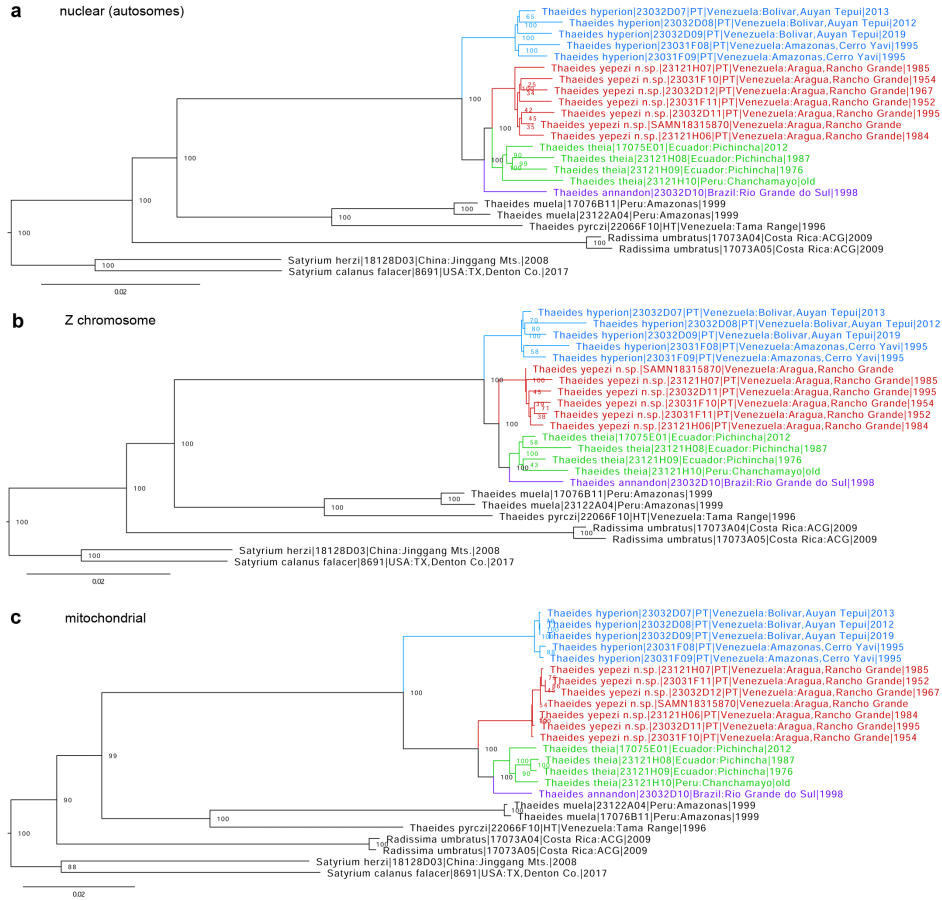


Figure 11. Phylogenetic trees of *Thaeides* and outgroups inferred from protein-coding regions of a) the nuclear genome (autosomes, 4.647.810 positions), b) the Z chromosome (213.555 positions, too few positions were sequenced in NVG-23032D12 to be included in this tree), and c) the mitochondrial genome. The sequence of SAMN18673399 is taken from the alignment provided by Kawahara *et al.* (2023). For each specimen, its species name is followed by the DNA sample number (without NVG- prefix), type status (if relevant; HT = holotype; PT = paratype), general locality, and year of collection (when known); compiled by N. Grishin.

The Serranía del Litoral, despite its relative accessibility, functions as a distinctive evolutionary stage, as evidenced by its high rates of endemism. This pattern is not simply a static count of unique taxa, but a dynamic indicator of ongoing evolutionary processes. Evidence suggests that many of these endemic taxa are poorly differentiated morphologically from their relatives in other Venezuelan mountain ranges, indicating that they are probably neo-endemic, the product of recent allopatric speciation. This means that geographic separation,

although not always absolute, has been sufficient to interrupt gene flow and allow populations to diverge independently.

Portachuelo Pass – Almost all of the types of *Thaeides yepezi* **n. sp.** were collected at Portachuelo Pass (Figs 12–13), located in Henri Pittier National Park (Rancho Grande) at 1,100 m asl. This narrow montane saddle is well known as a natural passage for locally distributed birds and butterflies (some migratory, but most not) between the northern (coastal) and southern (continental) slopes of the Serranía del Litoral Central (Beebe 1949a, b; 1950a, b; 1951).

However, the fact that a butterfly is found casually or commonly crossing the Portachuelo Pass does not mean that it is necessarily migrating, nor that it is migratory; in this respect, it is known that many of the supposedly "migratory" butterfly species captured and recorded by William Beebe and collaborators at Portachuelo Pass in the 1940s are not as such (Viloria *et al*., 2001: 38–39). The great majority of Neotropical butterflies they recorded are sedentary, and in particular those belonging to certain groups of Nymphalidae, such as Heliconiini, Ithomiini and Satyrinae.

Portachuelo Pass is famous for the possibility to collect specimens that would appear to be very rare based on collection records elsewhere, as is the case of females of *Heraclides astyalus hippomedon* (C. Felder & R. Felder, 1859). However, in a few hours of collecting during a migration in Portachuelo Pass, Francisco Romero Jr. obtained more than 50 of them. This is also the case for *Suneve coronata* (Hewitson, 1865), an extremely rare lycaenid, which is taken individually and very rarely in general, but has been seen much more frequently at Portachuelo Pass (Neild & Bálint 2014).

The fact that we have such a long type series available of *Thaeides yepezi* **n. sp.** indicates that it is not a rare butterfly. However, if we do not take into account the specimens captured at Portachuelo Pass, it would seem the contrary (only two specimens have been collected outside the type locality). Something similar possibly happens with the recently described sister species *Thaeides hyperion* Bálint *et al*., 2024, a lycaenid that appears to be very rare (Costa *et al*., 2024: 284–285). In both cases, they are probably common species that reside preferably in the canopy and only sporadically descend to lower levels closer to the ground.

During 12 years of intensive field work, Lamas *et al.* (2021) remarked upon two population booms of the species *Thaeides theia*, whilst otherwise it was rare and the sightings were restricted to the months of January, February, and November. These data indicate that *T. theia* and *T. yepezi* **n. sp.** may have different population strategies as the latter occurs across all seasons and was sampled with the same frequency in Henri Pittier National Park.

Further Thaeides *records from Venezuela* – On the basis of documentation available to us, the Central American and Mexican populations are conspecific with the Andean ones, since the males have a light blue dorsal wing surface blue colouration, and larger oval androconial cluster. Godman & Salvin (1887: 29) wrote that "we have two examples [of *Thecla theia*] said to be from Venezuela;

with these a pair from the State of Panama [Volcan de Chiriqui] (both of them figured) agree very closely". D'Abrera (1995: 1129) documented the Panama female and one of the Venezuelan specimens mentioned by Godman & Salvin. He remarked that one of the other females from Venezuela (Merida) "is purple on recto surface", a phenomenon what has also been recorded for *T. hyperion* females. However, further studies are necessary to find out whether *Thaeides theia* and *Thaeides yepezi* **n. sp.** are sympatric in the Cordillera de Mérida, a situation similar to the Sierra Nevada de Santa Marta of Colombia, inhabited by two *Thaeides* species. Meanwhile, we can state that the 70 specimens of *Thaeides* collected to date in the Serranía del Litoral Central all belong to the new species *Thaeides yepezi*.

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Figures 12–13. The type locality of *Thaeides yepezi* **n. sp.** in Henri Pittier National Park (Rancho Grande): 12 = Portachuelo Pass, view to the north over the canopy towards the Caribbean see (photos by A. Fernández-Badillo); 13 = Zsolt Bálint at the southern entrance of Henri Pittier National Park in 2009 (photo by B. Benedek).

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A *Thaeides theia* (Hewitson, 1870) új testvérfaja Venezuela tengerparti Karibi-hegységéből (Lepidoptera: Lycaenidae: Theclinae)

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Összefoglalás – Egy Pillangóalakú (Papilionoidea) lepkefaj leírása 70 típuspéldány alapján, melyeket a Portachuelo-hágón (Rancho Grande, Henri Pittier Nemzeti Park, Aragua, Venezuela) gyűjtöttek: *Thaeides yepezi* Bálint, Grishin, Romero és Costa, **n. sp.** (Lycaenidae: Theclinae: Eumaeini). Az új faj leírása mellett annak típuslelőhelyét, a hímek szárnyfelszínének színezetét és a történeti adatokat röviden ismertetjük vagy elemezzük. 13 ábrával és egy táblázattal.

* Levelező szerző.

Kulcsszavak – Androconia, Cordillera de la Costa , Francisco Fernández Yépez, Portachuelo-hágó, Serranía del Litoral Central, spektrális jellemzők.

ÁBRA ÉS TÁBLAMAGYARÁZATOK

1–2. ábra. A *Thaeides yepezi* **n. sp.** típuspéldányai felül- és alulnézetben (méretléc: 10 mm): 1 = holotípus hím (MIZA 0105238), 2 = allotípus nőstény (MIZA 0105239) (fotók: M. Costa).

3. ábra. *Thaeides* fajok normalizált hím spektrumai mind a négy szárny felszínén mérve: 1 = *T. theia* (Kolumbia: Sierra Nevada de Santa Marta); 2 = *T. ramoni* (Kolumbia: Sierra Nevada de Santa Marta); 3 = ugyanaz; 4 = *T. yepezi* **n. sp.** (Venezuela: Aragua); 5 = *T. theia* (Venezuela: Mérida); 6 = *T. hyperion* (Venezuela: Bolívar); 7 = *T. theia* (Ecuador); 8 = ugyanaz (Peru) (összeállította: Piszer G. és Kertész K.).

4. ábra. *Thaeides* hím példányok felül- és alulnézeti képei, plusz illatpikkelyfolt (az ábra alsó részén): a = *T. yepezi* **n. sp.** (Venezuela: Aragua), b = *T. theia* (Venezuela: Merida), c = ugyanaz (Ecuador), d = ugyanaz (Peru), e = ugyanaz (Kolumbia: Sierra Nevada de Santa Marta), f = *T. hyperion* (Venezuela: Bolívar), g–h = *T. ramoni* (Kolumbia: Sierra Nevada); méretléc: 10 mm (fotók és kompozíció: Katona G.).

5–7. ábra. *Thaeides* ivarszervek oldal- (balra) és alulnézetből (jobbra): 5 = *T. yepezi* **n. sp.** HNHM paratípus hím; 6 = ugyanaz, HNHM paratípusú nőstény; 7 = *T. theia* NECJU hím (Venezuela: Merida); méretléc: 1 mm (fotók: Bálint Zs. (5–6. ábra) és J. Lorenc-Brudecka (7. ábra); a táblát Katona G. állította össze).

8. ábra. Észak-Venezuela fő hegyvonulatait és azok egymástól való elszigeteltségét bemutató fizikai térkép; a piros pont a Henri Pittier Nemzeti Parkot (Rancho Grande) jelöli, a *Thaeides yepezi* **n. sp.** típuslelőhelyét (térkép: C. Brewer Carías és M. Costa).

9. ábra. Dr. Francisco Fernández-Yépez gyűjt a Portachuelo-hágónál 1986-ban (fotó: A. Fernández-Badillo).

10. ábra *Thaeides* fajok hím példányainak elülső szárny felszínén mért normalizált spektrumok: 1 = *T. theia* (Kolumbia: Sierra Nevada de Santa Marta); 2 = *T. ramoni* (Kolumbia: Sierra Nevada de Santa Marta); 3 = ugyanaz; 4 = *T. yepezi* **n. sp.** (Venezuela: Aragua); 5 = *T. theia* (Venezuela: Mérida); 6 = *T. hyperion* (Venezuela: Bolívar); 7 = *T. theia* (Ecuador); 8 = ugyanaz (Peru) (összeállította: Piszer G. és Kertész K.).

11. ábra. A *Thaeides* filogenetikai fái és fehérjéket kódoló régiókból következtetett külcsoportok: a = a nukleáris genom (autoszómák, 4 647 810 pozíció), b = a Z kromoszóma (213 555 pozíció, túl kevés pozíciót szekvenáltak az NVG-23032D12-ben ahhoz, hogy ebbe a fába beletartozzon), c = a mitokondriális genom. A SAMN18673399 szekvenciája Kawahara és munkatársai (2023) által megadott illesztésből származik. Minden példány esetében a faj nevét a DNS-minta száma (NVG-előtag nélkül), a típusstátusz (ha releváns: HT = holotípus; PT = paratípus), az általános lelőhely és a gyűjtés éve (ha ismert) egészíti ki (összeállította: N. Grishin).

12-13. ábra. A *Thaeides yepezi* **n. sp.** típuslelőhelye a Henri Pittier Nemzeti Parkban (Rancho Grande): 12 = Portachuelo-hágó, kilátás északi irányba a lombkorona felett a Karib-tenger felé; 13 = Bálint Zsolt a Henri Pittier Nemzeti Park déli bejáratánál 2009-ben (fotó A. Fernández-Badillo: 12. ábra, B. Benedek: 13. ábra).

1. táblázat. A *Thaeides* illatpikkelyfolt méretei mm-ben, a 4. ábrán látható mintákon mérve.