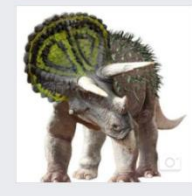


Kalligrammatidae

„Motýle“ veku dinosauru





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Prehistorický život Samos mamuta smratalo zahynul na následky nebud ovieda časť svojich veľkých rohov... Po určení pohľadia mamutov podľa chromozómov...



Podporte nás O nás Prednášky

f RSS Twitter Google+ Hľadať...



Darwinovi votrelci: Čo dokážeme povedať o evolúcii mimozemského života? Odpoveď na otázku existencie života na iných planétach predstavuje jednu z najväčších vedeckých výziev 21. storočia...

Podporte nás

Všetci chcú Vaše dobro... Nenechajte si ho vziať!

Prihláste sa na odber noviniek Pridať e-mail

Mediálny partner 758BC 863 1453 1943

Najnovšie

16.11.2017 - 09:31:50 Marek Dzurenko

Kozmos Evolúcia

Prehistorický život Nový domoauror Halařkaraptor vyzeral ako krízamec velociraptora a kačice. Diverzia "řaptorov" - teropodných dinosaurů z říše Dromaeosauridae - zísala, nepoznáva hranice...



Čudná Dendrograma: Vyriešenie jednej záhady prinieslo ďalšiu V roku 2014 vedci opísali nový druh morského živočícha. Tak nezvyčajného, že ho nedokázali zaradiť do žiadnej existujúcej skupiny.

Živá príroda Kuriozity

Relikt pred 600 miliónov rokov? Prvé jedince tohto živočícha podobného hľbu vylovili z hĺbok 400 a 1000 metrov nedeľské Tasmánie už v roku 1986.

Prímenovanie Dendrograma enigmatica odkazuje na vzhľad tráviacich kanálov, ktoré pripomínali dendrogram.

Podporte nás

www.serin

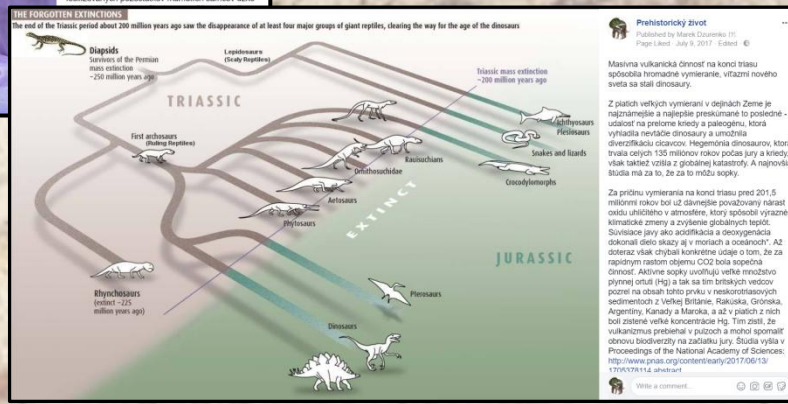
Prihláste sa na odber noviniek Pridať e-mail

Mediálny partner 758BC 863 1453 1943

Najnovšie

Fosilne frky: Mamutie pletky ja jeden Otorený list slovenských vedcov pre ministerke Školstva Ako vznikol Satan? Pôvod a vývoj dia Demaskovaný yeti: Zistili sme pravú identitu snežného muža

https://www.facebook.com /PrehistorickyZivot https://invivomagazin.sk https://vesmir.cz



Prehistorický život Masívna vulkanická činnosť na konci trasy pred 201,5 miliónmi rokov bol už častým zjavom... Z pľach veľkých vymieraní v dejinách Zeme je najznámejším a najlepšie preskúmané to posledné - udalosť na prelome kordy a paerogénu...

vesmír 6 2017 vesmír 11 2017

Dřevo místo uhlí Propaganda útočí



Děť, smrt a zármitek - Zlatá ryba - Kam se točí ulity - Zhroutení neobčejné civilizace - Není uhlí jako uhlí - Múlnot v letokruzích - Transplantace Vratné vědu vědčím - Nový cíl protikarbinové terapie - Lidožravci I - Fosilní temokras - Geomedicina - Nejslavnější z vědkyřů

Pg

66 mil. r.

Krieda

Distribúcia v čase a priestore

Stredná jura – spodná krieda (kelovej až apt, pred 166 – 113 mil. r.)

Najviac druhov z Číny (31) a Kazachstanu (8). Známe sú aj z Ruska (2), Mongolska (1), Nemecka (4), Veľkej Británie (1) a Brazílie (2).

Najrozšírenejšie rody: *Kalligramma* a *Kalligrammula*

145 mil. r.

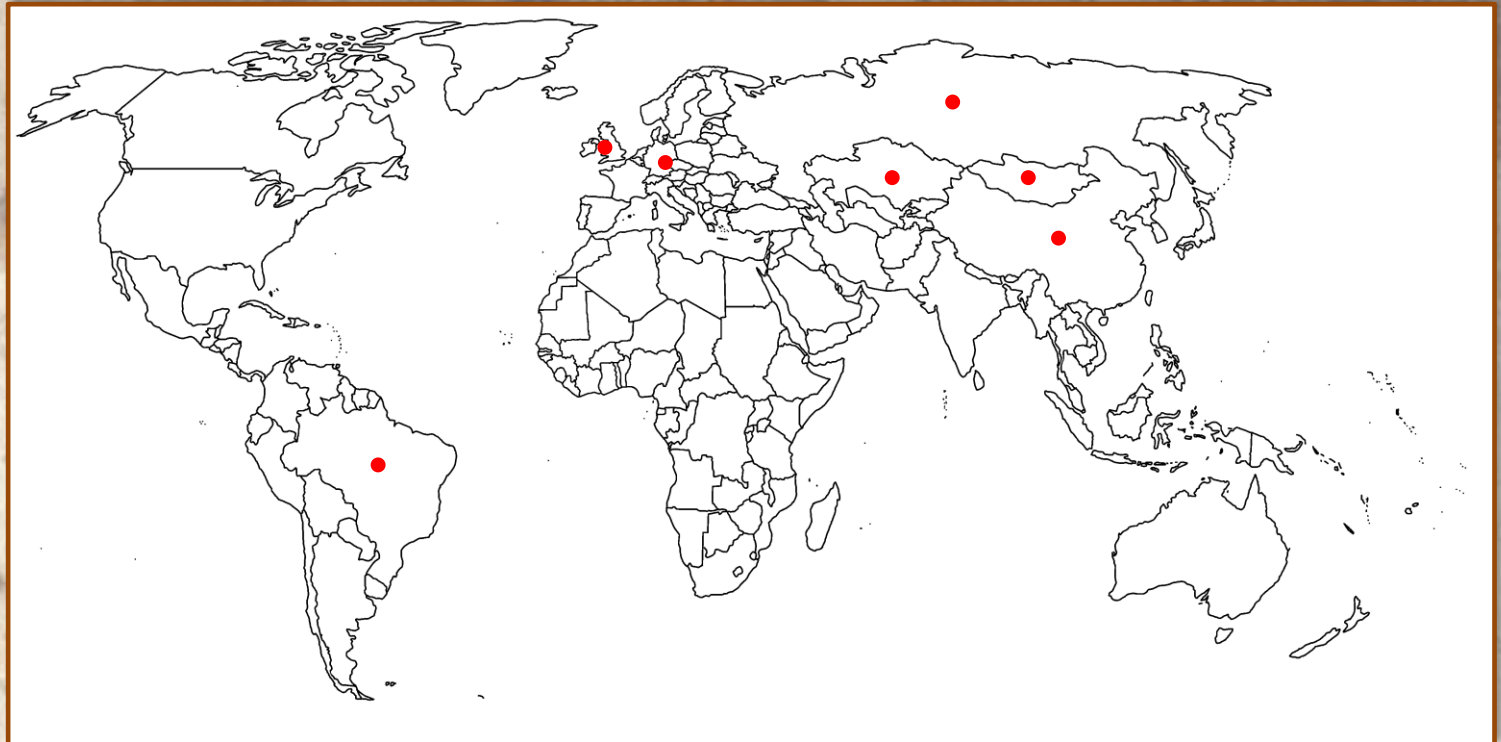
Jura

201 mil. r.

Trias

252 mil. r.

Perm



Taxonómia a diverzita

Neuroptera: †**Kalligrammatidae**

Handlirsch, 1906

20 rodov, 51 druhov.



Anton Handlirsch
1865 - 1935

Kalligrammatinae

Angarogramma
Kalligramma
Kalligrammina
Limnogramma
Sinokalligramma

Kallihemerobiinae

Affinigramma
Apochrysogramma
Huiyingogramma
Kalligrammula
Kallihemerobius
Lithogramma
Stelligramma

Meioneurinae

Meioneurites

Oregrammatinae

Abrigramma
Ithigramma
Oregramma

Sophogrammatinae

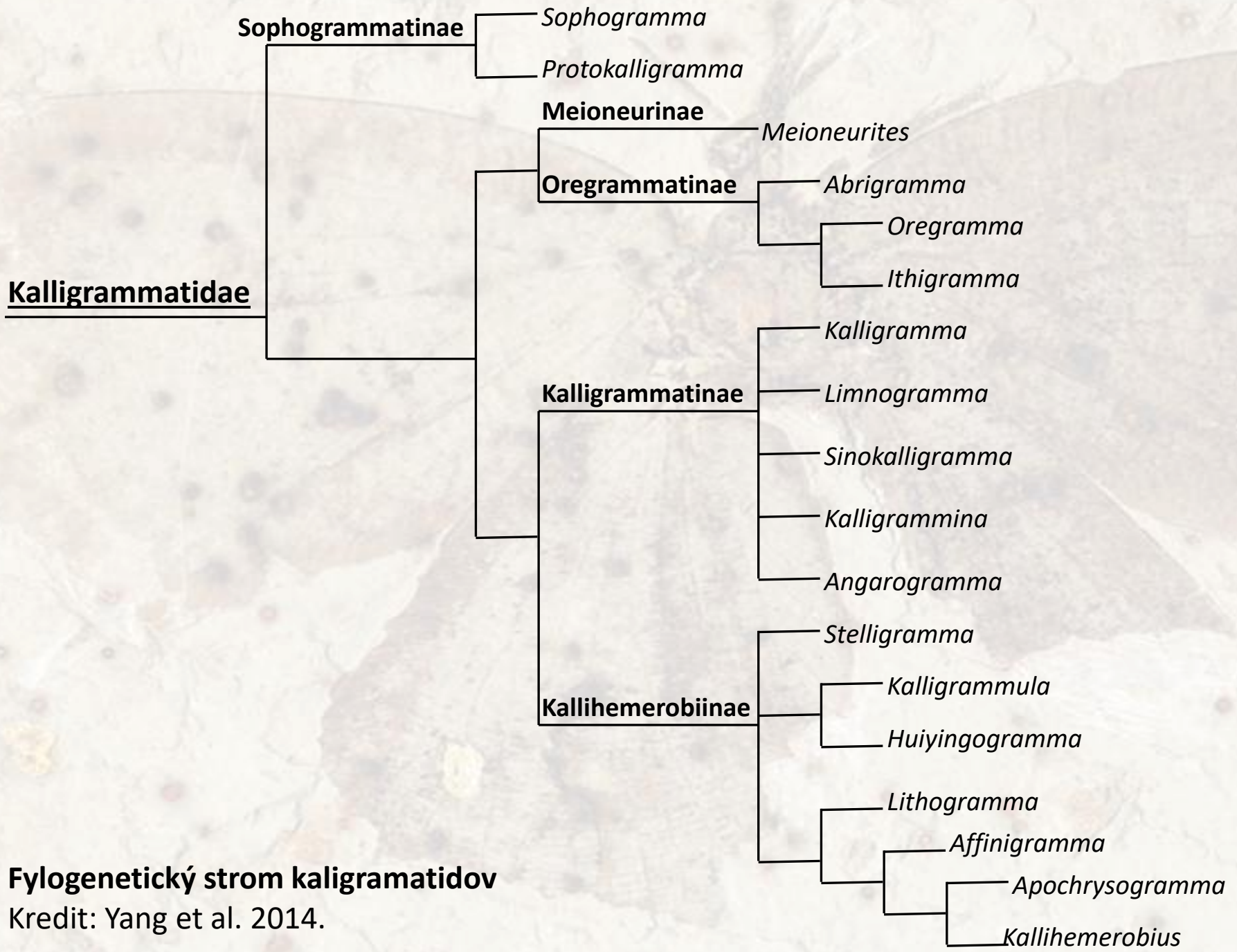
Protokalligramma
Sophogramma

incertae sedis

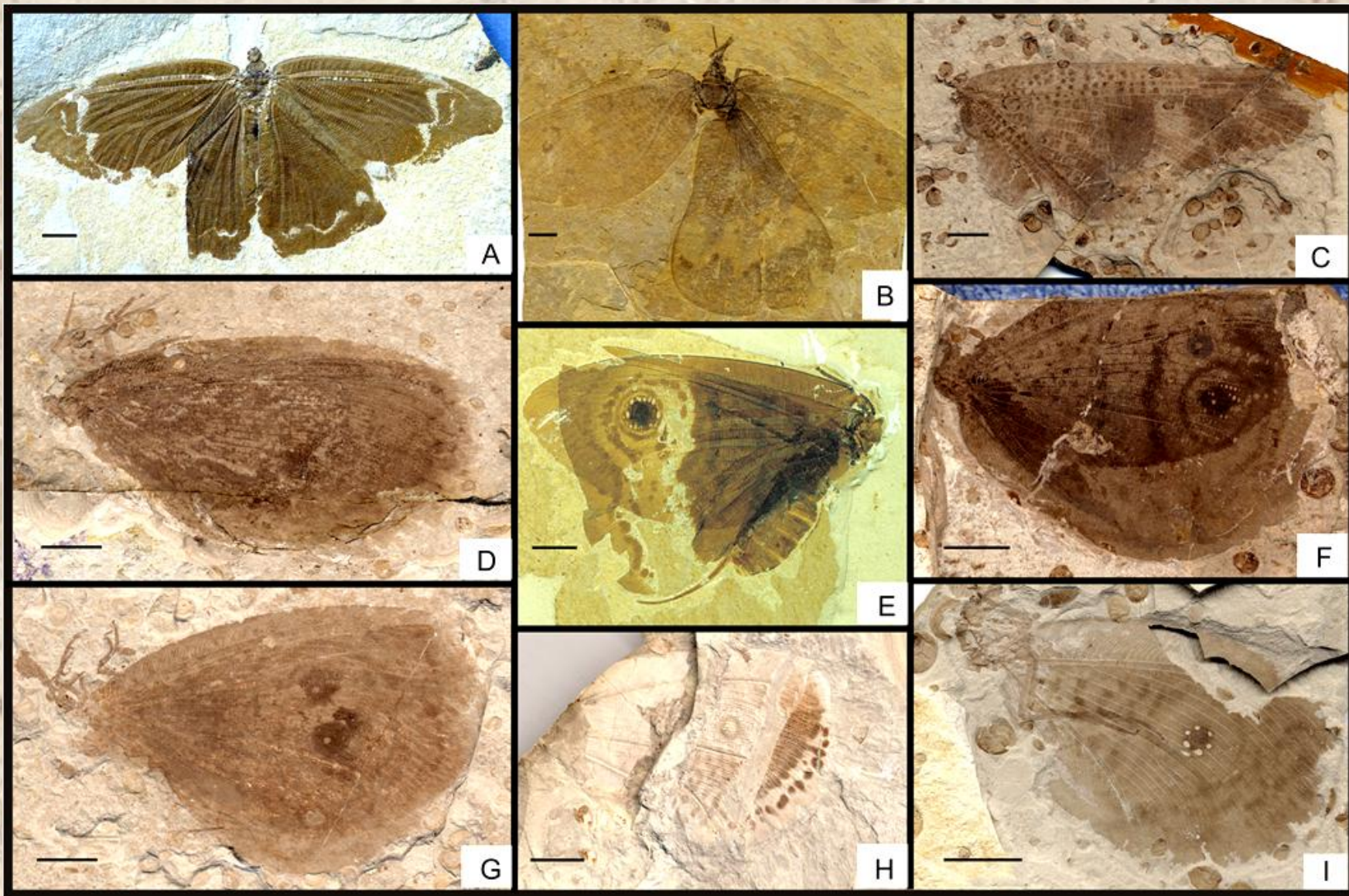
Makarkinia
Palparites



Kalligramma
haeckeli



Fylogenetický strom kaligramatidov
 Kredit: Yang et al. 2014.



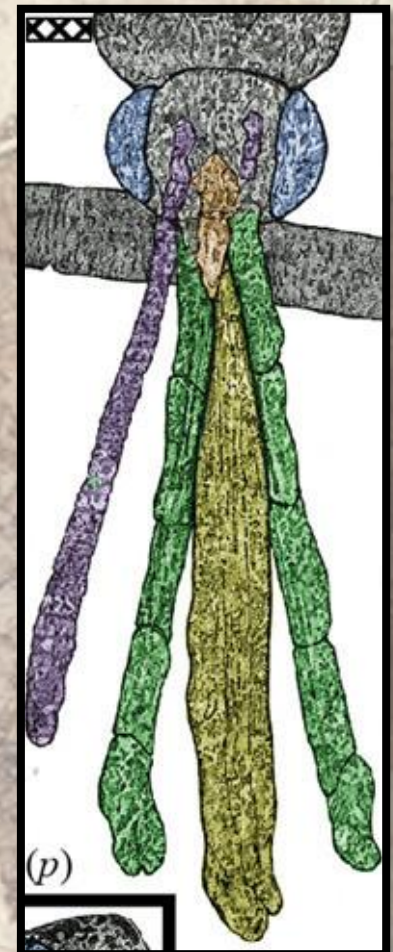
A: *Sophogramma lii*, B: *Oregramma aureolosa*, C: *Stelligramma allochroma*, D: *Affinigramma myrioneura*,
 E: *Oregramma illecebrosa*, F: *Kalligramma circularia*, G: *Affinigramma myrioneura*, H: *Apochrysogramma rotundum*,
 I: *Kalligramma brachyrhyncha*

Anatómia a morfológia

Telo dlhé >50 mm, dĺžka krídel až 160 mm (*Makarkinia*).
Nitkovité tykadlá. Niektoré mali dlhé kladielko (*Oregramma*).

Nápadné konvergenie s motýľmi (okrem Sophogrammatinae):

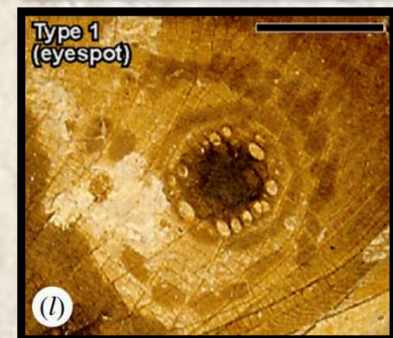
1. Široké krídla so šupinami.
2. Vzory a očné škvrny na krídlach.
3. Premena ústnych orgánov z hryzavých na cicavé, vznik trubicovitého proboscisu.
4. Savé pumpy v prednej časti hlavy.



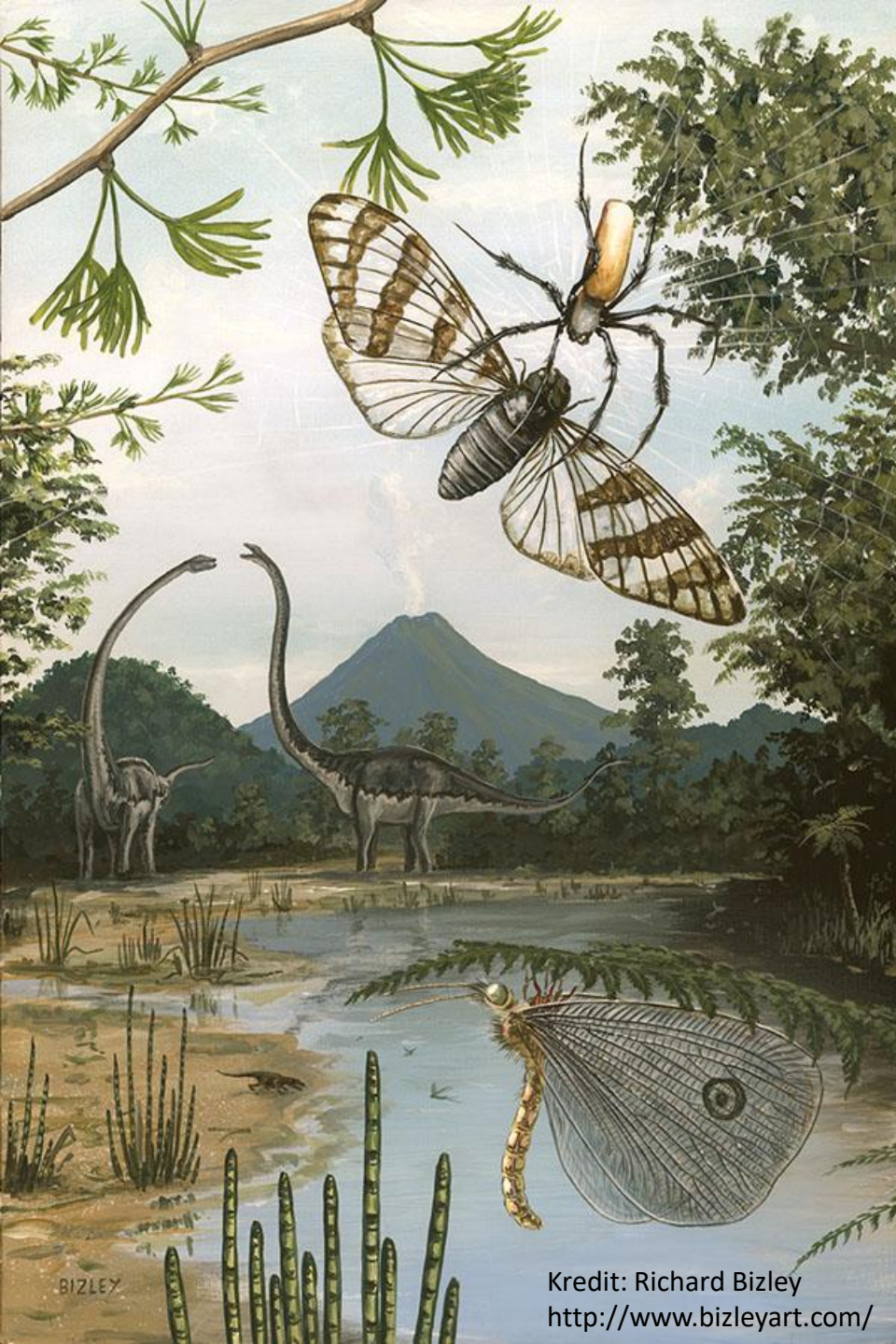
Kallihemerobiinae
gen. et sp. indet.
Nákres cuciaka pri
pohľade zhora
(žltým). →



Makarkinia kernerii, krídlo



Oregramma illecebrosa
Detail krídlovej škvrny



Paleoekológia a paleobiológia

Trópy až subtrópy. Termofilné.

Škvrnny na krídlach – obranný mechanizmus? (Aves, Pterosauria)

Denná aktivita, slabé letové schopnosti.

Potrava: Imága peľ nahosemenných rastlín (Bennettitales, Cycadales, Caytoniales). Larvy pletivá semien.



Kredit: Richard Bizley
<http://www.bizleyart.com/>



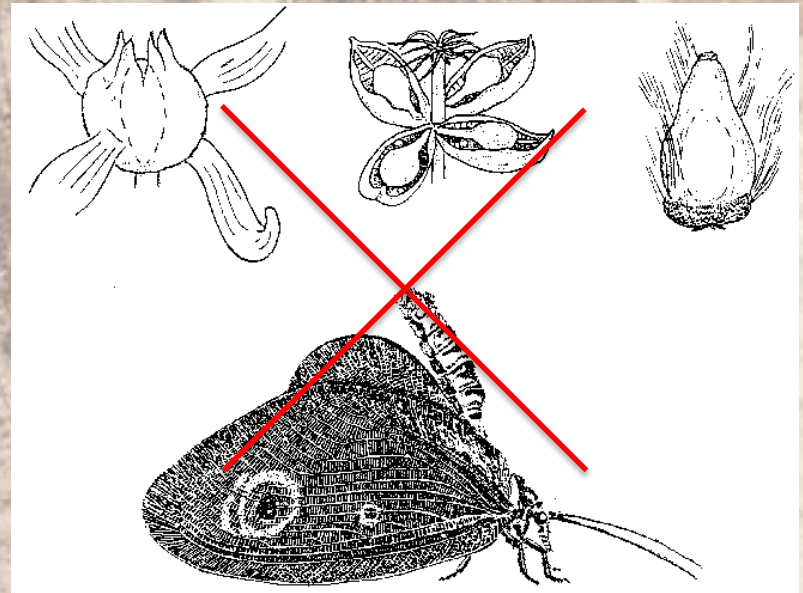
Anurognathus vs Kalligramma, Kredit: Dmitry Bogdanov

Extinkcia

Zmena ekologických vzťahov medzi rastlinami a hmyzom v dôsledku rozvoja krytosemenných rastlín:

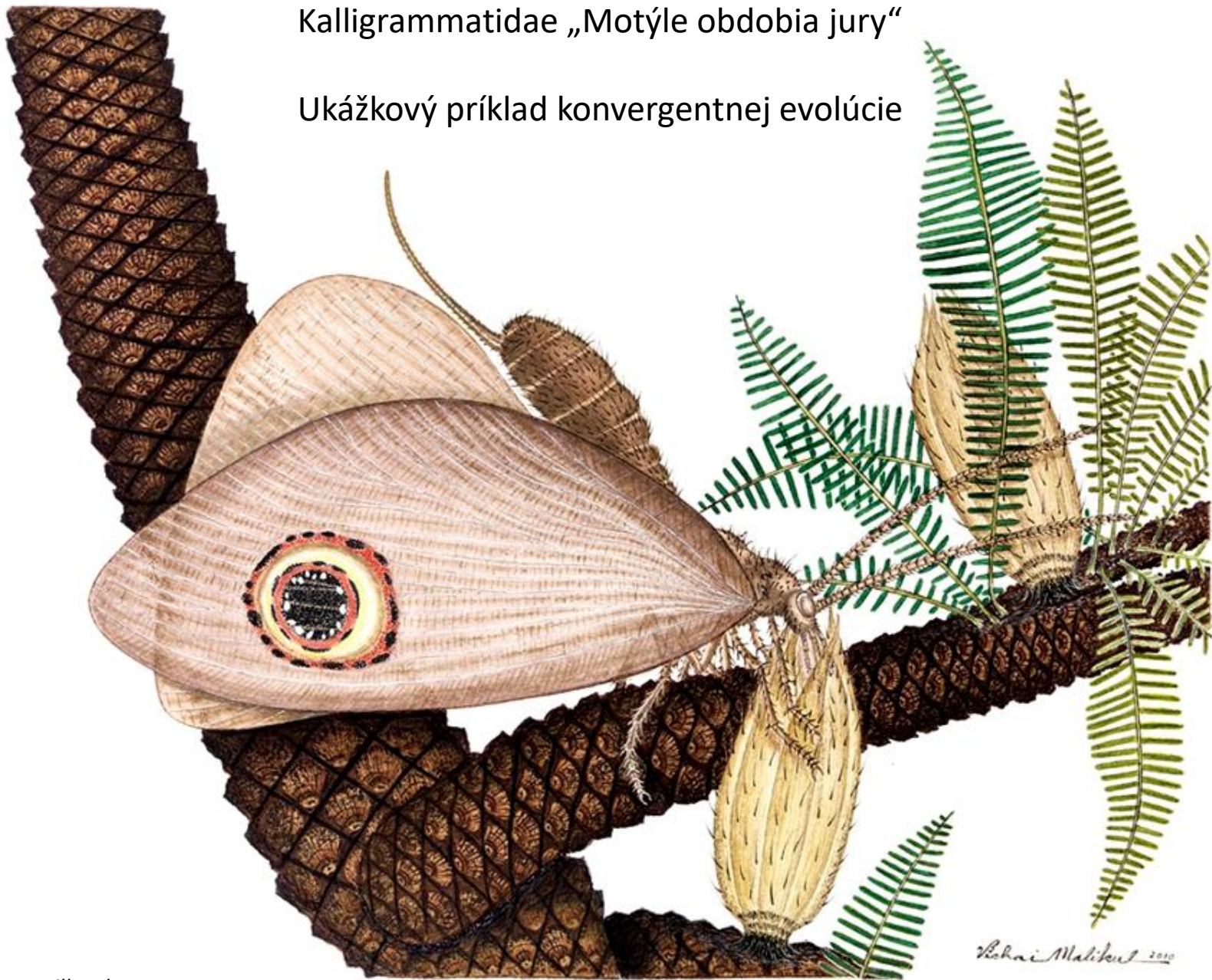
1. Zánik asociácií hmyzích druhov s nahosemennými rastlinami.
2. Laterálny transfer týchto asociácií z nahosemenných na krytosemenné rastliny.
3. Vznik nových asociácií s krytosemennými rastlinami.

O 50 miliónov rokov (paleogén) neskôr – objavenie sa denných motýľov (Rhopalocera).



Kalligrammatidae „Motýle obdobia jury“

Ukážkový príklad konvergentnej evolúcie

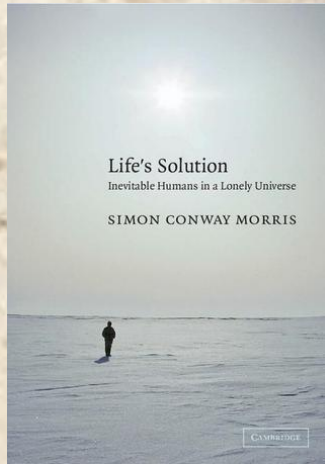


Oregamma illecebrosa

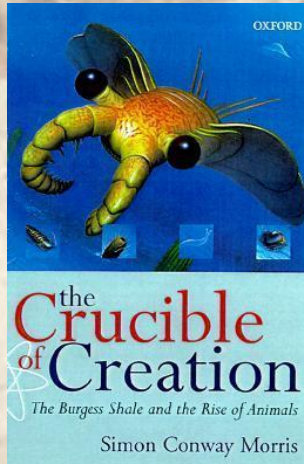
Autor: Vichai Malikul



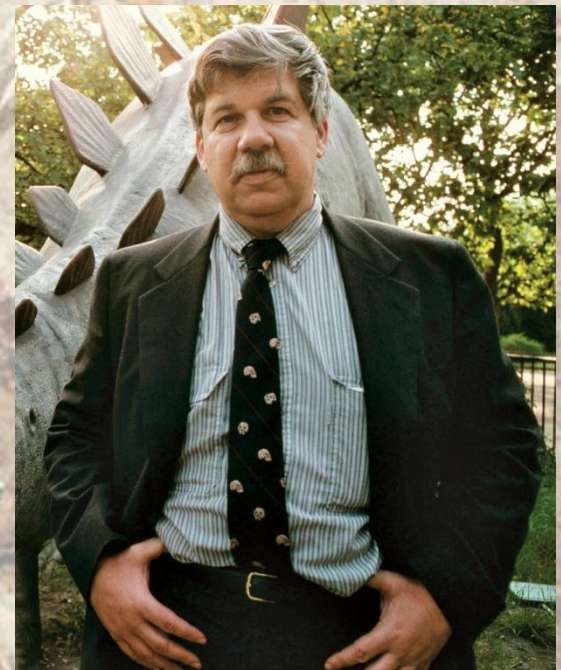
Simon Conway Morris
1951 -



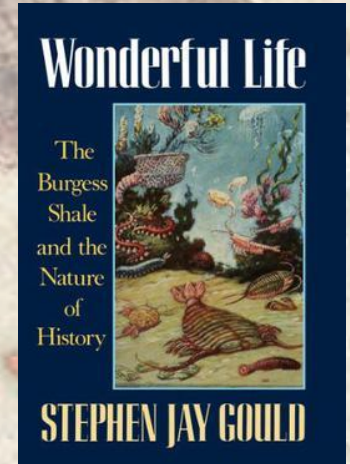
Life's Solution, 2003
The Crucible of Creation, 1998



VS



Stephen Jay Gould
1942 - 2002



Wonderful Life, 1989

Je vznik
konvergentných
foriem nevyhnutný?
Alebo je súčasná biota
prevažne výsledkom
nepredvídateľnej
náhodnosti?

EVOLUTIONARY BIOLOGY

A Triassic-Jurassic window into the evolution of Lepidoptera

Timo J. B. van Eldijk,¹ Torsten Wappler,² Paul K. Strother,³ Carolien M. H. van der Weijst,¹ Hossein Rajaei,⁴ Henk Visscher,¹ Bas van de Schootbrugge^{1*}

On the basis of an assemblage of fossilized wing scales recovered from latest Triassic and earliest Jurassic sediments from northern Germany, we provide the earliest evidence for Lepidoptera (moths and butterflies). The diverse scales confirm a (late) Triassic radiation of lepidopteran lineages, including the divergence of the Glossata, the clade that comprises the vast multitude of extant moths and butterflies that have a sucking proboscis. The microfossils extend the minimum calibrated age of glossatan moths by ca. 70 million years, refuting ancestral association of the group with flowering plants. Development of the proboscis may be regarded as an adaptive innovation to sucking free liquids for maintaining the insect's water balance under arid conditions. Pollination drops secreted by a variety of Mesozoic gymnosperms may have been non-mutually exploited as a high-energy liquid source. The early evolution of the Lepidoptera was probably not severely interrupted by the end-Triassic biotic crisis.

INTRODUCTION

Lepidoptera (moths and butterflies) represent one of the most admired and studied insect groups, not in the least for their remarkable associations with flowering plants. However, despite their important role in terrestrial ecosystems, the early evolutionary history of these insects remains murky and mired in an exceedingly poor fossil record (1). Current evolutionary concepts are largely based on molecular phylogenetic analyses, suggesting that Lepidoptera diverged from their sister group Trichoptera (caddisflies) during Permian (2, 3) or (late) Triassic (4–6) times. The large discrepancies in divergence time are mainly due to competing molecular dating methods and the choice of calibration fossils for providing age constraints. However, in any case, age estimates are substantially older than the oldest known stem-group lepidopteran fossil, *Archaeolepis minor* (Early Jurassic, Steinmannian, ca. 195 million years ago (Ma); Dorset, UK) (7) and the oldest known crown-group representative *Paraspathina affimacrai* (Early Cretaceous; Barremian; ca. 129 Ma, Lebanon) (8).

To contribute to a possible reduction of the gap between molecular and fossil dates, we explore for the first time the phylogenetic potential of dispersed lepidopteran wing scales encountered in sedimentary organic matter. Lepidoptera are characterized by, and named after, their dense covering of chitinous scales on bodies, legs, and wings. Detached scales can be transferred by wind and water action to depositional areas for burial in terrestrial or even marine sediments, from which they may be recovered by palynological methods (8, 9). Because the structure of the scales, particularly the wing scales, is taxonomically informative (10), well-preserved fossil specimens could have clade-level morphological characteristics relevant to more accurate calibration of divergence-time estimates in molecular lepidopteran phylogenies. We studied fossilized scales encountered as rare palynological elements (Fig. 1) in Triassic-Jurassic boundary sediments from the cored Schandeleh-1 well, drilled in northern Germany near Braunschweig.

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van Eldijk et al., Sci. Adv. 2018; 4:e1701568 10 January 2018

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RESULTS

The scales were found discontinuously within a 26-m stratigraphic interval embracing the Triassic-Jurassic (Rhaetian-Hietangian) transition (Fig. 2). About 70 scales and scale fragments, in various states of degradation, could be analyzed. Exceptionally well-preserved specimens were recovered from just above the palynologically defined Triassic-Jurassic boundary. Taxonomic identification of the fossil scales has been based on relevant literature data on scale morphology and structure of extant Lepidoptera and other scale-bearing hexapods, supplemented by the analysis of additional scanning electron microscopy (SEM) images (see the Supplementary Materials). Our survey of extant scale types and a compilation of the principal morphological characteristics (Table 1A) suggest that most hexapods, other than Lepidoptera, may be excluded as a source for the fossil scales (Table 1B). There is also little affinity with the scale types of the extinct neuropteran family Kalligrammatidae (11) and Trichoptera, a recently proposed extant order of the Amphipnesoptera (12).

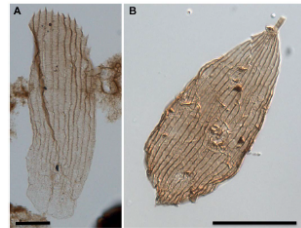


Fig. 1. Lepidopteran scales in palynological preparations, as seen in transmittent light. (A) Serrated scale from the Hietangian [31.670 m below surface (mbs)]. (B) Scale with a rounded apical margin from the Rhaetian [37.50 mbs]. Scale bars, 20 μ m.

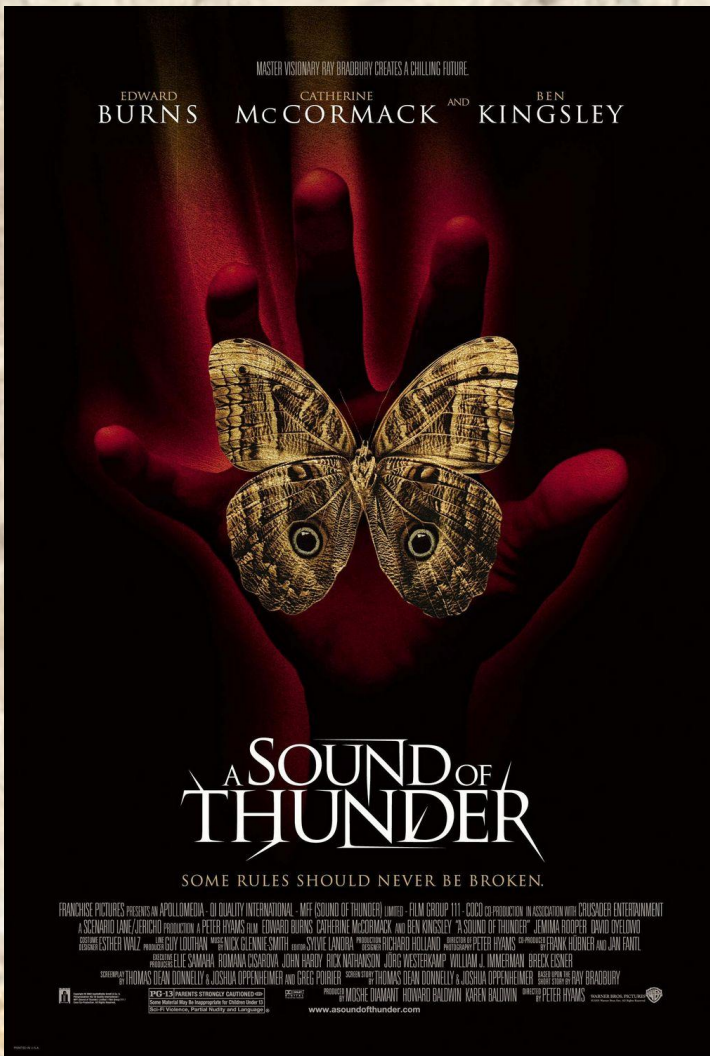
Najstaršie Lepidoptera (bazálne Glossata) z prelomu triasu/jury. Posúvajú vznik glosátnych lepidopter o 70 miliónov rokov.

Vznik Lepidoptera nesúvisel s rozvojom krytosemenných rastlín. Peľové kvapôčky nahosemenných rastlín ako zdroj v arídnych podmienkach.

Formy podobné dnešným potočnikovcom (Micropterigidae).



Eldijk TJBvan et al. 2018.
Sci. Adv. 4:e1701568



Ray D. Bradbury: „A Sound of Thunder“, 1952
 SK: Hlas hromu
 CZ: Burácení hromu

Zdroje:

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- <https://blogs.scientificamerican.com/artful-amoeba/butterflies-in-the-time-of-dinosaurs-with-nary-a-flower-in-sight/>

Ďakujem za pozornosť.