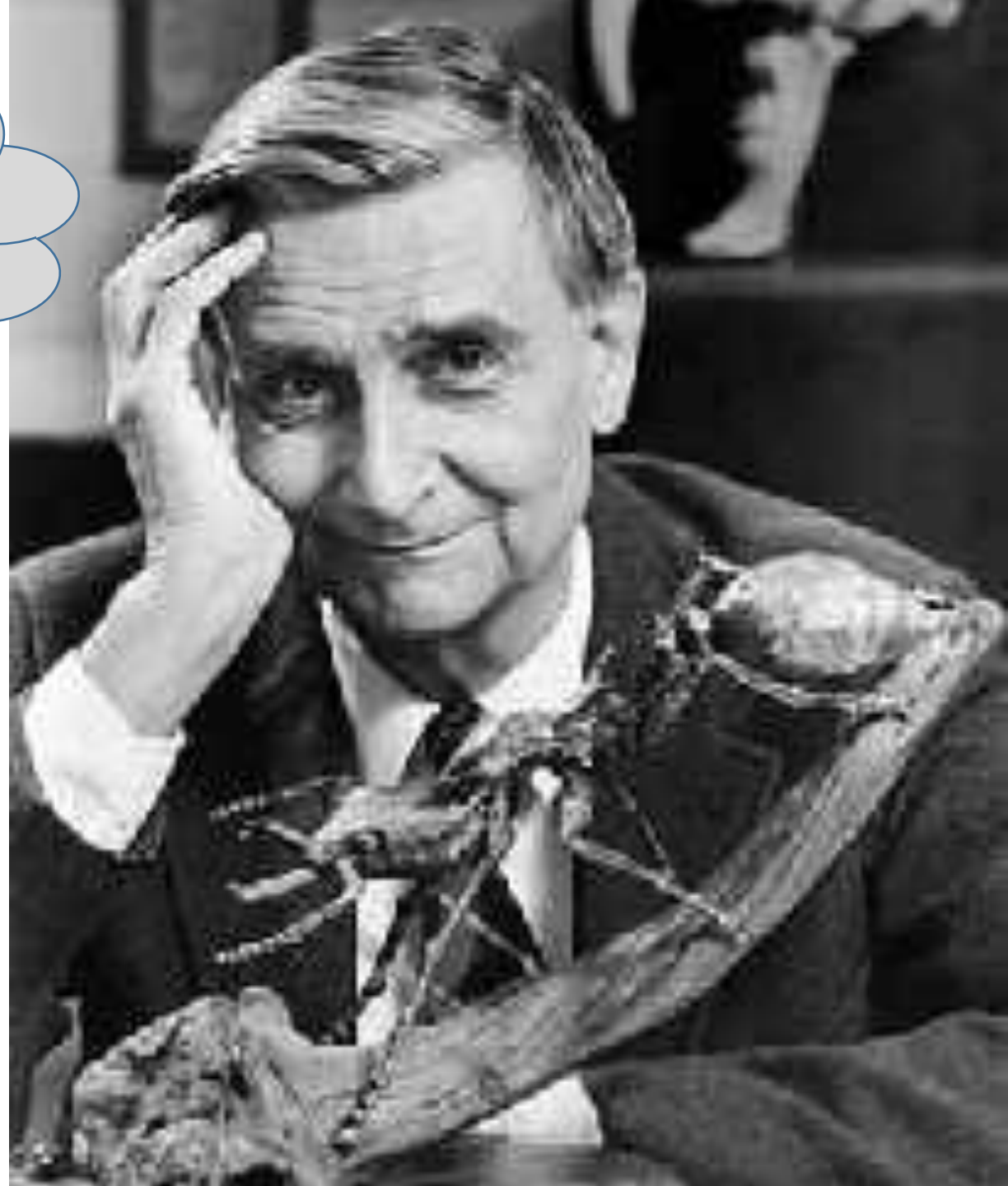
KAJ JE VRSTA?
IN KAJ NI!

Boris Kryštufek

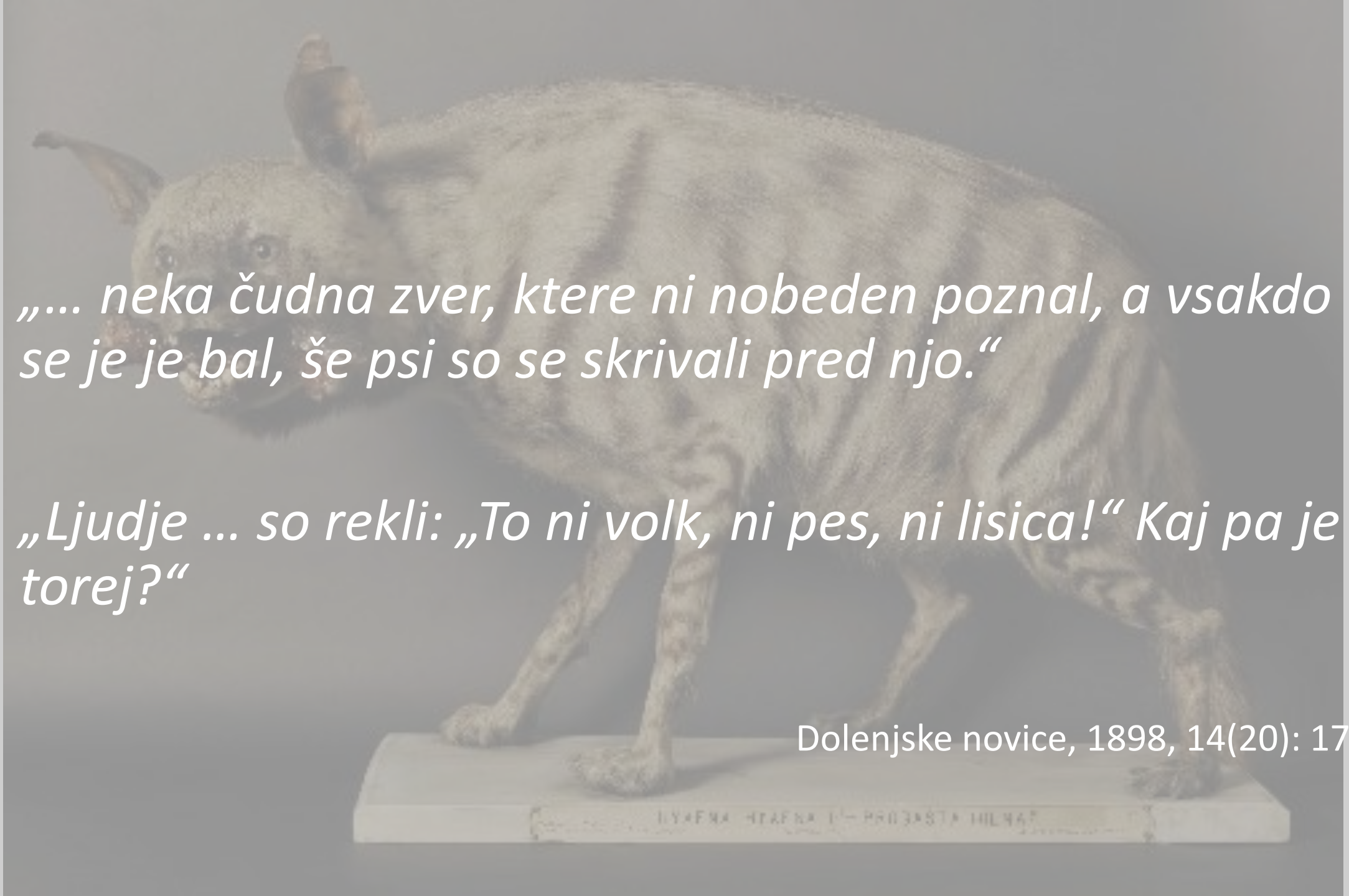
Kustodiat za vretenčarje

Prirodoslovni muzej Slovenije

ljudje imamo gen za biofilijo



Edward O. Wilson



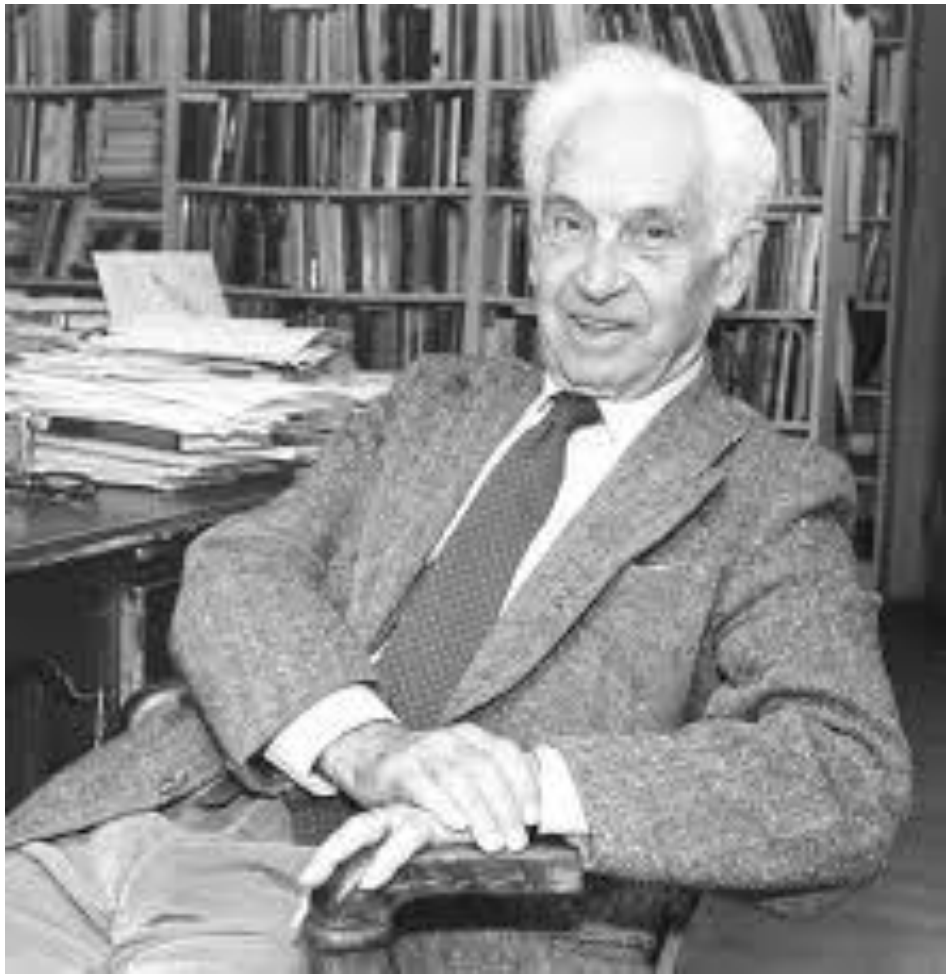
„… neka čudna zver, ktere ni nobeden poznal, a vsakdo se je je bal, še psi so se skrivali pred njo.“

„Ljudje … so rekli: „To ni volk, ni pes, ni lisica!“ Kaj pa je torej?“

Dolenjske novice, 1898, 14(20): 171

- Kaj vrsta je
- Zgodovina razmejevanja vrst
- Poimenovanje vrst

Ernst Mayr (1904-2005)



WHAT IS A SPECIES, AND WHAT IS NOT?*

ERNST MAYR†

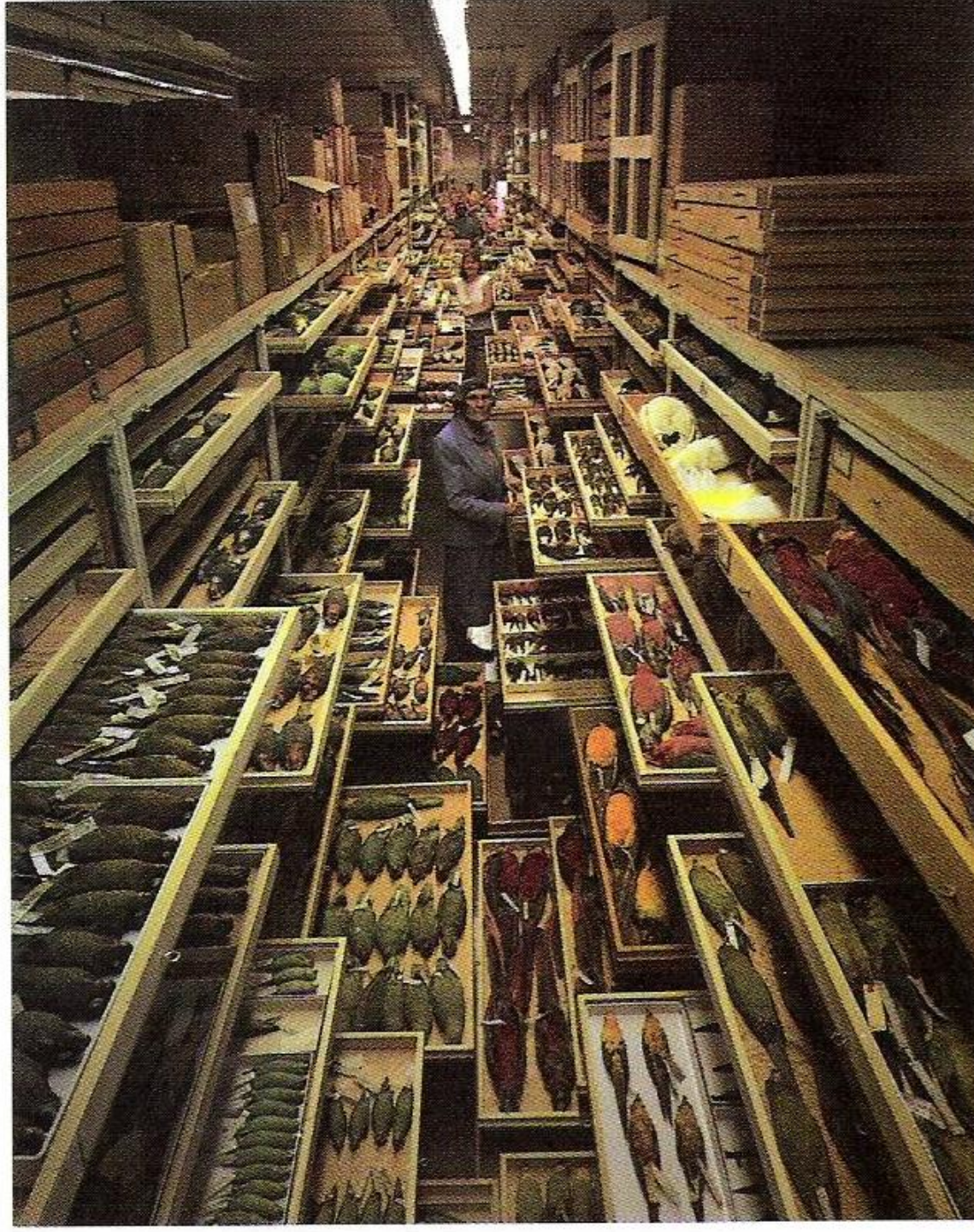
I analyze a number of widespread misconceptions concerning species. The species category, defined by a concept, denotes the rank of a species taxon in the Linnaean hierarchy. Biological species are reproducing isolated from each other, which protects the integrity of their genotypes. Degree of morphological difference is not an appropriate species definition. Unequal rates of evolution of different characters and lack of information on the mating potential of isolated populations are the major difficulties in the demarcation of species taxa.

1. What is a Species, and What is Not? As someone who has published books and papers on the biological species for more than 50 years, and who has revised and studied in detail more than 500 species of birds and many species of other groups of organisms, the reading of some recent papers on species has been a rather troubling experience. There is only one term that fits some of these authors: armchair taxonomists. Since many authors have never personally analyzed any species populations or studied species in nature, they lack any feeling for what species actually are. Darwin already knew this when, in September 1845, he wrote to Joseph Hooker: "How painfully true is your remark that no one has hardly the right to examine the question of species who has not minutely described many" (Darwin 1987, 253). These authors make a number of mistakes that have been pointed out again and again in the recent literature. Admittedly, the relevant literature is quite scattered, and some of it is perhaps rather inaccessible to a non-taxonomist. Yet, because the species concept is an important concept in the philosophy of science, every effort should be made to clarify it. It occurred to me that instead of criticizing certain recently published papers individually, it would be more constructive and helpful if I would here attempt to present, from the perspective of a practicing systematist, a concise overview of the philosophically important aspects of the problem of the 'species'. There is nothing of the sort in the literature.

Mayr, E. (1996). *Philosophy of Science, 63(2), 262–277.*

AMERICAN MUSEUM OF NATURAL HISTORY

Ameriški prirodoslovni muzej New York



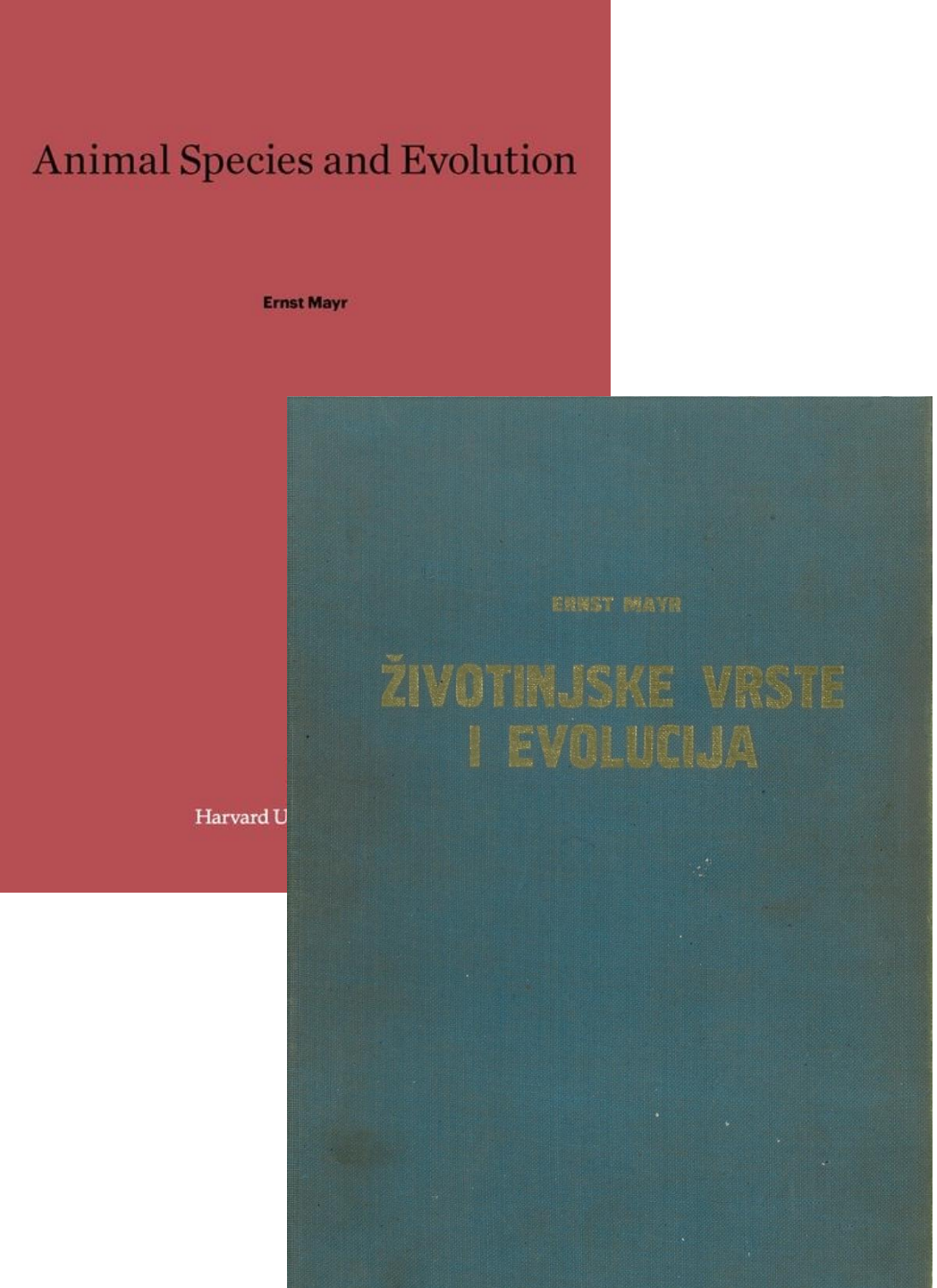
Muzej primerjalne zoologije, Univerza Harvard

Peter J. Park et al. (2013) Evolutionary Biology for the 21st Century. PLoS Biol 11(1): e1001466. doi:10.1371/journal.pbio.1001466, CC BY 2.5,

Animal Species and Evolution

Ernst Mayr

Harvard University Press



Životinjske vrste i evolucija

Živalske vrste in evolucija

Prevod Milena Šafarik

(Pavle Radoman, Milka Pljakić, Zoran Gradojević, Jelisaveta Jovanović, Ivo Savić, Vojislav Jovanović)

Vuk Karadžić, Beograd, 1965, 1970

Vrsta je pomembna

The species concept is an important concept in the philosophy of science and a crucial tool in quantifying biodiversity (Mayr 1996).

Koncept vrste je pomemben koncept v filozofiji znanosti in bistveno orodje za kvantificiranje biodiverzitete (Mayr 1996).

Vrsta je pomembna

Species are … one of the fundamental units of biological organization (de Queiroz 2007)

Vrste so temeljne enote biološke organizacije (de Queiroz 2007).

Vrsta . . . .

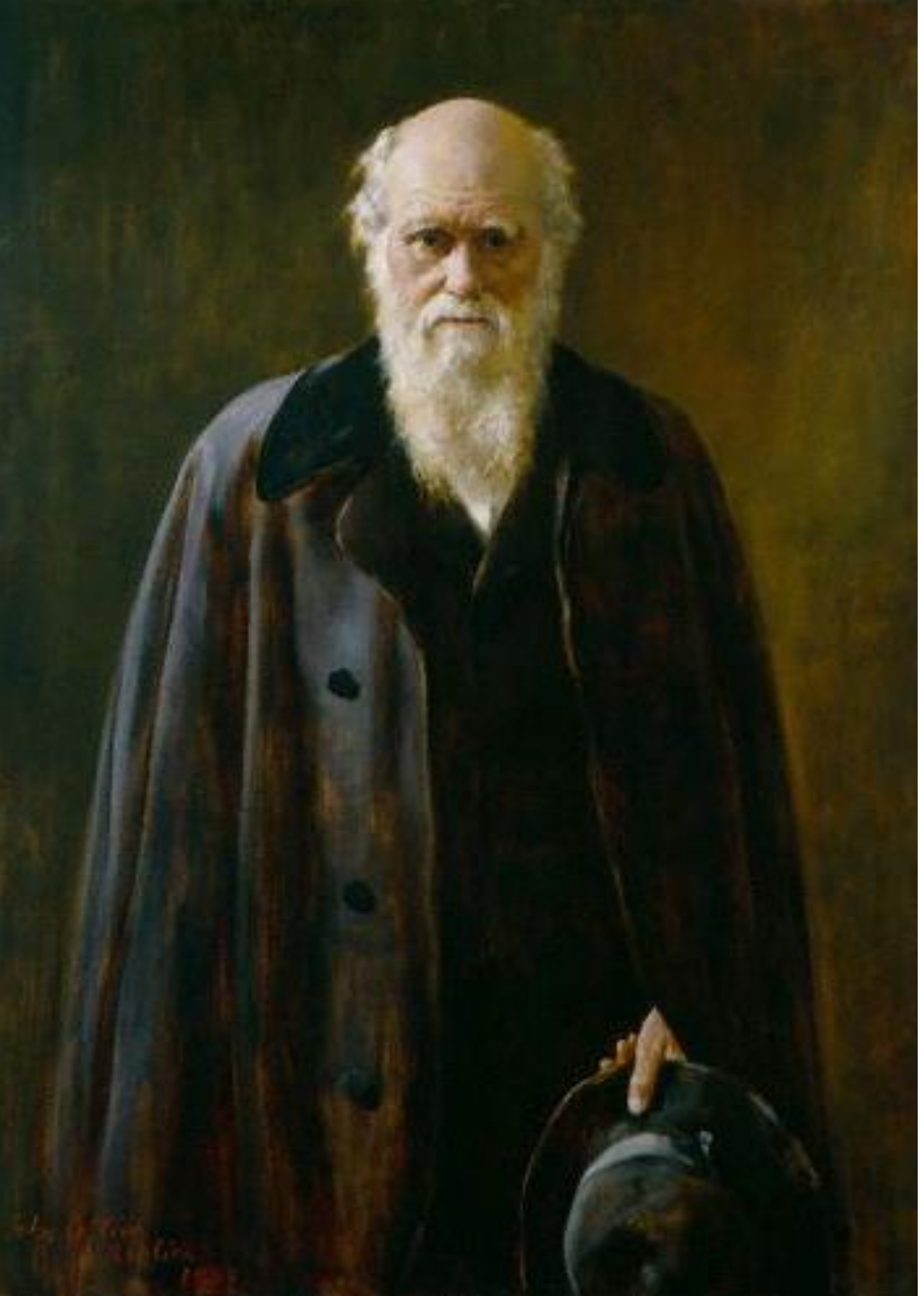
… species mean many things to many people (Agapow 2005)

… vrste pomenijo ljudem različne stvari (Agapow 2005)

Karl Linne

Vrsta je:

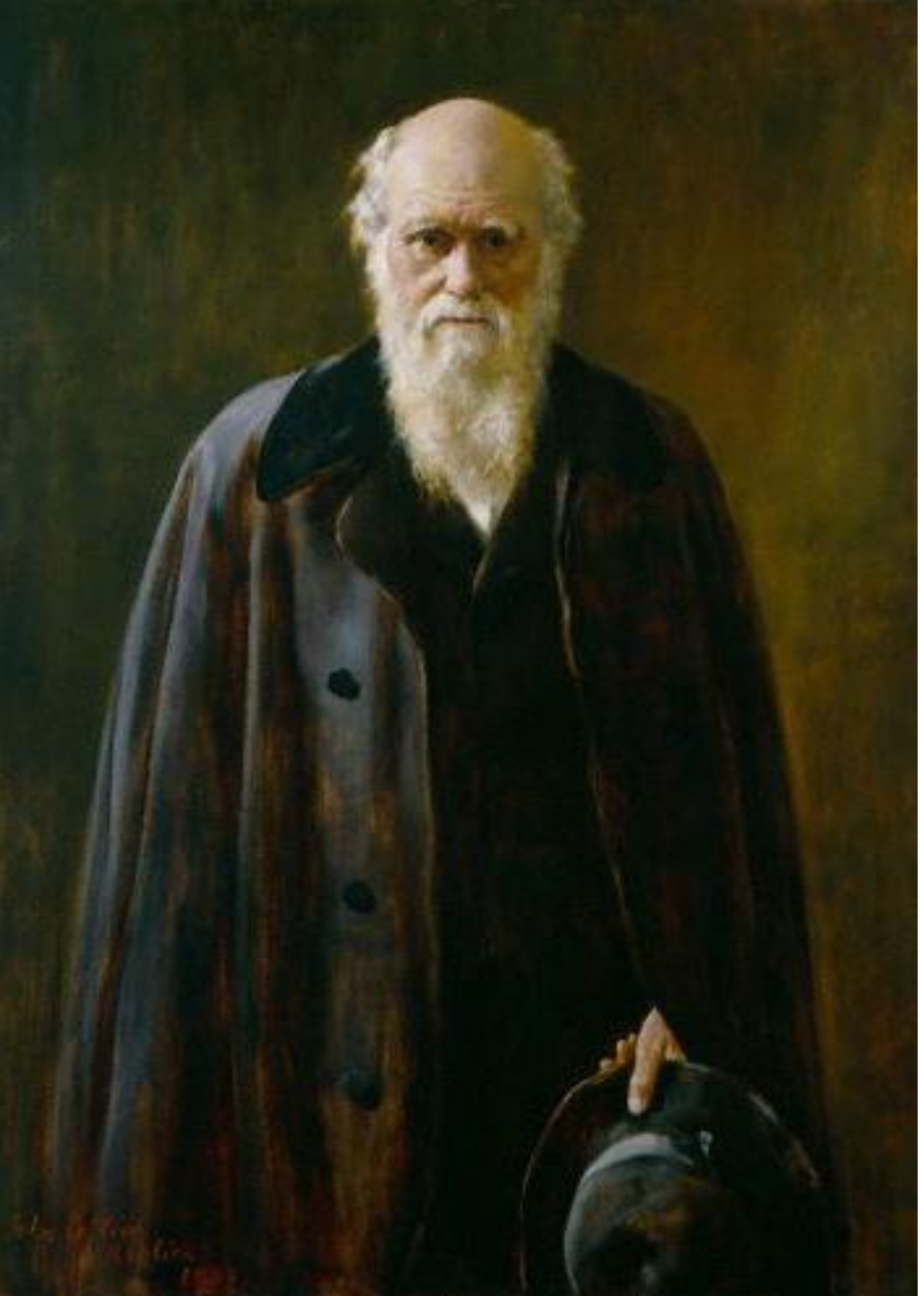
- resnična
- Stalna, statična (nespremenljiva)
- ostro omejena od drugih vrst



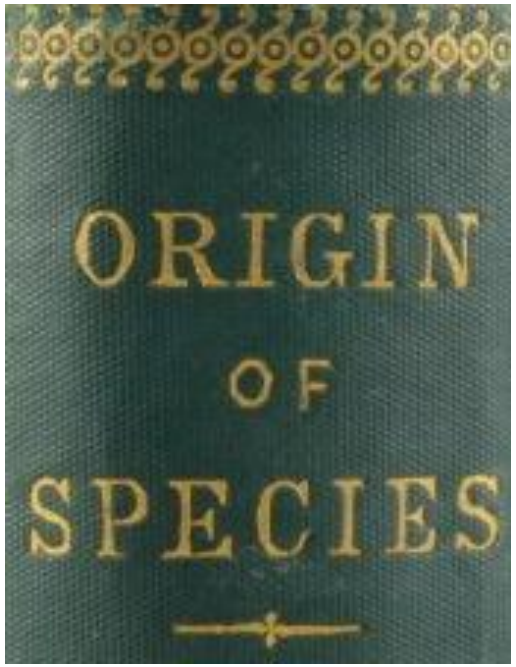
Charles Darwin

Vrsta ni:

- objektivna



Charles Darwin

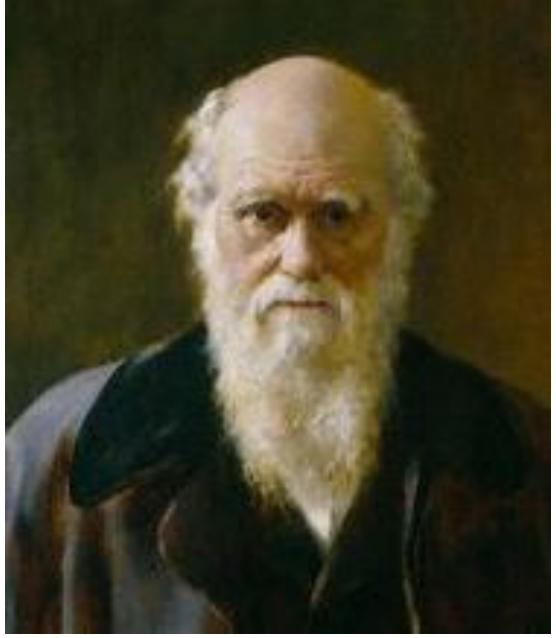


Izvor vrst (1859)

Ernst Mayr

Vrsta je:

- resnična
- reproduktivno izolirana skupina populacija
- ima skupen genetski sklad in zaseda lastno ekološko nišo



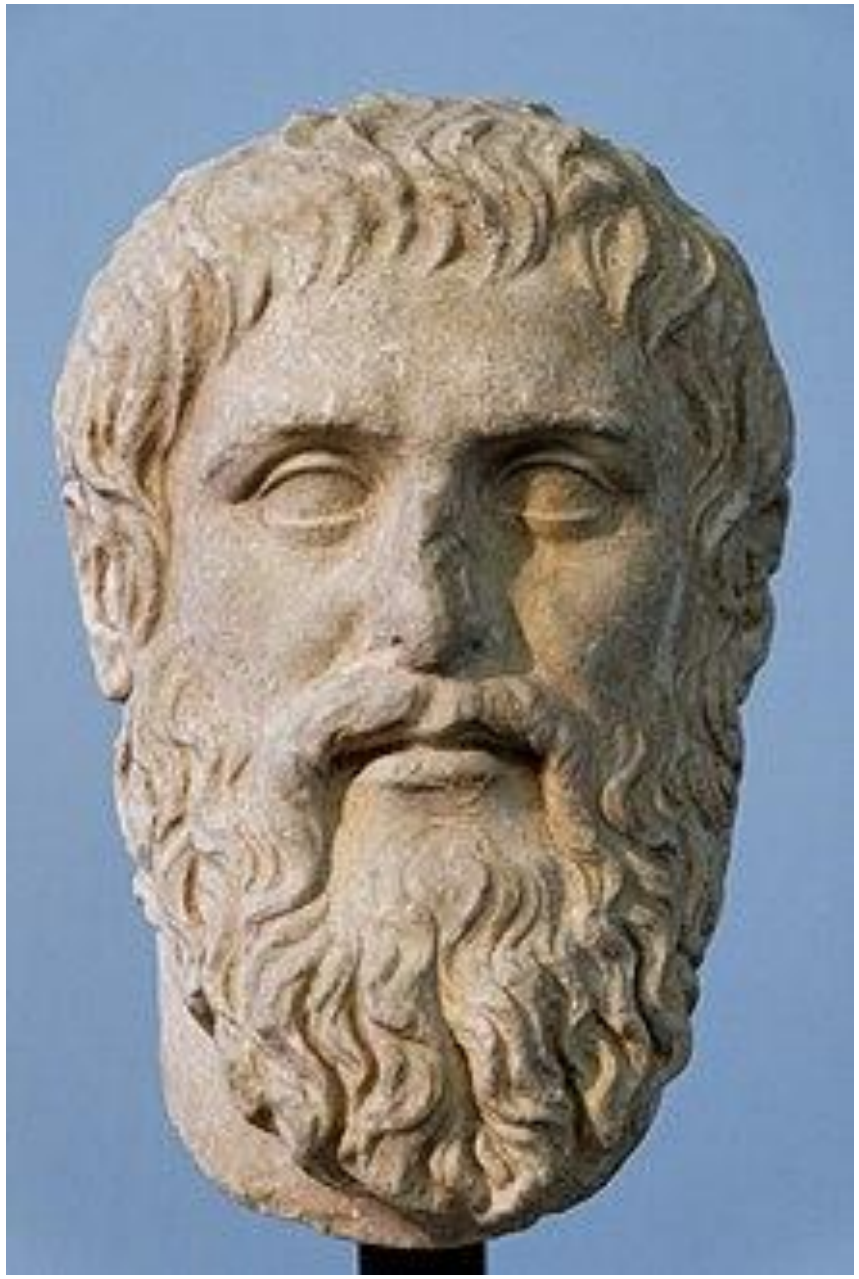
Biological species are reproducing isolated from each other, which protects the integrity of their genotypes (Mayr 1996)

… vrste se razmnožujejo izolirano druga od druge, kar zavaruje integriteto njihovih genotipov (Mayr 1996)

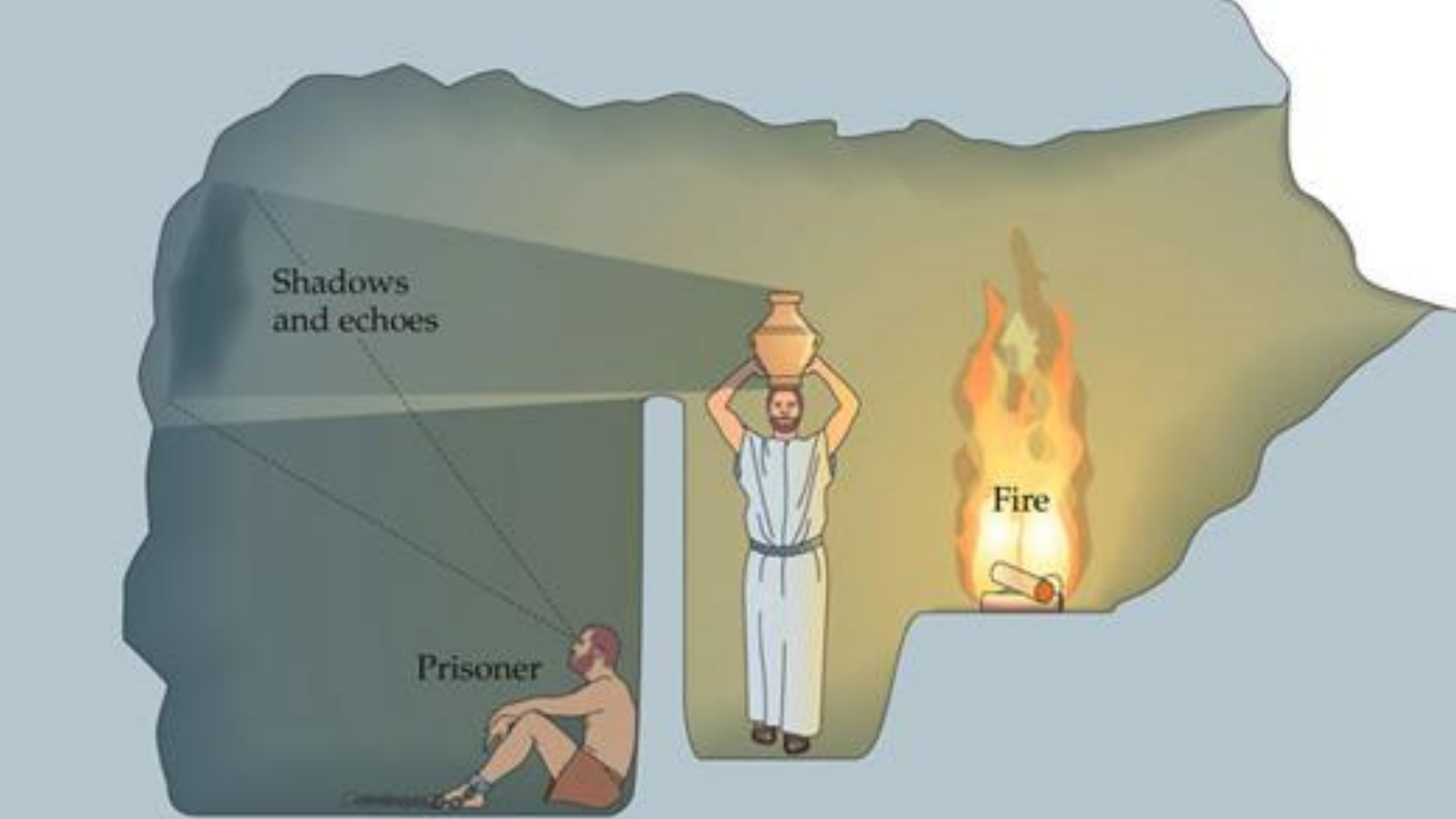
Platonov koncept sveta

Stvari imajo lastnosti (**esenco, eidos**), ki so potrebne za njihovo identiteto.

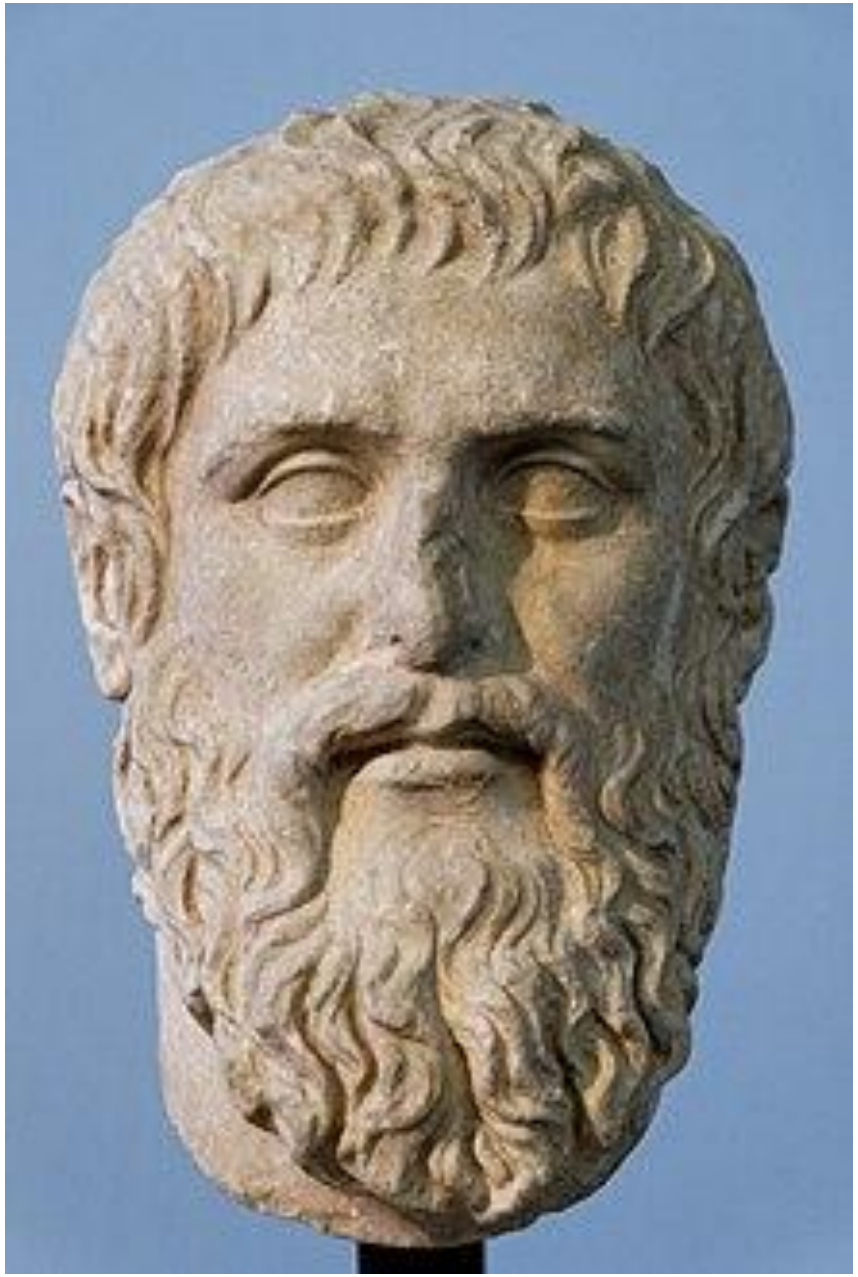
Svet esenc je transcendenten svetu substanc



Platon (c. 424-347 p.n.š.)


Shadows
and echoes
Fire
Prisoner

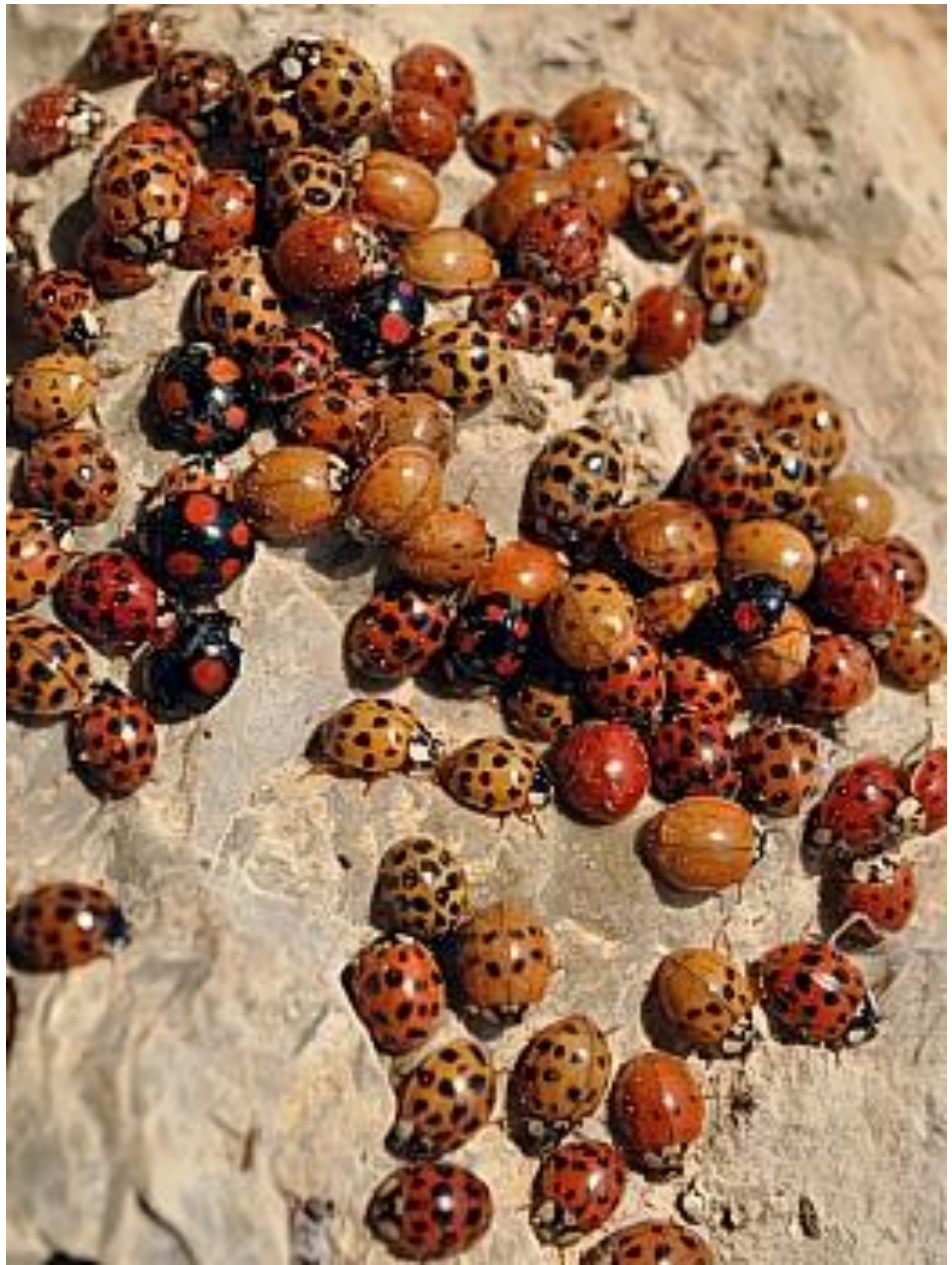
eidos = tip vrste



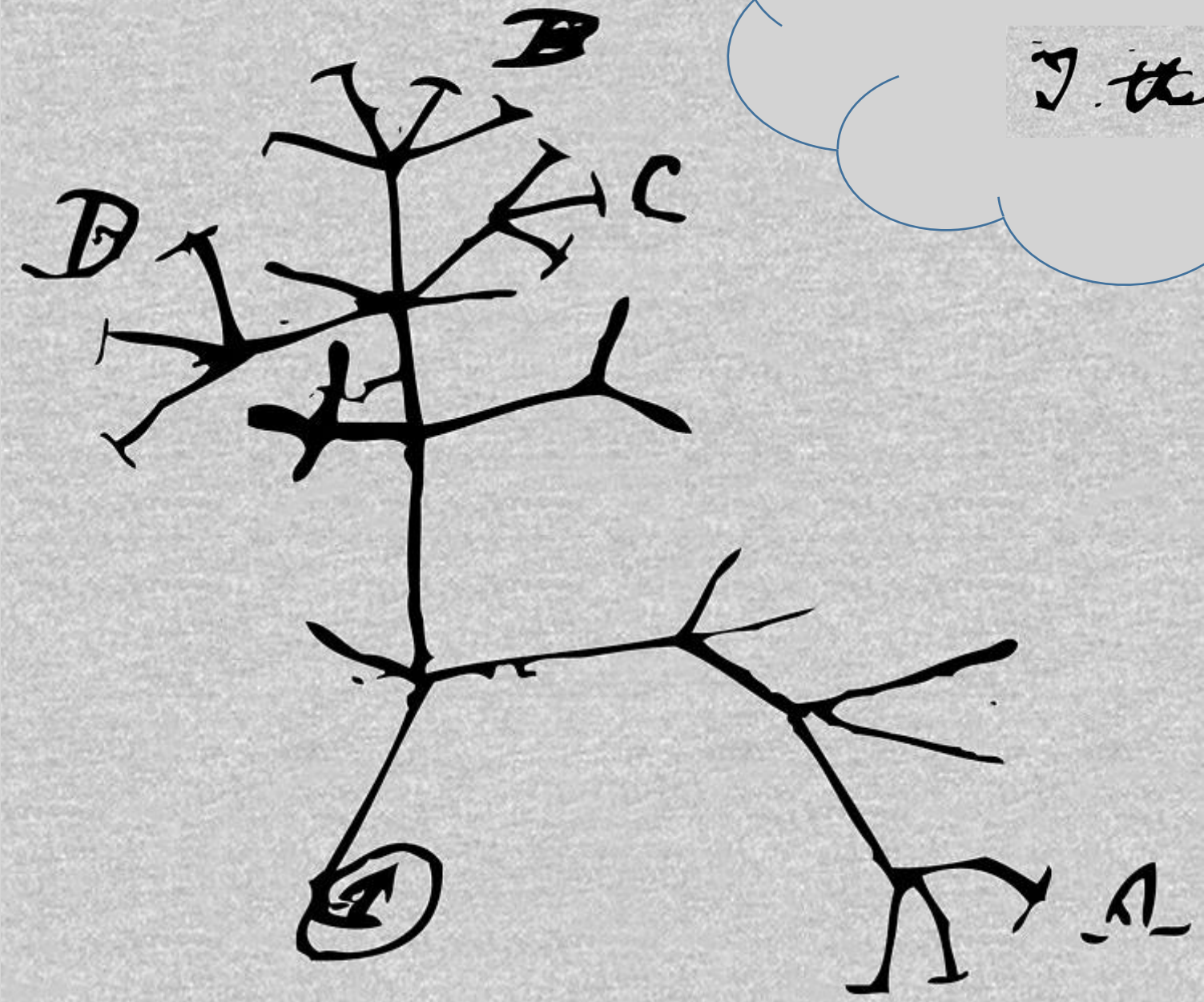
Platon (c. 424-347 p.n.š.)

mali vrtni polž

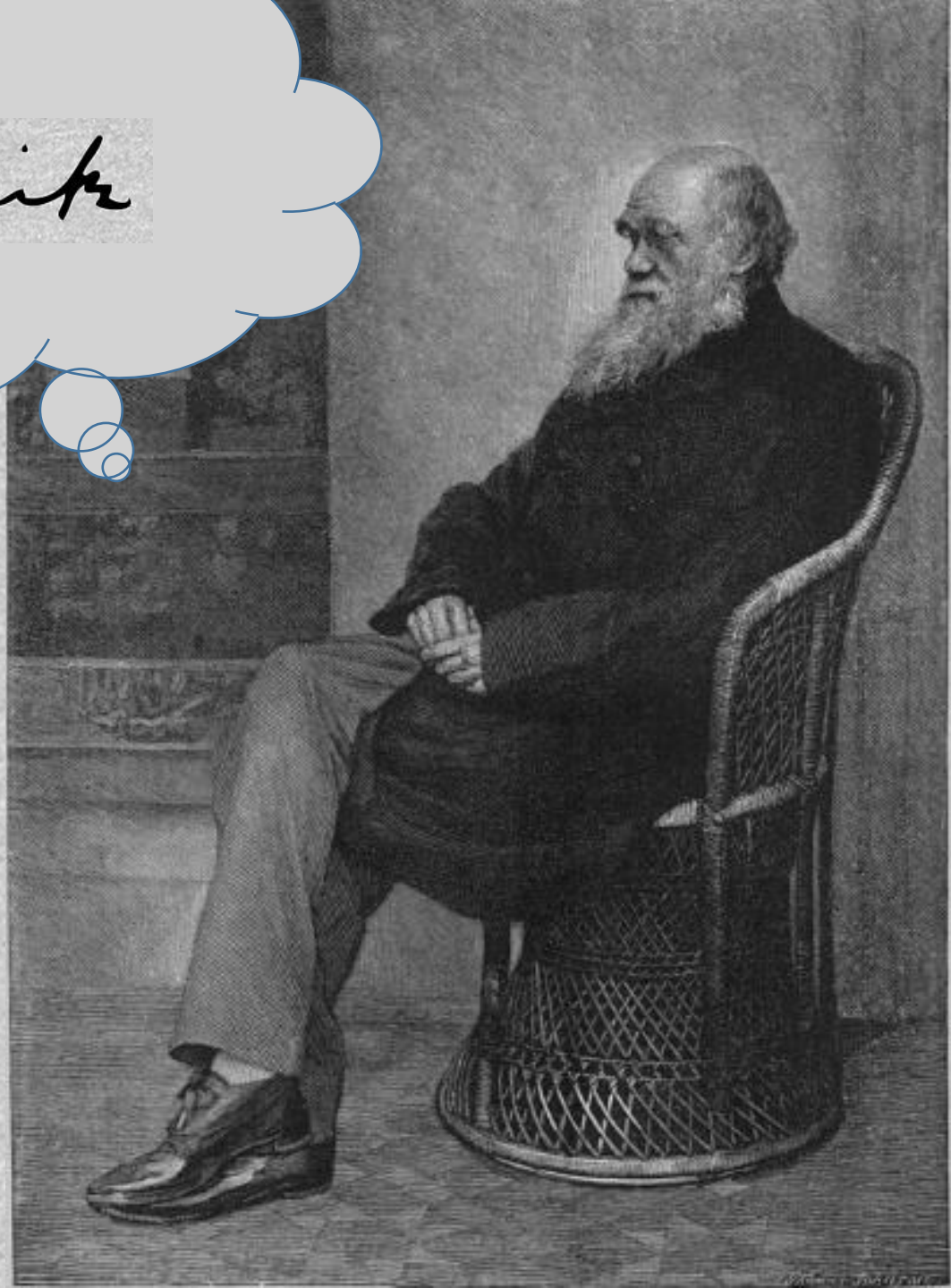
harlekinska pikapolonica



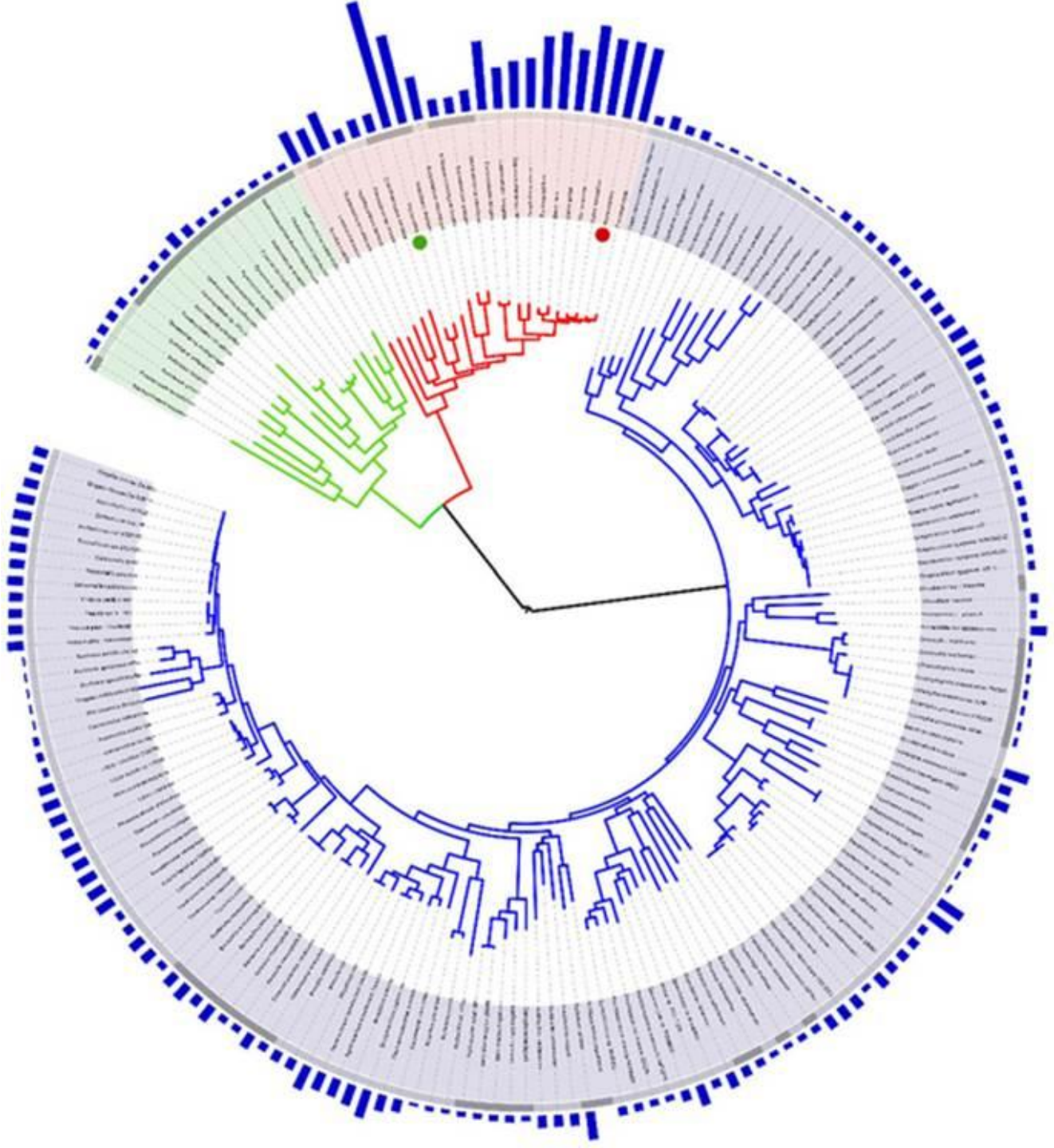
Variabilnost je temeljna značilnost živih bitij

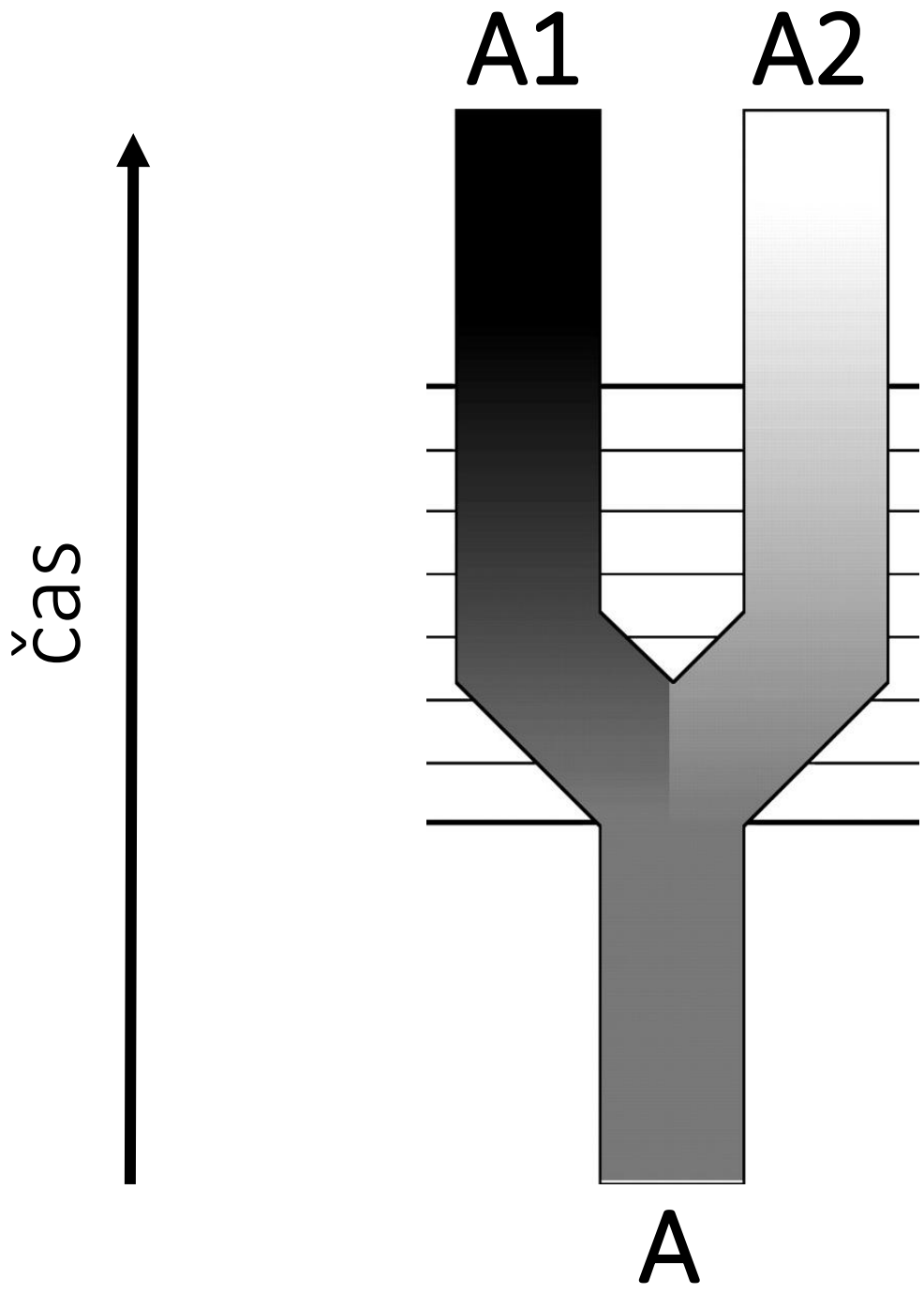


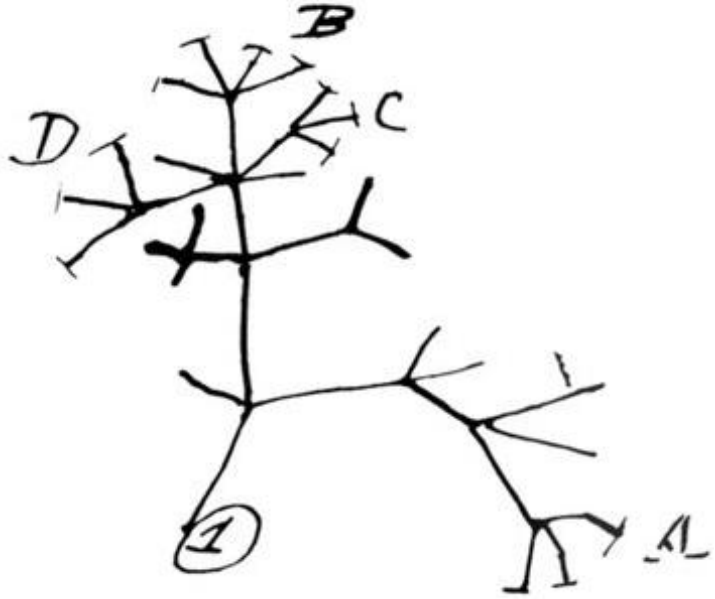
I think



Drevo življenja




A1
A2
čas
A

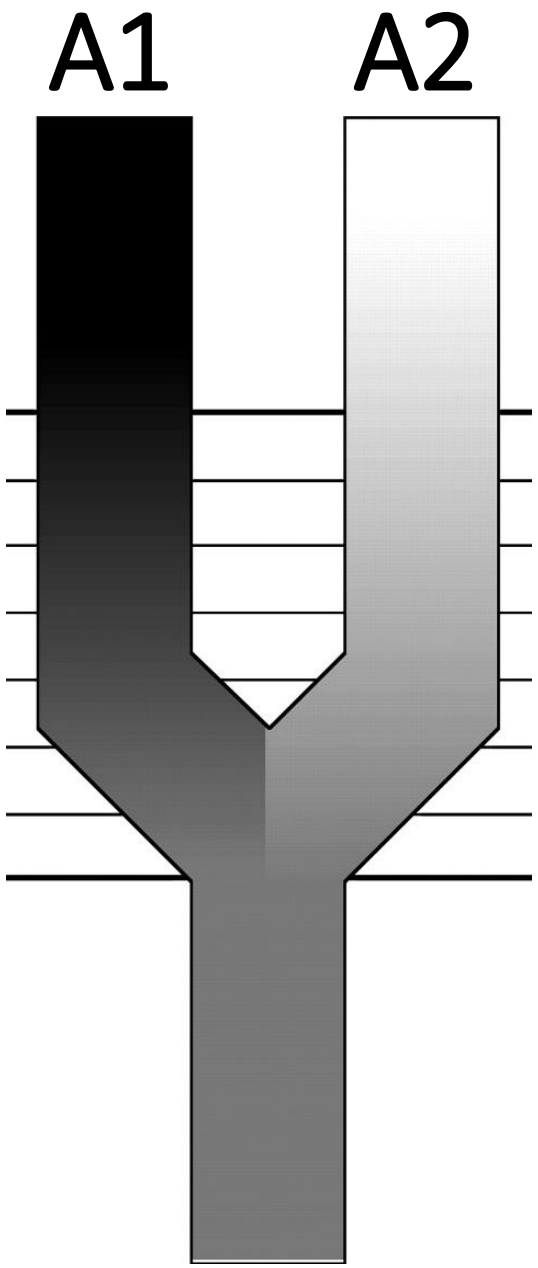

B
C
D
A

Nedimenzionalno pojmovanje vrste

136 vrst ptic

137 vrst ptic

136 vrst ptic

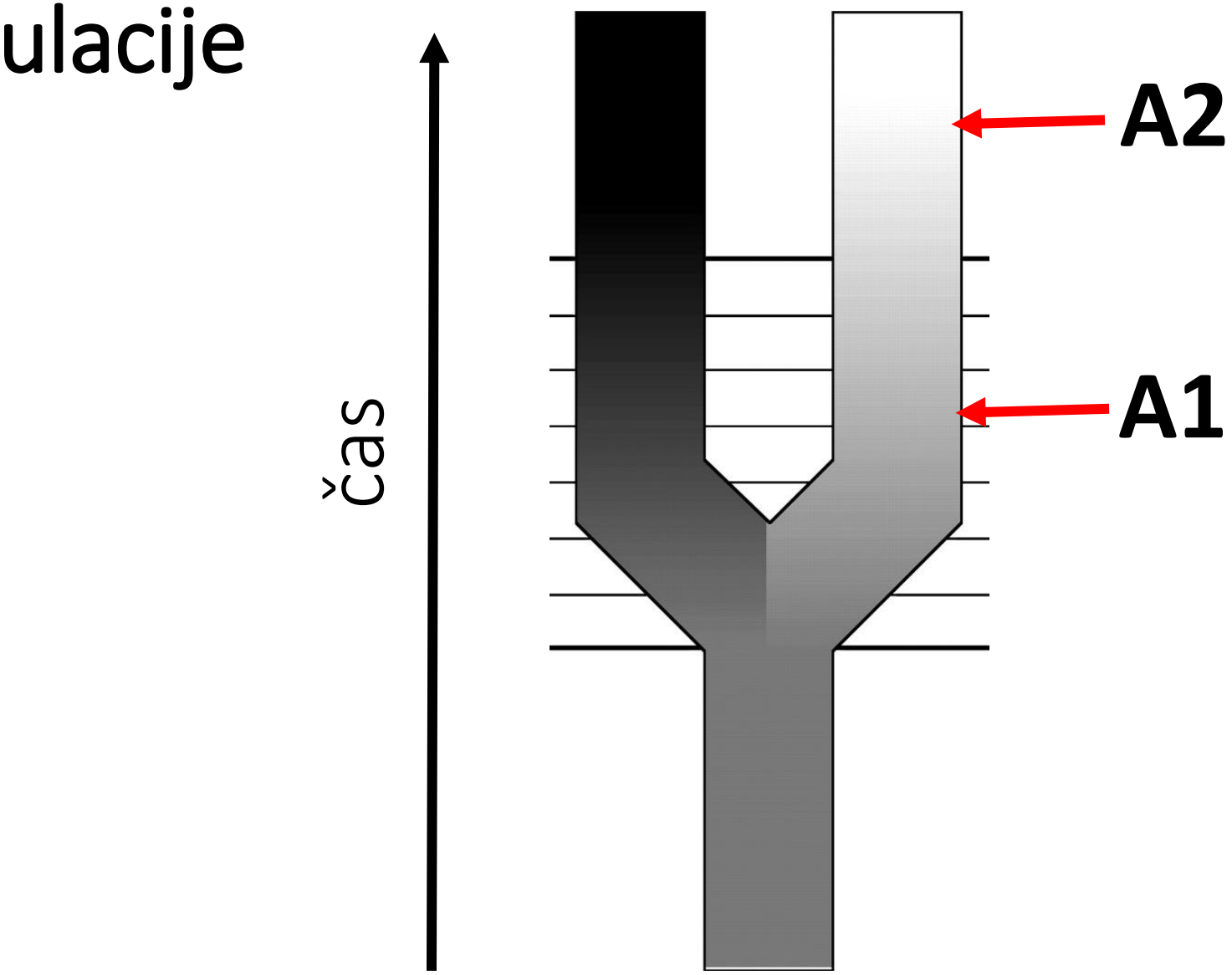


Da sta vrsti A1 in A2 sinpatrični in sinhroni, potem morata biti:

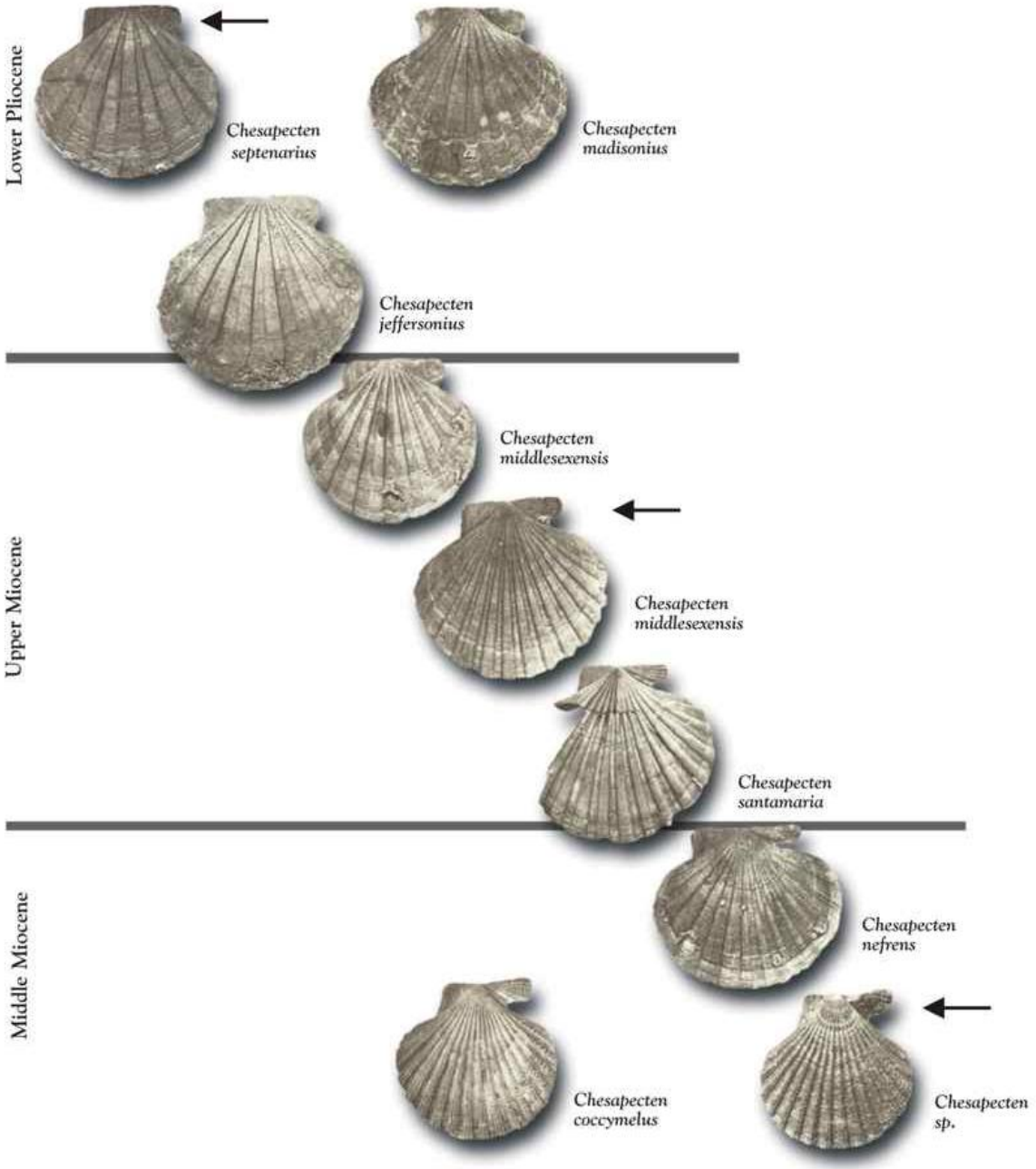
- reproduktivno (genetsko) nezdružljivi
- ekološko združljivi

Alopatrične in alohrone populacije

Alohrone populacije

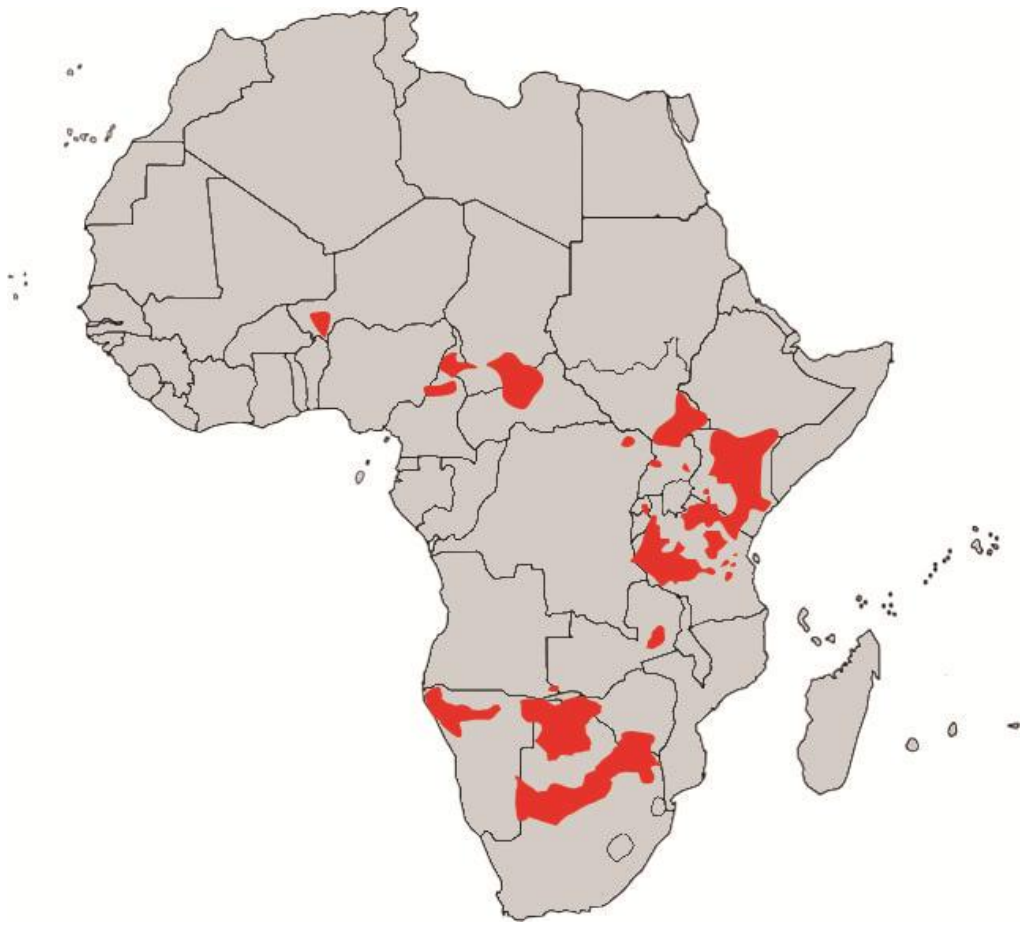


Pokrovača



https://www.quia.com/jg/2543647list.html

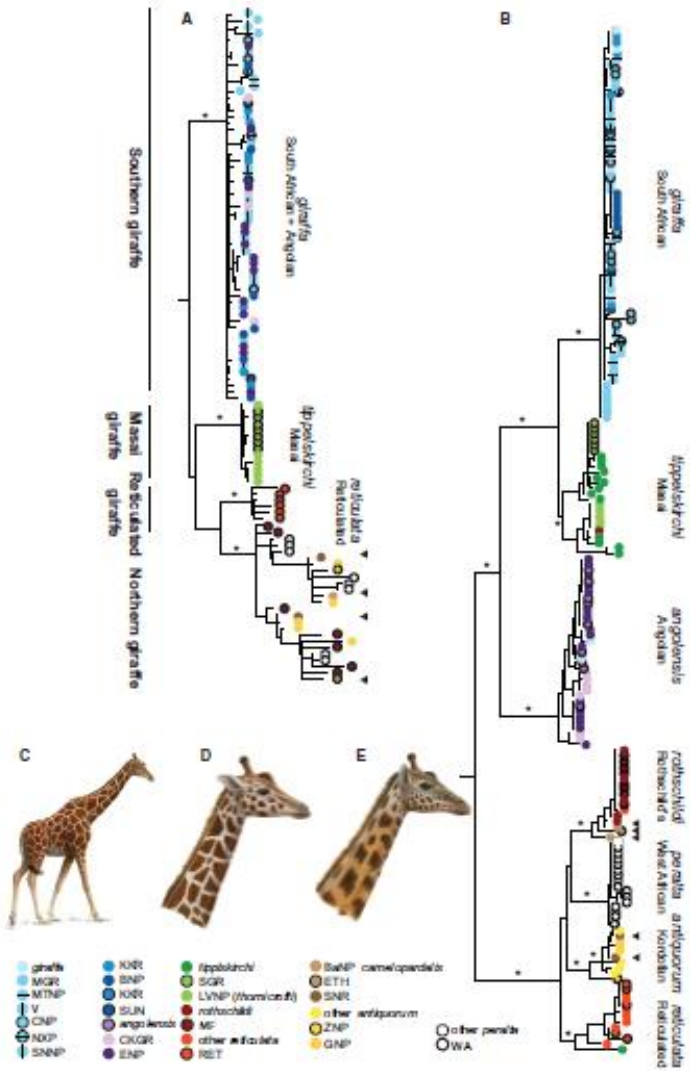
Alopatrične populacije

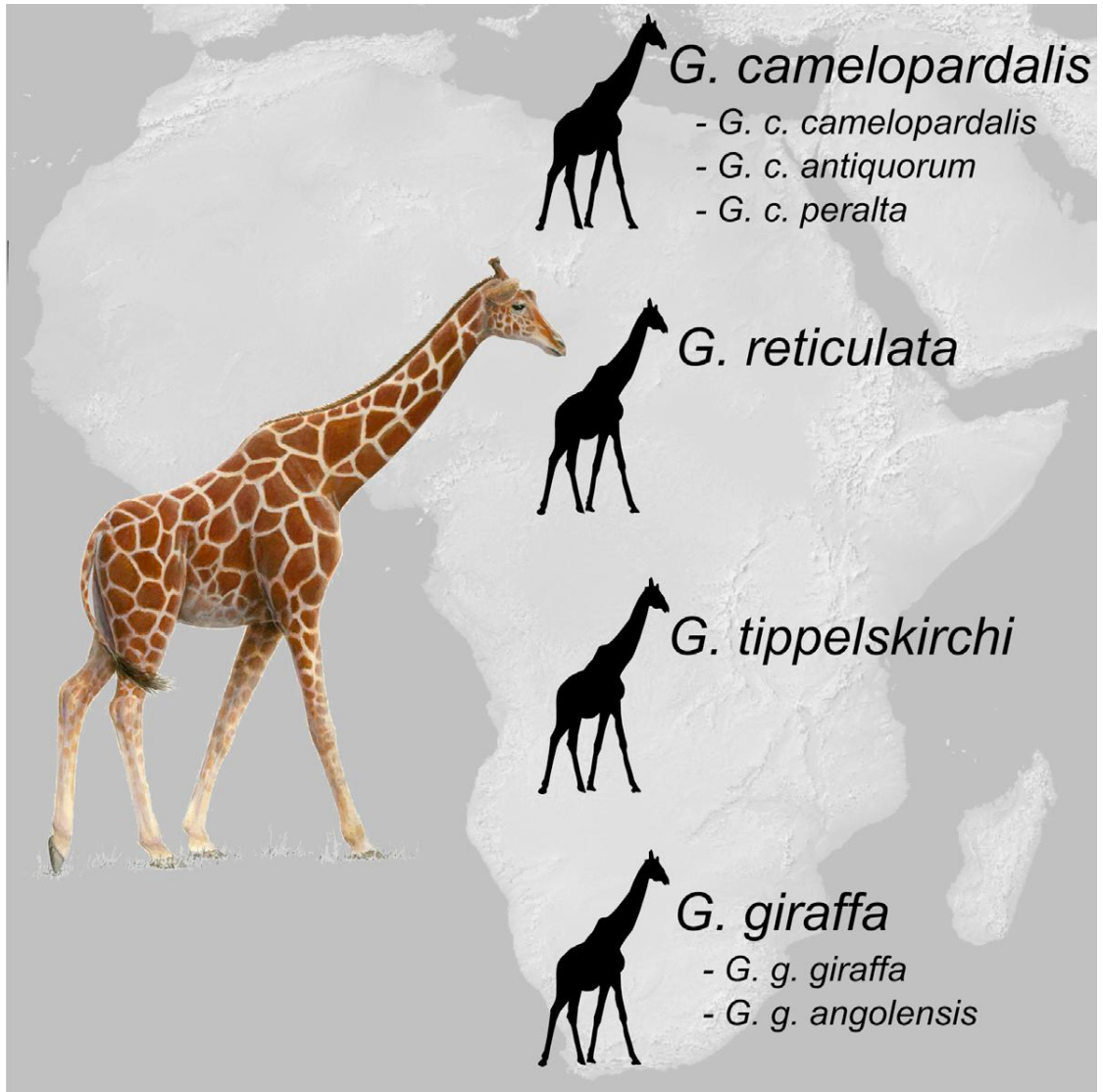


https://www.google.com/search?q=giraffe+subspecies+map&tbm=isch&source=univ&hl=sl&sa=X&ved=2ahUKEwi328j17ITgAhXSjqQKHSbxBdYQsAR6BAgEEAE&biw=1301&bih=658#imgdii=sZBHYMWo12TlPM:&imgrc=AIgYVYes5VR7JM:

How many species of giraffe are there?

Bercovitch et al. 2017 Current Biology





Koncept vrste

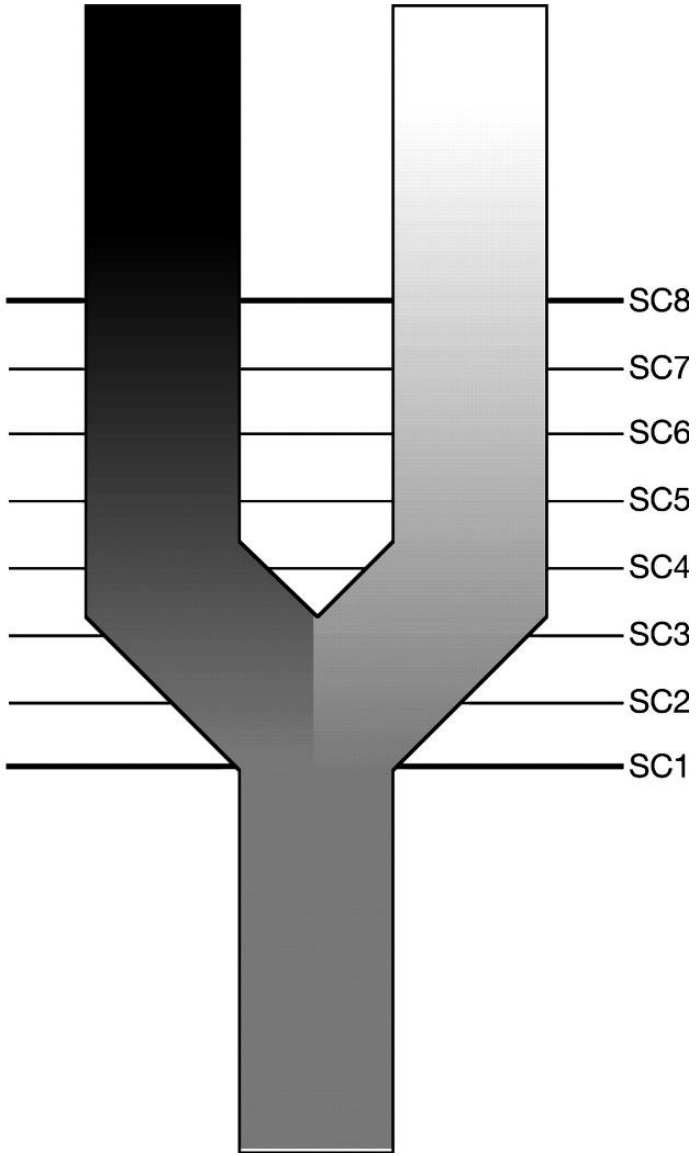
Name of species concept (alphabetically arranged)	Brief definition	Reference
"Biological" or reproductive isolation concept	Taxa possessing reproductive isolation with respect to other species. Characterized by reproductive isolating mechanisms	Poulton 1904, Mayr 1970
Cladistic Concept	Species are unbranched segments or lineages in an organismal phylogeny	Hennig 1968, Ridley 2004
Cohesion Concept	A taxon characterized by cohesion mechanisms, including reproductive isolation, recognition mechanisms, ecological niche, as well as by genealogical distinctness	Templeton 1998

Darwin's morphological concept	"Varieties" between which there are no or few morphological intermediates	Darwin 1859
Diagnostic ("phylogenetic") Concept	A species "is an irreducible (basal) cluster of organisms, diagnosably distinct from other such clusters, and within which there is a parental pattern of ancestry and descent"	Cracraft 1989
Ecological Concept	"A lineage which occupies an adaptive zone minimally different from that of any other lineage..."	Van Valen 1976
Phenetic concept	Clusters of individuals circumscribed using multivariate statistical analysis	Sokal and Crovello 1970
Polytypic Species	Taxa having many "types," i.e., geographic subspecies. Geographic populations are part of the same species if they intergrade in areas of overlap	1890 onwards, reviewed by: Mayr 1970, Mallet 1995, 2004

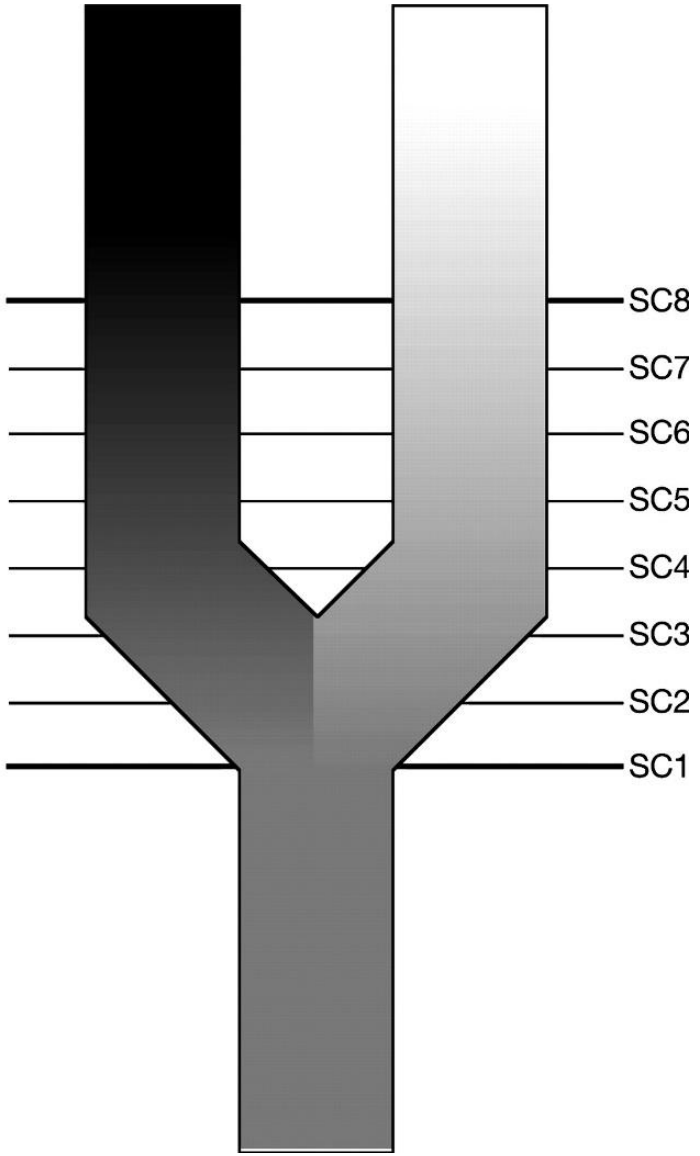
Evolutionary concept	A lineage evolving separately and "with its own unitary evolutionary role and tendencies"	Simpson 1951
Genealogical concept	Species are mutually monophyletic in the genealogies at all (or at a consensus of) gene genealogies in the genome	Baum and Shaw 1995
General lineage concept	Species are independent lineages. According to De Queiroz: all other species concepts agree on this fundamental principle; conflict about species concepts refers mainly to criteria applying to different stages of lineage divergence	de Queiroz 1998
Genotypic (genomic) cluster criterion	Sympatric species are clusters of genotypes circumscribed by gaps in the range of possible multilocus genotypes between them	Mallet 1995, 2001

Population concept	Populations are the real units of evolution, not species, because gene flow is generally weak. Morphological and genetic uniformity of species is explained by stabilizing selection acting separately in each population	Ehrlich and Raven 1969
Recognition concept	Species possess a shared fertilization system, known as "specific-mate recognition systems"	Paterson 1985
Taxonomy without species	Species are no more real than any other hierarchical level in the tree of life. Species and other taxonomic ranks should be replaced either by "rank-free taxonomy" (which can name each node in a bifurcating phylogeny—Mishler), or by genotypic clusters described according to their genetic divergence from other clusters (Hendry et al.)	Mishler 1999, Hendry et al. 2000

Kaj je vrsta?

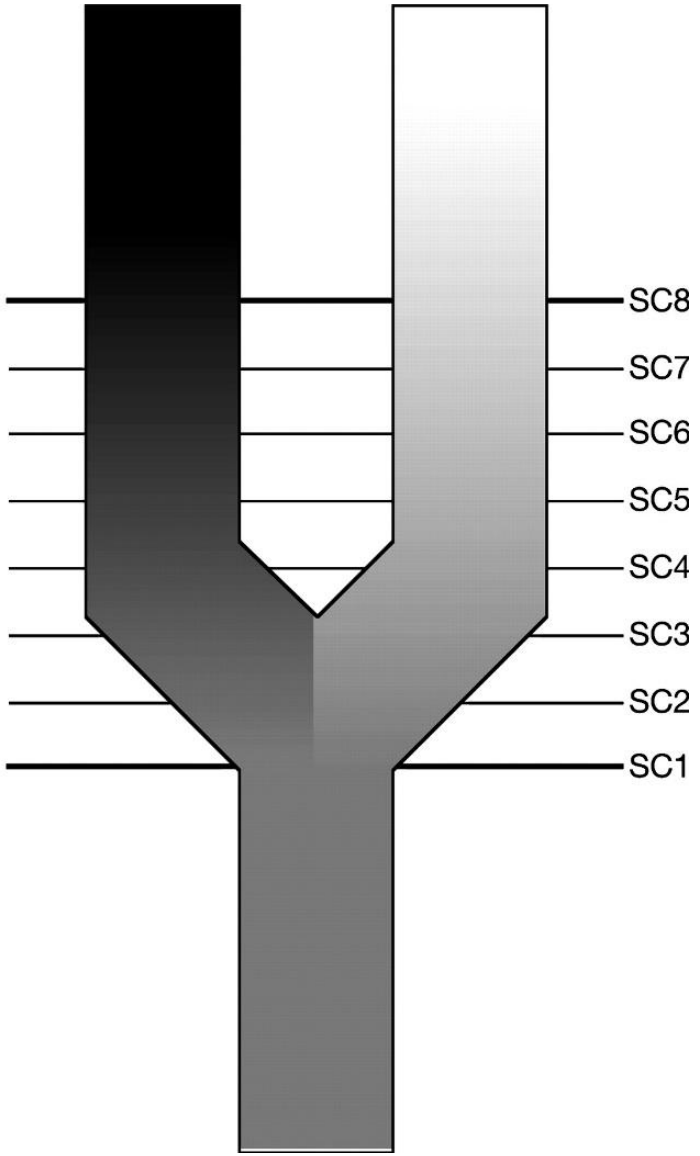


Kako vrste prepoznamo?



genetski

Atributi vrste



ekološki

morfološki

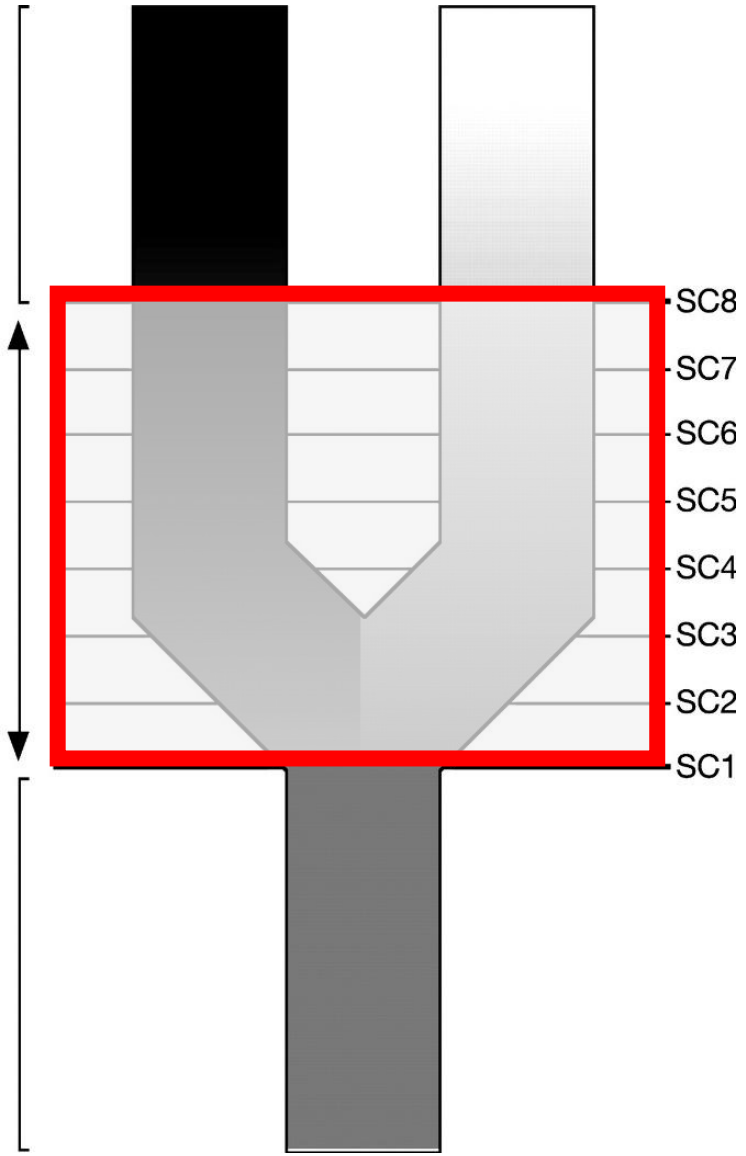
genetski

2 vrsti

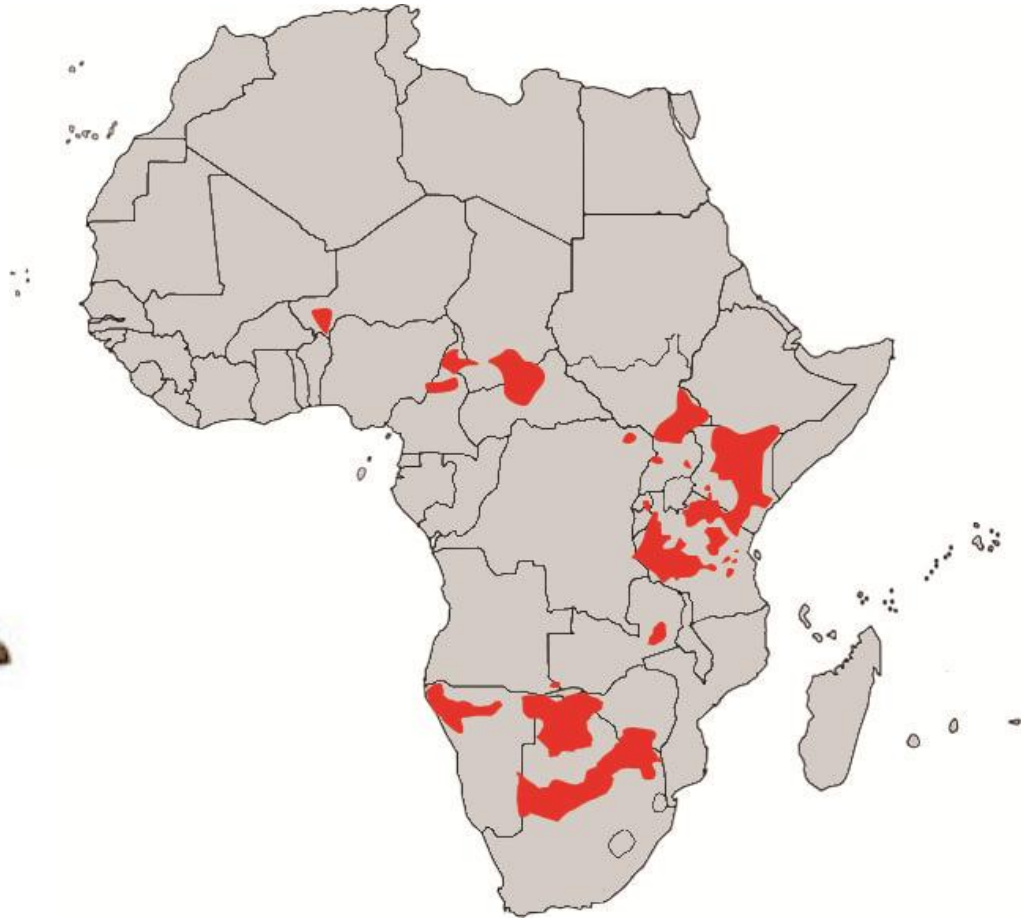
„sivo območje“

prehodnost

1 vrsta

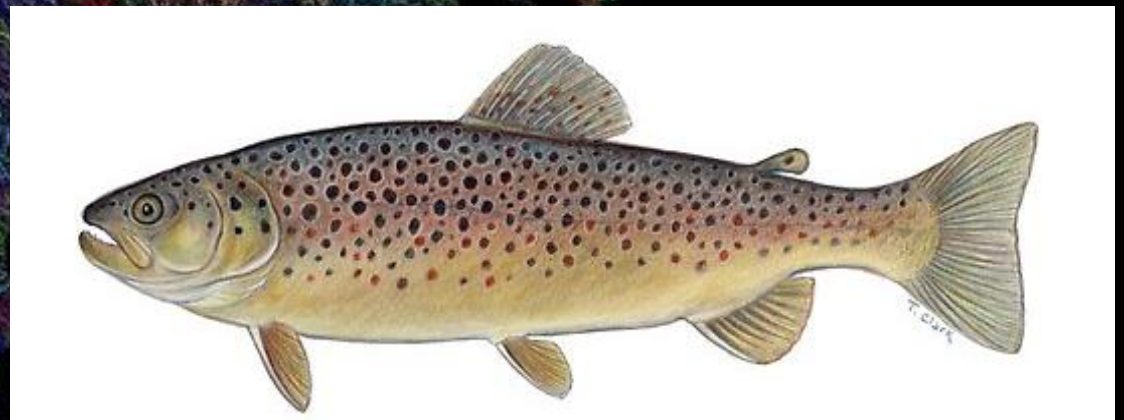


1 ali 4 vrste žiraf?

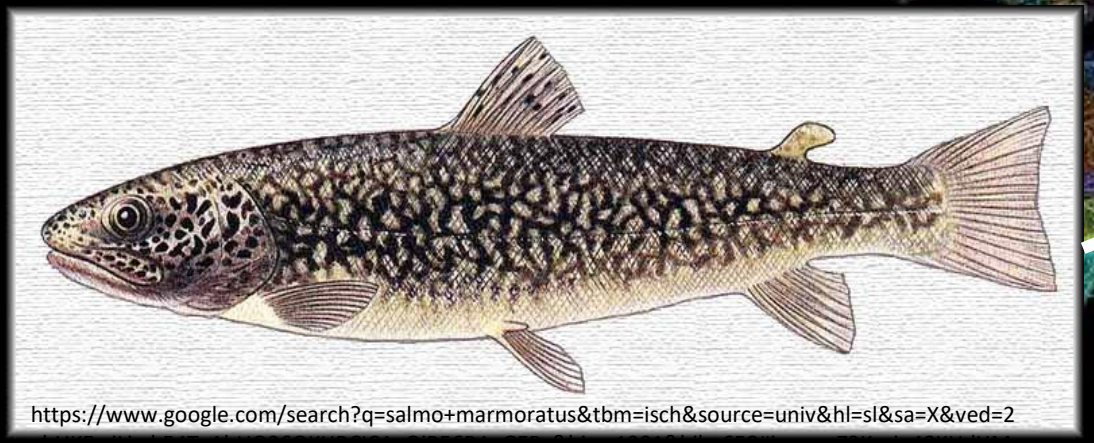


https://www.google.com/search?q=giraffe+subspecies+map&tbm=isch&source=univ&hl=sl&sa=X&ved=2ahUKEwi328j17ITgAhXSjqQKHSbxBdYQsAR6BAgEEAE&biw=1301&bih=658#imgdii=tDOGByCKGuMJXM:&imgrc=AIgYVYes5VR7JM:

1 ali 2 vrsti postrvi?



https://www.google.com/search?hl=sl&biw=1301&bih=658&tbm=isch&sa=1&ei=sdNIXPb9JqfjkgWM9ZKA
-salmo+trutta



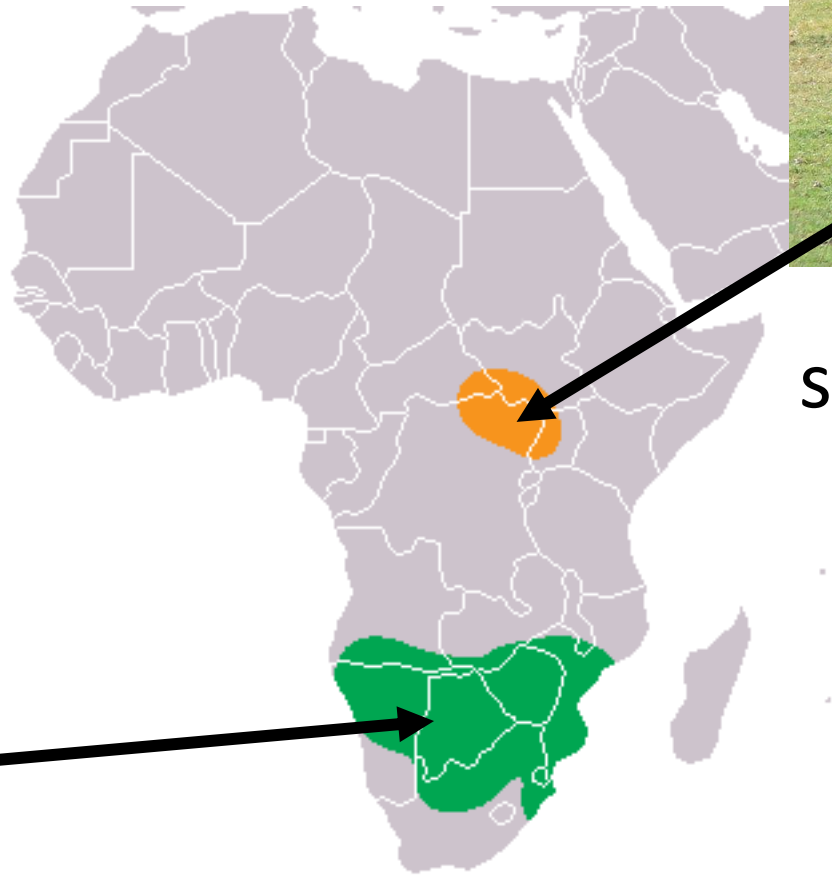
https://www.google.com/search?q=salmo+marmoratus&tbm=isch&source=univ&hl=sl&sa=X&ved=2

https://www.visualcapitalist.com/maps-worlds-watersheds/

1 ali 2 vrsti belih nosorogov?

severni

CR



južni

NT

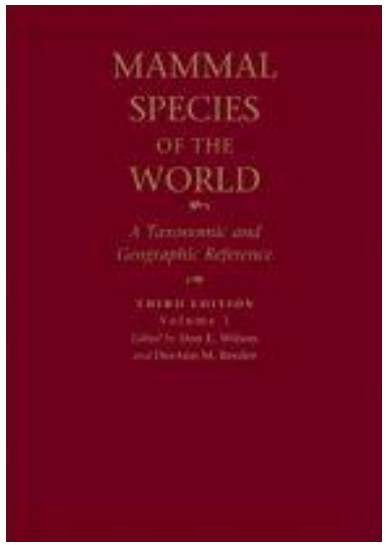
https://en.wikipedia.org/wiki/White_rhinoceros

https://en.wikipedia.org/wiki/Northern_white_rhinoceros

Vrsta je pomembna

Because species underpin every discipline of biology, species lists have a wide range of users treating them as accurate and stable measures of biological diversity (Isaac et al. 2004).

Ker so vrste v osnovi vsake biološke panoge, imajo seznami vrst številne uporabnike. Ti jih razumejo kot **točne in stabilne kazalce** biološke raznovrstnosti (Isaac et al. 2004).

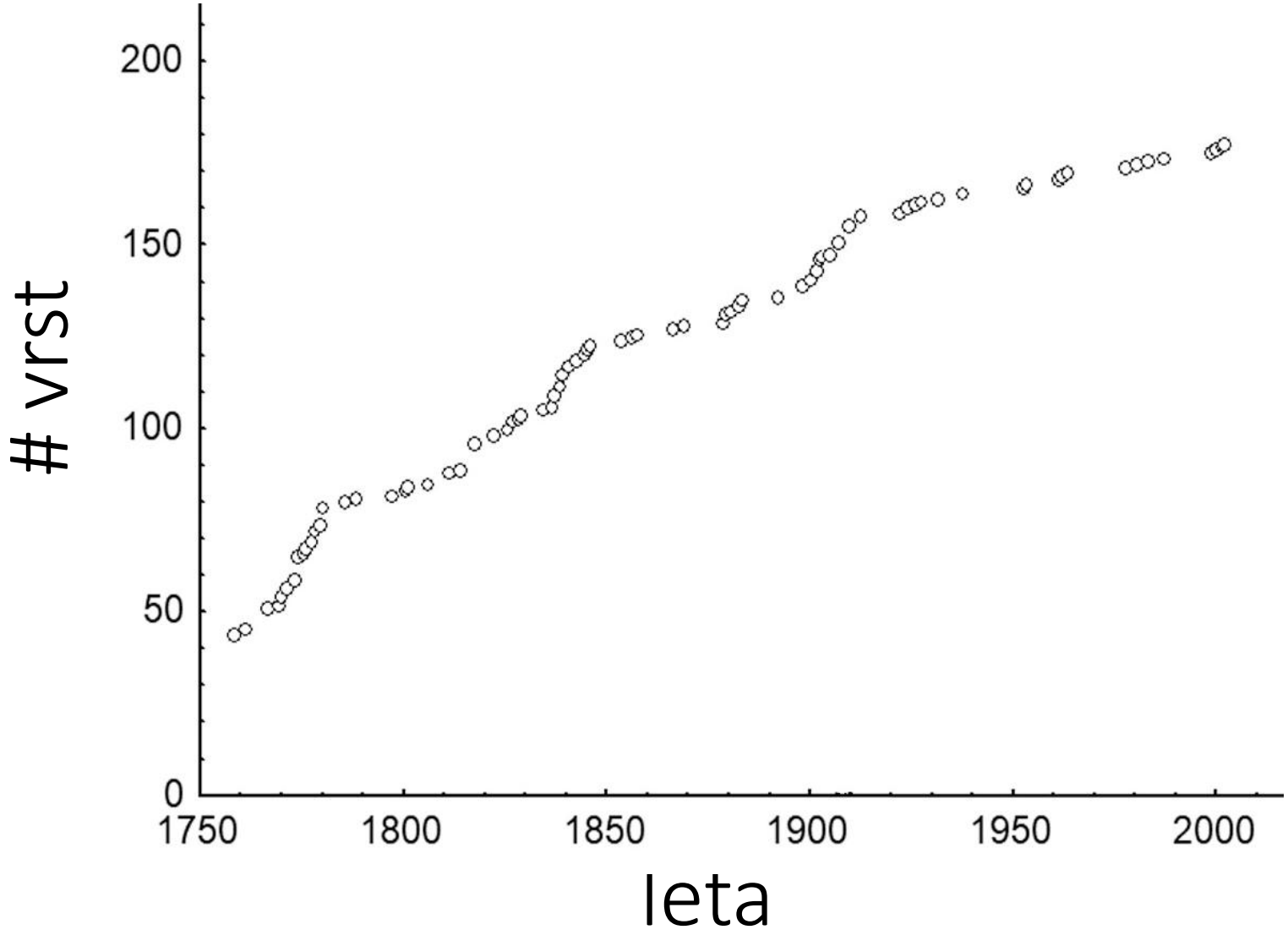


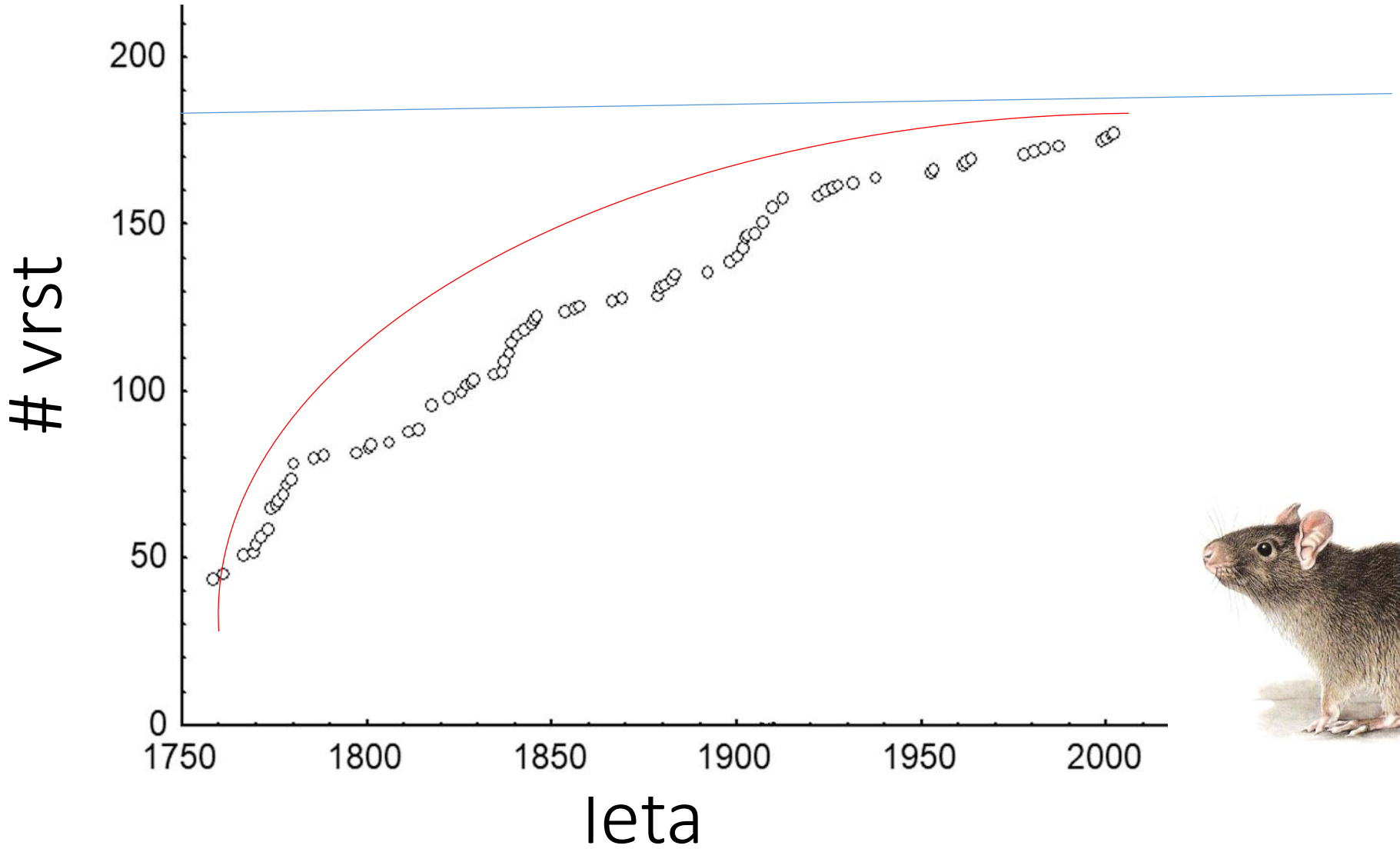
Sesalci Sveta

		št. vrst	index	
• 1982		4170	1	
• 1993	**23 let**	4629	1,11	1
• 2005		5416	**1,30**	1,17

Sesalci Sveta

	št. vrst	vrst/leto	
• 1982	4170		
		42	
• 1993	4629		**54**
		66	
• 2005	5416		


vrst
200
150
100
50
0
1750
1800
1850
1900
1950
2000
leta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1850
1900
1950
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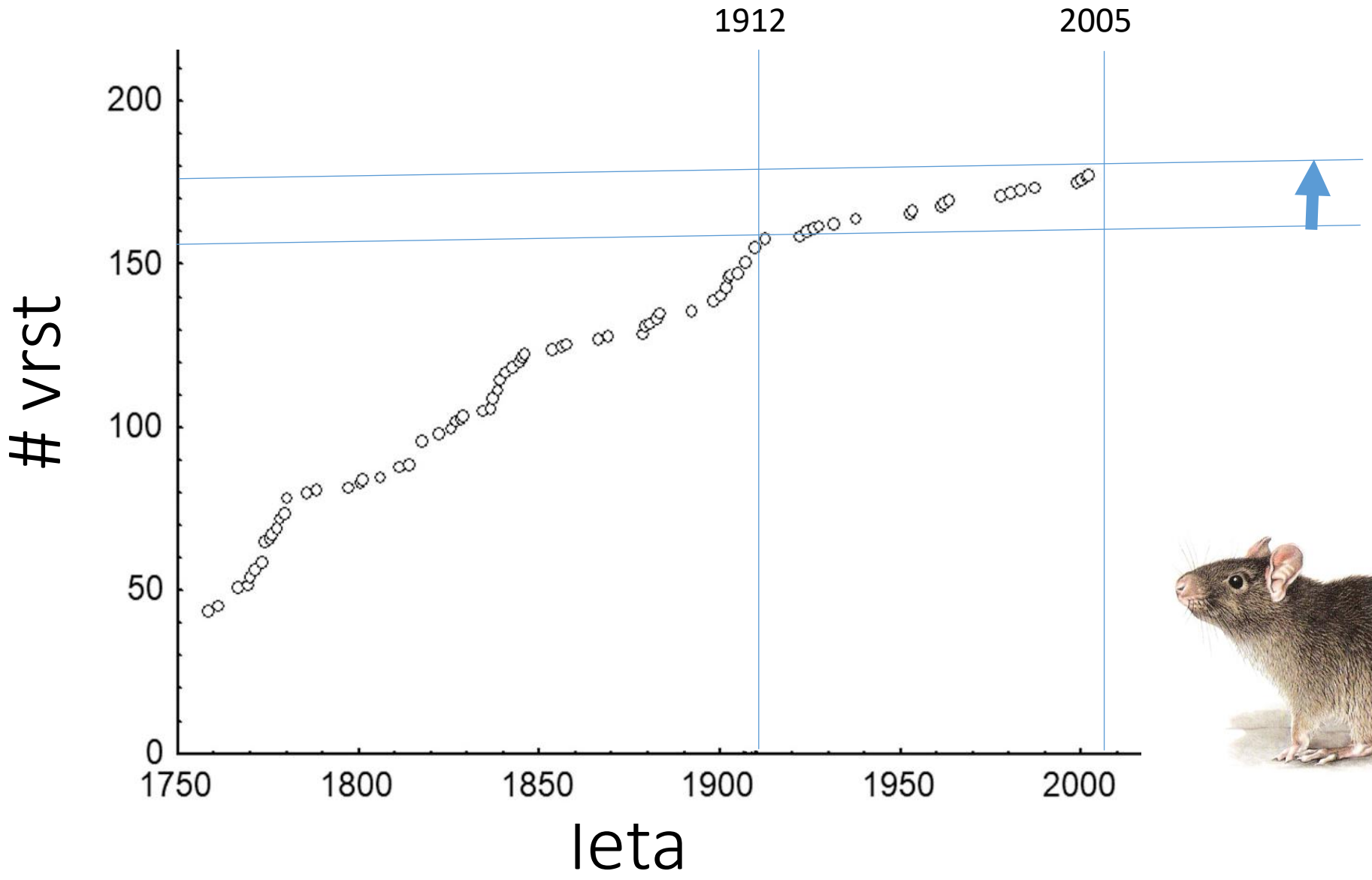
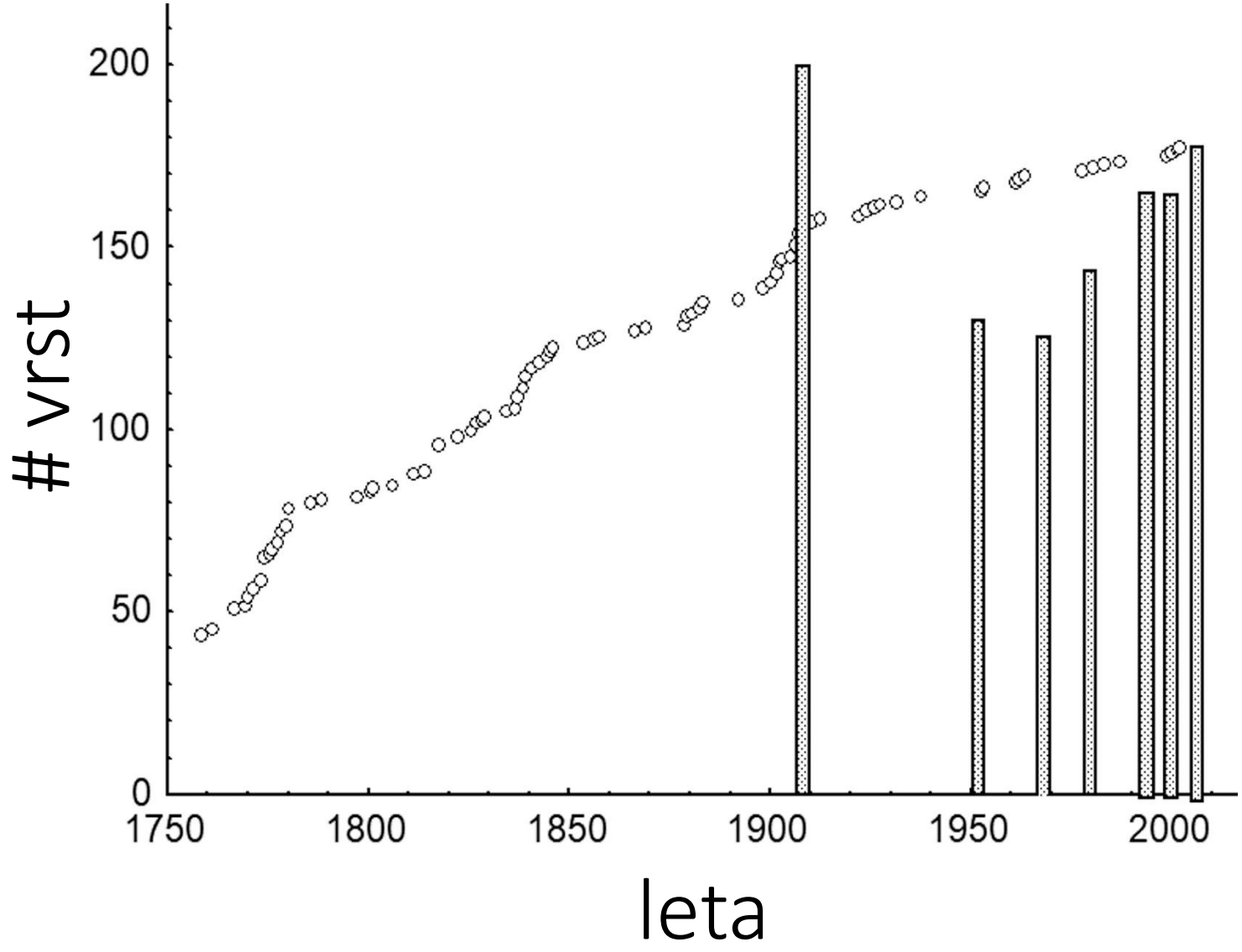

1912
2005
200
150
100
50
0
vrst
1750
1800
1850
1900
1950
2000
leta

European Mammals

	# species	index
• 1912	198	1
• 2005	174	0.88

1910	Troussart	185
1912	Miller	193
1951	Ellerman & Morrison-Scott	126
1957	van den Brink	124
1968	van den Brink	127
1978	Corbet	140
1980	Corbet & Hill	146
1982	Honacki et al.	150
1983	Nowak & Paradiso	141
1986	Corbet & Hill	151
1991	Corbet & Hill	155
1991	Nowak	157
1993	Wilson & Reeder	162
1999	Mitchell-Jones et al.	162
1999	Nowak	161
2005	Wilson & Reeder	176
2008	IUCN	178

1910	Troussart	185
1912	Miller	193
1951	Ellerman & Morrison-Scott	126
1957	van den Brink	124
1968	van den Brink	127
1978	Corbet	140
1980	Corbet & Hill	146
1982	Honacki et al.	150
1983	Nowak & Paradiso	141
1986	Corbet & Hill	151
1991	Corbet & Hill	155
1991	Nowak	157
1993	Wilson & Reeder	162
1999	Mitchell-Jones et al.	162
1999	Nowak	161
2005	Wilson & Reeder	176
2008	IUCN	178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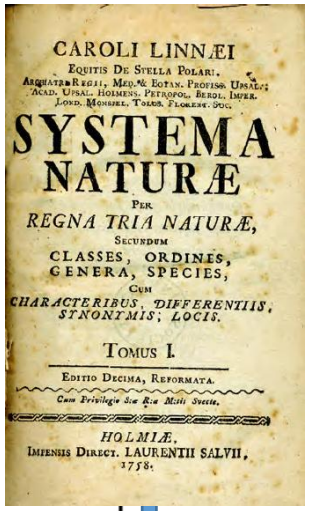
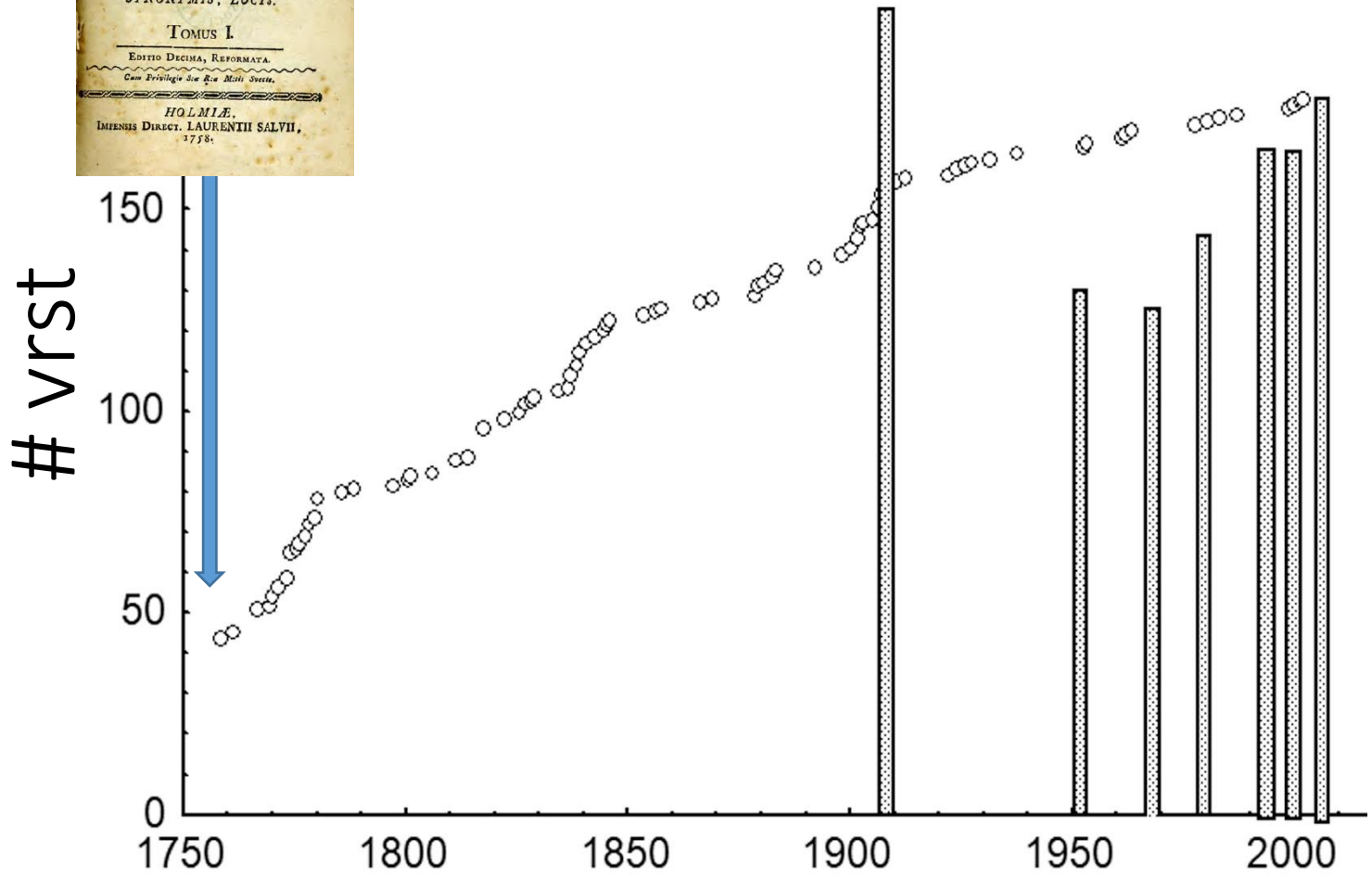
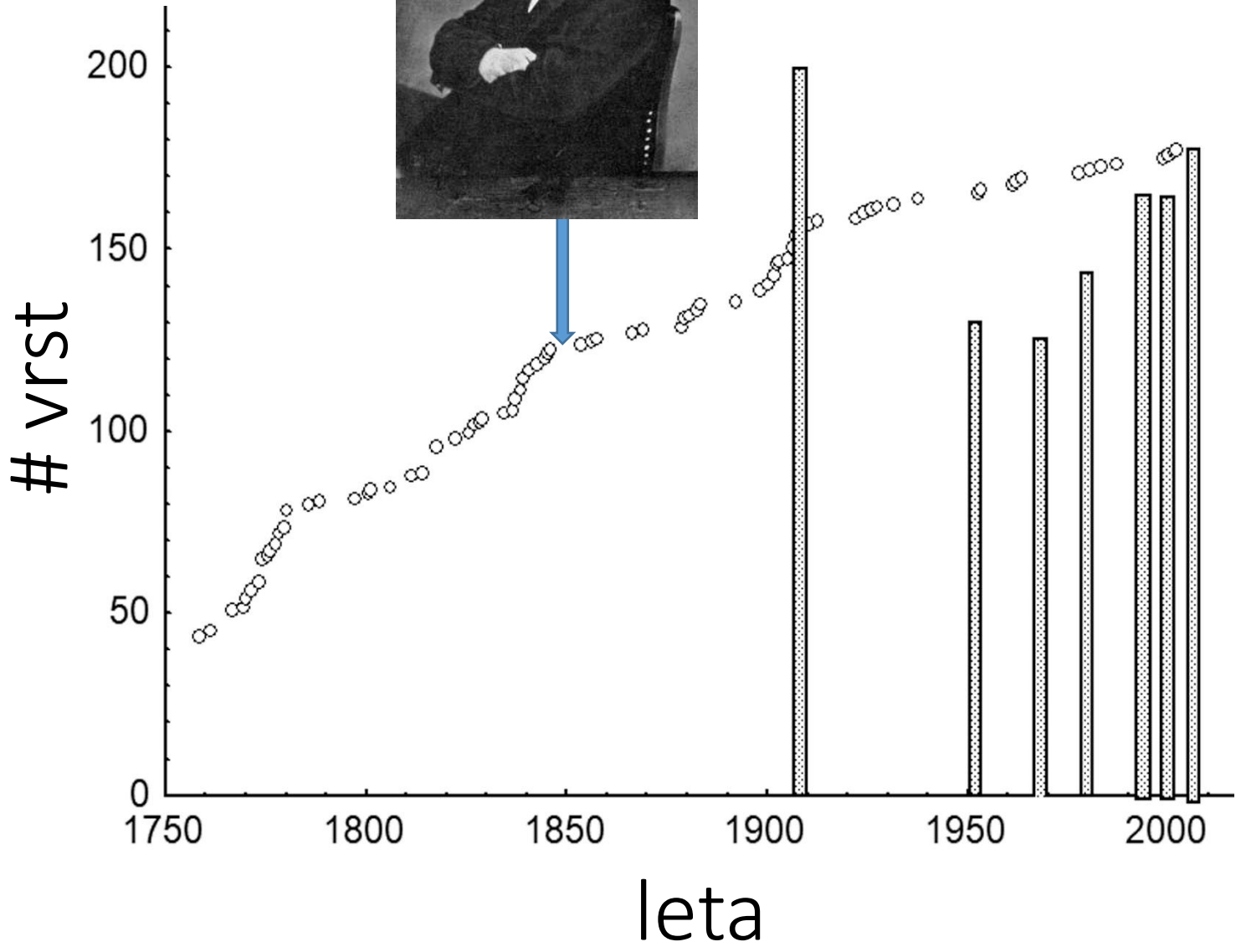

CAROLI LINNÆI
EQUITIS DE STELLA POLARI,
ARCHIATRI REGII, MED. & BOTAN. PROFESS. UPSAL.;
ACAD. UPSAL. HOLMENS. PETROPOL., BEROL. IMPER.
LOND. MONSPEL. TOLOS. FLORENT. SOC.
SYSTEMA NATURÆ
PER
REGNA TRIA NATURÆ,
SECUNDUM
CLASSES, ORDINES,
GENERA, SPECIES,
CUM
CHARACTERIBUS, DIFFERENTIIS,
SYNONYMIS, LOCIS.
TOMUS I.
EDITIO DECIMA, REFORMATA.
Cum Privilegio Sac. Reg. Majest. Svecie.
HOLMIÆ,
IMPENSIS DIRECT. LAURENTII SALVII,
1758.

1758 Linaneus



1857 Blasius



Johann Heinrich Blasius
1809–1870


Natur eschichte

der

Säugethiere

Deutschlands

und

der angrenzenden Länder von Mitteleuropa.

Von

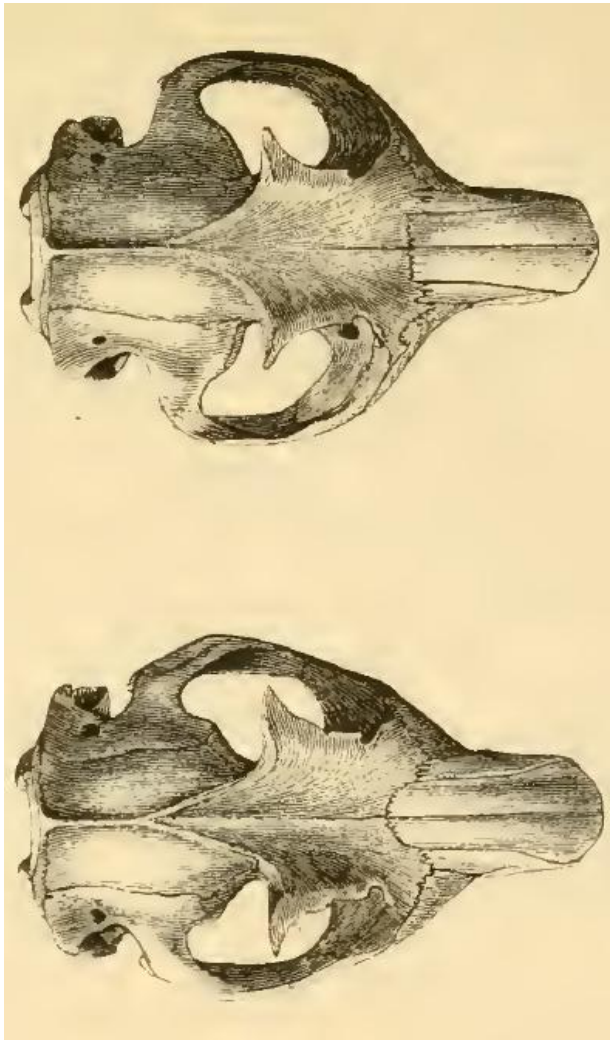
J. H. Blasius,

Mit 290 Abbildungen im Texte.

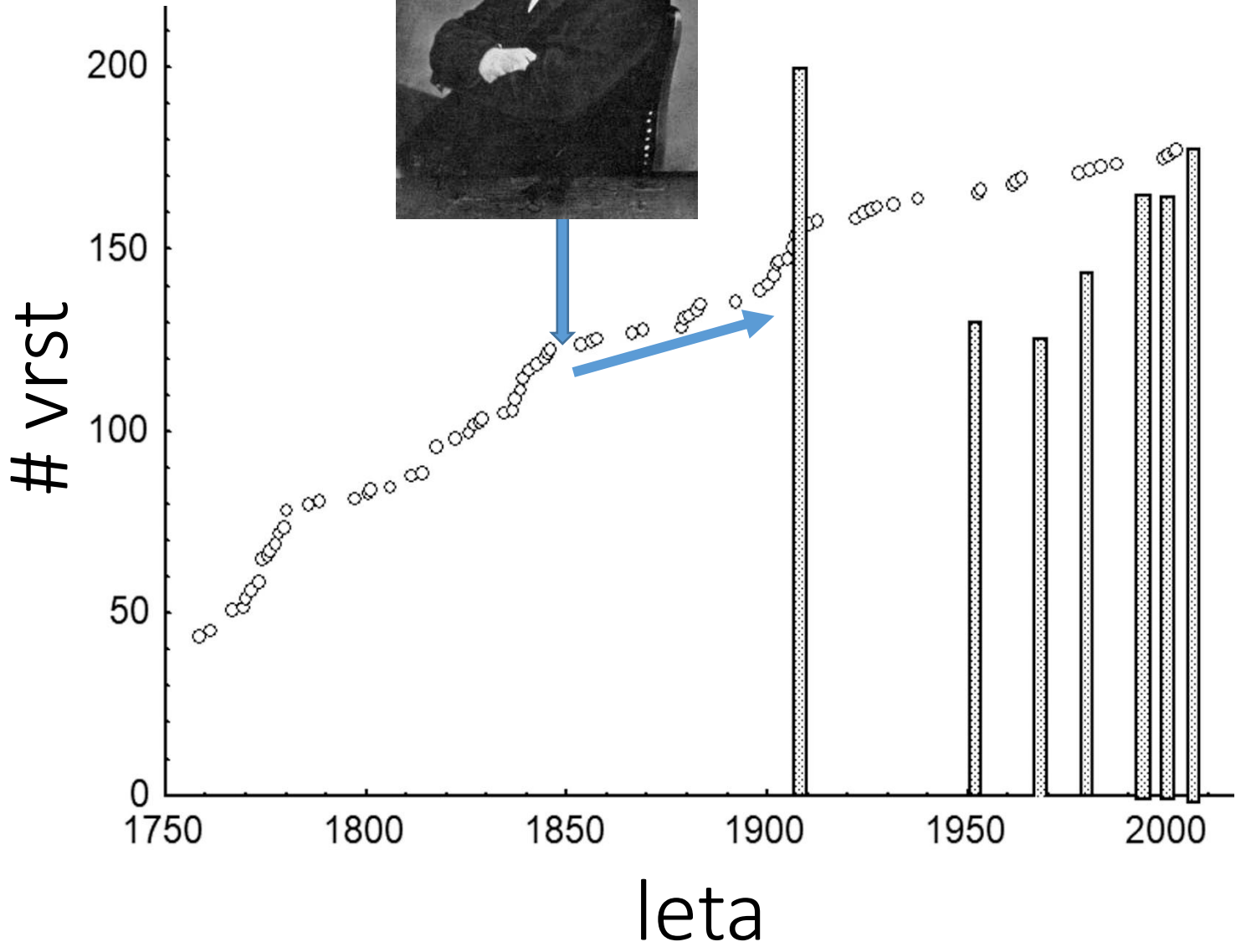
Braunschweig,

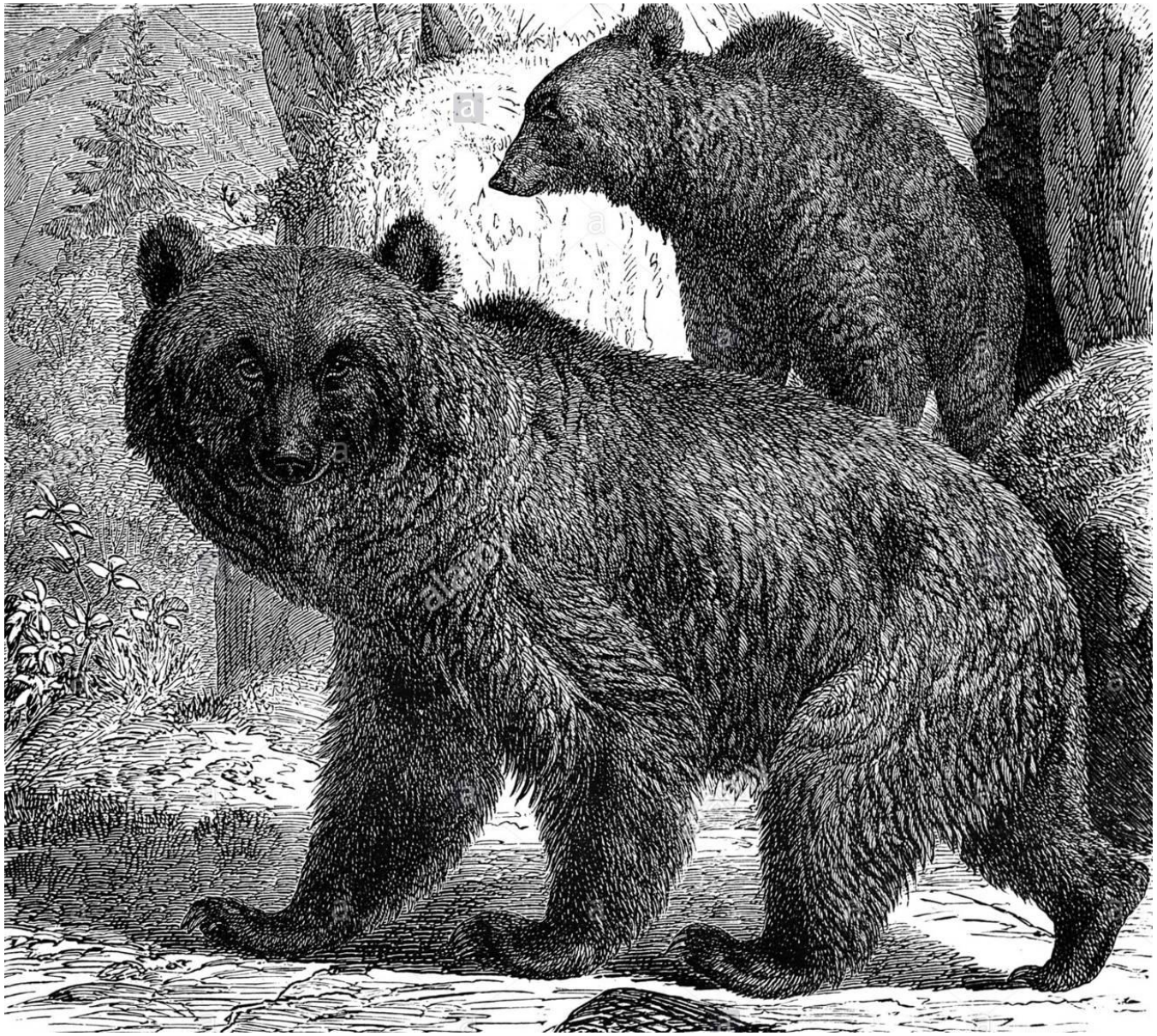
Druck und Verlag von Friedrich Vieweg und Sohn.

1857.



1857 Blasius





Miller 1912 Catalogue of the mammals of western Europe. London, BMNH

1788. [*Ursus arctos*] β *fuscus* Gmelin, Syst. Nat., I, 13th ed., p. 100 (Alps).

1778. [*Ursus arctos*] γ *albus* Gmelin, Syst. Nat., I, 13th ed., p. 100 (Unknown; based on the "ours blanc terrestre" of Buffon).

1792. *U*[*rsus*] *arctos griseus* Kerr, Anim. Kingd., p. 184 (Germany; also in northern North America).

1797. *Ursus arctos rufus* Borkhausen, Deutsche Fauna, I, p. 46 (Swiss and Tirolean Alps).

1798. *Ursus badius* Schrank, Fauna Boica, I, p. 55 (Forests on the Bohemian boundary).

1808. *Ursus fuscus* Tiedemann, Zoologie, I, p. 374 (Substitute for *arctos*).

1814. *Ursus alpinus* Fischer, Zoognosia, III, p. 161 (Alps? Based on an individual seen alive in Paris).

1820. *Ursus arctos major* Nilsson, Skand. Fauna, I, p. 112 (Wooded portions of southern Scandinavia).

1820. *Ursus arctos minor* Nilsson, Skand. Fauna, I, p. 123 (Northernmost Scandinavia).

1827. [*Ursus arctos*] β *brunneus* Billberg, Synopsis Faunæ Scandinaviæ, p. 15 (Northern Scandinavia).

1827. [*Ursus arctos*] γ *annulatus* Billberg, Synopsis Faunæ Scandinaviæ, p. 15 (Northern Scandinavia).

1827. [*Ursus arctos*] δ *argenteus* Billberg, Synopsis Faunæ Scandinaviæ, p. 15 (Northern Scandinavia).

1827. [*Ursus*] *myrmephagus* Billberg, Synopsis Faunæ Scandinaviæ, p. 16 (Northern Scandinavia).

1828. [*Ursus*] *formicarius* Billberg, Synopsis Faunæ Scandinaviæ, 2nd ed., p. 16 (Renaming of *myrmephagus*).

1829. *U*[*rsus*] *pyrenaicus* Fischer, Synopsis Mamm., p. 142. Latinization of "Ours des Pyrenees" F. Cuvier, Hist. Nat. des Mammif., V, fasc. 44, 1824 (Asturias, Spain).

1829. *U*[*rsus*] *norvegicus* Fischer, Synopsis Mamm., p. 142. Latinization of "Ours de Norwège" F. Cuvier, Hist. Nat. des Mammif., II, fasc. 7, 1819 (Norway).

1836. ? *Ursus faleiger* Reichenbach, Regn. Anim. Icon., I, p. 32 ("Pyrenees"; afterwards supposed to be an individual of "*U. ferox*." See Naturgesch. des In- und Auslands, Raubsäugeth., p. 299, 1852).

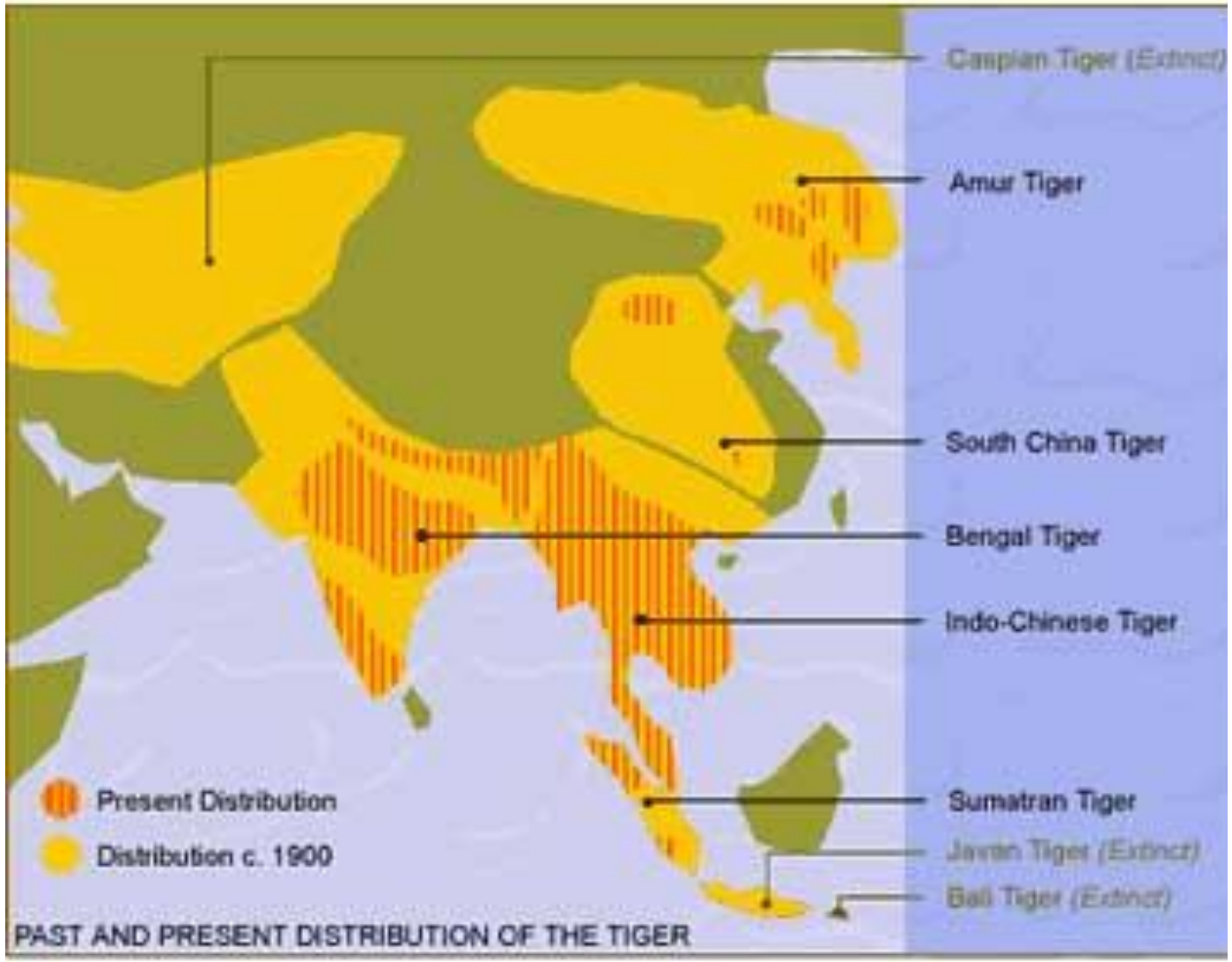
1842. *Ursus pyrenæus* F. Cuvier, Hist. Nat. des Mamm., Tabl. gen., p. 3 (Described in fasc. 44, 1824) (Asturias, Spain).

1847. ? *Ursus curyrhinus* Nilsson, Skand. Fauna, I, 2nd ed., p. 212 (Sweden? Type an individual raised in captivity).

1857. *Ursus arctos* Blasius, Säugethiere Deutschlands, p. 196.

1861. *Ursus arctos aureus* Fitzinger, Wissensch.-pop. Naturgesch. der Säugeth., I, p. 372 (Norway).

Politipska vrsta



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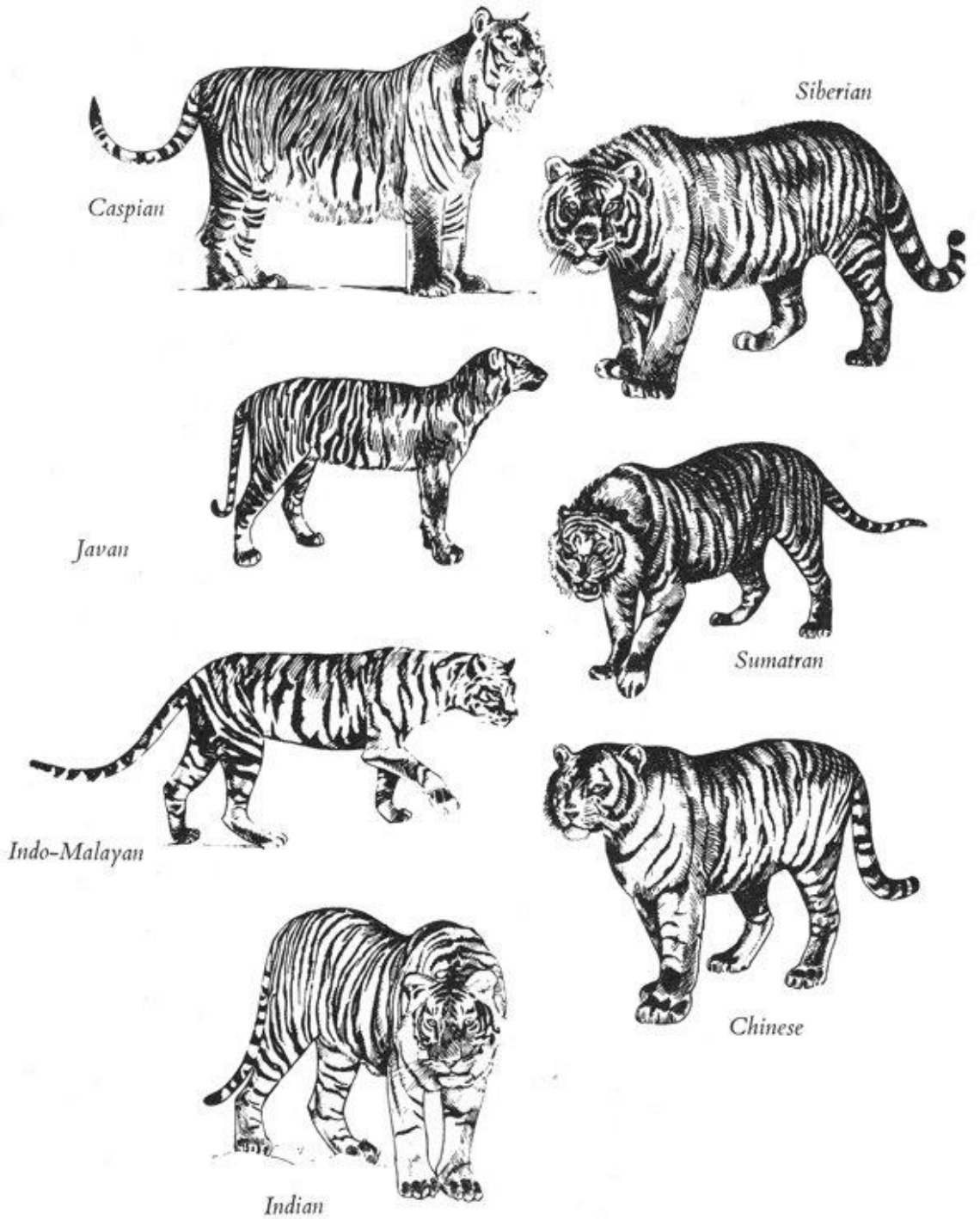

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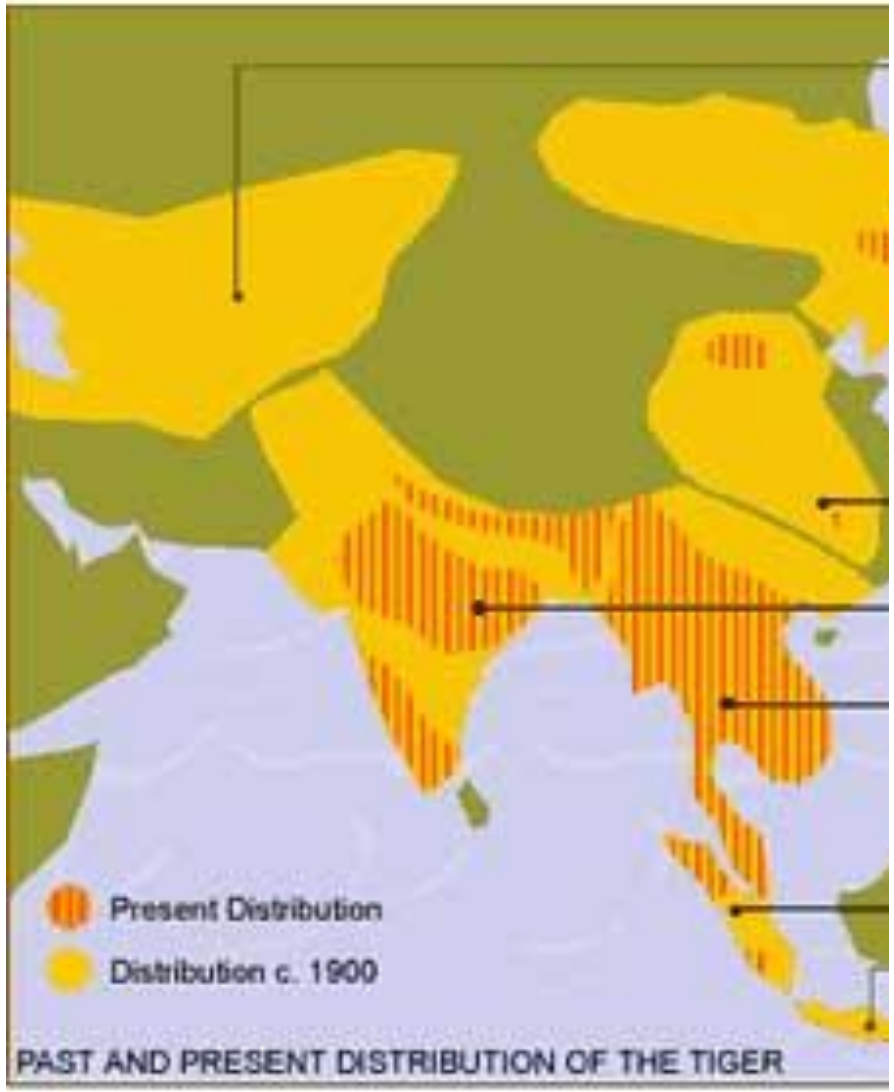

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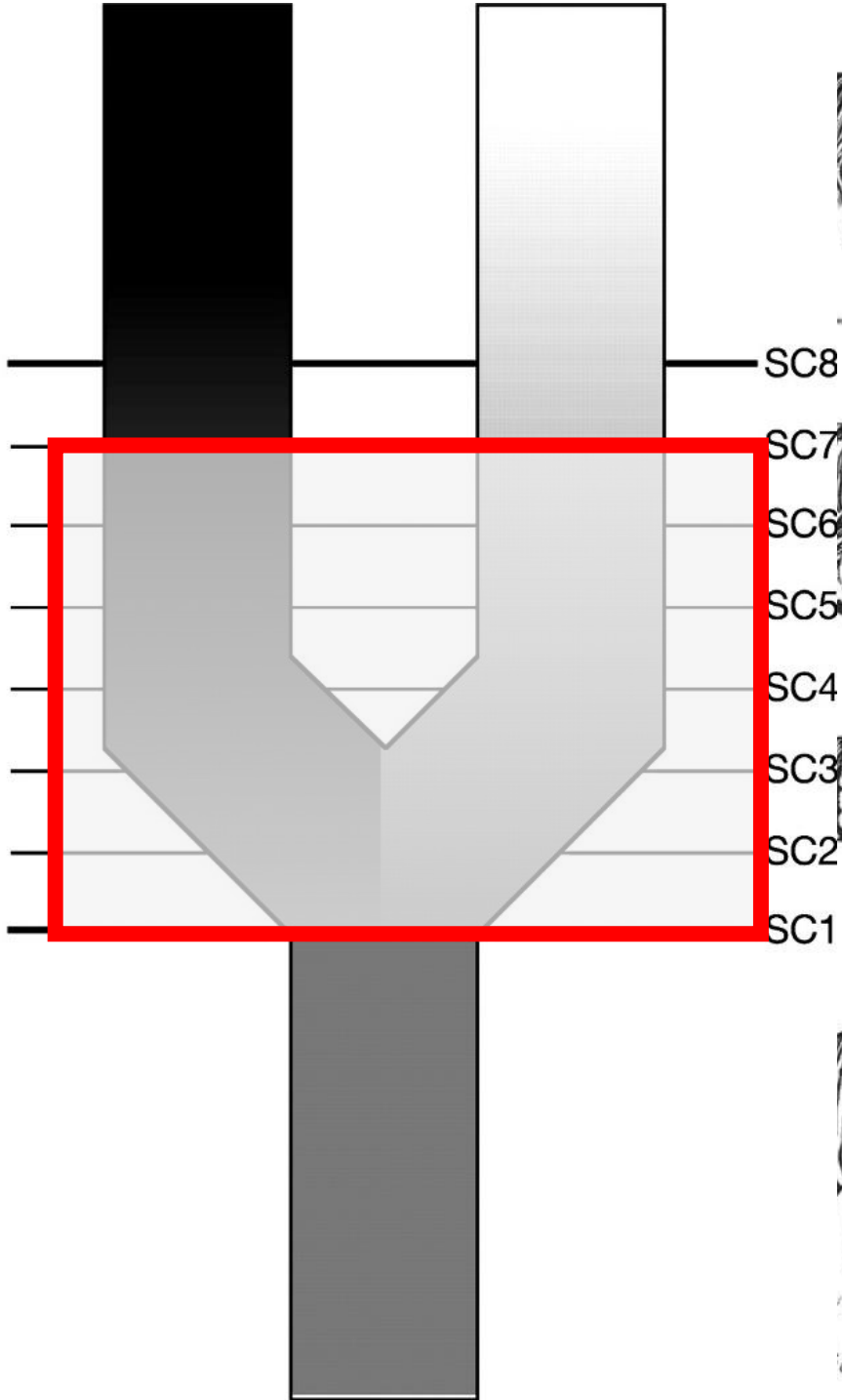

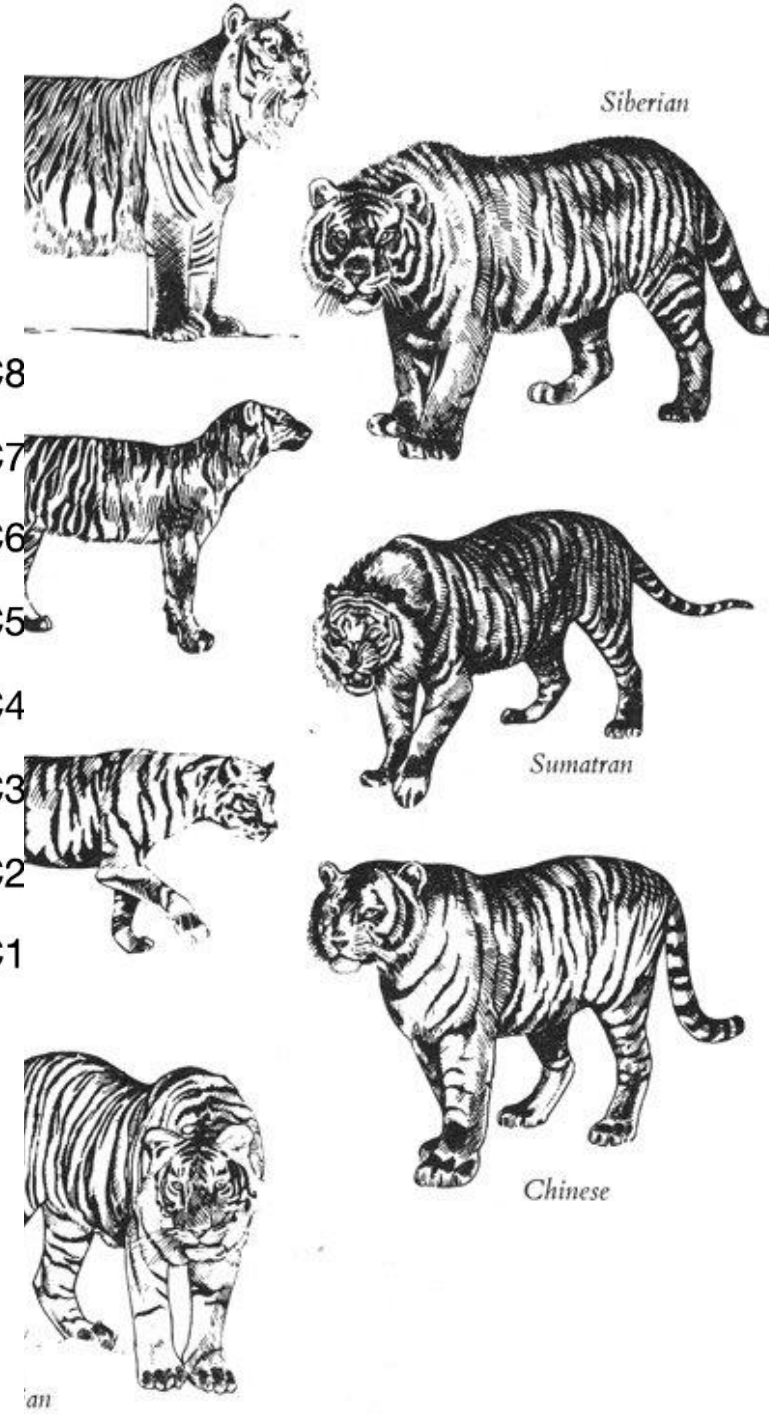

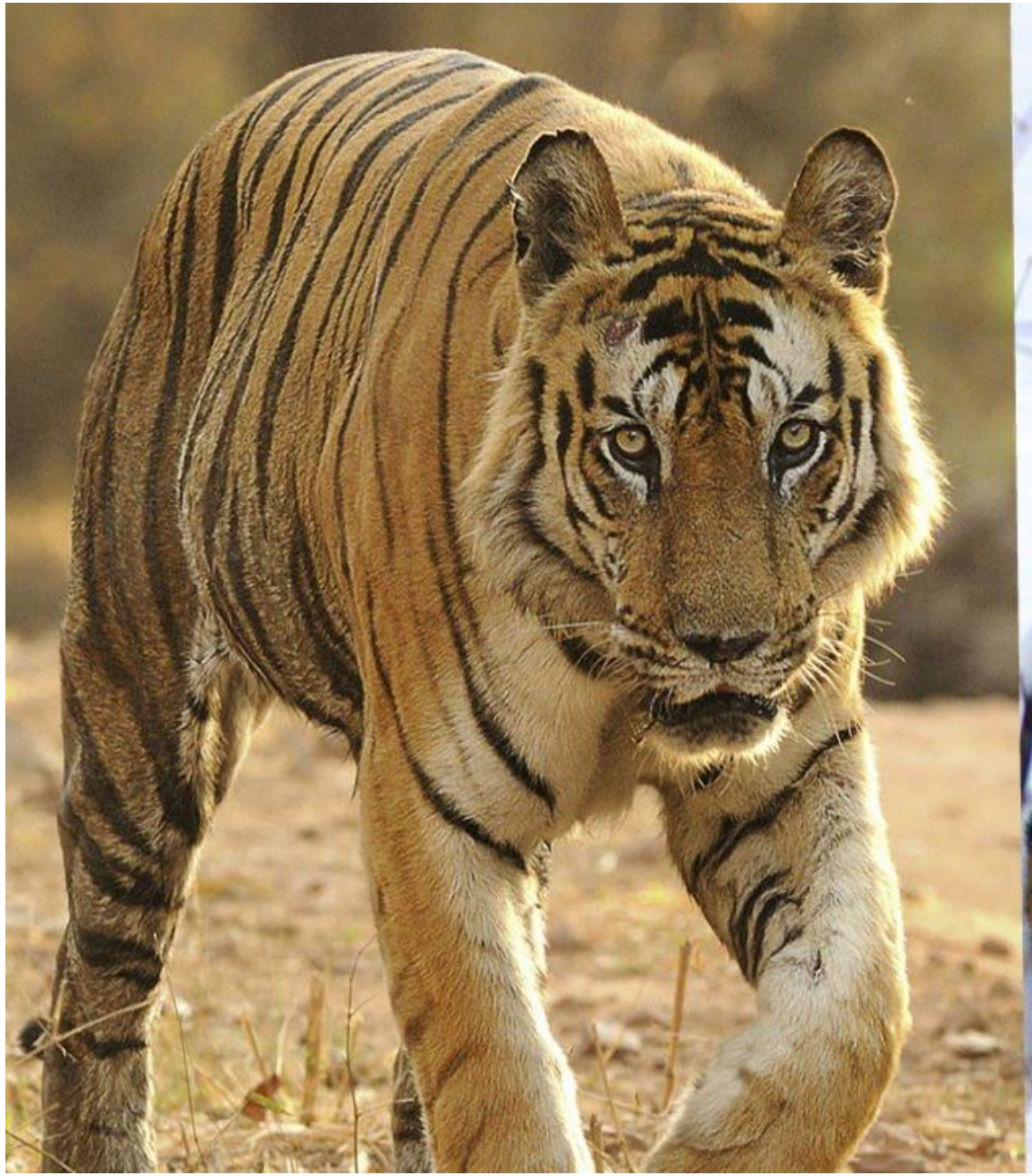

Panthera tigris

Panthera tigris

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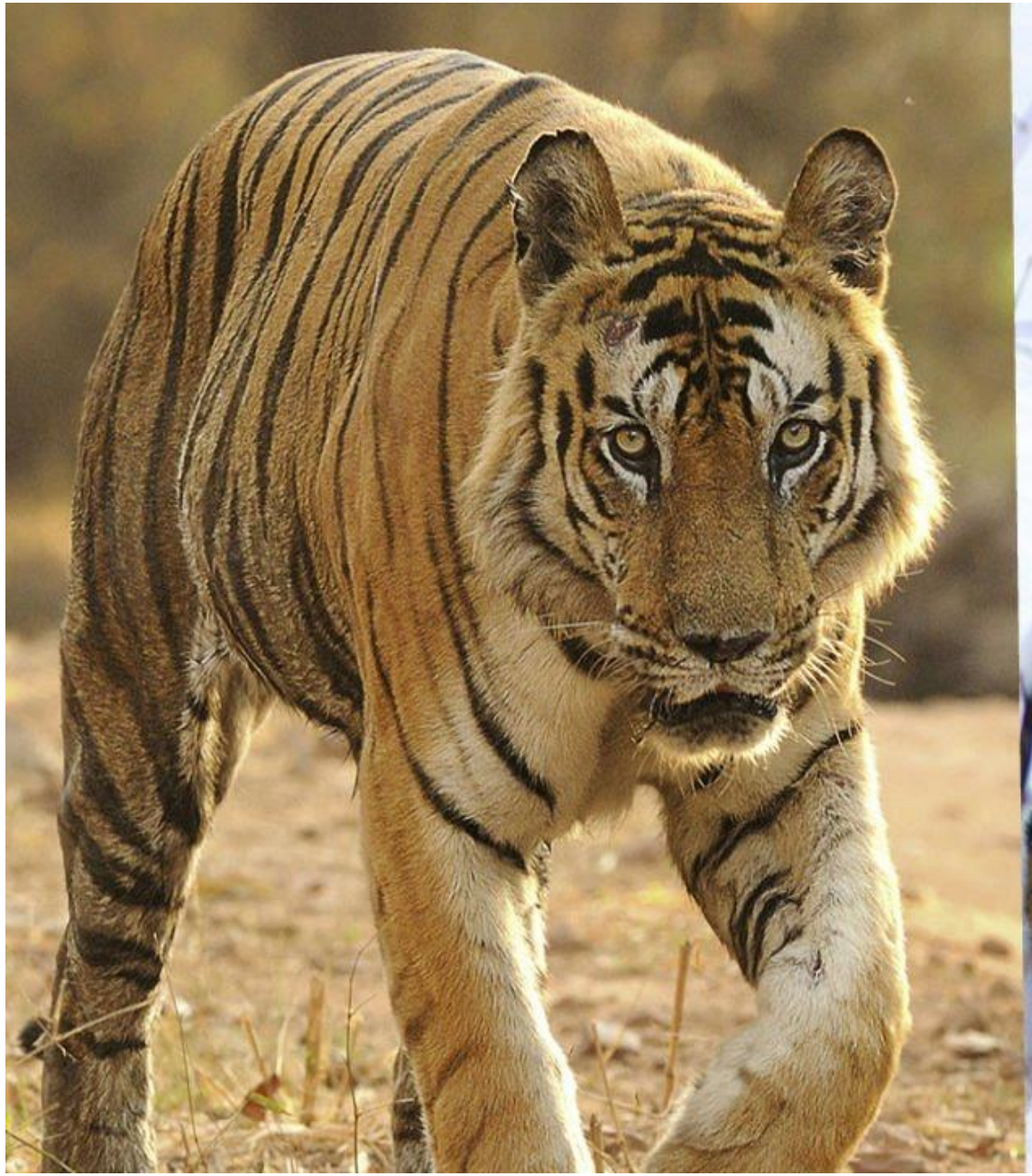

Panthera tigris tigris

Panthera tigris altaica

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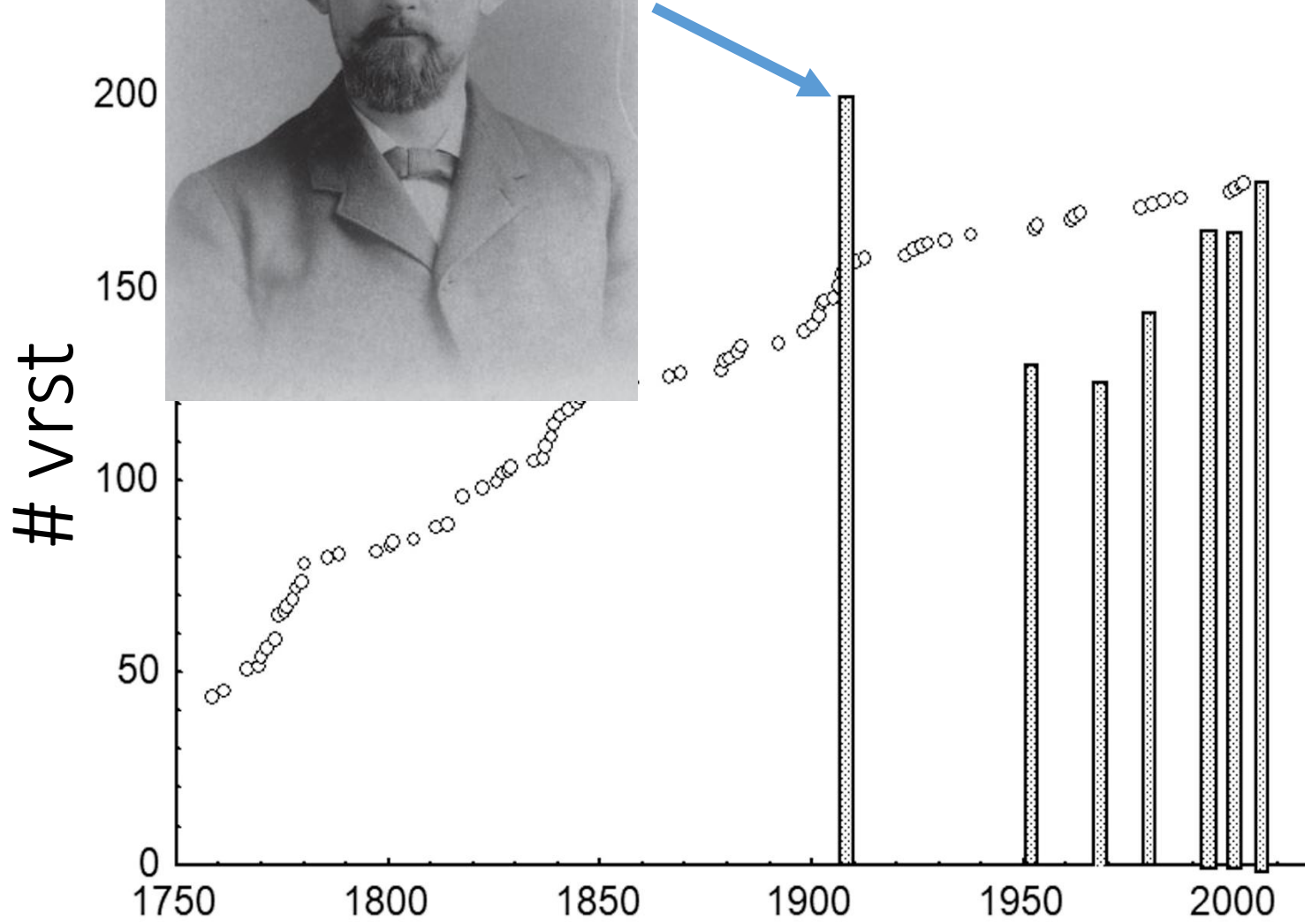
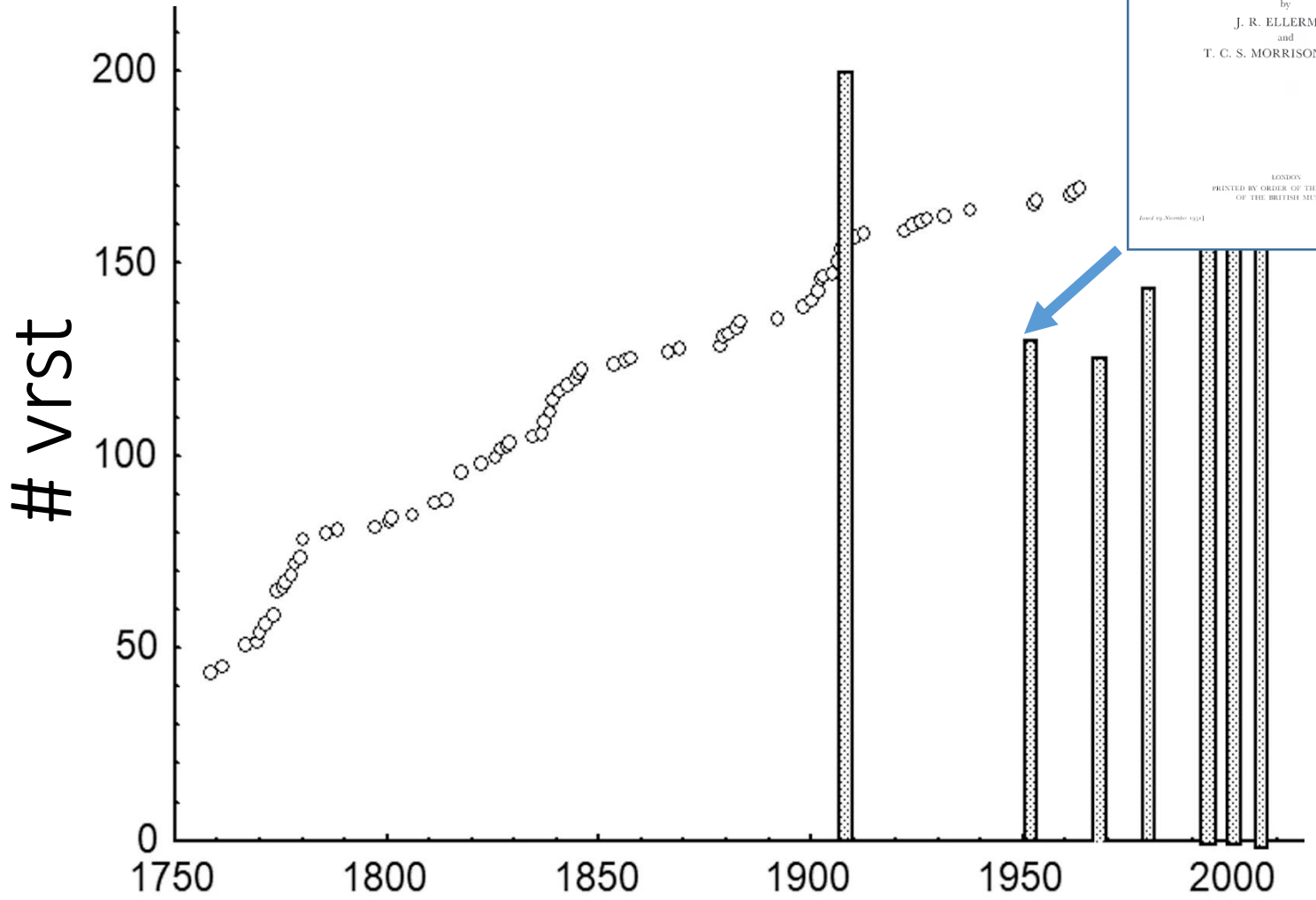
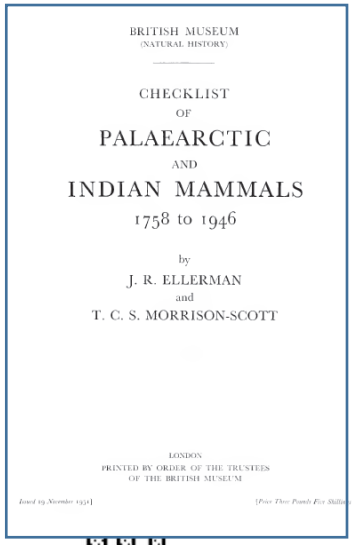
1912 Miller



1951 Ellerman & Morris-Scott





BRITISH MUSEUM
(NATURAL HISTORY)

CHECKLIST
OF
PALAEARCTIC
AND
INDIAN MAMMALS
1758 to 1946

by
J. R. ELLERMAN
and
T. C. S. MORRISON-SCOTT

LONDON
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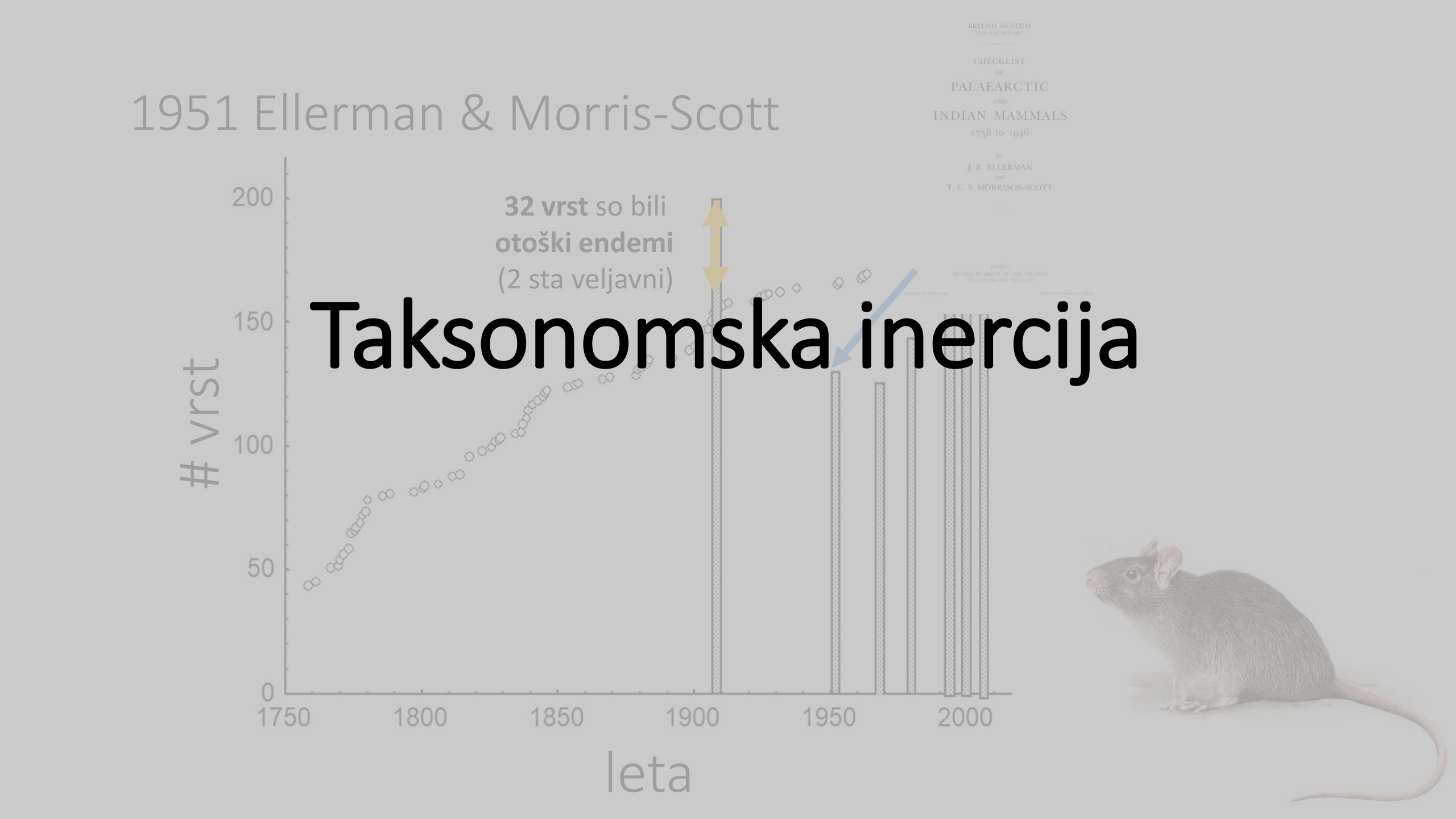
1951 Ellerman & Morris-Scott



32 vrst so bili
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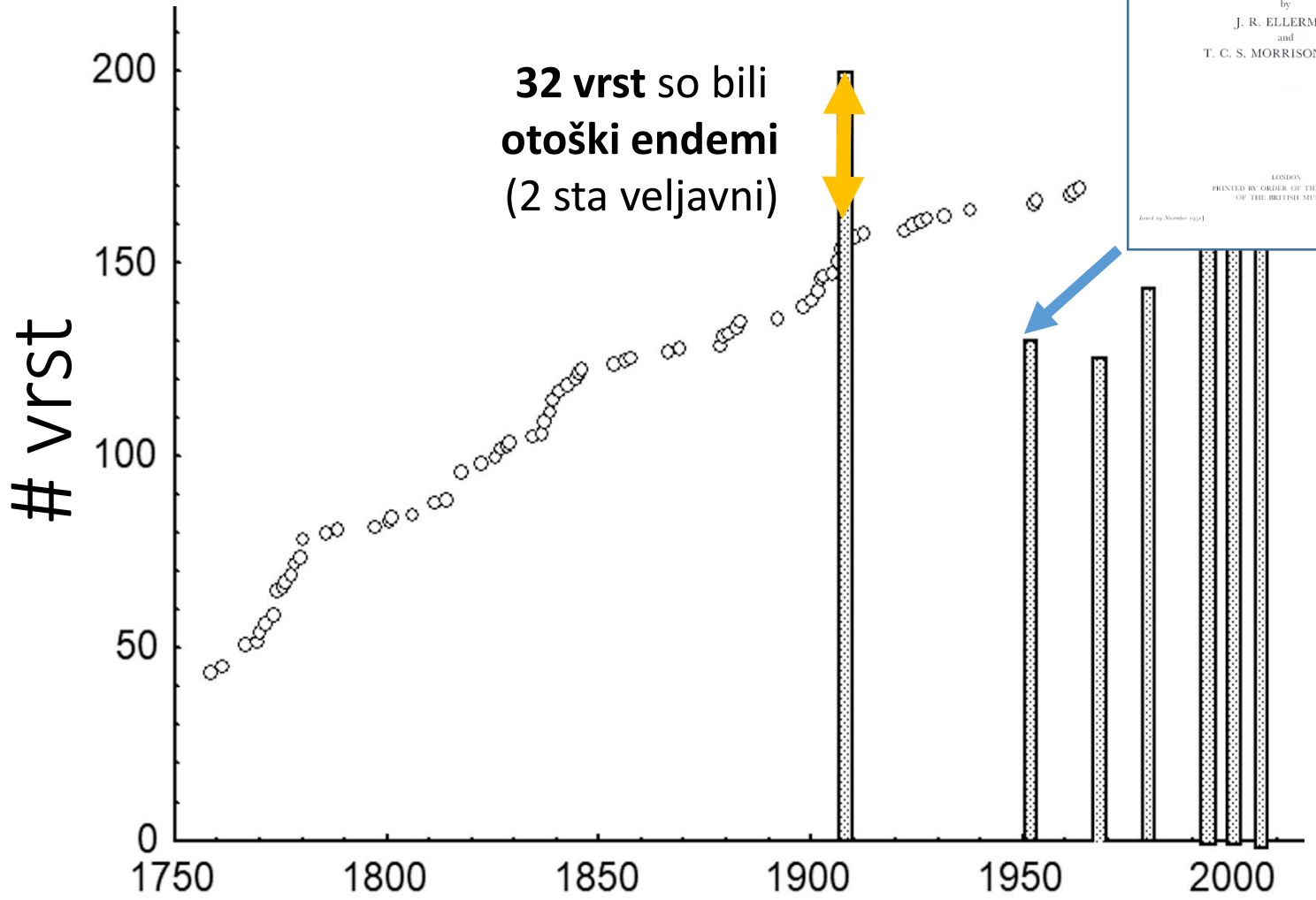
Taksonomska inercija

1951 Ellerman & Morris-Scott



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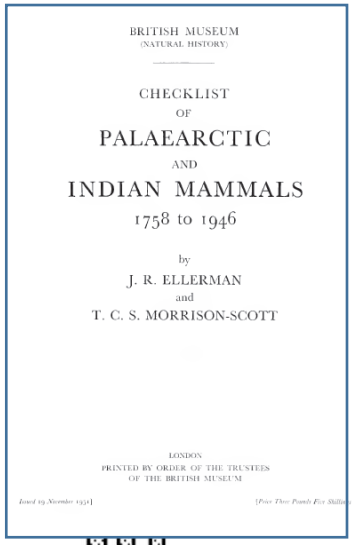
(2 sta veljavni)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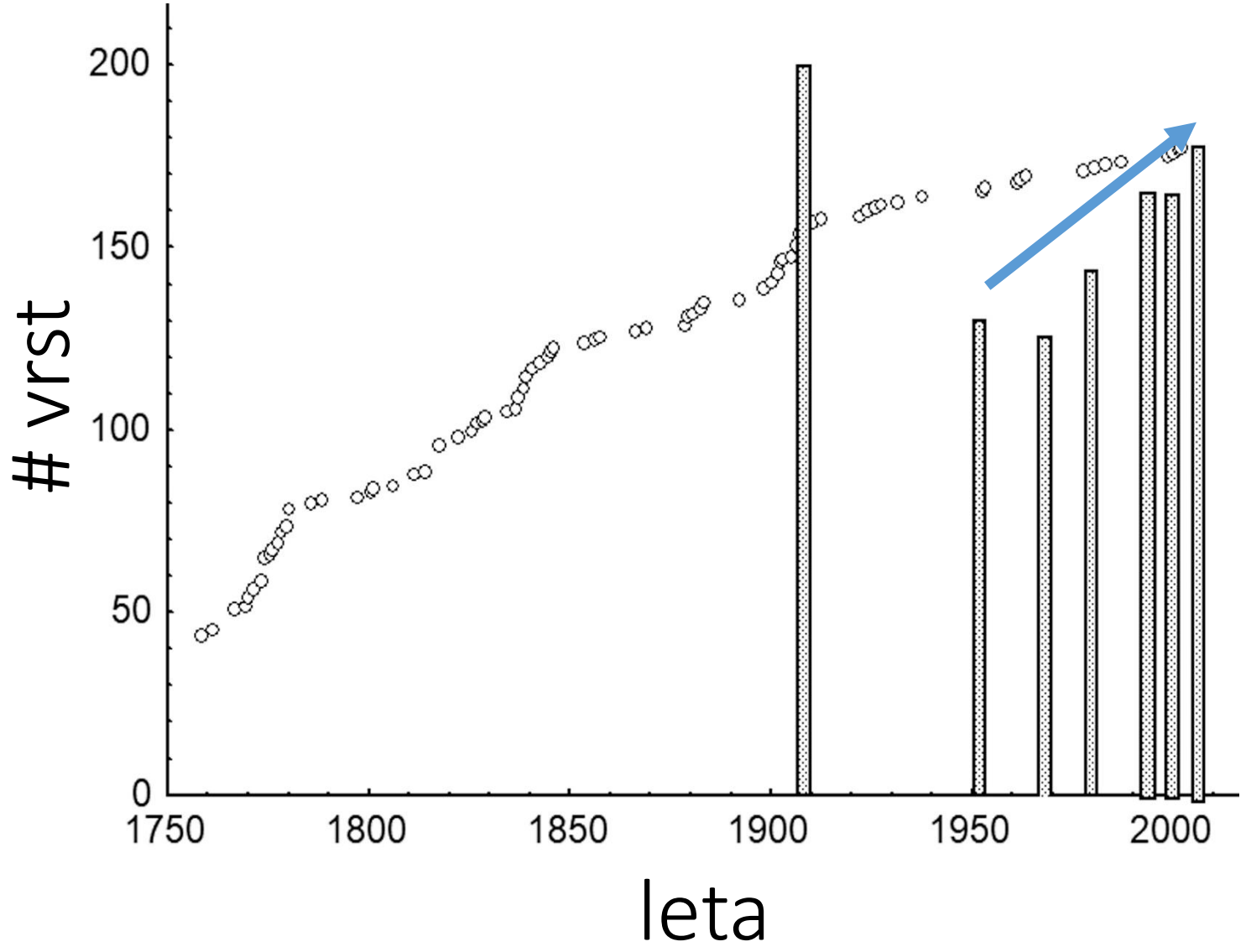
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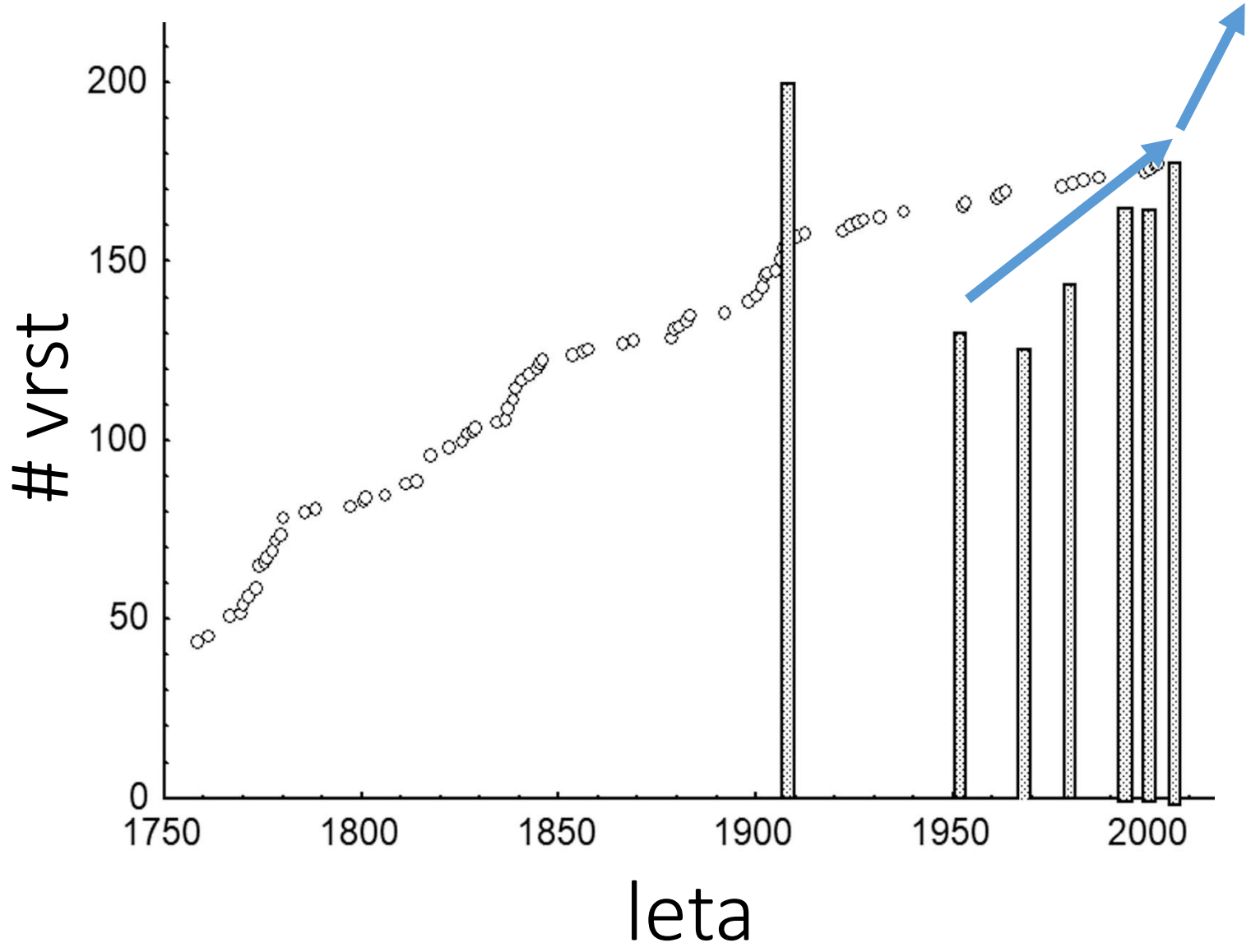
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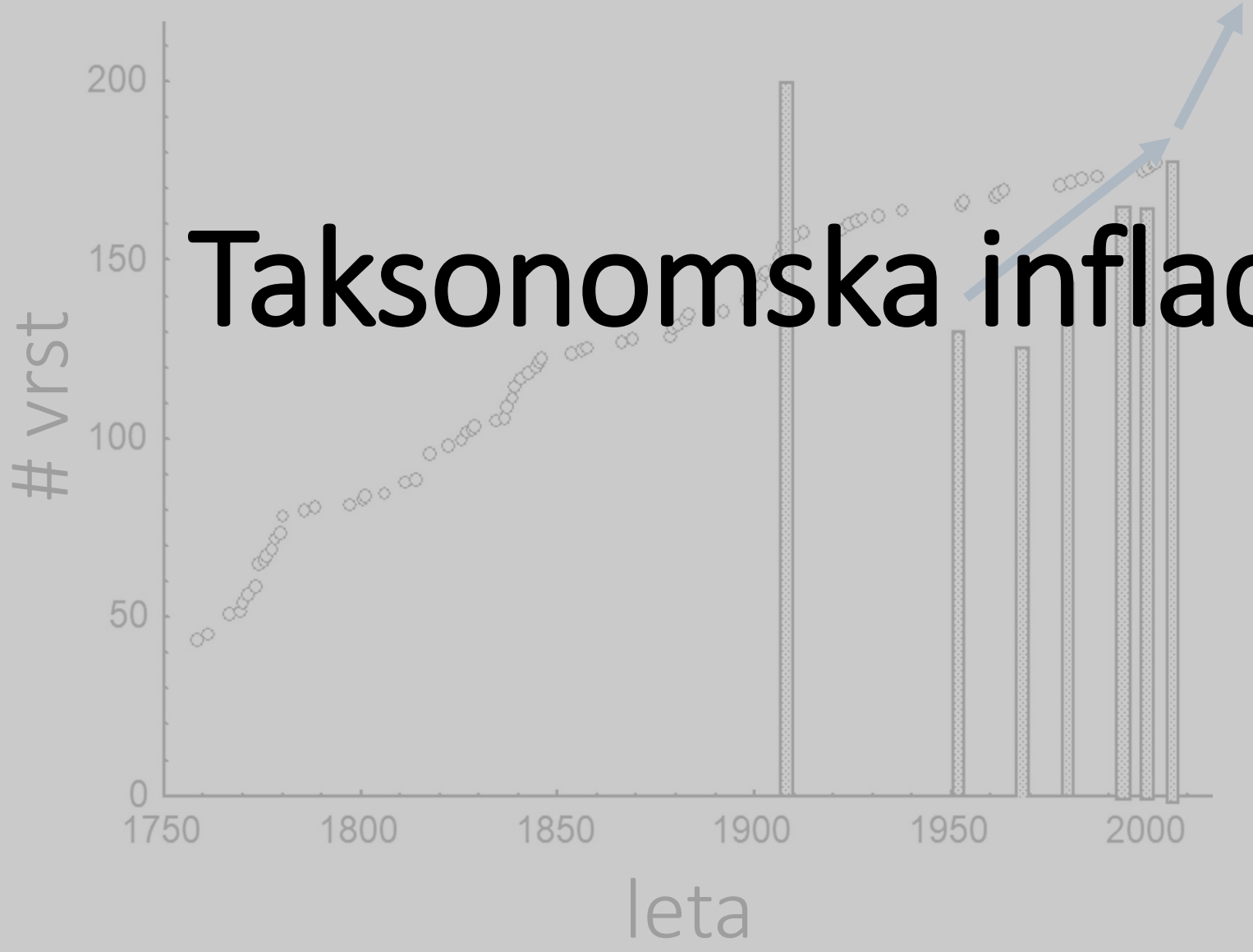
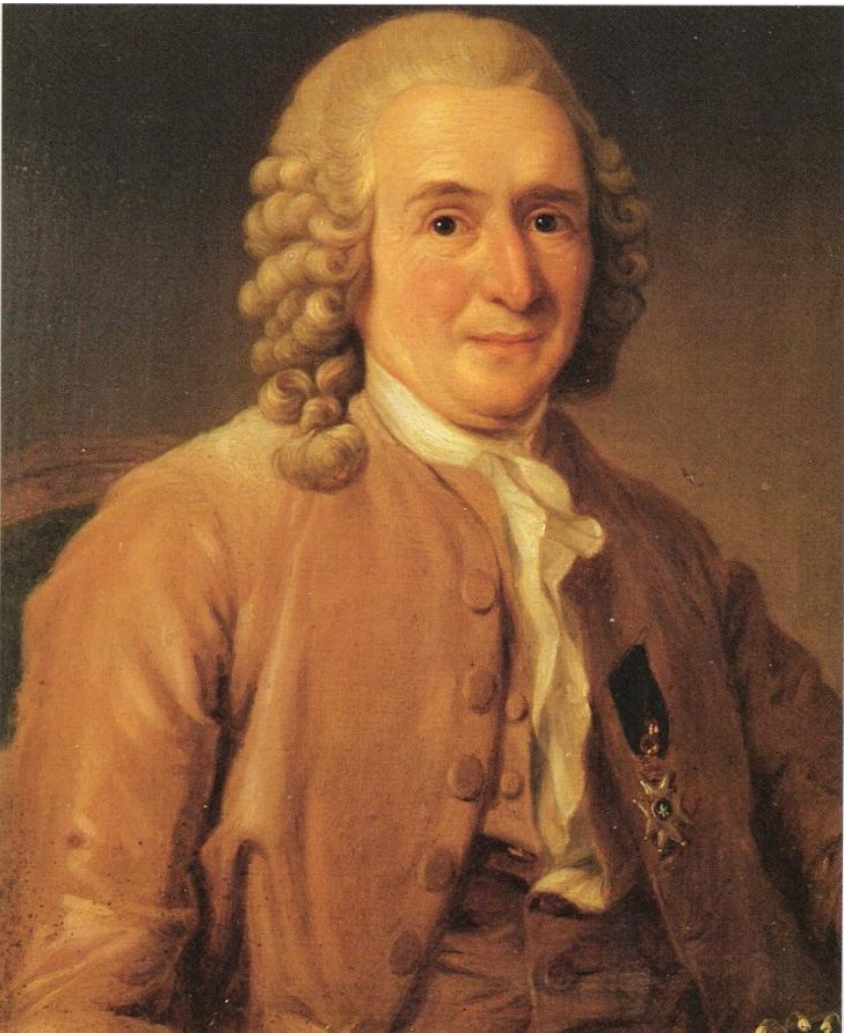
Taksonomska inflacija



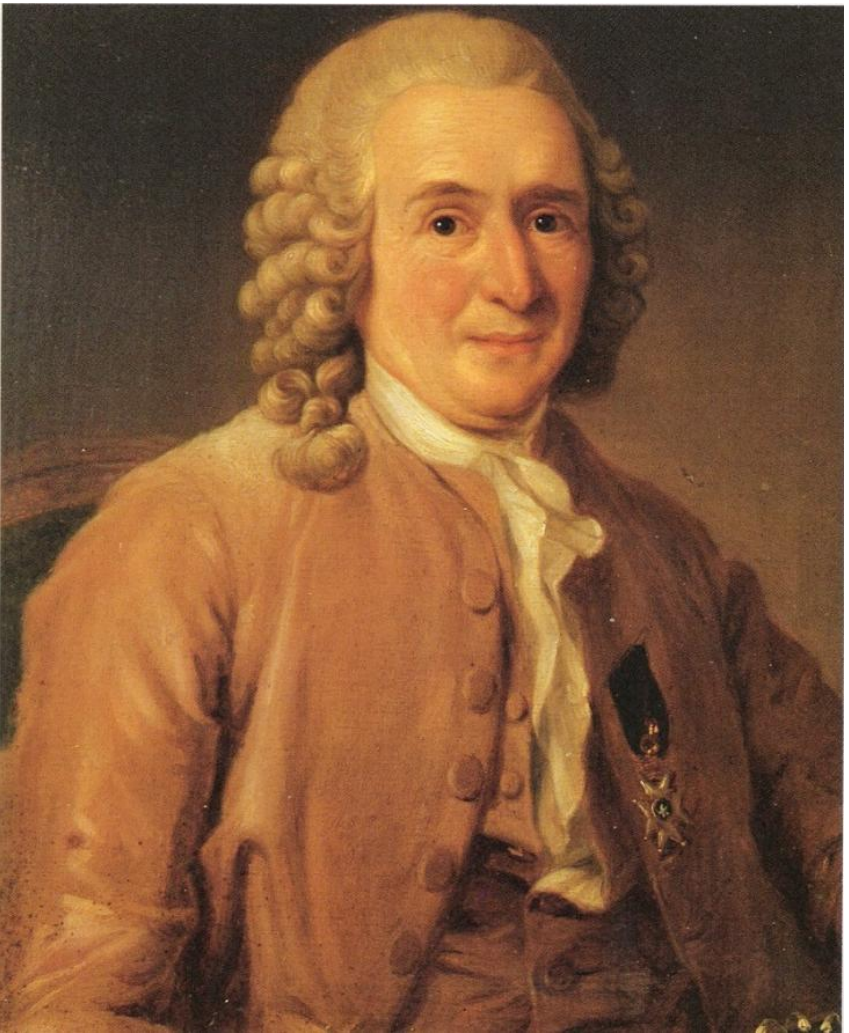
Nomen est omen



Homo sapiens

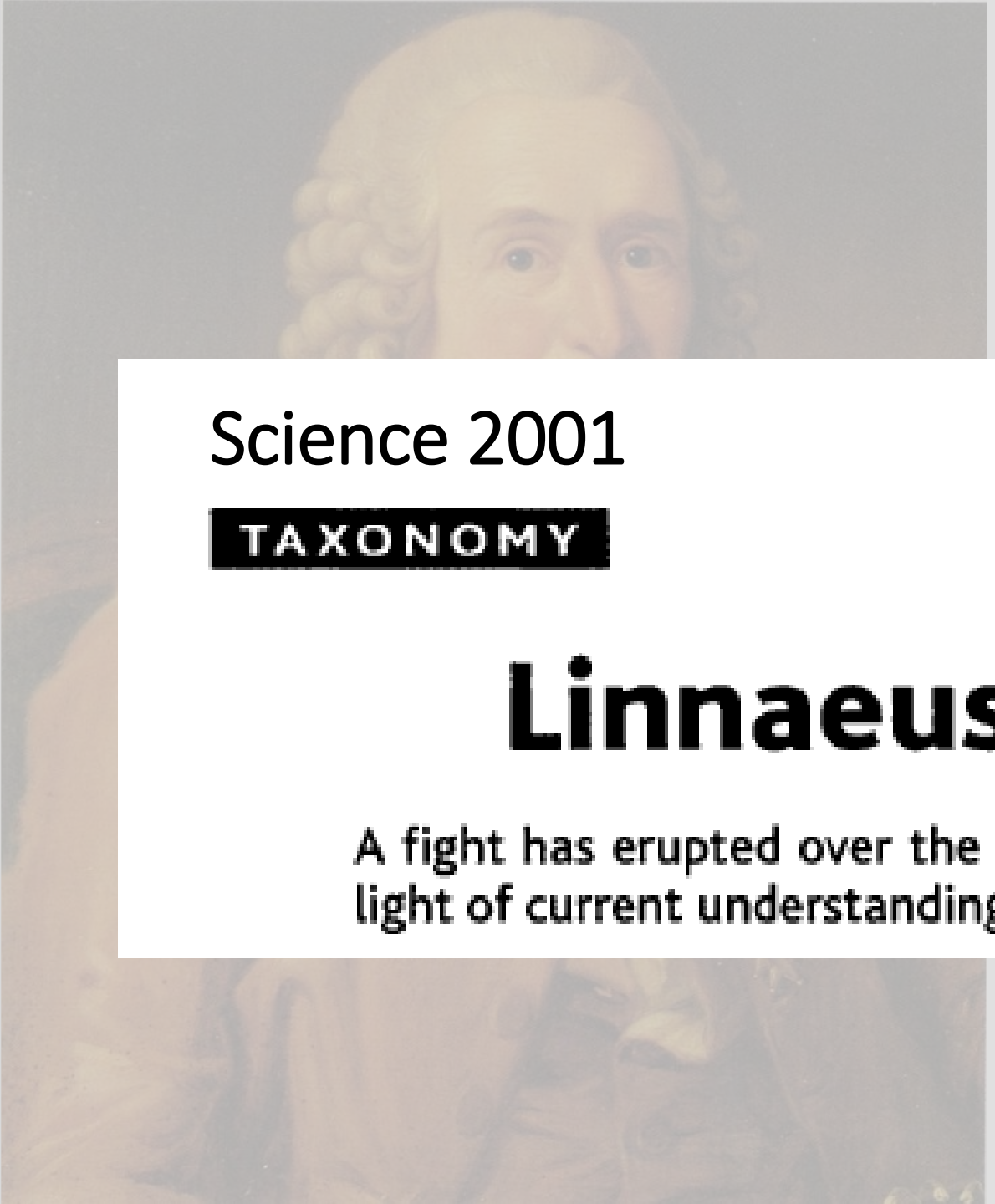
Rod vrsta

Nomen est omen



Homo sapiens

Priimek ime



Nomen est omen

Science 2001

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Linnaeus's Last Stand?

A fight has erupted over the best way to name and classify organisms in light of current understanding of evolution and biodiversity

International Commission on Zoological Nomenclature

INTERNATIONAL CODE OF ZOOLOGICAL NOMENCLATURE

Fourth Edition

[Incorporating Declaration 44, amendments of Article 74.7.3, with effect from 31 December 1999 and the Amendment on e-publication, amendments to Articles 8, 9, 10, 21 and 78, with effect from 1 January 2012]

adopted by the International Union of Biological Sciences

The provisions of this Code supersede those of the previous editions with effect from 1 January 2000

ISBN 0 85301 006 4

Koncept prioritete

Microtus arvalis rossiae-meridionalis Ognev, 1924

Microtus arvalis epiroticus Ondrias, 1966

Koncept prioritete

Koncept tipa

Tipski primerek (za **vrsto**)

Tipska vrsta (za **rod**)

Tipski rod (za **družino**)

Dryomys niethammeri, new species

Holotype: BM(NH) 79.688, an adult female collected by D. G. W. Fulk, Rodent Control Research Center, original number CS958. There is no collecting date recorded on the skin tag, but the specimen was probably collected in 1976 (T. J. Roberts, personal comm.), and was accessioned by the BM(NH) in 1979 (P. D. Jenkins, personal comm.). The preparation consists of a stuffed skin in good condition (fig. 2) and slightly damaged skull (left jugal missing, right jugal broken, posterior margin of bony palate and left hammular process broken) (fig. 3).

Skin measurements recorded by the collector, and craniodental measurements taken by me are listed in table 1.

I verified the usual myoxid count of 8 mammae on the type skin: one pectoral, one postaxillary, one abdominal and one inguinal pair.

Type locality: Pakistan: Balochistan province; 1 mi E of Ziarat (30.25 N, 67.49 E).

Holden 1996, Bon. Zool. Bull.

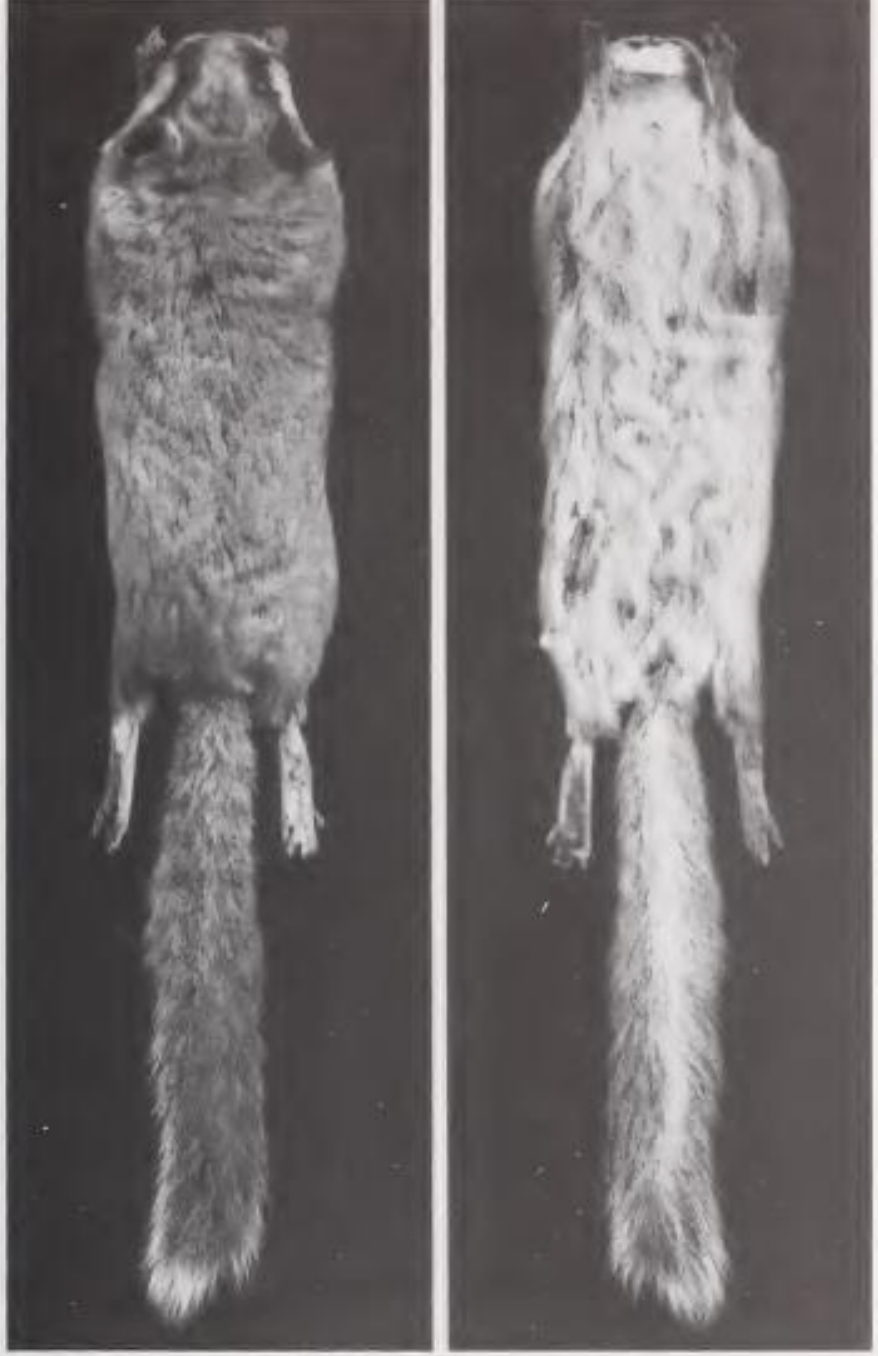

Fig. 2: *Dryomys niethammeri*, holotype (BMNH 1979.688). Dorsal and ventral views of stuffed skin.

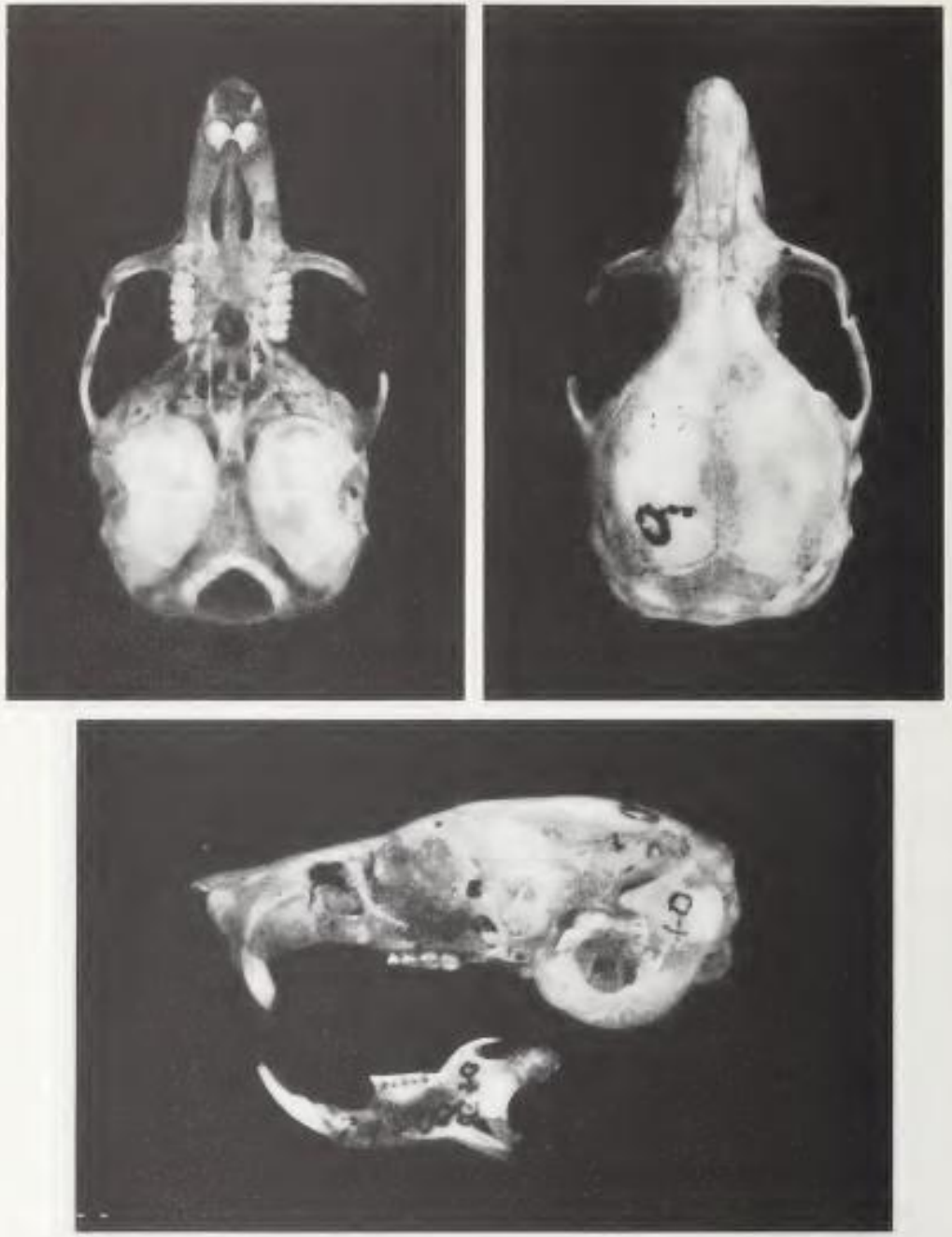

Fig. 3: *Dryomys niethammeri*, holotype (BMNH 1979.688). Dorsal and ventral views of cranium; lateral views of cranium and mandible. Approximately X2.5.

[Arvicola arvalis] f.[orma] *typica* Rörig & Börner 1907
[Arvicola arvalis] f.[orma] *duplicata* Rörig & Börner 1907
[Arvicola arvalis] f.[orma] *variabilis* Rörig & Börner 1907
[Arvicola arvalis] f.[orma] *contigua* Rörig & Börner 1907
[Arvicola arvalis] forma *depressa* Rörig & Börner 1907
Arvicola arvalis (Pall.) forma *assimilis* Rörig & Börner 1907
[Arvicola campestris] f.[orma] *maskii* Rörig & Börner 1907
[Arvicola arvalis] Forma *principalis* Rörig & Börner 1907
Microtus arvalis meridianus Miller 1908
Microtus asturianus Miller 1908
Microtus angularis Miller 1908
Microtus sandayensis westræ Miller 1908
Microtus arvalis duplicatus Miller 1912
M.[icrotus] orcadensis ronaldshaiensis Hinton 1913
Microtus orcadensis rousaiensis Hinton 1913
Microtus arvalis calypsus Montagu 1923
Microtus arvalis Havelkae Bolkay 1925
Microtus arvalis Brauneri V. Martino & E. Martino 1926
Microtus igmanensis Bolkay 1929
Microtus arvalis cimbricus Stein, 1931
Microtus arvalis incognitus Stein, 1931
Microtus arvalis rhodopensis Heinrich, 1936
Microtus arvalis oyænsis Haim de Balsac 1940

Belonoge miši
Apodemus

- 1951: 5 vrst
- 2005: 20 vrst

Apodemus hyrcanicus Vorontsov, Boyeskorov, and Mezhzherin, **1992**

Apodemus alpicola Heinrich, **1952**

Ellerman & Morrison-Scott 1951, BMNH, London

APODEMUS SYLVATICUS ALGIRUS Pomel, 1856

1856. *Mus algirus* Pomel, C.R. Acad. Sci. Paris, *42:* 634. Oran Province, Algeria.
? 1867. *Mus chamaeropsis* Levaillant, Explor. Sci. de l'Algérie, Zool. Mamm. Atlas, pl. v, fig. 1. Constantine, Algeria.

For generic status of this form see G. Allen, 1939, *Checklist African Mammals*, 373.

APODEMUS SYLVATICUS TOKMAK Severtzov, 1873

1873. *Mus tokmak* Severtzov, Mem. Soc. Amis. Sci. Moscow, *8:* 61, tab. Near Tokmak, Alexsandrov mountain ridge, Semirechyia district, Russian Central Asia. Range: Northern Kirghizia, Mountains of Alma-Ata Province.

APODEMUS SYLVATICUS ARIANUS Blanford, 1881

1881. *Mus arianus* Blanford, Ann. Mag. N.H. *7:* 162. Kohrud, Northern Persia. Replaces:
1875. *Mus erythronotus* Blanford, Ann. Mag. N.H. *16:* 311. Kohrud. Not of Temminck, 1845.
1902. *Mus sylvaticus witherbyi* Thomas, Ann. Mag. N.H. *10:* 490. Sheoul, Fars, Persia. A whitish-bellied race perhaps confined to Persia, although Kuznetzov lists it from Kopet-Dag Mountains, Russian Turkestan. (Type in B.M.)

APODEMUS SYLVATICUS HEBRIDENSIS de Winton, 1895

1895. *Mus hebridensis* de Winton, Zoologist, *19:* 369. Uig, Island of Lewis, Outer Hebrides.

APODEMUS SYLVATICUS ALGIRUS Pomel, 1856

1856. *Mus algirus* Pomel, C.R. Acad. Sci. Paris, *42:* 634. Oran Province, Algeria.
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For generic status of this form see G. Allen, 1939, *Checklist African Mammals*, 373.

APODEMUS SYLVATICUS TOKMAK Severtzov, 1873

1873. *Mus tokmak* Severtzov, Mem. Soc. Amis. Sci. Moscow, *8:* 61, tab. Near Tokmak, Alexsandrov mountain ridge, Semirechyia district, Russian Central Asia. Range: Northern Kirghizia, Mountains of Alma-Ata Province.

APODEMUS SYLVATICUS ARIANUS Blanford, 1881

1881. *Mus arianus* Blanford, Ann. Mag. N.H. *7:* 162. Kohrud, Northern Persia. Replaces:
1875. *Mus erythronotus* Blanford, Ann. Mag. N.H. *16:* 311. Kohrud. Not of Temminck, 1845.
1902. *Mus sylvaticus witherbyi* Thomas, Ann. Mag. N.H. *10:* 496. Shemil, Fars, Persia. A whitish-bellied race perhaps confined to Persia, although Kuznetzov lists it from Kopet-Dag Mountains, Russian Turkestan. (Type in B.M.)

APODEMUS SYLVATICUS HEBRIDENSIS de Winton, 1895

1895. *Mus hebridensis* de Winton, Zoologist, *19:* 369. Uig, Island of Lewis, Outer Hebrides.

A. flavicollis

A. witherbyi

Apodemus sylvaticus algirus Pomel, 1856

1856. *Mus algirus* Pomel, C.R. Acad. Sci. Paris, *42:* 634. Oran Province, Algeria.
? 1867. *Mus chamaeropsis* Levaillant, Explor. Sci. de l'Algérie, Zool. Mamm. Atlas, pl. v, fig. 1. Constantine, Algeria.

For generic status of this form see G. Allen, 1939, *Checklist African Mammals*, 373.

A. sylvaticus

Apodemus sylvaticus tokmak Severtzov, 1873

1873. *Mus tokmak* Severtzov, Mem. Soc. Amis. Sci. Moscow, *8:* 61, tab. Near Tokmak, Alexsandrov mountain ridge, Semirechyia district, Russian Central Asia. Range: Northern Kirghizia, Mountains of Alma-Ata Province.

A. uralensis

Apodemus sylvaticus arianus Blanford, 1881

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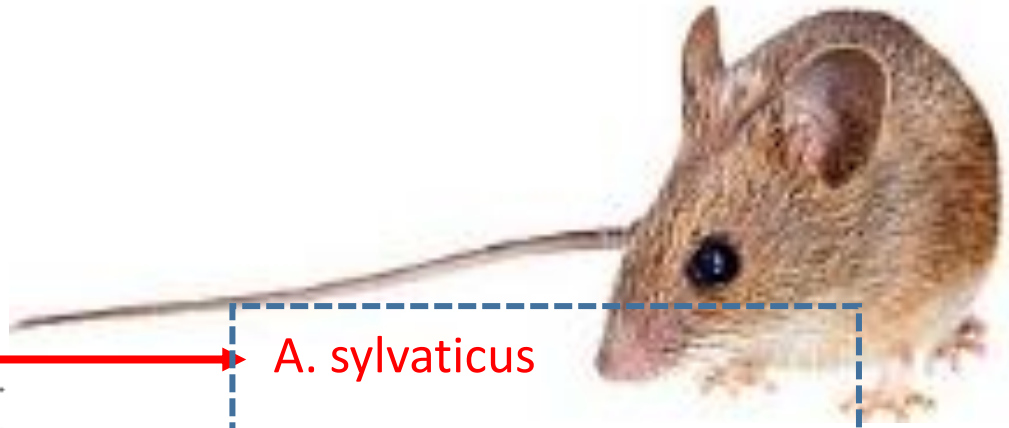

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Giovanni (Ioannis)
Antonio **Scopoli**

1723-1788
(1754-1769)

..., daleč od skupnosti izobraženih ljudi, daleč od knjižnic in vseh pripomočkov, ki so potrebni za opravljanje … del; in raje molčim o številnih sovražnih nasprotovanjih, ki me na Kranjskem tako prizadevajo, da je pravo čudo, kako sem jih zmogel toliko prestati; ...

5. februar 1762

Republika Slovenija **NIMA:**

- inventarja (baze) vrst
- institucionaliziranega proučevanja nacionalne biodiverzitete
- dostojne prirodoslovne zbirke

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Večer, 11. avgusta 2018

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HVALA

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