

Patrones filogenéticos, macroevolución y adaptación

Seriación indicativa u obligatoria antecedente, si es el caso:

No tiene seriación

Seriación indicativa u obligatoria subsecuente, si es el caso:

No tiene seriación

Objetivo general: Iniciar a los estudiantes en la aplicación de métodos macroevolutivos para entender los principales patrones filogenéticos (de diversificación, de evolución morfológica y biogeográficos) descritos a la fecha.

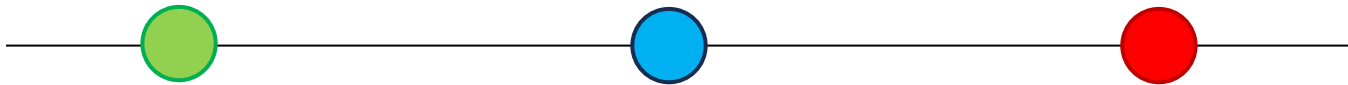
Objetivos específicos: (en si caso)

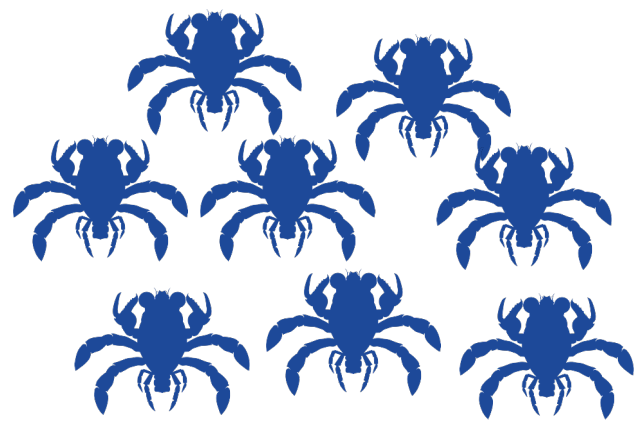
Temario	Horas	
	Teóricas	Prácticas
Unidad 1 (Se anota el nombre de la unidad y en su caso los subtemas que contiene. En caso de haber subtemas, ponerlos bajo el formato de numeral, es decir: 1.1, 1.1.1 en su caso, 1.2 etcétera) U 1: Patrones de diversificación 1.1 introducción al proceso de diversificación y que herramientas tenemos para calcular una tasa 1.2 Tasas de extinción y eventos de extinción masiva 1.3 Especiación dependiente de un carácter: modelos de la familia SSE	10	10
Unidad 2 U 2: Patrones morfológicos 2.1. Hipótesis y modelos de evolución morfológica 2.2. Reconstrucción ancestral de caracteres 2.3. Coevolución de rasgos 2.4. Identificación de tendencias en evolución morfológica	10	10
Unidad 3 Patrones biogeográficos 3.1. Modelo DEC uso y limitaciones 3.2. Modelo BIB uso y limitaciones 3.3. Diversificación dependiente del rango geográfico 3.4. Desarrollo de proyecto de investigación (así consecutivamente hasta el número de unidades temáticas que tenga el programa de la actividad)	12	12

Evaluación

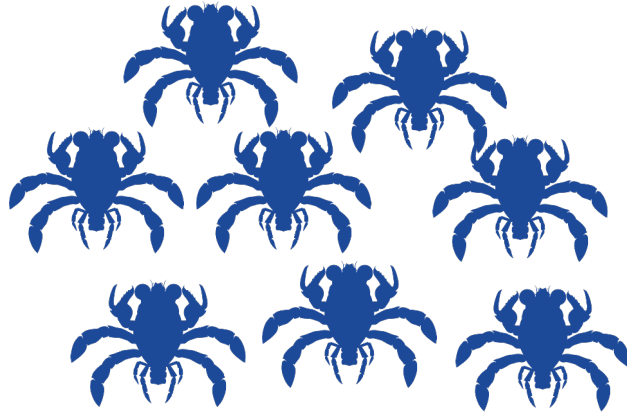
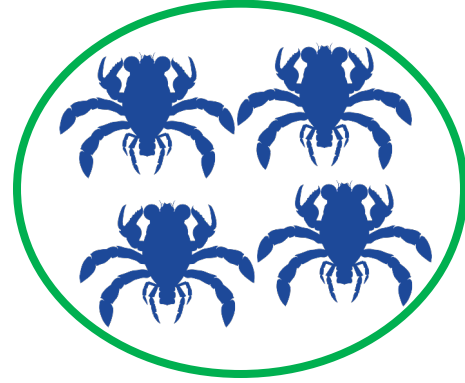
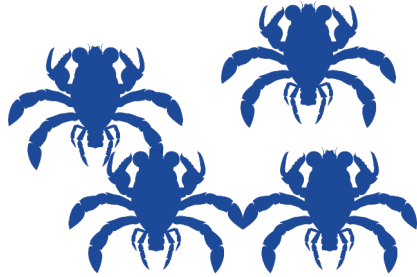
- Exámen por unidad **30%**
- Participación activa **30%**
- Proyecto final **30%**
 - Cómo aplicarían cualquiera de los métodos del temario en su proyecto
 - Escrito que contenga Objetivo y Material y Métodos
- Prácticas **10%**

Tempo and mode in Macroevolution

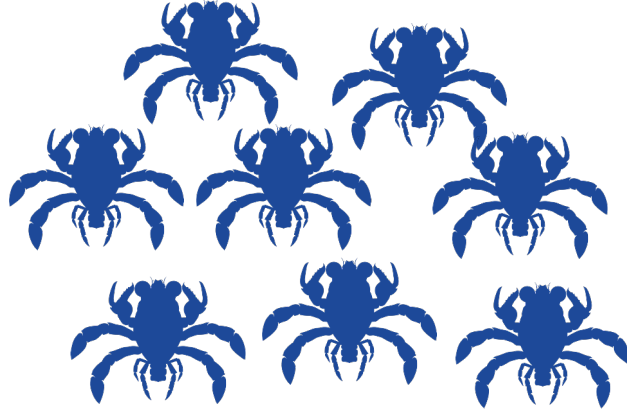
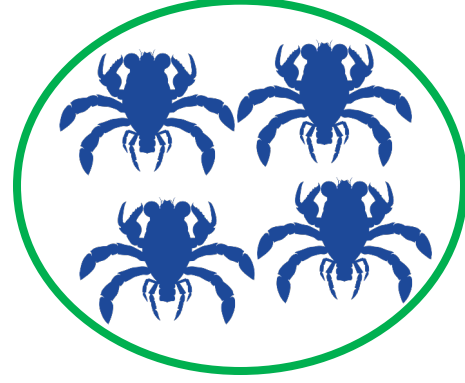
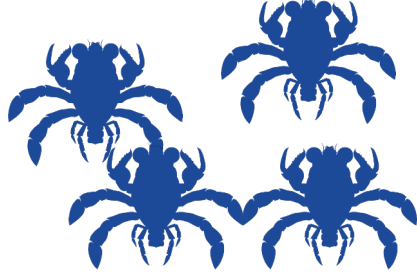
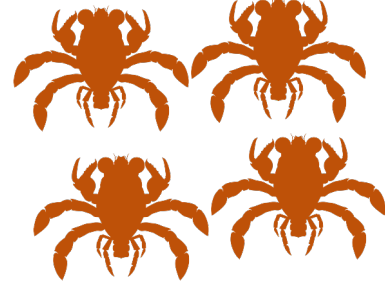
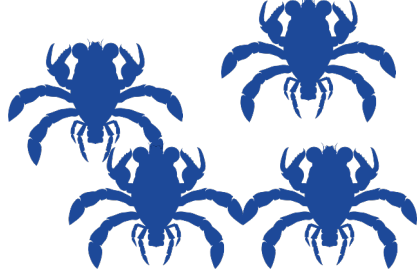




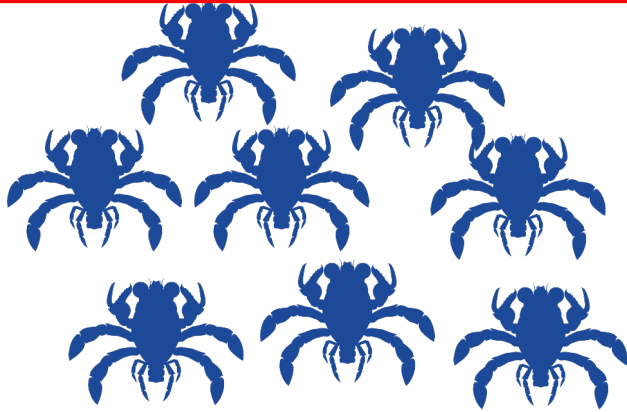
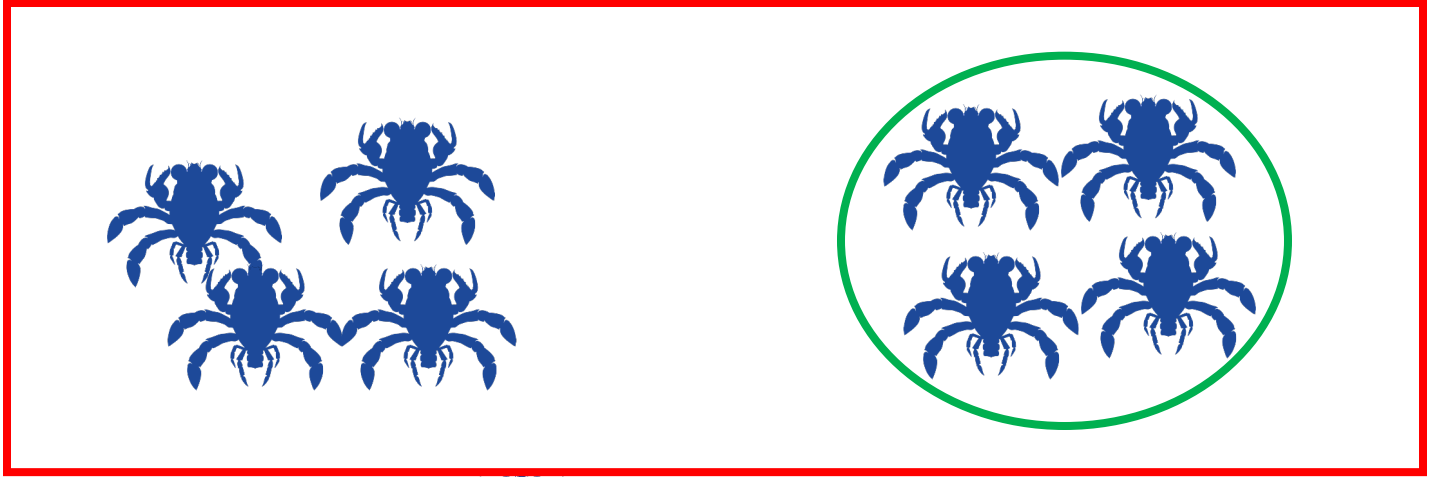
Tiempo



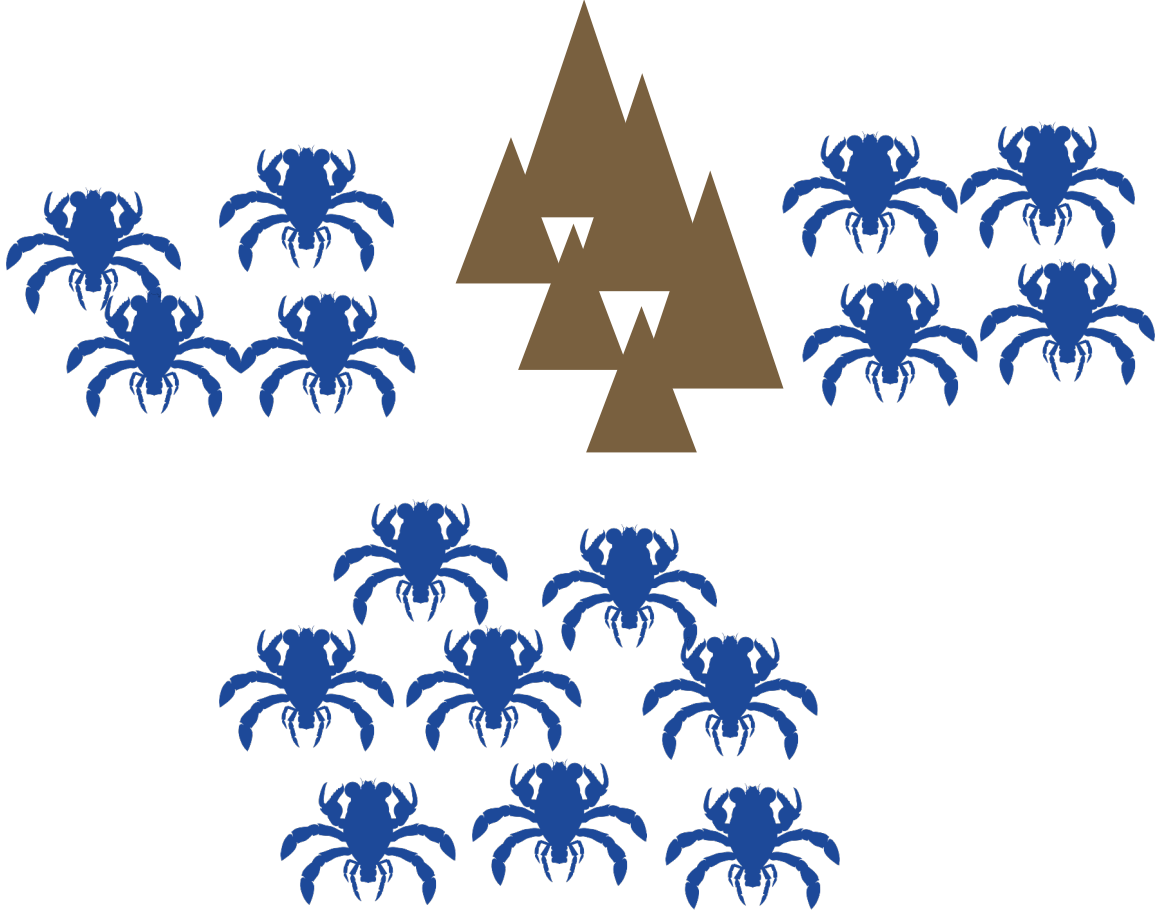
Tiempo



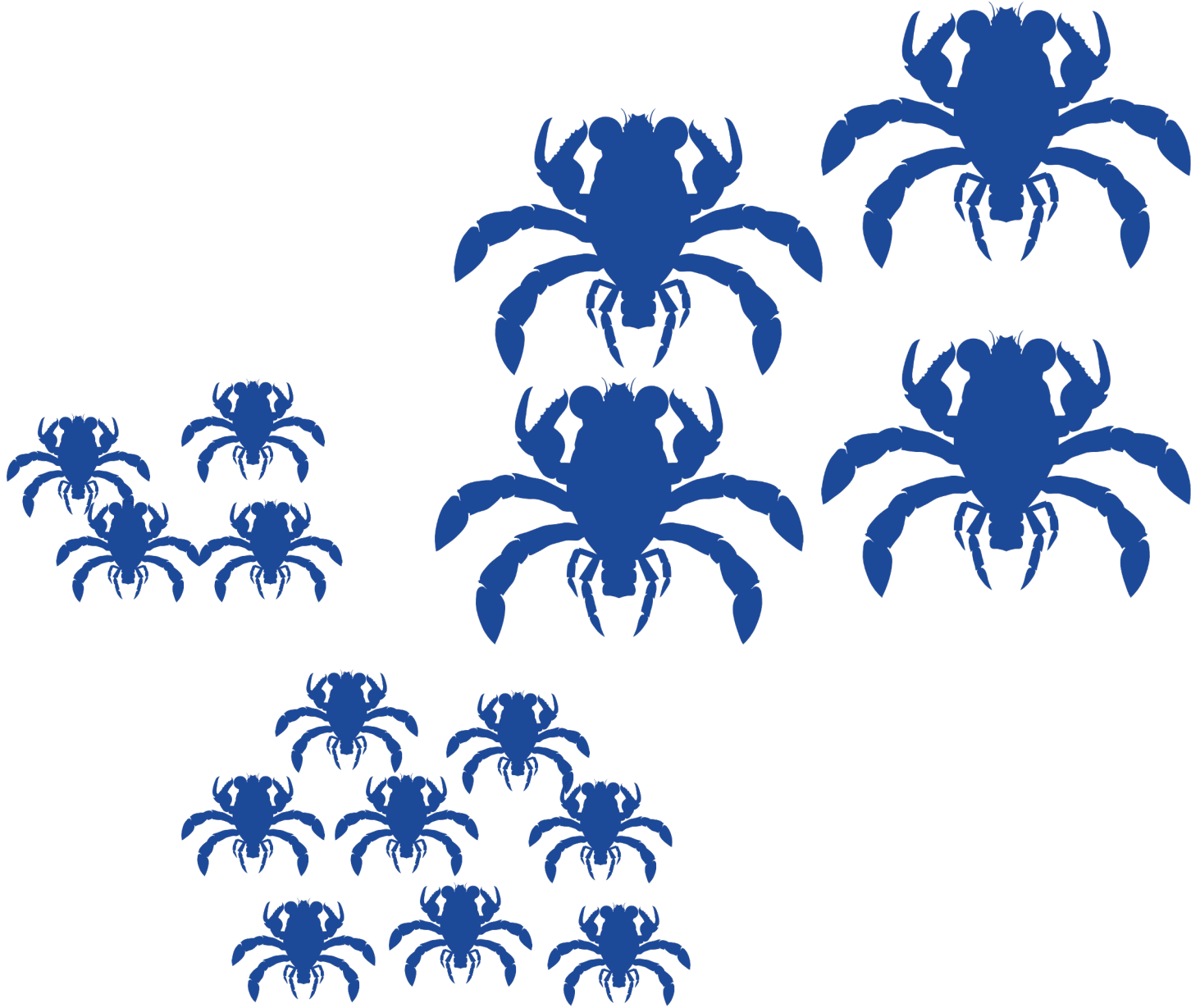
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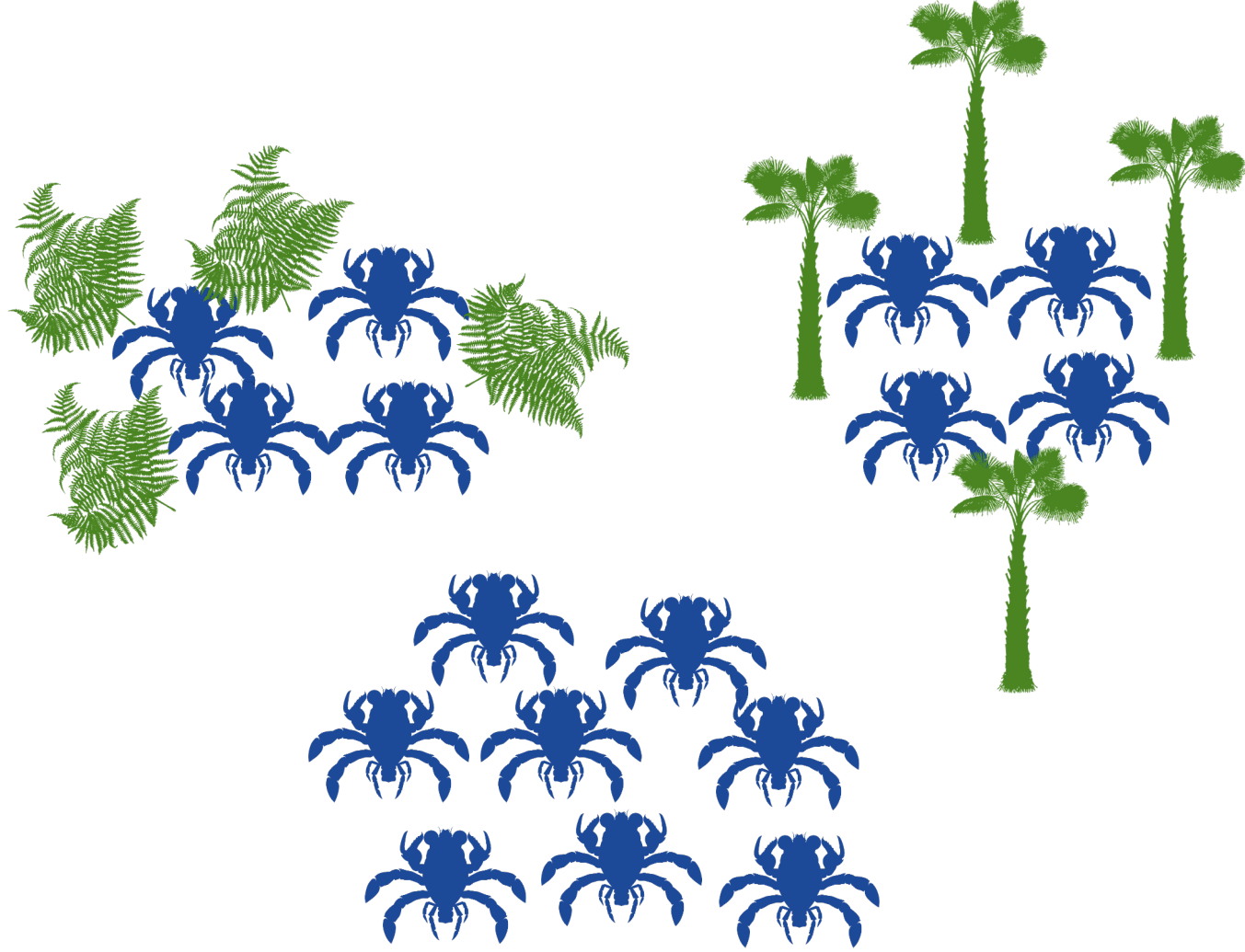
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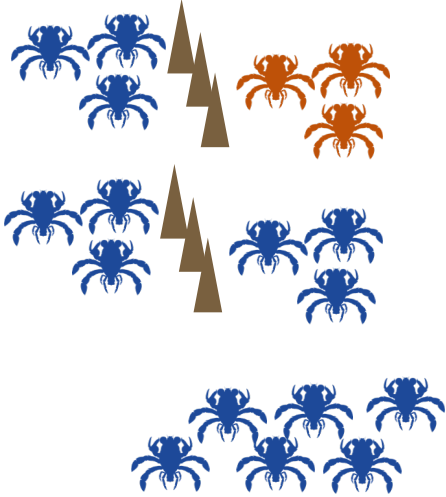
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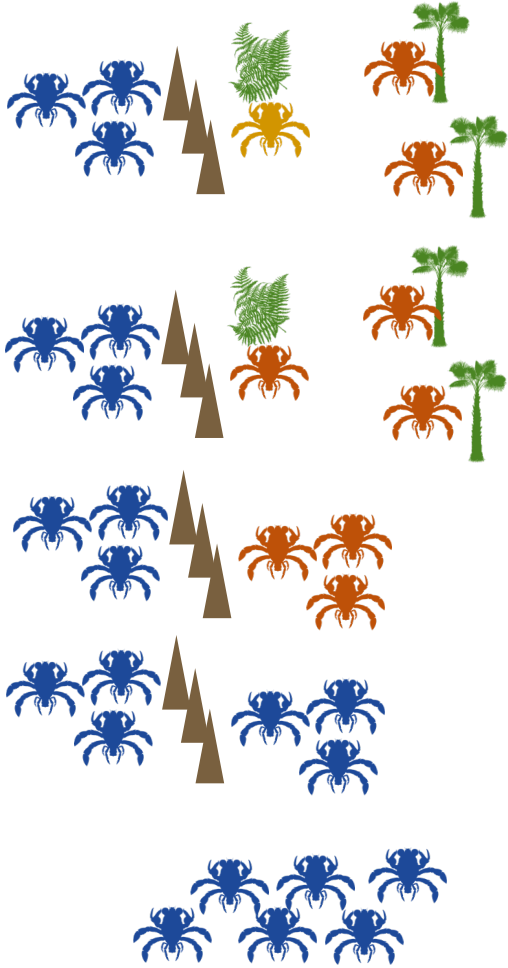
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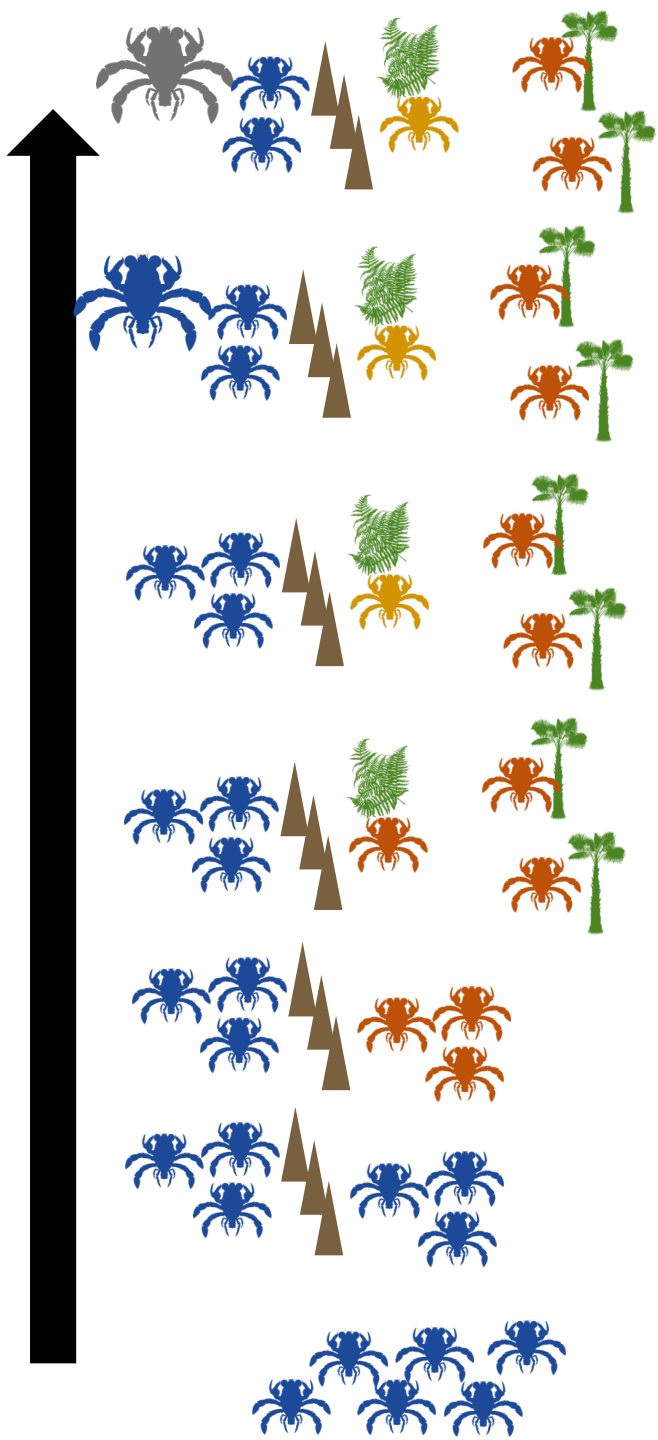
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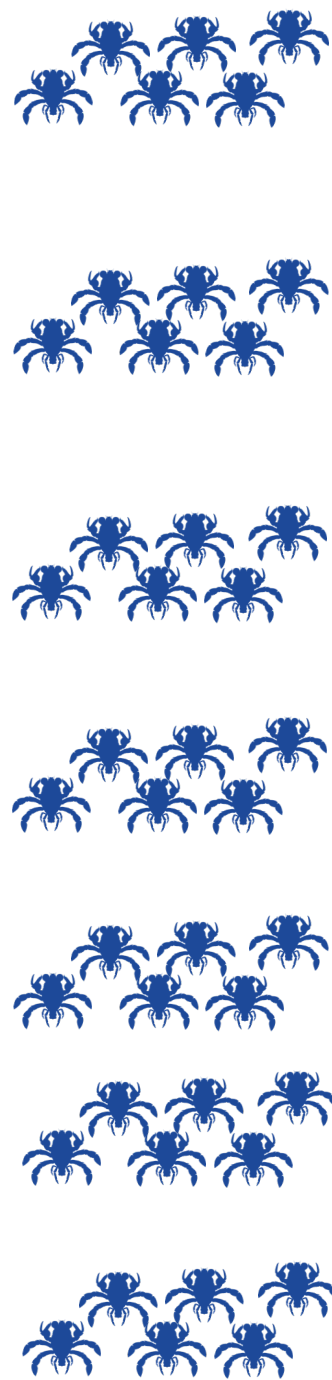
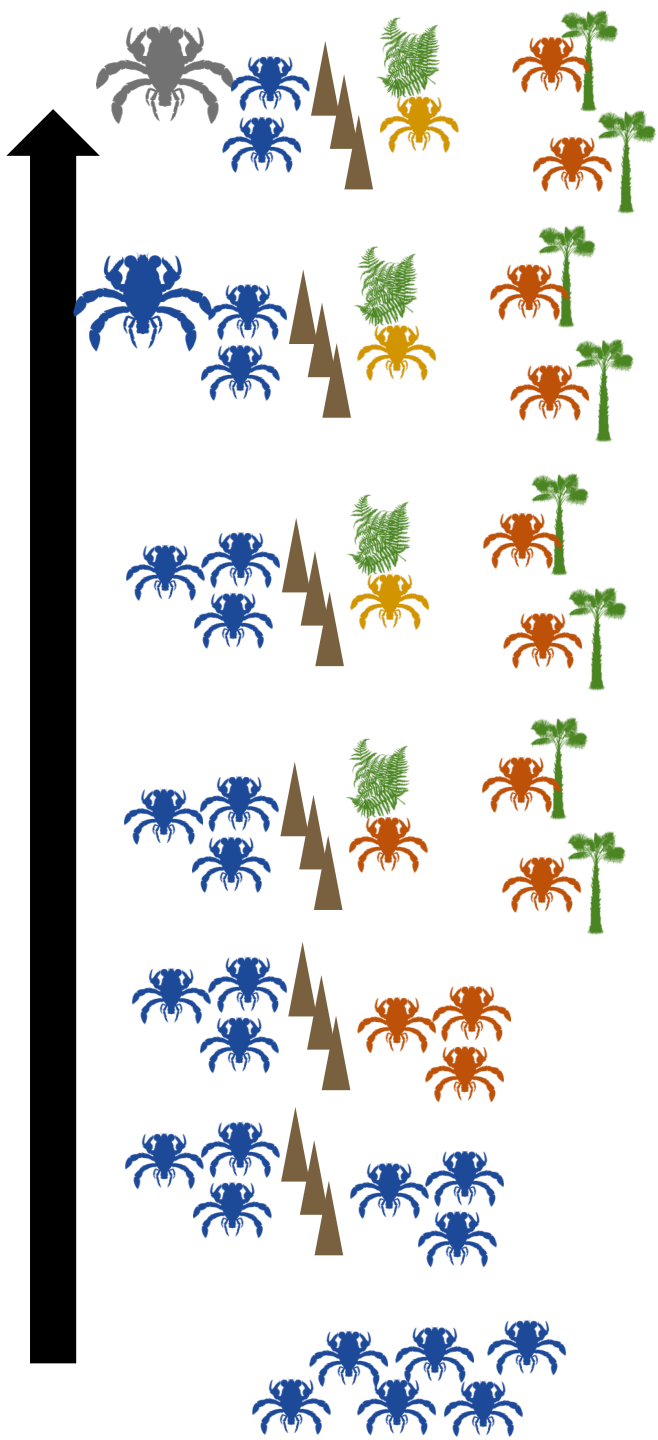
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Tiempo



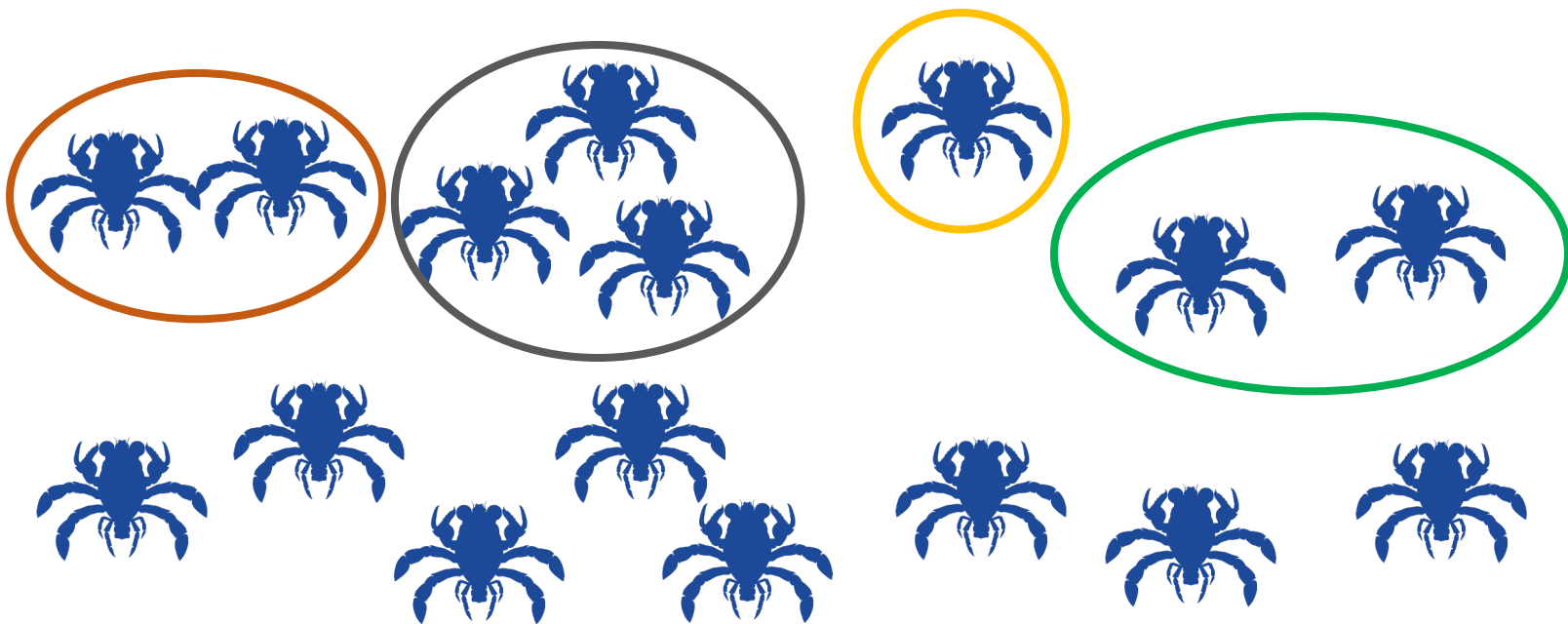
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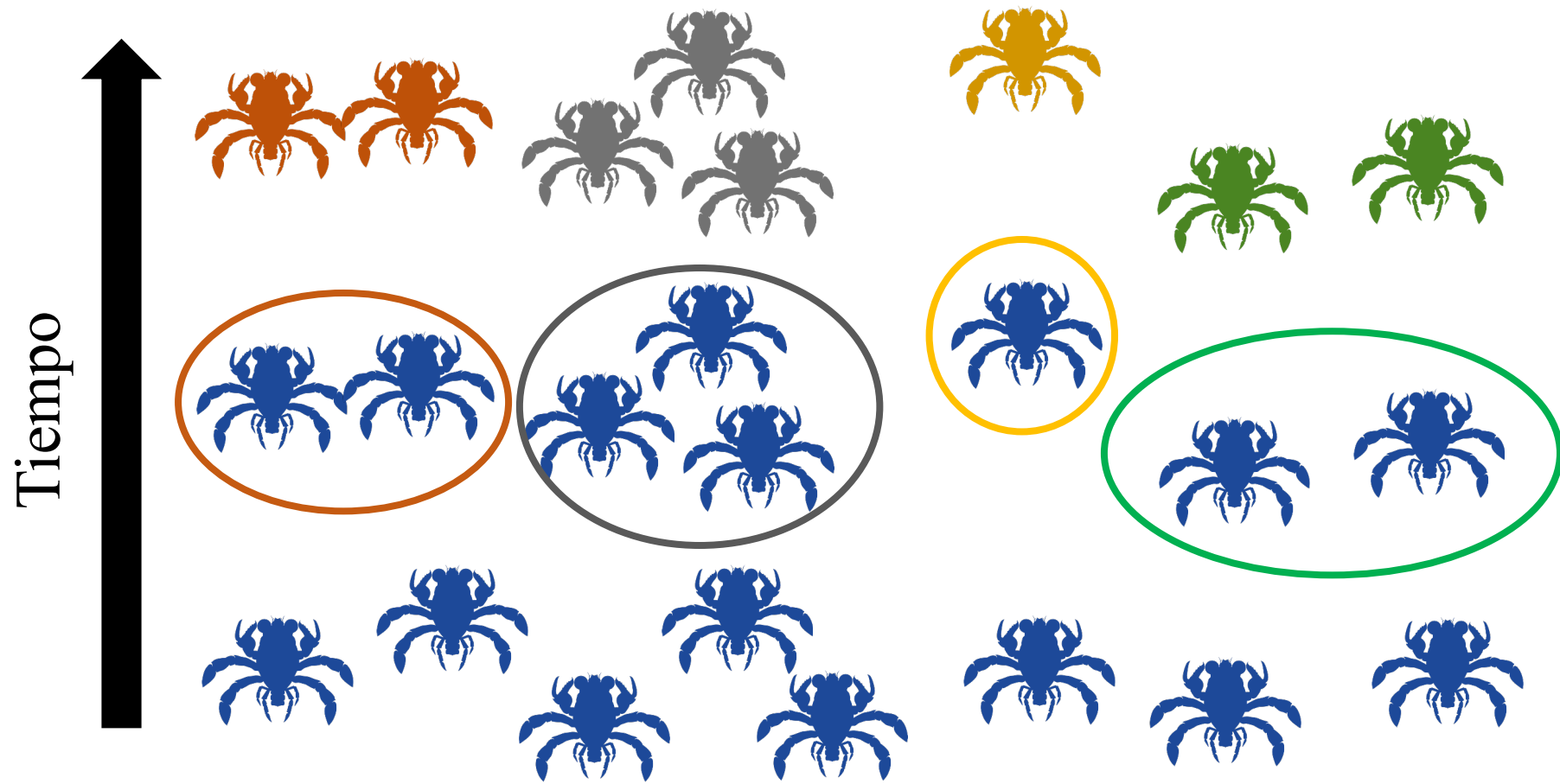


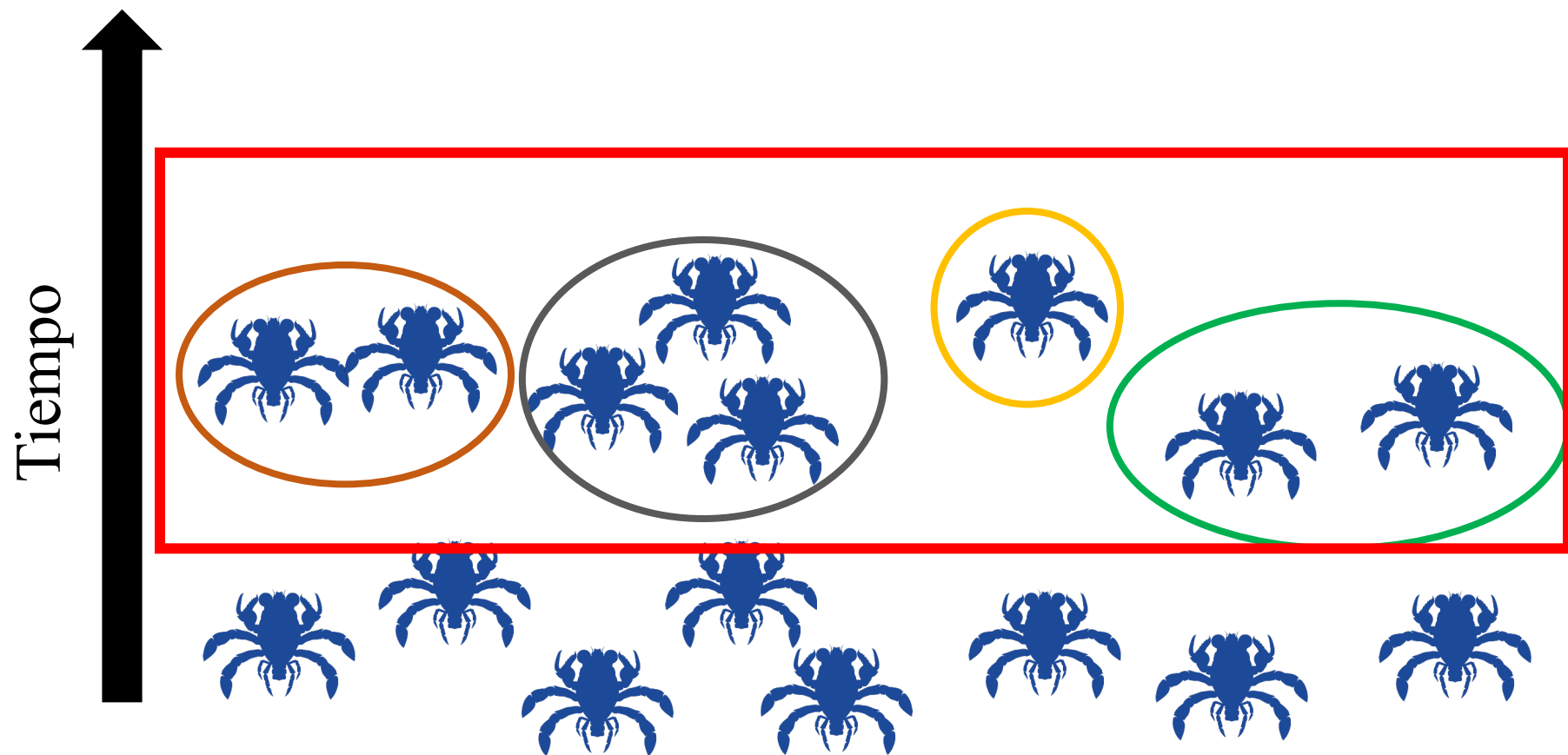
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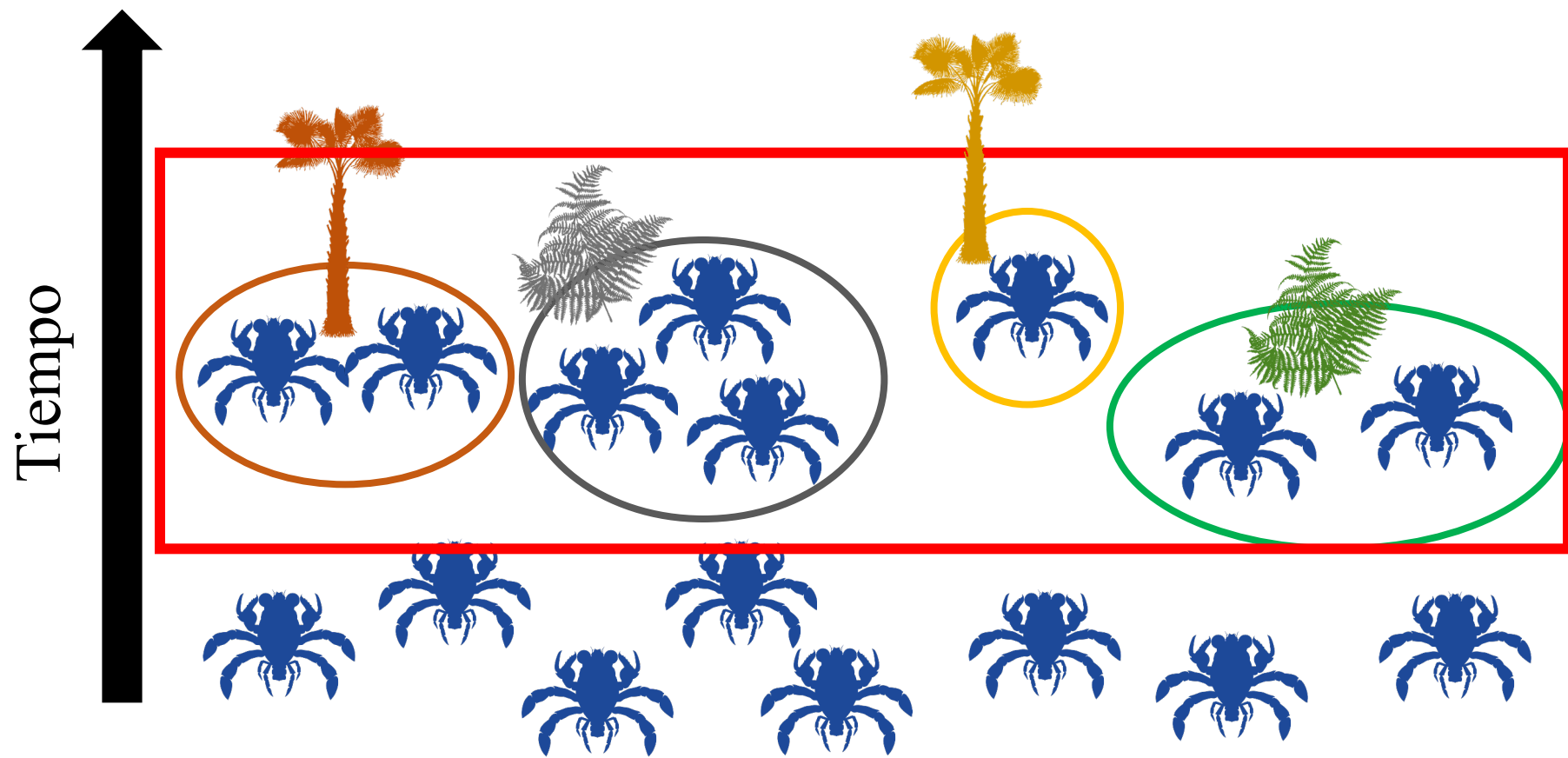


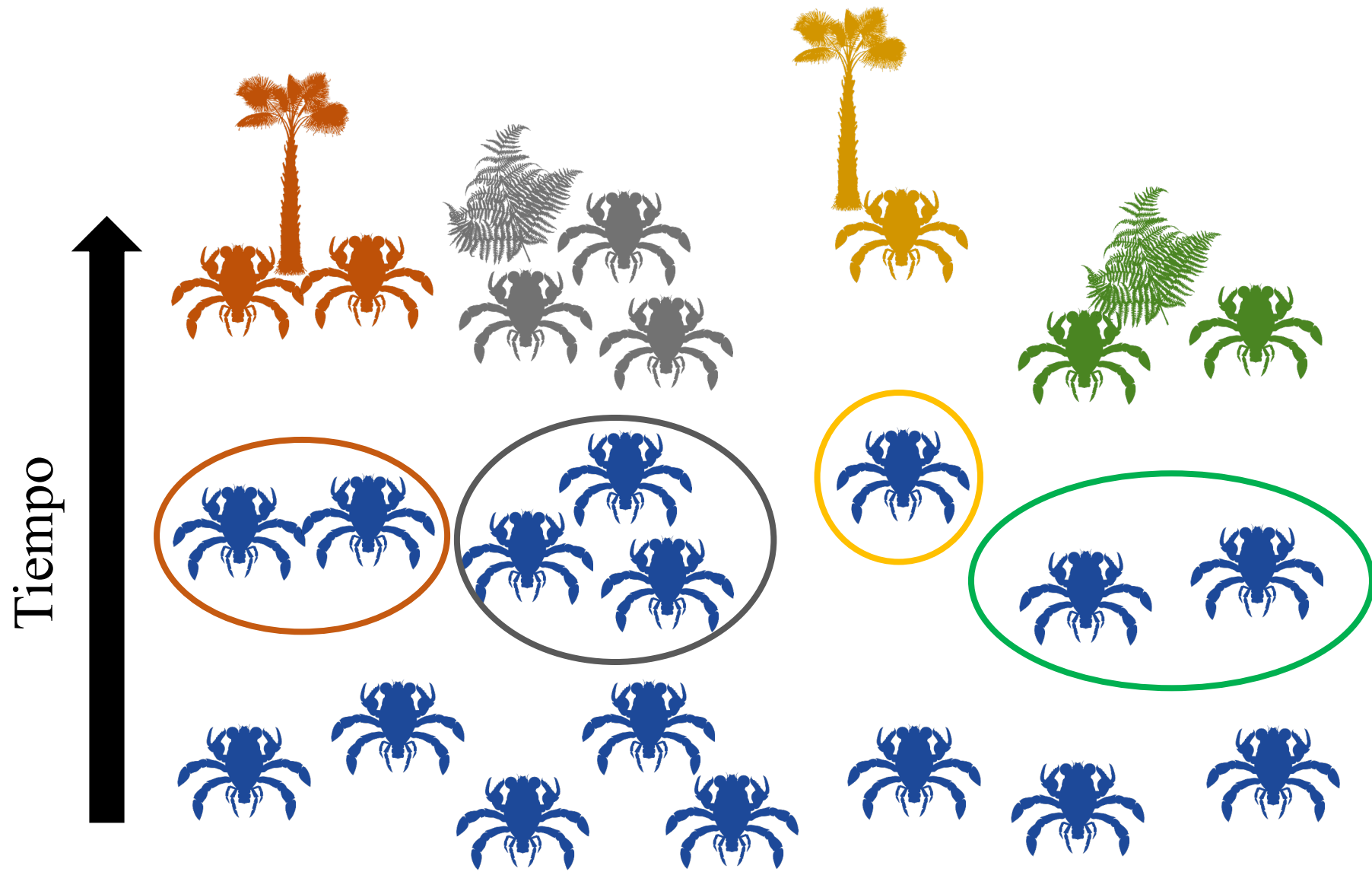
Tiempo

A thick black arrow pointing upwards, indicating the progression of time.

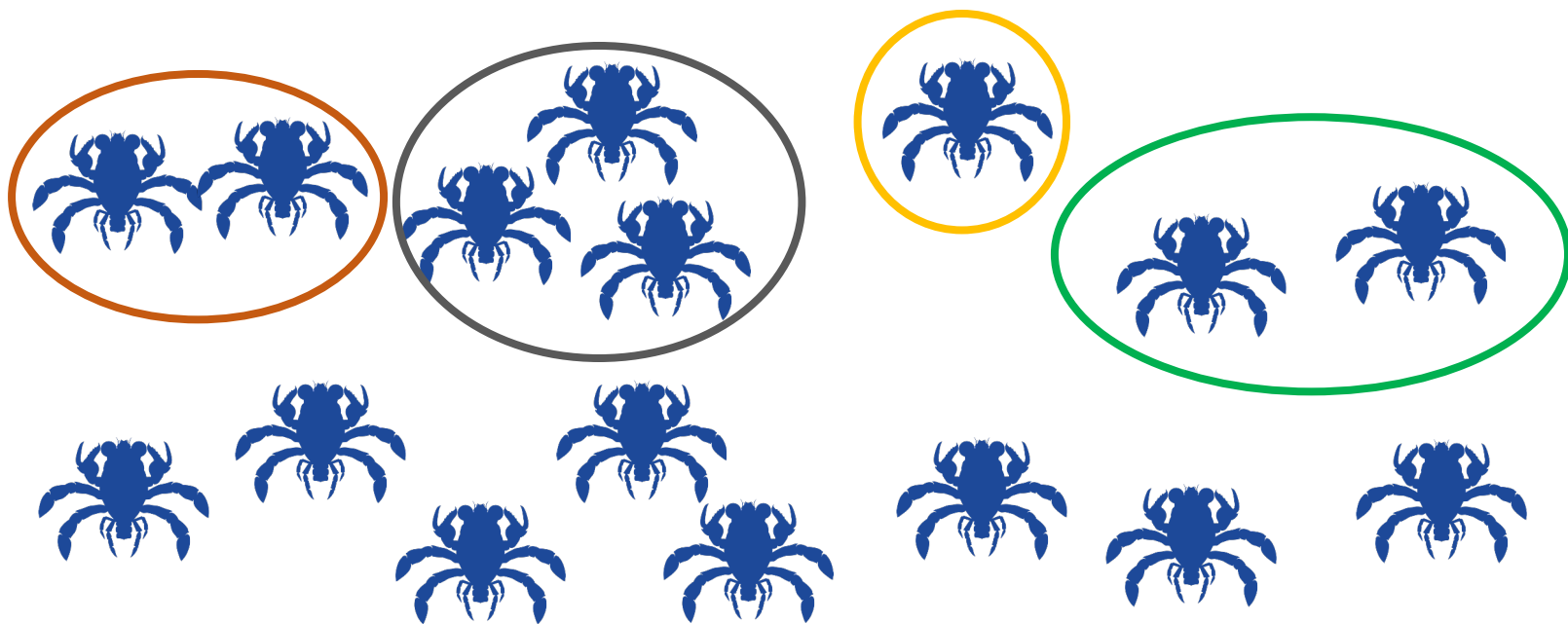


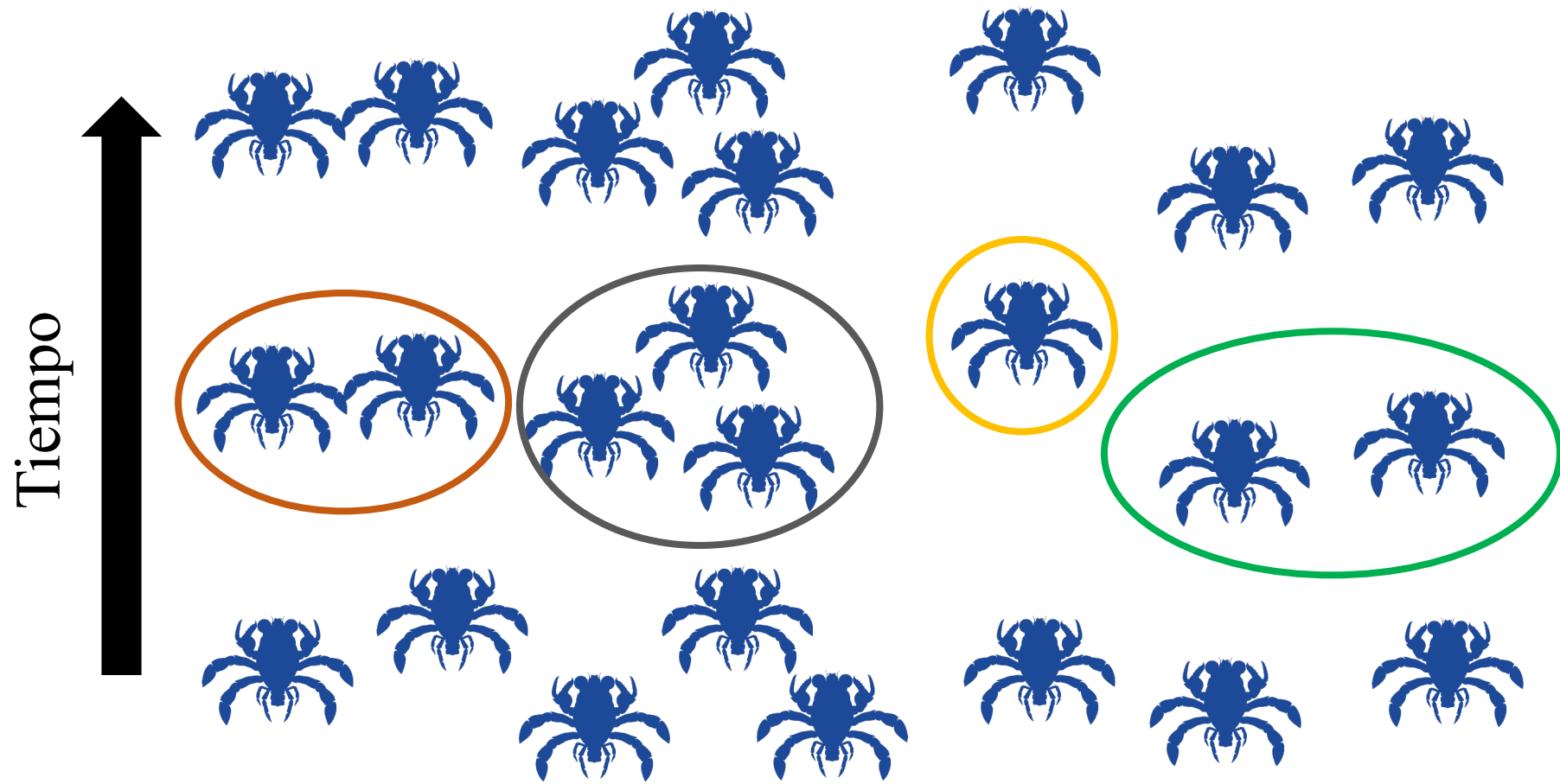


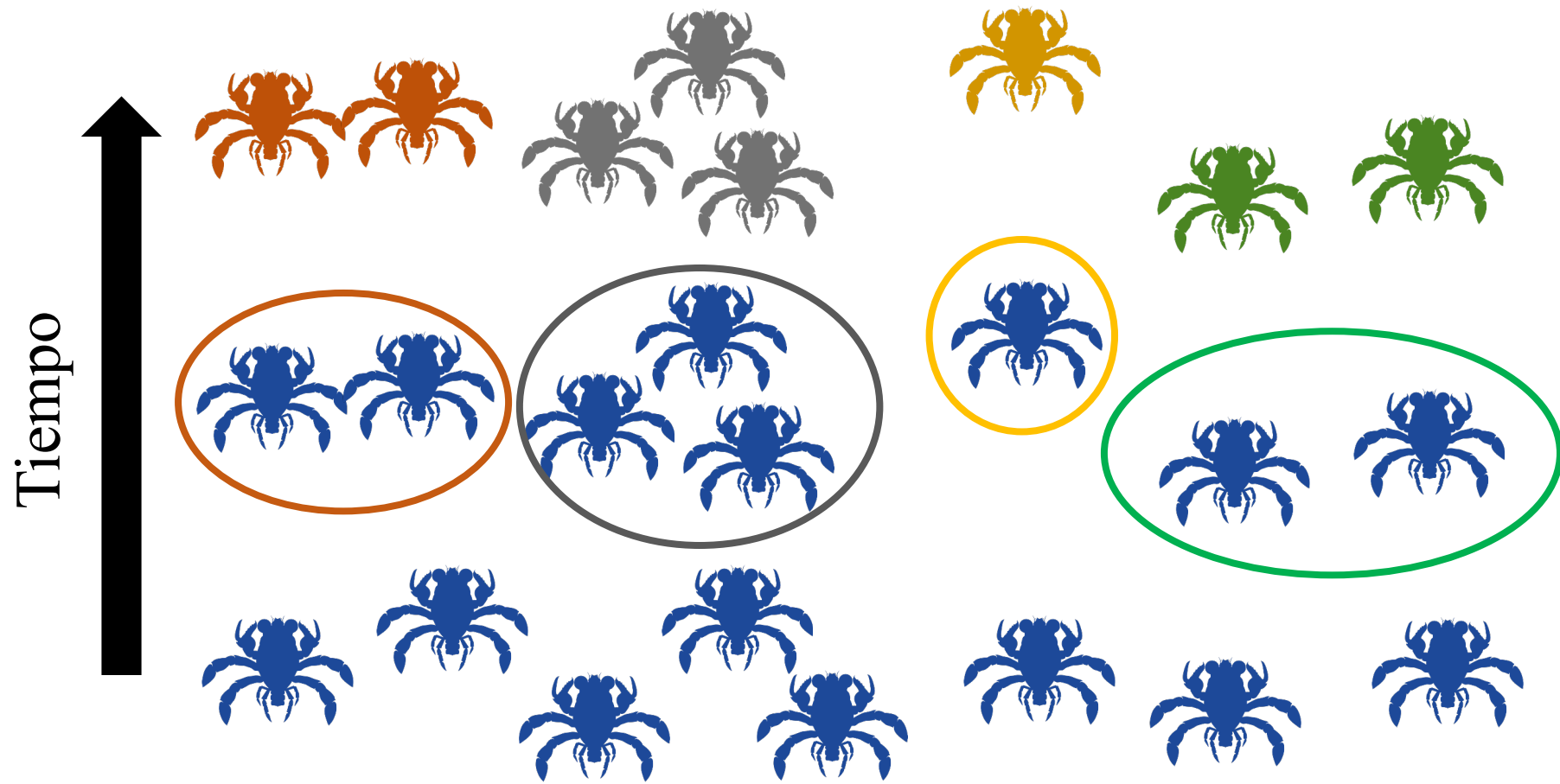


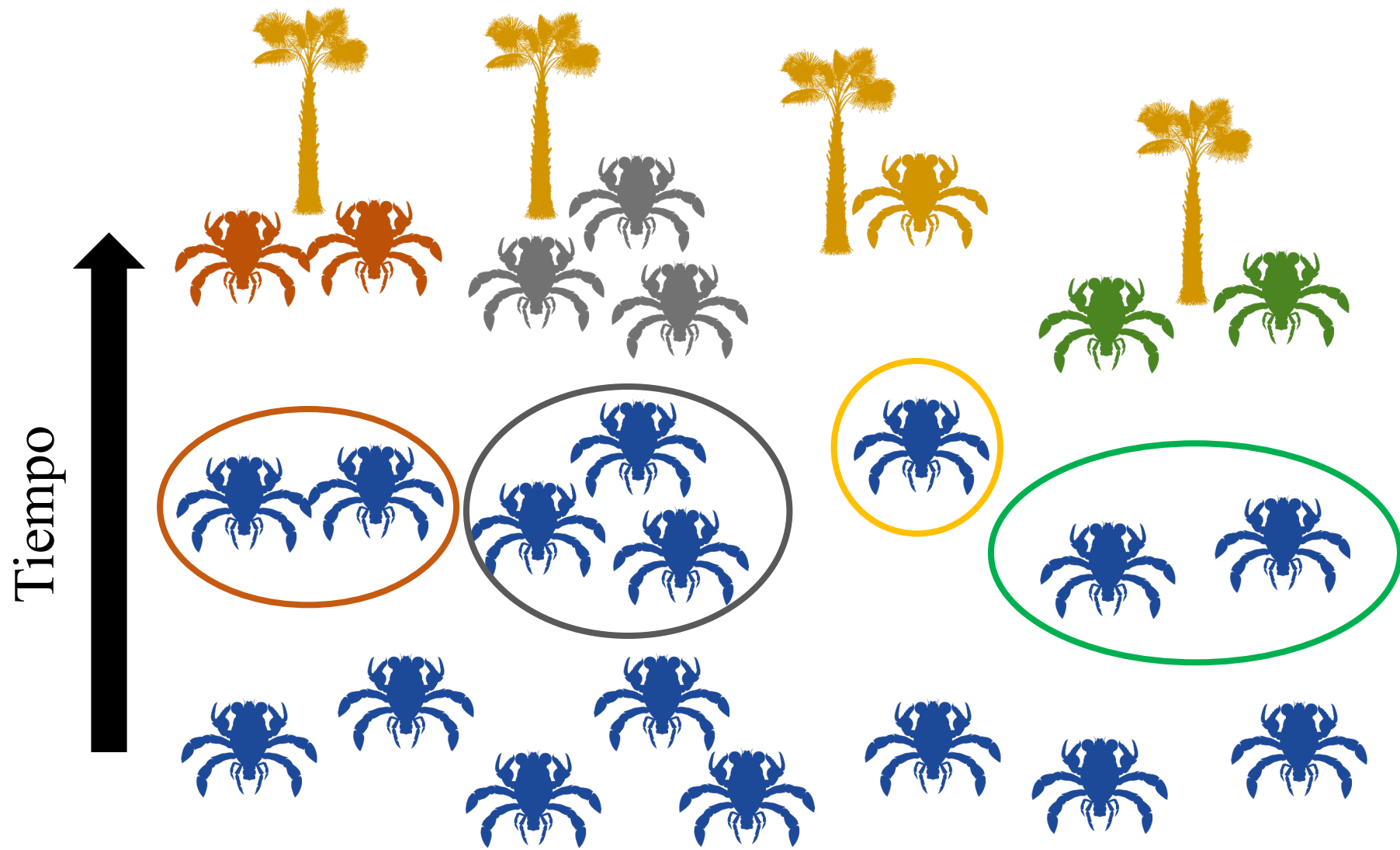


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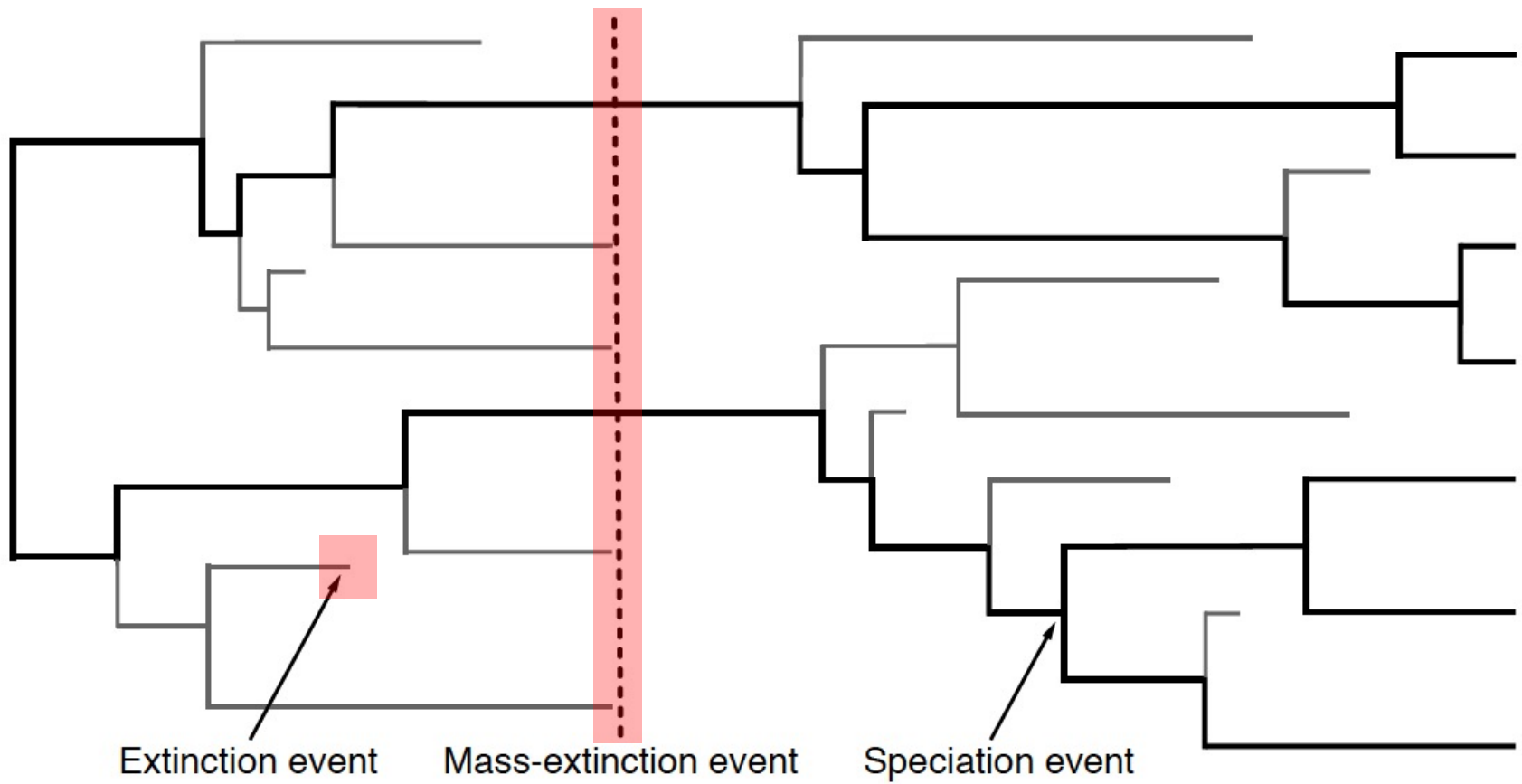
A thick black arrow pointing upwards, indicating the direction of time.











Höhna et al., 2016; *Systematic Biology*

Tempo

Mode

Equilibrio Puntuado

Extinción Masiva

Vicarianza

Simpatría

Novedad evolutiva

Gradualismo

Tempo

Equilibrio Puntuado

Gradualismo

Mode

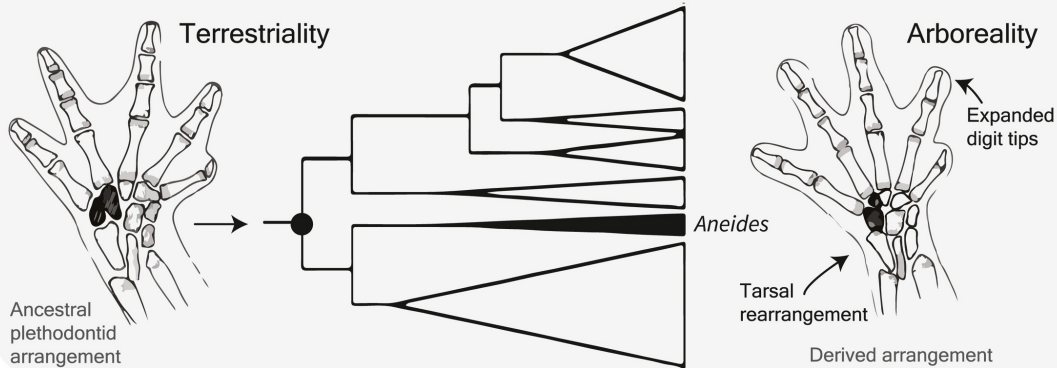
Extinción Masiva

Simpatría

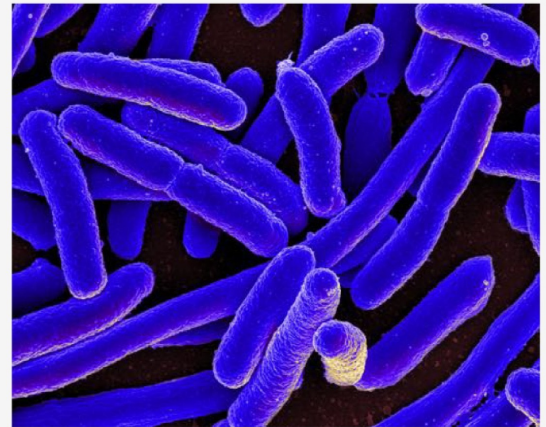
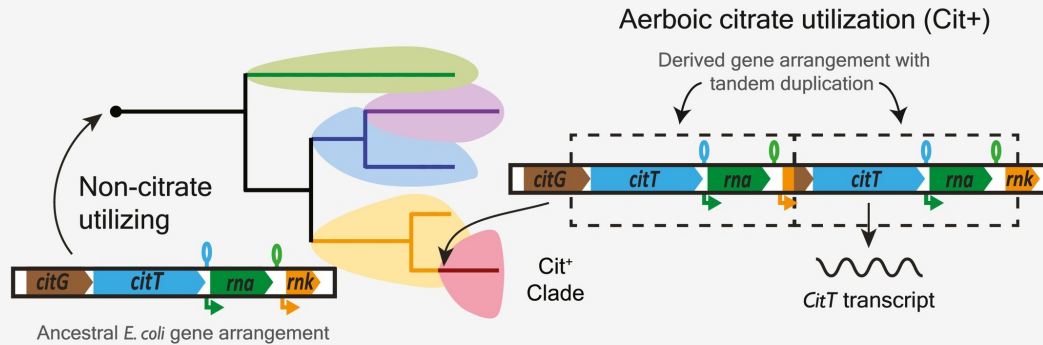
Novedad evolutiva

Vicarianza

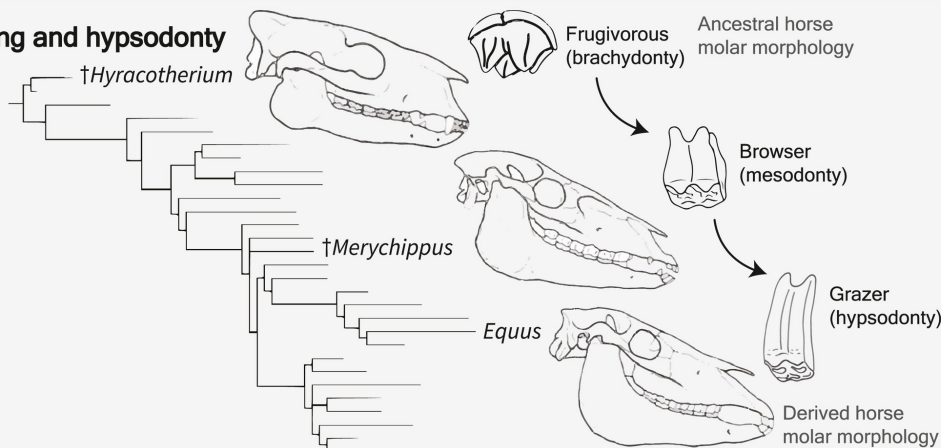
(A) Arboreality and digit modification



(B) Citrate utilization and promoter capture

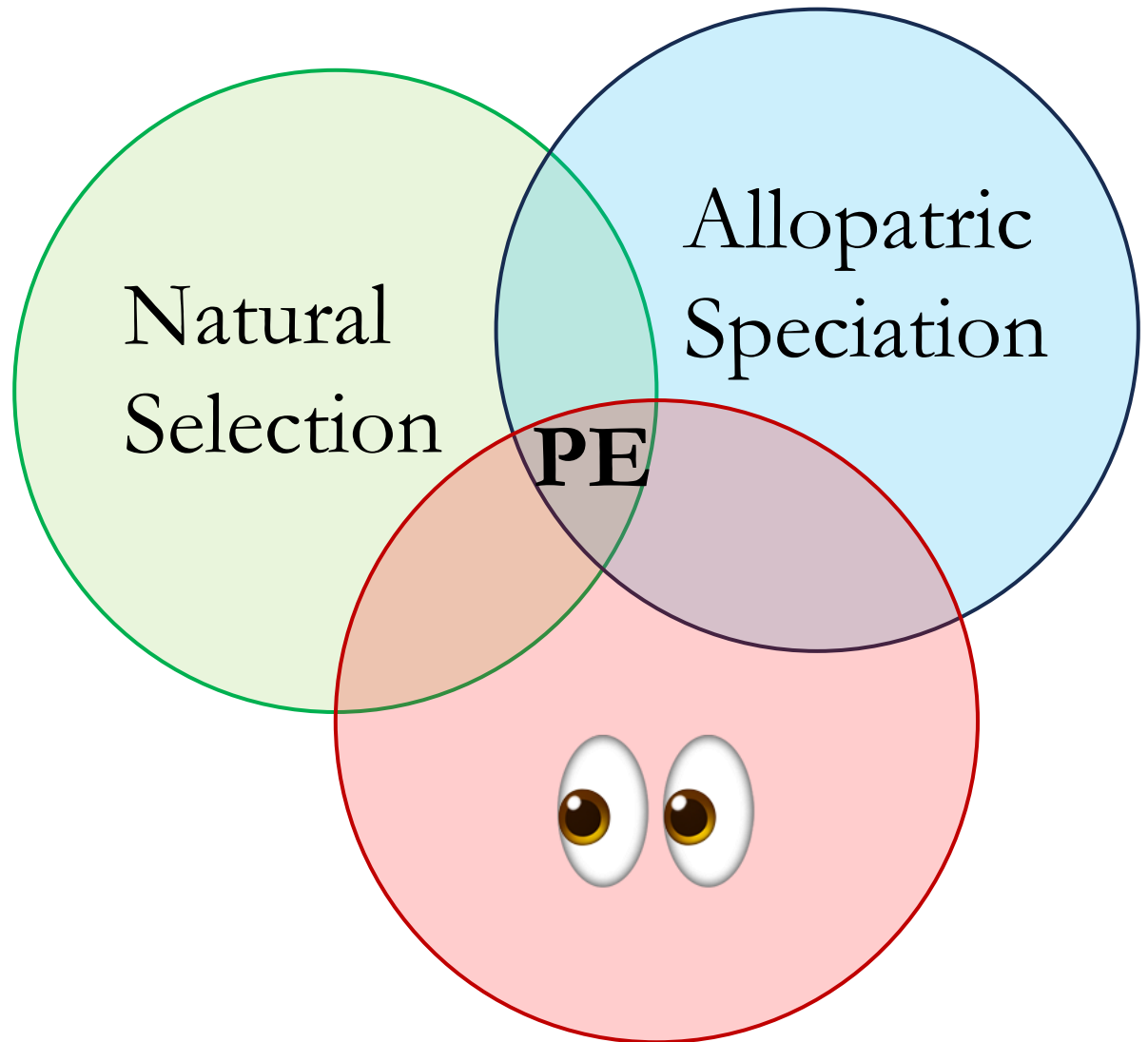


(C) Grazing and hypsodonty



Punctuated Equilibria (PE)

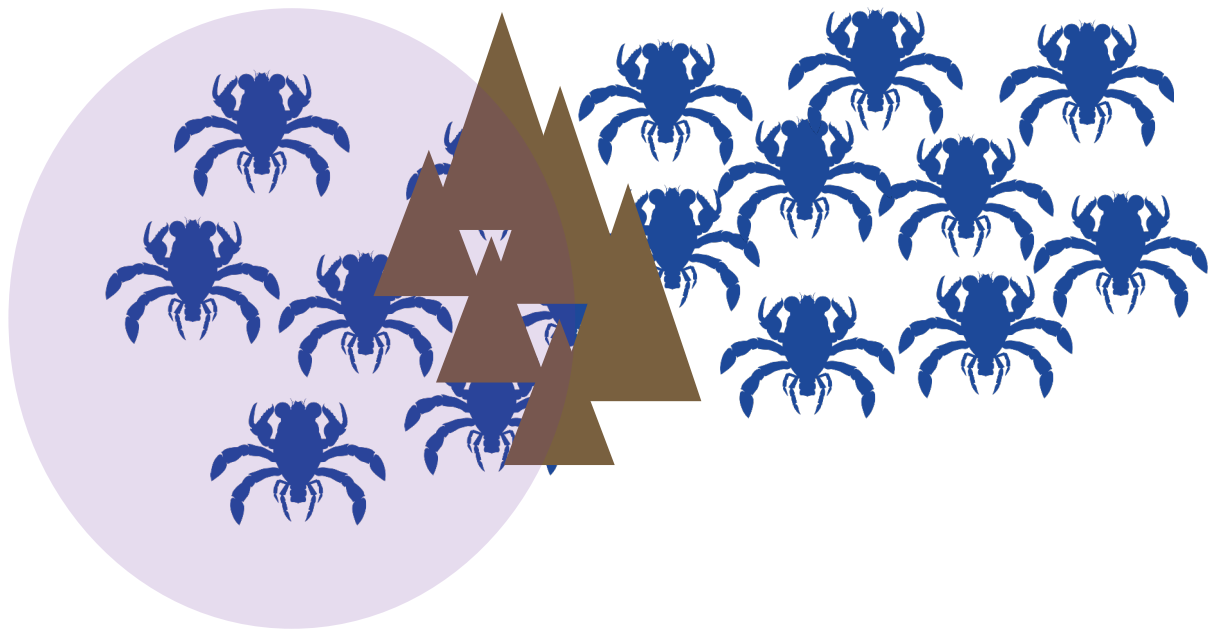
1970s by Eldredge
and Gould



Time

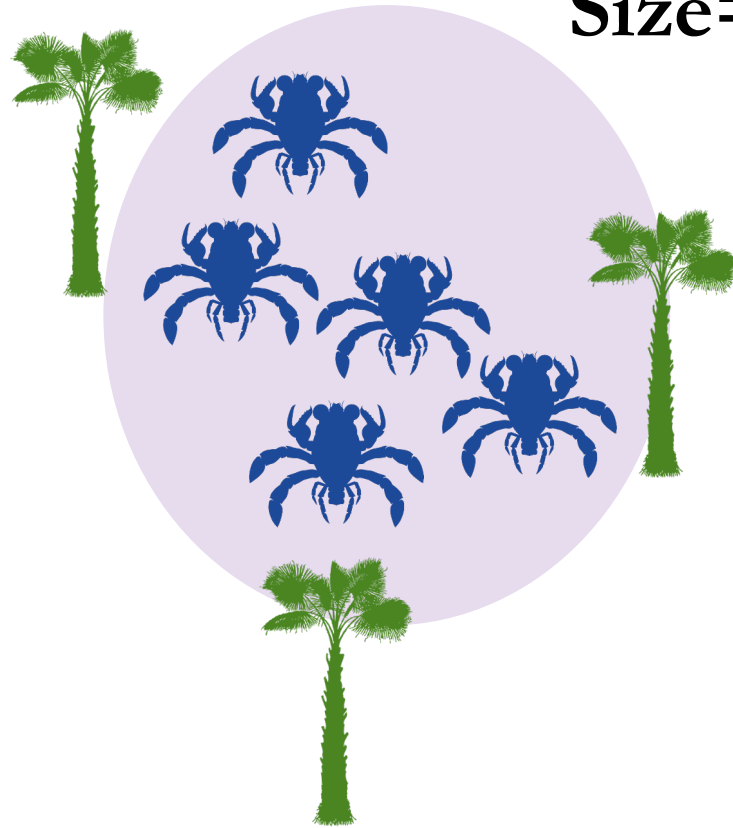


Time

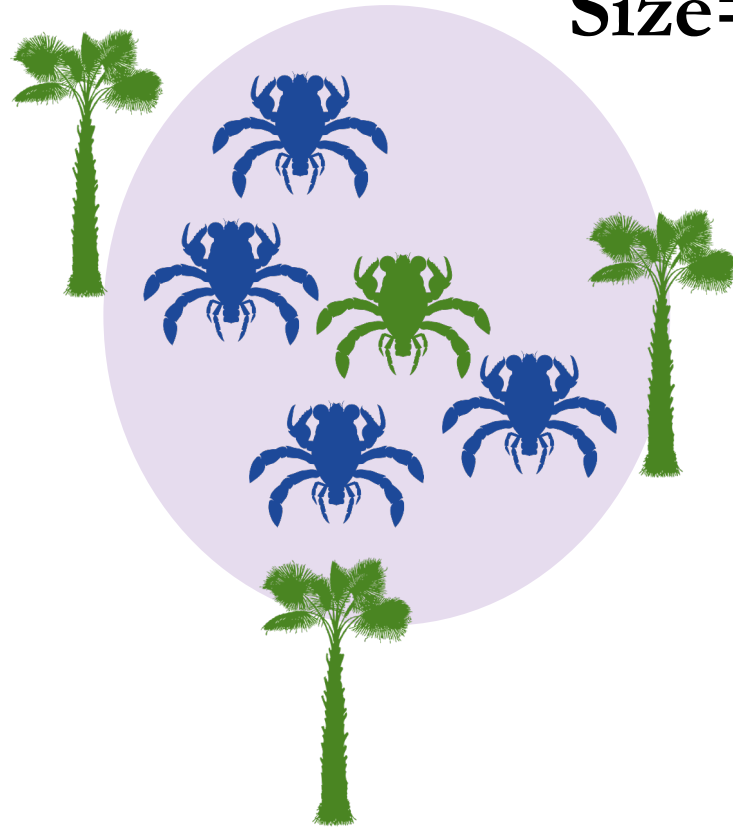


Time

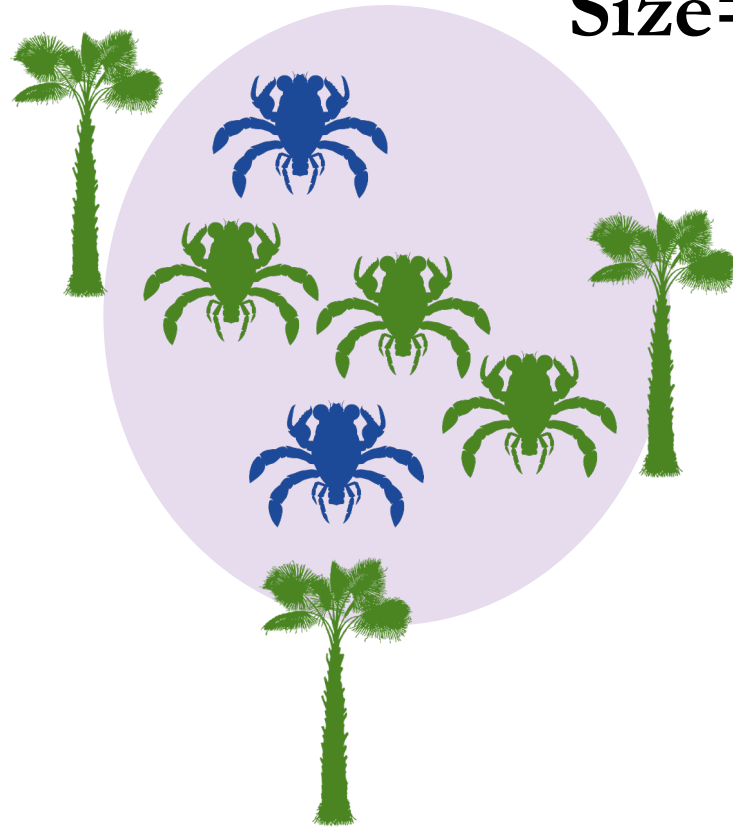
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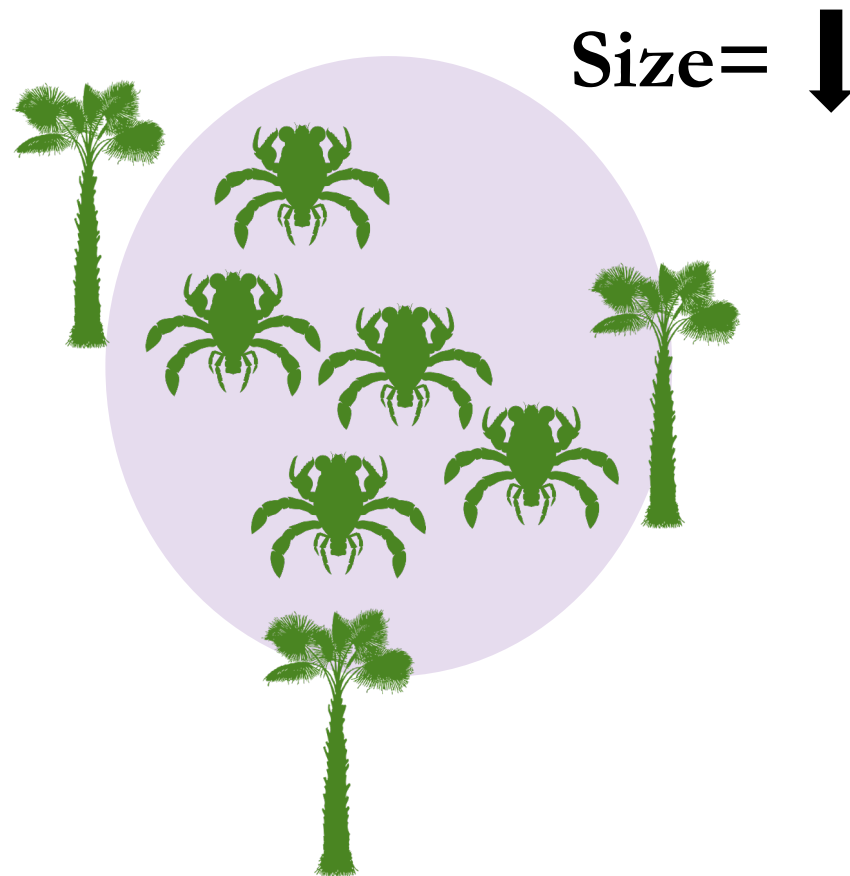


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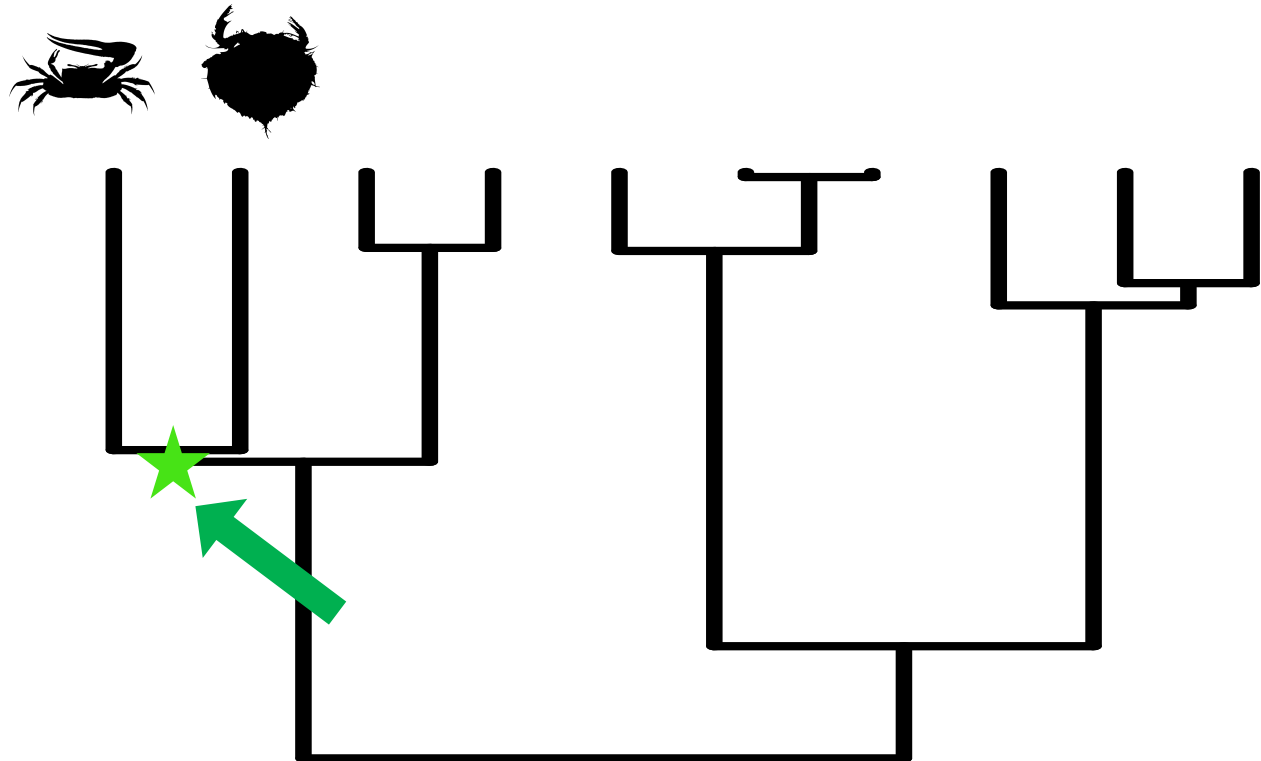
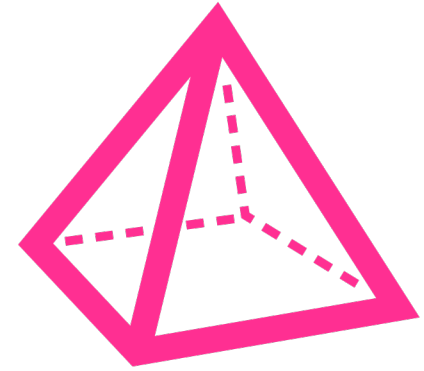


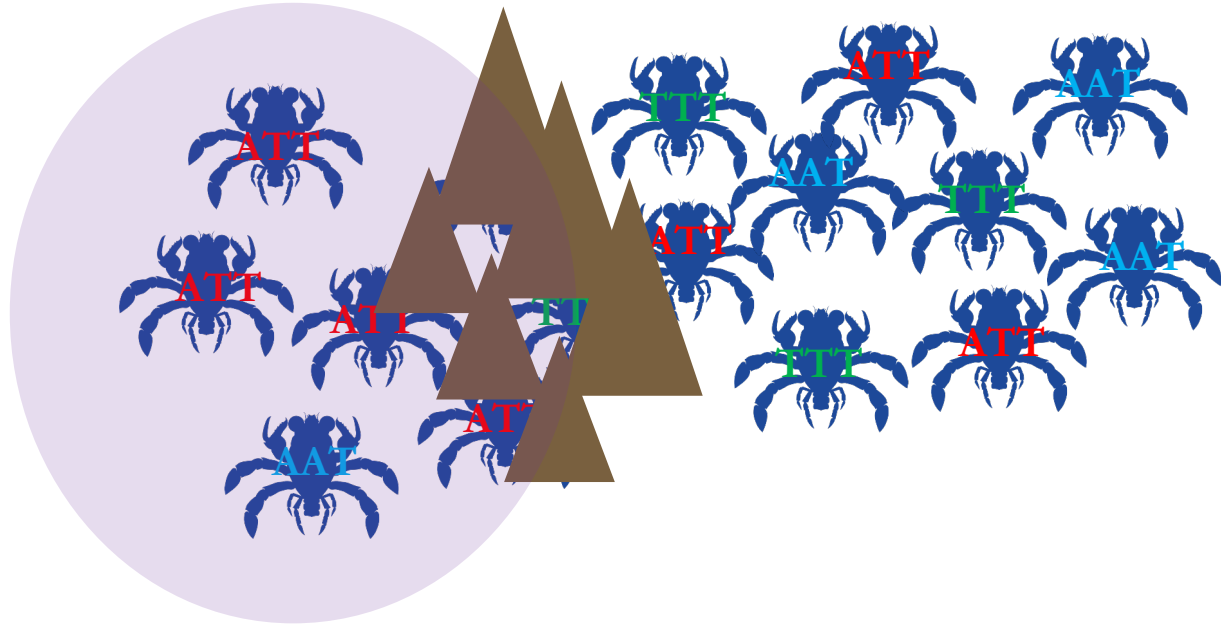
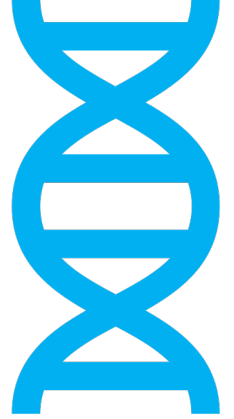


Punctuated Equilibrium

1970s by Eldredge
and Gould

The **predominant**
pattern of
evolution
throughout deep
time is that of stasis
'punctuated' by brief
intervals of rapid
evolution, which
often occurred
during speciation
events





Punctuated Equilibrium

Review

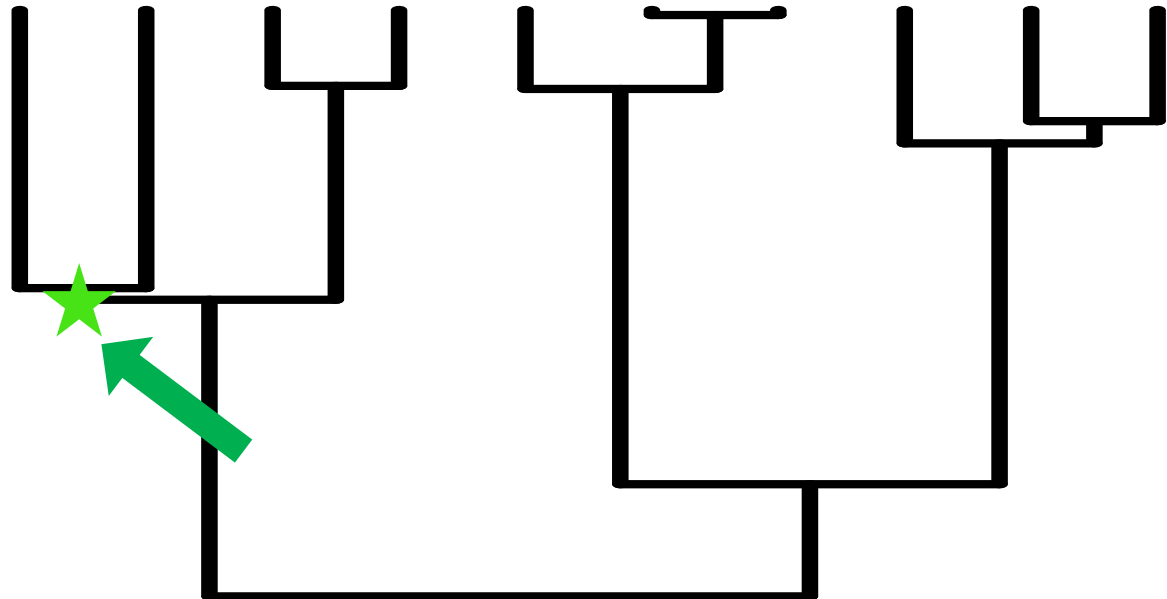
Cell
PRESS

Feature Review

Is there room for punctuated equilibrium in macroevolution?

Matthew W. Pennell, Luke J. Harmon, and Josef C. Uyeda

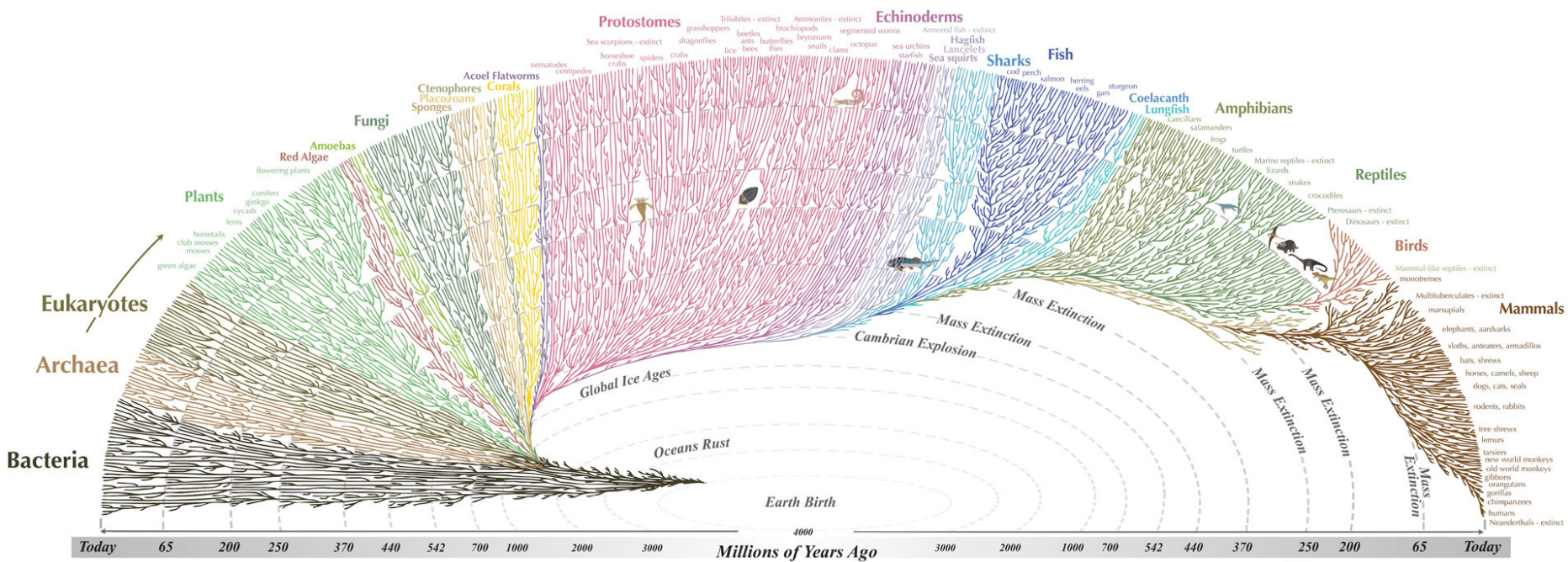
Department of Biological Sciences and Institute for Bioinformatics and Evolutionary Studies, University of Idaho, Moscow, ID 83844, USA



Time

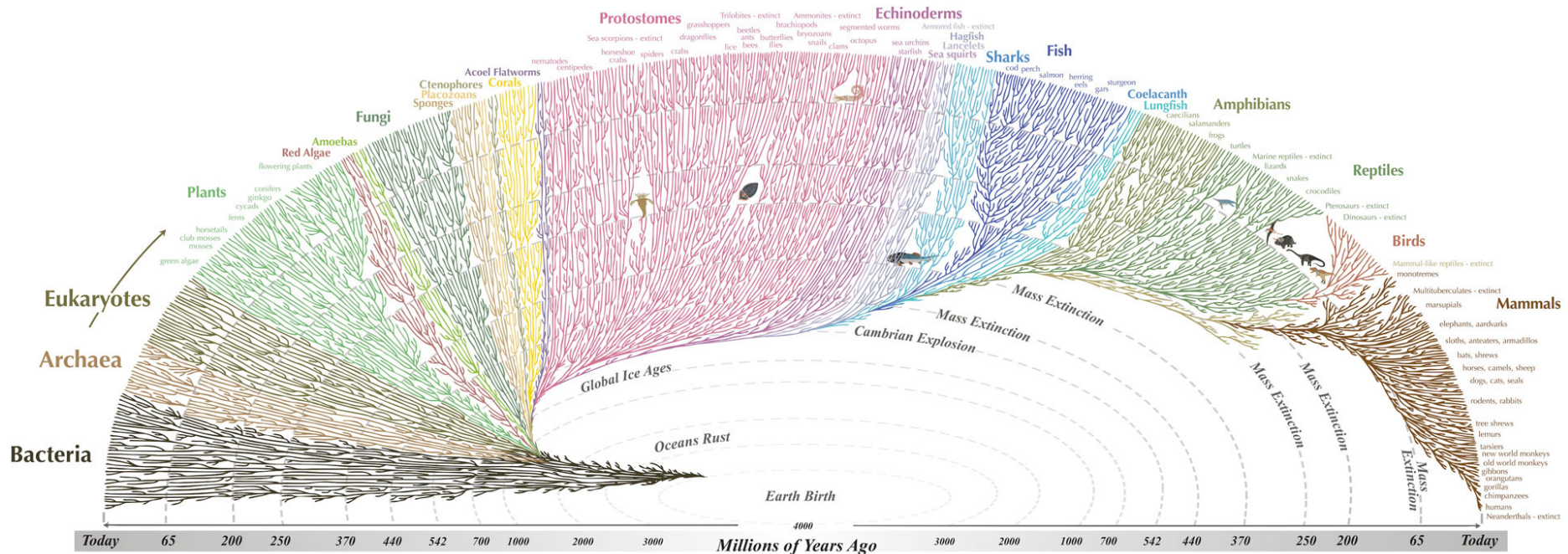


Time



All the major and many of the minor living branches of life are shown on this diagram, but only a few of those that have gone extinct are shown. Example: Dinosaurs - extinct 

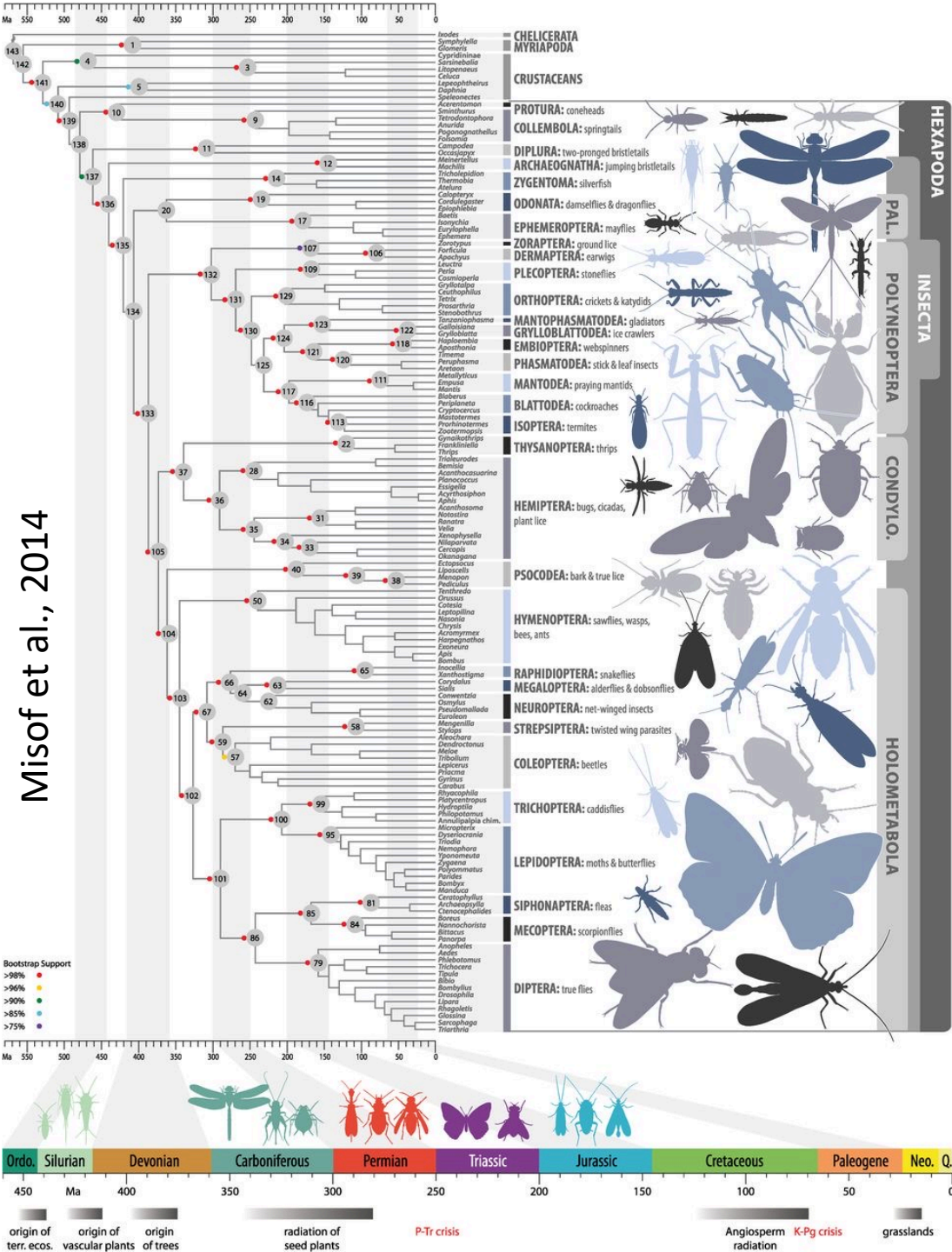
La diversidad actual no es producto de un único mecanismo evolutivo, ni es gradual ni silenciosa (Gould, 1989; Foote, 1997)

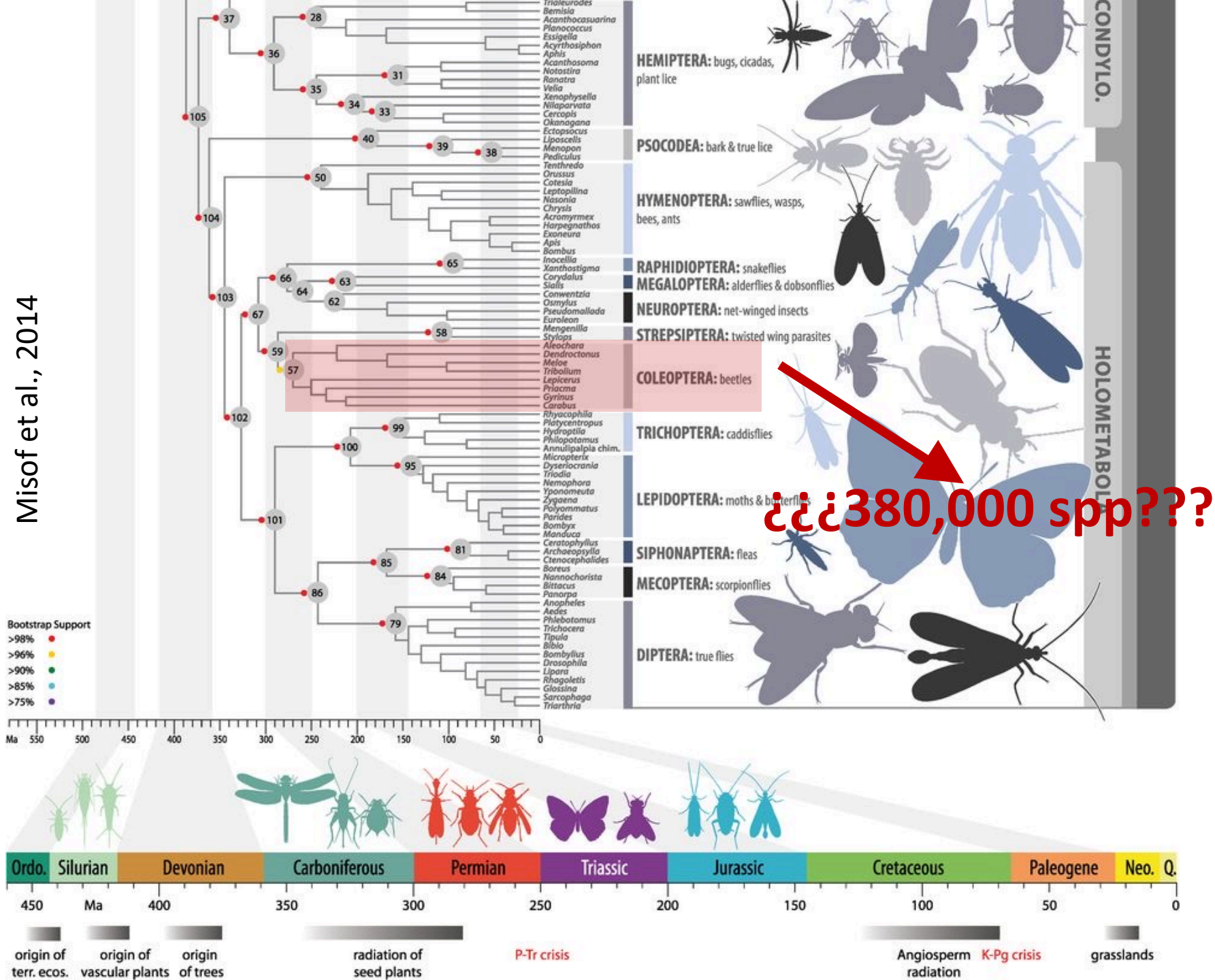


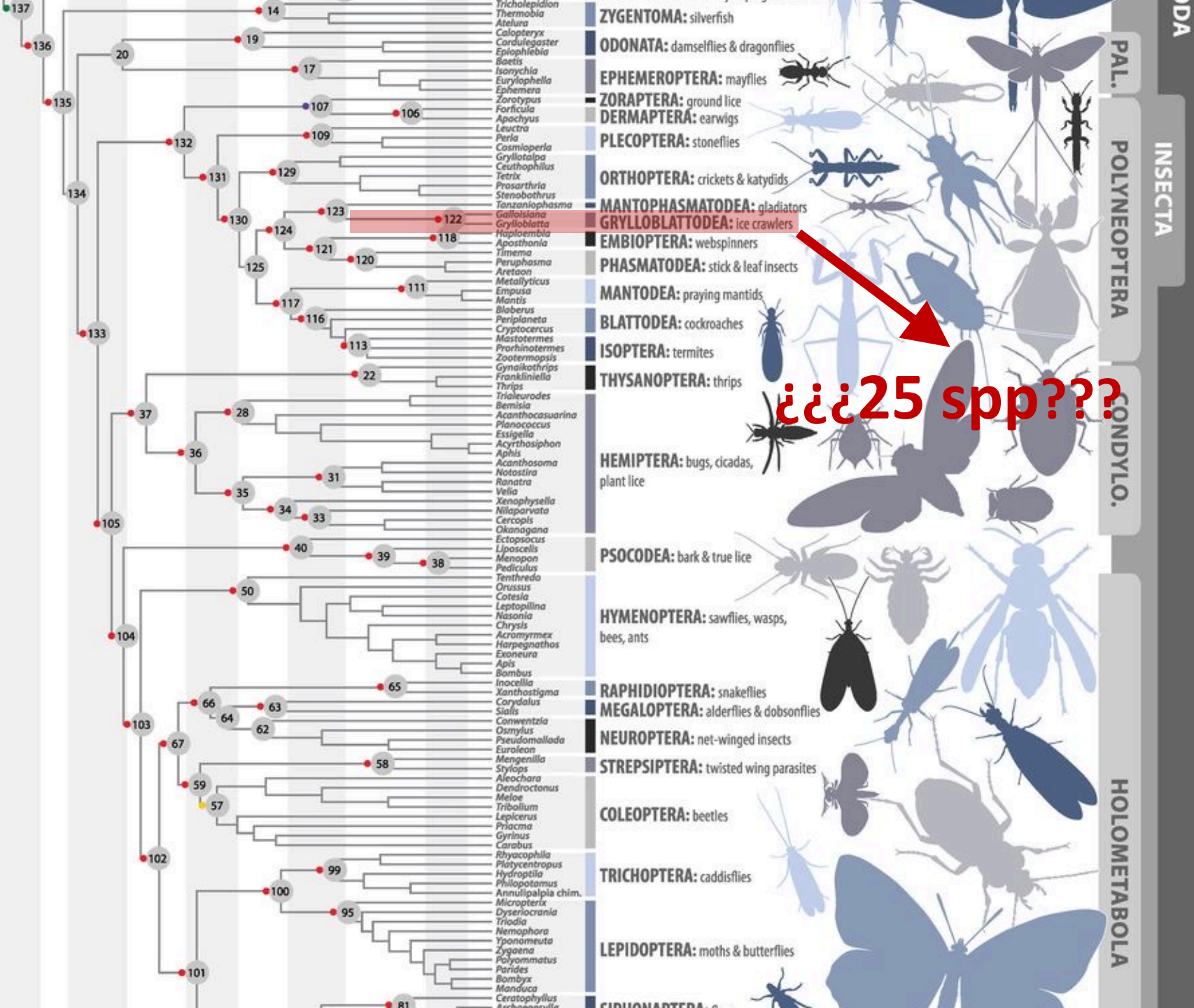
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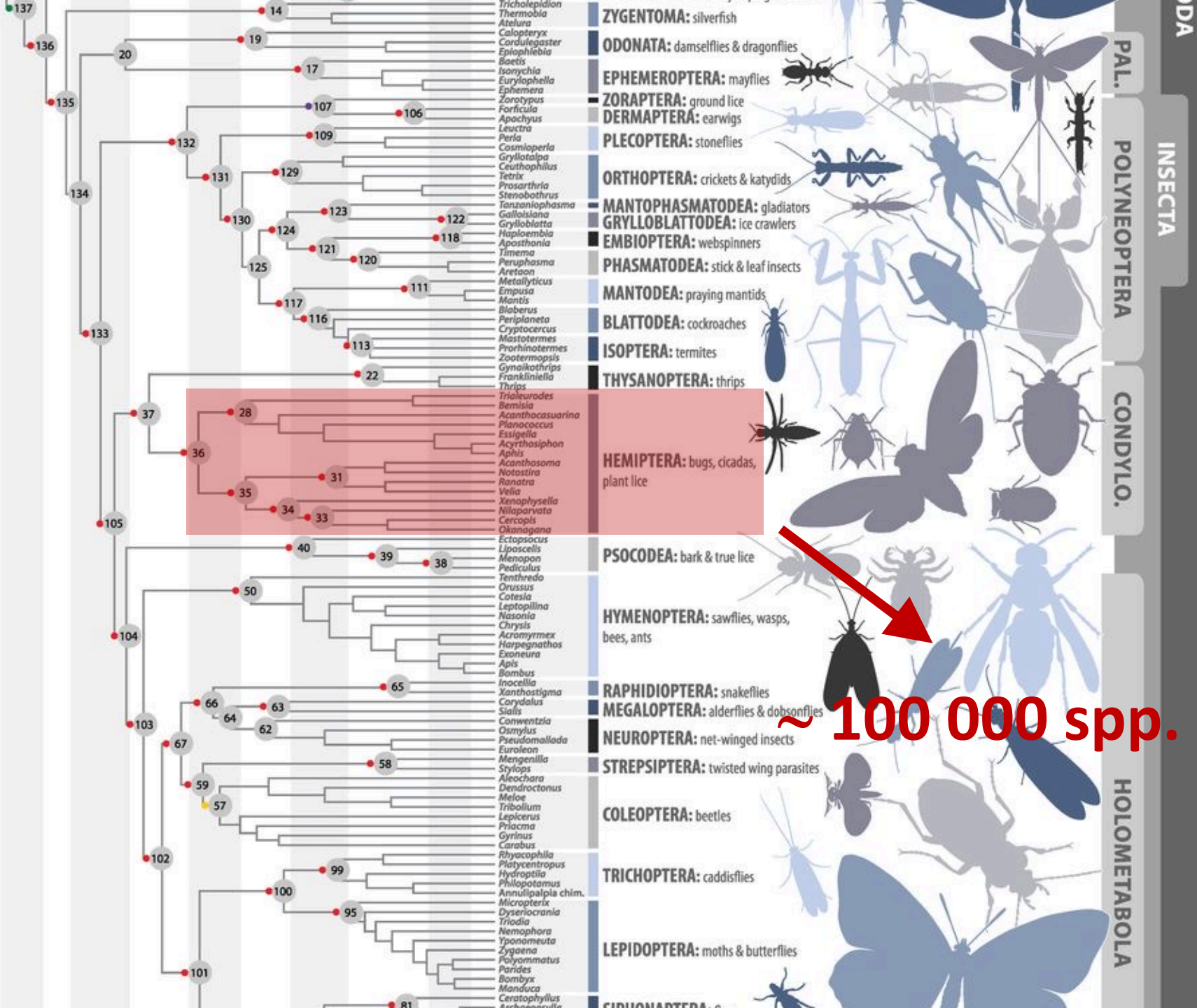
Misof et al., 2014

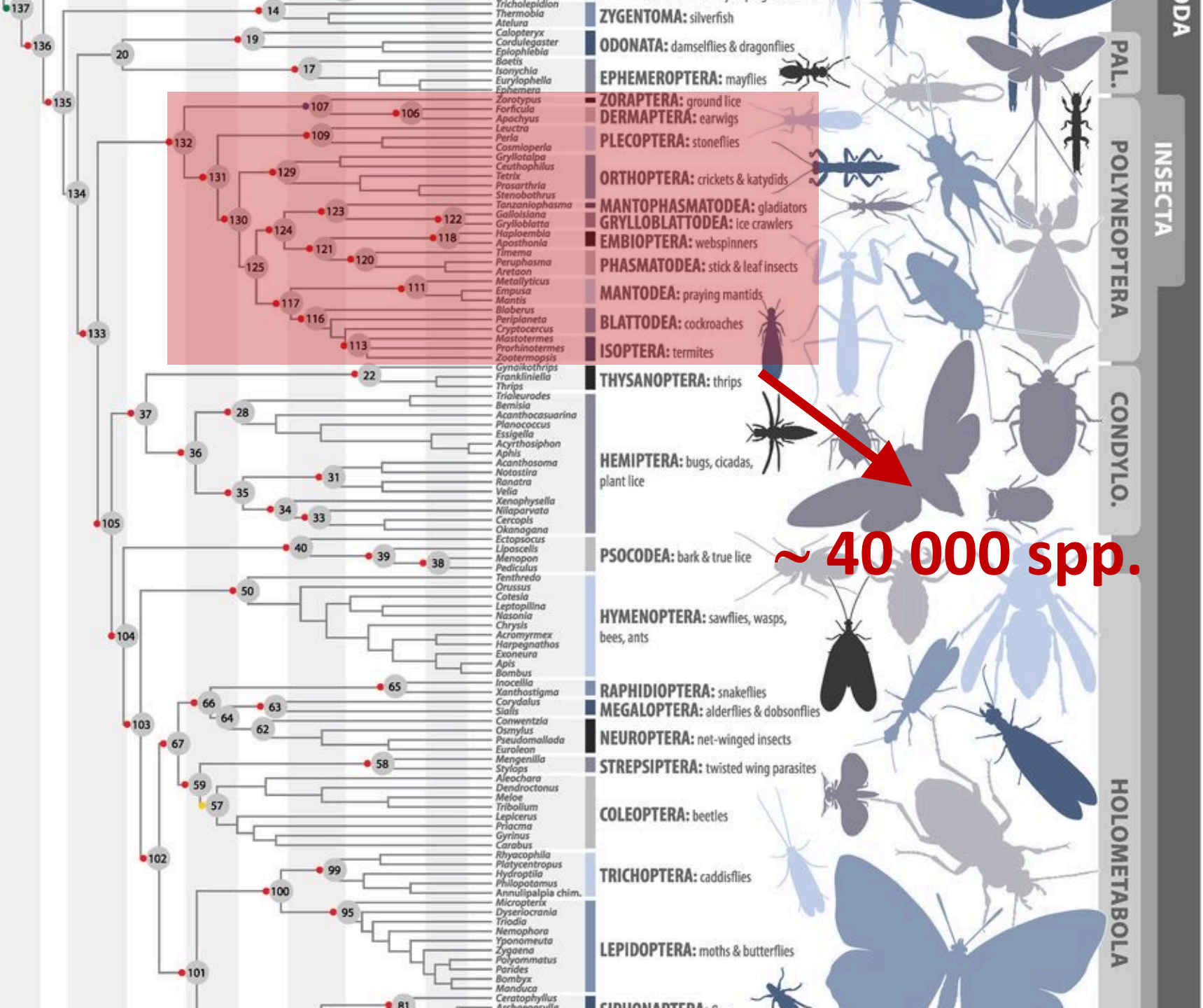
The figure displays a comprehensive phylogenetic tree of insects and other arthropods, rooted at the top left. The tree is color-coded by geological time, with a vertical axis on the left labeled 'Ma' (millions of years ago) ranging from 550 to 0. The tree branches out to show the relationships between various insect groups, with bootstrap support values indicated at the nodes. To the right of the tree, a list of insect orders and their corresponding silhouettes is provided, including: CHELICERATA, MYRIAPODA, CRUSTACEANS, PROTURA (coneheads), COLLEMBOLA (springtails), DIPLURA (two-pronged bristletails), ARCHAEOGNATHA (jumping bristletails), ZYGENTOMATA (silverfish), ODNATA (damselflies & dragonflies), EPHEMEROPTERA (mayflies), ZORAPTERA (ground lice), DERMAPTERA (earwigs), PLECOPTERA (stoneliess), ORTHOPTERA (crickets & katydids), MANTOPHASMATODEA (gladiators), GRYLLOBLATODEA (ice crawlers), EMBIOPTERA (web-spinners), PHASMATODEA (stick & leaf insects), MANTODEA (praying mantids), BLATTODEA (cockroaches), ISOPTERA (termites), THYSANOPTERA (thrips), HEMIPTERA (bugs, cicadas, plant lice), PSOCODEA (bark & true lice), HYMENOPTERA (sawflies, wasps, bees, ants), RAPHIIDOPTERA (snakelies), MEGALOPTERA (aldersies & dobsonflies), NEUROPTERA (net-winged insects), STREPSIPTERA (twisted wing parasites), COLEOPTERA (beetles), TRICHOPTERA (caddisflies), LEPIDOPTERA (moths & butterflies), SIPHONAPTERA (fleas), MECOPTERA (scorpionflies), and DIPTERA (true flies). The tree is also annotated with key evolutionary events, such as the origin of insects, the origin of vascular plants, the origin of seed plants, the P-Tr crisis, the Angiosperm radiation, the K-Pg crisis, and the origin of grasslands. The tree is rooted at the top left, with the root node labeled '1'. The tree is color-coded by geological time, with a vertical axis on the left labeled 'Ma' (millions of years ago) ranging from 550 to 0. The tree branches out to show the relationships between various insect groups, with bootstrap support values indicated at the nodes. To the right of the tree, a list of insect orders and their corresponding silhouettes is provided, including: CHELICERATA, MYRIAPODA, CRUSTACEANS, PROTURA (coneheads), COLLEMBOLA (springtails), DIPLURA (two-pronged bristletails), ARCHAEOGNATHA (jumping bristletails), ZYGENTOMATA (silverfish), ODNATA (damselflies & dragonflies), EPHEMEROPTERA (mayflies), ZORAPTERA (ground lice), DERMAPTERA (earwigs), PLECOPTERA (stoneliess), ORTHOPTERA (crickets & katydids), MANTOPHASMATODEA (gladiators), GRYLLOBLATODEA (ice crawlers), EMBIOPTERA (web-spinners), PHASMATODEA (stick & leaf insects), MANTODEA (praying mantids), BLATTODEA (cockroaches), ISOPTERA (termites), THYSANOPTERA (thrips), HEMIPTERA (bugs, cicadas, plant lice), PSOCODEA (bark & true lice), HYMENOPTERA (sawflies, wasps, bees, ants), RAPHIIDOPTERA (snakelies), MEGALOPTERA (aldersies & dobsonflies), NEUROPTERA (net-winged insects), STREPSIPTERA (twisted wing parasites), COLEOPTERA (beetles), TRICHOPTERA (caddisflies), LEPIDOPTERA (moths & butterflies), SIPHONAPTERA (fleas), MECOPTERA (scorpionflies), and DIPTERA (true flies). The tree is also annotated with key evolutionary events, such as the origin of insects, the origin of vascular plants, the origin of seed plants, the P-Tr crisis, the Angiosperm radiation, the K-Pg crisis, and the origin of grasslands.



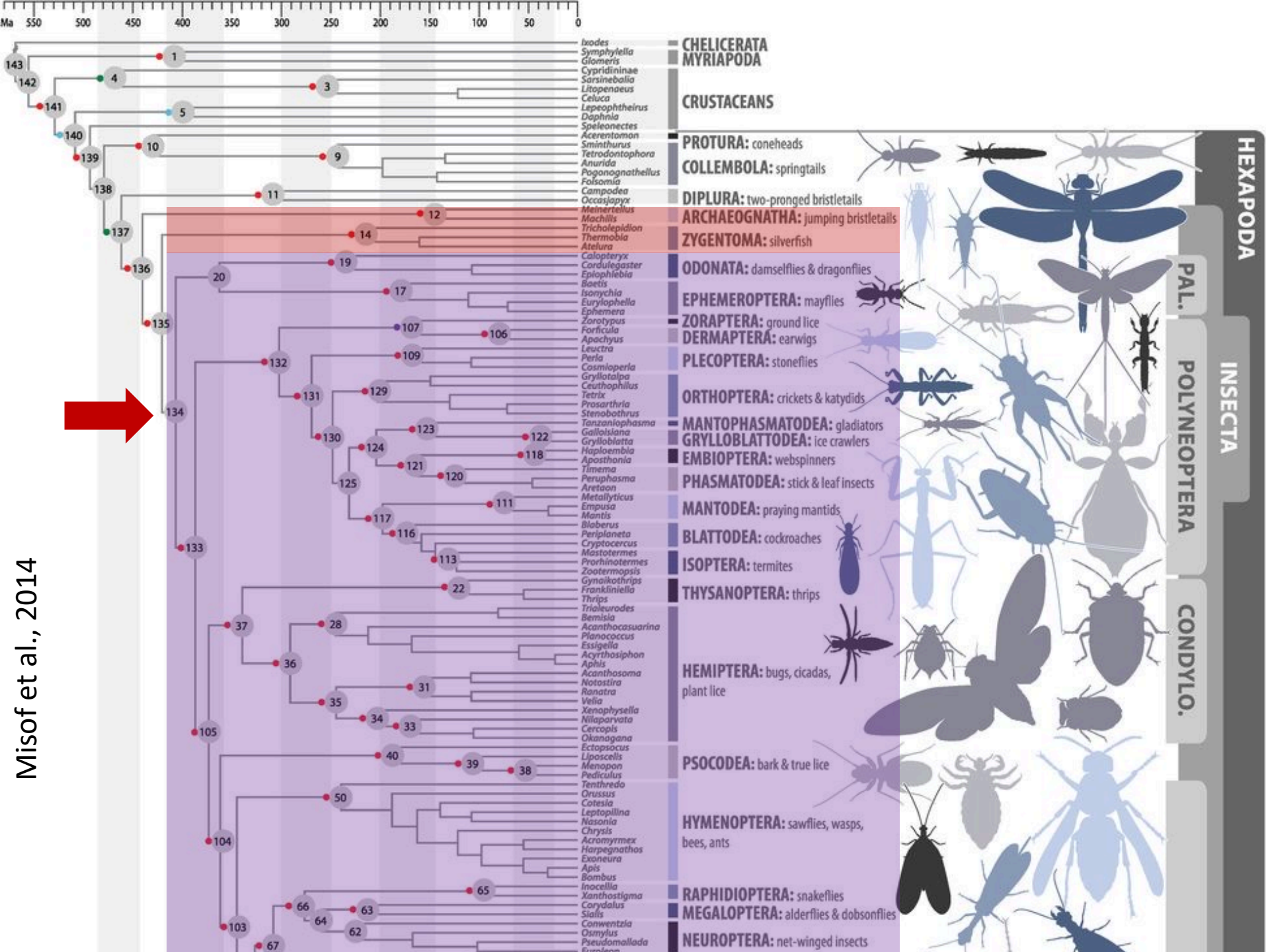


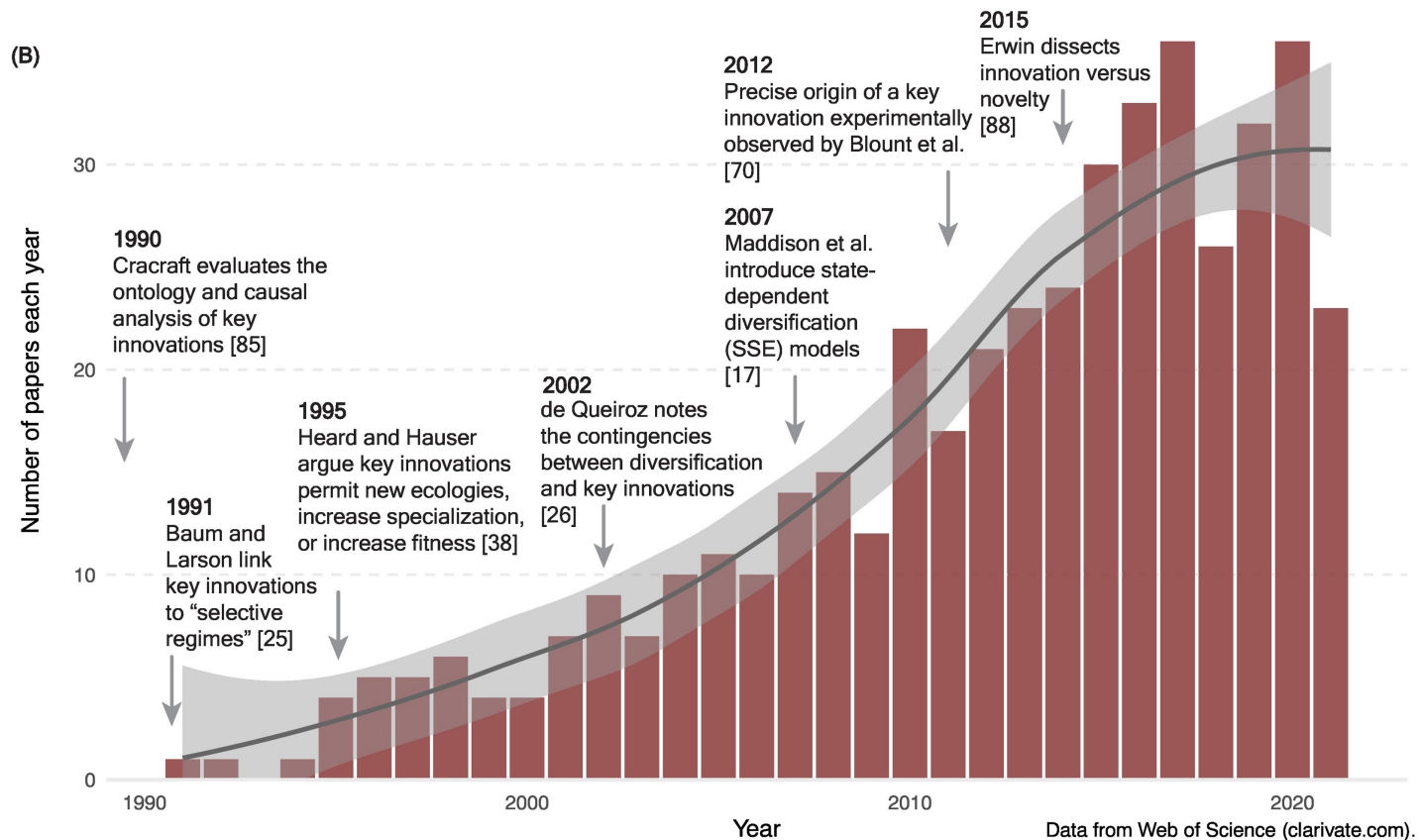
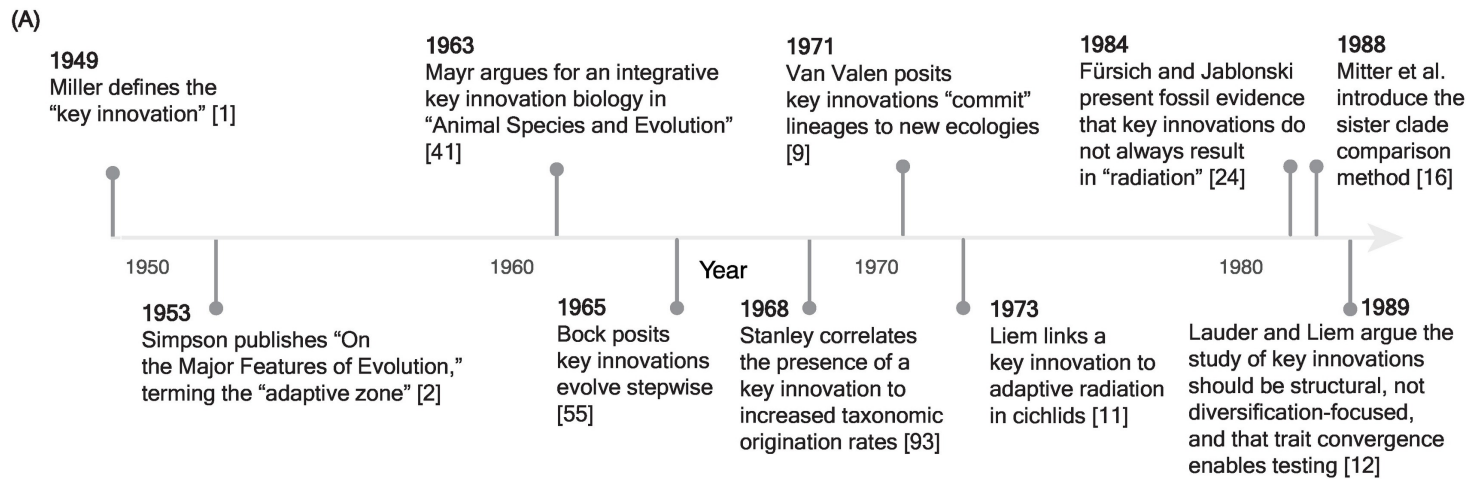


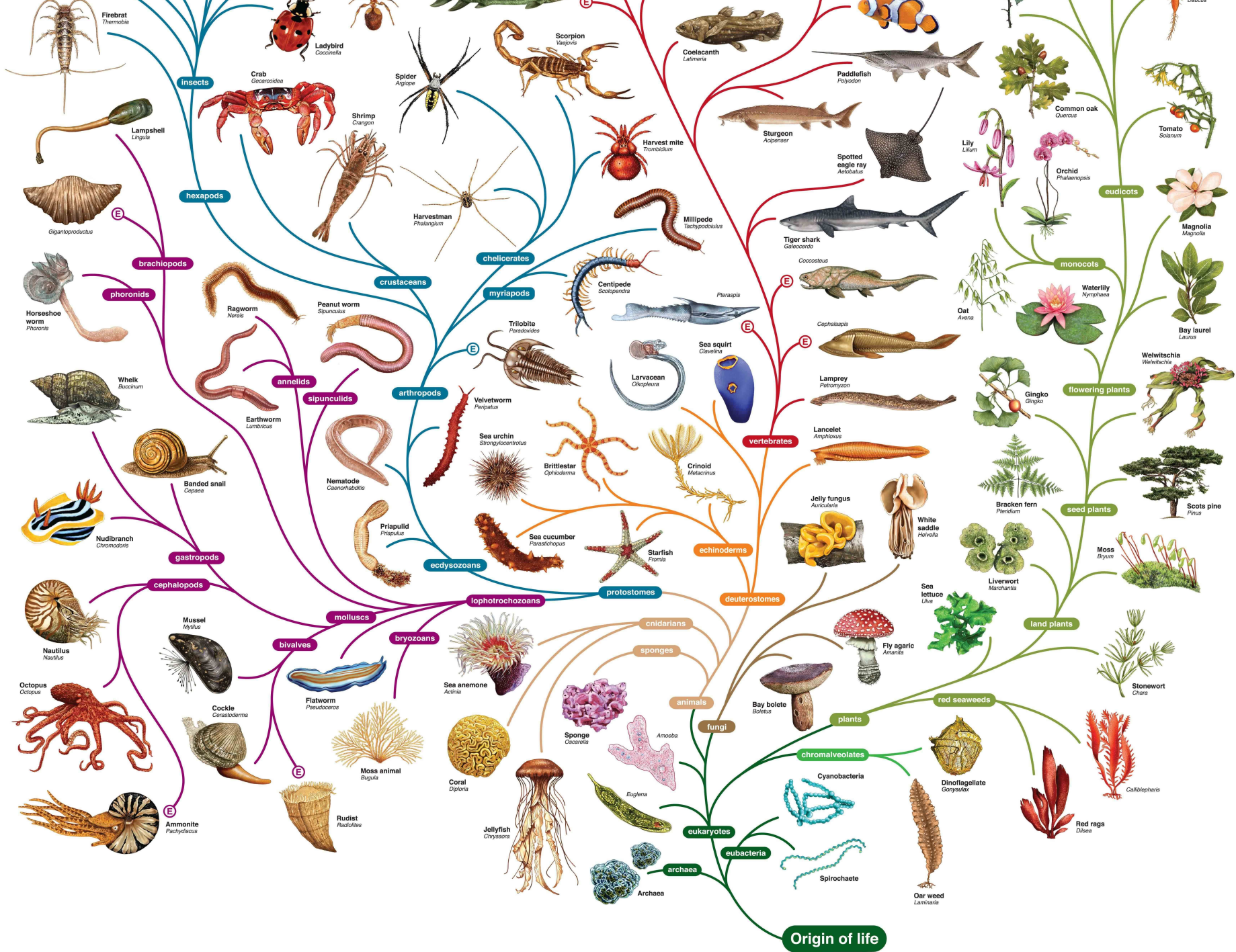


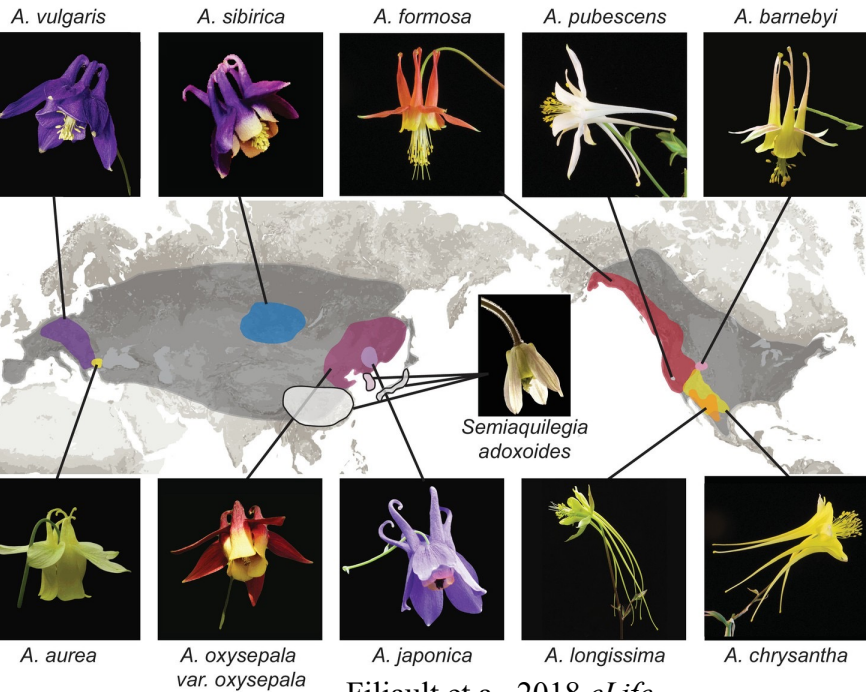
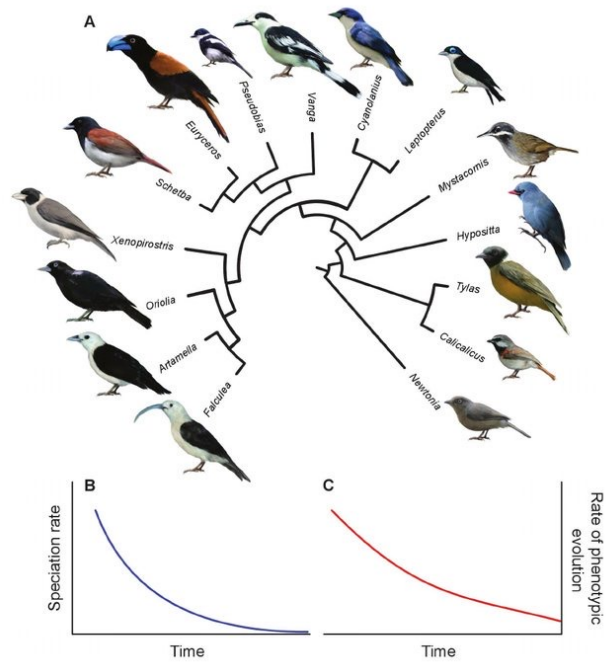
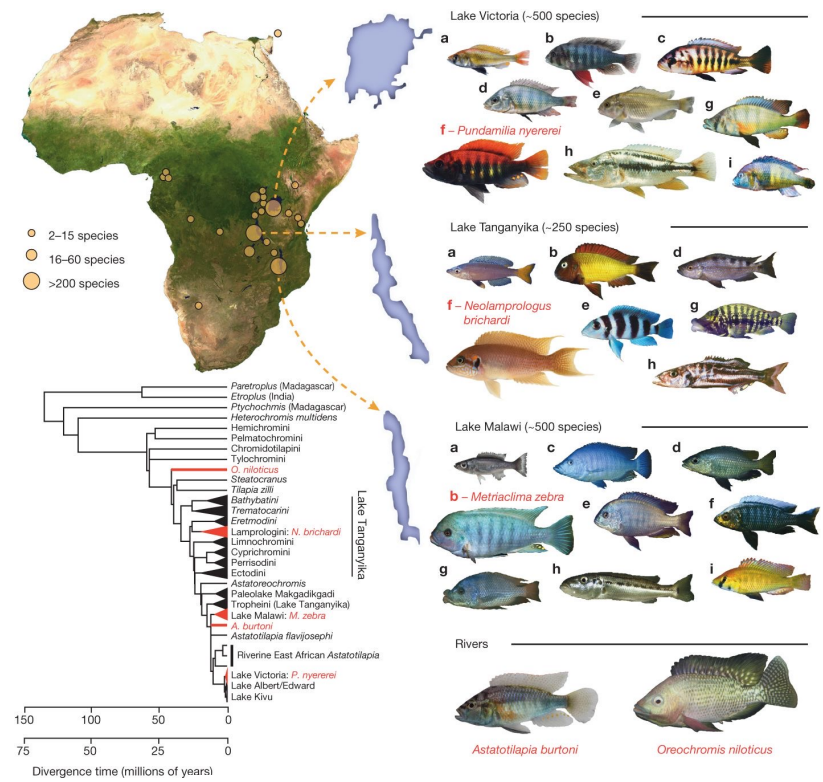
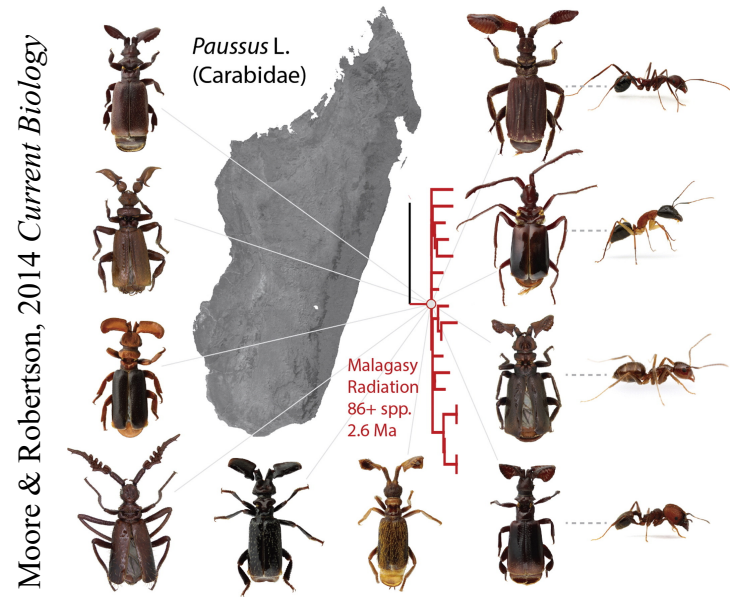


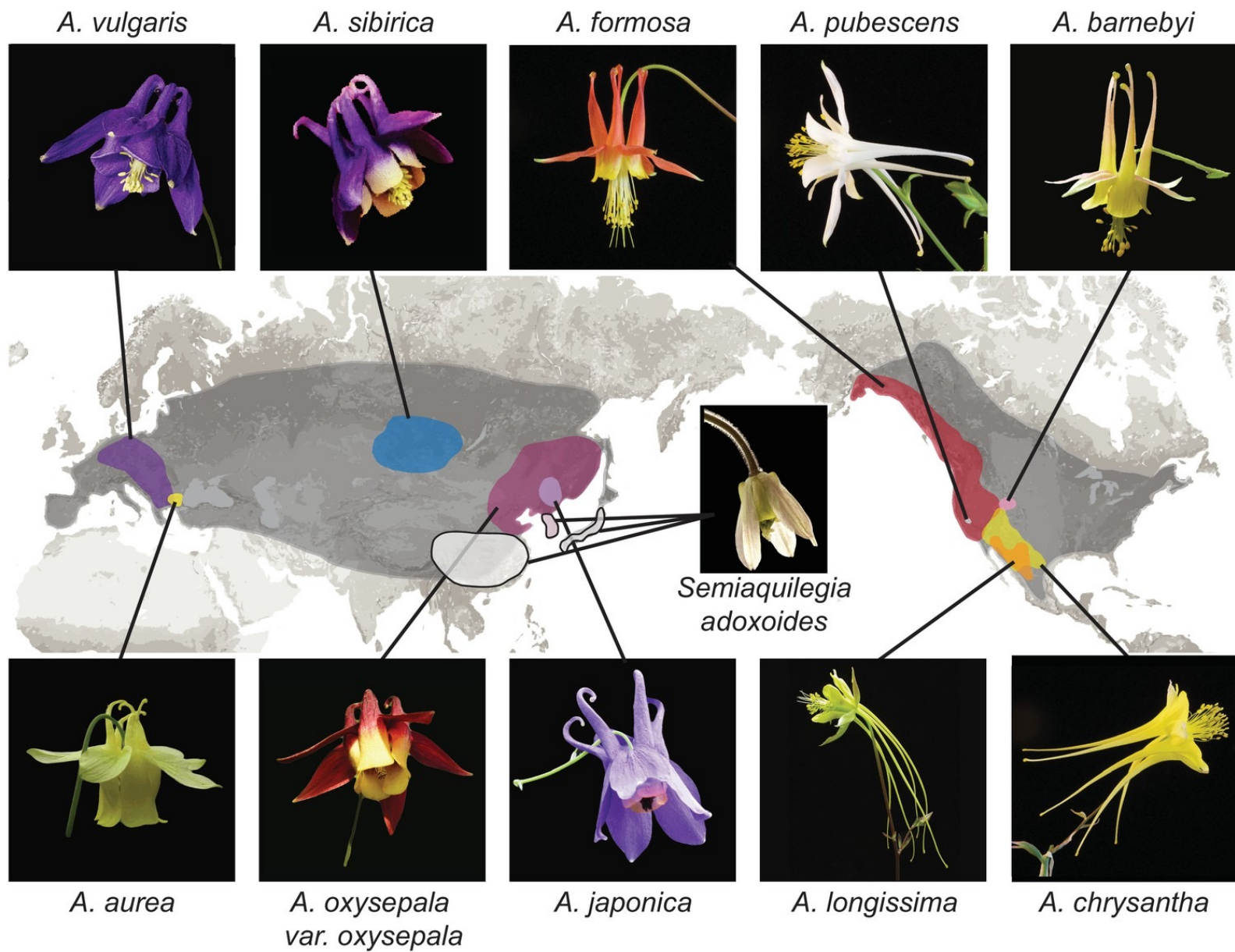
Misof et al., 2014





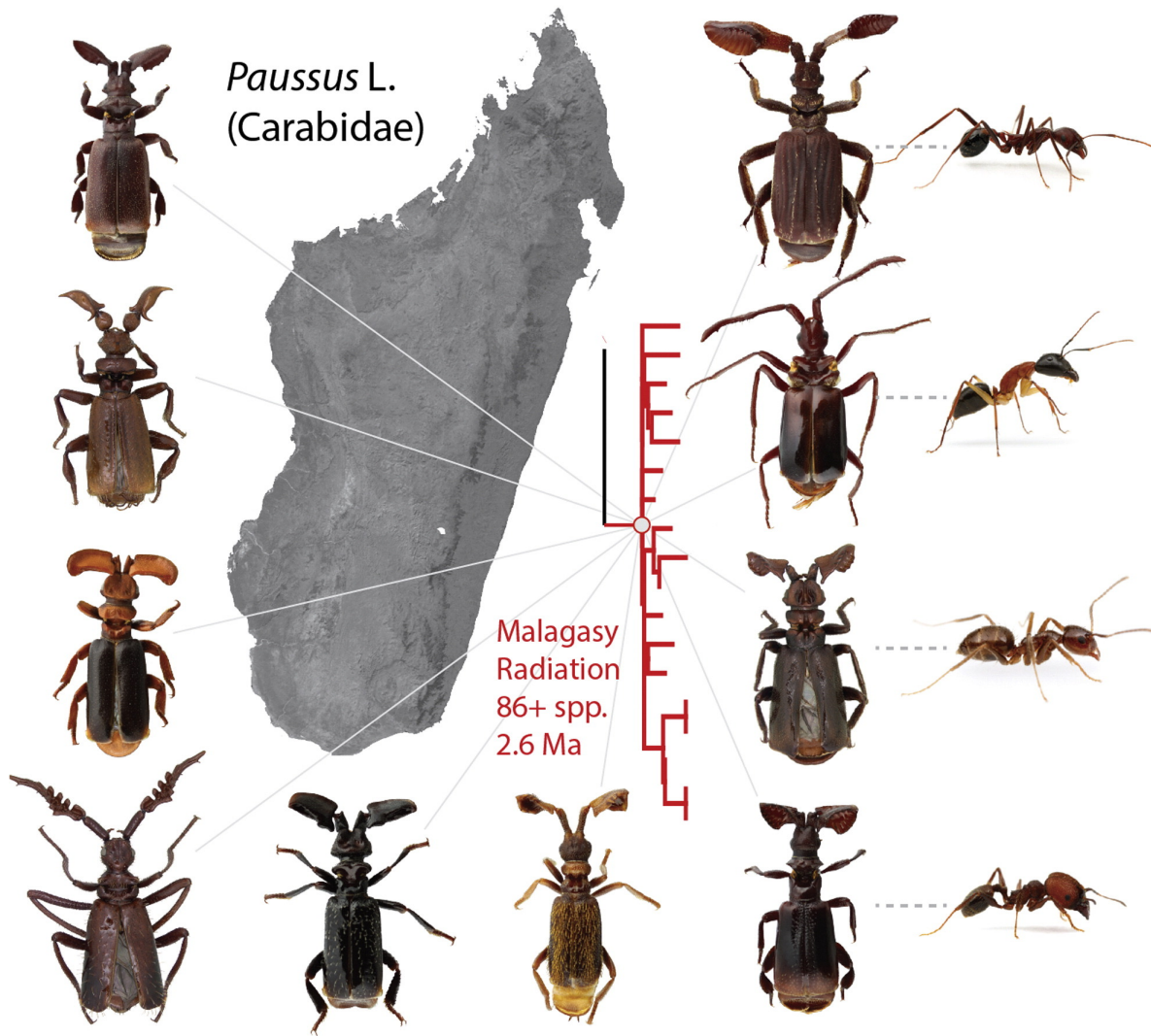


Filiault et a., 2018 *eLife*Brawand et al., 2014 *Nature*Moore & Robertson, 2014 *Current Biology*



Explosive Adaptive Radiation and Extreme Phenotypic Diversity within Ant-Nest Beetles

Moore & Robertson, 2014 *Current Biology*



Evolutionary significance of the variation in acoustic communication of a cryptic nocturnal primate radiation (*Microcebus* spp.)

Hasiniaina A.F. Et al., 2020; *Ecology and Evolution*

