Biodiversity Collection

Different Vision……..Different Future

Somsak Panha

BioD5 Plus

11st July 2018 Diamond Plaza Hotel, Surat-thani

Brazilian alien worm *Pontoscolex corethurus* (MÜLLER, 1857) at TAI ROMYEN NP, 9 July 18

Bandon Bay, Chaiya district

10 July 18

Nanosesarma pontianacense

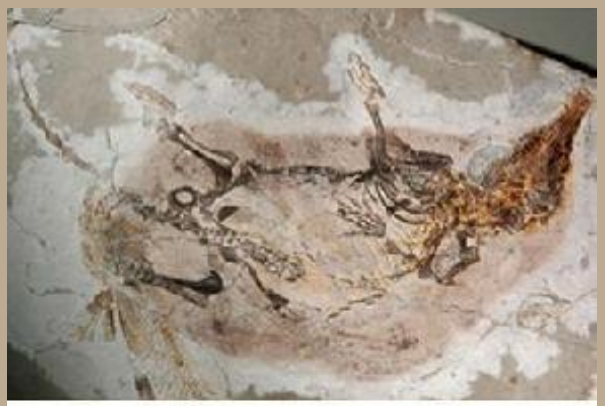
(De Man, 1895)

Scientists discover 'alien' insect in amber from 100 million years ago

Fossils


Annelid worm tubes Gitonia coralliphili in Heliophyllum sp.
Jeffersonville Limestone, Mid. Dev.
Charlestown, Clark Co., IN
1 cm
(c) Alan Goldstein - www.kyanageo.org


http://palaeo.gly.bris.ac.uk

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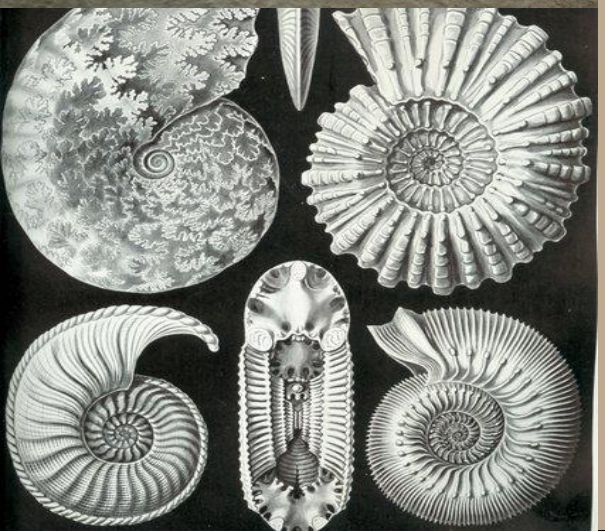



http://images.google.co.th/


http://www.treasure-hunting-team.com

The frozen ask

Why collections matter ?

- Our ability to understand the natural world depends on the collection, preservation, and ongoing study of natural history specimens. These collections are the physical record of Earth's life forms and processes.
- The study of natural science collections allows us to forecast the future of the planet – information that profoundly affects our lives.

Collections and their Impact……..

Economy and trade:

- Many regulatory decisions made by governments are supported by research that depends on scientific collections, including natural history collections. These decisions can have a major impact on foreign and domestic trade.

Changes over time:

- Worldwide, museums, universities, and other institutions have been amassing collections since the 17th Century. By analyzing specimens collected at different points in time, researchers can reconstruct important historical changes. Collections offer scientists a window on the past.

Environmental Quality:

- Collections document the condition of soil, air, and water, help track pollution, and enable us to model future environmental changes so they can be better managed.

Food and agriculture:

- Scientific collections of agricultural pests and other threats to food safety and security are used routinely for border inspection, consumer protection, and control measures.

Public Health and Safety:

- Whether they are used to track down the cause of a deadly new epidemic or to learn important lessons from an ancient one, collections are pivotal resources in the fight to save lives and to improve the health and safety of people around the world.

Collections and their Impact……

National Security:

- Research on collections is a critical part of developing strategies for defending agriculture and food against terrorist attacks, major disasters, and other emergencies.

Invasive Species:

- The easy movement of trade goods through ports is vital to the global economy. At the same time, invasive species that stow away with these goods can threaten our crops, ecosystems, and animal and human health. In the United States there are estimated to be over 50,000 invasive species; collectively, they cause nearly $120 billion worth of environmental damage and loss per year and can spread infectious diseases to animal and human populations.

Scientific Treasures:

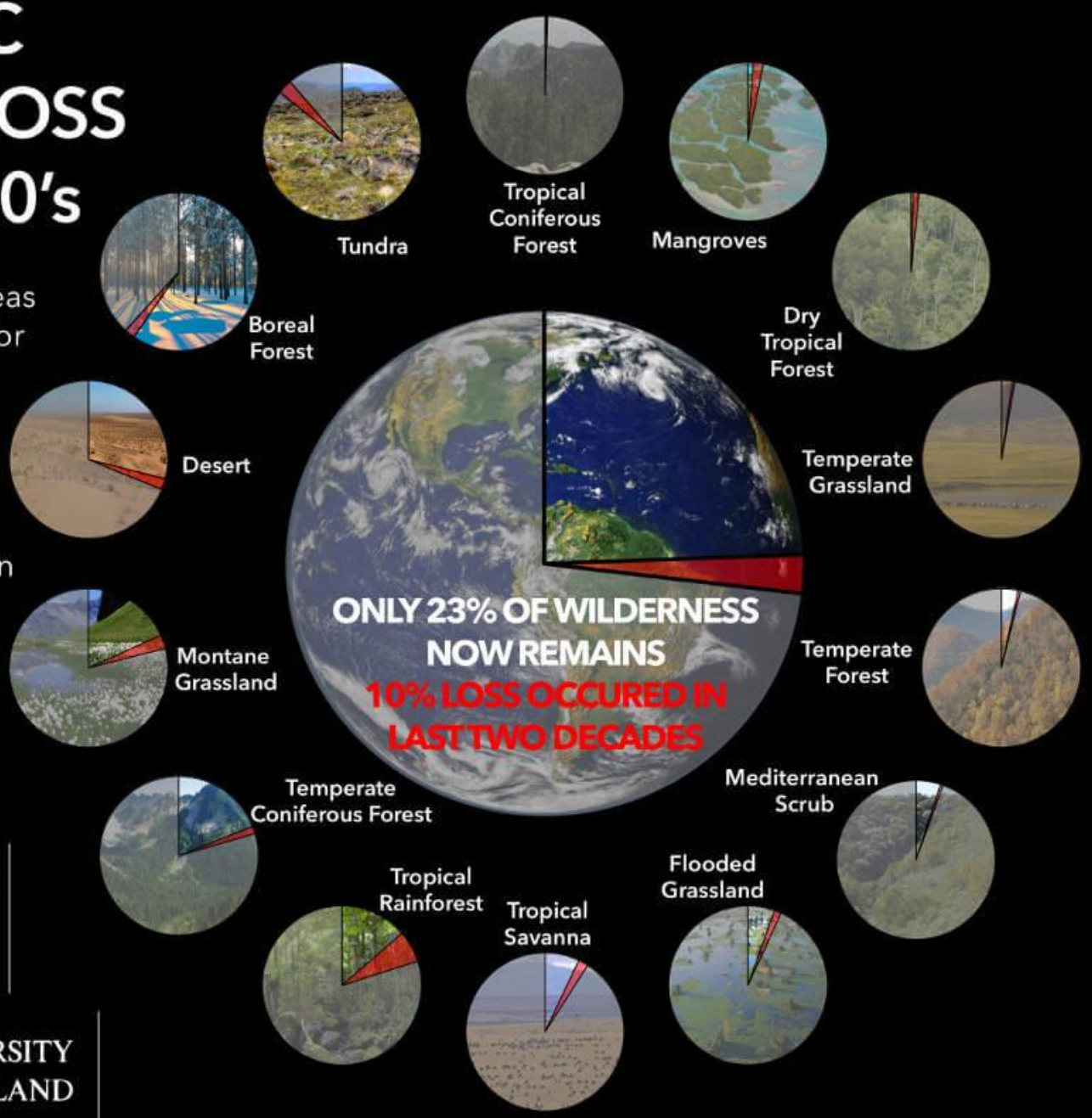
- Many scientific collections contain unique objects that cannot be collected again easily – or at all, in some cases. They are priceless.

Unanticipated Uses / New data:

- Collections of objects often serve us in ways that could not have been imagined at the time when they were made. Sometimes these unanticipated uses can help solve today's most pressing scientific problems. Likewise, years, even decades from now, new analytical techniques will allow researchers to use the same specimens to answer new questions.

CATASTROPHIC WILDERNESS LOSS SINCE THE 1990's

Globally important wilderness areas are strongholds for biodiversity, for regulating local climates, and for supporting the world's most politically and economically marginalized communities. They are disappearing rapidly, with an area twice the size of Alaska lost in two decades. Only 23% of the Earth's land surface contains now contains wilderness and some biomes have almost none left.



www.greenfirescience.com

WCS

UNBC

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

Watson et al., Catastrophic Declines in Wilderness Areas Undermine Global Environment Targets, Current Biology (2016), http://dx.doi.org/10.1016/j.cub.2016.08.049


SAGE 2017
THIRD INTERNATIONAL CONFERENCE ON
SOUTHEAST ASIAN GATEWAY EVOLUTION
August 28th - September 1st 2017, Bogor, Indonesia
SAGE
LIPI
museum für
naturkunde
berlin
PENSOFT
Embassy of the
Federal Republic of Germany
Jakarta

OCTOPI WALL STREET

Invertebrates are 97% of animal diversity!

Brought to you by Oregon Institute of Marine Biology, University of Oregon

Monster 15ft crocodile finally caught after eight-year hunt in Australia

10 July 18

"One of the most important aspects of frogs and salamanders is their martyrdom to science"

G. K. Noble (1931)
(The biology of the Amphibia)

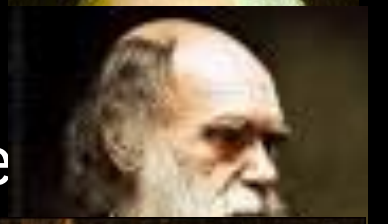
Many reasons exist to collect and preserve insects. Hobbyists, nature enthusiasts, amateur collectors, high school students, scientists, and criminal investigators each have different purposes to collect insects. Regardless of the purpose, however, insects collected must be preserved and processed according to established protocols. For example, a box of collected insects without accompanying collection information is of little scientific value. On the other hand, properly collected and preserved insects accompanied by collecting data **can be invaluable.**

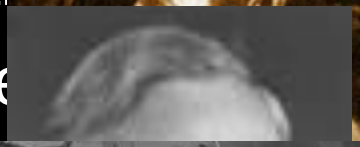
T.J. Gibb & C. Y. Oseto (2006)
(Arthropod Collection and Identification)

Very brief history

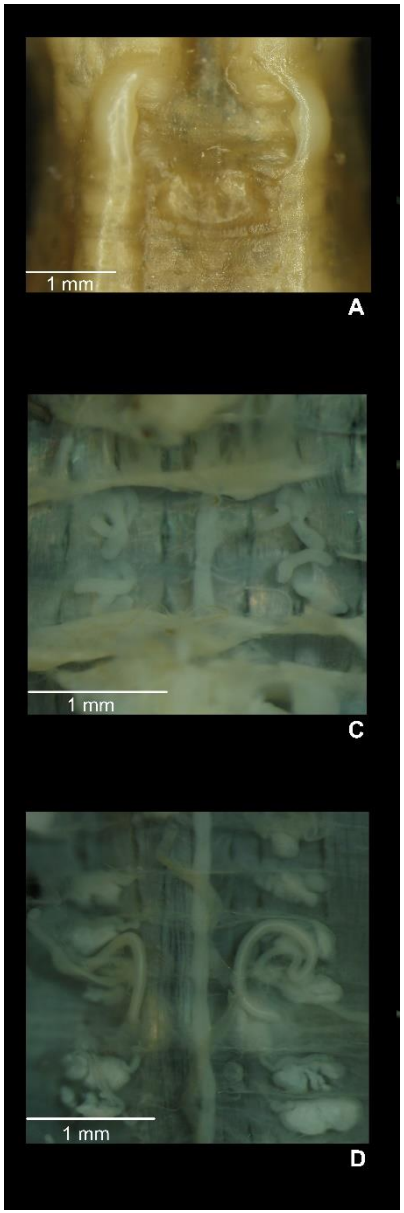
- 1753/ 1758
- 1859
- 1935
- 1950/ 1964
- 1953
- 1973
- 1980/ 1988
- 1992

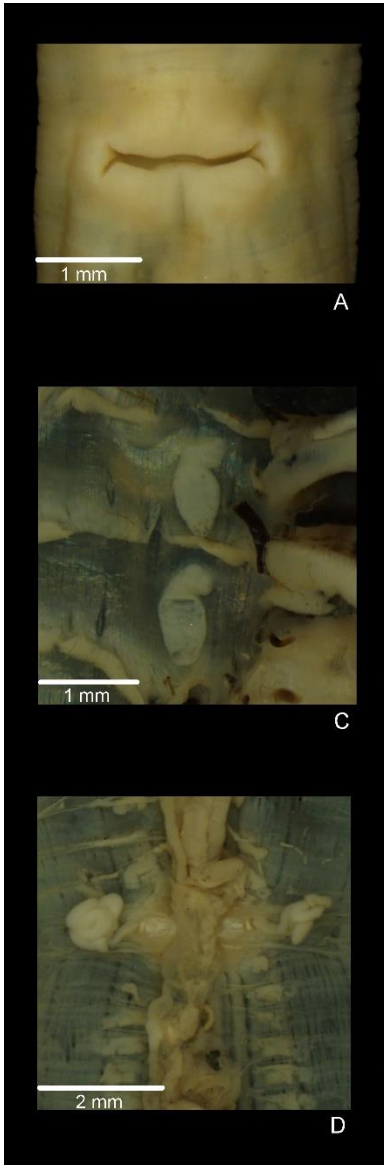
- Linnaeus: Species plantarum / Systema naturae
- Darwin: The origin of species
- Tansley: The ecosystem conce
- Hennig: Grundzüge der phylog schen Systematik / English tra
- Watson & Crick: The double he
- Beginning of the interne
- Lovejoy: Concept of bio / biodiversity
- Convention on Biologic

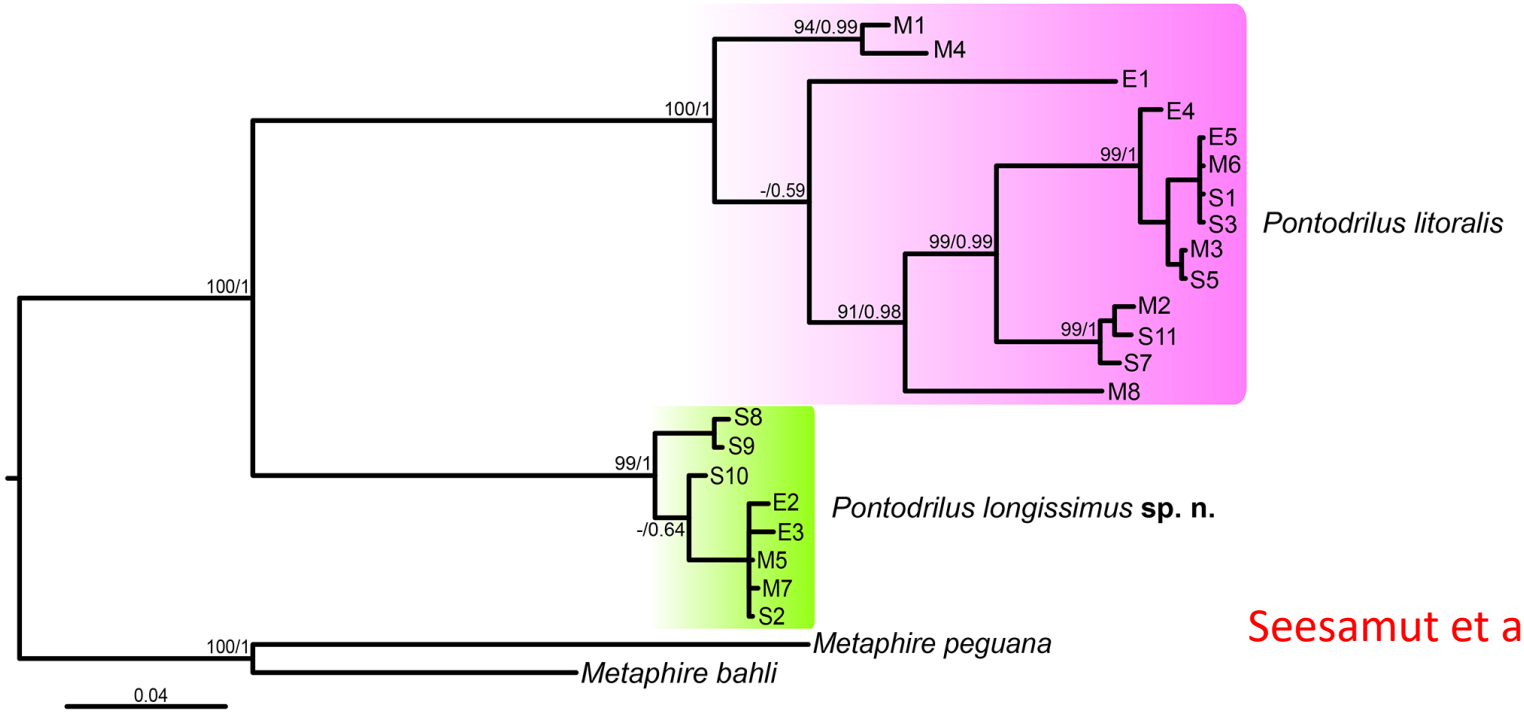






Morphological analysis

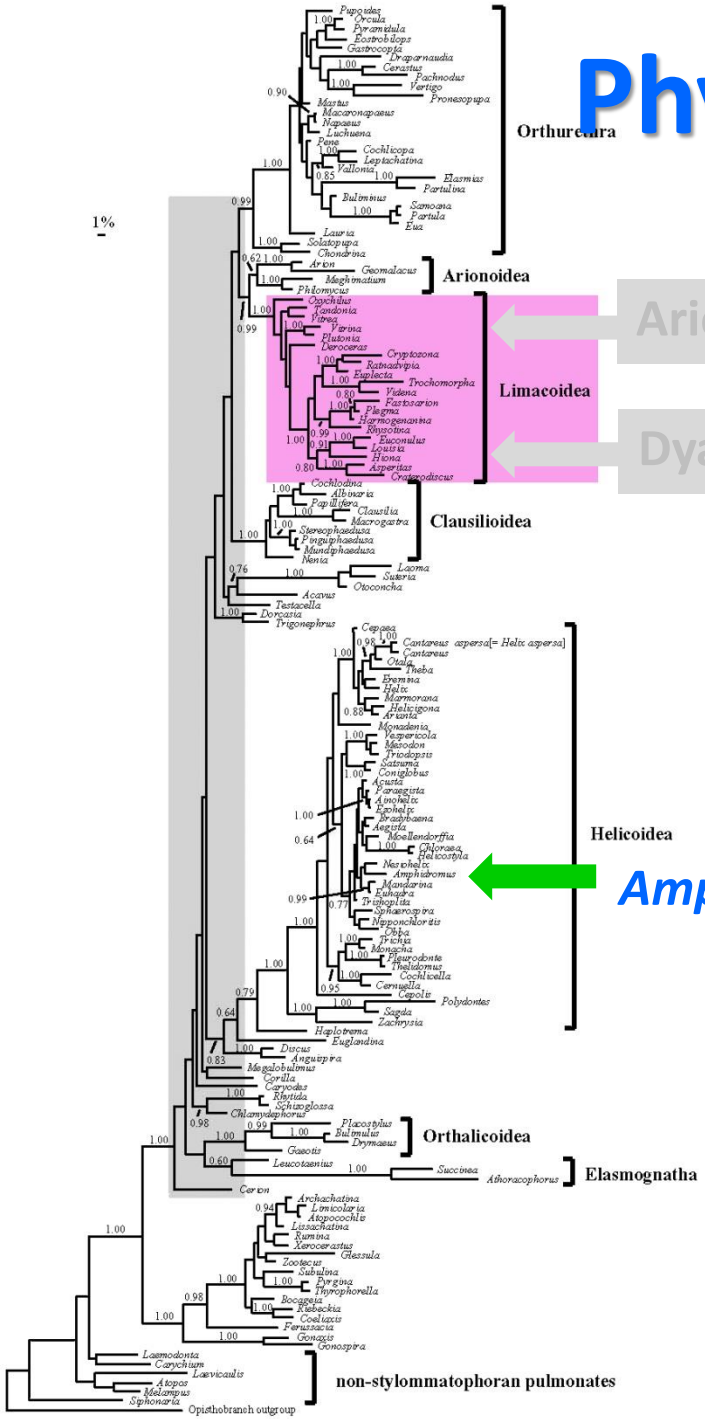






Seesamut et al., 2018

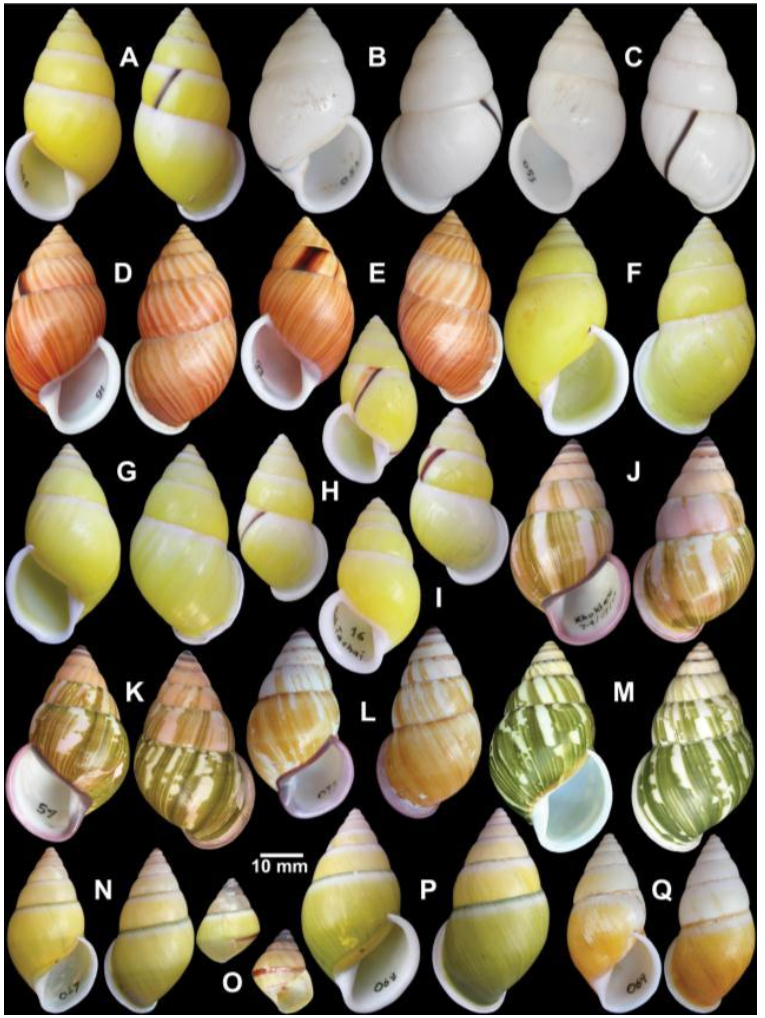
Phylogenetic background



Ariophantidae

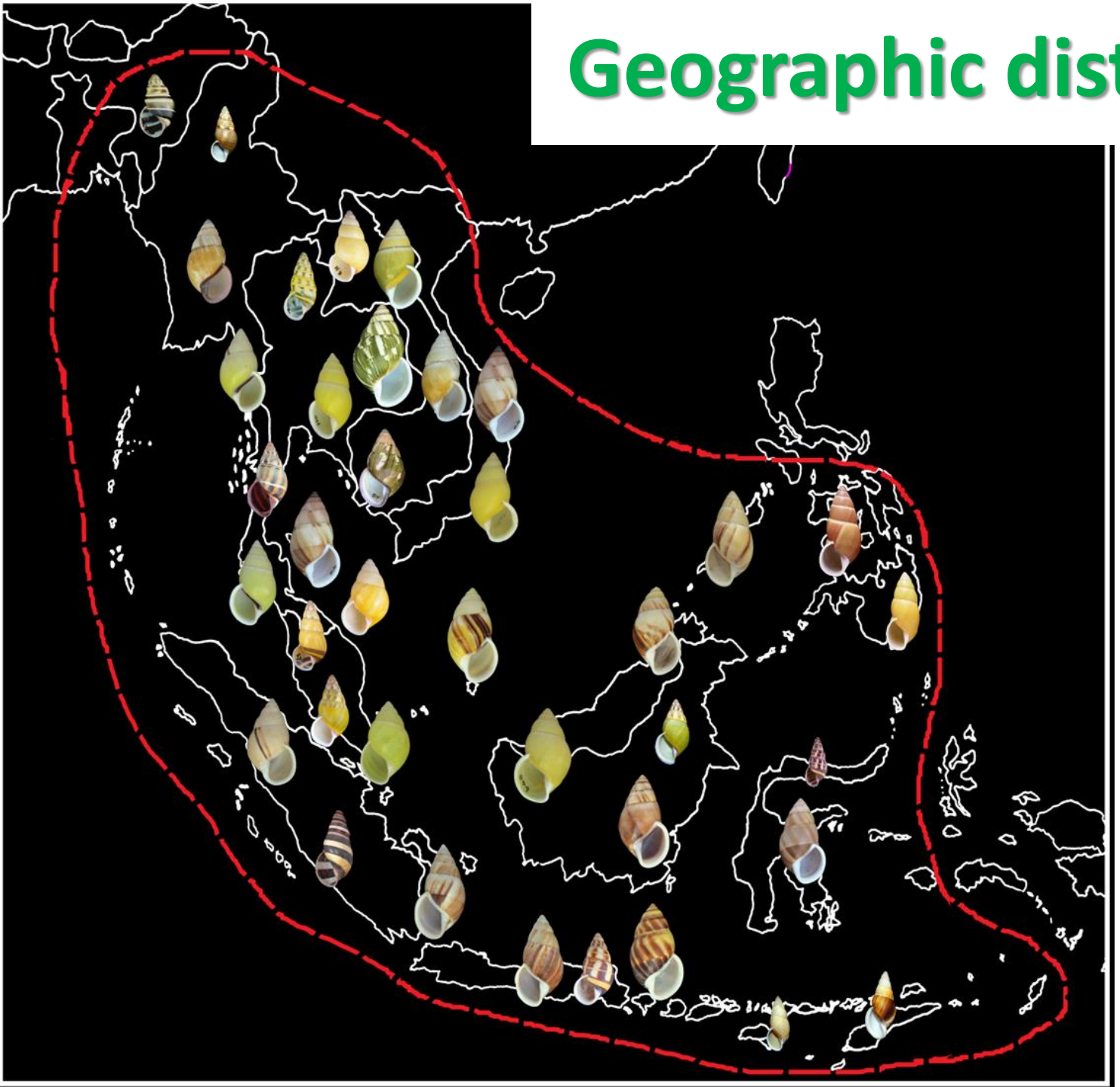
Dyakiidae

Amphidromus



Wade et al., 2006 ; Sutcharit &Panha, 2006

Geographic distribution



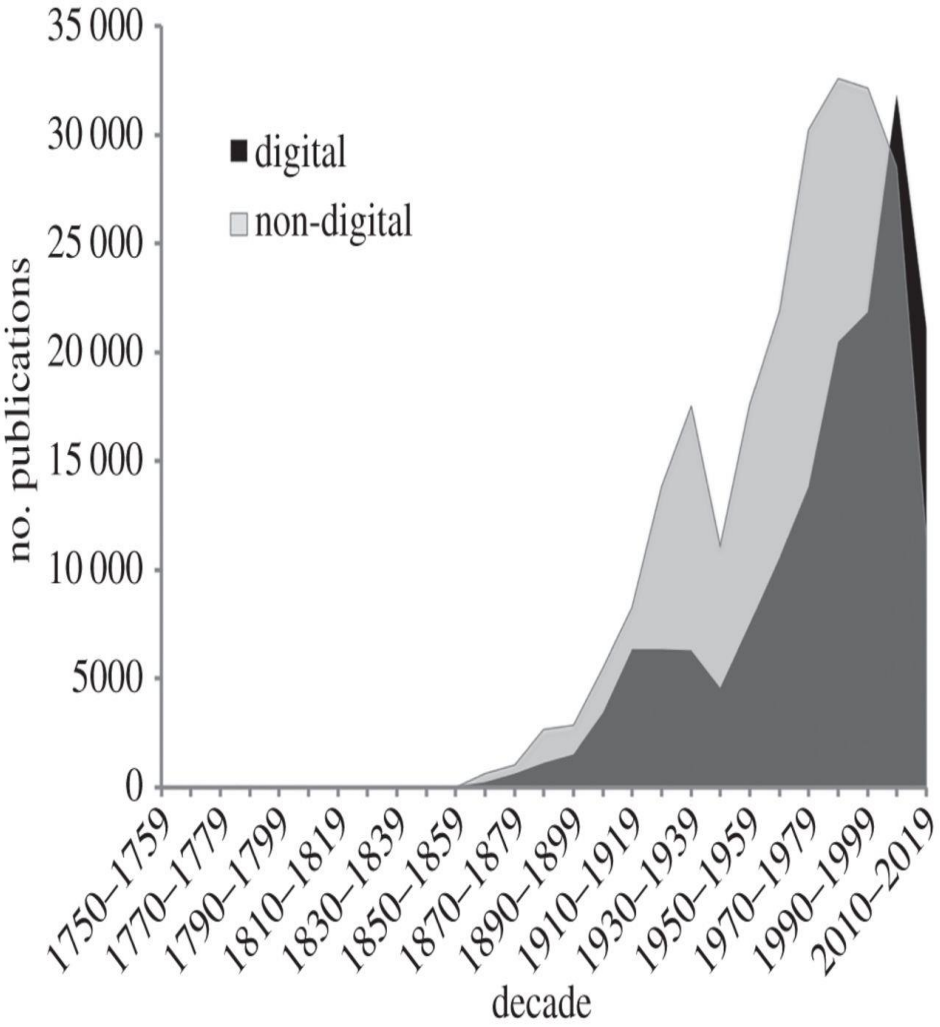
Pilsbry (1900)
Solem (1959)
Laidlaw & Solem (1961)
Sutcharit & Panha (2006)

TAXONOMY and DNA Barcoding: dark Taxa and dark texts

- **The task of digitizing the living world**
  - Classical taxonomy
  - DNA Barcoding…….
- Much of the literature (taxonomic descriptions) of the mid to late twentieth century remains offline (dark texts)
- DNA Barcoding, computable data are much easier but many sequences are not identified to species level (dark taxa)
- Voucher specimens are a potential link names, taxonomic literature and sequence database

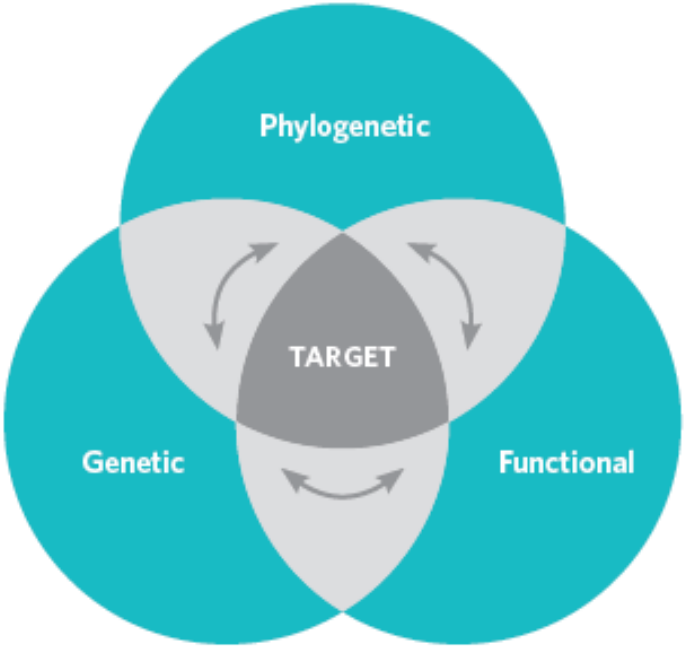
Page RDM. 2016, *Phil. Trans R. Soc. B* 371

Number of taxonomic publications in BioNames for each decade, grouped by whether the publication has a digital identifier (e.g. a DOI, a link to JSTOR, BHL, BioStor, etc.).



Roderic D. M. Page Phil. Trans. R. Soc. B 2016;371:20150334

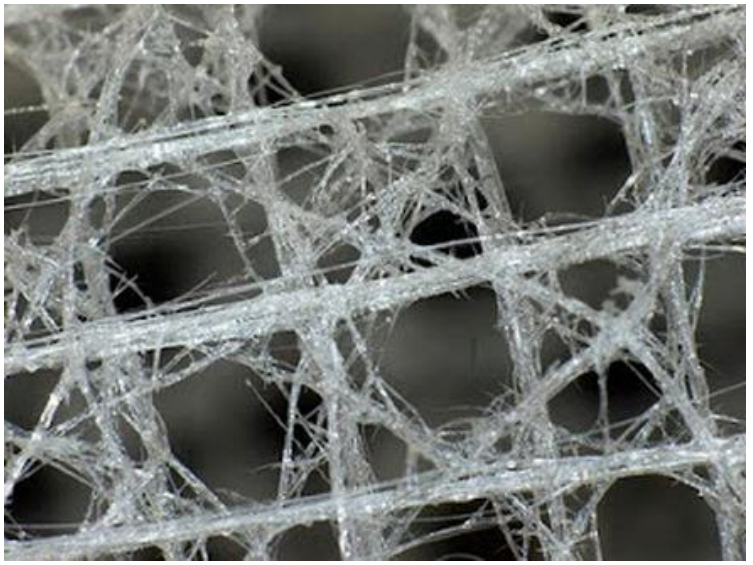
PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B

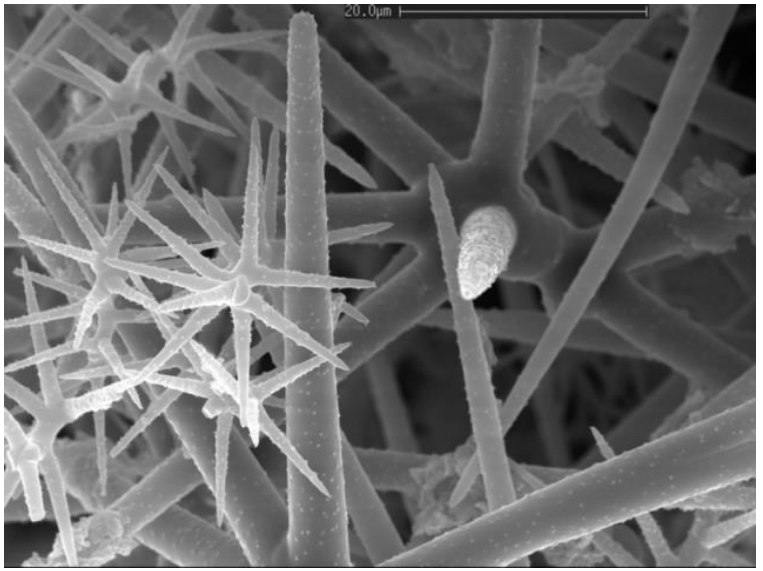


Understanding the diversity of life on land and in the sea is critical as our environment changes. This year's Dimensions of Biodiversity projects include important but poorly known branches of animals and microorganisms in understudied regions of the oceans.

Roger Wakimoto
Assistant Director
NSF Geosciences Directorate

Euplectella…fibre optic property

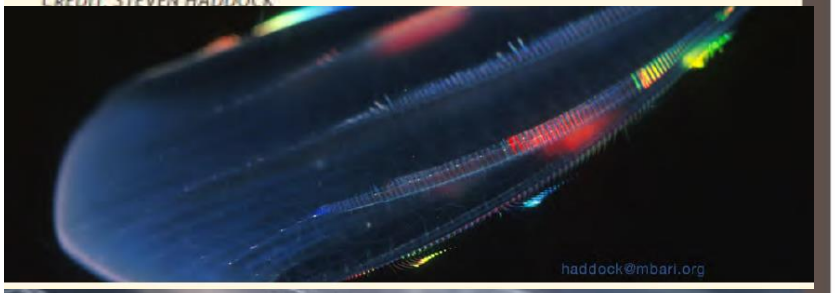


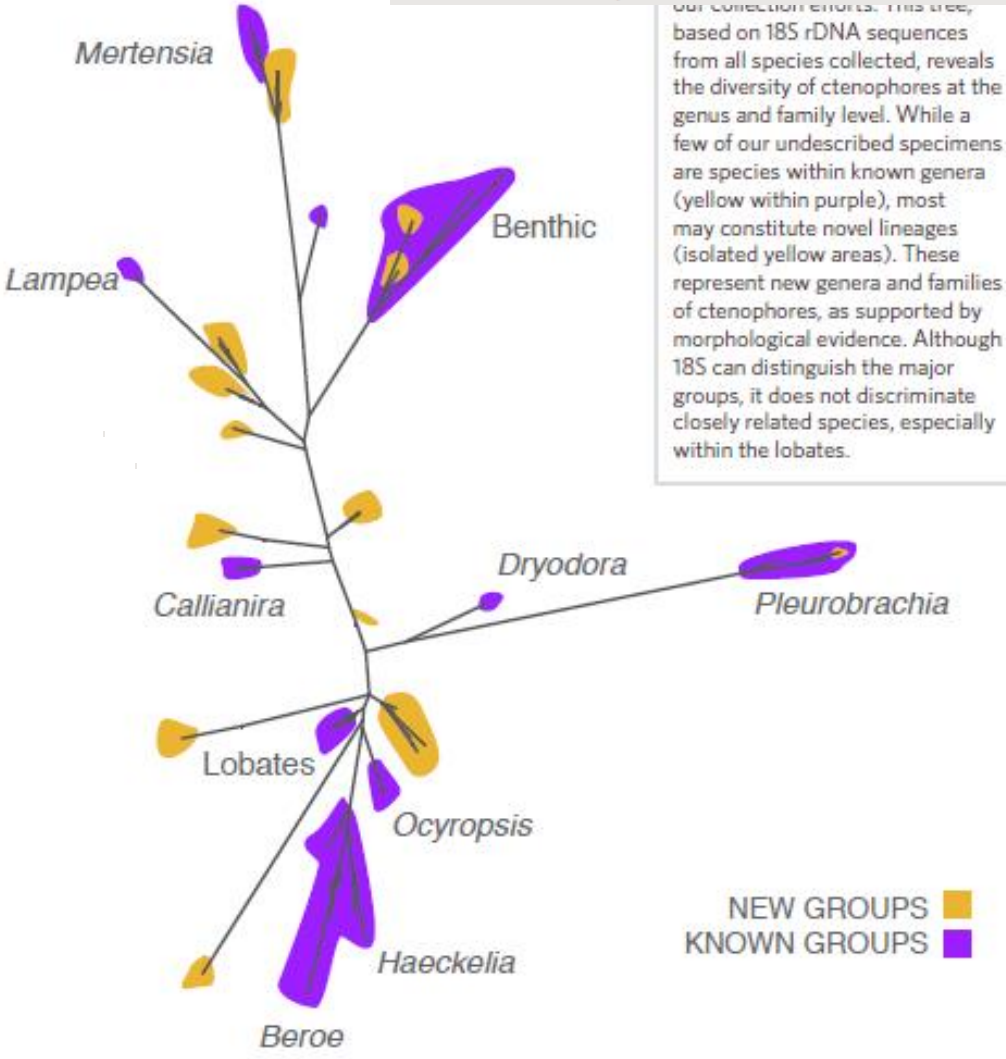


Life at extremes: Linking the phylogenetic and genomic diversity of ctenophores to ecophysiological adaptations in the deep sea

Deep sea ctenophore *Bathyctena chuni*, showing its large mouth and the dark red pigmentation typical of deep-sea species.

CREDIT: STEVEN HADDOCK



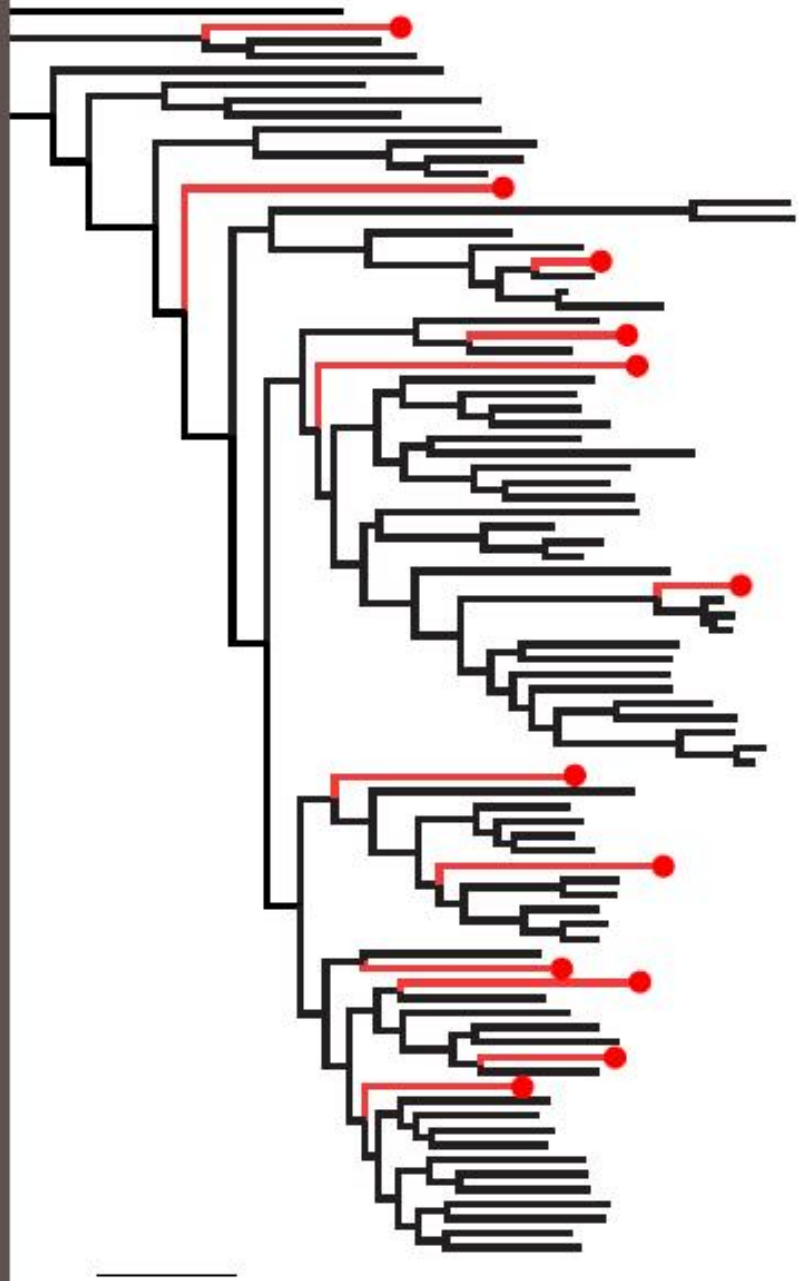


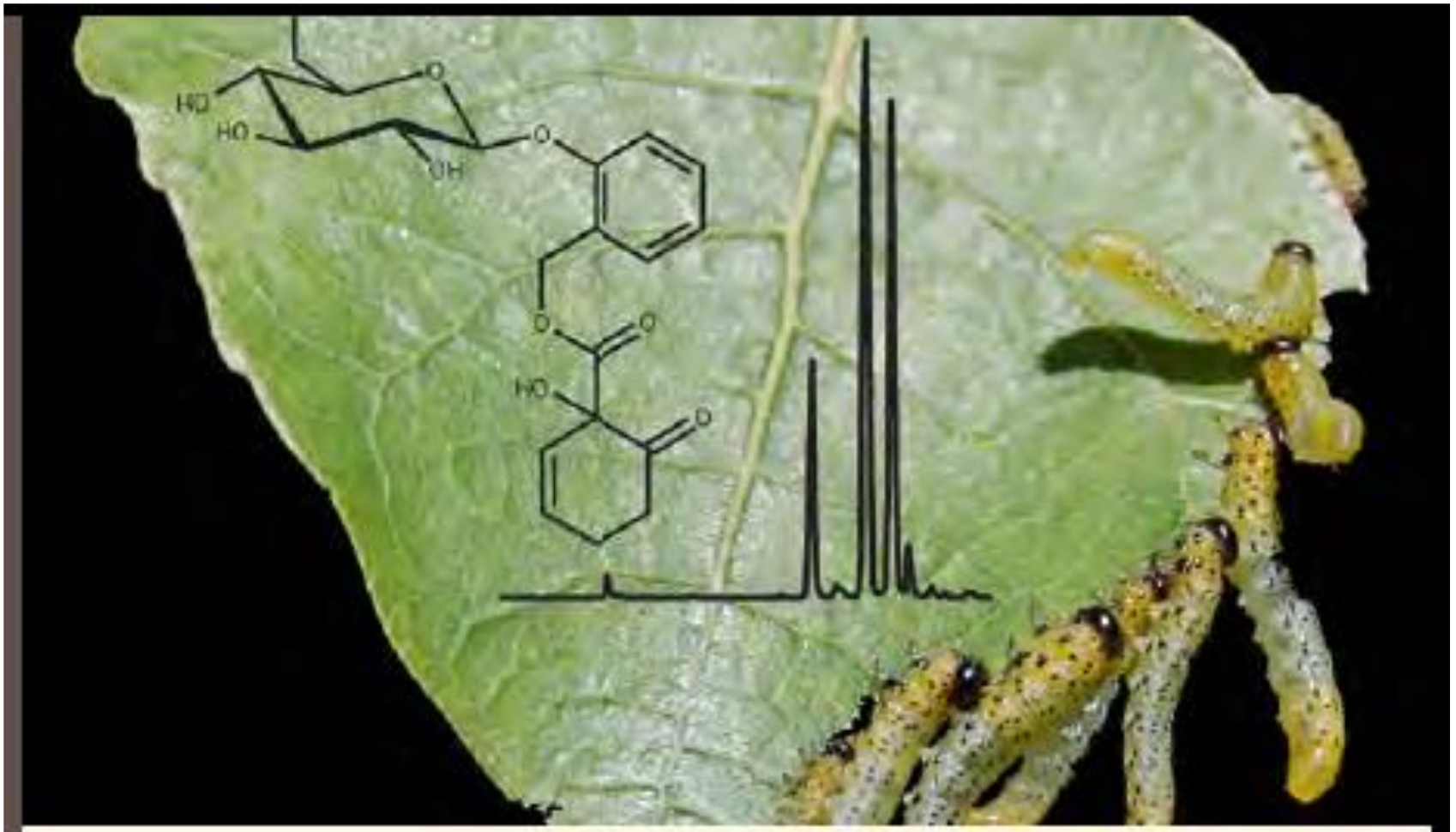
based on 18S rDNA sequences from all species collected, reveals the diversity of ctenophores at the genus and family level. While a few of our undescribed specimens are species within known genera (yellow within purple), most may constitute novel lineages (isolated yellow areas). These represent new genera and families of ctenophores, as supported by morphological evidence. Although 18S can distinguish the major groups, it does not discriminate closely related species, especially within the lobates.

The evolution of pollination syndrome diversity in *Penstemon*

Penstemon eatonii being visited by Anna's hummingbird in Pinal County, Arizona. *P. eatonii* displays the stereotypical hummingbird-adapted *Penstemon* floral type: red flowers that are long and narrow, producing copious amounts of dilute nectar.

CREDIT: CAROLYN WESSINGER





Sawfly larvae feeding on a Populus species leaf. The chemical structure represents salicortin, one of the most common defensive compounds in the foliage of poplars and willows. The graph shows a typical chromatogram from a liquid chromatography analysis of similar compounds.

CREDIT: KENNETH KEEFOVER-RING

Top: The parasitoid *Aphidius ervi* attacking a pea aphid.

Bottom: The pea aphid, *Acyrthosiphon pisum*.

CREDIT: ANTHONY R. IVES, UW-MADISON

The multicolored Asian ladybeetle, *Harmonia axyridis*.

CREDIT: ANTHONY R. IVES, UW-MADISON

Core facility upgrading program

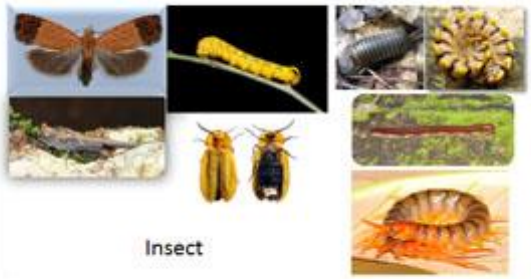
upgrading of systems for collection, preservation, and provision

Rodent | Amphibian & Reptile | Micro-organism | Fish | Mollusc | Arachnid

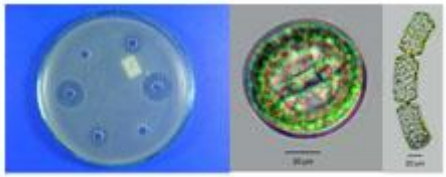
Parasite | Crustacean | Annelid

16 bioresources TBR

Bryophyte



Insect | Myriapods



Bacteria | Diatom

Fern

Other plants

Genome information upgrading program

adding higher value by genome analysis, etc.

Fundamental technology upgrading program

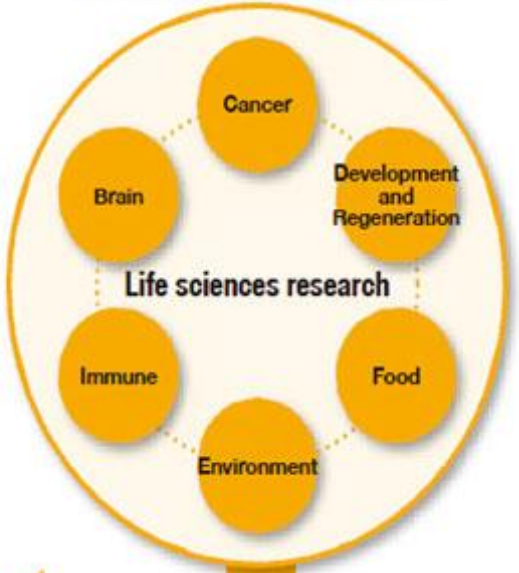
development of preservation technology, etc.

Information center upgrading program

providing of information on whereabouts and genomes, etc.

Provision of bioresources and information

Universities and Research Institutes

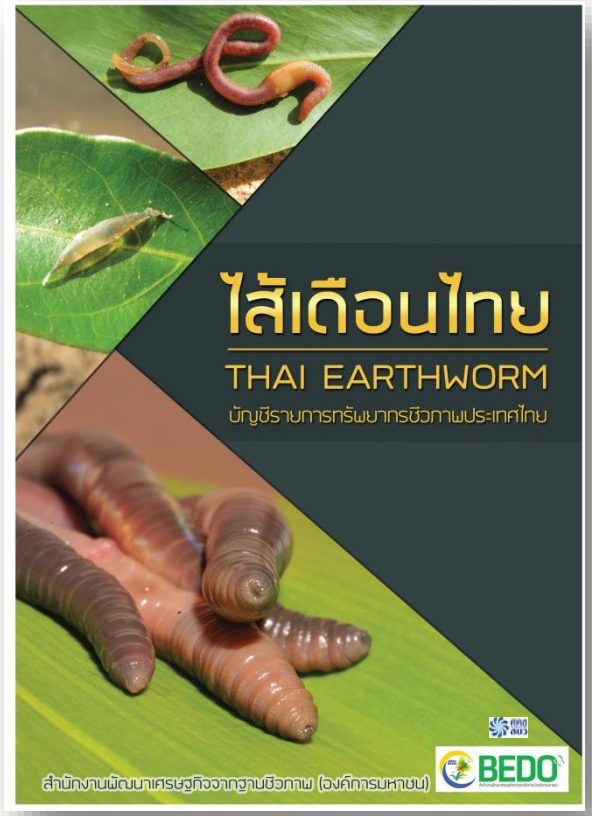


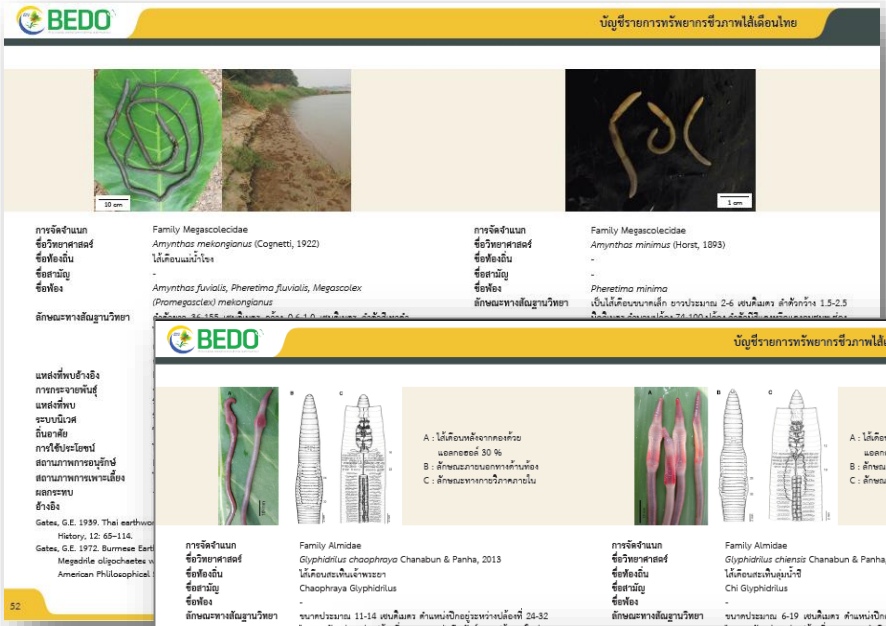
Depositing of bioresources and feedback of research results

- Original research progresses
- Acquisition of an international initiative

No BioResource, No Research !

บัญชีรายการทรัพยากรชีวภาพ: ไส้เดือนไทย





Loss and fragmentation of habitat