


Dynasty



ECOSUR

Taxonomy and Ecology: Interaction and Denial

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Thank you very much!

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- Dr. Alexander Tzetlin
White Sea Biological Station, Moscow State Univ.
- Dr. Elisaveta Bonch-Osmolovskaya
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Development of this talk

- Taxonomy: Too common and obvious
- Biodiversity: We know everything and if not, it is not our problem
- Ignorance and discovery: Knowledge, pattern detection, novelties

Taxonomy: Everywhere



The four basic types of personality

Other classifications

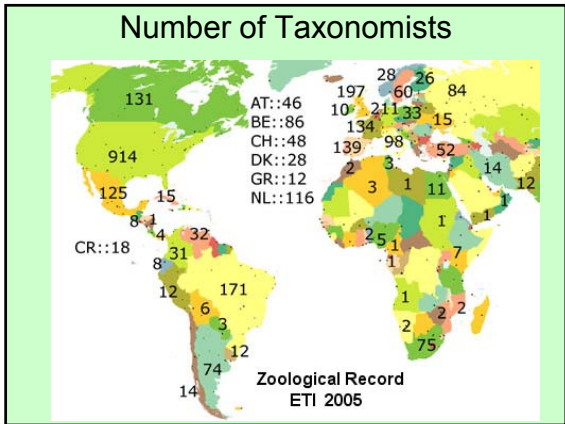
- Mexican people are ...
- French people are ...
 - German people are ...
 - Other people are ...

Why taxonomy matters?

<http://www.bionet-intl.org/opencms/opencms/caseStudies/pdf/BioNET-Case-Studies-Aug2011.pdf>




- Problems in management of natural resources**
(Kim & Byrne 2006 Ecol Res):
- 1) State or county programmes
 - 2) **Ignorancy about local and planetary biodiversity**
 - 3) Studies about structure and function of communities
 - 4) **Lack of taxonomic precision**
 - 5) **Decreasing number of taxonomists**
 - 6) **Declining collections and training**



SNI – México 2011

Postgr. Sciences	100,000
Total SNI	16,040
Biology	2,300
Ecology	400
Taxonomists	70

How is a taxonomist?

Sensible:
"You don't need to be crazy to be a taxonomist, but it will surely help you" (Sharp 1966).


Extrovert and generous:
"Taxonomists are like mice hidden among collection furniture and all hate each other" (Anderson 1966).

Goody:
"... they are antisocial, insecure, apathetic and selfish..." (Itlis 1967).



Grand Expeditions: *I want to be a taxonomist!*

- Challenger
- Albatross
- Loricifera, Cycliophora, n. phyla



The H.M.S. Challenger in full sail.

Chapman 2005

	Actual	Estim	% Ignor
Vertebrates	61,000	71,000	14
Invert.	1,260,000	5,500,000	77
Plants	290,000	444,000	35
Others	176,000	4 million.	96

How many species? Mora et al. 2011:

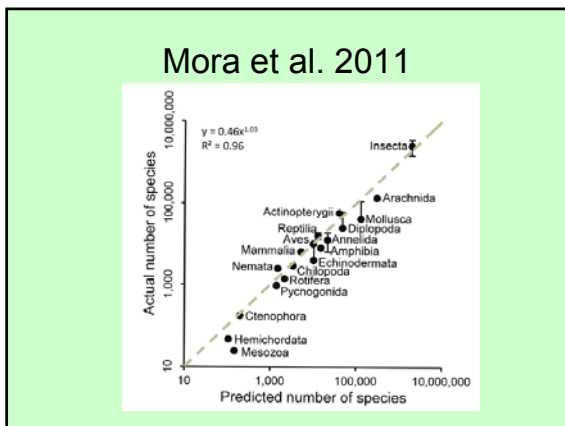
8.7 (± 1.3) millions eucariotes
(2.2 (± 0.2) marine ssp)

OPEN ACCESS Freely available online PLOS BIOLOGY

How Many Species Are There on Earth and in the Ocean?

Camilo Mora^{1,2*}, Derek P. Tittensor^{1,3,4}, Sina Adl¹, Alastair G. B. Simpson¹, Boris Worm¹

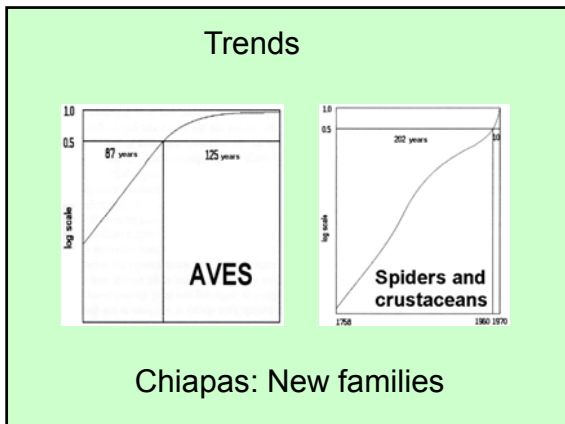
PLOS Biology | www.plosbiology.org 1 August 2011 | Volume 9 | Issue 8 | e1001127

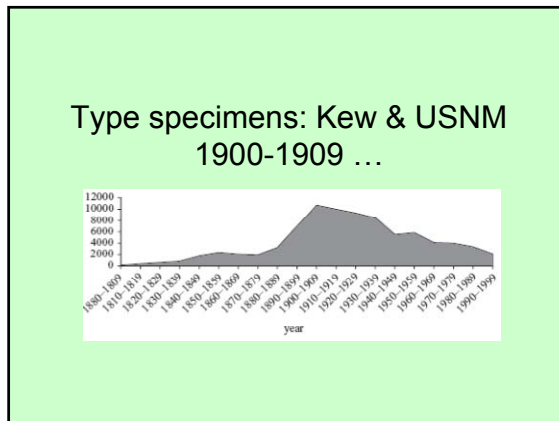
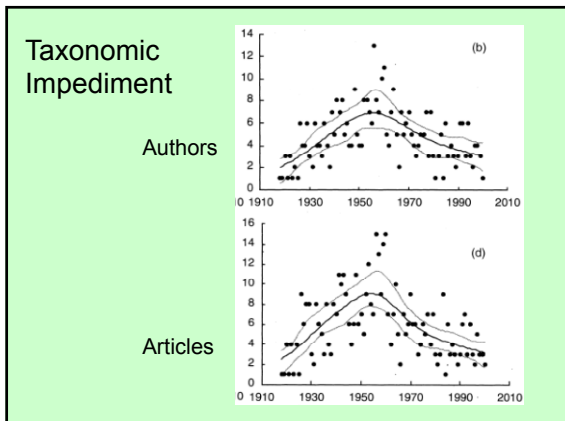



<http://www.marinespecies.org/>

212,722 valid species

356,506 nominal species





Mayr, 1942

Taxonomy \approx Systematics (p. 6, footnote)

	<u>Old System.</u>	<u>New System.*</u>
Taxa:	Little known	Better known
	Morphospecies	Biospecies
Specim.	Few	Many
Emphasis	Nomenclature	Variation

* Coined by Hubbs (1934), used by Huxley (1940).

1960s

- 1961. Simpson. Mammals (fossils). Principles of Animal Taxonomy.
- 1950/1966. Hennig. Entomologist. Cladistics.
- 1969. Mayr. Principles of Systematic Zoology.

Mayr, 1969-1

Taxonomy

- (Gr. *Taxis* = order, + *nomos* = law).

Taxonomy \ll Systematics (p. 2)

Taxonomy

- *Theory and practice of classifying organisms.*

Systematics: Scientific study of the types and variety of organisms and of any and all of their interactions (Simpson, 1961).

Mayr, 1969-2

- Stages in the study of a taxonomic group (p. 15):

Alpha

- Description of new species and placement in genera.

Beta

- Relationships between higher categories and classification.

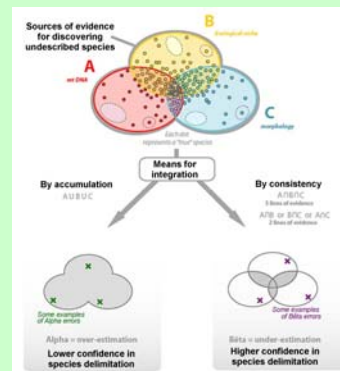
Gamma

- Intra-specific variation, evolutionary studies, interpretation of organismic diversity.

Chronic Crisis

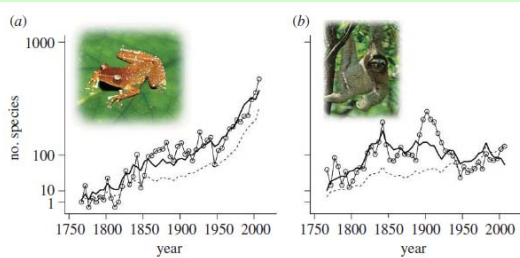
- * 1939 *J. Ecol.*: Tax. Ecol. Unconnected
- 1971 Wilson. *Ecology*: Crisis
- 1989 Small. *Taxon*: Standardization
- 1992 Macted. *Taxon*: Revisions
- 1999 Winston. Describing Species

Integrative Taxonomy

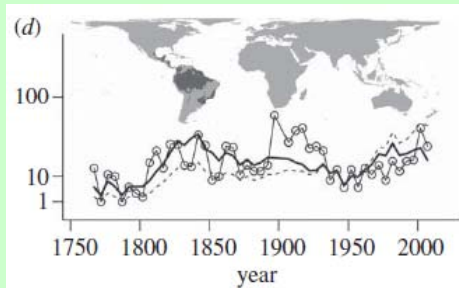


Padial et al. 2010 Front. Zool.

Giam et al. 2012 Proc. R. Soc. B 279



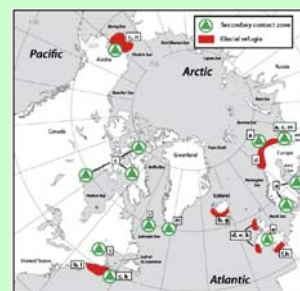
-o- Described species
--- Model
- - - Taxonomists

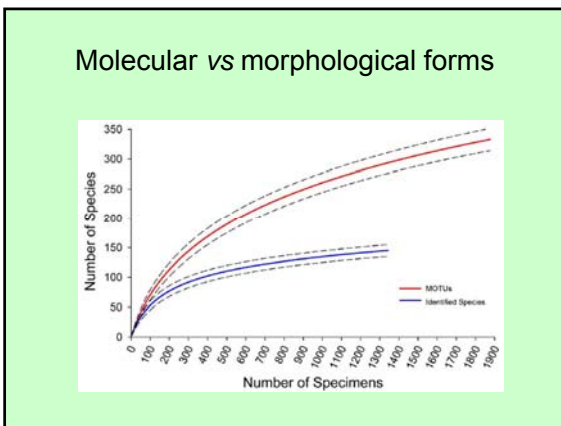
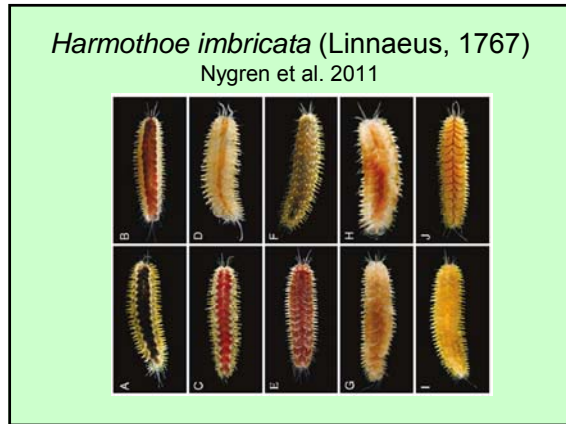
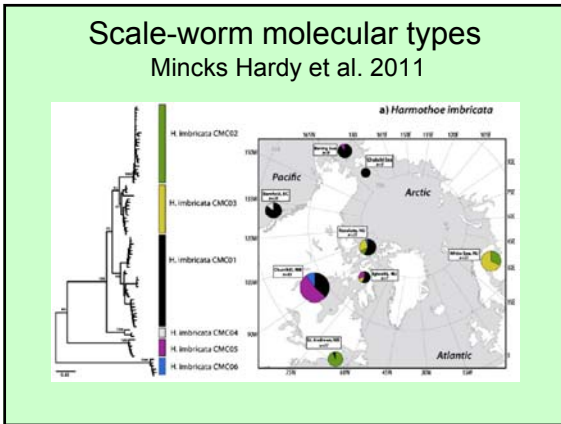


Chamelea Bouchet: Marine Biodiversity



Arctic Biogeography Mincks Hardy et al. 2011

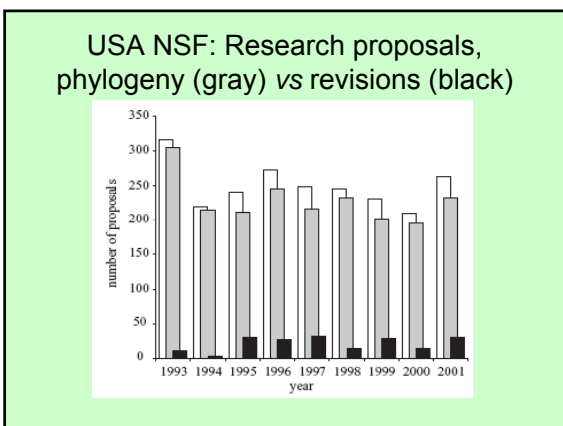
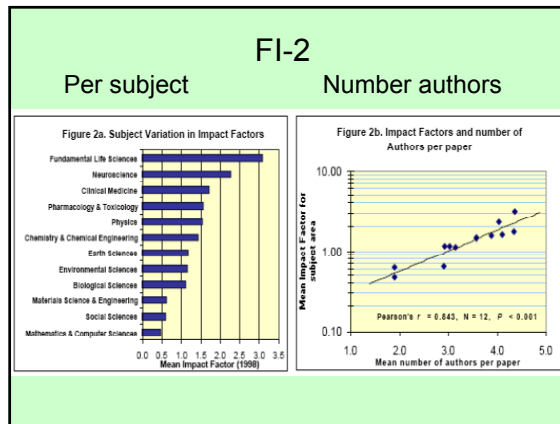
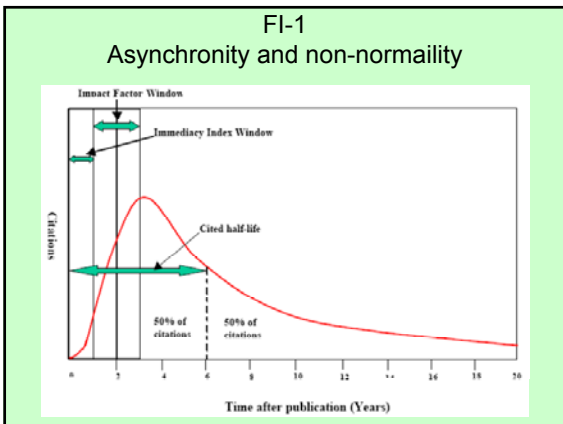




- ### Extrinsic Factors
- Proportion and exclusion
 - Indicator species and Taxon. Suff.
 - Editorial Policies Ecology
 - Impact Factors
 - Phylogeny / Molecular

- ### Primary Journals
- that **DO NOT** emphasize identification manuals or deposit of voucher materials
- | | |
|-----------------------------|------------------------------|
| • Acta Oecol. | • Ecol. Monogr. |
| • Ambio | • Ecology |
| • Am. Nat. | • Helgol. Mar. Res. |
| • Aquaculture | • Hydrobiologia |
| • Aquat. Conserv. | • J. Chem. Ecol. |
| • Biochem. Syst. Ecol. | • J. Ecol. |
| • Biodiv. Conserv. | • J. Trop. Ecol. |
| • Biol. Conserv. | • Mar. Ecol. |
| • Biotropica | • Mar. Ecol. Progr. Ser. |
| • BMC Ecol. | • Mar. Poll. Bull. |
| • B. Ecol. Soc. Am. | • Mol. Evol. Notes |
| • Can. J. Fish. Aquat. Sci. | • Oecologia |
| • Conserv. Biol. | • Stud. Neotr. Fauna Environ |
| • Ecol. Appl. | • Trop. Ecol. |

- ### Ecological Science or Fiction?
- Scientific method essentials
- 1) Evaluation by peers
 - 2) Replicability (Confirmation)

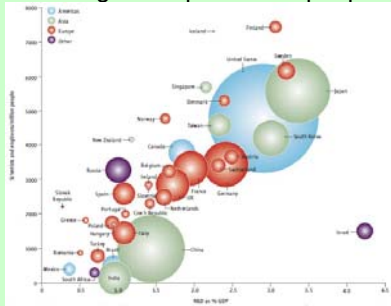


- ## Frontiers
- **Morphology overcome?**
 - **Ecological segregation**
 - **Reproductive isolation**
 - **Molecular evidences**

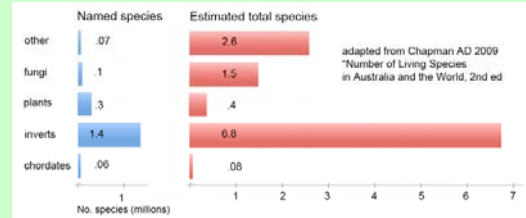
- ### Intrinsic Factors (Attitude)
- * **Taxonomists as providers**
 - Keys/ Regional catalogues
 - **Large modesty**
 - New species; not revisions
 - **Isolation**
 - Few national efforts
 - **New taxonomists**
 - Almost no training

- ### Fauna Ibérica 2007
- Monographs: 30
 - Fauna treated: 20%
 - New species: 920
 - New records: 820
 - Expected additional time: **65 years**

R&D investment and number of scientists and engineers per/million people



Do we need taxonomists? Pending issues



Inventory

Needing description

Renaissance

