

From liberating imprisoned data in publications to publishing linked open data

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Swiss Research Data Day 2018, 12 June 2018, Zürich

How many species are on planet Earth?



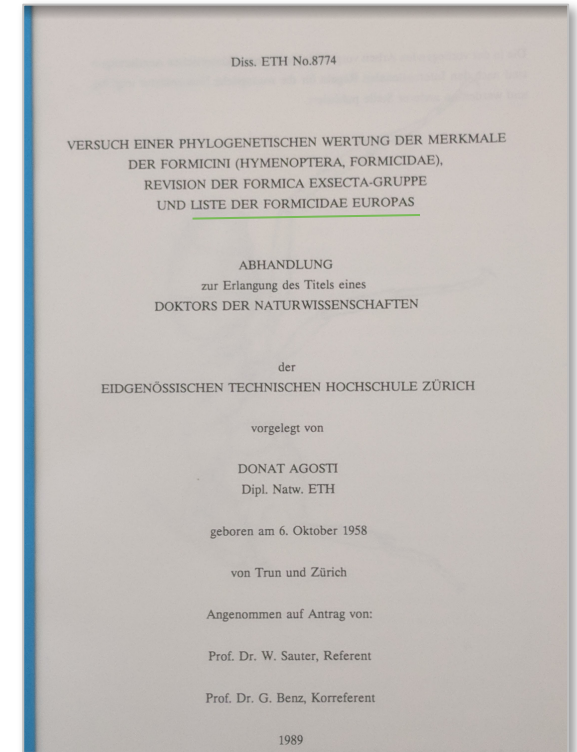
- 1989 How many ants in Europe?
- 1992 Rio Earth Summit: How many species on planet Earth?
- 2002 Online catalogue of the ants of world
- 2018 Half Earth: how many species?

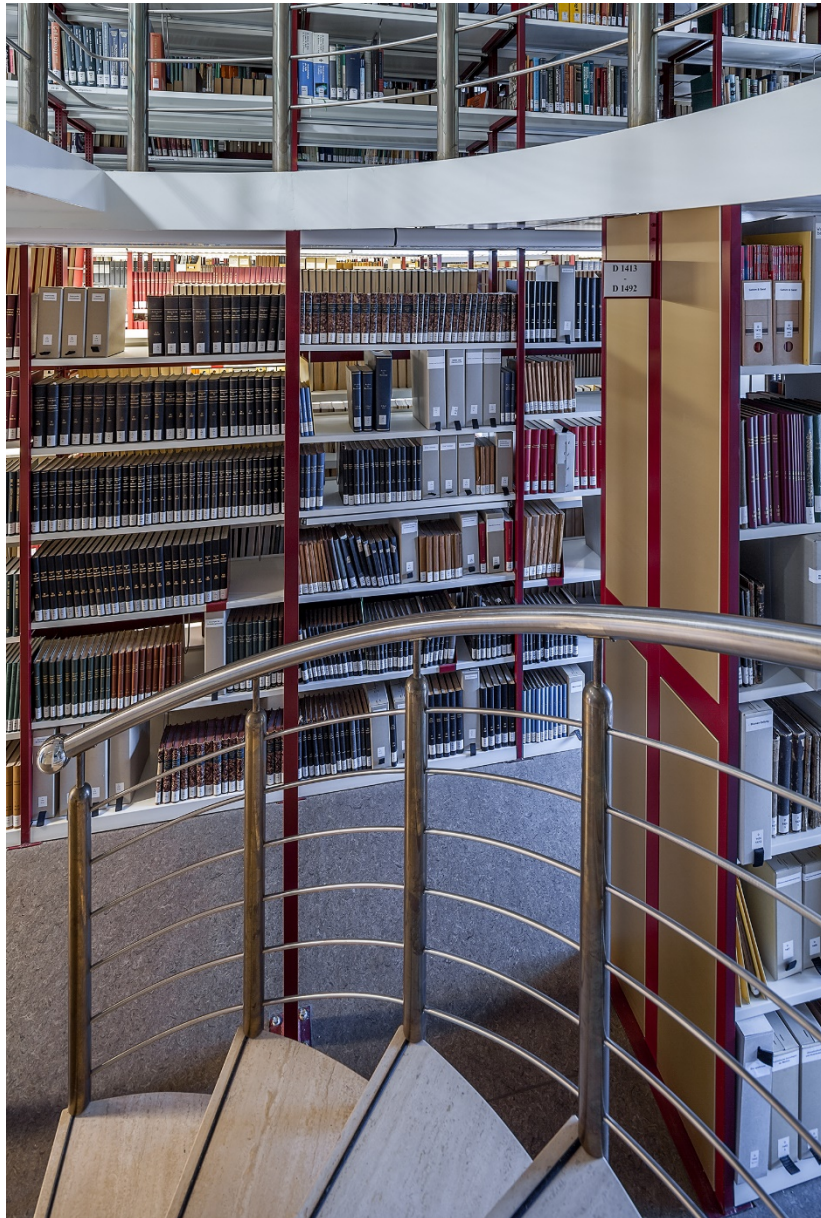
A scientific challenge as well as a crucial question for a sustainable life on planet Earth.

We depend on biodiversity.

We depend on the understanding of species and its traits.





We don't know how many species there are.
We don't know, how many we know.





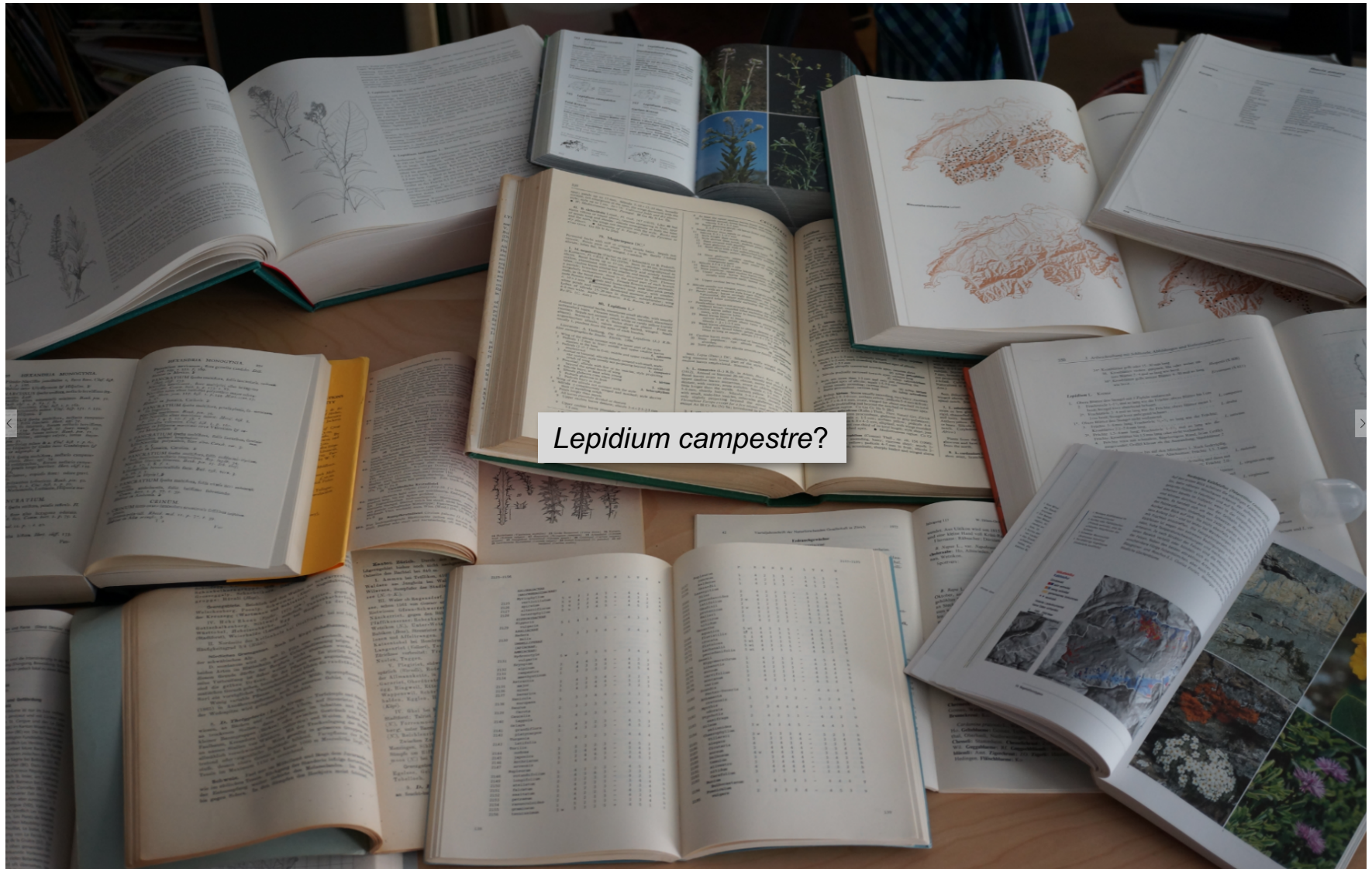
500,000,000+ printed pages
1,900,000 species described
20,000,000+ species treatments
18,000 new species discovered / year

BUT: Data are hidden

-  Incomplete digitization
-  Publications are not semantically enhanced
-  Data are not linked
-  Most data are not open

How can we query our accumulated biodiversity knowledge?

Biodiversity Knowledge: 20 years ago, and still today





Dijkstra, Klaas-Douwe B., Kipping, Jens & Mézière, Nicolas, 2015, Sixty new dragonfly and damselfly species from Africa (Odonata)

Dijkstra, Klaas-Douwe B., Kipping, Jens & Mézière, Nicolas, 2015, Sixty new dragonfly and damselfly species from Africa (Odonata), *Odonatologica* 44 (4), pp. 447-678

publication ID	http://dx.doi.org/10.5281/zenodo.35388
link to original document	http://dx.doi.org/10.5281/zenodo.35388
document provided by	Donat (2015-12-11 15:22:31, last updated by Admin 2015-12-18 12:58:08)

Treatments (61)

TreatmentBank Specimen Occurrence Map - Google Chrome

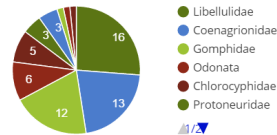
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Legend:
 Holotype, Lectotype, Neotype: ●
 Paratype, etc.: ●
 Holotype & 5 Paratypes: ●

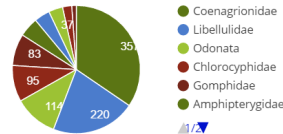
Distribution Map

Specimens

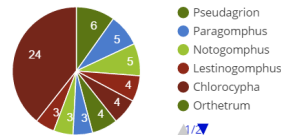
Article: Treatments by Family (n=61)



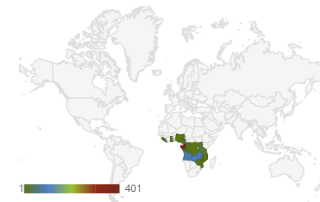
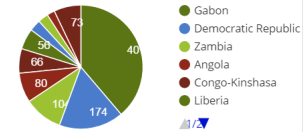
Article: Specimens by Family (n=1034)



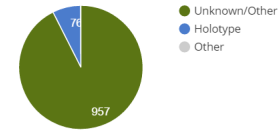
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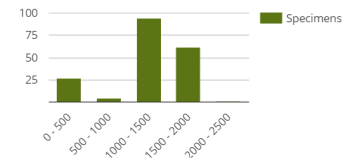
Article: Specimens by Country (n=1034)



Article: Specimens by Type Status (n=1034)



Article: Specimens by Elevation (n=1034)



Explicit links



Profundiconus puillandrei sp. nov.

um:lsid:zoobank.org:act:55807BF8-D984-42C1-B039-F3EBD8EB2C13

Figs 12A–J, 13A–D, 14

Conus ikedai – Poppe 2008: pl. 615, fig. 1a–b (non *C. ikedai* Ninomiya, 1987).

Conus smirna – Marshall 1981: 499, fig. 3j (non *C. smirna* Bartsch & Rehder, 1943).

Conus sp. C – Röckel *et al.* 1995b: 585, fig. 49.

Profundiconus n. sp. g. – Puillandre *et al.* 2014: Supplementary Material 1 (unfigured).

Etymology

This new species is dedicated to Dr. Nicolas Puillandre, mollusc curator at the MNHN. Dr. Puillandre has a long and outstanding trajectory in the study of the phylogeny of the Conoidea. The name of the new species after him recognises his important contributions to the taxonomy of Conoidea at the molecular level.

Type material examined

Holotype

NEW CALEDONIA: 43.2 × 18.0 mm, R/V *Alis*, NORFOLK 1 Expedition, st. DW 1707, Banc A Est, Norfolk Ridge, 23°43' S, 168°16' E, 381–493 m (MNHN IM-2000-30771; Fig. 12A).

Paratypes

NEW CALEDONIA: 39.6 × 17.3 mm, R/V *Alis*, NORFOLK 2 Expedition, st. DW 2072, Banc A Est, Norfolk Ridge, 25°21' S, 168°57' E, 100–150 m (MNHN IM-2007-30772; Fig. 12B).

MNHN-IM-2007-30772

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28



MUSÉUM
NATIONAL D'HISTOIRE NATURELLE

🏠 / [MNHN](#) / [Molluscs \(IM\)](#) / [2007-30772](#)

Conus frigidus Reeve, 1848



SPECIMEN

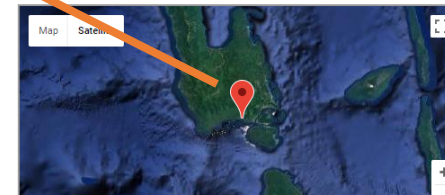
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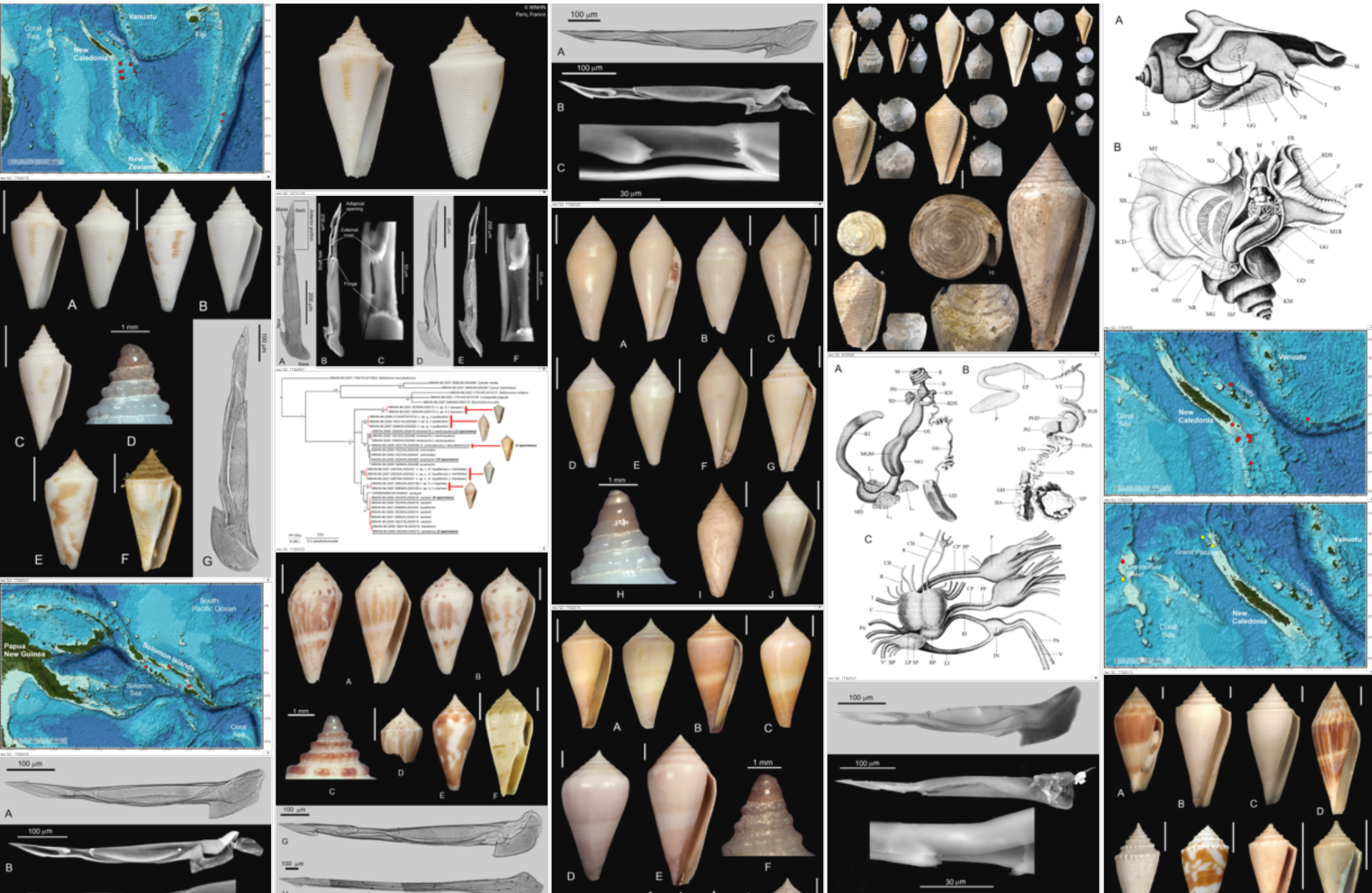
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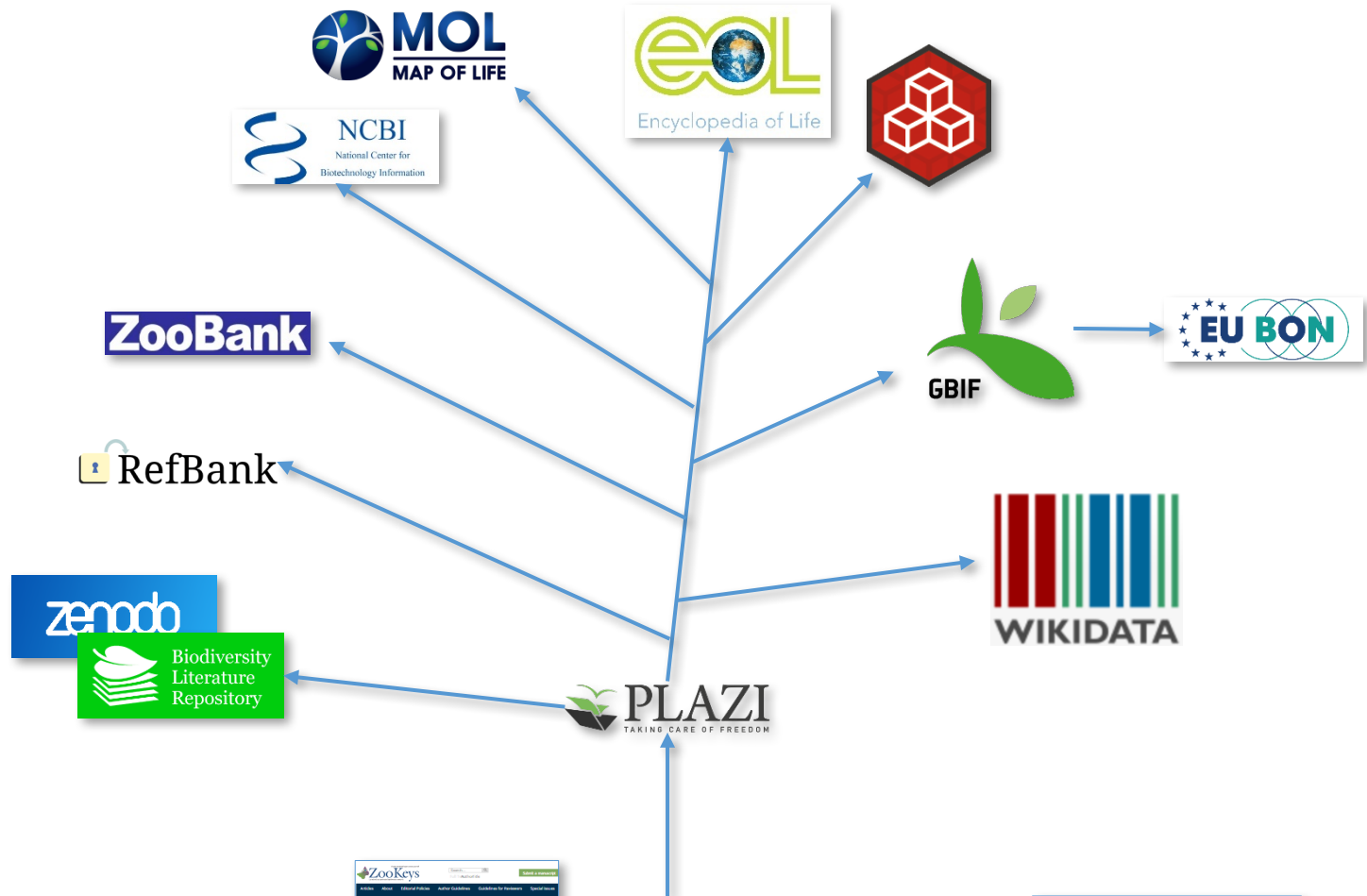
Phylum Mollusca
Class Gastropoda
Order Neogastropoda
Family Conidae
Genus *Conus*
Species *Conus frigidus*
Name *Conus frigidus* Reeve, 1848

ORIGIN

📍 Country label VANUATU
Locality Baldwin Core
📅 Expedition SANTO 2006
Station number VM02
Collection date 2006-09-10
Depth (meters) 0-1
📍 Geographic 15° 34' 51.9996" S ; 167° 2' 23.5248" E







Reuse of subarticle parts

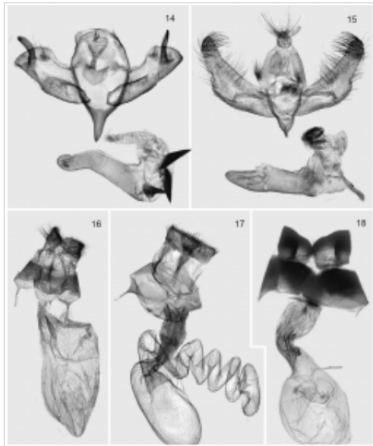




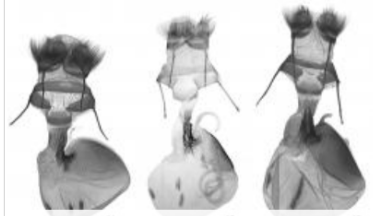
OCELLUS

noctuidae+genitalia

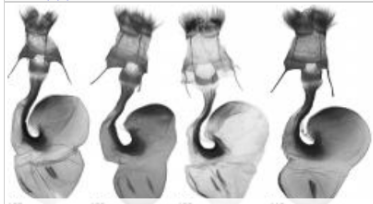
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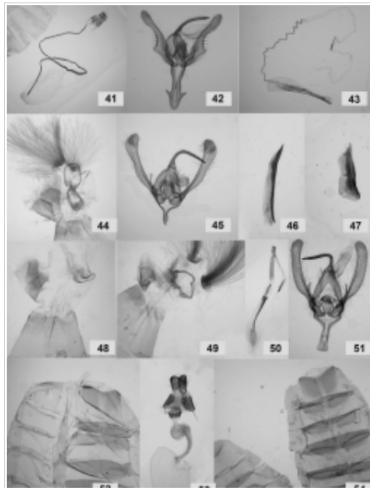
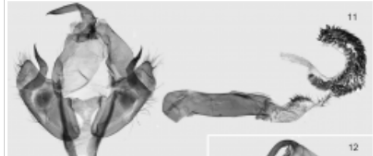
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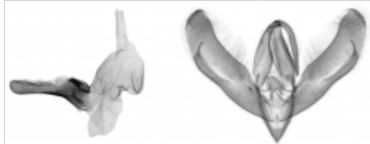
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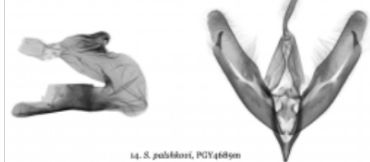
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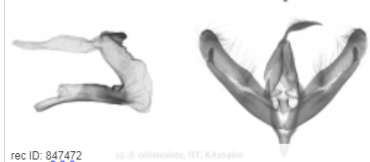
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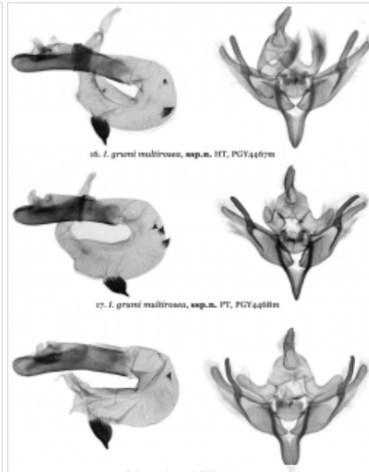
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14. *S. pubilivasi*, PCY4610M



15. *S. sublineata*, HT, K33020M

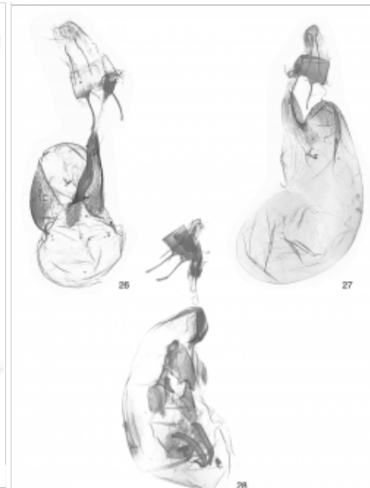
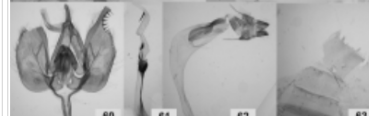
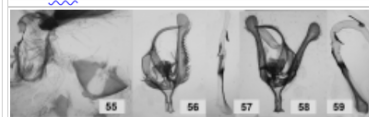


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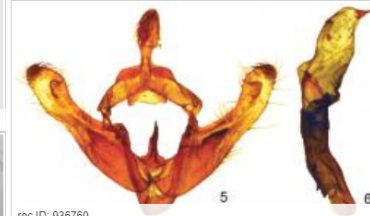
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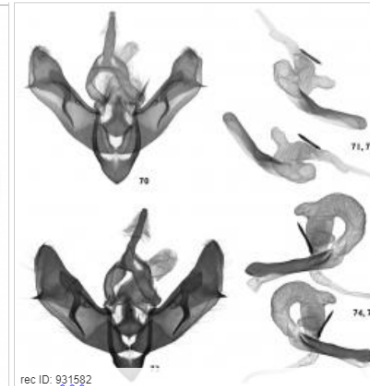
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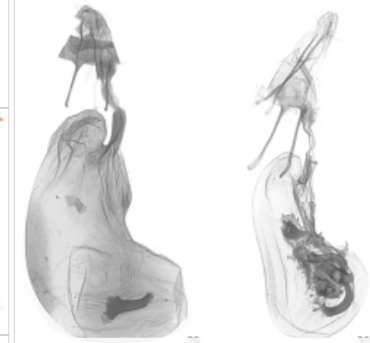
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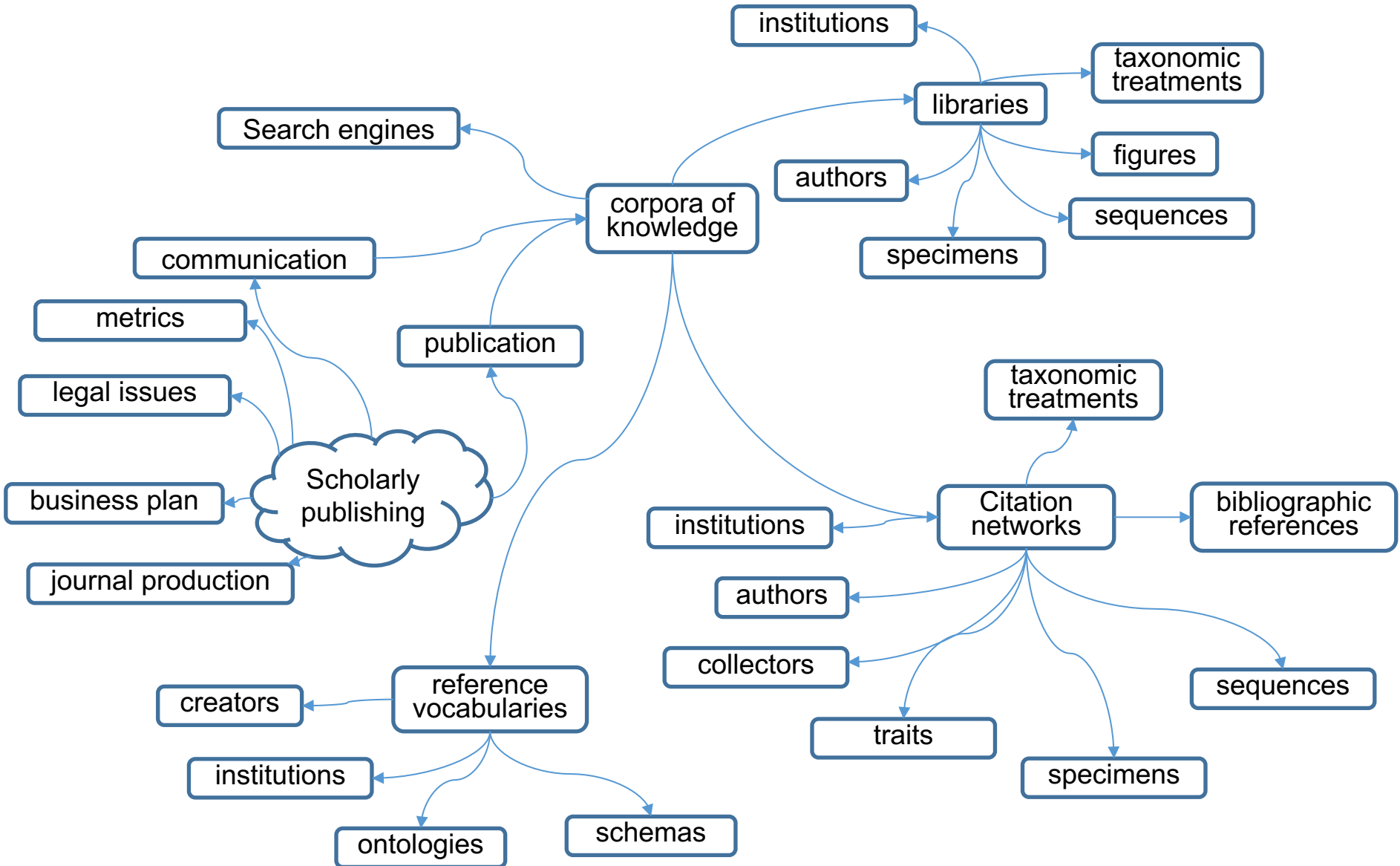


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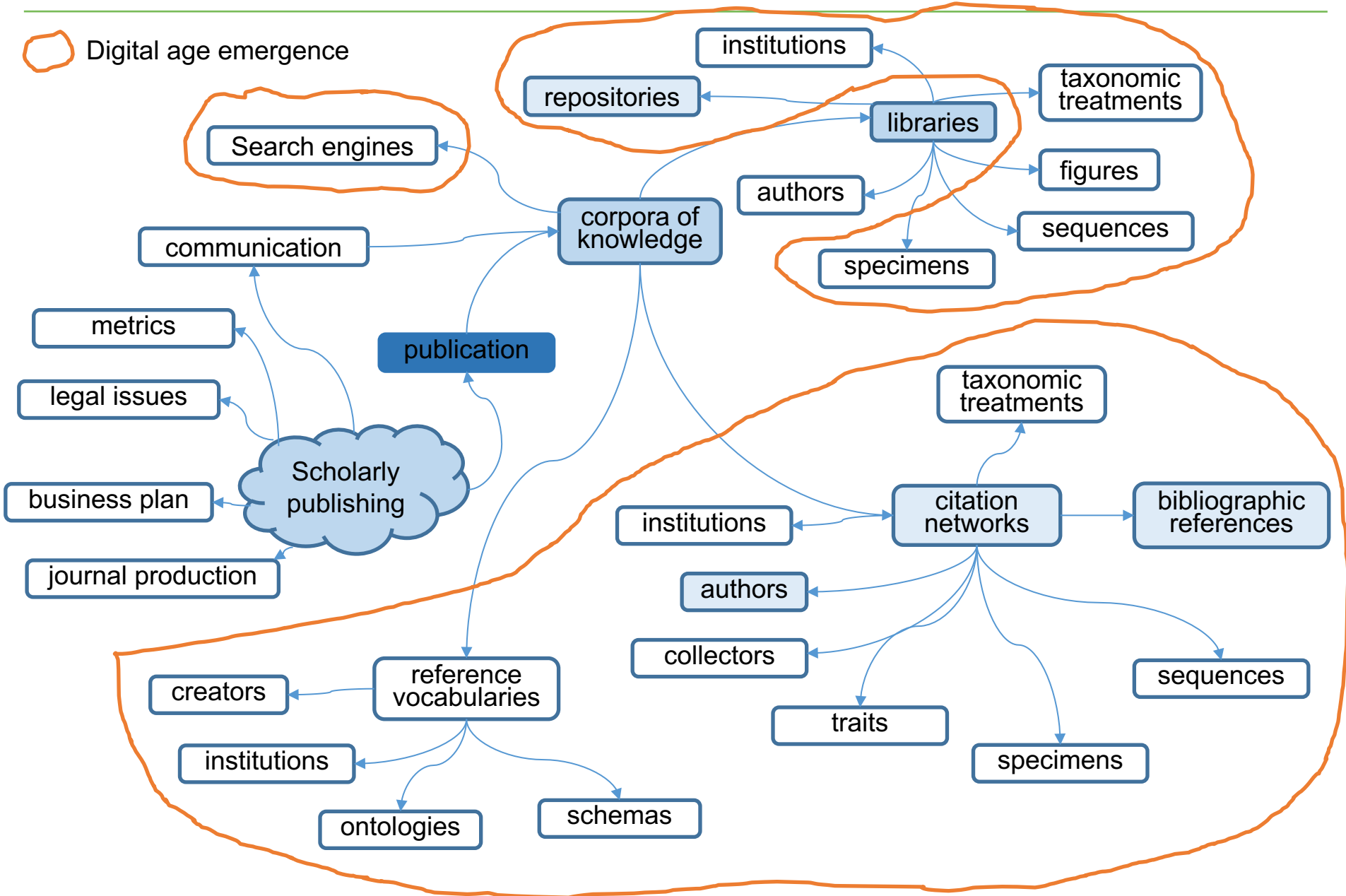




Scholarly publishing: a daunting task



 Digital age emergence





Highly **structured**
research data

publishing



Semantically
unstructured
text

data mining



Semantically
enhanced,
structured data

Beyond the PDF – unstructured to structured publications ...



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From an article to data and knowledge

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One article = thousands of facts

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Development of

- Standards vocabularies
 - Ontologies
 - Schemas
-
- Tools to mine and semantically enhance publications
-
- Repositories for semantical enhanced entities to make them FAIR
-
- Search engines

Plazi: conversion: extracting text streams and other elements



Re-creating a semantically enhanced publication

66 – Revision of *Meligethes* *Scotinus* [preparation] Conditae 01, 2014

Abstract
The endemic *Meligethes* genus *Scotinus* falls within *Aleocharinae* as distinguished from *Meligethes* Dejean, the only other genus of *Aleocharinae* occupying Madagascar, based on the presence of an indurate at least on young pupa (in glabrous or tuberculate) and on young pupae (finer and subshiny, red, short, straight) (DALL, 1964). *Scotinus* were placed in the subtribe *Asphaenotarsa* (FICKER & SIBOLD) raised along with 14 African and Asian genera (ROBERTSON & LI, 2010). Among these genera, *Scotinus* lies in the presence of an indurate of straight elongated tubercles on the outer surface of the corolla lobe (DALL, 1964; PERAIN, & WENZ, 1968). Nevertheless, during morphological analysis with both *Scotinus* Tugan and *Scotinus* Fries, and with the latter, a nearest and well-defined African genus, it falls in line with peculiar photostellar scarified *Helodes* (PERAIN, & WENZ, 1968). This character is absent in *Scotinus* a relationship with other Asian genera of c. 35 species with a single species in East Africa, 7 species both (PERAIN & WENZ, 1969). Therefore, we revealed the error in *Scotinus* as a minor revision of phylogenetic rank and consequently, “the genus *Scotinus* (tribe *Asphaenotarsini*) is synonymized with *Scotinus* (tribe *Meligethini*)” (PERAIN, PERAIN, & NICKLICH, 2008, 2010; also PERAIN & LI, 2013).

Previous treatments of *Scotinus* recognized two well-defined species: *Scotinus* *Scotinus* of *Scotinus* (DALL) and *Scotinus* *Scotinus* (DALL). They are localized respectively in the sub-ventral area and the sub-dorsal area of the subventral area of *Meligethes* (Fig. 1). A recent review of material of the genus *Scotinus* for the “Catalogue of the Nearctic genera of *Meligethinae*” (MADONCO & CATEORA, 2010) revealed a confusion from the immature stages of *Helodes* (SIBOLD) et al. (1846) that did not reach other of the currently known species. Subsequently, further collection of this subtribe species has been made in the island of Madagascar. The *Scotinus* distribution was mostly in the southern part of Madagascar (mostly in the vicinity of Antananarivo) (most of the material of this subtribe is mostly published monographs on the biodiversity of the insular fauna of Madagascar) (e.g. 2013), including a single African species (GOTTARD et al., 2013). These materials led to the discovery of new species of different groups including one with several morphological features (GOTTARD & GOTTARD, 2011) and a single pupa (GOTTARD et al., 2012; GOTTARD et al., 2013; GOTTARD & DREHSE, 2013).

In the present article, we provide a complete revision of *Scotinus* and describe a new species endemic to western Madagascar, *S. asphaenotarsis* G. & Sp. n. All three known species are provided with preliminary risk assessments based on the IUCN Red List Categories and Criteria (IUCN, 2001; IUCN, 2002). Considerable effort has been made to determine the *Aleocharinae* (ICOD) and number of subpopulations were

based on the methods presented in GOTTARD et al. (2012). Also, a discussion of the error concerns known species in the genus as presented as a subtribe of the morphological affiliation of each species is also provided.

Key to the endemic *Meligethes* genus *Scotinus*

- Flowers tube c. 1–2 mm in diam. and prior to anthesis; corolla tube covered by a sparse indurate, opening distally between each of the five lobes etc. → **S. *Asphaenotarsis***
- Flowers tube c. 4–6 mm in diam. and prior to anthesis; corolla tube covered by a dense indurate, opening mostly uniformly at anthesis. → **S. *Meligethini***
- Male genitalia and pupae covered by a sparse indurate; corolla with a dense uniform extant indurate. → **S. *Asphaenotarsis***
- Male genitalia and pupae indurate; corolla with two different extant indurate types; a distinct, relatively open indurate over the entire surface, and with complete yellow fringe of long indurates on the outer surface of the corolla longitudinal along each suture. → **S. *Meligethini***

Synonyms
Scotinus (DALL) in *Annalis* nos 2, 4, 115, 1964.
Type: *Scotinus* *Scotinus* (endemic) *Scotinus* (DALL) in *Annalis* nos 2, 4, 115, 1964.
Scotinus *Asphaenotarsis* (Lacourti) *Scotinus* in *Nat. Syst.* (Paris), 47, 1925.
= *Scotinus* *Asphaenotarsis* (Lacourti) *Scotinus* in *Yule*, *Ann. Entomol. Soc. Lond.*, 20(2), 1927, 20–21, 198, 1933.
= *Scotinus* *Asphaenotarsis* (Lacourti) *Scotinus* in *Yule*, *Ann. Entomol. Soc. Lond.*, 20(2), 1927, 20–21, 198, 1933.
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67 – Revision of *Meligethes* *Scotinus* [preparation] Conditae 01, 2014

Abstract
The endemic *Meligethes* genus *Scotinus* falls within *Aleocharinae* as distinguished from *Meligethes* Dejean, the only other genus of *Aleocharinae* occupying Madagascar, based on the presence of an indurate at least on young pupa (in glabrous or tuberculate) and on young pupae (finer and subshiny, red, short, straight) (DALL, 1964). *Scotinus* were placed in the subtribe *Asphaenotarsa* (FICKER & SIBOLD) raised along with 14 African and Asian genera (ROBERTSON & LI, 2010). Among these genera, *Scotinus* lies in the presence of an indurate of straight elongated tubercles on the outer surface of the corolla lobe (DALL, 1964; PERAIN, & WENZ, 1968). Nevertheless, during morphological analysis with both *Scotinus* Tugan and *Scotinus* Fries, and with the latter, a nearest and well-defined African genus, it falls in line with peculiar photostellar scarified *Helodes* (PERAIN, & WENZ, 1968). This character is absent in *Scotinus* a relationship with other Asian genera of c. 35 species with a single species in East Africa, 7 species both (PERAIN & WENZ, 1969). Therefore, we revealed the error in *Scotinus* as a minor revision of phylogenetic rank and consequently, “the genus *Scotinus* (tribe *Asphaenotarsini*) is synonymized with *Scotinus* (tribe *Meligethini*)” (PERAIN, PERAIN, & NICKLICH, 2008, 2010; also PERAIN & LI, 2013).

Previous treatments of *Scotinus* recognized two well-defined species: *Scotinus* *Scotinus* of *Scotinus* (DALL) and *Scotinus* *Scotinus* (DALL). They are localized respectively in the sub-ventral area and the sub-dorsal area of the subventral area of *Meligethes* (Fig. 1). A recent review of material of the genus *Scotinus* for the “Catalogue of the Nearctic genera of *Meligethinae*” (MADONCO & CATEORA, 2010) revealed a confusion from the immature stages of *Helodes* (SIBOLD) et al. (1846) that did not reach other of the currently known species. Subsequently, further collection of this subtribe species has been made in the island of Madagascar. The *Scotinus* distribution was mostly in the southern part of Madagascar (mostly in the vicinity of Antananarivo) (most of the material of this subtribe is mostly published monographs on the biodiversity of the insular fauna of Madagascar) (e.g. 2013), including a single African species (GOTTARD et al., 2013). These materials led to the discovery of new species of different groups including one with several morphological features (GOTTARD & GOTTARD, 2011) and a single pupa (GOTTARD et al., 2012; GOTTARD et al., 2013; GOTTARD & DREHSE, 2013).

In the present article, we provide a complete revision of *Scotinus* and describe a new species endemic to western Madagascar, *S. asphaenotarsis* G. & Sp. n. All three known species are provided with preliminary risk assessments based on the IUCN Red List Categories and Criteria (IUCN, 2001; IUCN, 2002). Considerable effort has been made to determine the *Aleocharinae* (ICOD) and number of subpopulations were

based on the methods presented in GOTTARD et al. (2012). Also, a discussion of the error concerns known species in the genus as presented as a subtribe of the morphological affiliation of each species is also provided.

Key to the endemic *Meligethes* genus *Scotinus*

- Flowers tube c. 1–2 mm in diam. and prior to anthesis; corolla tube covered by a sparse indurate, opening distally between each of the five lobes etc. → **S. *Asphaenotarsis***
- Flowers tube c. 4–6 mm in diam. and prior to anthesis; corolla tube covered by a dense indurate, opening mostly uniformly at anthesis. → **S. *Meligethini***
- Male genitalia and pupae covered by a sparse indurate; corolla with a dense uniform extant indurate. → **S. *Asphaenotarsis***
- Male genitalia and pupae indurate; corolla with two different extant indurate types; a distinct, relatively open indurate over the entire surface, and with complete yellow fringe of long indurates on the outer surface of the corolla longitudinal along each suture. → **S. *Meligethini***

Synonyms
Scotinus (DALL) in *Annalis* nos 2, 4, 115, 1964.
Type: *Scotinus* *Scotinus* (endemic) *Scotinus* (DALL) in *Annalis* nos 2, 4, 115, 1964.
Scotinus *Asphaenotarsis* (Lacourti) *Scotinus* in *Nat. Syst.* (Paris), 47, 1925.
= *Scotinus* *Asphaenotarsis* (Lacourti) *Scotinus* in *Yule*, *Ann. Entomol. Soc. Lond.*, 20(2), 1927, 20–21, 198, 1933.
= *Scotinus* *Asphaenotarsis* (Lacourti) *Scotinus* in *Yule*, *Ann. Entomol. Soc. Lond.*, 20(2), 1927, 20–21, 198, 1933.
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= *Scotinus* *Asphaenotarsis* (Lacourti) *Scotinus* in *Yule*, *Ann. Entomol. Soc. Lond.*, 20(2), 1927, 20–21, 198, 1933.

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Revision of *Meligethes* *Scotinus* [preparation] - 67

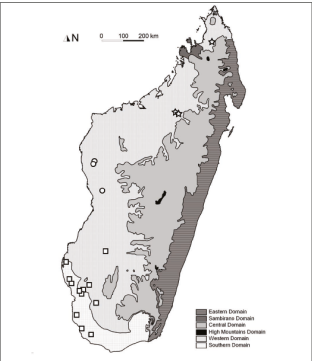


Fig. 1. Map showing the distribution of *Scotinus* *Asphaenotarsis* (*Scotinus*) and *Scotinus* *Meligethini* (*Scotinus*) in Madagascar, based on the IUCN Red List Categories and Criteria (IUCN, 2001; IUCN, 2002). Considerable effort has been made to determine the *Aleocharinae* (ICOD) and number of subpopulations were

67 – Revision of *Meligethes* *Scotinus* [preparation] - 67

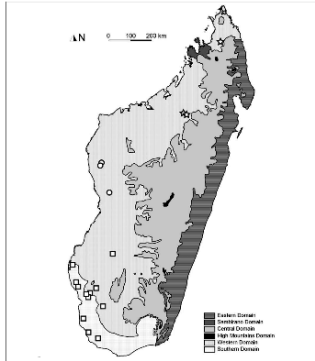


Fig. 1. Map showing the distribution of *Scotinus* *Asphaenotarsis* (*Scotinus*) and *Scotinus* *Meligethini* (*Scotinus*) in Madagascar, based on the IUCN Red List Categories and Criteria (IUCN, 2001; IUCN, 2002). Considerable effort has been made to determine the *Aleocharinae* (ICOD) and number of subpopulations were

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The screenshot displays a software interface for document metadata extraction. On the left, a file explorer shows a folder named 'annales_zoologici' containing 'ArchivosDeZoologia' and 'asianMyrmecology'. Below it, a document viewer shows a PDF page with text about the genus *Socratina*. The main window, titled 'Get Meta Data for Document candollea.c2014v691_65-73.pdf', contains a form for metadata extraction. The form includes fields for 'Publication Type' (set to 'Journal Article'), 'Authors', 'Title', 'Year', 'Journal', 'Part Designators' (with sub-fields for 'volume', 'issue', and 'numero'), 'Publisher', 'Location', and 'Editors'. A 'Document View' window is overlaid on the bottom right, showing the document's title, authors, and abstract. The abstract text is: 'A synoptic revision of the Malagasy endemic genus *Socratina* Balle (Loranthaceae) Martin W. Callmander, Iacopo Luino, Simona Da-Giau, Charles Rakotoavao & Laurent Gautier Abstract CALLMANDER, M. W., I. LUINO, S. DA-GIAU, C. RAKOTOVAO & L. GAUTIER (2014). A synoptic revision of the Malagasy endemic genus *Socratina* Balle (Loranthaceae). Candollea 69: 65-73. In English, English and French abstracts. The hemiparasitic endemic genus *Socratina* Balle (Loranthaceae) is revised for Madagascar. Three species are recognized, including a new one, *Socratina phillipsoniana* Callm. & Luino. The vegetative and floral morphology of the new species is distinctive; in particular the conspicuous longitudinal villous fringe of long dendritic trichomes on the outer surface of its corolla along each suture of the lobes that contrasts with the shorter floccose indument that covers the rest of the outer corolla surface. All three known species are provided with preliminary risk assessments based on the IUCN Red List Categories and Criteria. A key to the genus is presented and a discussion of

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Fig. 1. Map showing the distribution of *Socrataina bemarvensis* (Lecomte) Balle (stars), *S. keraudreniana* Balle (squares) and *S. philippsoniana* Calim & Luino (circles) in Madagascar plotted on the map of phytoecographical domains sensu HUMBERT (1955).

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both *Taxillus* Tiegh. and *Vanwykia* Wiens, and with the latter, an eastern and south-eastern African genus, it shares styles with peculiar pluricellular ramified trichomes (POLHILL & WIENS, 1998). This character is absent in *Taxillus*, a predominantly south-east Asian genus of c. 35 species with a single species in East Africa, *T. wiensii* Pohl. (POLHILL & WIENS, 1999). *Vanwykia* was a recent molecular phylogenetic event to Madagascar. *Socratina* could be in Madagascar (POLHILL & WIENS, 2008: 1026; see also POLHILL & WIENS, 2008: 1026).

Previous treatments of the genus *Socratina* described several species: *Socratina bemburana* Balle. They grow in the eastern dry bush and in the limestone region of Madagascar (Fig. 1). A recent review of material of the genus *Socratina* for the “Catalogue of the Vascular plants of Madagascar” (MADAGASCAR CATALOGUE, 2014) revealed a collection from the limestone region of Bemaraha (Jongkind & al. 3548) that did not match either of the currently known species. Subsequently, further collections of this undescribed species have been

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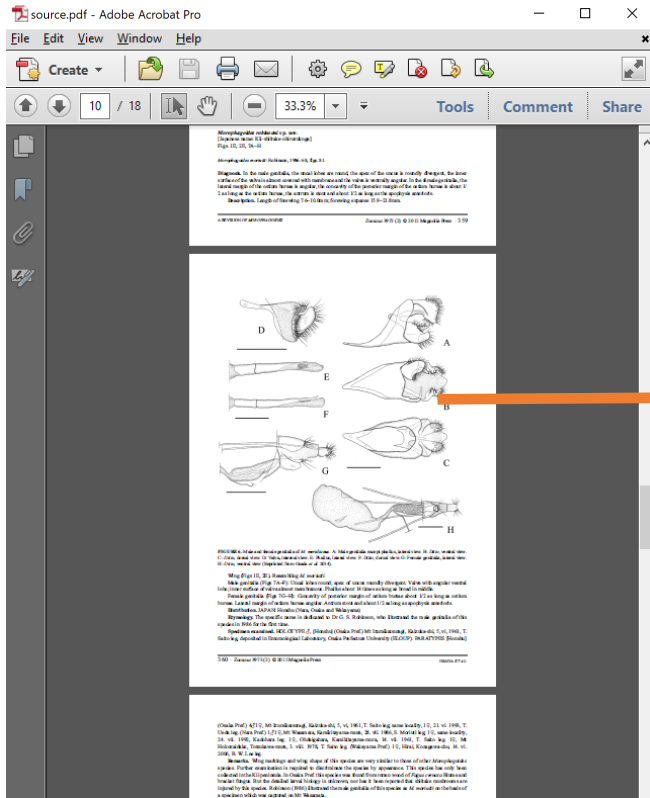
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Fig. 1. – Map showing the distribution of *Socrata bamarivensis* Lecomete Balle (stars), *S. keraudreniana* Balle (squares), and *S. philippsoniana* Calmi & Luino (circles) in Madagascar plotted on the map of phyogeographical domains sensu Humbert (1955).



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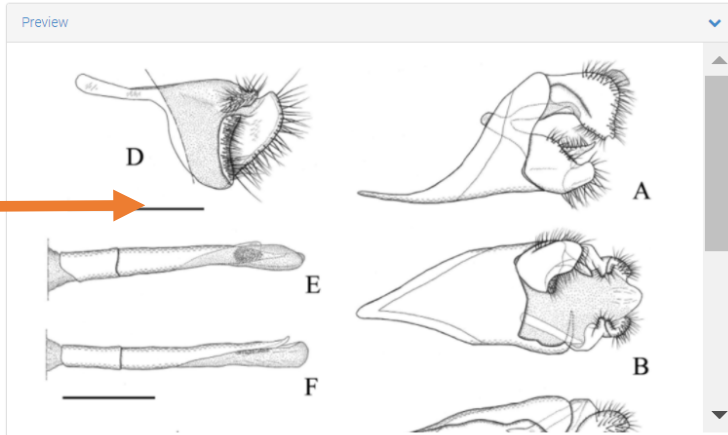
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FIGURE 6 in A revision of the genus *Morphogoides* Petersen (Lepidoptera, Tineidae) from Japan

Osada, Yohei; Sakai, Makoto; Hirowatari, Toshiya

FIGURE 6. Male and female genitalia of *M. meridianus*. A: Male genitalia except phallus, lateral view. B: Ditto, ventral view. C: Ditto, dorsal view. D: Valva, internal view. E: Phallus, lateral view. F: Ditto, dorsal view. G: Female genitalia, lateral view. H: Ditto, ventral view (Reprinted from Osada et al. 2014).



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Table 1.2

K2P distances for mtDNA COI sequences of 11 species of *Pseudofulvodes*

Minimum Interspecific and Maximum Intraspecific Distances (%)

	cer	pyr	xan	pol	kal	edw	sev	elo	ata	mes	zeu
<i>P. cerasinus</i>	0.18										
<i>P. pyrius</i>	3.50	NA									
<i>P. xanthomus</i>	11.34	11.23	NA								
<i>P. polackorum</i>	9.47	9.47	7.50	0.31							
<i>P. kaleidos</i>	10.40	10.71	4.48	8.42	NA						
<i>P. edwardi</i>	16.06	15.27	15.51	14.58	15.90	0.31					
<i>P. severnsi</i>	16.34	15.61	15.45	14.34	15.83	0.46	0.93				
<i>P. elongatus</i>	18.80	20.38	19.16	18.69	19.60	15.81	16.14	0.62			
<i>P. atavai</i>	19.32	18.57	16.22	14.83	16.61	17.97	17.76	17.78	0		
<i>P. mesostigma</i>	17.64	16.76	15.08	14.83	16.49	9.07	9.30	17.50	16.89	0.93	
<i>P. zeus</i> , n. sp.	17.49	17.23	16.28	17.09	17.51	9.29	8.61	17.94	18.20	5.31	NA

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	cer	pyr	xan	pol	kal	edw	sev	elo	ata	mes	zeu
<i>P. cerasinus</i>	0.18										
<i>P. pyrius</i>	3.50	NA									
<i>P. xanthomus</i>	11.34	11.23	NA								
<i>P. polackorum</i>	9.47	9.47	7.50	0.31							
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<i>P. atavai</i>	19.32	18.57	16.22	14.83	16.61	17.97	17.76	17.78	0		
<i>P. mesostigma</i>	17.64	16.76	15.08	14.83	16.49	9.07	9.30	17.50	16.89	0.93	
<i>P. zeus</i> , n. sp.	17.49	17.23	16.28	17.09	17.51	9.29	8.61	17.94	18.20	5.31	NA



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<Not a citation>	... February 24, 2014. Accepted on March 18, 2014. Introduction The endemic Malagasy genus <i>Socratina</i> Balle (Loranthaceae ...
BALLE, S. (1964a): Loranthaceae	... at anthesis (vs. short, straight) (BALLE, 1964 a). <i>Socratina</i> was placed in the subtribe <i>Tapinanthinae</i> Nickrent ...
NICKRENT, D. L. & MALECOT, R. VIDAL- RUSSELL (2010): A revised classification of Santalales	... & Vidal-Russell along with 14 African and Arabian genera (NICKRENT & al., 2010). Among these genera, <i>Socratina</i> is unique in ...
BALLE, S. (1964b): Les Loranthaceae de Madagascar et des archipels voisins	... appressed trichomes on the inner surface of the corolla-lobes (BALLE, 1964 b; POLHILL & WIENS, 1998). It nevertheless ...
POLHILL, R. (1998): D. WIENS	... surface of the corolla-lobes (BALLE, 1964 b; POLHILL & WIENS, 1998). It nevertheless has strong morphological affinities with both ...
POLHILL, R. (1998): D. WIENS	... , it shares styles with peculiar pluricellular ramified trichomes (POLHILL & WIENS, 1998). This character is absent in <i>Taxillus</i> , a ...
POLHILL, R. (1999): D. WIENS	... in East Africa, T. wiensii Pohl. (POLHILL & WIENS, 1999). <i>Vanwykia</i> was revealed to be sister to <i>Socratina</i> ...

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Introduction

The endemic Malagasy genus *Socratina* Balle (Loranthaceae) is distinguished from *Bakerella* Tiegh, the only other genus of Loranthaceae occurring in Madagascar; based on the presence of an indument at least on young parts (in *Bakerella*) and its long recurved filaments at a short- straight) (BALLE, 1964 a). *Socratina* was the subtribe *Tapinanthinae* Nickrent & Vidal-Russell with 14 African and Arabian genera (NICKRENT & al., 2010). Among these genera, *Socratina* is unique in the an indument of straight appressed trichomes on the face of the corolla-lobes (BALLE, 1964 b; POLHILL & WIENS, 1998). It nevertheless has strong morphological affinities with both *Taxillus* (Tiegh) and *Vanwykia* Wiens, and with an eastern and south-eastern African genus; it shares styles with peculiar pluricellular ramified trichomes (POLHILL & WIENS, 1998). This character is absent in *Taxillus*, a mainly south-east Asian genus of c. 35 species with species in East Africa, *T. wiensii* Pohl. (POLHILL & WIENS, 1999). *Vanwykia* was revealed to be sister to *Socratina* in a recent molecular phylogenetic study and a consequent dispersal event to Madagascar from a common ancestor could be implied (VIDAL-RUSSELL & NICKRENT, 2010: 1026; see also BUERKI & al., 2013).

Previous treatments of *Socratina* recognised two well-defined species: *Socratina bemarivensis* (Lecomte) Balle and *S. kerandreniana* Balle. They are localized respectively in the south-western dry bush and in the dry deciduous forests of the northern part of Madagascar (Fig. 1). A recent review of material of the genus *Socratina* for the "Catalogue of the Vascular plants of Madagascar" (MADAGASCAR CATALOGUE 2014) revealed a collection from the limestone region of Bemaraha (Jongkind & al. 3548) that did not match either of the currently known species. Subsequently, further collections of this undescribed species have been made at sites on a similar substrate in the Beanka area about 100 km to the north of Bemaraha. The Beanka forests have recently been the subject of intensive biodiversity inventories and a recently published monograph on the biodiversity of this inter-

based on the methods presented in CALLMANDER & al. (2007). A key to discriminate the three currently known species in the genus is presented and a discussion of the morphological affinities of each species is also provided.

Systematics

Socratina Balle in Adansonia ser. 2: 4: 135, 1964.
Typus: *Socratina bemarivensis* (Lecomte) Balle
Socratina bemarivensis (Lecomte) Balle in Adansonia ser. 2: 4: 135, 1964.
Loranthus bemarivensis Lecomte in Not. Syst. (Paris) 4: 37, 1923.
Tapinanthus bemarivensis (Lecomte) Danser in Verh. Kon. Akad. Wetensch., Afd. Natuurk., sect. 2: 29: 108, 1933.
Lectotypus (designed by BALLE, 1964 b): 135; MADAGASCAR. Prov. Maha-janga: Bois de la Haute Bemarivo-*SPhillipsoniana*

Edit Attributes

Attribute Name: bibRefCitation BUERKI & al., 2013

Attribute Value:

- author: BUERKI, S.
- journalOrPublisher: Bot. J. Linn. Soc.
- pagination: 304 - 329
- part: 171
- refString: BUERKI, S., D. S. DEVEY, M. W. CALLMANDER, P. B. PHILL
- title: Spatio-temporal history of the endemic genera of Madagascar
- type: journal article
- year: 2013

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Introduction

The endemic Malagasy genus *Socratina* Balle (*Loranthaceae*) is distinguished from *Bakerella* Tiegh, the only other genus of *Loranthaceae* occurring in Madagascar based on the presence of an indument at least on young parts (vs) glabrous in *Bakerella* and its long recurved filaments at anthesis (vs. short, straight) (BALLE, 1964a). *Socratina* was placed in the subtribe *Tapinanthinae* Nickrent & Vidal-Russell along with 14 African and Arabian genera (NICKRENT & al., 2010). Among these genera, *Socratina* is unique in the presence of an indument of straight appressed trichomes on the inner surface of the corolla lobes (BALLE, 1964b, 1998). It nevertheless has strong morphological similarities with both *Taxillus* (Tiegh) and *Vanwykia* (Wien) (WIEENS, 1998). This character is absent in the recently described, apparently south-east Asian genus of c. 35 species in East Africa, *T. wiensii* Pohl (2009). *Vanwykia* was revealed to be sister to *Socratina* in a recent molecular phylogenetic study and consequently a "dispersal event to Madagascar from a common ancestor with *Socratina* could be implied" (VIDAL-RUSSELL & NICKRENT, 2008: 1026; see also BUERRI & al., 2013).

Previous treatments of *Socratina* recognised two well-defined species: *Socratina bemarkensis* (Lecomte) Balle and *S. kerandreniana* Balle. They are localized respectively in the south-western dry bush and in the dry deciduous forests of the northern part of Madagascar (Fig. 1). A recent review of material of the genus *Socratina* for the "Catalogue of the Vascular plants of Madagascar" (MADAGASCAR CATALOGUE, 2014) revealed a collection from the limestone region of Bemarka (Jongkind & al. 3548) that did not match either of the currently known species. Subsequently, further collections of this undescribed species have been made at sites on a similar substrate in the Beanka area about 100 km to the north of Bemarka. The Beanka forests have recently been the subject of intensive biodiversity inventories and a recently published monograph on the biodiversity of this inte-

based on the methods presented in CALLMANDER & al. (2007). A key to discriminate the three currently known species in the genus is presented and a discussion of the morphological affinities of each species is also provided.

Key to the endemic Malagasy genus *Socratina*

1) Flowers buds c. 1-2 mm in diam. just prior to anthesis; corolla tube covered by a sparse indument, splitting distally between each of the five lobes at anthesis.....
S. kerandreniana

2) Flowers buds c. 1-2 mm in diam. just prior to anthesis; corolla tube covered by a sparse indument, splitting mostly between each of the five lobes at anthesis.....
S. bemarkensis

3) Flowers buds c. 1-2 mm in diam. just prior to anthesis; corolla tube covered by a sparse indument, splitting mostly between each of the five lobes at anthesis; corolla with two long trichomes on the inner surface of each lobe, relatively sparse indument over the entire surface, and with conspicuous villous fringe of long trichomes on the outer surface of its corolla longitudinal along each suture.....
S. phillipsoniana

Systematics

Socratina Balle in Adansonia ser. 2, 4: 135, 1964.

Typus: *Socratina bemarkensis* (Lecomte) Balle.

Socratina bemarkensis (Lecomte) Balle in Adansonia ser. 2, 4: 135, 1964.

± *Loranthus bemarkensis* Lecomte in Not. Syst. (Paris) 4: 37, 1923.

± *Tapinanthus bemarkensis* (Lecomte) Danser in Verh. Kon. Akad. Wetensch. Afd. Natuurk., sect. 2, 29: 108, 1933.

Lectotypus (designed by BALLE, 1964b: 135): MADAGASCAR, Prov. Maha-janga: Bois de la Haute Bemarka.

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Introduction

The endemic Malagasy genus *Socratina* Balle (Loranthaceae) is distinguished from *Bakerella* Tiegh, the only genus of *Loranthaceae* occurring in Madagascar based on presence of an indument at least on young parts (vs. glabrous in *Bakerella*) and its long recurved filaments at anthesis (short, straight) (BALLE, 1964a). *Socratina* was placed in the subtribe *Tapinanthinae* Nickrent & Vidal-Russell with 14 African and Arabian genera (NICKRENT & al., 2008). Among these genera, *Socratina* is unique in the presence of an indument of straight appressed trichomes on the inner face of the corolla lobes (BALLE, 1964b; POLHILL & al., 1998). It nevertheless has strong morphological affinity with both *Taxillus* Tiegh and *Vanwykia* Wiens, and with the eastern and south-eastern African genus, it shares with peculiar pluricellular ramified trichomes (POLHILL & al., 1998). This character is absent in *Taxillus*, a primarily south-east Asian genus of c. 35 species with a species in East Africa, *T. wiensii* Pohl (POLHILL & al., 1999). *Vanwykia* was revealed to be sister to *Socratina* in a recent molecular phylogenetic study and consequently a dispersal event to Madagascar from a common ancestor of *Socratina* could be implied (VIDALL-RUSSELL & NICKRENT, 2008; 1026; see also BUERKI & al., 2013).

Previous treatments of *Socratina* recognised two well-defined species: *Socratina bemarivensis* (Lecomte) Balle and *S. kerandreniana* Balle. They are localized respectively in the south-western dry bush and in the dry deciduous forests of the northern part of Madagascar (Fig. 1). A recent review of material of the genus *Socratina* for the "Catalogue of the Vascular plants of Madagascar" (MADAGASCAR CATALOGUE, 2014) revealed a collection from the limestone region of Bemaraha (Jongkind & al., 3548) that did not match either of the currently known species. Subsequently, further collections of this undescribed species have been made at sites on a similar substrate in the Beanka area, about 100 km to the north of Bemaraha. The Beanka forests have recently been the subject of intensive biodiversity inventories and a recently published monograph on the biodiversity of this interesting area (GOODMAN & al., 2013), including a check list of vas-

based on the methods presented in CALLMANDER & al. (2007).

Edit Attributes

taxonomicName: *Socratina bemarivensis* (Lecomte) Balle

_evidence: catalogs

_step: species 1

authority: (Lecomte) Balle

authorityName: (Lecomte) Balle

class: Magnoliopsida

family: Loranthaceae

genus: *Socratina*

kingdom: Plantae

order: Santalales

phylum: Tracheophyta

rank: species

species: *bemarivensis*

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Systematics

Socratina Balle in *Adansonia* ser. 2, 4: 135, 1964.

Typus: *Socratina bemarivensis* (Lecomte) Balle

Socratina bemarivensis (Lecomte) Balle in *Adansonia* ser. 2, 4: 135, 1964.

+ *Loranthus bemarivensis* Lecomte in *Not. Syst.* (Paris) 4: 37, 1923.

+ *Tapinanthus bemarivensis* (Lecomte) Danser in *Verh. Kon.-Akad. Wetensch. (Afd. Natuurk.) sect. 2*: 29, 108, 1933.

Lectotypus (designed by BALLE, 1964b: 135): MADAGASCAR, Prov. Mahajanga: Bois de la Haute Bemariva, [16°06'S 47°44'E], XI 1918, II, *Perrier de la Bâtie* 10646.

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Start 'multiple' SubSection	▼ Martin W. Callmander, Jacopo Luino, Smona Da-Giau, Charles Rakotoivoa & Laurent Gautier (page 65)
Start 'abstract' SubSection	▼ Abstract (page 65)
Continue SubSection	▼ CALLMANDER, M. W., I. LUINO, S. DA-GIAU, C. RAKOTOIVOAO & (page 65)
Continue SubSection	▼ L. GAUTIER (2014). A synoptic revision of the Malagasy endemic genus <i>Socratina</i> Balle (Loranthaceae). <i>Candollea</i> 69: 65 - 73. In English, English and French abstracts. (page 65)
Continue SubSection	▼ The hemiparasitic endemic genus <i>Socratina</i> Balle (Loranthaceae) is revised for Madagascar. Three species are recognized, including a new one, <i>Socratina</i> [...] Categories and Criteria. A key to the genus is presented and a discussion of the morphological affinities of each species is also provided. (page 65)
Continue SubSection	▼ Resume (page 65)
Continue SubSection	▼ CALLMANDER, M. W., I. LUINO, S. DA-GIAU, C. RAKOTOIVOAO & (page 65)
Continue SubSection	▼ L. GAUTIER (2014). Une révision synoptique du genre endémique malgache <i>Socratina</i> Balle (Loranthaceae). <i>Candollea</i> 69: 65 - 73. En anglais, résumés anglais et français. (page 65)
Continue SubSection	▼ Le genre hemiparasite endémique <i>Socratina</i> Balle (Loranthaceae) est révisé pour Madagascar. Trois espèces sont reconnues, y compris une nouvelle, <i>Socratina</i> [...] la Liste Rouge de LUIJON. Une clé de genre est présentée et une discussion des affinités morphologiques de chaque espèce est également fournie. (page 65)
Continue SubSection	▼ Key-words (page 65)
Start 'treatment' SubSection	▼ ORANTHACEAE - <i>Socratina</i> - Bearia - Madagascar - Taxonomy - Conservation (page 65)
Continue SubSection	▼ Addresses of the authors: MWC: Missouri Botanical Garden, P. O. Box 299, St. Louis, MO, 63166 - 0299, U. S. A. and Conservatoire et Jardin botaniques de la Ville de Genève, ch. de l'Impératrice 1, CP 60, 1292 Chambésy, Switzerland. Email: martin.callmander@mobot.org (page 65)
Continue SubSection	▼ LL, SDG, LG: Conservatoire et Jardin botaniques de la Ville de Genève and Université de Genève, Laboratoire universitaire Systématique végétale et Biodiversité, CP 60, 1292 Chambésy, Switzerland. (page 65)
Continue SubSection	▼ CR: Missouri Botanical Garden, P. O. Box 3391, Antananarivo 101, Madagascar. (page 65)
Continue SubSection	▼ Submitted on February 24, 2014. Accepted on March 18, 2014. (page 65)
Start 'introduction' SubSection	▼ Introduction (page 66)
Continue SubSection	▼ The endemic Malagasy genus <i>Socratina</i> Balle (Loranthaceae) is distinguished from <i>Bakerella</i> Tiegh., the only other genus of Loranthaceae occurring in Madagascar [...] <i>Socratina</i> could be implied " (VIDALL- RUSSEL & NICKRENT, 2008: 1026; see also BUERKI & al., 2013). (page 66)
Continue SubSection	▼ Previous treatments of <i>Socratina</i> recognised two well-defined species: <i>Socratina</i> <i>beharivensis</i> (Lecomte) Balle and <i>S. keraudreniana</i> Balle. They are localized respectively [...] and plants (LETSARA & al., 2012; CALLMANDER & al., 2013; GAUTIER & DEROIN, 2013). (page 66)
Continue SubSection	▼ In the present article, we provide a synoptic revision of <i>Socratina</i> and describe a new species endemic to western Madagascar, <i>S. philippiniana</i> [...] discriminate the three currently known species in the genus is presented and a discussion of the morphological affinities of each species is also provided. (page 66)
Start 'treatment' SubSection	▼ Key to the endemic Malagasy genus <i>Socratina</i> (page 66)
Continue SubSection	▼ 1. Flowers buds c. 1 - 2 mm in diam. just prior to anthesis; corolla tube covered by a sparse indument; splitting distally between each of the five lobes at anthesis <i>S. keraudreniana</i> (page 66)
Continue SubSection	▼ 1a. Flowers buds c. 4 - 6 mm in diam. just prior to anthesis; corolla tube covered by a dense indument, splitting mostly unilaterally at anthesis 2 (page 66)
Continue SubSection	▼ 2. Mature leaves and petiole covered by a russet indument; corolla with a dense uniform external indument <i>S. beharivensis</i> (page 66)
Continue SubSection	▼ 2a. Mature leaves and petiole glabrescent; corolla with two different external indument types: a uniform, relatively sparse indument over the entire surface, and with conspicuous villous fringe of long trichomes on the outer surface of its corolla longitudinal along each suture <i>S. philippiniana</i> (page 66)
Continue SubSection	▼ Systematics (page 66)
Start 'treatment' SubSection	▼ <i>Socratina</i> Balle in Adansonia ser. 2, 4: 135. 1964. (page 66)
Continue SubSection	▼ Typus: <i>Socratina</i> <i>beharivensis</i> (Lecomte) Balle (page 66)
Start 'treatment' SubSection	▼ <i>Socratina</i> <i>beharivensis</i> (Lecomte) Balle in Adansonia ser. 2, 4: 135. 1964. (page 66)
Continue SubSection	▼ ≠ <i>Loranthus</i> <i>beharivensis</i> Lecomte in Not. Syst. (page 66)
Continue SubSection	▼ (Paris) 4: 37. 1923. (page 66)
Continue SubSection	▼ ≠ <i>Tapinanthus</i> <i>beharivensis</i> (Lecomte) Danser in Verh. (page 66)
Continue SubSection	▼ Kon. Akad. Wetensch., Afd. Naturk., sect. 2. 29: (page 66)
Continue SubSection	▼ 108. 1933. (page 66)
Continue SubSection	▼ Lectotypus (designed by BALLE, 1964 b: 135): MADA- (page 66)
Continue SubSection	▼ GASCAR. Prov. Mahajanga: Bois de la Haute Beharivo, (page 66)
Continue SubSection	▼ [16 ° 06 'S 47 ° 44 'E], XI. 1918, fl., Perrier de la Bathie 10646 (page 66)
Continue SubSection	▼ [P: [P 00573453]]; isolecto- P: [P 0573454, P 0573455](). (page 66)
Continue SubSection	▼ Conservation status. - With an EOO of 2,336 km ² and an AOO of 27 km ² and three subpopulations, none situated within the protected area network, <i>S. beharivensis</i> is assigned a preliminary status of "Vulnerable" [VU B 1 ab (i) + 2 ab (i)] following IUCN Red List Categories and Criteria (IUCN, 2012). (page 66)
Continue SubSection	▼ Notes. - <i>Socratina</i> <i>beharivensis</i> was originally described in <i>Loranthus</i> Jacq. by LECOMTE (1923) following the very broad generic concept of ENGLER [...] vs. corolla slender covered by short (1 - 1.5 mm) trichomes forming a sparse indument) (Fig. 2). (page 66)

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nomenclature	▼ <i>Socratina bemarivensis</i> (Lecomte) Balle in <i>Adansonia</i> ser. 2, 4: 135. 1964.
reference_group	▼ ≠ <i>Loranthus bemarivensis</i> Lecomte in <i>Not. Syst. (Paris)</i> 4: 37. 1923.
reference_group	▼ ≠ <i>Tapinanthus bemarivensis</i> (Lecomte) Danser in <i>Verh. Kon. Akad. Wetensch., Afd.Natuurk., sect. 2</i> : 29: 108. 1933.
materials_examined	▼ Lectotypus (designed by BALLE, 1964b: 135): MADA- GASCAR. Prov. Mahajanga: Bois de la Haute Bemarivo, [16°06'S 47°44'E], XI.1918, fl., Perrier de la Bathie 10646 (P [P00573453]!); isolecto-: P [P0573454, P0573455]!).
biology_ecology	▼ Conservation status. - With an EOO of 2,336 km ² , and an AOO of 27 km ² and three subpopulations, none situated within the protected area network, <i>S. bemarivensis</i> is assigned a preliminary status of "Vulnerable" [VU B1ab(i)+2ab(i)] following IUCN Red List Categories and Criteria (IUCN, 2012).
discussion	▼ Notes. - <i>Socratina bemarivensis</i> was originally described in <i>Loranthus</i> Jacq. by LECOMTE (1923) following the very broad generic concept of ENGLER & KRAUSE (1935), a genus that is now circumscribed as mostly restricted to temperate or mountain forest from Europe to south-east Asia (BARLOW, 1997). Henri Perrier de la Bathie, who collected both syntypes wrote on the label of one of them (Perrier de la Bathie 10652), that the flowers open at maturity with only one longitudinal split along the entire length of the corolla lobes (see BALLE, 1964b: 137). Anthesis of <i>S. bemarivensis</i> is very different to that of <i>Socratina keraudreniana</i> where the corolla divides into five lobes in the distal part (Fig. 2). Several other characters of the morphology of its leaves and flowers allow to differentiate those two species: limb sub-orbicular to largely ovate, 0.8-4.8 cm in width in <i>S. bemarivensis</i> (vs. oblanceolate to obovate, 0.3-0.8 cm in <i>S. keraudreniana</i>); corolla broad, covered with long (2-2.5 mm) trichomes forming dense indument (vs. corolla slender covered by short (1-1.5 mm) trichomes forming a sparse indument) (Fig. 2).
discussion	▼ Perrier de la Bathie noted several hosts for <i>Socratina bemarivensis</i> : <i>Acacia</i> sp. and <i>Dalbergia</i> sp. (Leguminosae), <i>Eugenia</i> sp. (Myrtaceae) and <i>Vernonia</i> sp. (Asteraceae) (BALLE, 1964b). Most Loranthaceae species seem to have a wide range of hosts (POLHILL & WIENS, 1998) but some species have also very restricted hosts such as <i>Taxillus wiensii</i> known only to grow on <i>Cynometra webberi</i> Baker f. (Leguminosae) (POLHILL & WIENS, 1998). Further studies are needed in Madagascar to determine if the genus <i>Socratina</i> has host specificity as this information is recorded on very few collections (see also comments under <i>S. keraudreniana</i>).
materials_examined	▼ Additional material examined. - MADAGASCAR.Prov.Antsiranana: Ambilobe, Ambakirano, Behefaka, Anjahana, foret d'Ampivanana, 9 km au S de Behefaka, 13°21'12"S 49°09'11"E, 276 m, 6.V.2005, fl. & fr., Ratovoson 105 (CNARP, MO, P [P06714072], TAN). Prov. Mahajanga: Bord de l'Anovilava, affluent du Bemarivo (Boina), [16°09'S 47°51'E], VI.1906, fl., Perrier de la Bathie 10642 (P [P05447659, P05447668, P05447669] [syntypes]!).

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[-] *Loranthus bemarivensis* Lecomte in Not. Syst.
(Paris) 4: 37. 1923.

[-] *Tapinanthus bemarivensis* (Lecomte) Koenig, Akad. Wetensch., Afd. Naturk. (Berlin) 108: 1933.

Lectotypus (designed by BALLE, 1964b: 135): MADA- GASCAR, Prov. Mahajanga: Bois de la Haute Bemarivo, [16°06'S 47°44'E], XI.1918, fl., Perrier de la Bâthie 10646 (P [P 00573453]); isolecto-: P [P 0573453];

Conservation status. - With an EOO of 27 km² and three subpopulations, the protected area network, *S. bemarivensis* has a preliminary status of "Vulnerable" [VU Blab(i)+2ab(i)] following IUCN Red List Categories and Criteria (IUCN, 2012).

Notes. - *Socratina bemarivensis* was originally described in *Loranthus* Jacq. by LECOMTE (1923) following the very broad generic concept of ENGLER & KRAUSE (1935), a genus that is now circumscribed as mostly restricted to temperate or mountain forest from Europe to south-est Asia (BARLOW, 1997). Henri Perrier de la Bâthie, who collected both syntypes

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- collectionCode: P
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- latitude: -16.1
- location: Bois de la Haute Bemarivo
- longLatPrecision: 1283
- longitude: 47.733334
- municipality: Prov. Mahajanga
- specimenCode: 10646, P00573453
- specimenCount: 1
- typeStatus: lectotype

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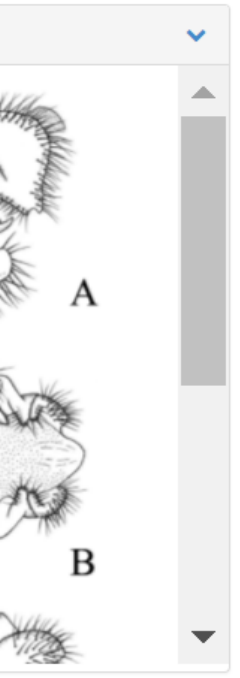
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Chromatopterum (Diptera, Chloropidae), a newly recorded genus from China, and description of two new species

Liu, Xiaoyan; Nartshuk, Emilia P.; Yang, Ding

Liu, Xiaoyan, Nartshuk, Emilia P., Yang, Ding (2017): Chromatopterum (Diptera, Chloropidae), a newly recorded genus from China, and description of two new species. Zootaxa 4306 (2): 279-286, DOI: <https://doi.org/10.11646/zootaxa.4306.2.8>



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Chromatopterum (Diptera, Chloropidae), a newly recorded genus from China, and description of two new species

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Abstract

The genus *Chromatopterum* Becker is newly recorded from China. The following two described species are new to science: *C. brevicauda* sp. nov. and *C. longicauda* sp. nov. A key to the species of genus *Chromatopterum* from the world is given.

Key words: Diptera, Chloropidae, *Chromatopterum*, new species, China

Introduction

Becker (1910) proposed the genus *Chromatopterum* based on a single species *C. delicatum* from East Africa. Anderson (1977) omitted to treat *Chromatopterum* in his generic classification mainly based on the character of male genitalia. Nartshuk (2012) placed this genus in the tribe Mindini of the subfamily Chloropinae. It is a small genus with 8 known species from the world, of which one species is distributed in the Oriental Region, one species in the Australian and six species in the Afrotropical (Sabrosky 1951; Seguy 1957; Deeming 1981; Kanmiya & Yukawa 1985; Pape & Thompson 2017).

The genus *Chromatopterum* is characterized by the combination of the following characters: head higher than long, wider than thorax; eyes large and naked; gena linear or narrow; ocellar triangle large, smooth and shiny; arista naked or pubescent; scutum slightly convex; scutellum wider than long; wing almost entirely fuscous or hyaline; fifth fuscous costal band extending along costa to or beyond apex of R_{4+5} crossvein; $m-cu_1$ close to wing base (Becker 1910, 1911). Deeming (1981) described generic diagnosis based on the Afrotropical species such as basal development and thickening of cuticle on either side of basal 2 abdominal tergites and 5th abdominal tergite absent or present only by a pair of small crescent shaped. But Kanmiya & Yukawa (1985) pointed out these characters are not applicable to the known Oriental species.

In this paper, the genus *Chromatopterum* is recorded from China for the first time with two species, *C. brevicauda* sp. nov. and *C. longicauda* sp. nov. A key to the species of genus *Chromatopterum* from the world is given.

Material and methods

Specimens were studied and illustrated with ZEISS Stemi 2000-c. Genitalic preparations were made by macerating the apical portion of abdomen in warm 10% NaOH for 17-20 min, after examination it was transferred to fresh cytochrome and stored in a microvial pinned below the specimen. Specimens are deposited in the Entomological Institute of China Agricultural University (GAD), Beijing. The morphological nomenclature follows Cumming & Wood (2009), except for the mesoblasts (fused male cerci) (Anderson 1977).

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Files

Files are not publicly accessible.

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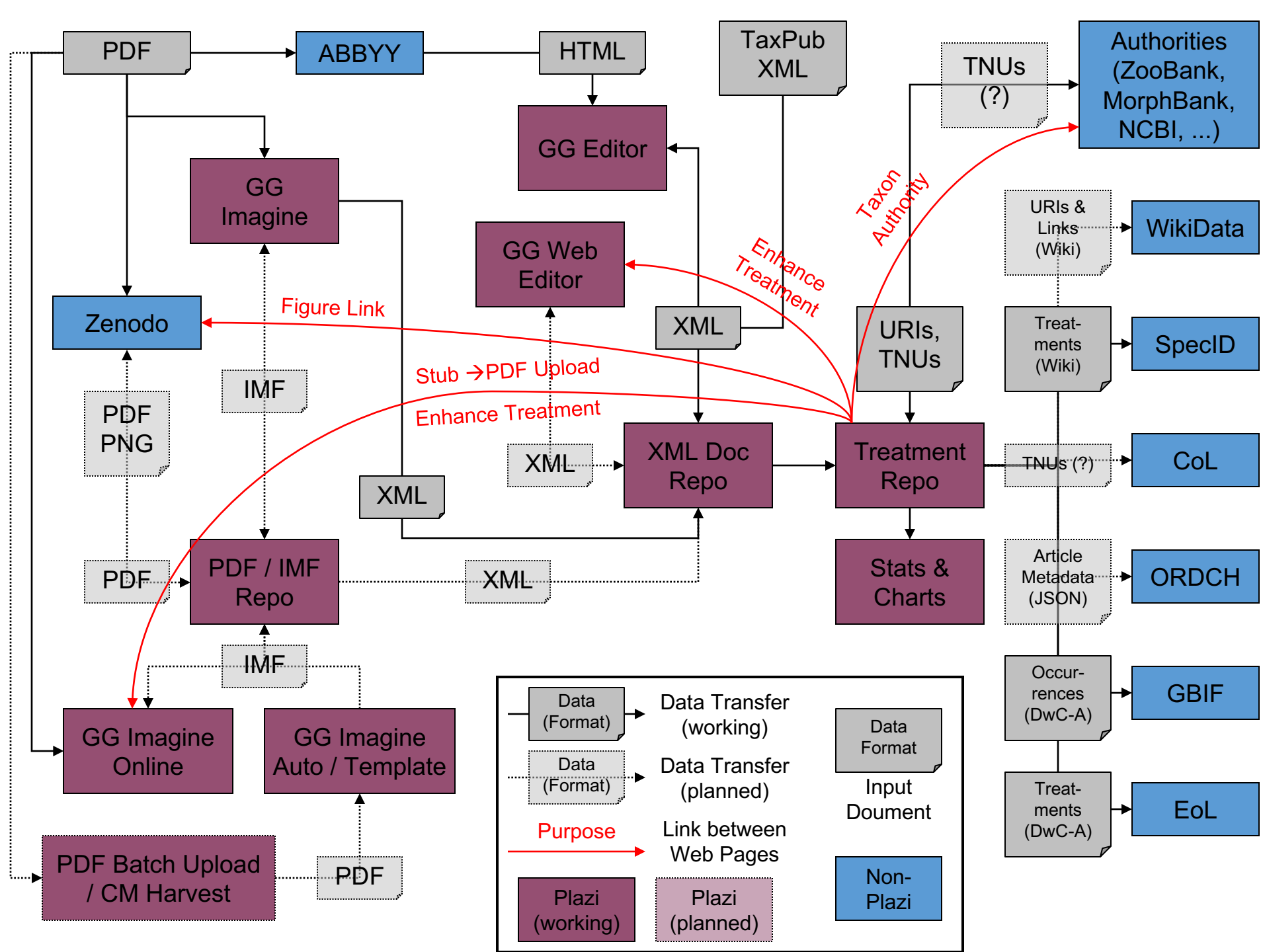
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Keyword(s):
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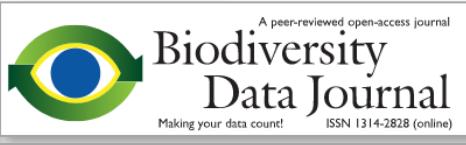
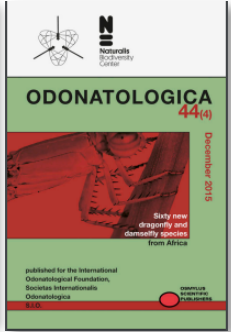
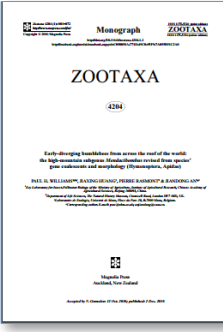
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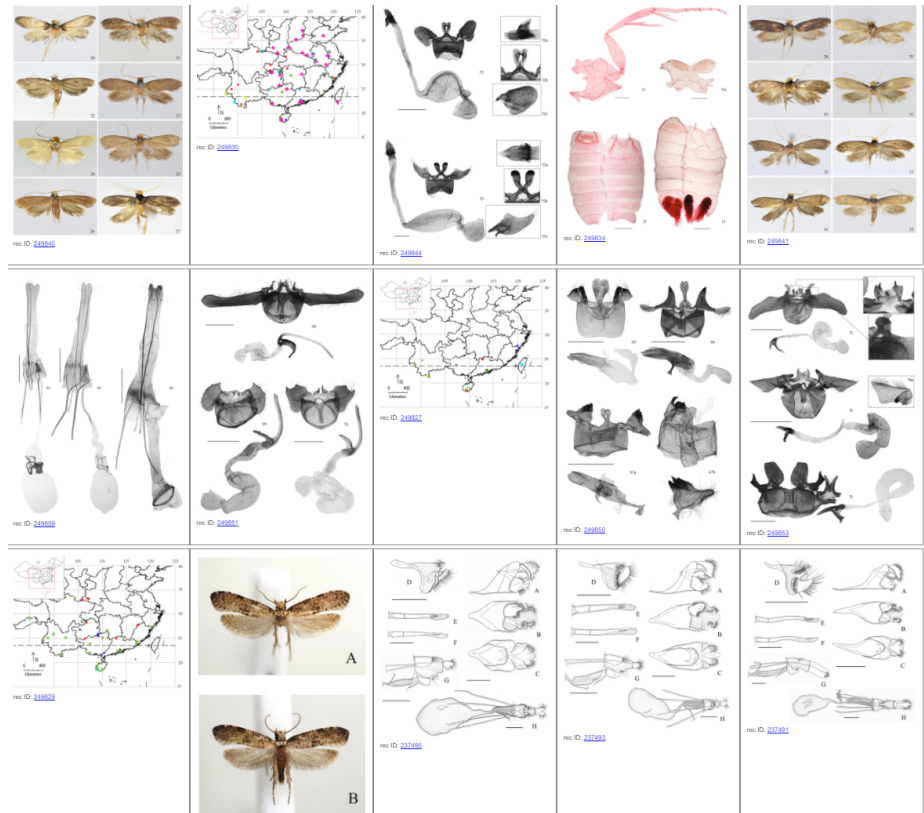
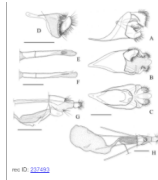


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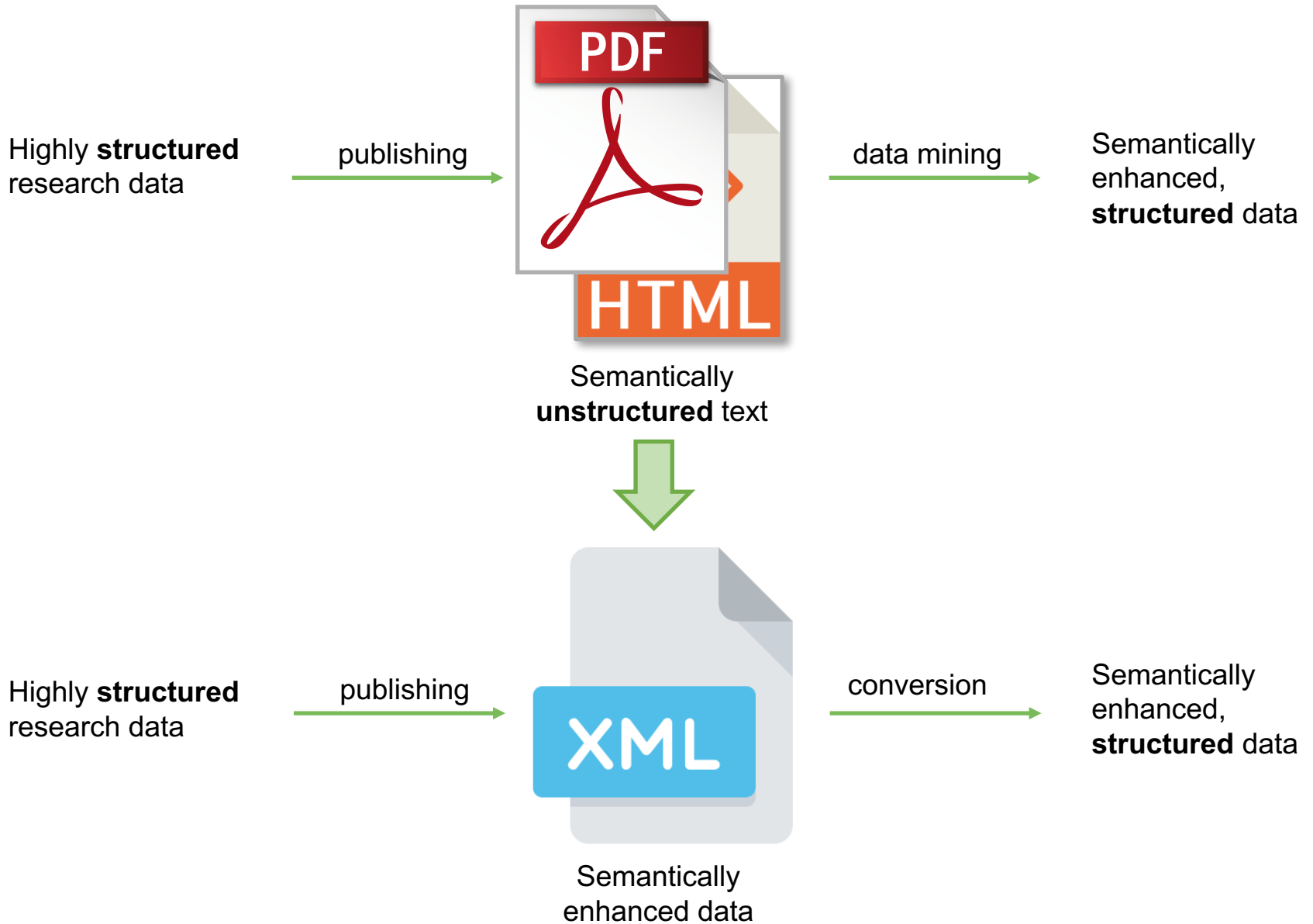
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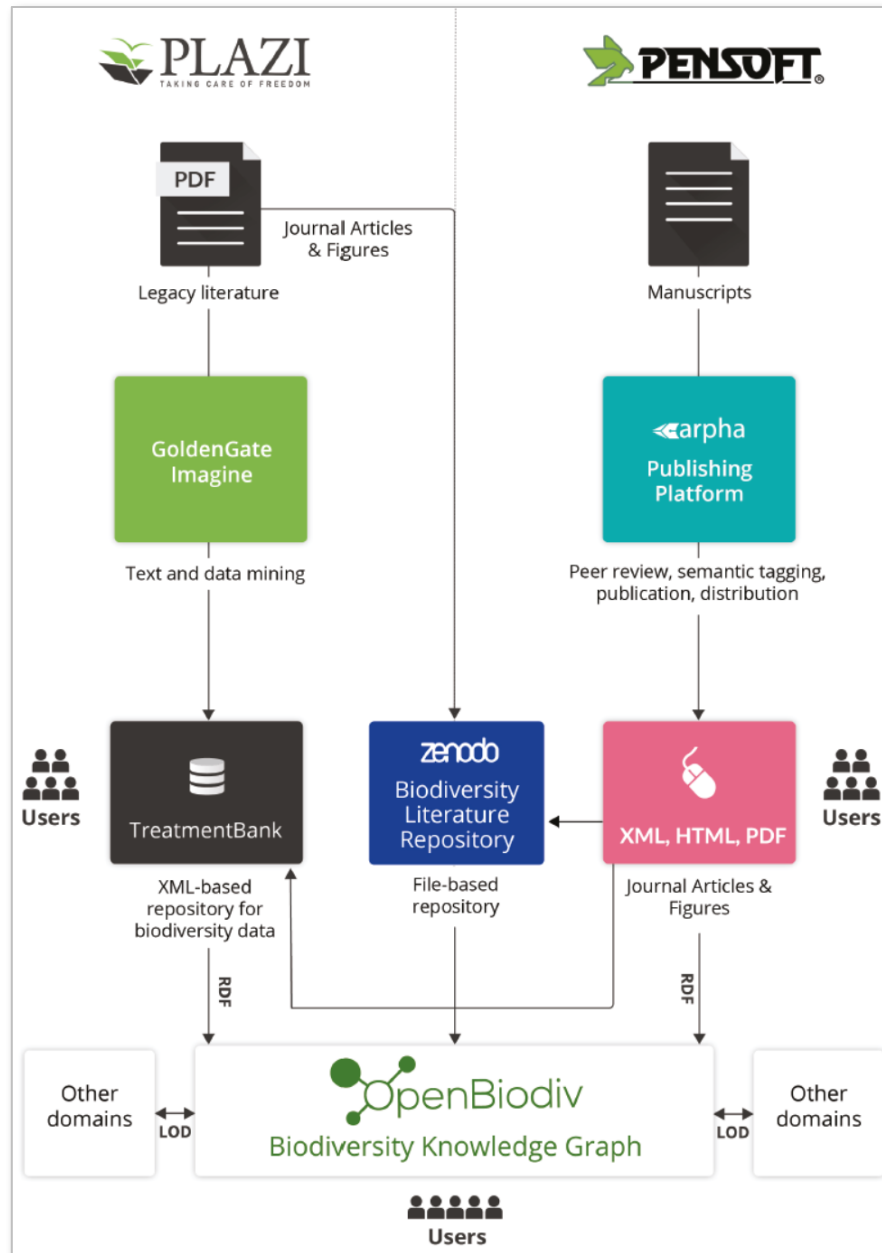
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