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INDIVIDUAL EXTRACTION

Steps to extract annotations
and attributes from a paper
using GGI

Julia Giora
Jonas Castro
Donat Agosti

<https://plazi.org/>

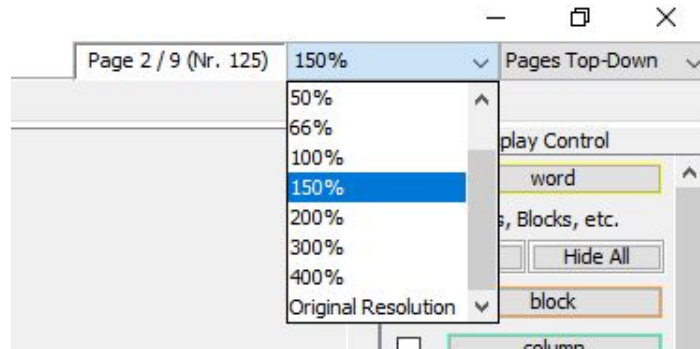
GOOD PRACTICES BEFORE STARTING AN INDIVIDUAL EXTRACTION



➤ Zoom

- Adjust the zoom to your preference for easier viewing

It is located in the right upper corner, next to the page numbers



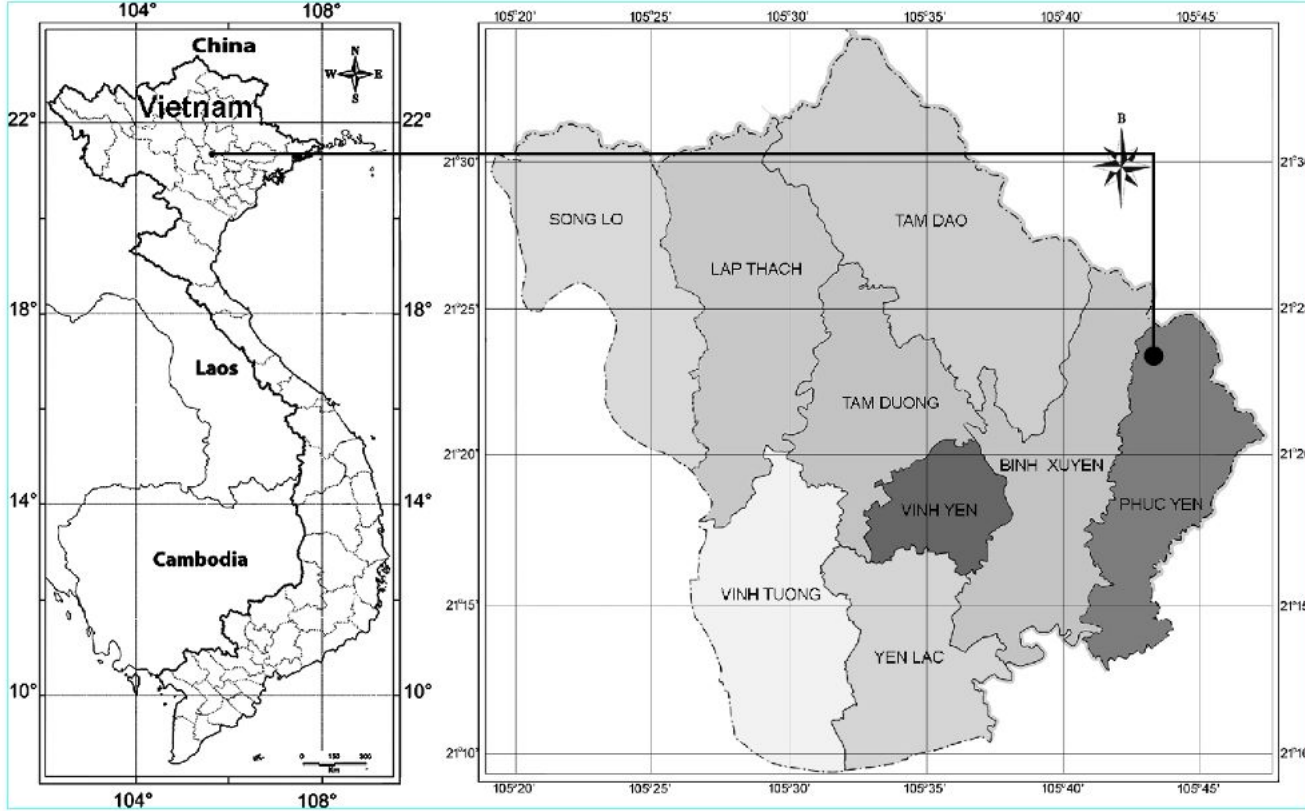
➤ Images

- Check if images were loaded correctly

Toggle on the box for image in the 'Display Control' (at the right of the GGI - up arrow on next slide) and check if all images were detected (in other words, if they have a markup around them - down arrow on next slide)



➤ Images



Display Control

- word
- Regions, Blocks, etc.
 - Show All
 - Hide All
- block
- column
- image
- line
- paragraph
- region

A red arrow points to the 'image' checkbox in the 'Display Control' panel.



➤ **Fonts**

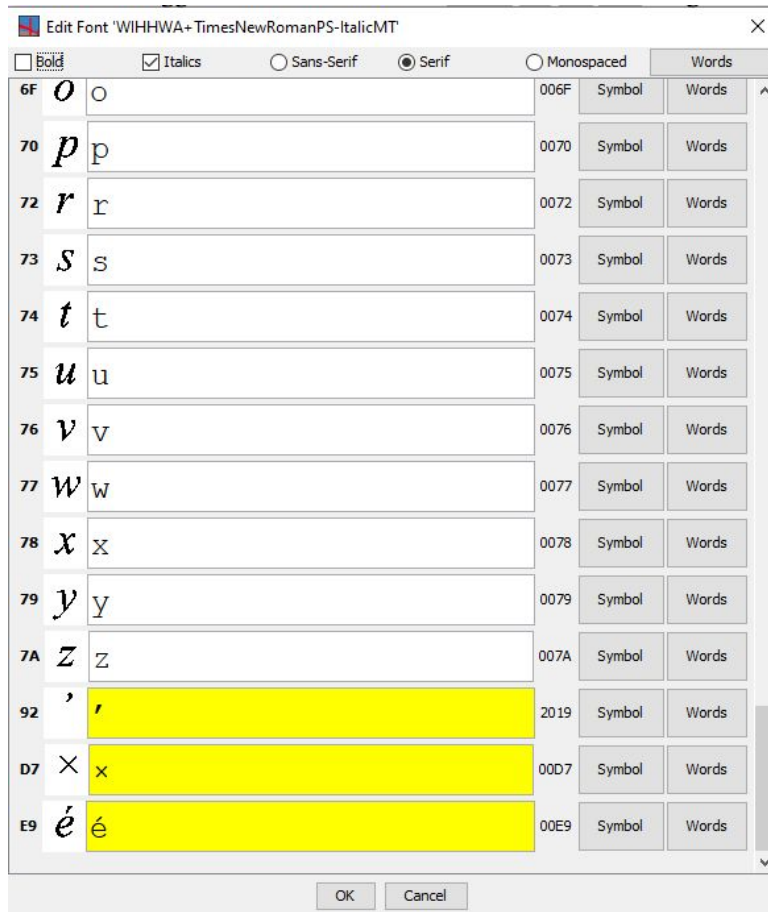
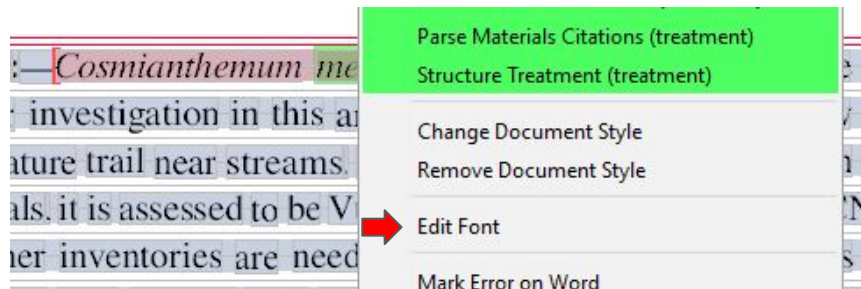
- **Edit font**

Click on any incorrect word and select 'Edit Font'. If needed, make manually corrections in the list that appears, or choose between the available symbols

You can also edit all fonts in the document by going to 'Edit -> Edit Embedded Fonts'



➤ Fonts



STEPS TO PERFORM AN INDIVIDUAL EXTRACTION



➤ 1. Detect Document Structure

- Select 'Tools -> Detect Document Structure'

It should automatically mark paragraphs, tables, page headers and numbers, headings, caption, figure and table citations, etc.

- You can see all the annotations in your 'Display Control'

Toggle on/off the boxes for the annotations you want to show/hide in your document



➤ 1. Detect Document Structure

Material and methods

Extensive field works were undertaken in Vinh Phuc province, northeastern Vietnam from 2013 to 2021 by the first author. The morphological description of the new species is based on the examination of fresh plant and dried specimens. Vouchers were prepared following the standard protocol (Jain & Rao 1977). The voucher specimens are deposited in the herbaria of Institute of Ecology and Biological Resources, Vietnam Academy of Science and Technology (HN), and herbarium of South China Botanical Garden, Chinese Academy of Sciences (IBSC). Materials in several herbaria (AAU, BM, E, GXIB, HNU, IBSC, K, KUN, L, P, and SING; acronym follows Thiers 2021) were also examined in order to compare with other Asian taxa to determine the new taxon. For the conservation assessments, the IUCN Red List Categories and Criteria (IUCN 2012, 2019) is applied.

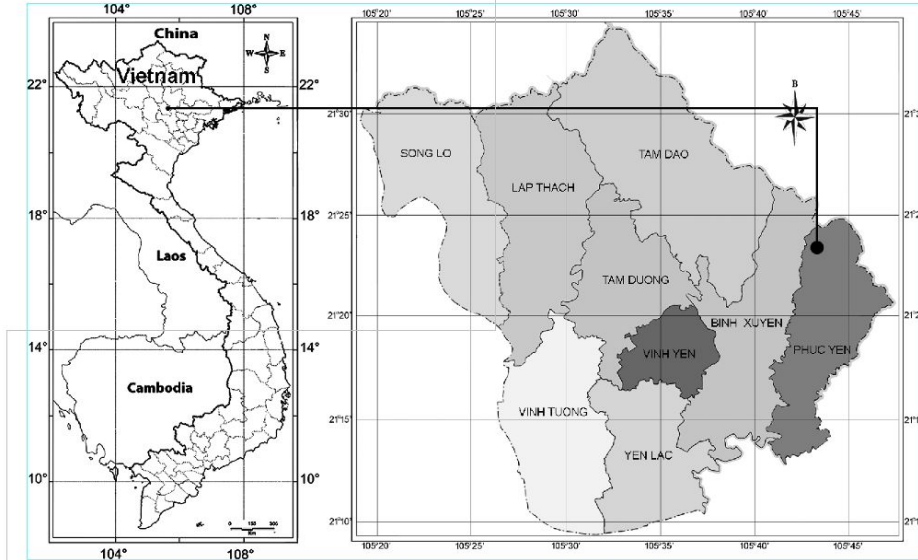


FIGURE 1. Map showing the type locality of *Cosmianthemum melinhense*

Display Control

word

Regions, Blocks, etc.

Show All Hide All

block

column

image

line

paragraph

region

table

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tableCol

tableRow

Annotations

Show All Hide All

accessDate

author

bibRef

bibRefCitation

bookContentInfo

caption

collectingCountry

collectingDate

specimenCount

subsection

subSubSection

superScript

tableCitation

taxonomicName

taxonomicNameLabel

title

treatment

typeStatus



➤ 2. Add Document Metadata

- Select 'Tools -> Add Document Metadata'

You can add the manuscript DOI in the field 'DOI Identifier' and click on 'Search'. Select the reference that appears and click on 'OK'. This will export the information straight to the metadata

You also need to add the affiliations (and emails when provided) of each author. Click on 'Edit Authors' and copy and paste the information from the main text. After adding them, click on 'Close'



➤ 2. Add Document Metadata

Get Metadata for Document phytotaxa.538.2.4.pdf

Publication Type: Journal Article

Authors (use '&' to separate): Edit Authors

Title:

Year: Pub Date: Pagination:

Journal: Series In Journal:

Part Designators: volume: issue: numero:

Publisher:

Location:

Editors (use '&' to separate):

Volume Title:

Publication Url:

DOI Identifier: 10.11646/phytotaxa.538.2.4

Handle Identifier:

ISBN Identifier:

ISSN Identifier:

ZooBank Identifier:

HNS-Pub Identifier:

Zenodo-Dep Identifier:

GBIF-Dataset Identifier:

Extract Search Validate OK Ca

Select Metadata for Document phytotaxa.538.2.4.pdf

[CrossRef via RefFinder]: HAI, DO VAN, CUONG, NGUYEN THE, CHOUDHARY, RITESH KUMAR, LIN, ZHANG

OK Details Cancel

Get Metadata for Document phytotaxa.538.2.4.pdf

Publication Type: Journal Article

Authors (use '&' to separate): HAI, DO VAN & CUONG, NGUYEN THE & CHOUDHARY, RITI Edit Authors

Title: Cosmianthemum melinhense (Acanthaceae), a new species from the Me Linh Station f

Year: 2022 Pub Date: 2022-03-07 Pagination: 124-132

Journal: Phytotaxa Series In Journal:

Part Designators: volume: 538 issue: 2 numero:

Publisher:

Location:

Editors (use '&' to separate):

Volume Title:

Publication Url: http://dx.doi.org/10.11646/phytotaxa.538.2.4

DOI Identifier: 10.11646/phytotaxa.538.2.4

Handle Identifier:

ISBN Identifier:

ISSN Identifier:

ZooBank Identifier:

HNS-Pub Identifier:

Zenodo-Dep Identifier:

GBIF-Dataset Identifier:

Extract Search Validate OK Cancel



➤ 2. Add Document Metadata

Get Metadata for Document phytotaxa.538.2.4.pdf

Publication Type: Journal Article

Authors (use '&' to separate): The & Choudhary, Ritesh Kumar & Lin, Zheli & Deng, Yunfei

Title: *Cosmianthemum melinhense* (Acanthaceae), a new species from the Me Linh Station f

Year: 2022 Pub Date: 2022-03-07 Pagination: 124-132

Journal: Phytotaxa Series In Journal:

Edit Authors

Hai, Do Van	Name: HAI DO VAN
Cuong, Nguyen The	Affiliation: Institute of Ecology and Biological Resources, Vietnam
Choudhary, Ritesh Kumar	Email: dovanhaiebr@gmail.com
Lin, Zheli	LSID:
Deng, Yunfei	ORCID: 0000-0001-7841-0585

Get Metadata for Document phytotaxa.538.2.4.pdf

Publication Type: Journal Article

Authors (use '&' to separate): HAI, DO VAN & CUONG, NGUYEN THE & CHOUDHARY, RITI

Title: *Cosmianthemum melinhense* (Acanthaceae), a new species from the Me Linh Station f

Year: 2022 Pub Date: 2022-03-07 Pagination: 124-132

Journal: Phytotaxa Series In Journal:

Part Designators: volume: 538 issue: 2 numero:

Publisher:

Location:

Editors (use '&' to separate):

Volume Title:

Publication Url: <http://dx.doi.org/10.11646/phytotaxa.538.2.4>

DOI Identifier: 10.11646/phytotaxa.538.2.4

Handle Identifier:

ISBN Identifier:

ISSN Identifier:

ZooBank Identifier:

HNS-Pub Identifier:

Zenodo-Dep Identifier:

GBIF-Dataset Identifier:



➤ 2. Add Document Metadata

- Alternatively, you can select the information needed in the main text and click on 'Use in Metadata', and then select the appropriate information from the list.

Ultimately, you can fulfill manually anything that is missing

- Validate the changes before closing the metadata box



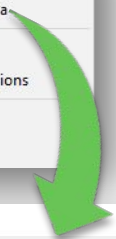
➤ 2. Add Document Metadata

The world's tiniest land snails from Laos and Vietnam
(Gastropoda, Pulmonata, Hypselostomatidae)

Barna Páll-Gergely || ORCID: 0000-0002-6167-7221
Plant Protection Institute, Centre for Agricultural Research, ELKH
Herman Ottó út 15, 1022 Budapest, Hungary
pall-gergely.barna@atkhu, pallgergely2@gmail.com

- Annotate >
- Use in Metadata ... >
 - Author (+)
 - Author Affiliation >
 - Author Email >
 - Author LSID >
 - Author ORCID >
 - Author URL >
 - Title (+)
- Assign Document Style
- Mark Caption
- Mark In-Line Caption
- Mark Footnote
- Mark Table Note

- Tools Help
- Detect Document Structure
- Add Document Metadata
- Parse Bibliography
- Mark Bibliographic Citations
- Mark Taxon Names
- Select Taxon Names



Adrienne Jochum
Naturhistorisches
Institute of Ecology
Senckenberg Fors
adrienne.jochum@

- Annotate >
- Annotate All >
- Annotate Similar >
- Use in Metadata ... >
 - Author (-)
 - Title (-)
- Assign Document Style

CONTRIBUTIONS TO ZOOLOGY 116: 62-78

- Annotate >
- Use in Metadata ... >
 - Author (+)
 - Author Affiliation >
 - Author Email >
 - Author LSID >
 - Author ORCID >
 - Author URL >
 - Title (+)
 - Year (-)
 - PubDate (-)
 - Pagination (-)
 - Journal (-)
- Make Stream
- Copy Text
- Merge Words
- Merge All
- More ...

iniest land snails fr
Pulmonata, Hypse

Gergely || ORCID: 0000-0002-

Get Metadata for Document ContribZool.91.62-78.pdf

Publication Type: Journal Article

Authors (use '&' to separate): Páll-Gergely, Barna & Jochum, Adrienne & J.Vermeulen, Ja

Title: The world's tiniest land snails from Laos and Vietnam (Gastropoda, Pulmonata, Hypselostomatidae)

Year: Pub Date: Pagination: 62-78

Journal: Contributions to Zoology | Series In Journal:

Part Designators: volume: issue: numero:

Publisher:

Location:

Editors (use '&' to separate):

Volume Title:

Publication Uri:

DOI Identifier: 10.1163/18759866-BJA10025

Handle Identifier:

ISBN Identifier:

ISSN Identifier:

ZooBank Identifier:

HNIS-Pub Identifier:

Zenodo-Dep Identifier:

GBIF-Dataset Identifier:



➤ 3. Parse Bibliography

- Select 'Tools -> Parse Bibliography'

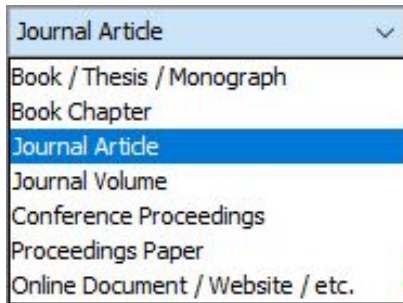
Choose the right type of manuscript (journal article, book chapter, etc.)

Then, mark each part of the references with their respective definitions, and click on 'OK & Next' until the last bibliographic reference



➤ 3. Parse Bibliography

Double click in the word you want to edit and then click with the right button of the mouse to open the edit options (to annotate or remove something)



Check Bibliographic Reference Details - (3 of 32) ✕

What to do in this dialog? (click to collapse)
Please make sure that all the details of this bibliographic reference are marked correctly.
If multiple bibliographic references are clung together, annotate the details of the first one normally, and annotate the first token of any subsequent one as **nextRef** to initiate a split.
If it is not a bibliographic reference at all, check the **Not a Bibliographic Reference** to indicate so.

Journal Article Not a Bibliographic Reference

author	editor	title	journalOrPublisher
year	part	pagination	DOI
publicationUrl	accessDate	nextRef	volumeTitle
bookContentInfo			

Bremekamp, C.E.B. (1969) New Bornean Acanthaceae. Blumea 10: 151-175.

Previous Cancel OK & Next Skip & Next Reset **Zoom Control** - 1.0 +



➤ 4. Mark Bibliographic Citations

- After bibliography is parsed, select 'Tools -> Mark Bibliographic Citations'

Link each bibliography with its respective excerpt in the main text

P.S: The bibliography needs to be already parsed so that this tool works



➤ 4. Mark Bibliographic Citations


Check Bibliographic Reference Citations - (1 of 5)

What to do in this dialog? (click to collapse)
Please check which bibliographic references these citations (printed in bold) refer to.
If an assumed citation actually is none, please select <Not a citation> to indicate so.

Kim, S.C., Hai, D.V. et al. (2015): Biodiversity of Me Linh Station, Vietnam-Vascular Plants	... the plant taxonomist and several new species were discovered (Kim et al. 2015 , Hai et al. 2018, Lin et al. ...)
Hai, D.V., Oanh, P.T. et al. (2018): Rungia khoii (Acanthaceae), a new species from species were discovered (Kim et al. 2015, Hai et al. 2018 , Lin et al. 2020). The genus ...
Lin, Z.L., Hai, D.V. et al. (2020): Rhinacanthus spiciformis, a new species of Acanthaceae from northern al. 2015, Hai et al. 2018, Lin et al. 2020). The genus <i>Cosmianthemum</i> Bremekamp (1960: 66 ...
Hansen, B. (1985): <i>Cosmianthemum knoxiifolium</i> (C. B. Clarke) B Lin et al. 2020). The genus <i>Cosmianthemum</i> Bremekamp (1960: 66) comprises 13 species mainly distributed in SE Asia with the ...
Hartley, T.G. (1993): Melicope	... in SE Asia with the diversity center in Borneo (Hansen 1985 , Hu et al. 2011, Mabberley 2017, ...
Ho, P.H. (2000): Acanthaceae	... with the diversity center in Borneo (Hansen 1985, Hu et al. 2011 , Mabberley 2017, POWO 2021). It is ...
Holtum, R.E. (1984): Studies in the family Thelypteridaceae IV. The genus <i>Pronephrium</i> (Hansen 1985, Hu et al. 2011, Mabberley 2017 , POWO 2021). It is characterized by the ...
Hooker, J.D. (1878): Bauhinia	..., Hu et al. 2011, Mabberley 2017, POWO 2021). It is characterized by the terminal, thyrsoid ...
Hu, C.C. (2002): <i>Cosmianthemum</i>	..., ovary glandular pubescent, and 4 - ovuled (Bremekamp 1960 , Hansen 1985, Scotland & Vollesen 2000, Hu ...
Hu, J.Q., Deng, Y.F. et al. (2011): <i>Cosmianthemum</i>	
IUCN & Cambridge, UK (2012): IUCN Red List Categories and Criteria: Version 3.1. ...	
IUCN (2019): Guidelines for using the IUCN Red List categories and criteria ...	
Jain, S.K. & Rao, R.R. (1977): A Handbook of Field and Herbarium Methods	
Kiel, C.A., Daniel, T.F. et al. (2017): Unravelling relationships in the morphologically diverse and taxonomically challenging " ...	
Kim, S.C., Hai, D.V. et al. (2015): Biodiversity of Me Linh Station, Vietnam-Vascular Plants	
Lien, T.K. (2005): Acanthaceae	
Lin, Z.L., Hai, D.V. et al. (2020): Rhinacanthus spiciformis, a new species of Acanthaceae from northern ...	
Lindau, G. (1897): Acanthaceae Americanae et Asiaticae nova vel minus cognitae	
Mabberley, D.J. (2017): Mabberley's Plant-book: a portable dictionary of plants, their ...	
McDade, L.A., Daniel, T.F. et al. (2000): Phylogenetic relationships within the tribe Justiceae (Acanthaceae): ...	
POWO (2021): Plants of the World Online	
Scotland, R.W. & Vollesen, K. (2000): Classification of Acanthaceae	
Thiers, B. (2021): [continuously updated] Index Herbariorum: A global ...	

Reset

Zoom Control: 1.0





➤ 5. Mark Taxon Names

- Select 'Tools -> Mark Taxon Names'

It should automatically detect all taxon names present in the document.

- You can list all taxon names by clicking on 'Tools -> Select Taxon Names'

If a name was erroneously marked, you can select it and click on 'Remove'. Do not click on 'Delete' because this would delete the word from the document, not only remove the annotation



➤ 5. Mark Taxon Names

PS:

- **authority** = all the authors in a taxonomicName
- **authorityName** = the author of the valid combination (it can be the original one)
- **baseAuthorityName** = the author of the basionym, when a posterior new combination is the valid name



➤ 5. Mark Taxon Names

The genus *Cosmianthemum* Bremekamp (1960: 66) com

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Accepted

2024

Edit Attributes

taxonomicName Cosmianthemum Bremekamp (1960: 66)

- _authorityPlausibility:** 0.99358594
- _evidence:** catalogs
- _step:** genera
- authority:** Bremekamp (1960: 66)
- authorityName:** Bremekamp
- authorityPageNumber:** 66
- authorityYear:** 1960
- class:** Magnoliopsida
- family:** Acanthaceae
- genus:** Cosmianthemum
- kingdom:** Plantae
- order:** Lamiales
- phylum:** Tracheophyta
- rank:** genus

Attribute Name Add / Set Attribute

Attribute Value

Previous OK Cancel Next

Select Taxon Names - 50 Annotations

Merge Rename Remove Delete Edit Attri... Rename ... Modify A... Remove ...

Show Matches Only Highlight Matches

Remove annotations from the document

Type	Start	End	Value
taxonomicN...	0	2	Cosmianthemum melinhense
taxonomicN...	3	4	Acanthaceae
taxonomicN...	274	276	Cosmianthemum melinhensis
taxonomicN...	281	282	Acanthaceae
taxonomicN...	295	298	C. guangxiense
taxonomicN...	299	302	C. knoxifolium
taxonomicN...	304	307	C. viriduliflorum
taxonomicN...	352	353	Cosmianthemum
taxonomicN...	476	483	Cosmianthemum Bremekamp (1960: 66)
taxonomicN...	496	497	Borneo
taxonomicN...	615	616	Justiciae
taxonomicN...	644	645	Pseuderanthemum
taxonomicN...	662	670	Odontoneminae (Deng et al. 2016)
taxonomicN...	673	674	Justicieae
taxonomicN...	687	694	Pseuderanthemum Radlkofer (1883: 282)
taxonomicN...	742	763	C. knoxifolium (C.B. ... B.Hansen (1985: 195)
taxonomicN...	806	807	Cosmianthemum
taxonomicN...	827	830	C. knoxifolium

- authority:** (C. B. Clarke 1908: 663) B. Hansen (1985: 195)
- authorityName:** B. Hansen
- authorityPageNumber:** 195
- authorityYear:** 1985
- baseAuthorityName:** C. B. Clarke
- baseAuthorityPageNumber:** 663
- baseAuthorityYear:** 1908



➤ 6. Mark Taxonomic Keys

- Select 'Tools -> Mark Taxonomic Keys'
- If you need to mark a key manually, just select the whole key (without its introduction or title) and create a new annotation by typing 'key'

Notice that, in both cases, two additional annotations will be created:

- keyLead: one of the leading instructions, alone
- keyStep: two or more leads that make up a single step (1 and 1' or 2.1, 2.2 and 2.3, for example)



➤ 6. Mark Taxonomic Keys

Key to the species of the *Interphasma* Chen & He

Females

- | | | |
|----|--|---|
| 1. | Seventh sternum lacking distinct preopercular organ | 2 |
| - | Seventh sternum with distinct preopercular organ | 3 |
| 2. | Posterior margin of the anal segment with small emargination; posterior apex of subgenital plate reaching posterior margin of anal segment (Distribution: Emeishan, Sichuan) | <i>I. conicercum</i> Chen & He, 2008 |
| - | Posterior margin of anal segment rounded; posterior apex of subgenital plate not reaching posterior margin of anal segment (Distribution: Leigongshan, Guizhou) | <i>I. leigongshanense</i> Xu, Yang & Guo, 2010 |
| 3. | Preopercular organ dorsoventrally flattened (Distribution: Emeishan, Sichuan) | <i>I. emetense</i> Chen & He, 2008 |
| - | Preopercular organ cylindrical | 4 |
| 4. | Posterior apex of preopercular organ bifurcated (Distribution: Emeishan, Sichuan) | <i>I. bifidum</i> Chen & He, 2008 |
| - | Posterior apex of preopercular organ not bifurcated | 5 |
| 5. | Vertex of head with a pair of granule-like tubercles between compound eyes | 6 |
| - | Vertex of head lacking granule-like tubercles between compound eyes | 7 |
| 6. | Body short and robust; posterior margin of anal segment with slight emargination (Distribution: Wolong, Wenchuan, Sichuan) | <i>I. wolongense</i> Chen & He, 2008 |
| - | Body long and slender; posterior margin of anal segment with broad emargination (Distribution: Lushan, Jiangxi) .. | <i>I. lushanense</i> Chen & He, 2008 |
| 7. | Body densely covered with small granules (Distribution: Tianlin, Guangxi) | <i>I. guangxiense</i> Chen & He, 2008 |
| - | Body sparsely covered with small granules | 8 |
| 8. | Antennae with 15 segments; anal segment as long as ninth tergum (Distribution: Yang Country, Shaanxi) | <i>I. shaanxiense</i> Chen & He, 2008 |
| - | Antennae with 14 segments; anal segment longer than ninth tergum | 9 |
| 9. | Preopercular organ short and not reaching middle of eighth tergum (Distribution: Gaoligongshan, Tengchong, Yunnan) | <i>I. marginatum</i> Chen & Zhang, 2008 |
| - | Praeopercular organ long and reaching middle of eighth tergum (Distribution: Liziping, Shimian, Sichuan) | <i>I. lizipingense</i> Ho & Shi sp. nov. |

 keyStep

 keyLead


➤ 7. Mark Treatments

- Select 'Tools -> Mark Treatments'

In the dialog, click on the dropdown lists and address the beginning of each document section to their related excerpts of the main text

P.S: Here you will show to GGI which parts of the document are related to treatments and which ones are not. All those that are not treatments will be annotated as 'subSection'. The treatments will receive the annotation 'treatment'



➤ 7. Mark Treatments

- Start 'abstract' SubSection
- Continue SubSection
- Start 'abstract' SubSection
- Start 'acknowledgments' SubSection
- Start 'discussion' SubSection
- Start 'document_head' SubSection
- Start 'introduction' SubSection
- Start 'key' SubSection
- Start 'key_words' SubSection
- Start 'materials_methods' SubSection
- Start 'multiple' SubSection
- Start 'reference_group' SubSection
- Start 'results' SubSection
- Start 'synonymic_list' SubSection
- Start 'synopsis' SubSection
- Start 'taxon_list' SubSection
- Start 'treatment' SubSection

Check Document Structure and Treatments - (1 of 4)

What to do in this dialog? (click to expand)

- Continue SubSection 7 rkhoudhary @ arjuna. org; https:// orcid. org / 0000 - 0001 - 6250 - 4624 (page 124)
- Continue SubSection 8 zhellin @ scbg. ac. cn; https:// orcid. org / 0000 - 0003 - 2832 - 8115 (page 124)
- Continue SubSection 9 yfdeng @ scb. ac. cn; https:// orcid. org / 0000 - 0002 - 0876 - 3286 (page 124)
- Continue SubSection * Author for correspondence (page 124)
- Start 'abstract' SubSection Abstract (page 124)
 - Continue SubSection Cosmianthemum melinhensis, a new species of Acanthaceae is described and illustrated from northern Vietnam. It is morphologically allied to C. guangxiense, [...] corolla and fruits. This species is assessed as "Vulnerable " (VU) according to IUCN Red List Categories and Criteria. (page 124)
- Start 'key_words' SubSection Keywords: Cosmianthemum, morphology, new species, taxonomy, Vinh Phuc Province (page 124)
- Start 'introduction' SubSection Introduction (page 124)
 - Continue SubSection The Me Linh Station for Biodiversity was established in 1999 under the Institute of Ecology and Biological Resources, Vietnam Academy of Science and Technology [...] several new species were discovered (Kim et al. 2015, Hai et al. 2018, Lin et al. 2020). (page 124)
 - Continue SubSection The genus Cosmianthemum Bremekamp (1960: 66) comprises 13 species mainly distributed in SE Asia with the diversity center in Borneo (Hansen pubescent, and 4 - ovuled (Bremekamp 1960, Hansen 1985, Scotland & Vollesen 2000, Hu et al. 2011). (page 124)
 - Continue SubSection The genus was placed under subtribe Justininae by some authors (Bremekamp 1965, Hu 2002, Scotland & Vollesen 2000). However, Hansen (1985: 195), was recorded in Vietnam (Hu et al. 2011, Hai et al. 2016). (page 124)
 - Continue SubSection During our several floristic exploration trips to Me Linh Station for Biodiversity, Vinh Phuc province of Vietnam, we collected some specimens of Cosmianthemum [...] Lien 2005, Hu et al. 2011), we confirmed that our specimens represent a new species described below as Cosmianthemum melinhense. (page 125)
- Start 'materials_methods' SubSection Material and methods (page 125)
 - Continue SubSection Extensive field works were undertaken in Vinh Phuc province, northeastern Vietnam from 2013 to 2021 by the first author. The morphological description of [...] the new taxon. For the conservation assessments, the IUCN Red List Categories and Criteria (IUCN 2012, 2019) is applied. (page 125)
- Start 'results' SubSection Taxonomic treatment (page 125)
- Start 'treatment' SubSection Cosmianthemum melinhense D. V. Hai, Z. L. Lin & Y. F. Deng, sp. nov. (Figs. 2 - 4) (page 125)
 - Continue SubSection Type: - VIETNAM, Vinh Phuc Province: Phuc Yen Town, Ngoc Thanh commune, elev. ca. 152 m, 21 ° 23 ' 51.3 " N, 105 ° 42 ' 56.8 " E, 21 October 2016, Do Van Hai, Trinh Xuan Thanh, DVH 149 (holotype HNI; isotypes HNI, IBSC!). (page 125)

Cancel OK & Next Reset

Zoom Control 1.0



➤ 8. Treatment Structure

- Select 'Tools -> Treatment Structure'

Assign the sections of each treatment (=subSubSection) by choosing them on the dropdown lists

P.S. The sections of the treatment will be annotated as 'subSubSection' only. Note that they do not have annotation of 'subSection'.

Recheck the subSubSections each time you reopen the treatment structure, because GGI may not save the changes you made



➤ 8. Treatment Structure

Check Substructure of Treatments - (1 of 1)

What to do in this dialog? (click to expand)

nomenclature **Cosmianthemum melinhense** D.V.Hai, Z.L.Lin & Y.F.Deng, sp. nov. (Figs. 2-4)

materials_examined Type:-VIETNAM. Vinh Phuc Province: Phuc Yen Town, Ngoc Thanh commune, elev. ca. 152 m, 21°23'51.3"N, 105°42'56.8"E, 21 October 2016, Do Van Hai, Trinh Xuan Thanh, DVH 149 (holotype HN); isotypes HN1, IBSCI).

description Herbs 0.3-0.6 m tall. Stems subterete, swollen at nodes, pubescent when young, soon glabrescent. Leaves opposite; petiole 12-15 mm long, pubescent; blade elliptic to ovate, lanceolate, 12-16 × 4-6 cm, adaxially dark green, glabrous, abaxially light green, pubescent along the veins, densely punctate with grayish white strip-like cystoliths, secondary veins 6-8 on each side of midvein, one pair of veins near base, midvein and secondary veins abaxially prominent, base cuneate to attenuate, margin entire to subsinuate, with marginal gland, apex acute to shortly acuminate. Inflorescence compound dichasia in terminal or axillary, the axis glandular, 7-10 cm long, interrupted, usually in a leafy thyrse, peduncle 0.5-1.5 cm long; cymes 3-9-flowered; bracts subulate, 4-5 × 1-1.3 mm, basal ones longer, then gradually smaller with apical most ones, outside pubescent, with sparsely gland-tipped pubescence, apex acute; bracteoles subulate, 2.5-3.5 × 0.8-1.3 mm, outside pubescent with sparsely gland-tipped pubescence, apex acute. Calyx ca. 6 mm long, 5-lobed; lobes linear-lanceolate, ca. 4 × 0.5-0.8 mm, subequal, apex acuminate, outside sparsely gland-tipped pubescent; inside densely gland-tipped pubescent. Corolla green-purple, 1.4-1.5 cm long, outside gland-tipped pubescent; tube basally cylindrical and 1.5-2 mm wide for 4.5-5 mm long; limb strongly 2-lipped, lower lip violet dotted, 5-5.5 mm broad, 3-lobed, middle lobes bigger than laterals, middle ovate, ca. 2.5 mm long, laterals oblong, 1- 1.5 × 2 mm; upper lip violet blotched, triangular, ca. 6 × 6 mm, 2-deft. Stamens 2, exserted; filaments ca. 6 mm long, glabrous; anthers bithecaous, thecae oblong, ca. 2.5 mm long, superposed, mucous at base; staminodes 2, linear, 2-2.5 mm long, glabrous. Ovary glabrous, green, fusiform with nectary flower disc bowl-shaped at base; style 9-10 mm long, glabrous, stigma slightly 2-lobed. Capsule clavate, 2.5-2.8 cm long, sterile portion 1.2-1.6 cm long, puberulent. Seeds 4, ca. 3.5 × 5 mm, ovate, scarcely compressed, pale brown, rugulose-alveolate.

etymology Etymology:-The species is named after the type locality, Me Linh Station for Biodiversity in Vinh Phuc Province, northeastern Vietnam.

biology_ecology Phenology:-It was observed in flowering from October to January and fruiting from December to April.

distribution Distribution and ecology:-*Cosmianthemum melinhense* is currently known from Ngoc Thanh Commune, Phuc Yen Town, Vinh Phuc Province, and probably endemic to the northern region of Vietnam. It grows under the shades in secondary evergreen broad-leaved forest in association with bamboos, along the streams at elevation of about 150 m. The associated plants include *Bauhinia khasiana* Baker (1878: 281), *Christella dentata* (Forssk.) Brownsey & Jermy (1973: 338), *Melicope pteleifolia* (Champ. ex Benth.) T.G.Hartley (1993: 521), *Pteris grevilleana* Wall. ex J.Gardner (1839: 23), *Pronophrium triphyllum* (Sw.) Holttum (1972: 122), *Strobilanthes mucronatoproducta* Lindau (1897: 650), etc.

conservation Conservation status:-*Cosmianthemum melinhense* is known only from the type locality which lies within a protected area. During our investigation in this area, we could observe only a few scattered populations growing in secondary forests, along nature trail near streams. Because of its narrow distribution with an estimated population size of 1000 mature individuals, it is assessed to be Vulnerable (VU) following the IUCN Red List Categories and Criteria (IUCN 2012, 2019). Further inventories are needed to find additional populations in Vietnam. The discovery of *C. melinhense* along with many new species tells more about the floristic richness and diversity of the Me Linh Station for Biodiversity, for which further studies are necessary in the future.

materials_examined Additional Specimens Examined (Paratypes):-VIETNAM. Vinh Phuc: Phuc Yen Town, Ngoc Thanh commune, elev. ca. 57 m, 21°22'40.7"N, 105°42'41.3"E, 27 January 2013, Do Van Hai et al., ML281 (HN); *ibid.* elev. ca. 155 m, 21°23'51.7"N, 105°43'41.2"E, 25 January 2015, Do Van Hai et al., MLS 135 (HN); *ibid.* elev. ca. 160 m, 21°23'52.3"N, 105°42'56.3"E, 15 January 2018, Do Van Hai, DVH 15012018 (HN); *ibid.* elev. ca. 148 m, 21°23'48.9"N, 105°42'56.9"E, 24 March 2021, Do Van Hai, Nguyen The Cuong, Trinh Xuan Thanh, DVH 399 (HN).

discussion Notes:-*Cosmianthemum melinhense* is allied to *C. quangxiense* H.S.Lo & D.Fang in Fang et al. (1997: 42), *C. knoxiifolium* and *C. viriduliflorum* (C.Y.Wu & H.S.Lo) H.S.Lo in Fang et al. (1997: 42) from China in the characters of the inflorescence, stamens, staminodes, and fruits. However, it differs from *C. viriduliflorum* in having elliptic to ovate, lanceolate leaf blade with more pairs of secondary veins, longer bracts and calyx, style, and fruits, and corolla with gland-tipped pubescence outside, style glabrous. However, *C. viriduliflorum* has pubescent corolla and style. It differs from *C. quangxiense* by its shorter habit, more pairs of secondary veins, subulate bracts, 4-5 × 1-1.3 mm, outside pubescent and sparsely gland-tipped pubescent, longer petioles and calyx with lobes linear-lanceolate, ca. 6 mm long, outside sparsely gland-tipped pubescent. Furthermore, it differs from *C. knoxiifolium* by shorter petioles, pubescent, shorter inflorescence but longer bracts, calyx, corolla, staminodia and calyx outside sparsely gland-tipped pubescent. The detailed comparison among *C. melinhense*, *C. quangxiense*, *C. knoxiifolium* and *C. viriduliflorum* is given in Table 1.

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- etymology
- biology_ecology
- conservation
- description
- diagnosis
- discussion
- distribution
- etymology
- key
- materials_examined
- multiple
- nomenclature
- reference_group
- synonymic_list
- type_taxon
- vernacular_names



Important to check!

Abstract There is no **subSubSection** outside treatments

Cosmianthemum melinhense, a new species of **Acanthaceae** is described and illustrated from northern Vietnam. It is morphologically allied to *C. quangxiense*, *C. knoxii* **folium**, and *C. viriduliflorum* but differs in the habit, shape and trichomes of the leaves, stem, bracts, bracteole, corolla and fruits. This species is assessed as “Vulnerable” (VU) according to IUCN Red List Categories and Criteria.

Keywords: *Cosmianthemum*, morphology, new species, taxonomy, Vinh Phuc Province

Introduction

The Me Linh Station for Biodiversity was established in 1999 under the Institute of Ecology and Biological Resources, Vietnam Academy of Science and Technology to facilitate the long-term field studies. It is located in Vinh Phuc Province of the northeastern region of the country (Fig. 1). The station covers a total area of 175 ha and has a diverse flora. It is home to numerous Vietnamese endemics and has recently gained attention of the plant taxonomist and several new species were discovered (Kim *et al.* 2015, Hai *et al.* 2018, Lin *et al.* 2020).

The genus *Cosmianthemum* Bremekamp (1960: 66) comprises 13 species mainly distributed in SE Asia with the diversity center in Borneo (Hansen 1985, Hu *et al.* 2011, Mabberley 2017, POWO 2021). It is characterized by the terminal, thyrsoid inflorescence; glandular-pubescent calyx, with lobes equal in length; bilabiate, white to pale yellow corolla, with its lower lip having purple spot at base, slightly curved in anterior direction at transition to limb; stamens 2, inserted in throat; bithecos, glabrous anthers with thecae parallel at same level; staminodia 2, ovary glandular pubescent and 4-ovuled (Bremekamp 1960, Hansen 1985, Scotland & Vollesen 2000, Hu *et al.* 2011).

The genus was placed under subtribe **Justicieae** by some authors (Bremekamp 1965, Hu 2002, Scotland & Vollesen 2000). However, the recent molecular studies implied that it belongs to the *Pseuderanthemum* lineage (*sensu* McDade *et al.* 2000, Kiel *et al.* 2017) or subtribe **Odontoneminae** (Deng *et al.* 2016) in the tribe **Justicieae** in having two fertile stamens and two staminodes. It is allied to *Pseuderanthemum* Radlkofer (1883: 282) but differs by the smaller corolla being distinctly 2-lipped and lacking an elongate, narrow, cylindrical tube (Burt & Smith 1965, Hansen 1985, Hu *et al.* 2011, Deng & Gao, 2020). Previously, only one species, *C. knoxii* **folium** (C.B. Clarke 1908: 663) B.Hansen (1985: 195), was recorded in Vietnam (Hu *et al.* 2011, Hai *et al.* 2016).

There is no **subSection** inside treatments

Etymology:—The species is named after the type locality, Me Linh Station for Biodiversity in Vinh Phuc Province, northeastern Vietnam.

Phenology:—It was observed in flowering from October to January and fruiting from December to April.

Distribution and ecology:—*Cosmianthemum melinhense* is currently known from Ngoc Thanh Commune, Phuc Yen Town, Vinh Phuc Province, and probably endemic to the northern region of Vietnam. It grows under the shades in secondary evergreen broad-leaved forest in association with bamboos, along the streams at elevation of about 150 m. The associated plants include *Bauhinia khasiana* Baker (1878: 281), *Christella dentata* (Forssk.) Brownsey & Jermy (1973: 338), *Melicope pteleifolia* (Champ ex Benth) T.G.Hartley (1993: 521), *Preris grevilleana* Wall ex J.Agarth (1839: 23), *Pronephrum triphyllum* (Sw.) Holttum (1972: 122), *Srobilanthes mucronatopunctata* Lindau (1897: 650), etc.

Conservation status:—*Cosmianthemum melinhense* is known only from the type locality which lies within a protected area. During our investigation in this area, we could observe only a few scattered populations growing in secondary forests, along nature trail near streams. Because of its narrow distribution with an estimated population size of < 1000 mature individuals, it is assessed to be Vulnerable (VU) following the IUCN Red List Categories and Criteria (IUCN 2012, 2019). Further inventories are needed to find additional populations in Vietnam. The discovery of *C. melinhense* along with many new species tells more about the floristic richness and diversity of the Me Linh Station for Biodiversity, for which further studies are necessary in the future.

Additional Specimens Examined (Paratypes):—VIETNAM, Vinh Phuc: Phuc Yen Town, Ngoc Thanh commune, elev. ca. 57 m, 21°22'40.7"N, 105°42'41.3"E, 27 January 2013, Do Van Hai *et al.*, *ML281* (HN); *ibid.* elev. ca. 155 m, 21°23'51.7"N, 105°43'41.2"E, 25 January 2015, Do Van Hai *et al.*, *MLS 135* (HN); *ibid.* elev. ca. 160 m, 21°23'52.3"N, 105°42'56.3"E, 15 January 2018, Do Van Hai, *DVH 15012018* (HN); *ibid.* elev. ca. 148 m, 21°23'48.9"N, 105°42'56.9"E, 24 March 2021, Do Van Hai, Nguyen The Cuong, Trinh Xuan Thanh, *DVH 399* (HN).

Notes:—*Cosmianthemum melinhense* is allied to *C. quangxiense* H.S.Lo & D.Fang in Fang *et al.* (1997: 42), *C. knoxii* **folium** and *C. viriduliflorum* (C.Y.Wu & H.S.Lo) H.S.Lo in Fang *et al.* (1997: 42) from China in the characters of the inflorescence, stamens, staminodes, and fruits. However, it differs from *C. viriduliflorum* in having elliptic to ovate, lanceolate leaf blade with more pairs of secondary veins; longer bracts and calyx, style, and fruits; and corolla with gland-tipped pubescence outside, style glabrous. However, *C. viriduliflorum* has pubescent corolla and style. It differs from *C. quangxiense* by its shorter habit, more pairs of secondary veins, subulate bracts, 4–5 × 1–1.3 mm, outside pubescent and sparsely gland-tipped pubescent, longer petioles and calyx with lobes linear-lanceolate, ca. 6 mm long, outside sparsely gland-tipped pubescent. Furthermore, it differs from *C. knoxii* **folium** by shorter petioles, pubescent, shorter inflorescence but longer bracts, calyx, corolla, staminodia and calyx outside sparsely gland-tipped pubescent. The detailed comparison among *C. melinhense*, *C. quangxiense*, *C. knoxii* **folium** and *C. viriduliflorum* is given in Table 1.



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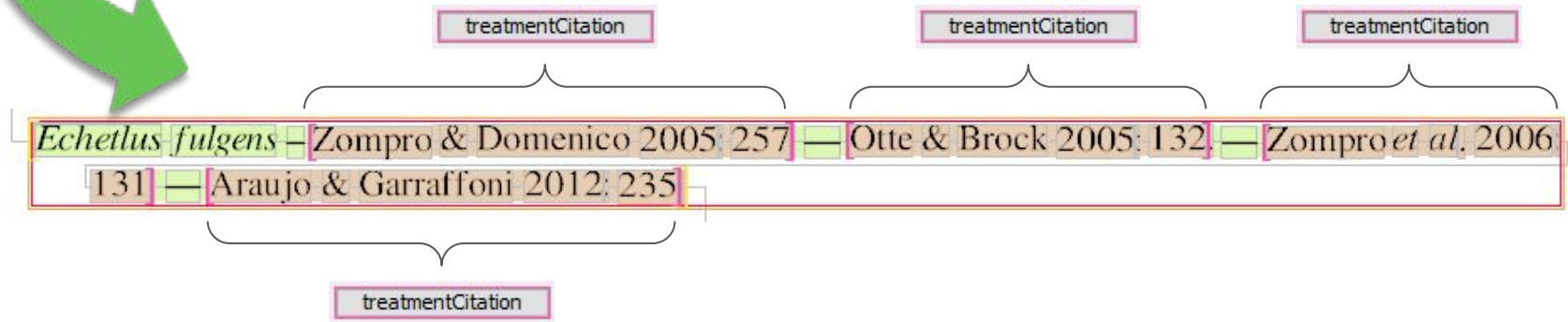
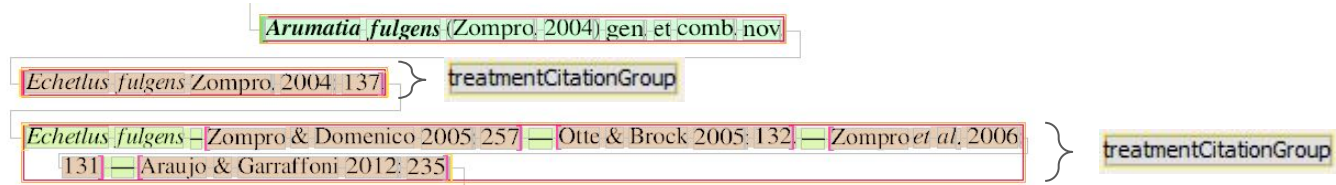
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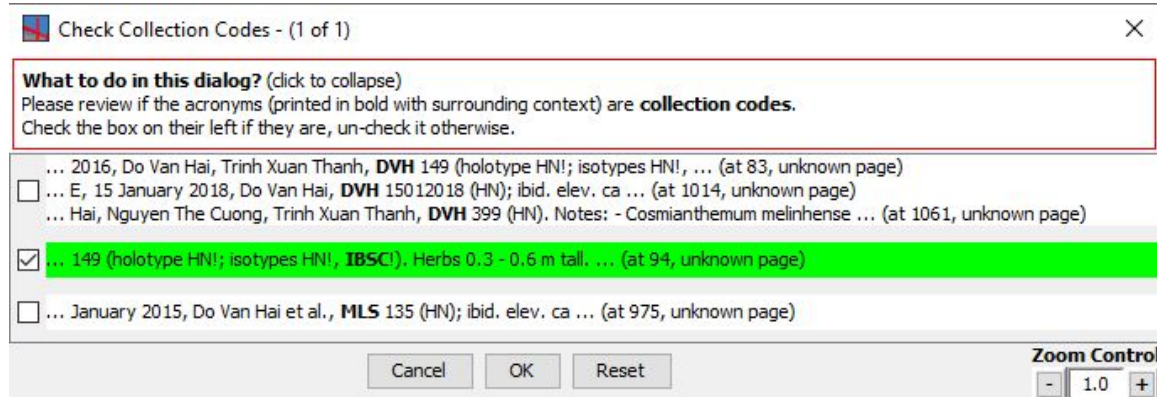
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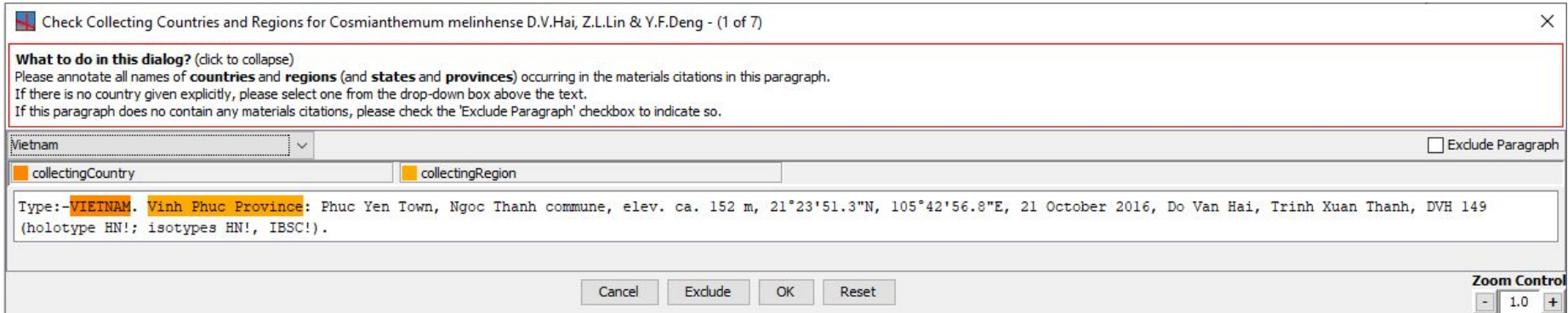


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Vietnam Exclude Paragraph

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Distribution and ecology:—*Cosmianthemum melinhense* is currently known from Ngoc Thanh Commune, Phuc Yen Town, Vinh Phuc Province, and probably endemic to the northern region of **Vietnam**. It grows under the shades in secondary evergreen broad-leaved forest in association with bamboos, along the streams at elevation of about 150 m. The associated plants include *Bauhinia khasiana* **Baker** (1878: 281), *Christella dentata* (Forssk.) Brownsey & Jermy (1973: 338), *Melicope pteleifolia* (Champ. ex Benth.) T.G.Hartley (1993: 521), *Pteris grevilleana* Wall. ex J.Agardh (1839: 23), *Pronephrium triphyllum* (Sw.) Holttum (1972: 122), *Strobilanthes mucronatopunctata* Lindau (1897: 650), etc.

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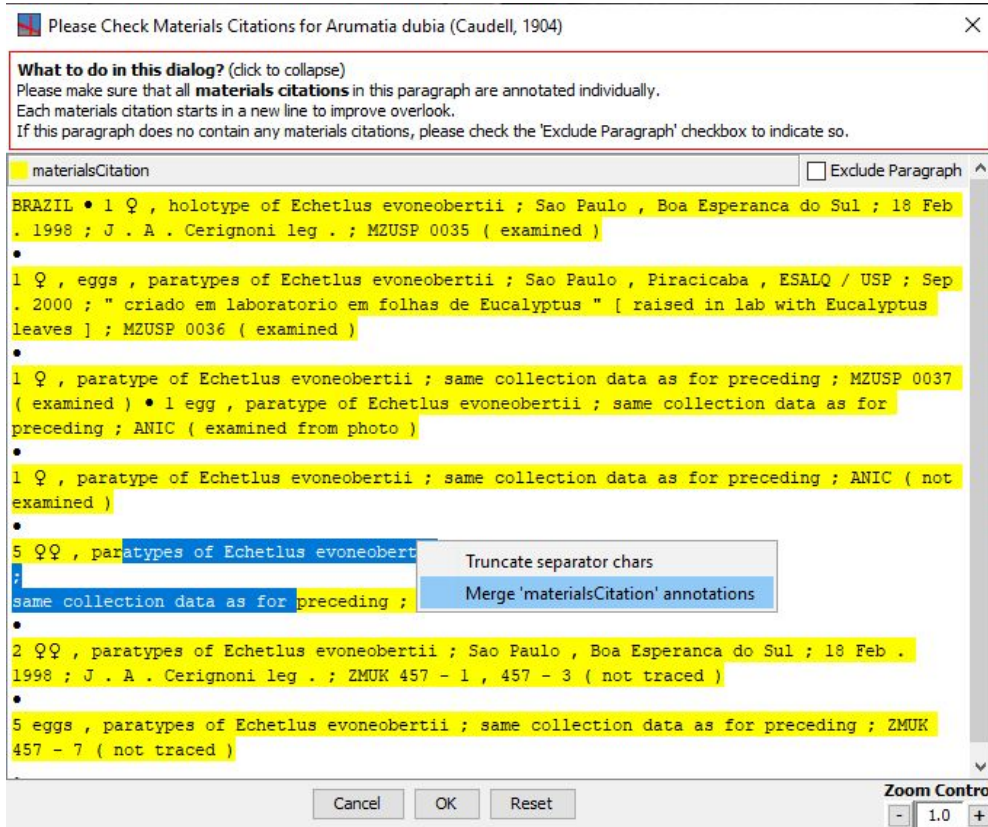
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<input type="checkbox"/> collectingCounty	<input type="checkbox"/> location	<input type="checkbox"/> locationDeviation	<input type="checkbox"/> originalDetermination
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