



Phylogeny and taxonomy of the genus *Cinnamomum*: what the study on plants from which cinnamon is derived clarifies

Dr. A. Colonnese¹, R. Panzironi²

¹ Nutrition Biologist, Latina, Italy

² Independent Researcher, Latina, Italy

1. ABSTRACT

The study by Yang and colleagues examined the evolutionary relationships among numerous plants of the Lauraceae, the botanical family that includes the genus *Cinnamomum*. The results show that the name *Cinnamomum* has included groups that are not all closely related and support a more precise classification. The authors' summary describes a phylogeny study, that is, a reconstruction of the evolutionary relationships between organisms, conducted on the *Cinnamomum*-*Ocotea* complex of the Lauraceae. The researchers compared DNA sequences from the plastome, the genetic material of the chloroplast involved in photosynthesis, and two genetic markers: nrITS and psbA-trnH. The comparison included 38 complete plastomes, 324 nrITS sequences, and 238 psbA-trnH sequences. The analyses identified five major evolutionary groups. The Old World species then attributed to *Cinnamomum* did not form a single branch: the *Camphora* section appeared close to *Sassafras*, while the *Cinnamomum* section appeared close to the African genus *Kuloa*. The authors also integrated the genetic data with visible characteristics of the leaves, buds, and flowers. Based on the body of evidence, they restricted *Cinnamomum* in the strict sense and transferred 18 Asian species to *Camphora*. This result improves the botanical language useful for describing aromatic plants. However, it does not allow for the certain identification of the species present in a package of cinnamon without direct analysis of the material.

VIDEO ARTICLE



ARTICLE INFORMATION

Received: October 26, 2026

Revised: October 26, 2026

Accepted: October 26, 2026

Published: October 2026

DOI 10.5281/zenodo.placeholder

KEYWORDS

filogenesi e tassonomia del genere *Cinnamomum*
genere *Cinnamomum*
Lauraceae
specie di *Cinnamomum*
origine botanica della cannella
classificazione botanica della cannella

MISSION

LIFE Science Hub – Journal of Science was founded with the aim of making scientific knowledge accessible without giving up methodological rigour, quality of sources and authoritativeness of content. The journal promotes the dissemination of knowledge in the health, nutrition, medical and longevity sciences, building a bridge between the world of research and society.

Through articles, reviews, in-depth analyses and expert contributions, the Journal champions evidence-based medicine and science, fostering a correct interpretation of scientific data and countering misinformation. Every piece of content is developed with the aim of translating the complexity of research into understandable, useful and applicable information, while keeping intact the principles of accuracy, transparency and scientific independence.

Free from political, industrial and commercial influence, the journal stands as an authoritative and independent editorial space, dedicated to promoting scientific culture, professional development and the growth of health awareness among the public.



2. WHAT THIS RESEARCH ANALYZED

The research evaluated whether the *Cinnamomum* genus, which includes species known for their aromatic bark and oils, corresponds to a single evolutionary group. Simply put, the authors verified whether plants with similar names and characteristics truly share a close common history. They compared chloroplast and nuclear DNA sequences with observable traits, such as leaf arrangement, bud structure, and microscopic details of the leaf epidermis. The phylogenetic analyses used three datasets: 38 plastomes, 324 nrITS sequences, and 238 psbA-trnH sequences. The nrITS is a nuclear DNA region useful for comparing closely related species; psbA-trnH, on the other hand, is a segment of chloroplast DNA. Using multiple markers reduces the risk of basing classification on a single genetic signal, but it does not eliminate uncertainties due to incomplete sampling or complex evolutionary histories.

3. WHAT RESULTS EMERGE FROM THE STUDY

The main finding is that the Asian and Australasian species previously grouped under *Cinnamomum* did not appear as a single evolutionary branch. The *Camphora* section was closer to *Sassafras*, while the *Cinnamomum* section was closer to the African genus *Kuloa*. This means that the traditional name encompassed distinct evolutionary lineages, not that the plants lack common characteristics. Analyses based on nrITS, either alone or associated with psbA-trnH, yielded five major groups. Leaf data provided additional support: the two groups differed in the outer wall of the epidermal cells. The authors therefore recognized *Cinnamomum* in a narrower sense and transferred 18 species to *Camphora*, including 15 new nomenclatural combinations. This is a taxonomic proposal based on available data, not a measure of the quality, aroma, or safety of commercial cinnamon.

4. WHY THIS STUDY IS RELEVANT

Correct botanical identification is the starting point for speaking precisely about the plants from which cinnamon can be derived. If different species are referred to by the same genus or commercial name, it becomes more difficult to compare botanical

descriptions, chemical composition, and materials examined in the laboratory. The study by Yang and colleagues therefore helps to clarify the boundaries between species and genera of the Lauraceae family. The practical value is primarily classificatory. Phylogeny allows us to link visible similarity to evolutionary history, avoiding the mistake of considering plants equivalent simply because they have aromatic leaves or barks used in a similar way. However, an updated classification does not automatically identify the species of a powdered spice: for that result, documentary information or analytical methods applied directly to the sample are required.

5. LIMITATIONS OF THE STUDY AND WHAT IT DOES NOT DEMONSTRATE

The study used the largest sampling available for the group at the time of the analysis, but not all species had the same genetic data. In particular, *Kuloa* plastomes were missing. For this reason, the deeper relationships derived from chloroplast DNA may differ from those obtained with nuclear DNA. The authors themselves note that some relationships within the two main sections remain unresolved. The results do not prove that all previous designations were useless, nor that a species transferred to *Camphora* loses its biological characteristics. They also do not demonstrate which species is contained in a specific food, extract, or supplement. Taxonomy describes relationships and scientific names; it does not, by itself, establish nutritional properties, health effects, or the characteristics of the product sold.

6. INDEPENDENT CONFIRMING EVIDENCE

An anatomical analysis of 48 species has reinforced the idea that the two Asian lineages can be distinguished beyond their DNA. Gang and colleagues observed that specific details of the leaf epidermis, the surface layer of the leaf, followed the two phylogenetic groups [1]. This is indirect but convergent confirmation: the model consisted of leaves from botanical species, not commercial products. The limitation is that an anatomical trait, on its own, does not reconstruct the entire evolutionary history. Yang and colleagues then studied two samples of *Cinnamomum guizhouense* using plastome and morphology. Both fell into the *Camphora* group, supporting the transfer of the species to *Camphora*.



guizhouensis [2]. This evidence is direct for that species, but it is not enough to verify all the reclassifications proposed in 2022. A 2025 study compared plastomes and nuclear ribosomal DNA in 72 Lauraceae taxa, 35 of which are referable to *Camphora* and *Cinnamomum*. The nuclear DNA distinguished monophyletic groups—that is, branches with an exclusive common ancestor—consistent with the separation of the two genera [3]. The support is significant, but the authors themselves report differences between the genetic signals.

7. CONFLICTING EVIDENCE

Not all analyses reconstruct the relationships between these groups in the same way. Rohde and colleagues, studying Neotropical species using molecular data and floral traits, transferred a set of plants previously

attributed to *Cinnamomum* into the genus *Aiouea* [4]. The work confirms that the old perimeter of *Cinnamomum* was problematic, but it proposes a different arrangement for the American group than the one that emerged in Yang's study. The difference primarily concerns sampling and the position of the branches, not the use of phylogeny to revise names. In a previous study on a single plastome of *Cinnamomum camphora*, Li and colleagues had placed *C. camphora* close to *Cinnamomum verum* within the same genus [5]. This outcome contrasts with the subsequent separation of *Camphora*, but it stems from a much narrower comparison. No directly discordant evidence of sufficient relevance was identified beyond these differences in topology and sampling; this does not prove the absence of contradictory results.

8. QUADRO COMPARATIVO E SINTESI DELLE EVIDENZE

The following research helps to evaluate the extent to which the taxonomic proposal is supported or limited by independent data.

Quadro comparativo

Publication	Model and data	Main result	Relationship with Yang's study
Gang et al., 2021 [1]	48 species; leaf epidermis microscopy	Two epidermal types correspond to the main groups	Indirect morphological confirmation
Yang et al., 2023 [2]	Two samples of one species; plastome and morphology	The examined species falls into the <i>Camphora</i> group	Direct confirmation for a reclassification
Xu et al., 2025 [3]	72 taxa; plastomes and nuclear ribosomal DNA	Nuclear DNA distinguishes <i>Camphora</i> and <i>Cinnamomum</i>	Confirmation with differences between markers
Rohde et al., 2017 [4]	Neotropical species; molecular data and flowers	Transfer of neotropical species to <i>Aiouea</i>	Partially different topology
Li et al., 2019 [5]	One <i>Cinnamomum camphora</i> plastome	Close to <i>Cinnamomum verum</i> in the same genus	Result limited by restricted sampling

9. SINTESI EDITORIALE E CONCLUSIONI

EDITORIAL CONCLUSION

The 2022 study by Yang and colleagues shows that the classification of plants traditionally included in the *Cinnamomum* genus requires a more precise interpretation. By comparing 38 complete plastomes and hundreds of nuclear and chloroplast genetic markers, the authors identified separate evolutionary lineages and proposed recognizing *Camphora* as a

distinct genus for 18 Asian species. The simplest takeaway is that outward similarities, such as aromatic leaves or bark, are not always enough to define botanical relationships. Independent studies on the leaves and DNA of individual species support this revision, while other analyses show that the exact position of some groups can change depending on the genetic marker and the number of species considered. The most thoughtful conclusion is that the taxonomy of the group has been clarified, but it remains a work in progress. For cinnamon sold commercially, the



genus name does not replace direct species identification.

Aggiornato al 26/10/2026. Questo contenuto riflette una sintesi divulgativa delle evidenze scientifiche al momento della pubblicazione e non sostituisce il parere medico.

10. TRANSPARENCY AND SCIENTIFIC RESPONSIBILITY

Artificial Intelligence was used solely as a tool for editorial and documentary support. All content, interpretations, bibliographic citations and conclusions have been verified, reviewed and approved by the author, who assumes full scientific responsibility for them.

The manuscript was also subjected to independent peer review prior to publication.

To ensure the greatest transparency, the complete history of the article, including the dates of submission, revision, acceptance and publication, as well as information on the peer review process, is available on the dedicated Article History page.

11. RIFERIMENTI BIBLIOGRAFICI

[1] **Leaf epidermal micromorphology defining the clades in Cinnamomum (Lauraceae)**

Gang et al., 2021

PhytoKeys

DOI: <https://doi.org/10.3897/phytokeys.182.67289>

[2] **Plastome Phylogeny and Taxonomy of Cinnamomum guizhouense (Lauraceae)**

Yang et al., 2023

Forests

DOI: <https://doi.org/10.3390/f14020310>

[3] **Phylogeny of Camphora and Cinnamomum (Lauraceae) Based on Plastome and Nuclear Ribosomal DNA Data**

Xu et al., 2025

International Journal of Molecular Sciences

DOI: <https://doi.org/10.3390/ijms26031370>

[4] **Neither Phoebe nor Cinnamomum – the tetrasporangiate species of Aiouea (Lauraceae)**

Rohde et al., 2017

TAXON

DOI: <https://doi.org/10.12705/665.6>

[5] **The complete chloroplast genome of Cinnamomum camphora (L.) Presl., a unique economic plant to China**

Li et al., 2019

Mitochondrial DNA Part B

DOI: <https://doi.org/10.1080/23802359.2019.1640083>