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Research Article

New Names and New Combinations of *Jarava*, *Cinna*, *Coleanthus*, *Sclerochloa* and *Graphephorum* (Poales)

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Abstract

When establishing a new genus, the utilization of incorrect genera or mere synonyms as comparative taxa will inevitably result in the emergence of a new synonym and leading to new taxonomic confusions. However, both traditional taxonomy and modern phylogeny have limitations in their objectivity and impartiality when it comes to accurately identifying taxa for scientific comparison. In order to scientifically identify the genus synonyms and resolving the taxonomic nomenclature confusions within three families of Stipaceae Burnett, Avenaceae Martinov and Poaceae (R.Br.) Barnh (Poales Small), using the minimum criterion PHS (phylogenetic similarity) ≤ 0.928 (inter genera) for genus classification by CPCG (chloroplast complete genomes) of Fructophyta D.L.Fu & H.Fu, total 19 current synonyms of the five genera of *Jarava* Ruiz et Pav, *Graphephorum* Desv., *Cinna* L., *Coleanthus* Seidl and *Sclerochloa* P.Beauv. have been identified, 4 current synonyms of the genus *Jarava* Ruiz et Pav including *Amelichloa* Arriaga & Barkworth, *Eriocoma* Nutt., *Nassella* (Trin.) É.Desv. and *Pseudoeriocoma* Romasch. et al., 6 current synonyms of the genus *Graphephorum* Desv. being *Cinnagrostis* Griseb., *Leptophyllochloa* C.E.Calderón ex Nicora, *Limnodea* Dewey, *Peyritschia* E.Fourn., *Sphenopholis* Scribn. and *Trisetopsis* Röser & A.Wölk, 7 current synonyms of the genus *Cinna* L. being *Aniselytron* Merr., *Arctagrostis* Griseb., *Dupontia* R.Br., *Festucella* E.B.Alexeev, *Hookerochloa* E.B.Alexeev, *Nicoraepoa* Soreng & L.J.Gillespie, *Saxipoa* Soreng et al. and *Sylvipoa* Soreng, 1 current synonym of the genus *Coleanthus* Seidl being *Phippsia* (Trin.) R.Br and 1 current synonym of the genus *Sclerochloa* P.Beauv. being *Puccinellia* Parl.. Additionally, 10 new specific names such as *Jarava thurberiana* Piper ex D.L.Fu, *Graphephorum prasinum* D.L.Fu and *Cinna trinii* D.L.Fu, along with 406 new specific combinations like *Jarava acuta* (Swallen) D.L.Fu, *Graphephorum cernuum* (Trin.) D.L.Fu, *Coleanthus algidus* (Sol.) D.L.Fu and *Sclerochloa acroxantha* (C.A.Sm. & C.E.Hubb.) D.L.Fu have been scientifically and validly published. These publications will effectively resolve taxonomic nomenclature confusions in a scientific manner and establish a solid foundation for evolutionary system research within the order Poales Small.

Keywords

Jarava, *Cinna*, *Graphephorum*, *Coleanthus*, *Sclerochloa*, New Combination, CPCG (Chloroplast Complete Genome), Genus Minimum Criterion, Typical Algorithm

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1. Introduction

Established as early as 1794 with the single species, *Jarava ichu* Ruiz & Pav., the genus *Jarava* Ruiz et Pav. (Stipaceae Burnett) can be morphologically distinguished by the awn not plumose, the lemma usually less thickened than in many other genera of Stipeae, and the palea much shorter than the lemma. The first combination of *Jarava plumosa* (Spreng.) S.W.L.Jacobs & J.Everett (nom. inval.) was not published until 1997 by Jacobs & Everett [1], and the genus had been consistently considered as *Stipa* L. sect. *Jarava* (Ruiz et Pav.) Trin. et Rupr. since 1842. Over 60 specific combinations of this genus have now been published by taxonomists [2-6], but all of them are invalidly published according to the Article 37.1 "A name published on or after 1 January 1953 without a clear indication of the rank of the taxon concerned is not validly published" and other relevant articles of International Code of Botanical Nomenclature (Melbourne Code, 2011). Furthermore, most of these combinations lack a sufficiently scientific basis, as they mostly belong to the genera *Austrostipa* S.W.L.Jacobs & J.Everett [7] and *Pappostipa* (Speg.) Romasch. (nom. inval.) [8].

The phylogenic analysis results [8-11] suggest that the genus *Jarava* Ruiz et Pav. is most closely related to the other four genera: *Amelichloa* Arriaga & Barkworth, *Eriocoma* Nutt., *Nassella* (Trin.) É.Desv. and *Pseudoeriocoma* Romasch. et al.. There is no general agreement upon the circumscription within the Stipeae tribe, and the genus *Nassella* (Trin.) É.Desv. can be easily distinguished by the presence of a usually very distinct, bone-like, often cupuliform corona at the apex of the lemma [12]. The genus *Amelichloa* Arriaga & Barkworth established in 2006, differs from other genera in its woody, sharp tips of the basal leaves, smooth longitudinal ribs on its caryopses, persistent stylar bases, and frequent presence of cleistogamous panicles in the axils of its basal leaf sheaths [13]. The genus *Pseudoeriocoma* Romasch. et al. established in 2019, differs from *Eriocoma* Nutt. in having bamboo-like culms commonly with up to 13 nodes, 3–6 mm thick below, with ramified branching at the middle and upper nodes [14]. However, there may be a scientific problem as compared to genus *Eriocoma* Nutt., owing to it may being a synonym of the genus *Jarava* Ruiz et Pav.. Similarly, the new genus *Nicoraepoa* Soreng & L.J.Gillespie [15] established in 2007, and the new genus *Saxipoa* Soreng [16] established in 2009 are closely related to *Festucella* E.B.Alexeev and *Hookerochloa* E.B.Alexeev [17], which may be the synonyms of the genus *Cinna* L. (Poaceae (R.Br.) Barnh., nom. cons.) based on the phylogenic analysis results [18-20].

In another case, the new genus *Sylvipoa* Soren established in 2009 [16] was only compared to the genus *Poa* L. rather than to the close relative genera such as *Aniselytron* Merr., *Arctagrostis* Griseb., *Cinna* L., *Dupontia* R.Br., *Festucella* E.B.Alexeev, *Hookerochloa* E.B.Alexeev, *Nicoraepoa* Soreng & L.J.Gillespie and *Saxipoa* Soreng [18]. Likewise, the new genus *Trisetopsis* Röser & A.Wölk established in 2013 [21] was only compared with the genus *Helictotrichon* Besser, without comparison to the closer genera like *Graphephorum* Desv., *Cinnagrostis* Griseb., *Sphenopholis* Scribn., *Limnodea* Dewey and *Peyritschia* E.Fourn (Avenaceae Martinov). [22-27].

When establishing a new genus, the utilization of incorrect genera or mere synonyms as comparative taxa will inevitably lead to the emergence of a novel synonym. However, both traditional taxonomy and modern phylogeny encounter limitations in their objectivity and impartiality when it comes to accurately and validly identifying compared taxa. To overcome these shortcomings, the new science evolutionomy has been developed with the publications of the evolutionary continuity principle, the evolutionary particularity principle, the theoretical monograph as *the Theory and Practice of Evolutionomy*, and so on [28-34]. The establishment, publication, and implementation of the minimum criterion PHS ≤ 0.928 (inter genera, CPCG) for the classification of genus of Fructophyta D.L.Fu & H.Fu have scientifically identified 34 current synonyms of the genus *Phyllostachys* Sieb. & Zucc., 15 ones of *Bambusa* Schreb., 3 ones of *Dinochloa* Büse and 4 ones of *Guadua* Kunth within the subfamily Bambusoideae, and the taxonomic confusions of the subfamily have also been scientifically resolved to a certain extent [31-34].

To scientifically identify the synonyms of certain genera and resolve the taxonomic confusions within the three families of Stipaceae Burnett, Avenaceae Martinov and Poaceae (R.Br.) Barnh of Poales Small, some relevant CPCG sequences from the NCBI (National Center for Biotechnology Information, USA) database have been downloaded and the evolutionary analyses on these sequences have been conducted, and the results are as follows.

2. Materials and Methods

2.1. CPCG of Poales

Total 24 CPCG of representative species of three families of Poales Small were selected from the NCBI database. Their current names, scientific names and CPCG numbers of NCBI are listed in Table 1 to Table 5.

2.2. Evolutionary Analyses of CPCG

The evolutionary analyses of CPCG mainly use the typical algorithm [28-33] to determine the relative evolutionary relationships between different taxa by comparing the phylogenetic similarity (PHS) between the designated type and target taxa. The formula is as follows:

$$PHS = \frac{\text{SPHL}}{\text{APHL}}$$

PHS = phylogenetic similarity between the type and objective taxon; SPHL = the number of same phylogenetic loci between the type and objective taxon; APHL = the number of all phylogenetic loci of the type; statistics of phylogenetic loci using Nucleotide Barcodes (17bp).

3. Results

3.1. Synonyms of the Genus *Jarava*

The PHS of CPCG of 7 species of Stipaceae using the type *Jarava ichu* Ruiz et Pav. and the results are shown in Table 1.

Table 1. *PHS of CPCG between Jarava ichu and some representative species of Stipaceae.*

No.	Scientific Names and Numbers of CPCG in NCBI	Current Names	PHL/17bp	PHS
1	*Jarava ichu*_NC058913.1	*Jarava ichu*	115654	1
2	*Jarava brachychaet*_NC042701.1	*Amelichloa brachychaet*	112000	0.968
3	*Jarava hyalina*_MF480753.1	*Nassella hyalina*	111783	0.967
4	*Jarava hymenoides* NC027464.1	*Eriocoma hymenoides*	107788	0.932
5	*Achnatherum inebrians*_MW423581.1	*Achnatherum inebrians*	103221	0.893
6	*Stipellula capensi*_NC062958.1	*Stipellula capensi*	102771	0.889
7	*Trikeraia hookeri*_MW699773.1	*Trikeraia hookeri*	95077	0.822

From Table 1, it is evident that *Amelichloa*, *Eriocoma* and *Nassella* are synonyms of the genus *Jarava* using the type of *Jarava ichu* Ruiz & Pav., because of their evolutionary relationships with the type all not meeting the minimum criterion of genus evolution: PHS(17bp) ≤ 0.928 (inter genera).

Although the genus *Pseudoeriocoma* Romasch currently lack CPCG, it can also be confirmed that it is the synonyms of *Jarava* based on Table 1 and previous research results [8-14]. Therefore, it is scientific to combine the genus *Jarava* Ruiz & Pav. as follows.

Jarava Ruiz & Pav., Fl. Peruv. Prodr. 2. 1794. Type: *Jarava ichu* Ruiz & Pav. ─ *Amelichloa* Arriaga & Barkworth, Sida 22(1): 146. 2006. Type: *Jarava ambigua* (Speg.) D.L.Fu. ─ *Eriocoma* Nutt., Gen. N. Amer. Pl. 1: 40. 1818. Type: *Jarava hymenoides* (Roem. & Schult.) D.L.Fu. ─ *Nassella* (Trin.) É.Desv., Fl. Chil. [Gay] 6: 263. 1853. Type: *Jarava chilensis* (Trin.) D.L.Fu. ─ *Pseudoeriocoma* Romasch., P.M.Peterson & Soreng, PhytoKeys 126: 112. 2019. Type: *Jarava eminens* (Cav.) D.L.Fu.

About 159 species in America, including 1 new specific name and 157 new specific combinations.

3.2. Synonyms of the Genus *Graphephorum*

The PHS of CPCG of 7 species of Avenaceae using the type *Graphephorum cernuum* (Trin.) D.L.Fu and the results are shown in Table 2.

Table 2. *PHS of CPCG between Graphephorum cernuum and some representative species of Avenaceae.*

No.	Scientific Names and Numbers of CPCG in NCBI	Current Names	PHL/17bp	PHS
1	*Graphephorum cernuum*_NC027487.1	*Trisetum cernuum*	113374	1
2	*Graphephorum deyeuxioides*_NC059969.1	*Peyritschia deyeuxioides*	110059	0.971
3	*Graphephorum elongatum*_MT089575.1	*Trisetopsis elongata*	110009	0.97
4	*Graphephorum intermedium*_MT094331.1	*Sphenopholis intermedia*	108757	0.959
5	*Acrospelion glaciale*_NC059973.1	*Trisetum glaciale*	103344	0.912
6	*Koeleria nitidula*_NC042404.1	*Koeleria nitidula*	98454	0.868
7	*Arrhenatherum elatius*_NC042673.1	*Arrhenatherum elatius*	94713	0.835

Table 2 shows that *Peyritschia* E.Fourn., *Trisetopsis* Röser & A.Wölk and *Sphenopholis* Scribn. are synonyms of the genus *Graphephorum* Desv. using the type of *Graphephorum cernuum* (Trin.) D.L.Fu, on account of their evolutionary relationships with the type all not meeting the minimum criterion PHS(17bp) ≤ 0.928 (inter genera) for genus classification.

Although other three genera of *Cinnagrostis* Griseb., *Leptophyllochloa* C.E.Calderón ex Nicora and *Limnodea* Dewey currently lack CPCG, it can also be confirmed that they all are the synonyms of *Graphephorum* based on Table 2 and previous research results [22-27]. Therefore, it is scientific to combine the genus *Graphephorum* Desv. as follows.

Graphephorum Desv., in Nouv. Bull. Soc. Philom. ii. 189. 1810. Type: *Graphephorum melicoides* (Michx.) Desv. ─ *Cinnagrostis* Griseb., Abh. Königl. Ges. Wiss. Göttingen 19: 256. 1874. Type: *Graphephorum polygamum* (Griseb.) D.L.Fu ─ *Leptophyllochloa* C.E.Calderón ex Nicora, Fl. Patagonica 3: 69. 1978. Type: *Graphephorum micratherum* (É.Desv.) D.L.Fu. ─ *Limnodea* Dewey, Contr. U.S. Natl. Herb. 2: 518. 1894. Type: *Graphephorum arkansanum* (Nutt.) D.L.Fu. ─ *Peyritschia* E.Fourn., Mexic. Pl. 2: 109. 1886. Type: *Graphephorum koelerioides* (Peyr.) D.L.Fu. ─ *Sphenopholis* Scribn., Rhodora 8(no. 92): 142. 1906. Type: *Graphephorum obtusatum* (Michx.) D.L.Fu. ─ *Trisetopsis* Röser & A.Wölk, Schlechtendalia 25: 57. 2013. Type: *Graphephorum elongatum* (A.Rich.) D.L.Fu.

About 131 species in America and Asia, including 6 new specific name and 122 new specific combinations.

3.3. Synonyms of the Genus *Cinna*

The PHS of CPCG of 5 species of Poaceae were analyzed using the type of *Cinna arundinacea* L. and the results are shown in Table 3.

Table 3. *PHS of CPCG between Cinna arundinacea and some representative species of Poaceae.*

No.	Scientific Names and Numbers of CPCG in NCBI	Current Names	PHL/17bp	PHS
1	*Cinna arundinacea*_NC059959.1	*Cinna arundinacea*	114205	1
2	*Cinna latiphylla* _MT094313.1	*Arctagrostis latifolia*	108913	0.954
3	*Beckmannia syzigachne*_MT653696.1	*Beckmannia syzigachne*	105251	0.924
4	*Arctopoa saltuensis*_NC050408.1	*Poa saltuensis*	103911	0.910
5	*Alopecurus pratensis*_NC067048.1	*Alopecurus pratensis*	102198	0.895

From Table 3, it can be concluded that using the type of *Cinna arundinacea* L., the genus *Arctagrostis* Griseb. is a synonym of the genus *Cinna* L., owing to its evolutionary relationship with the type being 0.954, not meeting the minimum criterion PHS(17bp) ≤ 0.928 (inter genera) for genus evolution.

Based on Table 1, combined with the results of relevant phylogenic analysis [18-20], it can also be confirmed that there are 7 current synonyms of the genus *Cinna* L., including *Aniselytron* Merr., *Dupontia* R.Br., *Festucella* E.B.Alexeev, *Hookerochloa* E.B.Alexeev, *Nicoraepoa* Soreng & L.J.Gillespie, *Saxipoa* Soreng et al. and *Sylvipoa* Soreng. Therefore, it is scientific to combine the genus *Cinna* L. as follows.

Cinna L., Sp. Pl. 1: 5. 1753. Type: *Cinna arundinacea* L..─ *Aniselytron* Merr., Philipp. J. Sci., C 5: 328. 1910. Type: *Cinna agrostoides* (Merr.) D.L.Fu. ─ *Arctagrostis* Griseb., Fl. Ross. (Ledeb.) 4(13): 434. 1852. Type: *Cinna latiphylla* D.L.Fu. ─ *Dupontia* R.Br., Chlor. Melvill. 32. 1823. Type: *Cinna fisheri* (R.Br.) D.L.Fu. ─ *Festucella* E.B.Alexeev, Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol. 90(5): 104. 1985. Type: *Cinna eriopoda* (Vickery) D.L.Fu. ─ *Hookerochloa* E.B.Alexeev, Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol. 90(5): 106. 1985. Type: *Cinna hookeriana* (Hook.f.) D.L.Fu. ─ *Nicoraepoa* Soreng & L.J.Gillespie, Ann. Missouri Bot. Gard. 94(4): 842. 2007. Type: *Cinna andina* (Trin.) D.L.Fu. ─ *Saxipoa* Soreng, L.J.Gillespie & S.W.L.Jacobs, Austral. Syst. Bot. 22(6): 406. 2009. Type: *Cinna saxicola* (R.Br.) D.L.Fu. ─ *Sylvipoa* Soreng, L.J.Gillespie & S.W.L.Jacobs, Austral. Syst. Bot. 22(6): 404. 2009. Type: *Cinna queenslandica* (C.E.Hubb.) D.L.Fu.

About 19 species in America, Asia, Europe and Oceania, including 2 new specific names and 14 new specific combinations.

3.4. Synonyms of the Genus *Coleanthus*

The PHS of CPCG of 5 species of Poaceae were analyzed using the type *Coleanthus subtilis* Seidl ex Roem. & Schult. and the results are shown in Table 4.

Table 4. *PHS of CPCG between Coleanthus subtilis and relevant species of Poaceae.*

No.	Scientific Names and Numbers of CPCG in NCBI	Current Names	PHL/17bp	PHS
1	*Coleanthus subtilis*_NC062353.1	*Coleanthus subtilis*	113770	1
2	*Coleanthus algidus*_NC059982.1	*Phippsia algida*	109695	0.964
3	*Sclerochloa distans*_NC054281.1	*Puccinellia distans*	98916	0.869
4	*Scolochloa festucacea*_NC042709.1	*Scolochloa festucacea*	89163	0.784
5	*Cinna arundinacea*_NC059959.1	*Cinna arundinacea*	88743	0.780

From Table 4, it is obvious that using the type of *Coleanthus subtilis* Seidl ex Roem. & Schult., the genus *Phippsia* (Trin.) R.Br. is a synonym of the genus *Coleanthus* Seidl, for its evolutionary relationship with the type being 0.964, far from reaching the minimum criterion PHS(17bp) ≤ 0.928 (inter genera) for genus classification. Therefore, it is scientific to combine the genus *Coleanthus* Seidl (nom. cons.) as follows.

Coleanthus Seidl, Syst. Veg., ed. 15 bis [Roemer & Schultes] 2: 11, 276. 1817, nom. cons. Type: *C. subtilis* (Trattinick) W. B. Seidl. ─ *Phippsia* (Trin.) R.Br., Chlor. Melvill. 27. 1823. Type: *Coleanthus algidus* (Sol.) D.L.Fu.

About 4 species, in America, Asia & Europe, including 3 new specific combinations.

3.5. Synonyms of the Genus *Sclerochloa*

The PHS of CPCG of 5 species of Poaceae were analyzed using the type *Sclerochloa dura* (L.) Beauv. and the results are shown in Table 5.

Table 5. *PHS of CPCG between Sclerochloa dura and relevant species of Poaceae.*

No.	Scientific Names and Numbers of CPCG in NCBI	Current Names	PHL/17bp	PHS
1	*Sclerochloa dura*_MT094329.1	*Sclerochloa dura*	113302	1
2	*Sclerochloa distans*_NC054281.1	*Puccinellia distans*	105596	0.932
3	*Coleanthus subtilis*_NC062353.1	*Coleanthus subtilis*	97054	0.857
4	*Scolochloa festucacea*_NC042709.1	*Scolochloa festucacea*	88910	0.785
5	*Cinna arundinacea*_NC059959.1	*Cinna arundinacea*	88494	0.781

Table 5 indicates that the genus *Puccinellia* Parl. is a synonym of the genus *Sclerochloa* P.Beauv., because the evolutionary relationship between *Sclerochloa dura* (L.) Beauv. and *Puccinellia distans* (Jacq.) Bab. is 0.932, not meeting the minimum criterion PHS(17bp) ≤ 0.928 (inter genera) for genus evolution. Therefore, the latest combination of the genus *Puccinellia* Parl. are as follows.

Sclerochloa P.Beauv., Ess. Agrostogr. 97. 1812. Type: *Sclerochloa dura* (L.) Beauv. ─ *Puccinellia* Parl., Fl. Ital. (Parlatore) 1: 366. 1848. Type: *Sclerochloa distans* (Jacq.) Bab.

About 116 species, in Africa, America, Asia, Europe & Oceania, including 1 new specific name and 107 new specific combinations.

4. New Names and New Combinations

Acrospelion distichophyllum (Vill.) D.L.Fu, sp. transl. nov. *Avena distichophylla* Vill., Prosp. Hist. Pl. Dauphin é 2: 144. 1787; *Acrospelion distichophyllum* (Vill.) Barber á J. Syst. Evol. 58(4): 523. 2019, nom. inval.

Acrospelion glaciale (Bory) D.L.Fu, sp. transl. nov. *Avena glacialis* Bory, Ann. G én. Sci. Phys. 3: 6. 1820; *Acrospelion glaciale* (Bory) Barber á, Soreng & Quintanar, Molec. Phylogen. Evol. 159-107110: 9. 2021.

Arctopoa saltuensis (Fernald & Wiegand) D.L.Fu, sp. transl. nov. *Poa saltuensis* Fernald & Wiegand, Rhodora 20: 122. 1918.

Cinna agrostoides (Merr.) D.L.Fu, sp. transl. nov. *Aniselytron agrostoides* Merr., Philipp. J. Sci., C 5: 329. 1910.

Cinna andina (Trin.) D.L.Fu, sp. transl. nov. *Poa andina*

Trin., Linnaea 10: 306. 1836. ─ *Nicoraepoa andina* (Trin.) Soreng & L.J.Gillespie, Ann. Missouri Bot. Gard. 94(4): 843. 2007.

Cinna chonotica (Phil.) D.L.Fu, sp. transl. nov. *Poa chonotica* Phil., Linnaea 29: 97. 1858.

Cinna eriopoda (Vickery) D.L.Fu, sp. transl. nov. *Festuca eriopoda* Vickery, Contr. New South Wales Natl. Herb. 1: 10. 1939. ─ *Festucella eriopoda* (Vickery) E.B.Alexeev, Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol. 90(5): 104. 1985.

Cinna fisheri (R.Br.) D.L.Fu, sp. transl. nov. *Dupontia fisheri* R.Br., Chlor. Melvill. 33. 1823.

Cinna fulva (Trin.) D.L.Fu, sp. transl. nov. *Poa fulva* Trin., Mém. Acad. Imp. Sci. St.-Pétersbourg, Sér. 6, Sci. Math. 1: 378. 1830.

Cinna hookeriana (Hook.f.) D.L.Fu, sp. transl. nov. *Festuca hookeriana* F.Muell. ex Hook.f., Fl. Tasman. 2: 127. 1858. ─ *Hookerochloa hookeriana* (F.Muell. ex Hook.f.) E.B.Alexeev, Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol. 90(5): 106. 1985.

Cinna latiphylla D.L.Fu, sp. nom. nov. *Colpodium latifolium* R.Br., Chlor. Melvill. 28. 1823. non *Cinna latifolia* (Trevir. ex Göpp.) Griseb. ─ *Arctagrostis latifolia* Griseb., Fl. Ross. (Ledeb.) 4(13): 434. 1852.

Cinna pugionifolia (Speg.) D.L.Fu, sp. transl. nov. *Poa pugionifolia* Speg., Anales Mus. Nac. Buenos Aires 7: 199. 1902.

Cinna queenslandica (C.E.Hubb.) D.L.Fu, sp. transl. nov. *Poa queenslandica* C.E.Hubb., Bull. Misc. Inform. 1934: 449. 1934. ─ *Sylvipoa queenslandica* (C.E.Hubb.) Soreng, L.J.Gillespie & S.W.L.Jacobs, Austral. Syst. Bot. 22(6): 404. 2009.

Cinna robusta (Steud.) D.L.Fu, sp. transl. nov. *Poa robusta* Steud., Syn. Pl. Glumac. 1: 426. 1854.

Cinna saxicola (R.Br.) D.L.Fu, sp. transl. nov. *Poa saxicola* R.Br., Prodr. Fl. Nov. Holland.: 180. 1810. ─ *Saxipoa saxicola* (R.Br.) Soreng, L.J.Gillespie & S.W.L.Jacobs, Austral. Syst. Bot. 22(6): 407. 2009.

Cinna stepparia (Nicora) D.L.Fu, sp. transl. nov. *Poa stepparia* Nicora, Hickenia 1: 101. 1977.

Cinna subenervis (Hack.) D.L.Fu, sp. transl. nov. *Poa subenervis* Hack., Ark. Bot. 7(2): 7. 1907.

Cinna treutleri (Kuntze) D.L.Fu, sp. transl. nov. *Milium treutleri* Kuntze, Revis. Gen. Pl. 2: 780. 1891.

Cinna trinii D.L.Fu, sp. nom. nov. *Vilfa arundinacea* Trin., Gram. Unifl. Sesquifl.: 157. 1824, non *Cinna arundinacea* L.

Coleanthus algidus (Sol.) D.L.Fu, sp. transl. nov. *Agrostis algida* Sol. in C.J.Phipps, Voy. North Pole: 200. 1774. ─ *Phippsia algida* (Sol.) R.Br., Chlor. Melvill. 27. 1823.

Coleanthus concinnus (Th.Fr.) D.L.Fu, sp. transl. nov. *Catabrosa concinna* Th.Fr. in Öfvers. Kongl. Vetensk.-Akad. Förh. 26(2): 140. 1869 publ. 1870.

Coleanthus wilczekii (Hack) D.L.Fu, sp. transl. nov. *Phippsia wilczekii* Hack., Repert. Spec. Nov. Regni Veg. 7: 321. 1909.

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5. Conclusion

When establishing a new genus, the use of inaccurate and unscientific genera as compared taxa can result in a new synonym. By applying the minimum criterion for genus classification by CPCG of Fructophyta D.L.Fu & H.Fu, which is a crucial and empirically validated scientific tool, it is possible to effectively address the subjectivity and partiality in traditional taxonomy and modern phylogeny. This approach allows for the scientific identification of genus synonyms and resolution of taxonomic nomenclature confusions. Through the application of this minimum criterion, a total of 19 current synonyms have been identified for the five genera: *Jarava* Ruiz et Pav, *Graphephorum* Desv., *Cinna* L., *Coleanthus* Seidl and *Sclerochloa* P.Beauv.. Additionally, 10 new specific names along with 406 new specific combinations have been scientifically and validly published in the paper. These publications will establish a solid foundation for evolutionary system research within the order Poales Small.

6. Recommendation

Genus is not only a crucial element in biological taxonomy names, but also a significant rank in evolutionary systems. Therefore, the definition of genus presents a scientific challenge that cannot be overlooked by biological nomenclature, taxonomists, and systematicists. However, there has been no definitive scientific answer or evaluation method. The minimum criterion for defining genera of Fructophyta D.L.Fu & H.Fu serves as an effective scientific tool for identifying genus synonyms and should be widely promoted and applied. Utilizing the minimum criterion to find and identify genus synonyms, analyzing the causes of synonyms, and making scientifically sound corrections are essential for accurately naming and establishing evolutionary systems of fruit plants. The evolutionary system of the phylum Fructophyta D.L.Fu & H.Fu is notably complex, particularly re-

garding the unique taxonomic traits of the class Scutellopsida D.L.Fu, which poses significant challenges to traditional taxonomy and modern plant phylogeny; moreover, plants within the class are closely linked to human production and daily life. Therefore, it is recommended to continue identifying synonyms of certain plant genera while scientifically combining and publishing their species to lay a solid foundation for accurate application of plant taxonomic names — especially in agriculture and forestry.

7. Correction

Bambusa wenii D.L.Fu, Amer. J. Agr. For. 12(3): 182. 2024, (as '*weni*').

Bambusa zengiae D.L.Fu, Amer. J. Agr. For. 12(3): 182. 2024, (as '*zengi*').

Dinochloa holttumii D.L.Fu, Amer. J. Agr. For. 12(3): 182. 2024, (as '*holttumi*').

Phyllostachys holttii D.L.Fu & H.Fu, Amer. J. Agr. For. 12(2): 95. 2024, (as '*holtti*').

Phyllostachys stapletonii D.L.Fu & H.Fu, Amer. J. Agr. For. 12(2): 102. 2024, (as '*stapletoni*').

Phyllostachys wenii D.L.Fu & H.Fu, Amer. J. Agr. For. 12(2): 104. 2024, (as '*weni*').

Abbreviations

CPCG	Chloroplast Complete Genomes
PHL	Phylogenetic Loci
PHS	Phylogenetic Similarity

Author Contributions

Da-Li Fu is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The author declares no conflicts of interest.

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