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THE USE OF ALTERNATIVE NAMES FOR A FEW WELL KNOWN ANGIOSPERM FAMILIES VIS-A-VIS FABACEAE VERSUS PAPILIONACEAE: HISTORICAL PERSPECTIVE

R. L. Mitra, V. S. Raju* and P. Singh+

Central National Herbarium, Botanical Survey of India, Howrah 711 103
e-mail : rl.mitra37@gmail.com

**Plant Systematics Laboratory, Kakatiya University, Warangal 506 009*
e-mail: vatsavayar@hotmail.com

+*Botanical Survey of India, CGO Complex, Salt Lake City, Kolkata 700 064*
e-mail: pchanna@gmail.com

ABSTRACT

The paper is a brief historical resume on the genesis and development of familial concept as a natural unit in plants and its nomenclature. It explains in the backdrop of Latin grammar, how names with diverse terminations once dominated family nomenclature in taxonomic literature. It also narrates the logical efforts that followed to rationalize the family names to its present state leaving room for use of alternative names for a few angiosperm families. Besides, the paper discusses the proper use of the names Leguminosae, Fabaceae and Papilionaceae, and the associated problems.

Keywords : Alternative names, Family names, Latin Grammar, History, Fabaceae, Papilionaceae.

INTRODUCTION

Plant nomenclature has attained an achievable stability. Any system devised or divined, which is dynamic like plant nomenclature, can never reach complete steadiness. Certain of the provisions in the Botanical Code which were deliberately incorporated for historical or other reasons, are sources of apparent instability and providing room for confusion. One such issue is the use of alternative names for certain of the familiar angiosperm families. There is an increasing demand for abandoning them and going for one name as envisaged in Principle IV of the Botanical Code which seeks one name for one taxon with a particular circumscription, position and rank. The recent three proposals (205-207) in this regard by Govaerts (2004) are a testimony to the persisting problem. The defeat of the proposals is also not an end of the issue in itself and perhaps cannot be avoided till a more rational solution is achieved. Therefore, for a proper introspection, this contentious issue is brought to the fore again, emphasizing its historical perspective.

The discovery of more and more of novel plants at the beginning of 18th century put before the botanists in Europe the stupendous task of naming, describing and publishing them. In the process, the science of nomenclature was given a definite direction and destiny by Carolus Linnaeus with the publication of *Species Plantarum* (1753) and *Systema Naturae* (1759). Yet, in the absence of any generally accepted rules of nomenclature other than those elemental principles propounded by Linnaeus, the botanical nomenclatural patterns and practices were set by the then Botanists of considerable prestige and repute. On the whole, some of these were different from those which were in vogue later.

As the time passed, the inadequacies in plant nomenclature surfaced; the need for initiation of organized corrective measures to standardize plant nomenclature became increasingly apparent. It resulted in enacting a unified nomenclatural procedure, *i.e*., the International Rules of Botanical Nomenclature, to start with the Paris Code, 1867 (The de Candollean Rules). The declared objective of the Rules, embodied subsequently as Articles in the Code, is to put the nomenclature of the past into order and to provide for that of the future. In other words, all the corrective measures to standardize the botanical nomenclature began much after the same attained a certain stature independent of any internationally agreed rules. As and when many of the "proposed rules" were put into practice during the formative era of the Code, the inherent deficiencies of some of the rules became clear. In fact, the demand for the conservation of established names contrary to Principle of

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Priority [of publication] was first voiced by German Botanical Society in 1897. It was due to the fact that many botanists became dismayed by the magnitude of name changes suggested by O. Kuntze in *Revisio Genera Plantarum*(1891-98). As it is impossible to legislate for every eventuality, there is a provision in the Code for periodical modification of Code itself.

CONCEPT OF FAMILY AS A NATURAL UNIT

Linnaeus and the Natural Order : The two massive classics of pre-Linnean era, namely *Rariorum Plantarum Historia* (1601) by Carolus Clusius and *Historia Plantarum* (1686-1704) by John Ray, greatly influenced Carolus Linnaeus in conceiving his *Species Plantarum*. He intended that *Species Plantarum* together with *Genera Plantarum* will provide a simple means of referring all the known plants of the world.

There existed systems of classification based on form, gross morphology of plant structures, etc., before the time of Linnaeus. But none of those systems was adequate and simple enough to accommodate the increasing number of newly described plants, nor could be easily used to identify the already known ones. Linnaeus, therefore, introduced a system of classification in the 1st edition of *Systema Naturae* (1735), and employed the said classification in arranging plants in *Species Plantarum* and *Genera Plantarum*. It is a simple but ingenious arithmetical system whereby the genera are grouped into 24 classes according to number, union, length, etc. of stamens. The classes were then subdivided into orders on the basis of number of pistils. It is true that the sexual system mentioned above is usually associated with the name of Linnaeus. But it is seldom known that Linnaeus himself was critical about the system and freely acknowledged the inadequacy of the same (*Classes Plantarum* 440. 1738). He was compelled to adopt the system in *Species Plantarum* and *Genera Plantarum* for no other system then available could be used to achieve his cherished objective. Though, at that time, the concept of evolution was not there, yet from his vast experience in the study of nature in Western Europe (1735-37), Linnaeus firmly believed that there certainly existed more close, natural and orderly relationship in the creation of God. He, therefore, felt the need for such a method to bring together into groups the plants which resemble each other in their botanical qualities and also knew it was all the more hard to write (*Genera Plantarum, Ratio Operis* No.1. 1737). He even outlined what he thought might be such a system, publishing a first draft, '*Fragmenta Methodi Naturalis*' – an incomplete work as the name implied, in *Classes Plantarum* (1738). Here he drew an outline of 65 orders in a schematic form by placing the related genera under each Order. About the same time, Linnaeus also contributed a natural classification – 'Clavis Classium' to Adriaan van Royen, *Florae Leydensis Prodromus* (1740).

In the preface of '*Fragmenta Methodi Naturalis*' (*Classes Plantarum* 485-488. 1738), Linnaeus remarked: 'A truly natural method is the highest goal of systematic botany … No one has so far succeeded in designing a true natural method. I [Linnaeus] have labored long trying to work out such a method, and done all I could, without reaching my aim. I will work at this task my whole life, publishing what I shall discover…. It is impossible to give a key of the natural method before having placed every plant correctly as to order. It is not enough to define an order using the common characters of its genera, but data must be provided in addition by which one order can be set aside from another. My work is restricted to orders [*i.e*., families in the modern sense] because once these are correctly placed, the classes [*i.e*., orders in the modern sense] can be worked out at ease. No a priori rules can be laid down to write a natural method, and no part of flower and fruit comes first in sequence of the character to be used. All that may count toward such a method is the symmetry of every part, which is often peculiar to each group… Let everybody correct, extend, and perfect this method who can. Let those leave it alone who cannot. Those who can are the best of botanists'. [Croizat, Bull. Torrey Bot. Club 72: 57-58, 1945].

In the sexual system of Linnaeus, the orders were glaringly artificial in composition while in the natural system each of these were composed of genera supposedly expressive of their true affinities hence called 'Natural Order'[1], now known as family, a term of French origin and appears to have been introduced by Pierre Mangol (1638-1715) in his *Prodromus historie generalis* **…** (1689). Thus, we find genesis of modern familial concept in Linnaeus's *Classes Plantarum* (1738), a land mark publication in Botany.

[1]Paris Code (1867) maintained the then term Order (*Ordo*) or Natural Order (*Ordo naturalis*) as synonymous to French term 'Family'.

Linnaeus published his '*Fragmenta*' anew with little change in *Philosophia botanica* (1751) providing the orders special descriptive names and also adopting for the orders similar such names already in use as 'descriptive terms' in plant classification in pre-Linnean texts. Linnaeus, however, did not give up his thoughts on '*Fragmenta Methodi Naturalis*' and went on perfecting his ideas with the knowledge then available. In the sixth edition of *Genera Plantarum* (1764), Linnaeus thus appended a section on his '*Ordines Naturales*' which he introduced with 11 aphorisms reiterating his thoughts on natural system of classification, for example:

10. '*Ordines naturales valent de natura plantarum*. *Artificiales in diagnosi plantarum*.' ['Natural orders indicate the nature of plant. Artificial orders are effectual for identification of plants.']

11. '*Genera qui condit naturalia, Naturales ordines ibi, ubi licet, perspectos reddat*.' ['He who founds natural genera should refer them to the Natural orders where possible.']

Accordingly, Linnaeus added serial numbers to all the genera following *Genera Plantarum* in the schema of his *Ordines Naturales*. Later on, he gave his much considered views in two series of lectures to the two select little gatherings of his students, the first in 1764 to Ferber, Fabricius, Zoega, Meyer and Kuhn who had come from Philadelphia, and the second in 1771 to Giseke, Vahl, Edinger and Tislef. From his own notes and those of Fabricius, Giseke published in 1792 Linnaeus's *Praelectiones in Ordines naturales Plantarum*. Even today, Piperaceae ('Piperitae'), Papilionaceae and Compositae carry the name of Linnaeus in a true sense though these are attributed to his student Giseke on nomenclatural ground, who compiled, edited and published the lectures ('*praelectiones*') of Linnaeus posthumously.

de Jussieus and the Natural Order : Meanwhile, further major developments in natural classification initiated by Linnaeus in 1738 took place in France. Bernard de Jussieu (1699-1777), a French contemporary of Linnaeus and Professor of Botany at Royal Gardens, Trianon in Versailles, while attempting to lay plants according to a natural system in the Botanical Gardens of Trianon and Paris brought about a number of modifications to Linnaean system. It appears that at the time Bernard was also in possession of a draft manuscript of Adanson's '*Familles des Plantes*' which was alleged to have been sent to him in 1750 from Senegal in West Africa where Adanson was engaged in the study of plants and animals. But never being completely satisfied with the changes he could bring about to the systems of Linnaeus and Adanson, Bernard did not publish his results.

Antoine Laurent de Jussieu (1748-1836), who joined his uncle Bernard at the Royal Gardens at a very young age and then succeeded him there, brought about a significant improvement to his uncle's incomplete and unpublished system of classification. In fact, Bernard's quiet deed – observing natural system of classification live at work in gardens, greatly influenced the botanical thoughts of younger de Jussieu. In 1789, A.L. de Jussieu published his *Genera Plantarum secundum Ordines naturalis disposita* [Arrangement of Plant Genera according to Natural Orders, *i.e*., Families] – the first complete system which can be claimed a natural one. In the preface of his work A.L. de Jussieu also published (pp.LXIII – LXX) his uncle's manuscript, '*Bernardi de Jussieu, Ordines naturalis, In Ludovici XV Horto Trianonense Dispositi, Anno* 1759' – again a schematic representation of 48 orders with their included genera. In A.L. de Jussieu's work, the orders (*i.e*., families) which number 100 are carefully characterized, clearly differentiated and named. The excellence of the work lay in the fact that in all modern classifications nearly all of them are recognized as distinct. It is perhaps because of this uniqueness of the work, A.L. de Jussieu's *Genera Plantarum* (1789) has been accepted as starting point date for family names of Spermatophyta[2] (Art. 13.1 & Appendix IIB, Vienna Code, 2006).

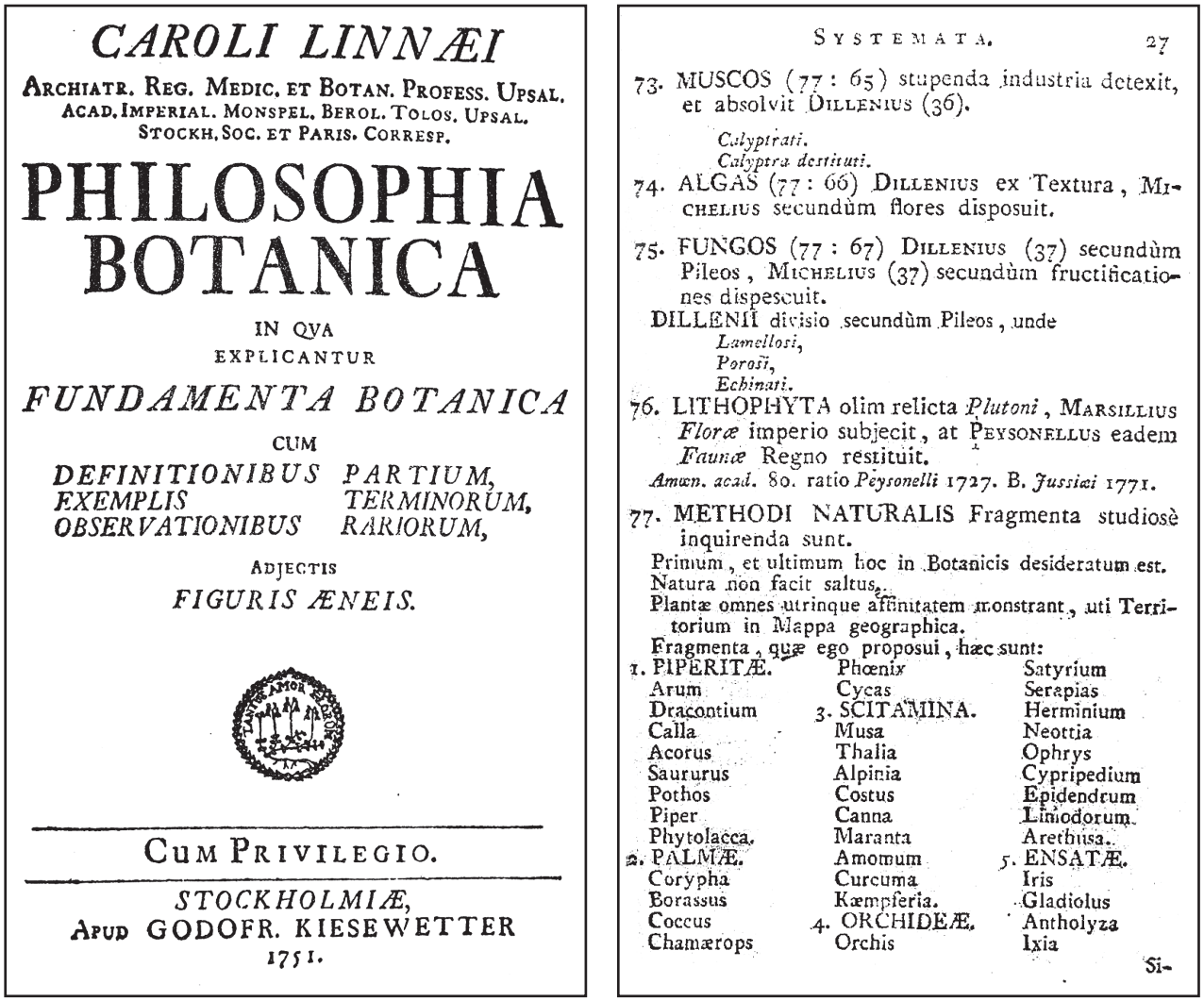
Adanson and the Plant Family : Michel Adanson (1727-1806), a French botanist, enriched by his vast experience as an explorer in west tropical Africa, published second volume of his two volume work, '*Les*

[2]. Lately it was noticed that the starting point for publication of supra generic names of Spermatophyta was included in Montreal Code (1961) on the basis of an informal decision in Montreal Congress (1959). The provision was not therefore included in any articles of the Code. When an attempt to ratify the decision in Tokyo Congress (1993) failed, there was a temporary setback which was reflected in the authorship, date and place of publication of some family names in Appendix IIB, St. Louis Code (2000). However, a decision of the Vienna Congress (2005) restored the original basis of Spermatophyta family names in Appendix IIB, dating to Montreal Congress (1959).

Familles des Plantes' in 1763. Therein though Adanson named and properly described for the first time 58 plant families, 'his lavish incorporation of doubtful or ill-known genera' in many of these families, systematists in general did not consider his familial concept better than Linnaeus's '*Fragmenta*'.

FAMILY NOMENCLATURE

As stated earlier, the first conscious attempt to name[3] the families ('orders') was there in *Philosophia botanica* (pp.27 - 36. 1751) when the concept of order as a natural unit fairly crystallized. There under '77. METHODI NATURALIS Fragmenta…' Linnaeus gave special descriptive names like Bicornes, Spathaceae, Scabridae, Vepreculae, etc., and adopted similar such names for the orders – Piperitae, Palmae, Orchideae, Liliaceae, Gramina, Compositi, Umbellate, Cariophillaei, Cucurbitaceae, Papilionaceae, and the like from the works of his predecessors[4] though these were in use there in a different context (**Fig.1**).



CAROLI LINNÆI

ARCHIATR. REG. MEDIC. ET BOTAN. PROFESS. UPSAL.
ACAD. IMPERIAL. MONSPEL. BEROL. TOLOS. UPSAL.
STOCKH. SOC. ET PARIS. CORRESP.

PHILOSOPHIA BOTANICA

IN QVA
EXPLICANTUR

FUNDAMENTA BOTANICA

CUM

DEFINITIONIBUS PARTIUM,
EXEMPLIS TERMINORUM,
OBSERVATIONIBUS RARIORUM,

ADJECTIS

FIGURIS ÆNEIS.

CUM PRIVILEGIO.

STOCKHOLMIÆ,
APUD GODOFR. KIESEWETTER
1751.

SYSTEMATA. 27

73. MUSCOS (77 : 65) stupenda industria detexit, et absolvit DILLENIUS (36).

Calyptrati.
Calyptra destituti.

74. ALGAS (77 : 66) DILLENIUS ex Textura, MICHELIUS secundùm flores disposuit.

75. FUNGOS (77 : 67) DILLENIUS (37) secundùm Pileos, MICHELIUS (37) secundùm fructificationes dispescuit.

DILLENII divisio secundùm Pileos, unde
Lamellosi,
Porosi,
Echinati.

76. LITHOPHYTA olim relicta *Plutoni*, MARSILLIUS *Floræ* imperio subjecit, at PEYSONELLUS eadem *Faunæ* Regno restituit.

Amœn. acad. 80. ratio *Peysonelli* 1727. B. *Jussiæi* 1771.

77. METHODI NATURALIS Fragmenta studiosè inquirenda sunt.

Primum, et ultimum hoc in Botanicis desideratum est.
Natura non facit saltus.
Plantæ omnes utrinque affinitatem monstrant, uti Territorium in Mappa geographica.
Fragmenta, quæ ego proposui, hæc sunt:

1. PIPERITÆ.
Arum
Dracontium
Calla
Acorus
Saururus
Pothos
Piper
Phytolacca.
2. PALMÆ.
Corypha
Borassus
Coccus
Chamærops
Phœnix
Cycas
3. SCITAMINA.
Musa
Thalia
Alpinia
Costus
Canna
Maranta
Amomum
Curcuma
Kæmpferia.
4. ORCHIDEÆ.
Orchis
Satyrium
Serapias
Herminium
Neottia
Ophrys
Cypripedium
Epidendrum
Limodorum.
Arethusa.
5. ENSATÆ.
Iris
Gladiolus
Antholyza
Ixia

Si-

Fig.1 : Title page of *Philosophia botanica* (1751) and a page of 'Fragmenta'.

[3]A few such names were already used as name of Classes in *Florae Leydensis Prodromus* (1740) which Linnaeus helped van Royen to prepare in 1738 (Stearn, 1959: 96). Sprengel (1824: 44), however, claims that Linnaeus actually wrote the flora for van Royen – [*Florae Leidensis prodromus*. LB., 1740. 8. *Linnaeus scripsit* ('Linnaeus written it'), non Royenus…]

[4]I) Boerhaav, Hermann, *Ind. pl. hort. Lugd.-Bat.Leiden* 1710 & *Ind. alter hort. Lugd.-Bat.*Leiden 1720. II) Hermann, Paul, *Fl. Lugd.-Bat.*Leiden 1690. III) Morison, Robert, *Pl. hist. Univ.* vol. 2 & 3. Oxford 1680-99. IV) Ray, John, *Meth. Pl.* London 1682; *Meth. Pl. em.* London 1703; *Hist. Pl.* vol. 1-3. London 1686 - 1704 & *Syn. meth. strip. brit.* ed.1-3. London 1690-1724. V) Tournefort, Joseph Pitton, *Elem. Bot.* 3 vol. Paris 1694 & *Inst. rei herb*. Paris 1700.

Adanson (1763), however, preferred to use almost exclusively the plurals of a characteristic constituent generic name as the name of families. The prevailing French custom of using plurals of vernacular names to refer groups of such plants like, 'Les Anones', 'Les Amaranthes', 'Les Rosiers' (*i.e*., the Anonas, the Amaranths, the Roses), etc., appears to have influenced Adanson to use the Latin equivalents like Anonae, Amaranthi, Rosae, etc., as the family names. Such adoption of plurals of a characteristic constituent generic name as the family name even though was not appreciated afterwards, yet it helped to conceive the concept of type genus of a family[5] at a later date. Adanson also adopted traditional names like Palmae, Liliaceae, Compositae, Labiatae, Leguminosae and Cruciferae.

A.L. de Jussieu and his uncle Bernard de Jussieu (Gen. Pl. 1789 & pp. LXIII-LXX) gave little thought to the nomenclatural issue. Both of them followed Adanson (1763) in using plurals of the generic names as family names, at the same time liberally adopted traditional names ending in '–ae', '–eae', '–aceae' and '–oideae'. The traditional names adopted by Bernard in his manuscript are Palmae, Gramineae, Rubiaceae, Umbelliferae, Labiatae, Cruciferae, Papaveraceae, Leguminosae, Cucurbitaceae, Rosaceae, and Aroideae. A.L. de Jussieu, in addition adopted names like Campanulaceae, Ranunculaceae, Guttiferae, Malvaceae, Tiliaceae and Rutaceae.

Family Names and Latin Grammar: It is thus seen that naming of certain natural groups of plants variously called orders or families has been full of inconsistencies. Although, Botanical Code has now articles (18 & 19) which deal with procedure for establishment of names of families and their subdivisions, earlier family names have not been formed by any single method. Unlike English, in Latin an adjective has to agree in gender, number and case of the noun it qualifies, *i.e*., the ending of the adjective changes in accordance with the state of the noun it associates. Thus though a noun has only one gender, in Latin the adjective words exist in masculine, feminine and neuter genders. Botanical Latin has a rich store of such adjective words which ancient botanists liberally used as an 'independent noun' (to a lesser extent nouns also) to form newer descriptive terms to distinguish taxonomic categories in plant classification. Many such names were adopted by Linnaeus and his successors as family names. The following few examples fairly explains the grammatical implications of such names formed at the beginning:

Table-1. Examples of derivation of family names.

(I)	Cornu (N) – horn		Cornis (Adj.) – horned Bi-cornis (Adj.) – two horned	
	NOM	SINGULAR		
		M Bicornis	F Bicornis	N Bicorne
		PLURAL		
		Bicornes	**Bicornes**	Bicornia
(II)	Spatha (F) – spathe		Spathaceus (Adj.) – spathe-like	
	NOM	SINGULAR		
		M Spathaceus	F Spathacea	N Spathaceum
		PLURAL		
		Spathacei	**Spathaceae**	Spathacea
(III)	Scabri – (Latin comp.) – rough		Scabridus (Adj.) – somewhat rough	
	NOM	SINGULAR		
		M Scabridus	F Scabrida	N Scabridum
		PLURAL		
		Scabridi	**Scabridae**	Scabrida

[5]In the Brussels Code (1912), the type concept was first included as a 'Recommendation' which suggested among other things to indicate the typical genus in a family. In Cambridge Code (1935), type concept was included as 'Rules' and in Paris Code (1956) even as one of the six guiding principles (Principle II) of botanical nomenclature.

(IV)	Vepres (M) – thorn bush		Vepre – culus (Adj.) – dimunitive of Vepres	
	NOM	SINGULAR		
		M Vepreculus	F Veprecula	N Vepreculum
		PLURAL		
		Vepreculi	**Vepreculae**	Veprecula
(V)	Piper (N) – peper, piperis		(a) Piperitus (Adj.) – having the quality of piper (b) Piperaceus (Adj.) – piper-like	
	(a) NOM	SINGULAR		
		M Piperitus	F Piperita	N Piperitum
		PLURAL		
		Piperiti	**Piperitae**	Piperita
	(b) NOM	SINGULAR		
		M Piperaceus	F Piperacea	N Piperaceum
		PLURAL		
		Piperacei	**Piperaceae**	Piperacea
(VI)	Compo (Participle) – bringing together separate things		Compositus (Adj.) – put together, united	
	NOM	SINGULAR		
		M Compositus	F Composita	N Compositum
		PLURAL		
		Compositi	**Compositae**	Composita
(VII)	(a) Gramen (N) – Grass		(b) Gramineus (Adj.) – Grassy, grass-like (c) Graminaceus (Adj.) – having the character of grass	
	(a) NOM	SINGULAR	PLURAL	
		Gramen	**Gramina**	
	(b) NOM	SINGULAR		
		M Gramineus	F Graminea	N Gramineum
		PLURAL		
		Graminei	**Gramineae**	Graminea
	(c) NOM	SINGULAR		
		M Graminaceus	F Graminacea	N Graminaceum
		PLURAL		
		Graminacei	**Graminaceae**	Graminacea

(VIII)	(a) Palma (F) – Palm tree		(b) Palmaceus (Adj.) – having the character of palm tree	
	(a) NOM	SINGULAR	PLURAL	
		Palma	**Palmae**	
	(b) NOM	SINGULAR		
		M Palmaceus	F Palmacea	N Palmaceum
		PLURAL		
		Palmacei	**Palmaceae**	Palmacea
(IX)	(a) Orchis (F) – Orchid		(b) Orchideus (Adj.) – Orchid-like (c) Orchidaceus (Adj.) – having the character of Orchid.	
	(a) NOM	SINGULAR	PLURAL	
		Orchis	**Orchides**	
	(b) NOM	SINGULAR		
		M Orchideus	F Orchidea	N Orchideum
		PLURAL		
		Orchidei	**Orchideae**	Orchidea
	(c) NOM	SINGULAR		
		M Orchidaceus	F Orchidacea	N Orchidaceum
		PLURAL		
		Orchidacei	**Orchidaceae**	Orchidacea
(X)	Labia (F) – lip		Labiatus (Adj.) – lipped	
	NOM	SINGULAR		
		M Labiatus	F Labiata	N Labiatum
		PLURAL		
		Labiati	**Labiatae**	Labiata
(XI)	(a) Lilium (N) – lily		(b) Liliaceus (Adj.) – lily-like	
	(a) NOM	SINGULAR	PLURAL	
		Lilium	**Lilia**	
	(b) NOM	SINGULAR		
		M Liliaceus	F Liliacea	N Liliaceum
		PLURAL		
		Liliacei	**Liliaceae**	Liliacea
(XII)	Papilionis (M) – Butterfly		Papilionaceus (Adj.) – butterfly-like (corolla)	
	NOM	SINGULAR		
		M Papilionaceus	F Papilionacea	N Papilionaceum
		PLURAL		
		Papilionacei	**Papilionaceae**	Papilionacea

(XIII)	Legumen (N) – Pea or bean		(a) Leguminaceus (Adj.) – legume-like (b) Leguminosus (Adj.) – legume bearing	
	(a) NOM	SINGULAR		
		M Leguminaceus	F Leguminacea	N Leguminaceum
		PLURAL		
		Leguminacei	**Leguminaceae**	Leguminacea
	(b) NOM	SINGULAR		
		M Leguminosus	F Leguminosa	N Leguminosum
		PLURAL		
		Leguminosi	**Leguminosae**	Leguminosa
(XIV)	Umbella (F) – parasol		(a) Umbellifer (Adj.) – umbel bearing (b) Umbellatus (Adj.) – umbel-like	
	(a) NOM	SINGULAR		
		M Umbellifer	F Umbellifera	N Umbelliferum
		PLURAL		
		Umbelliferi	**Umbelliferae**	Umbellifera
	(b) NOM	SINGULAR		
		M Umbellatus	F Umbellata	N Umbellatum
		PLURAL		
		Umbellati	Umbellatae	Umbellata
(XV)	Caryo – phyllum (Latin comp.) – nut-bearing leaf Caryo – phyllus (Greek comp.) – nut-bearing leaf		(a) Caryophyllaceus (Adj.) – nut-leaved (b) Caryophyllaeus (Adj.) – nut-leaved (c) Caryophylleus (Adj.) – nut-leaved (d) Caryophylloideus (Adj.) – nut-leaved	
	(a) NOM	SINGULAR		
		M Caryophyllaceus	F Caryophyllacea	N Caryophyllaceum
		PLURAL		
		Caryophyllacei	**Caryophyllaceae**	Caryophyllacea
	(b) NOM	SINGULAR		
		M Caryophyllaeus	F Caryophyllaea	N Caryophyllaeum
		PLURAL		
		Caryophyllaei	Caryophyllaeae	Caryophyllaea
	(c) NOM	SINGULAR		
		M Caryophylleus	F Caryophyllea	N Caryophylleum
		PLURAL		
		Caryophyllei	**Caryophylleae**	Caryophyllea
	(d) NOM	SINGULAR		
		M Caryophylloideus	F Caryophylloidea	N Caryophylloideum
		PLURAL		
		Caryophylloidei	**Caryophylloideae**	Caryophylloidea

(XVI)	Cucurbita (F) – gourd		Cucurbitaceus (Adj.) – gourd-like	
	N O M	SINGULAR		
		M Cucurbitaceus	F Cucurbitacea	N Cucurbitaceum
		PLURAL		
		Cucurbitacei	**Cucurbitaceae**	Cucurbitacea
(XVII)	Rosa (F) – rose		Rosaceus (Adj.) – rose-like	
	N O M	SINGULAR		
		M Rosaceus	F Rosacea	N Rosaceum
		PLURAL		
		Rosacei	**Rosaceae**	Rosacea

F = Feminine; M = Masculine; N = Neuter; NOM = Nominative. Forms adopted as family names are in bold letters.

It is obvious from preceding examples (*Table 1*) that Linnaeus and his successors preferred substantive (nominative) plural form of feminine adjective words to substantive plural form of nouns or masculine adjective words as family names. It is also seen (examples VIIb&c, IXb&c, XIII and XV) that choice of various adjectival forms of a word resulted in many different endings in a family name when such adjectival words were declined to substantive feminine plural forms. In short, while coining family names, botanists chose to add declined forms of different adjectival suffixes of their likings to the stem, *i.e*. basic part of a Latin word or generic name (obtained by removing the inflection from its genitive singular form). So, we find family names with varied endings at a later date.

Rationalisation of Family Nomenclature: The fact that no author has ever consistently followed any rule in naming such group and even some families have been known by two or more names in the published literature, a few leading nineteenth century botanists took the initiative to rationalize the confused state of family nomenclature. Among them, A.P. de Candolle (Theorie Elem. 203.1813), while dealing with family nomenclature, felt that family names should be derived from an important included genus. He thus, accepted several such suffixes (de Candolle actually mentioned the corresponding French form of those Latin suffixes) in family names of earlier authors: –aceae, –arieae, –eae, –ineae, –aneae, –ideae, etc. Examples are Tiliaceae, Salicarieae, Menispermeae, Cistineae, Flacourtianeae and Polymonideae. The choice of a particular suffix was left to euphony. He also favoured the usage of following few large, well established family names formed otherwise long ago: Compositae, Cruciferae, Gramineae, Guttiferae, Labiatae, Leguminosae, Palmae and Umbelliferae. Such diversity of termination for the groups of the same rank was found to be confusing. John Lindley (Nat. Syst. ed.2. p. XIII. 1836), therefore, 'ventured upon a reformation of the nomenclature of the natural system, by making all the names of the divisions of the same value end in the same way' in second edition[6] of his work - 'An introduction to the natural system of Botany**……**1830', where he treated all the natural orders of the vegetable kingdom.

Accordingly, Lindley (*l.c.* 1836) not only adopted uniformly the suffix ' –aceae' for the names of the orders but also proposed therein several names ending in '–aceae' for those orders for which such names were wanting. To make the transition, particularly of those eight well-established classical names of orders ending in '–ae' to equivalent names ending in ' –aceae' a smooth affair, Lindley (*l.c.,* 1836, pp. 21, 58, 74, 148, etc.) mooted a novel way of presenting all such change-over (except Palmaceae). For example : order XI. Umbelliferae or Apiaceae, order XL. Cruciferae or Brassicaceae, order LV. Guttiferae or Clusiaceae, order CX. Leguminosae or Fabaceae, and the like. Though, thereby Lindley (*l.c.* 1836) heralded the inclusion of an unique exception in the botanical nomenclature – the provision for use of alternative names in specified cases, but this was not generally adopted until many years later.

Meanwhile, with the gradual recognition of more and more natural units between family and genus, and the usage of quite a few of such adjectival suffixes in providing suitable nomenclature to these units, there

[6] This edition was not only thoroughly revised with numerous additions and corrections but was also titled differently– A natural system of Botany**……** ed.2. 1836.

was a marked shift in the preponderance of typified family names ending in –aceae and –eae. In fact, together with a few classical names ending with '–ae', family/subfamily names ending in '–aceae' and '–eae' dominated 19th century taxonomic literature beginning with seventeen volume de Candolle, *Prodromus* (1824-1873) and ending in three volume Bentham & Hooker, *Genera Plantarum* (1862-1883). We also find that such a de Candollean provision for family names was also incorporated in Paris Code (1867).

The third International Botanical Congress (Vienna 1905, Code 1906) which for the first time gave serious consideration to nomenclatural matter, held that family names must be based on the name of an included genus with termination ' –aceae'. But listed eight classical family names ending in '–ae' as exceptions (not based on generic names) owing to long usage (some of these were in use even in *Phil. Bot*. 27. 1751) and to be used in preference to equivalent names (based on a genus) ending in '–aceae'. The fourth International Botanical Congress (Brussels 1910, Code 1912) further specified similar use of termination '–oideae' to an included generic name for subfamilies. But unanimity in the uses of rules for family nomenclature was not achieved until these were ratified again in fifth International Botanical Congress (Cambridge, 1930, Code 1935). Here a significant change in the rules was introduced to usher uniformity in family nomenclature, which allowed the use of those eight classical names ending in '–ae' as well as their equivalent names (based on a genus) ending in' –aceae' as **alternative** names.

Even after the enactment of internationally agreed rules of nomenclature in the Cambridge Congress 1930 (Code, 1935), there was no uniformity in the application of family names in the botanical literature. Because of varied interpretation of rules, two or more names were in use even for the same family. For instance, Willow-herb family was named variously as Onagraceae, Oenotheraceae or Epilobiaceae, and the tea family was called Ternstroemaceae and Theaceae. To bring order to the usage of the family names and not to supersede the popular names purely on technical ground, the provision of '*Nomina Conservanda'* was therefore extended to include names of families in Montreal Congress (1959, Code 1961).

Botanical Code now has Articles 18 & 19 which deal with establishment of names of families and their subdivisions. It also includes provisions for regularization of illegitimate names through conservation, and correction of names published with improper termination or incorrectly designated ranks. Thus each of the eight family names which were not based on generic names has been provided with an *alternative* family name based on a genus. Accordingly each of the following descriptive families are presumed to be typified by the generic names of their respective alternative families/family names: Compositae (Asteraceae; type, *Aster* L.); Cruciferae (Brassicaceae; type, *Brassica* L.); Gramineae (Poaceae; type, *Poa* L.); Guttiferae (Clusiaceae; type, *Clusia* L.); Labiatae (Lamiaceae; type, *Lamium* L.); Leguminosae (Fabaceae; type, *Faba* Mill. [= *Vicia* L.]); Palmae (Arecaceae; type, *Areca* L.); Papilionaceae (Fabaceae; type, *Faba* Mill.); Umbelliferae (Apiaceae; type, *Apium* L.).

Furthermore, in view of the fact that most of the family names were formed in the past, a substantial number of those generic names on which these were based are no longer considered legitimate on nomenclatural motive. Accordingly, while the generic names *Caryophyllus* Mill. and *Wintera* Murray are illegitimate, the family names Caryophyllaceae and Winteraceae are legitimate because they have been conserved. Similar examples are Balsaminaceae, Ebenaceae, Lentibulariaceae, Onagraceae and Sapotaceae. One may find many such examples from the Appendix IIB of the Code. It may also be noted that although A.L. de Jussieu, *Genera Plantarum* (1789) has been taken as a starting point for listing of 'Nomina Familiarum Conservanda', except for a few adopted classical names, none of the family names was really published therein with the suffix '–aceae'.

FABACEAE VS. PAPILIONACEAE

It is true that there is a general confusion regarding the proper use of the names Fabaceae, Leguminosae and Papilionaceae. But much of this can be avoided if the underlying problems are properly understood. Unfortunately, it is not always clear to many that Code is not concerned with the circumscription of a taxon. On the other hand, an author is given a free hand to circumscribe a taxon according to his/her concept of the same. But once the taxon is circumscribed, the author is not given any free hand to name the same. The various provisions of the Code will then guide the author to select the correct name of the taxon with that particular circumscription, position and rank.

As is obvious, the problem with Leguminosae is typical. It is owing to the fact that there exists difference of opinion concerning the circumscription of the family: (i) It can be conceived as a 'single large conglomerate' or (ii) it can be split into three smaller but more natural, independent families. If one circumscribes the family as a single large conglomerate, then [as per the Botanical Code] the family has to be called either Leguminosae or Fabaceae. But, if the same taxon is considered as composed of 'three segregate families', then that one particular part may have to be called either Papilionaceae or Fabaceae.

As to other associated problems, it has been pointed out that, in the past, after enactment of rules of 'Names of families and subfamilies, tribes and subtribes' in Cambridge Code (1935), each of the eight conserved family names, which did not conform to this rule, have been provided with an alternative name (as per the enacted rule), either of which may be used. As a result *Faba* Mill., the type of the alternative family name Fabaceae is also presumed to be the type of both Leguminosae and Papilionaceae. This, however, created a new problem. The types of both Leguminosae and Papilionaceae being the same, these two are to be treated as synonymous. But because the well-established circumscription of these two traditional families is different, they have been conserved (not to destabilize such long usage of these two names). To overcome this anomalous situation, a provision has been embodied in the code which states that: "When the Papilionaceae are regarded as a family distinct from the remainder of Leguminosae, the name Papilionaceae is conserved against Leguminosae" despite the fact that their types being the same (*i.e*. *Faba* Mill.). Similarly, even though the subfamily name Papilionoideae is contrary to the rules, a unique exception is made in the Code, not to destabilize its long usage: "When Papilionaceae are included in the family Leguminosae as a subfamily, the name Papilionoideae may be used as alternative to Faboideae."

Conversely, the family names are unique in one feature, for, unlike the names at any other rank, the vast majority is conserved to maintain their use as though they are "protected names" rather than names conserved strictly for nomenclatural reasons (Hoogland & Reveal, 2005). To summarize, today only nine family names are descriptive in a sense that these are not based on generic names; all are conserved together with their appropriate alternative names (Article 18.5 & 18.6).

This provision in the Code has, however, become controversial in recent years. McNeil & Brummitt (2003), after analyzing relative frequency in their use in published literature, noted a growing preference for "–aceae" names with an unstoppable momentum; yet, for many compelling reasons, they did suggest a natural solution to the issue.

Since the Botanical Code aims at providing a stable method of naming taxonomic groups and keeping in view the ever-growing body of users of such names consists mostly of people who are not taxonomic experts, the well-established names formed in the past are not destabilized. Finally, it may also be noted again that 'Botanical Code' is not averse to modifications (as there is a clear provision) if better solution to the problems are proposed.

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फेबेसी बनाम पेपिलिओनेसी के संदर्भ में कुछ विख्यात आवृतबीजी कुलों के लिए विकल्प नाम : ऐतिहासिक परिप्रेक्ष्य

आर.एल. मित्र, वी. एस. राजू एवं पी. सिंह

सार संक्षेप

यह शोधपत्र एक प्राकृतिक इकाई के रूप में कुल संबंधी अवधारणा एवं उसके नामकरण के उत्स तथा विकास का ऐतिहासिक सारांश है। इसमें लैटिन व्याकरण की पृष्ठभूमि में वर्गीकर (टेक्सोनोमिक) साहित्य मे कुलों के नामकरण में विविध अंत वाले नामों की अतीत प्रधानता, वर्तमान में उनको युक्तिसंगत बनाने के तार्किक प्रयास, कुछ आवृतबीजी कुलों के लिए विकल्प नामों के प्रयोग के प्रावधान की व्याख्या भी है। इसमें लेग्युमिनॉसे, फेबेसी एवं पेपिलिआनेसी नामों के समुचित प्रयोग एवं समवर्गी समस्याओं के विवेचन भी हैं।