LEGUMINOSAE SUBFAMILY PAPILIONOIDEAE

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Summary

This paper is an historical resumé of names that have been used for the group of legumes whose members have papilionoid flowers. When this taxon is treated as a subfamily, the prefix "Papilion-", with various terminations, has predominated. We propose conservation of Papilionoideae as an alternative to Faboideae, coeval with the "unique" conservation of Papilionaceae at the family rank.

(42) Proposal to revise Code:

Add to Article 19 of the Code:

Note 2. When the Papilionaceae are included in the family Leguminosae (alt. name Fabaceae) as a subfamily, the name Papilionoideae may be used as an alternative to Faboideae (see Art. 18.5 and 18.6).

Introduction

Some botanists (e.g., Isely, 1973, 1975; Gillett, Polhill and Verdcourt, 1971; Cronquist, 1968) treat the Leguminosae as a single family comprising three subfamilies. Others, e.g., Jones (1955) and Hutchinson (1964), regard the vast, heterogenous consortium as an order including three or four families. Deleting Jones' misplaced Krameriaceae, these views represent reasonable differences in taxonomic judgment, and either classification is defensible, as Brenan (1967, p. 1) has stated:

"Although some authors consider the three subfamilies of Leguminosae as separate families, this really represents no more than a slight difference of opinion. If emphasis is laid on the borderline tribes. . . , then subfamily is the reasonable rank; if, on the other hand, these are discounted in favour of the numerically much larger mass of genera about whose position there is no room for doubt or difference of opinion, then the subfamilies are reasonably considered as families. The three groups, however, remain very much the same in content whatever taxonomic rank is assigned to them."

If only one family is recognized, subfamilial names are needed for the major subordinate taxa. The use of the plural adjectives Mimosoideae and Caesalpinioideae is consistent among botanists. The largest subfamily is, however, currently called either Faboideae (e.g., Rudd, 1972; Robertson and Lee, 1976) or the Papilionoideae (e.g., Gillett, Polhill and Verdcourt, 1971; Isely, 1973). Faboideae and Fabaceae, derived from the type genus, Faba, are both, of course, correct names for the taxon
at either rank and are used by those who prefer that the suffix "aceae," in all cases, be added "to the stem of a legitimate name of an included genus" (Stafleu, 1978).

Robertson and Lee (1976) assert that Faboideae is the correct name for the subfamily and state that "The name Papilionoideae cannot be used under any circumstances." In a possibly similar vein, one of us received a manuscript review a couple of years ago that condemned the use of the word Papilionoideae. The writers evidently regarded the impropriety of "Papilionoideae" as self-evident since they did not indicate reasons for their position.

The Code, Articles 18.5 and 18.6 in Stafleu (1978), extends license to the traditionalists who prefer names "sanctioned by long usage," and permits the use of alternative names such as Palmae, Gramineae, Guttiferae, Leguminosae, Compositae, and Umbelliferae for the Arecaceae, Poaceae, Clusiaceae, Fabaceae, Asteraeae and Apiaceae, respectively. But what about Papilionaceae and Papilionoideae? If this large group of plants is treated as a family, the Code is explicit: "When the Papilionaceae (Fabaceae: type, Faba Mill.) are regarded as a family distinct from the remainder of the Leguminosae, the name Papilionaceae is conserved against Leguminosae" (Stafleu, 1978; Article 18.5; Stafleu, 1972; Article 18, note 3). And Article 51, which treats "retention of names...of taxa...that are divided," states (Stafleu, 1978; Article 51.2; Stafleu, 1972; Article 51) that "A unique exception is made for the family name Papilionaceae."

Papilionaceae is thus emphatically sanctioned. But what of Papilionoideae when the Legumes are regarded as a single family? Does the change in rank from family to subfamily invalidate the singular preservation of Papilionaceae? Or can conservation of Papilionaceae reasonably imply propriety of use of stem-name with the suffix "oideae" instead of "aceae"? Our response is affirmative for two reasons.

(1) Since the Code says that Papilionaceae is a "unique" exception among alternative family names, it is not unreasonable to assert that an exception of this level should or does sanction maintenance of the conserved stem-name at the subfamily rank. A legitimate rejoinder is that one must go by what the Code says and not what one thinks it implies. True. But the Code includes both the explicit and the implicit, the latter being necessary, if for no other reason than to prevent its assuming the length of Webster’s Unabridged. It gives directions, but it also allows for judgment. The fact that the Code is somewhat flexible is, and has been, a major cause of nomenclatural discussion.

(2) Paragraph 9 of the Preamble of the Code (Stafleu, 1978) says "In the absence of a relevant rule or where the consequence of rules are doubtful, established custom is followed." And traditional utilization is the reason for the conservation of names. Papilionaceae, Papilionatae, Papilionoideae (and other terminal variants) have, since their entry into the literature, been the acknowledged and almost mandatory names for the major group of legumes. But this statement requires documentation.

This report, then, is a historical sampling of the literature about the Leguminosae. Family and subfamily nomenclature for those legumes with papilionaceous flowers is categorized. The sources are major floristic works or treatments by authors whose viewpoint has been considered significant. Within this general delimitation, the sampling is random, and we recognize that representative lists of others would be somewhat different.

The New World list was prepared by Duane Isely and the Old World one by Roger Polhill.

OLD WORLD

Names based on nouns coeval with the adjectives "leguminous" and "papilionoid" were overwhelmingly predominant until the 1960’s. Linnaeus (1751) used Papilionaceae to explain the natural arrangement of plants as an alternative to
his sexual system, following the precedent of Tournefort (1719), who attributes the allusion to Valerius Cordus (1561) and Haller (1742). As an order or class, equivalent to a modern family, Papilionaceae enters formal nomenclature with Scopoli (1760) and Gieske (1792). Adanson (1763), faced with the problem of introducing tropical genera with non-papilionoid flowers into his family concept, adopted Leguminosae and was followed by Jussieu (1789), Gaertner (1791) and Jaume Saint-Hilaire (1805). The two concepts were neatly combined by Robert Brown (1814), who divided the class Leguminosae into three orders—Papilionaceae, Lomentaceae or Caesalpineae, and Mimoseae. This arrangement, consolidated by the three major generic classifications of the nineteenth century, de Candolle's Prodromus (1825), Bentham in Genera Plantarum (1865) and Taubert in Engler's Pflanzenfamilien (1891–1894), was disseminated in the major regional floras (Flora Australiensis, Flora Capensis, Flora Orientalis, Flora of British India, Flora of Tropical Africa; author citations in subsequent discussion) and in the innumerable local floras heir to them. Heresy received short shrift.

"Why should Leguminosae be called Fabaceae rather than Trifoliaceae or Astragalaceae, or by fifty other names? . . . Fixity of names is a principle of superior order." (A. L. de Candolle, 1867; Laws of Botanical Nomenclature, p. 45, in Weddell's translation).

Tradition persisted through the first half of the twentieth century with variations in rank and ending that provide some clue to their primary nineteenth century source. Among the 60 basic and standard floras listed at the beginning of Flora Europaea (Tutin et al., 1964), one uses Fabaceae (Rothmaler, 1962), one uses Phaseolaceae (Pires de Lima, 1947), and one uses Viciaceae (Dostál, 1948); the rest that mention the family use some variant of Leguminosae-Papilionaceae-Papilionoideae, sub-equally divided between a two tier system (19), Leguminosae (17) and Papilionaceae (20). In respect of rank, it should be remembered that in southern Europe the native representation of mimosoid and caesalpinioide flowers is negligible, and there are none in the north.

The tradition overseas was more influenced by linguistic and cultural connections than by the content of the native flora. The Swartziaeae and least specialized Sophoreae, which are intermediate between Caesalpinioideae and Papilionoideae, predominate in tropical America, decline sharply in Africa, and are virtually unrepresented in Australia. A broad concept of the family prevailed in South America (see New World text), but was more mixed in the Old World, without a clear conceptual cline from one family in the west to three in the east. The English-speaking world generally followed Bentham (1865), but a disturbing influence was the consistent use of three families by Hutchinson from 1926 to 1964, most evident in Africa, more recently (and with more reason) in Australasia. The French-speaking world remains staunchly adherent to the tradition set by de Candolle (1825), except for Belgium, which lies between two cultural traditions. The system of Taubert (1891–1894) also provided a stable influence, perpetuated in eleven editions of Engler's Syllabus (Diels, 1936) and in Dalla Torre & Harms (1901). Linnaean influence, naturally strong in the Low Countries and Scandinavia, and coupled with a total lack of native Mimosoideae and Caesalpinioideae in northern Europe, tended to favour Papilionaceae, which is occasionally used in Dutch publications in a broad sense to cover all three subfamilies. From this tradition, there is a rather ready adherence to the concept of three families, which avoids the problem (tropical genera with non-papilionoid flowers) faced by Adanson. Both Linnaean and German influences affected eastern Europe.

repercussions are not yet apparent, except that Fabaceae (occasionally as Viciaceae) has become general in eastern Europe and has been adopted sporadically elsewhere.

**Leguminosae as One Family**

**Order Leguminosae: suborder Papilionaceae.**—Deriving from de Candolle (1825–1827), Lindley (1830), Endlicher (1836–1840), and Bentham (1865), this, initially the usual form, was common until the 1912 Code specified the termination -oideae for subfamilies. Indeed, there was some persistence of convention until the ruling was specified again in 1935. This tradition was exemplified by major classic regional floras of the nineteenth century as Harvey (1862, *Flora Capensis*), Bentham (1864, *Flora Australiensis*), Baker (1871, *Flora of Tropical Africa*), Boissier (1872, *Flora Orientalis*), and Baker (1876–78, *Flora of British India*). Subsequent floras and revisions followed suit: e.g., Trimen (1894, Ceylon), Bailey (1900, Queensland), Rodway (1903, Tasmania), Cheeseman (1906, 1925, New Zealand), Backer (1911, Java), Ridley (1922, Malaya), and E. G. Baker (1926, 1929, tropical Africa).

**Famille Legumineuses: sousfamille Papilionacées.**—This has been the general French language form, with only minor variations (Papilionées or more recently Papilionoïdées): e.g., Baillon (1870), Drake (1893, Polynésie; 1902, Madagascar), Gagnepain (1916, 'éées', Indo-China), Guillamin (1948, 'ées', New Caledonia), Pellegin (1949, 'ées', Gabon), Quèzel & Santa (1962, Algérie), Aubrèville (1970, 'oidees', Cameroun), and Ozenda (1977, Sahara).

**Family Leguminosae: subfamily Papilionatae.**—The nomenclature of the widely used Englerian system, beginning with Taubert (1891–1894) and continuing to the eleventh edition of the *Syllabus der Pflanzenfamilien* (Diels, 1936), set a precedent followed by many others: e.g., Warburg (1895, E. Africa), Dalla Torre & Harms (1901), Ascherson & Graebner (1907, Middle Europe), Thonner (1908, Africa), Koorders (1912, Java), Gamble (1915–18, Madras), Gams (1923–24, Middle Europe), Marloth (1925, South Africa), Williamson (1930, Australia, Victoria), Brown (1935, Polynesia), Schwartz (1939, Arabie), Shishkin (1945, USSR), Black (1963, South Australia), Nyárády et al. (1957, Romania), and Ohwi (1965, Japan).

**Family Leguminosae: subfamily Papilionoideae.**—We come to the modern version of the first and third above: e.g., Torre (1962, Angola), Davis (1970, Turkey), Hess et al. (1970, Switzerland), Brenan (1967, East Africa; 1970, Flora Zambesiaca), Gillett et al. (1971, E. Africa), Airy Shaw (1973), Täckholm (1974, Egypt), Dyer (1975, South Africa), and Meikle (1977, Cyprus).

**Family Fabaceae: subfamily Papilionoideae.**—Ross (1975, South Africa).

**Family Leguminosae: subfamily Lotoideae.**—Following Rehder (1945), this was used in *Flora Europaea* (Heywood & Ball, 1968) and a few subsequent works, e.g., Franco (1971, Portugal) and Heywood (1971).


**Family Papilionaceae: suborder/subfamily Papilionaceae/atae.**—These are the variants of Miquel (1855, Java), Hayek (1927, Balkans), Mayer (1952, Yugoslavia), Szafer et al. (1953, Poland), and van Ooststroom (1975, Netherlands).

**Family Leguminosae: no subfamilies listed.**—One quarter of the basic and standard floras of Europe listed in *Flora Europaea* (Tutin et al., 1964) do not enumerate subfamilies, this being a probable consequence of the paucity of mimosoid and caesalpinoid representatives. Subfamilies are omitted also by Burbidge (1963, Australia), Ohashi (1966, Himalaya), and Iconographia Cormophytorum Sinicorum (1972, China).

**Leguminosae Treated as Three Families**

**Family Fabaceae.**—Fabaceae was mentioned as a name for a group of tribes by
Reichenbach (1828); proposed as a family name by Lindley (1836), and then largely disused until reintroduced from North America in the 1960’s by Rothmaler (1962, Germany), Hutchinson (1964) and Takhtajan (1969), and also taken up by Gams & Podlech (1964, Middle Europe), Eichler (1965, S. Australia), Soó (1966, Hungary), Lüve (1970, Iceland), Schreiber et al. (1970, SW. Africa), and Clifford & Ludlow (1972, Queensland).

**Family Papilionaceae.**—This has been the most common option in Europe where, as noted above, mimosoid and caesalpinoid representation is negligible. It has been popularized in the English-speaking world by its consistent use by Hutchinson from 1926 to 1959, and increasingly used in Australasia where there are virtually no intermediate genera. A few examples are Hutchinson & Dalziel (1928, W. Africa), Burtt Davy (1932, Transvaal), Rechinger (1943, Aegean), Andrews (1952, Sudan), Toussaint et al. (1953, Zaire), Cufodontis (1955, Ethiopia), Hepper (1958, W. Africa), Ho (1960, Vietnam), van Meeuwen et al. (1961, Malaysia), Allan (1961, New Zealand), Thompson (1961, New South Wales), Backer & Bakhuizen van den Brink (1963, Java), Mashewari (1963, India), Jafri (1966, Pakistan), Burbidge & Gray (1970, ACT, Australia), Zohary (1972, Israel), Townsend (1974, Iraq), and Ali (1977, Pakistan).

**Family Viciaceae.**—See Dostál (1958).

**Family Phaseolaceae.**—Pires de Lima (1947).

**Old World Summary**

Historically, variants of Leguminosae-Papilionaceae-Papilionoideae are overwhelmingly predominant, the variations loosely linked to linguistic and cultural traditions, but nowadays essentially merged into Papilionaceae or Leguminosae subfamily Papilionoideae. There has been a trend this century toward three families rather than one, but this is part of a general pattern unrelated to any change in legume systematics. Regionally, the volume of legume literature is more or less inversely proportional to the richness of the legume flora and within that context, the narrower concept is generally convenient. The adoption of a narrow concept by Hutchinson (1926, 1959, 1964) might appear significant but seems more connected with his general view of the Bentham & Hooker system, derived from his youthful studies of the Urticales, than a special familiarity with legumes.

The reintroduction of variants of Fabaceae s.l.-Fabaceae s.s.-Faboideae by Hutchirison (1964), Melchior (1964) and Takhtajan (1969) is certainly significant, and its rapid spread in central and eastern Europe, sporadically elsewhere, is notable. The attempt by Dostál (1958) to introduce Viciaceae has not been successful.

An advantage of Leguminosae-Papilionaceae-Papilionoideae is in the implication of systematic content included in the names; in this respect Fabaceae is ambiguous. The lack of specific provision in Article 19 for Papilionoideae is generally regarded as a minor oversight, which can be logically and simply rectified when appropriate. Furthermore, it may be regarded as provisionally sanctioned by paragraph 9 of the Preamble to the Code (Stafleu, 1978).

**NEW WORLD**

Early and middle nineteenth century botany in the New World was derived from western Europe and nomenclature reflects this ancestry. The words Papilionaceae, Papilionatae, and Papilionoideae originated in the Old World as related in the foregoing text. Botanists, as listed below, followed de Candolle (1825) and Bentham (1865) in referring to the papilionoid legumes as the Suborder Papilionaceae of the Order Leguminosae. A taxonomic schism followed release from the dominating influence of Asa Gray in 1888, of which the American Code of Nomenclature was the most conspicuous cry of independence. The Americans gradually returned to the international botanical community during the third and fourth decades of the twentieth
century. New World taxonomy, presently dominated by the United States, has some unitary coherence, independent of that of western Europe, but there is vigorous introgression in both directions.

Leguminosae as One Family

Order Leguminosae: suborder Papilionaceae.—The name Papilionaceae entered botanical literature in the eighteenth century in European literature. The ancestors of subsequent use in the United States are Hooker’s (1831–32) Flora Boreali-Americana and Torrey’s checklist of genera of North American plants in Lindley’s American edition of the Natural System of Botany (1831).

Order Leguminosae: suborder Papilionaceae was almost universal during the next 60 years; e.g., Torrey and Gray (1838–1840), the five editions of Gray’s manual under his authorship (Gray, 1848, 1856, 1862, 1863, 1867), Beck (1833, 1848; northeast flora), Chapman (1860, 1883, 1897; southern flora); Brewer and Watson (1876, California), Watson (1878, Index), and Watson and Coulter (1890; 6th edition of the Gray’s Manual).

In South America, Bentham’s classic summary of Brazilian legumes (Bentham in Martius, 1859–1862) brought a similar viewpoint from the European continent.

Family Leguminosae.—Then the Natural Order became Family by erosion of time. This is plainly indicated in the sequence in Gray’s terminology. Although he stoutly adhered to order Leguminosae in all editions of his manual, as early as 1850, in the 3rd edition of his Botanical Textbook, he wrote “Order Leguminosae (Pulse family).” By 1868 (Gray’s lessons) and 1870 (Field, forest and garden botany), he was stoutly asserting Leguminosae (Pulse family) with no reference to Order.

Family Leguminosae: subfamily Papilionatae.—Thus, the natural orders became families, and major segments, if any, subfamilies. The Code of Nomenclature had not yet designated “oideae” as the correct termination for subfamily rank. Perhaps Taubert (1891–1894), in Die Pflanzenfamilien, set the example. In the New World, he was followed by Perkins (1907; Puerto Rico), Fawcett and Rendle (1920; Jamaica), and most recently Standley and Steyermark (1946; Guatemala), Rehder (1940; woody plants) also used these names, but shortly thereafter changed his mind, as noted under Leguminosae: Lotoideae.

Family Leguminosae: subfamily Papilionoideae.—Deriving from the above, this has been the usual twentieth century designation of those who regarded the legumes as a single family.

Robinson and Fernald (1908), in the 7th edition of Gray’s Manual of Botany, carried the banner for those who adhered to the International Code and the European tradition. But they were not immediately followed because of the dominance of the American Code of Nomenclature, whose adherents regarded the legumes as constituting three families. Following recovery from a 30-year pyrexia, New World botanists everywhere returned to the International Code of Nomenclature and the Robinson and Fernald legume classification as exemplified by Burkart (1943, 1952, 1967; Argentina), Woodson and Schery (1950; Panama), Fernald (1950; 8th edition Gray’s manual), Leon and Alain (1951; Cuba), Benson (1957; plant taxonomy text), Turner (1959; Texas), Munz (1959; California), Kearney and Peebles et al. (1942, 1960; Arizona), Wilbur (1963; North Carolina), Steyermark (1963; Missouri), Dwyer (1965; Panama), Ward (1972; Florida), and Isely (1973, 1975; Legumes of the United States).

Family Fabaceae: subfamily Papilionoideae.—McGregor and Barkley (1977; Flora of Great Plains, Atlas). Fabaceae was introduced for the family but the traditional Papilionoideae was retained for the subfamily.

Family Papilionaceae: subfamily Papilionatae.—Amshoff (1939). This combination obviously derived from Old World usage.

Family Leguminosae: subfamily Lotoideae.—We will not review Rehder’s (1945)
nomenclatural reasons for calling the papilionoid legumes the Lotoideae. He was briefly followed by such authors as Bailey (1949; cultivated plants; subfamilies indicated in introduction), Lawrence (1951; textbook), and Porter (1957; Nevada).

**Family Fabaceae: subfamily Lotoideae.**—Porter (1967; textbook) switched from Leguminosae to Fabaceae, but retained the subfamily he had used 10 years before.

**Family Leguminosae: subfamily Faboideae.**—This is the formula espoused by contemporary authors who prefer to decline the use of exceptions permitted by the Code. Among these are Rudd (1972; Sophoreae of North America) and Robertson and Lee (1976; genera of Caesalpinioideae).

**Family Leguminosae: no subfamilies listed.**—Although not relevant to our primary issue, this category and the one following are germane to present discussion in tabulating authors who have considered the legumes most conveniently classified as a single family. A sampling includes Coulter and Nelson (1909), Jepson (1936; California), Fassett (1939; Wisconsin), Deam (1940; Indiana), Tidestrom and Kittell (1941; Arizona and New Mexico), Gentry (1942; Rio Mayo plants), Thorne (1954; south Georgia), Macoun (1883; Canada), Boivin (1966; Canada), Correll and Johnston (1970; Texas), Welsh (1974; Alaska), Hitchcock (1961; Pacific Northwest) and Hitchcock and Cronquist (1976; Pacific Northwest). The preponderance of these authors were treating regions of the North American continent in which the representation of Caesalpinioideae and Mimosoideae is negligible.

**Family Fabaceae: no subfamilies listed.**—Radford et al. (1964; Carolinas).

**Leguminosae Treated as Three Families**

**Family Fabaceae.**—Authors who used this name are (were) mostly adherents of the American Code, which dominated floristic publications in North America from about 1900 to 1935. Independently, some modern (after Small, 1933) authors prefer to categorize the group as three families and use the code-conventional name.

These include Britton and Brown (1913; Illustrated flora), Small (1903, 1933; southeastern U.S.), Britton and Shafer (1908; North American trees), Wooton and Standley (1915; New Mexico), Rydberg (1922; Rocky Mountains), Standley (1922; Mexico), Rydberg (1932; plains and prairies), Abrams (1944; Pacific states), Gleason (1952; northeastern states); Gleason and Cronquist (1963; northeastern states), and Shreve and Wiggins (1964; Sonoran desert).

**Family Papilionaceae.**—Britton and Brown (1897; Illustrated flora), Pittier (1944; Venezuela), and Adams (1972; Jamaica).

**New World Summary**

1. The paramount classic taxonomic-nomenclatural treatment of the Leguminosae has been to consider the group as a single family. The major subfamily has usually been called the Papilionoideae. This nomenclature was interrupted during the reign of the American Code but revived since 1940.

2. Modern taxonomists who prefer to regard the legume complex as three families usually use the name Fabaceae for the papilionoid group.

**Conclusions**

Our essay begins with a proposal for the explicit conservation of the name Papilionoideae at the subfamily rank parallel to that of the Papilionaceae at the family level. We believe that the documentation supports that proposal.

One may perhaps question the purpose of proposing this alternative when Faboideae is conveniently available with no questions. Why are Gramineae, Umbelliferae, Labiatae, etc.,
presently admitted in the Code? The reason is that these are names that have been used and preferred. Maintenance of these names is consistent with conservation tradition in the Code of Nomenclature. With de Candolle (1867; Laws of Botanical Nomenclature), the basic and continuing principles were established. The context of our quotation from de Candolle in the Introduction is as follows:

"Exceptions to the use of these two finals [ales, aceae] are warranted in some orders by long-standing custom, and sometimes by custom and euphony together. The leading principle of changing names as little as possible is applicable here. Added to this, some large, very conspicuous, old Orders, bearing names of quite another form, the difficulty of choosing one genus among many hundreds, and making it, as it were, the standard of the order, is a real obstacle. Why should Leguminosae be called Fabaceae rather than Trifoliaceae or Astragalaceae, or by fifty other names? . . . Fixity of names is a principle of superior order."

We enter this discussion with a bias. Perhaps ours is a romantic and emotional partiality. Indeed we prefer Papilionoideae. Not all botanists share this preference nor have they in past. They are free to use Faboideae. But through the tracery of history and tradition, through controversy and cultural diffusion, the term Papilionoideae emerges as the decisive winner.

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