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Book review: Syllabus of plant families. Adolf Engler's Syllabus der Pflanzenfamilien. 13th edition by Wolfgang Frey. Part 5/1

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More than half a century ago, Adolf Engler's *Syllabus der Pflanzenfamilien* volume II, devoted to the angiosperms, had been published in its twelfth, then completely newly arranged edition ("völlig neugestaltete Auflage"), written in German and edited by Hans Melchior, professor of botany at the Botanic Garden and Botanical Museum Berlin-Dahlem (Melchior 1964a). The publisher was "Gebrüder Borntraeger", then located in Berlin-Nikolassee. The same publishing house, now "Borntraeger Science Publishers" located in Stuttgart, currently cares for the production of the 13th edition of that handbook of contemporary plant taxonomy in English, entitled *Syllabus of plant families* and edited by Wolfgang Frey, professor emeritus at the Institute of Systematic Botany and Geography of Plants, Freie Universität Berlin (Frey 2009–2018). The new edition started in 2009 and is scheduled in five parts, with parts 1 (1/1, 1/2, 1/3) and 2 (2/1, 2/2) dealing with protists, algae and fungi, part 3 with bryophytes and seedless vascular plants, part 4 with gymnosperms and the first batch of angiosperms from basic groups (*Amborellales* to *Magnoliales*) to the monocots from *Acorales* to *Asparagales*, and finally part 5 comprising the monocots from *Arecales* to *Zingiberales*, followed by *Ceratophyllales* as a link to the core eudicots (now subclass *Rosidae*). Part 5 appears in two parts, 5/1 reviewed here, and 5/2 (superorders *Santalanae*, *Caryophyllanae* and *Asteranae*) still under preparation. As the concluding part of the *Syllabus*, part 5/2 will finish this *magnum opus*, i.e. a voluminous handbook series comprising all taxa from phylum to genus level of blue-green algae, algae, fungi, lichens, liverworts and mosses, ferns and flowering plants.

The present part 5/1 provides a basic treatise of the worldwide morphological and molecular diversity of the subclass *Magnoliidae* p.p. (*Liliana* p.p. with *Arecales*,

Commelinales, *Poales*, *Zingiberales* and *Ceratophyllales*) and the subclass *Rosidae* p.p. with 25 (of its 44) orders from *Ranunculales* to *Berberidopsidales*. The remaining 19 orders (*Santalales* to *Apiales*) will be treated in the forthcoming part 5/2. Part 5/1 discussed here covers extremely diverse plant groups, distributed from the arctic tundra to the tropical rainforests. In particular the *Brassicales*, *Fabales*, *Malpighiales*, *Poales*, *Ranunculales* and *Saxifragales* comprise many species and cultivars with high economic value, playing a very important role in human food as oil and fruit plants, grapes, cereal crops and last not least as ornamentals. Two authors are responsible for the taxonomic treatments, namely Eberhard Fischer, professor at the Institute of Integrated Natural Sciences, Department of Biology, University of Koblenz-Landau (Germany), and Kai Müller, professor at the Institute of Evolution and Biodiversity, University of Münster (Germany). Fischer is author of the superorders *Liliana*, *Ceratophyllanae*, *Ranunculanae*, *Proteanae* and *Rosanae* p.p. (*Fabales*), while Müller is author of the *Trochodendranae*, *Buxanae*, *Myrothamnanae*, *Dillenia* and *Saxifraganae*; both share the authorship of *Rosanae* (excl. *Fabales*) and *Berberidopsidanae*. All in all, 200 families are accepted and 5636 genera treated, each with total range of distribution and number of species currently known; in case of monospecific genera the full species name is provided. Each family treatment is completed with pertinent notes or even full chapters on morphology, ecology, pollination and dispersal, fossil history and evolution, systematics and phylogeny and economic importance. Subfamilies, tribes and subtribes, if any, are furnished with morphological, floral, carpological and karyological descriptions. A wisely selected synonymy at each taxonomic rank from class, subclass, superorder, order to family tells a lot of the history of

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Table 1. Vascular plant families of the order *Rosales* (in bold) accepted in the 12th and 13th editions of the *Syllabus*, respectively (Schultze-Menz 1964; Müller & Fischer 2022). Sequence of taxa is taken from the 12th edition; pagination is added for orientation. Numbers of accepted genera (not bracketed) and species (bracketed) are cited, e.g. 15 (150) indicated 15 genera and 150 species.

Rosales in <i>Syllabus</i>, ed. 12, 2: 193–243. 1964		Rosales in <i>Syllabus</i>, ed. 13, 5/1: 315–344. 2022	
page	taxon	taxon	page
52	<i>Urticales, Ulmaceae</i> 15 (150)	→ Rosales, Ulmaceae 7 (62)	338
54	<i>Urticales, Ulmaceae–Barbeyoideae</i> 1 (1)	→ Rosales, Barbeyaceae 1 (1)	315
54	<i>Urticales, Moraceae</i> (incl. <i>Cecropiaceae</i>) 61 (1550)	→ Rosales, Moraceae 42 (1280)	317
57	<i>Urticales, Urticaceae</i> 42 (700)	→ Rosales, Urticaceae (incl. <i>Cecropiaceae</i>) 57 (2090)	339
57	<i>Urticales, Moraceae–Cannaboideae</i> 2 (4)	→ Rosales, Cannabaceae 10 (110)	315
195	Rosales, Platanaceae 1 (6 or 7)	→ <i>Proteales, Platanaceae</i> 1 (9)	201
196	Rosales, Hamamelidaceae 26 (100–115)	→ <i>Saxifragales, Hamamelidaceae</i> 26 (110)	241
198	Rosales, Myrothamnaceae 1 (2)	→ <i>Gunnerales, Myrothamnaceae</i> 1 (2)	220
199	Rosales, Crassulaceae 30 (1400)	→ <i>Saxifragales, Crassulaceae</i> 37 (1570)	231
200	Rosales, Cephalotaceae 1 (1)	→ <i>Oxalidales, Cephalotaceae</i> 1 (1)	378
201	Rosales, Saxifragaceae 80 (1200)	→ <i>Saxifragales, Saxifragaceae</i> 34 (790)	245
206	Rosales, Brunelliaceae 1 (35)	→ <i>Oxalidales, Brunelliaceae</i> 1 (56)	377
206	Rosales, Cunoniaceae 25 (350)	→ <i>Oxalidales, Cunoniaceae</i> 27 (330)	380
207	Rosales, Davidsoniaceae 1 (1)	→ <i>Oxalidales, Cunoniaceae, Davidsonia</i> 1 (3)	381
207	Rosales, Pittosporaceae 9 (240)	→ <i>Apiales, Pittosporaceae</i> (in <i>Syllabus</i> , ed. 13, 5/2, in prep.)	(12)
208	Rosales, Byblidaceae 1 (2)	→ <i>Lamiales, Byblidaceae</i> (in <i>Syllabus</i> , ed. 13, 5/2, in prep.)	(11)
208	Rosales, Roridulaceae 1 (2)	→ <i>Ericales, Roridulaceae</i> (in <i>Syllabus</i> , ed. 13, 5/2, in prep.)	(11)
209	Rosales, Bruniaceae 12 (75)	→ <i>Bruniales, Bruniaceae</i> (in <i>Syllabus</i> , ed. 13, 5/2, in prep.)	(12)
209	Rosales, Rosaceae 100 (3000)	Rosales, Rosaceae 105 (5095)	327
218	Rosales, Neuradaceae 3 (10)	→ <i>Malvales, Neuradaceae</i> 3 (8)	571
219	Rosales, Chrysobalanaceae 12 (300)	→ <i>Malpighiales, Chrysobalanaceae</i> 23 (450)	392
220	Rosales, Connaraceae 24 (300–400)	→ <i>Oxalidales, Connaraceae</i> 12 (240)	380
221	Rosales, Leguminosae 600 (13 000)	→ <i>Fabales, Fabaceae (Leguminosae)</i> 747 (21 757)	365
240	Rosales, Krameriaceae 1 (20)	→ <i>Zygophyllales, Krameriaceae</i> 1 (18)	260
249	<i>Geraniales, Geraniaceae–Dirachmeae</i> 1 (1)	→ Rosales, Dirachmaceae 1 (2)	316
300	<i>Rhamnales, Rhamnaceae</i> 58 (900)	→ Rosales, Rhamnaceae 62 (1170)	323
320	<i>Thymelaeales, Elaeagnaceae</i> 3 (65)	→ Rosales, Elaeagnaceae 3 (100)	316

scientific studies on the circumscription of taxa toward the present (i.e. currently accepted) state of knowledge. Under the heading “References and further reading”, each major taxon or group of taxa is accompanied by an immense thesaurus of basic and specialized literature which amounts to c. 84 printed pages in close type. A wealth of 152 coloured plates, with variably five to ten photographs each, illustrates diagnostic characters of many rare families and genera of all continents, partly published for the first time; ten scientists supplying illustrations are specially thanked in the acknowledgements (pp. 615–616), and the Missouri Botanical Garden (<https://tropicos.org/>) allowed the reproduction of photographs from Madagascar. Like the formerly published volumes of the *Syllabus*, the present part is a comprehensive modern survey derived from an updated synthesis of classical anatomical-morphological characters with modern molecular data, incorporating numerous new discoveries made during the last ten years. Following the tradition of Engler, and incorporating the latest results from molecular phylogenetics and phylogenomics, the completely restructured and revised 13th edition provides an up-to-date evolutionary and systematic overview of the plant groups treated.

It seems otiose to compare in detail the 13th edition of the *Syllabus* with its predecessor of 1964. The order

Rosales exemplifies best the last c. 60 years of scientific progress (see Table 1). In the 12th edition of the *Syllabus* (Schulze-Menz 1964), it consisted of 19 families of which only a single family, *Rosaceae*, keeps its systematic position within its order, while 18 families have left the *Rosales* in different directions (to *Apiales*, *Bruniales*, *Ericales*, *Fabales*, *Gunnerales*, *Lamiales*, *Malpighiales*, *Malvales*, *Oxalidales*, *Proteales*, *Saxifragales* and *Zygophyllales*). Now, in the 13th edition of the *Syllabus* (Müller & Fischer 2022), the family *Rosaceae*, within its order *Rosales*, is accompanied by *Barbeyaceae*, *Cannabaceae*, *Dirachmaceae*, *Elaeagnaceae*, *Moraceae*, *Rhamnaceae*, *Ulmaceae* and *Urticaceae*, families that were previously allocated to the orders *Geraniales* (Scholz 1964), *Rhamnales* (Schultze-Motel 1964), *Thymelaeales* (Wagenitz 1964) and *Urticales* (Melchior 1964b). In short, almost no stone has been left unturned! It likewise seems otiose trying to enumerate possible typographical errors and textual inconsistencies that may occur here and there in this well-prepared, valuable and indispensable book. Yet a single case should be mentioned, which the present reviewer came across when arranging Table 1. On p. 381, *Davidsonia* is mentioned as a genus in *Cunoniaceae*, while on p. 384 the family *Davidsoniaceae* appears as a synonym of *Oxalidaceae* (not *Cunoniaceae* as would be expected

– and is correct, according to Stevens 2017); moreover, the number of species is missing in the family description of *Rosaceae* (p. 328). In the introduction to part 4 of the whole work (Frey 2015: 1), the monocotyledonous groups *Arecales*, *Commelinales*, *Poales*, *Zingiberales* and *Dasy-pogonales* were announced to be treated in part 5/1, but in fact only the first four groups are indexed and paginated in the contents of part 5/1 (p. vii), while *Dasy-pogonales* are apparently omitted, although they appear in the phylogenetic tree of angiosperms on p. 3, fig. 2-1. The reader finally finds the group through the Index to taxa (pp. 617–671), as included in *Arecales* (p. 13) – a “hidden” recent progress in phylogenetic systematics, elucidated on p. 29.

In conclusion, there is actually no published work available covering all families and genera of angiosperms, because the ambitious work of Kubitzki (1990–2018) is still not complete. With its parts 4 and 5, the 13th edition of Engler’s *Syllabus* will be the first comprehensive survey covering all angiosperms, generally arranged according to the most recent phylogenetic system of APG IV (2016). There is a vitally important and growing need to preserve the knowledge of the entire range of diversity and biology of organisms for coming generations, because there is a decline in classical morphological and taxonomic expertise. Accordingly, the 13th edition of the *Syllabus* synthesizes both modern data and classical expertise, serving to educate and enable future experts to maintain our knowledge of the full range of our planet’s biodiversity.

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