



A 2013 linear sequence of legume genera set in a phylogenetic context – A tool for collections management and taxon sampling

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ABSTRACT

The Leguminosae (or Fabaceae) currently comprises 751 genera. In most of the world's herbaria the genera are arranged by old, non-phylogenetic, classification systems which, while offering insights into morphological similarity, make no explicit statement as to evolutionary relationships. While classifications based on morphology are useful tools for plant identification, they do not offer the predictive value that phylogenetically based linear sequences provide. The legume collection of c.750,000 specimens in the Herbarium of the Royal Botanic Gardens, Kew was moved to a new building between 2010 and 2011, which presented the opportunity to reorganise the collection by a linear sequence based on a number of relatively comprehensive published legume phylogenies. The numbered linear sequence adopted at Kew has been updated and emended to include generic changes that have been published up to March 2013. The linear sequence, together with an alphabetical list of genera, is presented here to serve as a management tool for future taxon sampling and herbarium curation. The process used to develop the linear sequence and to rearrange the legume collection at Kew is discussed together with plans for future dissemination of changes to the sequence as new phylogenies are published and incorporated.

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1. Introduction

The Leguminosae (alternative name Fabaceae), commonly called the bean or pea family, is currently divided into three subfamilies (Caesalpinioideae, Mimosoideae and Papilionoideae), further subdivided into 35 tribes which together comprise 751 genera containing a total of c.19,500 species (LPWG, 2013a). The Leguminosae is second only to the grass family in economic value, but has significantly greater habit, flower and fruit diversity. Legumes are ubiquitous throughout the main biomes and occur in nearly all vegetation types globally. Published phylogenies of legumes at the supra-generic level have been accumulating at an ever increasing rate since the beginning of the millennium. An international legume systematics community is now working towards producing a comprehensive phylogenetic estimate and revised classification for all Leguminosae (LPWG, 2013a,b; Wojciechowski, 2013—in this issue).

Many of the world's herbaria are using out-of-date classification systems to arrange plant families and genera. Some have their herbarium specimens ordered alphabetically at all levels of the nomenclatural hierarchy and, whilst convenient for specimen filing and easy consultation, such arrangements are inefficient when used as an identification tool since they carry no predictive value about taxon relationships. Where resources permit, a number of herbaria are now arranging their plant families by the APG system (e.g., the Edinburgh Botanic Garden

(E); the Natural History Museum, London (BM), the Muséum National d'Histoire Naturelle, Paris (P), the University of Western Australia (UWA), Duke University, U.S.A. (DUKE), and North Carolina State University, U.S.A. (NCSC)). Many other herbaria are using the APG family delimitation, but order the families alphabetically (E. Haston, pers. comm., and Haston et al., 2007). In the Herbarium of the Royal Botanic Gardens, Kew, Leguminosae (approximately 750,000 specimens) were recently moved (2010–2011) to the newly built fifth wing of the Herbarium building. This presented the opportunity to update the arrangement of the genera from the old **Bentham and Hooker (1865)** classification to a system that better reflects the modern understanding of inter-generic relationships within legumes. The new arrangement of genera for herbarium specimens was completed in May 2011, and the supplementary legume seed and reprint collections subsequently were rearranged by the same linear sequence. Other large supplementary collections (fruits, illustrations) are in the process of being reorganised according to the new linear arrangement.

Bentham in **Bentham and Hooker's (1865)** *Genera Plantarum* recognised 399 genera in the Leguminosae which together comprised c.6500 species. When part 1 of *Advances in Legume Systematics* (Polhill and Raven, 1981) was published, somewhat before the era of molecular phylogenetics, those numbers had increased to 650 genera and 18,000 species. Thirteen years later (Polhill, 1994), the number of genera recognised had increased to 671, but the estimated number of species had decreased to c.17,000. *Legumes of the World* (Lewis et al., 2005), an encyclopaedic compendium of legume genera, recognised

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727 genera and provided a more accurate estimate of 19,325 accepted species in the family. At the time of writing this paper the number of genera stands at 751 and the species at c.19,500 (LPWG, 2013). It is clear from this brief overview that the number of accepted genera and species of legumes has increased significantly in the past 150 years and that the number of accepted genera, even today, is far from static.

Since Legumes of the World (Lewis et al., 2005) a number of genera have been placed in synonymy, e.g., the two monospecific genera *Ophiocarpus* (Bunge) Ikonn. and *Barnebyella* Podlech have been informally returned to *Astragalus* (M.F. Wojciechowski, pers. comm.), *Vaughania* S. Moore has been subsumed back into *Indigofera* (Schrire, 2008), *Spartidium* Pomel becomes a synonym of the reinstated genus *Calobota* Eckl. & Zeyh. (Boatwright et al., 2009); *Pellegriniodendron* (Harms) J. Léonard is now part of *Gilbertiodendron* J. Léonard (Estrella et al., 2012), and *Bergeronia* Micheli and *Margaritolobium* Harms have been reduced to synonyms of *Muelleria* Lf. (Silva et al., 2012). The synonymisation of other genera have been proposed (e.g., *Paloveopsis* and *Elizabetha* into *Paloue*, Redden et al., in press; *Guinetia* into *Calliandra*, Souza et al., in press). All native New World species formerly placed in *Lotus* are segregated into four genera: *Hosackia* Douglas ex Lindl., *Acmispon* Raf., *Syrmatium* Vogel and *Ottleya* D.D. Solokoff (Sokoloff, 1999, 2000, 2003; Sokoloff et al., 2007), segregates which we recognise in the linear sequence presented here, although Brouillet (2008) only accepts two: *Acmispon* (including *Syrmatium* and *Ottleya*) and *Hosackia*. Degtjareva et al. (2006, 2008) placed *Dorycnium* Mill. and *Tetragonolobus* Scop. back in synonymy under *Lotus*, and Degtjareva et al. (2012) show that *Anthyllis* is paraphyletic with respect to *Hymenocarpus* Savi, and thus place the latter into synonymy under *Anthyllis*, although these suggested changes are not yet adopted in our list. It is probable that *Securigera* DC. will be placed back into synonymy under *Coronilla* L. (Sokoloff, pers. comm.).

In contrast, since 2005, more than 30 genera have been added to the list of 727 presented in Legumes of the World. A number of generic names have been resurrected from synonymy and are now considered to be accepted genera based on recent phylogenetic analyses: *Phyllobium* Fisch. (Zhang and Podlech, 2006); *Acaciella* Britton & Rose (Rico Arce and Bachman, 2006); *Senegalia* (Seigler et al., 2006a); *Pityrocarpa* Britton Rose (Jobson and Luckow, 2007); *Vachellia* Wight & Arn. (Brown et al., 2008); *Bionia* Mart. ex Benth. (Queiroz, 2008); *Isomacrolobium* Aubrév. & Pellegr. (Breteler, 2008); *Leptolobium* (Rodrigues and Tozzi, 2008); *Fairchildia* Britton & Rose (Torke and Schaal, 2008); *Calobota* Eckl. & Zeyh. (Boatwright et al., 2009); *Schnella* Raddi (Wunderlin, 2010); *Cochlianthus* Trew and *Condylostylis* Piper (Delgado-Salinas et al., 2011); *Euchlora* Eckl. & Zeyh., *Listia* E. Mey. and *Leobordea* Del. (Boatwright et al., 2011); *Ototropis* Nees (Ohashi and Ohashi, 2012a); *Steinbachiella* Harms (Lewis et al., 2012). Other taxa have been raised to generic rank from a previously described infrageneric taxon: *Leptospron* (Benth.) A. Delgado, and *Sigmoidotropis* (Piper) A. Delgado (Delgado-Salinas et al., 2011). Some recently recognised segregates have required new generic names: *Guianodendron* Sch. Rodr. & A.M.G. Azevedo (Rodrigues and Tozzi, 2006); *Mariosousa* Seigler & Ebinger (Seigler et al., 2006b); *Wiborgiella* Boatwr. & B.-E. Van Wyk (Boatwright et al., 2009); *Ladeania* A. N. Egan and Reveal (2009); *Ancistrotropis* A. Delgado (Delgado-Salinas et al., 2011); *Ezoloba* B.-E. Van Wyk & Boatwr. (Boatwright et al., 2011); *Helicotropis* A. Delgado (Delgado-Salinas et al., 2011); *Paragoodia* I. Thomps. (Thompson, 2011); and *Verdesmum* Ohashi and Ohashi (2012b). In addition, *Heteroflorum* M. Sousa (2005) and *Tabaroa* L.P. Queiroz, G.P. Lewis & M.F. Wojc. (Queiroz et al., 2010) are newly discovered genera described from relatively recent field-collected specimens. The current estimate of 751 genera and ca. 19,500 species will change soon because more new genera are anticipated (D. Cardoso, A.N. Egan, S.L. Gomez-Acevedo, M. Luckow, J.E. Meireles, H. Ohashi, E.R. Souza, and

J.J. Wieringa, pers. comm., and Cardoso et al., 2012b, in which a new genus is flagged, but not formally published), including one described by Mackinder and Wieringa (in press).

The aim of this paper is to provide a generic backbone for the legume family arranged within a phylogenetic context, essentially as a working list of all the legume genera widely accepted in March 2013 by the international legume community. It is hoped that this will serve as a practical guide to taxon sampling in future legume research, as well as a linear sequence by which herbarium curators might choose to arrange their legume genera.

2. Materials and methods

2.1. Collections management

The Leguminosae, together with the Compositae (Asteraceae), were chosen as the two families to be moved to the new building of the Kew Herbarium, officially opened in November 2010. One reason for selecting these two families for the move was to reduce the risk of specimen damage by a number of beetle species, including the biscuit or herbarium beetle (*Stegobium paniceum*) which preferentially seeks out parts of dried specimens (mostly the flowers and fruits) of a number of Compositae and legume genera (particularly the anthers of some taxa, e.g., members of the Cassiinae) as a food source. The new herbarium building is temperature and humidity controlled and specimens are stored in closed boxes housed on open-shelved compactors in custom-built vaults, all designed to reduce the risk of pest infestation. To minimise the risk of transferring any beetles from the old accommodation to the new building, all specimens were frozen for 72 h at -40°C prior to their relocation.

To ensure that all legume specimens were moved efficiently, more than 30,000 genus folders were given the appropriate new linear sequence number prior to the material being boxed, frozen and relocated. A detailed spreadsheet was also prepared to cross-map the location of each genus in the old herbarium cupboards with the number of boxes that the genus would occupy in its new location, allowing space for future expansion as newly accessioned material is added to the collection. Between June 2010 and May 2011 an estimated 750,000 legume specimens (including c.30,000 types) were relocated.

To facilitate access to specimens in the new arrangement, each box (holding between c. 25 and c. 100 specimens, depending on individual specimen woodiness) is labelled with genus name and number, species content and geographical region. Coloured stickers indicate the main geographical areas (e.g., Europe, Africa, the Americas) with additional geographical data added as a number that cross references to a standard Kew world list of continental and subcontinental regions. A red stripe was added to the label of a box that contains an index to species, and a blue star indicates the inclusion of cultivated material.

2.2. Enumeration of genera

Due to the increased storage space available in the new building, the move provided an opportunity to reinsert into the legume collection material that, for a number of years, had been stored elsewhere due to lack of space. The move also provided the impetus to rearrange all legume genera by the new linear sequence based on the latest published phylogenies, most of which had already been consulted when preparing genus accounts for Legumes of the World (Lewis et al., 2005). Thus, the linear sequence largely follows the phylogenetic content of Legumes of the World. More specifically, the sequence was adapted from Lewis et al. (2005: 5, Fig. 1: a phylogeny of Leguminoase compiled as a supertree, based on a number of analyses cited therein), and fine-tuned using a series of trees representing the latest view of phylogenetic relationships among genera within each legume tribe

Table 1
Numbered linear sequence of legume genera.

Genus	Number	Genus	Number
Cercis	1	Didelotia	80
Adenolobus	2	Librevillea	81
Griffonia	3	Michelsonia	82
Brenierea	4	Brachystegia	83
Bauhinia	5	Julbernardia	84
Gigasiphon	6	Aphanocalyx	85
Tylosema	7	Bikinia	86
Barklya	8	Tetraberlinia	87
Lysiphyllum	9	Icuria	88
Phanera	10	Microberlinia	89
Schnella	10.01	Odoniodendron	90
Lasiobema	11	Englerodendron	91
Piliostigma	12	Isomacrolobium	92
Neopaloxylon	13	Anthonotha	93
Schotia	14	Isoberlinia	94
Barnebydendron	15	Berlinia	95
Goniorrhachis	16	Duparquetia	96
Brandzeia (= Bathiaea)	17	Poeppigia	97
Oxystigma	18	Baudouinia	98
Kingiodendron	19	Eligmocarpus	99
Gossweilerodendron	20	Mendoravia	100
Prioria	21	Distemonanthus	101
Colophospermum	22	Apuleia	102
Hardwickia	23	Storckia	103
Daniellia	24	Labichea	104
Eurypetalum	25	Petalostylis	105
Eperua	26	Koompassia	106
Augouardia	27	Martiodendron	107
Stemonocoleus	28	Androcalymma	108
Peltogyne	29	Kalappia	109
Hymenaea	30	Zenia	110
Guibourtia	31	Uittienia	111
Hylodendron	32	Dialium	112
Gilletiodendron	33	Dicorynia	113
Baikiaea	34	Gymnocladus	114
Tessmannia	35	Gleditsia	115
Sindora	36	Umtiza	116
Sindoropsis	37	Tetrapterocarpon	117
Copaifera	38	Arcoa	118
Detarium	39	Acrocarpus	119
Endertia	40	Ceratonia	120
Lysidice	41	Pterogyne	121
Saraca	42	Vouacapoua	122
Leucostegane	43	Melanoxylon	123
Talbotiella	44	Recordoxylon	124
Scorodophloeus	45	Batesia	125
Annea	45.01	Chamaecrista	126
Gabonius	45.02	Senna	127
Crudia	46	Cassia	128
Lebruniodendron	47	Cordeauxia	129
Plagiosiphon	48	Stuhlmannia	130
Micklethwaitia	49	Haematoxylum	131
Maniltoa	50	Tara	132
Cynometra	51	Coulteria	133
Tamarindus	52	Moullava	134
Intsia	53	Guilandina	135
Afzelia	54	Pterolobium	136
Brodriguesia	55	Mezoneuron	137
Loesenera	56	Caesalpinia	138
Neochevalierodendron	57	Cenostigma	139
Normandiodendron	58	Pomaria	140
Zenkerella	59	Erythrostemon	141
Humboldtia	60	Poincianella	142
Hymenostegia	61	Libidibia	143
Leonardoxa	62	Hoffmannseggia	144
Amherstia	63	Stahlia	145
Ecuadendron	64	Stenodrepanum	146
Paloue	65	Zuccagnia	147
Paloveopsis	66	Lophocarpinia	148
Brachycylix	67	Balsamocarpon	149
Heterostemon	68	Diptychandra	150
Elizabetha	69	Moldenhawera	151
Brownea	70	Tachigali	152
Browneopsis	71	Arapatiella	153
Macrolobium	72	Jacqueshuberia	154
Paramacrolobium	73	Schizolobium	155
Cryptosepalum	74	Bussea	156
Dicymbe	75	Peltophorum	157
Polystemonanthus	76	Parkinsonia	158
Pseudomacrolobium	77	Conzattia	159
Gilbertiodendron	78	Heteroflorum	160
Pellegriniodendron		Delonix	161
=Gilbertiodendron	78	Colvillea	162

Table 1 (continued)

Genus	Number	Genus	Number
Lemuropisum	163	Archidendron	245
Pachyelasma	164	Archidendropsis	246
Erythrophleum	165	Blanchetiodendron	247
Campsiandra	166	Leucochloron	248
Dimorphandra	167	Chloroleucon	249
Dinizia	168	Sphinga	250
Mora	169	Havardia	251
Burkea	170	Ebenopsis	252
Stachyothyrsus	171	Painteria	253
Sympetalandra	172	Pithecellobium	254
Chidlowia	173	Fairchildia	255
Pentaclethra	174	Bobgunnia	256
Aubrevillea	175	Swartzia	257
Adenantha	176	Candolleodendron	258
Tetrapleura	177	Bocoa	259
Amblygonocarpus	178	Trischidium	260
Pseudoprosopis	179	Cyathostegia	261
Calpocalyx	180	Ateleia	262
Xylia	181	Orphanodendron	263
Piptadeniastrum	182	Camoensia	264
Entada	183	Uleanthus	265
Elephantorrhiza	184	Alexa	266
Plathymenia	185	Castanospermum	267
Indopiptadenia	186	Angylocalyx	268
Lemurodendron	187	Xanthocercis	269
Newtonia	188	Amburana	270
Fillaeopsis	189	Mildbraediendendron	271
Cylicodiscus	190	Cordyla	272
Prosopis	191	Aldina	273
Xerocladia	192	Dussia	274
Prosopidastrum	193	Amphimas	275
Mimozyganthus	194	Myrocarpus	276
Piptadeniopsis	195	Myroxylon	277
Neptunia	196	Myrospermum	278
Leucaena	197	Monopteryx	279
Schleinitzia	198	Taralea	280
Desmanthus	199	Pterodon	281
Kanaloa	200	Dipteryx	282
Calliandropsis	201	Cladrastis	283
Gagnebina	202	Styphnolobium	284
Dichrostachys	203	Pickeringia	285
Alantsilodendron	204	Zollernia	286
Parkia	205	Holocalyx	287
Anadenanthera	206	Lecointea	288
Pseudopiptadenia	207	Dermatophyllum (= Calia)	289
Pityrocarpa	208	Uribea	290
Parapiptadenia	209	Harleyodendron	291
Microlobius	210	Exostyles	292
Stryphnodendron	211	Sweetia	293
Adenopodia	212	Luetzelburgia	294
Piptadenia	213	Vatairea	295
Mimosa	214	Vataireopsis	296
Vachellia	215	Ormosia	297
Acaciella	216	Haplormosia	298
Mariosousa	217	Pericopsis	299
Senegalia	218	Bowdichia	300
Faidherbia	219	Acosmium	301
Zapoteca	220	Leptolobium	302
Guinetia = Calliandra	222	Guianodendron	303
Calliandra	222	Diploptropis	304
Viguieranthus	223	Staminodianthus	304.01
Lysiloma	224	Clathrotropis	305
Acacia	225	Panurea	306
Macrosamanea	226	Spirotropis	307
Cojoba	227	Petaladenium	308
Hydrochorea	228	Sakoanala	309
Abarema	229	Neoharmsia	310
Punjuba	230	Bolusanthus	311
Zygia	231	Platycelyphium	312
Marmaroxylon	232	Dicraeopetalum	313
Albizia	233	Ammodendron	314
Samanea	234	Ammothamnus	315
Cathormion	235	Maackia	316
Thailandatopsis	236	Sophora	317
Inga	237	Euchresta	318
Cedrelinga	238	Salweenia	319
Enterolobium	239	Poecilanthus	320
Pararchidendron	240	Amphiodon	320.01
Wallaceodendron	241	Harpalyce	321
Serianthes	242	Tabaroa	322
Paraserianthes	243	Cyclobium	323
Falcataria	244	Brongniartia	324

Table 1 (continued)

Genus	Number
Plagiocarpus	325
Templetonia	326
Hovea	327
Cristonia	328
Thinicola	329
Lamprolobium	330
Ammopiptanthus	331
Anagyris	332
Piptanthus	333
Thermopsis	334
Baptisia	335
Cadia	336
Cyclopia	337
Xiphotheca	338
Amphithalea	339
Stirtonanthus	340
Podalyria	341
Liparia	342
Virgilia	343
Calpurnia	344
Spartidium = Calobota	347.02
Lebeckia	346
Ezoloba	346.01
Wiborgia	347
Wiborgiella	347.01
Calobota	347.02
Rafnia	348
Aspalathus	349
Lotononis	350
Listia	350.01
Leobordea	350.02
Bolusia	351
Euchlora	351.01
Crotalaria	352
Pearsonia	353
Rothia	354
Robynsiophyton	355
Melolobium	356
Dichilus	357
Polhillia	358
Argyrolobium	359
Lupinus	360
Anarthrophyllum	361
Sellocharis	362
Adenocarpus	363
Cytisophyllum	364
Argyrocytistus	365
Petteria	366
Laburnum	367
Podocytisus	368
Hesperolaburnum	369
Cytisus	370
Lembotropis	371
Calicotome	372
Echinopartum	373
Erinacea	374
Retama	375
Gonocytisus	376
Genista	377
Spartium	378
Stauracanthus	379
Ulex	380
Hymenolobium	381
Andira	382
Adesmia	383
Amicia	384
Zornia	385
Poiretia	386
Nissolia	387
Chaetocalyx	388
Riedeliella	389
Discolobium	390
Cranocarpus	391
Brya	392
Platymiscium	393
Platypodium	394
Inocarpus	395
Maraniona	396
Tipuana	397
Ramorinoa	398
Centrolobium	399
Paramachaerium	400

Genus	Number
Etaballia	401
Pterocarpus	402
Casconia	403
Geoffroea	404
Fissicalyx	405
Fiebrigella	406
Chapmannia	407
Stylosanthes	408
Arachis	409
Grazielodendron	410
Dalbergia	411
Machaerium	412
Steinbachiella	412.01
Aeschynomene	413
Cyclocarpa	414
Soemmeringia	415
Smithia	416
Kotschya	417
Humularia	418
Bryaspis	419
Geissaspis	420
Pictetia	421
Diphysa	422
Zygocarpum	423
Ormocarpum	424
Ormocarpopsis	425
Peltiera	426
Weberbauerella	427
Apoplanesia	428
Parryella	429
Amorpha	430
Errazurizia	431
Eysenhardtia	432
Psorothamnus	433
Marina	434
Dalea	435
Dalhousiea	436
Airyantha	437
Leucomphalos	438
Bowringia	439
Baphia	440
Baphiastrum	441
Baphiopsis	442
Hypocalyptus	443
Gompholobium	444
Sphaerolobium	445
Daviesia	446
Erichsenia	447
Viminaria	448
Isotropis	449
Jacksonia	450
Leptosema	451
Latrobea	452
Euchilopsis	453
Phyllota	454
Otione	455
Aotus	456
Urodon	457
Stonesiella	458
Almaleea	459
Eutaxia	460
Dillwynia	461
Pultenaea	462
Mirbelia	463
Chorizema	464
Oxylobium	465
Podolobium	466
Callistachys	467
Gastrolobium	468
Goodia	469
Paragoodia	469.01
Bossiaea	470
Platylobium	471
Muelleranthus	472
Ptychosema	473
Aenictophyton	474
Clitoria	475
Barbieria	476
Centrosema	477
Periandra	478
Clitoriopsis	479
Schefflerodendron	480

Table 1 (continued)

Genus	Number
Craibia	481
Aganope	482
Ostryocarpus	483
Dalbergiella	484
Xeroderis	485
Disynstemon	486
Phylloxylon	487
Cyamopsis	488
Indigastrum	489
Microcharis	490
Rhynchotropis	491
Indigofera	492
Austrostenisia	493
Kunstleria	494
Platycyamus	495
Leptoderris	496
Dewevrea	497
Platysepalum	498
Philenoptera	499
Sylvichadsia	500
Fordia	501
Hesperothamnus	502
Piscidia	503
Deguelia	504
Derris	505
Paraderris	506
Antheroporum	507
Millettia	508
Pongamiopsis	509
Apurimacia	510
Tephrosia	511
Mundulea	512
Pyranthus	513
Chadsia	514
Paratephrosia	515
Requienia	516
Ptycholobium	517
Dahlstedtia	518
Muelleria	519
Bergeronia = Muelleria	519
Margaritolobium = Muelleria	519
Lonchocarpus	522
Behaimia	523
Abrus	524
Dioclea	525
Luzonia	526
Macropsychnanthus	527
Canavalia	528
Cymbosema	529
Cleobulia	530
Camptosema	531
Bionia	532
Cratylia	533
Galactia	534
Collaea	535
Lackeya	536
Rhodopis	537
Neorudolphia	538
Burkilliodendron	539
Craspedolobium	540
Cruddasia	541
Ophrestia	542
Pseudoeriosema	543
Spatholobus	544
Butea	545
Meizotropis	546
Adenodolichos	547
Paracalyx	548
Bolusafra	549
Carrisoa	550
Chrysoscias	551
Rhynchosia	552
Eriosema	553
Dunbaria	554
Cajanus	555
Flemingia	556
Erythrina	557
Psophocarpus	558
Dysolobium	559
Otoptera	560
Decorsea	561
Strongylodon	562

Genus	Number
Calopogonium	563
Cologania	564
Pachyrhizus	565
Herpyza	566
Neorautanenia	567
Neonotonia	568
Teyleria	569
Dumasia	570
Pueraria	571
Nogra	572
Eminia	573
Sinodolichos	574
Pseudeminia	575
Pseudovigna	576
Amphicarpea	577
Teramnus	578
Glycine	579
Phylacium	580
Neocolletia	581
Otholobium	582
Psoralea	583
Cullen	584
Bituminaria	585
Orbexilum	586
Hoita	587
Rupertia	588
Psoralidium	589
Ladeania	589.01
Pediomelum	590
Wajira	591
Sphenostylis	592
Nesphostylis	593
Alistilus	594
Austrodolichos	595
Dolichos	596
Macrotyloma	597
Dipogon	598
Lablab	599
Spathionema	600
Vatovaea	601
Physostigma	602
Vigna	603
Oxyrhynchus	604
Phaseolus	605
Ramirezella	606
Condylostylis	606.01
Ancistrotropis	606.02
Sigmoidotropis	606.03
Cochliasanthus	606.04
Helicotropis	606.05
Leptospron	606.06
Strophostyles	607
Dolichopsis	608
Macroptilium	609
Mysanthus	610
Oryxis	611
Apios	612
Cochlianthus	613
Shuteria	614
Mastersia	615
Diphylarum	616
Mucuna	617
Kennedia	618
Hardenbergia	619
Vandasina	620
Campylotropis	621
Kummerowia	622
Lespedeza	623
Dendrolobium	624
Phyllodium	625
Ougeinia	626
Aphyllodium	627
Ohwia	628
Hanslia	629
Verdesmum	629.01
Arthroclianthus	630
Nephrodesmus	631
Tadehagi	632
Akschindium	633
Droogmansia	634
Monarthrocarpus	635
Trifidacanthus	636

(continued on next page)

Table 1 (continued)

Genus	Number	Genus	Number
Desmodium	637	Afgekia	688
Ototropis	637.01	Wisteria	689
Codariocalyx	638	Glycyrrhiza	690
Hylodesmum	639	Chesneya	691
Hegnera	640	Spongiocarpella	692
Pseudarthria	641	Gueldenstaedtia	693
Pycnospora	642	Tibetia	694
Mecopus	643	Erophaca	695
Uraria	644	Oxytropis	696
Christia	645	Biserrula	697
Alysicarpus	646	Astragalus	698
Desmodiastrum	647	Ophiocarpus = Astragalus	698
Melliniella	648	Barnebyella = Astragalus	698
Leptodesmia	649	Phyllolobium	698.01
Eleiotis	650	Colutea	701
Sesbania	651	Oreophysa	702
Hippocrepis	652	Smirnowia	703
Scorpiurus	653	Eremosparton	704
Securigera	654	Sphaerophysa	705
Coronilla	655	Lessertia	706
Podolotus	656	Sutherlandia	707
Anthyllis	657	Swainsona	708
Hymenocarpus	658	Montigena	709
Pseudolotus	659	Clianthus	710
Antopetitia	660	Carmichaelia	711
Hosackia	661	Strebilorrhiza	712
Ornithopus	662	Calophaca	713
Dorycnopsis	663	Caragana	714
Kebirita	664	Halimodendron	715
Ottleya	665	Alhagi	716
Acmispon	666	Eversmannia	717
Syrmatium	667	Hedysarum	718
Lotus	668	Corethroedendron	719
Dorycnium	669	Sulla	720
Tetragonolobus	670	Taverniera	721
Tripodion	671	Onobrychis	722
Hammatolobium	672	Sartoria	723
Cytisopsis	673	Ebenus	724
Hebestigma	674	Parochetus	725
Lennea	675	Galega	726
Gliricidia	676	Cicer	727
Poitea	677	Ononis	728
Olneya	678	Melilotus	729
Robinia	679	Trigonella	730
Poissonia	680	Medicago	731
Coursetia	681	Trifolium	732
Peteria	682	Vicia	733
Genistidium	683	Lens	734
Sphinctospermum	684	Lathyrus	735
Callerya	685	Pisum	736
Endosamara	686	Vavilovia	737
Sarcodum	687		

(e.g., Lewis et al., 2005: 58, for tribe Cercideae). Legume genera reinstated based on new data, or described as new between 2005 and 2009 were inter-collated into the linear sequence to give a total of 737 genera, an increase of 10 on the number of genera presented in Legumes of the World.

Since 2009, a number of legume genera have either been synonymised, reinstated or described as new, taking the current total of accepted genera to 751 (the number reported by the LPWG, 2013). These changes are included in the linear sequence presented here.

3. Results

We recognise 751 legume genera. This is an increase of 14 over the 737 genera recognised in 2009 when the linear sequence was prepared prior to the legume move in 2010–2011. The difference of 14 is made up of seven recently published segregates (*Ancistrotropis*, *Ezoloba*, *Helicotropis*, *Ladeania*, *Paragooodia*, *Verdesmum*, and *Wiborgiella*), 13 genus reinstatements or up-rankings from previous infrageneric taxa (*Amphiodon*, *Calobota*, *Cochlianthus*,

Condylostylis, *Euchlora*, *Leobordea*, *Leptospron*, *Listia*, *Ototropis*, *Phyllolobium*, *Schnella*, *Sigmoidotropis*, and *Steinbachiella*) and six synonymisations (*Barnebyella*, *Bergeronia*, *Margaritolobium*, *Ophiocarpus*, *Pellegrinodendron*, and *Spartidium* are no longer accepted genera). Table 1 presents the linear sequence by which legume genera in the Kew herbarium are arranged. It is a generic backbone of the Leguminosae arranged within a phylogenetic context and thus implicitly includes predictive value based on relationships among genera. It includes the 751 legume genera widely accepted by the international legume community in March 2013. Each genus is given a unique number. 737 genera (those accepted during the 2010–2011 relocation of legumes at Kew) have an integer, although a small number of these are now recognised as synonyms of other accepted genera and these synonyms are annotated in the table. Twenty genera added to the overall list of accepted genera since 2009 are allotted new decimal numbers that place them next to the genus to which they are most closely related (e.g., *Schnella* is given the unique decimal number 10.01 placing it next to its close generic relative *Phanera*, genus 10; *Verdesmum*, genus 629.01 is placed next to its sister genus *Hanslia*, genus 629). A small number of genera already in press are included in the linear sequence and given a decimal number in anticipation of imminent publication (*Annea*, *Gabonius*, and *Staminodianthus*), but these genera are not counted in the current total of 751. The linear sequence that we present is a March 2013 snap-shot of accepted legume genera, but the numbering used is based on our original list drawn up for the specimen move in 2010–2011, with new synonyms annotated and additional genera added, based on the 2009 literature onwards. We also know that a number of new synonymies and newly reinstated or described genera are to be published in the near future and we can therefore safely predict that the list of genera will constantly be changing for the foreseeable future.

Table 2 is an alphabetical list of the legume genera presented in Table 1.

4. Discussion

4.1. Limitations of the linear sequence and dealing with dynamic change

The single greatest limitation of the implementation of a linear sequence to represent phylogenetic relationships is that it flattens out a 3-D model of relationships into a straight line and, inevitably, some information is lost as a consequence. The challenge is to construct a linear sequence that best represents known inter-generic relationships (see Haston et al., 2007 and Wearn et al., 2013 for the challenges, and linear sequences adopted, at the family level using the Angiosperm Phylogeny Group II and with APG III classifications, respectively).

Large collections of herbarium specimens cannot be reorganised frequently because of lack of resources (staff time and money) and lack of available space. In addition, it is not desirable to continually reorganise systems that serve perfectly well for information retrieval. Nevertheless, exceptionally an opportunity to rearrange a whole herbarium, or one large family, presents itself and offers the chance to re-order material by the latest systematic or phylogenetic information. In the Herbarium at Kew this opportunity arose in 2010 for the legume family. Drawing up a linear sequence for the re-arrangement of legume genera was relatively straight forward because such a list already existed implicitly in Legumes of the World (Lewis et al., 2005). Adding in new synonymies, reinstated genera and newly described ones published between 2005 and 2009 was likewise not problematic. Nevertheless, the 2010 linear sequence adopted for legumes at Kew was a snap-shot at that point in time. From 2010 to now an additional c.20 genera have been reinstated or described as new and these have been added to the linear sequence presented here. It is evident that having relocated 750,000 legume specimens in accordance with a new linear sequence it is not desirable then to

Table 2

Alphabetical list of legume genera.

Genus	Number	Genus	Number
Abarema	229	Bionia	532
Abrus	524	Biserrula	697
Acacia	225	Bituminaria	585
Acaciella	216	Blanchetiodendron	247
Acmispon	666	Bobgunnia	256
Acosmium	301	Bocoa	259
Acrocarpus	119	Bolusafr	549
Adenanthera	176	Bolusanthus	311
Adenocarpus	363	Bolusia	351
Adenodolichos	547	Bossiaea	470
Adenolobus	2	Bowdichia	300
Adenopodia	212	Bowringia	439
Adesmia	383	Brachycylis	67
Aenictophyton	474	Brachystegia	83
Aeschynomene	413	Brandzeia (= Bathiaea)	17
Afgekia	688	Brenierea	4
Afzelia	54	Brodriguesia	55
Aganope	482	Bronniartia	324
Airyantha	437	Brownea	70
Akschindlium	633	Browneopsis	71
Alantsilodendron	204	Brya	392
Albizia	233	Bryaspis	419
Aldina	273	Burkea	170
Alexa	266	Burkilliodendron	539
Alhagi	716	Bussea	156
Alstilus	594	Butea	545
Almaleea	459	Cadia	336
Alysicarpus	646	Caesalpinia	138
Amblygonocarpus	178	Cajanus	555
Amburana	270	Calicotome	372
Amherstia	63	Callerya	685
Amicia	384	Calliandra	222
Ammodendron	314	Calliandropsis	201
Ammopiptanthus	331	Callistachys	467
Ammothamnus	315	Calobota	347.02
Amorpha	430	Calophaca	713
Amphicarpaea	577	Calopogonium	563
Amphimas	275	Calpocalyx	180
Amphiodon	320.01	Calpurnia	344
Amphithalea	339	Camoensia	264
Anadenanthera	206	Campsandra	166
Anagyris	332	Camptosema	531
Anarthrophyllum	361	Campylotropis	621
Ancistrotropis	606.02	Canavalia	528
Andira	382	Candolleodendron	258
Androcalymma	108	Caragana	714
Angylocalyx	268	Carmichaelia	711
Annea	45.01	Carrisoa	550
Antheroporum	507	Casaronia	403
Anthonotha	93	Cassia	128
Anthyllis	657	Castanospermum	267
Antopetitia	660	Cathormion	235
Aotus	456	Cedrelinga	238
Aphanocalyx	85	Cenostigma	139
Aphyllodium	627	Centrolobium	399
Apios	612	Centrosema	477
Apoplanesia	428	Ceratonia	120
Apuleia	102	Cercis	1
Apurimacia	510	Chadsia	514
Arachis	409	Chaetocalyx	388
Arapatiella	153	Chamaecrista	126
Archidendron	245	Chapmannia	407
Archidendropsis	246	Chesneva	691
Arcoa	118	Chidlowia	173
Argyrocytius	365	Chloroleucon	249
Argyrolobium	359	Chorizema	464
Arthroclianthus	630	Christia	645
Aspalathus	349	Chrysoscias	551
Astragalus	698	Cicer	727
Ateleia	262	Cladrastis	283
Aubrevillea	175	Clathrotropis	305
Augouardia	27	Cleobulia	530
Austrodolichos	595	Clanthus	710
Austroteenisia	493	Clitoria	475
Baikiaea	34	Clitoriopsis	479
Balsamocarpon	149	Cochlianthus	613
Baphia	440	Cochlianthus	606.04
Baphiastrum	441	Codariocalyx	638
Baphiopsis	442	Cojoba	227
Baptisia	335	Collaea	535
Barbieria	476	Cologania	564
Barklya	8	Colophospermum	22
Barnebydendron	15	Colutea	701
Barnebyella = Astragalus	698	Colvillea	162
Batesia	125	Condylotylis	606.01
Baudouinia	98	Conzattia	159
Bauhinia	5	Copaifera	38
Behaimia	523	Cordeauxia	129
Bergeronia = Muellera	519	Cordyla	272
Berlinia	95	Corethrodendron	719
Bikinia	86	Coronilla	655

Table 2 (continued)

Genus	Number	Genus	Number
Coulteria	133	Erinacea	374
Coursetia	681	Eriosema	553
Craibia	481	Erophaca	695
Cranocarpus	391	Errazurizia	431
Craspedolobium	540	Erythrina	557
Cratylia	533	Erythrophleum	165
Cristonia	328	Erythrostemon	141
Crotalaria	352	Etaballia	401
Cruddasia	541	Euchilopsis	453
Crudia	46	Euchlora	351.01
Cryptosepalum	74	Euchresta	318
Cullen	584	Eurypetalum	25
Cyamopsis	488	Eutaxia	460
Cyathostegia	261	Eversmannia	717
Cyclocarpa	414	Exostyles	292
Cyclobium	323	Eysenhardtia	432
Cyclopia	337	Ezoloba	346.01
Cylicodiscus	190	Faidherbia	219
Cymbosema	529	Fairchildia	255
Cynometra	51	Falcataria	244
Cytisophyllum	364	Fiebrigella	406
Cytisopsis	673	Fillaeopsis	189
Cytisus	370	Fissicalyx	405
Dahlstedtia	518	Flemingia	556
Dalbergia	411	Fordia	501
Dalbergiella	484	Gabonius	45.02
Dalea	435	Gagnebina	202
Dalhousiea	436	Galactia	534
Daniellia	24	Galega	726
Daviesia	446	Gastrolobium	468
Decorsea	561	Geissaspis	420
Deguelia	504	Genista	377
Delonix	161	Genistidium	683
Dendrolobium	624	Geoffroea	404
Dermatophyllum (= Calia)	289	Gigasiphon	6
Derris	505	Gilbertiodendron	78
Desmanthus	199	Gilletiodendron	33
Desmodium	647	Gleditsia	115
Desmodium	637	Gliricidia	676
Detarium	39	Glycine	579
Dewevrea	497	Glycyrrhiza	690
Dialium	112	Gompholobium	444
Dichilus	357	Goniorrhachis	16
Dichrostachys	203	Gonocytisus	376
Dicorynia	113	Goodia	469
Dicraeopetalum	313	Gossweilerodendron	20
Dicymbe	75	Grazielodendron	410
Didelotia	80	Griffonia	3
Dillwynia	461	Gueldenstaedtia	693
Dimorphandra	167	Guianodendron	303
Dinizia	168	Guibourtia	31
Dioclea	525	Guilandina	135
Diphyllarium	616	Guinetia = Calliandra	222
Diphysa	422	Gymnocladus	114
Diploptropis	304	Haematoxylum	131
Dipogon	598	Halimodendron	715
Dipteryx	282	Hammatolobium	672
Diptychandra	150	Hanslia	629
Discolobium	390	Haplomosia	298
Distemonanthus	101	Hardenbergia	619
Disynstemon	486	Hardwickia	23
Dolichopsis	608	Harleyodendron	291
Dolichos	596	Harpalyce	321
Dorycnium	669	Havardia	251
Dorycnopsis	663	Hebestigma	674
Droogmansia	634	Hedysarum	718
Dumasia	570	Hegnara	640
Dunbaria	554	Helicotropis	606.05
Duparquetia	96	Herpyza	566
Dussia	274	Hesperolaburnum	369
Dysolobium	559	Hesperothamnus	502
Ebenopsis	252	Heteroflorum	160
Ebenus	724	Heterostemon	68
Echinospartum	373	Hippocrepis	652
Ecuadendron	64	Hoffmannseggia	144
Eleiotis	650	Hoita	587
Elephantorrhiza	184	Holocalyx	287
Eligmocarpus	99	Hosackia	661
Elizabetha	69	Hovea	327
Eminia	573	Humboldtia	60
Endertia	40	Humularia	418
Endosamara	686	Hydrochorea	228
Englerodendron	91	Hylodendron	32
Entada	183	Hylodesmum	639
Enterolobium	239	Hymenaea	30
Eperua	26	Hymenocarpus	658
Eremosparton	704	Hymenolobium	381
Erichsenia	447	Hymenostegia	61

(continued on next page)

Table 2 (continued)

Genus	Number	Genus	Number
Hypocalyptus	443	Melliniella	648
Icunia	88	Melolobium	356
Indigastrum	489	Mendoravia	100
Indigofera	492	Mezoneuron	137
Indopiptadenia	186	Michelsonia	82
Inga	237	Micklethwaitia	49
Inocarpus	395	Microberlinia	89
Intsia	53	Microcharis	490
Isobertlinia	94	Microlobius	210
Isomacrolobium	92	Mildbraediendendron	271
Isotropis	449	Milletia	508
Jacksonia	450	Mimosa	214
Jacqueshuberia	154	Mimozgyanthus	194
Julbernardia	84	Mirbelia	463
Kalappia	109	Moldenhawera	151
Kanaloa	200	Monarthrocarpus	635
Kebirita	664	Monopteryx	279
Kennedia	618	Montigena	709
Kingiodendron	19	Mora	169
Koompassia	106	Moullava	134
Kotschyia	417	Mucuna	617
Kummerowia	622	Muellera	519
Kunstleria	494	Muelleranthus	472
Labichea	104	Mundulea	512
Lablab	599	Myrocarpus	276
Laburnum	367	Myrospermum	278
Lackeya	536	Myroxylon	277
Ladeania	589.01	Mysanthus	610
Lamprolobium	330	Neopaloxylon	13
Lasiobema	11	Neoechevalierodendron	57
Lathyrus	735	Neocolletia	581
Latrobea	452	Neoharmsia	310
Lebeckia	346	Neonotonia	568
Lebruniodendron	47	Neorautanenia	567
Lecointea	288	Neorudolphia	538
Lembotropis	371	Nephrodesmus	631
Lemurodendron	187	Neptunia	196
Lemurospidium	163	Nesphostylis	593
Lennea	675	Newtonia	188
Lens	734	Nissolia	387
Leobordea	350.02	Nogra	572
Leonardoxa	62	Normandiodendron	58
Leptoderris	496	Odoniodendron	90
Leptodesmia	649	Ohwia	628
Leptolobium	302	Olneya	678
Leptosema	451	Onobrychis	722
Leptospron	606.06	Ononis	728
Lespedeza	623	Ophiocarpus = Astragalus	698
Lessertia	706	Ophrestia	542
Leucaena	197	Orbexilum	586
Leucochloron	248	Oreophysa	702
Leucomphalos	438	Ormocarpopsis	425
Leucostegane	43	Ormocarpum	424
Libidibia	143	Ormosia	297
Librevillea	81	Ornithopus	662
Liparia	342	Orphanodendron	263
Listia	350.01	Oryxis	611
Loesenera	56	Ostryocarpus	483
Lonchocarpus	522	Otholobium	582
Lophocarpinia	148	Otione	455
Lotononis	350	Otoptera	560
Lotus	668	Ototropis	637.01
Luetzelburgia	294	Ottleya	665
Lupinus	360	Ougeinia	626
Luzonia	526	Oxylobium	465
Lysidice	41	Oxyrhynchus	604
Lysiloma	224	Oxystigma	18
Lysiphyllum	9	Oxytropis	696
Maackia	316	Pachyelasma	164
Machaerium	412	Pachyrhizus	565
Macrolobium	72	Painteria	253
Macropsychnanthus	527	Paloue	65
Macroptilium	609	Paloveopsis	66
Macrosamanea	226	Panurea	306
Macrotyloma	597	Paracalyx	548
Maniltoa	50	Paraderris	506
Maraniona	396	Paragoodia	469.01
Margaritolobium = Muellera	519	Paramachaerium	400
Marina	434	Paramacrolobium	73
Mariosousa	217	Parapiptadenia	209
Marmaroxylon	232	Pararchidendron	240
Martiodendron	107	Paraserianthes	243
Mastersia	615	Paratephrosia	515
Mecopus	643	Parkia	205
Medicago	731	Parkinsonia	158
Meizotropis	546	Parochetus	725
Melanoxylon	123	Parryella	429
Melilotus	729	Pearsonia	353

Table 2 (continued)

Genus	Number	Genus	Number
Pediomelum	590	Rhodopis	537
Pellegriniodendron = Gilbertiodendron	78	Rhynchosia	552
Peltiera	426	Rhynchotropis	491
Peltogyne	29	Riedeliella	389
Peltophorum	157	Robinia	679
Pentaclethra	174	Robynsiophyton	355
Periandra	478	Rothia	354
Pericopsis	299	Rupertia	588
Petaladenium	308	Sakoanala	309
Petalostylis	105	Salweenia	319
Peteria	682	Samanea	234
Petteria	366	Saraca	42
Phanera	10	Sarcodum	687
Phaseolus	605	Sartoria	723
Philenoptera	499	Schefflerodendron	480
Phylacium	580	Schizolobium	155
Phyllodium	625	Schleinitzia	198
Phyllolobium	698.01	Schnella	10.01
Phyllota	454	Schotia	14
Phylloxylon	487	Scorodophloeus	45
Physostigma	602	Scorpiurus	653
Pickeringia	285	Securigera	654
Pictetia	421	Sellocharis	362
Piliostigma	12	Senegalia	218
Piptadenia	213	Senna	127
Piptadeniastrium	182	Serianthes	242
Piptadeniopsis	195	Sesbania	651
Piptanthus	333	Shuteria	614
Piscidia	503	Sigmoidotropis	606.03
Pisum	736	Sindora	36
Pithecellobium	254	Sindoropsis	37
Pityrocarpa	208	Sinodolichos	574
Plagiocarpus	325	Smirnowia	703
Plagiosiphon	48	Smithia	416
Plathymenia	185	Soemmeringia	415
Platycephalium	312	Sophora	317
Platycyamus	495	Spartidium = Calobota	347.02
Platylobium	471	Spartium	378
Platymiscium	393	Spathionema	600
Platypodium	394	Spatholobus	544
Platysepalum	498	Sphaerolobium	445
Podalyria	341	Sphaerophysa	705
Podocytisus	368	Sphenostylis	592
Podolobium	466	Sphinctospermum	684
Podolotus	656	Sphinga	250
Poecilanthus	320	Spitropis	307
Poepigia	97	Spongiocarpella	692
Poicniana	142	Stachyothyrsus	171
Poiretia	386	Stahlia	145
Poissonia	680	Staminodianthus	304.01
Poitea	677	Stauracanthus	379
Polhillia	358	Steinbachiella	412.01
Polystemonanthus	76	Stemonocoleus	28
Pomaria	140	Stenodrepanum	146
Pongamiopsis	509	Stirtonanthus	340
Prioria	21	Stonesiella	458
Prosopidastrum	193	Storckiella	103
Prosopis	191	Streblorrhiza	712
Pseudarthria	641	Strongyloclon	562
Pseudemia	575	Strophostyles	607
Pseudoeriosema	543	Stryphnodendron	211
Pseudolotus	659	Stuhlmannia	130
Pseudomacrolobium	77	Stylosanthes	408
Pseudopiptadenia	207	Styphnolobium	284
Pseudoprosopis	179	Sulla	720
Pseudovigna	576	Sutherlandia	707
Psophocarpus	558	Swainsona	708
Psoralea	583	Swartzia	257
Psoralidium	589	Sweetia	293
Psorothamnus	433	Sylvichadsia	500
Pterocarpus	402	Sympetalandra	172
Pterodon	281	Syrmatium	667
Pterogyne	121	Tabaroa	322
Pterolobium	136	Tachigali	152
Ptychlobium	517	Tadehagi	632
Ptychosema	473	Talbotiella	44
Pueraria	571	Tamarindus	52
Pultenaea	462	Tara	132
Punjuba	230	Taralea	280
Pycnospora	642	Taverniera	721
Pyranthus	513	Templetonia	326
Rafnia	348	Tephrosia	511
Ramirezella	606	Teramnus	578
Ramorinoa	398	Tessmannia	35
Recordoxylon	124	Tetraberlinia	87
Requienia	516	Tetragonolobus	670
Retama	375	Tetrapleura	177
		Tetrapterocarpus	117

Table 2 (continued)

Genus	Number	Genus	Number
Teyleria	569	Vicia	733
Thailectadopsis	236	Vigna	603
Thermopsis	334	Viguieranthus	223
Thinicola	329	Viminaria	448
Tibetia	694	Virgilia	343
Tipuana	397	Vouacapoua	122
Trifidacanthus	636	Wajira	591
Trifolium	732	Wallaceodendron	241
Trigonella	730	Weberbauerella	427
Tripodion	671	Wiborgia	347
Trischidium	260	Wiborgiella	347.01
Tylosema	7	Wisteria	689
Uittienia	111	Xanthocercis	269
Uleanthus	265	Xerocladia	192
Ulex	380	Xeroderris	485
Umtiza	116	Xiphotheca	338
Uraria	644	Xylia	181
Uribea	290	Zapoteca	220
Urodon	457	Zenia	110
Vachellia	215	Zenkerella	59
Vandasina	620	Zollernia	286
Vatairea	295	Zornia	385
Vataireopsis	296	Zuccagnia	147
Vatovaea	601	Zygia	231
Vavilovia	737	Zygocarpum	423
Verdesmum	629.01		

change the overall numbering of hundreds of genera every time a new genus is added to the sequence or one on the list is synonymised. In consequence, a limitation of the list presented here is that we have had to introduce decimal numbers for new (post-2009) additions to the sequence so as to incorporate those genera in the most appropriate phylogenetic position (e.g. *Schnella*, reinstated based on Wunderlin, 2010 and Sinou et al., 2009, has been allotted number 10.01 to place it next to its closest relative *Phanera*, genus 10; the new genus *Ladeania* A.N.Egan & Reveal is given the decimal number 589.01 placing it next to its relative *Psoralidium*, genus 589). Users of the list are, of course, at liberty to arrange and number their legume genera by any system they choose when re-curating their herbarium collections.

Whilst repositioning collections of newly reinstated or segregate genera next to, or near, the genus in which they were previously included is relatively straightforward, responding to the more complex results of other systematic research can be curatorially challenging. Thus, papers published post-2009, which include data on newly discovered genus alignments, or present novel phylogenetic topologies or clade structure, have not had, to date, all of their published results assimilated into our linear sequence. An example of this is the recent paper by Cardoso et al. (2012a) that realigns *Acosmium* s.s. (now reduced to three species) with the Dalbergioid clade, some distance from the two genera *Leptolobium* and *Guianodendron* (segregated from *Acosmium* s.l.) both included in the Bowdichia clade of the Genistoid s.l. clade. While our linear sequence includes *Guianodendron* (as genus 303) and *Leptolobium* (genus 302) it does not renumber *Acosmium* (genus 301 in our sequence) so as to place it within the Pterocarpus clade of Dalbergioid legumes. Such dynamic change, when incorporated into our list will require a new decimal number for *Acosmium* s.s., close to *Pterocarpus* (genus 402), and will leave number 301 unoccupied. The realignment of *Acosmium* s.s. is just one example out of a number of genera that have been repositioned within the legume phylogeny since 2009. Such changes to the linear sequence will be physically disruptive to herbarium collections and will thus require more staff time and management. If space permits then planning ahead to leave adequate expansion room within a collection will greatly facilitate such genus re-positionings.

Furthermore, the advent of lower cost next generation sequencing has given new impetus to the construction of supra-generic legume phylogenies. In particular, the recently formed Legume Phylogeny

Working Group is exploring these technologies with a view to producing a comprehensive phylogenetic estimate and revised classification for all Leguminosae. Consequently, we think it wise to wait for the outcome of the bulk of that research before realigning some genera which might have to be moved again in the light of new evidence.

4.2. Managing and communicating future modifications to the linear sequence

The legume team at Kew continually updates the arrangement of our legume collections based on new publications in accredited botanical journals. In the future, reinstated or newly described genera will receive a new decimal number to place them appropriately in the linear sequence. Herbarium specimens will be re-curated in accordance with the publication in which the new genera were proposed. Revisions and monographs that result in genera being segregated will likewise lead to the addition of new genus numbers. At Kew we are always pleased to receive direct from an author notification of their new legume papers so that we can keep our collections up-to-date. We hold a comprehensive legume reprint collection which acts as a valuable supplement to our herbarium specimens and we encourage legume researchers to use this as a safe repository for their research in hard-copy.

We anticipate publishing regular updates to our linear sequence so that others who wish to adopt the same system will have access to the changes. One possible way to do this will be annually in the legume newsletter *Bean Bag* which is compiled, edited and distributed by Kew. We are also close to going live with our Legumes of the World Online (LOWO) project, which builds on the hard copy publication *Legumes of the World*. The genus-level backbone that LOWO provides will be linked to other electronic legume resources and our ultimate aim is to provide a one-stop-shop for legume information. LOWO will also provide an ideal hub through which to communicate changes to the linear sequence presented here.

5. Recommendations

We recommend the following:

That the sequence presented here replaces all previously published linear systems of legumes which do not take account of the huge advances in our knowledge of legume supra-generic relationships elucidated by phylogenetic studies published during the last 15 years.

To maximise the utility of legume collections as identification tools, those collections must be managed in a systematic order.

Constant review of newly published taxonomic literature is needed to monitor and evaluate which proposed changes in supra-generic relationships should be implemented in the collections.

Minor relocations can be carried out more or less continuously whilst information concerning major rearrangements is compiled for less frequent implementation.

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