NOMENCLATURE

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# Who amends the *International code of botanical nomenclature*?

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**Abstract** The tropical, subtropical and some temperate regions of the world are home to large components of the known global flora. However, the herbaria in these countries, often classified as so-called emerging economies, hold a fraction of the votes that influence and decide proposals to amend the *International code of botanical nomenclature*. We argue that the allocation of votes to herbaria should more closely reflect the richness of the plant diversity of the country in which the herbarium is situated, as well as the size of the population using the names associated with the flora. Globally, in every single sphere of life and human endeavour, minority rule is not only frowned upon, it is rejected, often with contempt. There is no reason why, in the second decade of the 21st century, decision-making in plant nomenclature should be affected by a minority of institutions from countries with some of the world's most depauperate floras. The way in which some nomenclature committees, and the Nomenclature Section itself, have advocated a particular point of view on the typification of the genus name *Acacia* Mill. at the International Botanical Congress held in Vienna in 2005 has indicated just how far developing nations and continents have been left behind in the plant nomenclature debate. The IAPT could now proactively initiate a debate and process that will ultimately ensure a better representation for neglected herbaria, and therefore the countries in which they are situated, that lack a voice in plant nomenclatural matters.

**Keywords** developing nations; International Botanical Congress; *International code of botanical nomenclature*; Nomenclature Section; representation; voting

## ■ HOW IS THE *CODE* AMENDED?

Plant nomenclature, a cornerstone of all plant biological endeavours, advances every six years through meetings of the Nomenclature Section of an International Botanical Congress (henceforth referred as the Section), which convenes during the week preceding the main sessions of the Congress. During Section meetings proposals to amend the *International code of botanical nomenclature* (*ICBN* or *Code*) are considered for adoption and subsequent inclusion in the *Code* that will be used by plant taxonomists and their colleagues during the ensuing six years. Such proposals, typically aimed at improving the *ICBN*, are published in *Taxon*, the journal of the International Association for Plant Taxonomy (IAPT), during the preceding six years. Proposals are debated and voted on by the Section, which consists of registered individuals who are present at the meeting. As outlined in the *Code* (Division III.4(b)2), individuals may carry up to 15 votes to a Section meeting, i.e., an individual vote as well as 14 institutional proxy votes. (The *Code* does not permit the transference of personal votes.) A selection of the larger herbaria of the world has been allocated up to 7 votes that can be cast at a Section meeting. Institutions are informed by the Bureau for Nomenclature by conventional mail of the number of votes they carry prior to a Nomenclature Section meeting. These letters have to be submitted to the Registration Desk of the Section meeting by the individual representing that institution, or group of institutions, when registering to attend the Section meeting. Whereas Division III of the *Code* has clear rules regarding the preliminary mail and final Section votes, it is largely silent on how the institutional votes get assigned, stating only that the list is to be drawn up by the Bureau of Nomenclature and approved by the General Committee (GC). Thus, while the Bureau and GC have no power regarding *how votes are cast* at the Section, they wield substantial power regarding *how the votes are assigned*. As there are no hard guidelines on how many votes an institution gets, many nomenclaturists find this somewhat troubling.

Voting on a proposal to amend the *ICBN* takes place in two stages. Firstly, a preliminary mail ballot on published proposals is called for in advance of a Section meeting. The mail ballot is informed by a summary of, and comments on, all the proposals, which have been published in *Taxon*. The comments are provided by the Rapporteurs and could be influential in determining the outcome of the mail ballot. Recent Nomenclature Sections have agreed to consider as rejected all proposals that fail to receive at least 25% support in the mail ballot, unless a new motion is made from the floor and supported by five Section members (see McNeill & al., 2005 for example). The

second stage of voting on a proposal to amend the *Code* is through voting at the Nomenclature Section meeting proper. At the Section meeting votes are of two types: personal and institutional (see previous discussion on institutional votes). The actual voting can occur in three ways: show of hands, show of cards (coloured cards are provided to delegates, a card's colour indicating the number of institutional votes allocated), and a card vote (by secret ballot). The latter two procedures are generally used when a vote on a proposal is close and not readily determined by a show of hands.

One of the first decisions taken by a convened Section meeting is the definition of what a 'majority' constitutes. Recent Nomenclature Sections, such as in 2005 in Vienna (McNeill & al., 2005), it was decided that to effect a change to the *Code* would require a 60% (3/5th) majority, while proposals not effecting changes in the *Code* would require a simple (>50%) majority.

## ■ ALLOCATION OF VOTES TO HERBARIA

From Table 1 it is clear that the most populated and botanically diverse areas of the world are significantly underrepresented as far as potential votes available for casting at a Section meeting is concerned. When human population is considered, North America and Europe comprise only 19.2% (1,228,500,000/6,396,500,000) of the world's population but possess 64% (560/863) of the institutional votes. When diversity is considered, of for example Africa south of the Sahara, a part-continent straddling the equator, it has an estimated flora of 55,000 taxa (Klopper & al., 2006) and can cast a maximum of 35 votes. North America (in the sense of the *Flora of North America*, i.e., north of Mexico) has a flora of 23,000 species (http://www.bonap.org/Floristic%20Synthesis%20summary.htm), less than half the plant diversity found in Africa, but it can cast five times more votes (a maximum of 189 votes). The United Kingdom has a flora 1,623 taxa, about 3% of that found on the African continent, while it has more votes than the whole of Africa, coming in at 41 votes.

The argument will inevitably be that, particularly the former European colonial powers, hold significant collections of preserved (and living) plant diversity from developing countries, conceivably more than some of them hold in their own herbaria, botanical gardens and museums, and that the European herbaria will therefore speak on behalf of these nations. This is, of course, a paternalistic argument that is no longer acceptable. Furthermore, the *Code* states that institutional votes are allocated based on the "level of taxonomic activity" (Footnote 1 of Division III.4(b)(2)). To many taxonomists this is a poor primary criterion for the assignment of institutional votes. Rather, activity of *usage* of the names of the plants of a country or region is a better approach. This can be determined in two ways: (1) diversity of the flora of a region as addressed in this paper (see Table 1), and (2) population size. A central question is therefore whether taxonomic activity, at best a rather vague statement, in a country is a reasonable criterion for determining how many votes (and thus power and influence) a country gets to carry to a meeting of the Section. We argue that it is not. Scientific names are not simply used by taxonomists—they are used by researchers in other fields of science, students, conservationists, amateurs, and even the general public. In rural communities where scientific names may be a foreign concept, common names are ultimately linkable to one or more scientific name(s) (see for example the comprehensive analysis of vernacular South African plant names by Smith, 1966). It would thus be preferable to consider broader criteria (diversity of flora and human population size as two additional possibilities) when allocating votes to herbaria. While we are not advocating the current system be replaced by one that is based on diversity or population alone, we do strongly believe that these factors need to also be considered.

The figures speak for themselves in showing the bias of vote allocation (Table 1). Together, the northern regions, comprising Europe and North (and Central) America, have 303

**Table 1.** Countries with number of allocated votes (and number of voting herbaria) and their plant diversity (World Resources Institute, 2004). Countries holding the majority of votes (61%) are in bold. Population figures were obtained from www.worldatlas.com. Note: Figures are not available for Bosnia and Herzegovina, Iraq and Turkmenistan.

| Region/country | Votes (voting herbaria) | Vascular plant species | Population | Region/country | Votes (voting herbaria) | Vascular plant species | Population |
|---|---|---|---|---|---|---|---|
| AFRICA | 35 (26) | | 877,500,000 | Ghana | 1 (1) | 3,725 | |
| South Africa | 15 (9) | 23,420 | | Morocco | 1 (1) | 3,675 | |
| Madagascar | 1 (1) | 9,505 | | Malawi | 1 (1) | 3,665 | |
| Cameroun | 1 (1) | 8,260 | | Ivory Coast | 1 (1) | 3,660 | |
| Ethiopia | 1 (1) | 6,603 | | Namibia | 1 (1) | 3,174 | |
| Kenya | 3 (2) | 6,506 | | Egypt | 3 (2) | 2,076 | |
| Mozambique | 1 (1) | 5,692 | | Libya | 1 (1) | 1,825 | |
| Uganda | 1 (1) | 4,900 | | ASIA | 167 (112) | | 3,879,000,000 |
| Nigeria | 1 (1) | 4,715 | | **China** | **63 (40)** | **32,200** | |
| Zimbabwe | 2 (1) | 4,400 | | Indonesia | 4 (1) | 29,375 | |

**Table 1.** Continued.

| Region/country | Votes (voting herbaria) | Vascular plant species | Population |
|---|---|---|---|
| **India** | **20 (13)** | **18,664** | |
| Malaysia | 5 (5) | 15,500 | |
| Thailand | 2 (1) | 11,625 | |
| Vietnam | 3 (2) | 10,500 | |
| Philippines | 2 (2) | 8,931 | |
| Turkey | 4 (4) | 8,650 | |
| Iran | 3 (2) | 8,000 | |
| Nepal | 1 (1) | 6,973 | |
| Kazakhstan | 1 (1) | 6,000 | |
| **Japan** | **23 (12)** | **5,565** | |
| Bangladesh | 1 (1) | 5,000 | |
| Tajikistan | 1 (1) | 5,000 | |
| Pakistan | 4 (3) | 4,950 | |
| Uzbekistan | 2 (1) | 4,800 | |
| Georgia | 2 (1) | 4,350 | |
| Azerbaijan | 1 (1) | 4,300 | |
| Taiwan | 4 (4) | 3,568 | |
| Armenia | 3 (1) | 3,553 | |
| Sri Lanka | 1 (1) | 3,314 | |
| Korea | 2 (1) | 2,898 | |
| Mongolia | 1 (1) | 2,823 | |
| Israel | 3 (2) | 2,317 | |
| Singapore | 2 (1) | 2,282 | |
| **Russia** | **6 (6)** | | |
| EUROPE | 346 (167) | | 727,000,000 |
| **Russia** | **19 (5)** | **11,400** | |
| French Guyana (France) | 1 (1) | 5,625 | |
| **Italy** | **25 (16)** | **5,599** | |
| Ukraine | 6 (2) | 5,100 | |
| **Spain** | **21 (14)** | **5,050** | |
| Portugal | 10 (6) | 5,050 | |
| Greece | 5 (3) | 4,992 | |
| France | 11 (6) | 4,630 | |
| Croatia | 1 (1) | 4,288 | |
| Serbia | 1 (1) | 4,082 | |
| Bulgaria | 4 (2) | 3,572 | |
| Romania | 4 (3) | 3,400 | |
| Slovenia | 1 (1) | 3,200 | |
| Slovakia | 4 (3) | 3,124 | |
| Austria | 13 (6) | 3,100 | |
| Switzerland | 15 (7) | 3,030 | |
| **Germany** | **36 (18)** | **2,682** | |
| Poland | 15 (9) | 2,450 | |
| Hungary | 6 (2) | 2,214 | |
| Belarus | 1 (1) | 2,100 | |
| Czech Republic | 7 (4) | 1,900 | |
| Lithuania | 1 (1) | 1,796 | |
| Moldova | 1 (1) | 1,752 | |
| Sweden | 26 (8) | 1,750 | |
| Norway | 9 (3) | 1,715 | |
| Estonia | 4 (2) | 1,630 | |
| **United Kingdom** | **41 (19)** | **1,623** | |
| Belgium | 11 (5) | 1,550 | |
| Denmark | 11 (2) | 1,450 | |
| Luxembourg | 1 (1) | 1,246 | |
| Netherlands | 19 (5) | 1,221 | |
| Latvia | 2 (2) | 1,153 | |
| Finland | 10 (3) | 1,102 | |
| Ireland | 2 (2) | 950 | |
| Iceland | 2 (2) | 377 | |
| NORTH AMERICA | 216 (132) | | 501,500,000 |
| **Mexico** | **20 (12)** | **26,071** | |
| **U.S.A.** | **155 (93)** | **19,473** | |
| Costa Rica | 2 (2) | 12,119 | |
| Panama | 1 (1) | 9,915 | |
| Cuba | 5 (2) | 6,522 | |
| Honduras | 1 (1) | 5,680 | |
| Dominican Rep. | 1 (1) | 5,657 | |
| Jamaica | 1 (1) | 3,308 | |
| **Canada** | **29 (19)** | **3,270** | |
| Trinidad | 1 (1) | 2,259 | |
| OCEANIA | 43 (20) | | 32,000,000 |
| **Australia** | **32 (11)** | **15,638** | |
| Papua New Guinea | 1 (1) | 11,544 | |
| New Zealand | 9 (7) | 2,382 | |
| Fiji | 1 (1) | 1,518 | |
| SOUTH AMERICA | 62 (41) | | 379,500,000 |
| **Brazil** | **26 (16)** | **56,215** | |
| Colombia | 4 (2) | 51,220 | |
| Venezuela | 4 (3) | 21,073 | |
| Ecuador | 2 (2) | 19,362 | |
| Bolivia | 1 (1) | 17,367 | |
| Peru | 3 (2) | 17,144 | |
| **Argentina** | **17 (10)** | **9,372** | |
| Paraguay | 1 (1) | 7,851 | |
| Guyana | 1 (1) | 6,409 | |
| Chile | 2 (2) | 5,284 | |
| Uruguay | 1 (1) | 2,278 | |

voting herbaria and a total of 560 votes (65% of the total number of votes). The number of votes allocated to the U.S.A. alone is 155 votes (18% of the total). A total of 527 votes (61%) is held by 14 countries, of which five are European (128 votes), three are North or Central American (204 votes), four are Asian (112 votes), two are South American (43 votes) and one is in Oceania (32 votes) (Russia is here included in both Europe and Asia and its votes placed according to the location of the respective herbarium). Africa is not represented among these voting potencies.

Twelve herbaria have been allocated the maximum number of votes (seven). These consist of eight European, three North American and one Chinese herbarium. Again, as we argued above, the rules for allocating votes to a herbarium are not clear. For example (Table 2), if all the institutions that were allocated 4 votes are compared based on information held in *Index herbariorum* (Thiers, 2009), it is not apparent what puts them on par, as their number of specimen holdings vary from 22,000 to 8,000,000, staff ranges from 4 to 44, and serial publication titles from 1 to 6. The allocation of votes seems to be historically based and does not reflect the actual development of the institutions.

Table 1 shows how the number of votes relates to the estimated vascular plant diversity of the countries that have been allocated votes. Countries with high diversity have often a low number of votes or are even absent from the voting list. That is the case for the Democratic Republic of Congo (11,007 species), Tanzania (10,008), Guatemala (8,681) and Laos (8,286) to mention only those with more then 8,000 species (all figures of species diversity are from World Resources Institute, 2004).

## ■ SOUTHERN AFRICA AS AN EXAMPLE

Comprehensive summaries of herbaria in southern Africa (Smith & Willis, 1997, 1999) indicated that the region has 95 herbaria, ranging from national to provincial to university to nature reserve collections. Of the 95, 74 are in South Africa and of these, 43 are provided with acronyms in *Index herbariorum*. Of the South African herbaria only nine have allocated votes that can be cast at a Section meeting. Of the total of 72 herbaria with acronyms in southern Africa only 13 have allocated votes. Five countries (Angola, Botswana, Lesotho, Swaziland, Zambia) have no votes at all, even though they all have herbaria listed with acronyms in *Index herbariorum*. In the whole of Africa only 16 of the 54 countries (i.e., 30%) have been allocated votes. Several African countries with high plant diversity (Democratic Republic of Congo, Angola, Gabon) are not even represented. The information contained in Smith & Willis (1999) was regularly communicated to *Index herbariorum* and is now captured in the online version. Information on the other African herbaria is also available online. The Bureau for Nomenclature could

**Table 2.** Herbaria that were allocated 4 votes at the Nomenclature Section meeting in Vienna in 2005 (McNeill & Turland, 2009; Thiers, 2009).

| Country | City | Herbarium | Specimens | In-house publications | Staff |
|---|---|---|---|---|---|
| Australia | Adelaide | AD | 980,000 | 1 | 27 |
| Australia | Brisbane | BRI | 770,000 | 2 | 44 |
| Australia | Canberra | CANB | 1,327,520 | 1 | 29 |
| Australia | Melbourne | MEL | 1,200,000 | 1 | 11 |
| Brazil | São Paulo | SP | 370,000 | 2 | 41 |
| China | Guangzhou | IBSC | 1,000,000 | 4 | 29 |
| Denmark | Aarhus | AAU | 700,000 | 1 | 12 |
| France | Paris | P | 8,000,000 | 6 | 33 |
| Indonesia | Bogor | BO | 2,000,000 | 3 | 26 |
| Italy | Firenze | FI + FT | 3,850,000 | 6 | 15 |
| Japan | Tokyo | TI | 1,700,000 | 1 | 4 |
| Netherlands | Utrecht | CBS | 22,000 | 2 | 13 |
| Netherlands | Wageningen | WAG | 600,000 | 1 | 21 |
| South Africa | Pretoria | PRE | 1,200,000 | 4 | 29 |
| Spain | Madrid | MA | 850,000 | 3 | 15 |
| Sweden | Göteborg | GB | 1,600,000 | 2 | 22 |
| Sweden | Uppsala | UPS | 3,000,000 | 2 | 4 |
| U.K. | Egham | IMI | 385,000 | 3 | 13 |
| U.S.A. | Ann Arbor | MICH | 1,700,000 | 3 | 12 |
| U.S.A. | Austin | TEX | 1,006,000 | 1 | 22 |
| U.S.A. | San Francisco | CAS, DS | 1,850,000 | 4 | 24 |

proactively contact these institutions and inform them of their votes or indicate that they should request votes to be allocated. This approach should be extended to include other institutions in *Index herbariorum* that do not have allocated votes. Criteria for such allocations should be developed on the basis of wide consultation; we give two possibilities above.

## ■ TIME TO CHANGE

A re-assessment of the allocation of Section votes to institutions is overdue. The inherent unfairness in the number of votes available to African herbaria, for example, must be addressed without delay. This is not a call for anarchy or abandoning the *ICBN* and how its machinations work. On the contrary, the IAPT has an excellent opportunity to proactively engage herbaria from developing countries in implementing a fair distribution of institutional votes.

Plant nomenclature, and by implication the *ICBN*, is a means to an end. It is intended—and was always intended—to exist for the sake of having an unambiguous rulebook (McNeill & al., 2006) that guides the naming of plants. It is a living document that requires improvement every six years. Taxonomic outputs (and inputs for that matter) have numerous stakeholders and end-users. In the case of plant nomenclature (governed by the *ICBN*) the primary end-users are taxonomists who name, describe (and by implication circumscribe) plants. (The products of taxonomists are of course used by all and sundry.) It is imperative to equitably allocate votes to herbaria by taking into account where the world's floristic riches, and the people who daily work with and often depend on the plants for their livelihood, are situated and allowing taxonomists and institutions from such areas to equally contribute to influencing and making the regularly required refinements to the *Code*.

Attending a two-week long International Botanical Congress and the preceding Nomenclature Section meeting is costly in any currency. It is certainly prohibitively expensive for anyone operating in a cash-strapped emerging economy where even some of the most basic institutional needs are luxuries. (Incidentally, the IAPT recognizes that there are dire fiscal needs in the developing world; admirably it even has a membership category for 'Developing Country Individual'.) Although not many of these institutions (and individuals) will be able to afford supporting the attendance of even a single person at a Section meeting, they can easily be empowered to have their votes cast by proxy by their trusted and like-minded colleagues from better-resourced institutions. In this way plant nomenclature will finally be ridded of a lingering colonial legacy.

The way in which some of the committees of the Section, and the Section itself, have advocated a particular point of view on the *Acacia* typification matter has done much more than raise the ire of a significant number of African and non-African botanists (see Orchard & Maslin, 2003; Smith & al., 2006; Moore, 2007 and references in these). Perhaps most importantly it has indicated just how far developing nations and continents have been left behind in the plant nomenclature debate. We should now collectively be brave enough to proactively rectify this situation.

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