

Acacia: the case against moving the type to Australia

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Recent studies have shown that *Acacia* is polyphyletic and must be split into five genera. Proposal 1584 would retypify *Acacia*: the type of the Australian taxon *A. penninervis* would be conserved over the current lectotype (*A. scorpioides*) of an African taxon. We disagree with the recommendation of the Spermatophyte Committee to endorse this proposal. Contrary to Article 14.12 of the *ICBN*, no detailed case against conservation was presented in Proposal 1584. We maintain that there are strong arguments against conservation, such as the large number of countries that would be affected, the economic importance of the extra-Australian species, and the economic burden placed on developing countries. Acceptance of this proposal would also violate the guidelines for conservation which clearly state that the principle of priority should prevail when conservation for one part of the world would create disadvantageous change in another part of the world.

KEYWORDS: *Acacia*, conservation, nomenclature, retypification, Leguminosae.

INTRODUCTION

Based on proposal 1584 by Orchard & Maslin (2003), the Committee for Spermatophyta (CS) has recommended that *Acacia* be retypified (Brummitt, 2004a). The holotype of *A. penninervis* Sieber ex DC., the name of an Australian taxon, would replace the present lectotype of *Acacia*, *A. scorpioides* (L.) W. Wight, a name applied to an African taxon. This proposal was precipitated in part by recent molecular phylogenetic analyses (Luckow & al., 2003, in press; Fig. 1) that confirmed the polyphyly of *Acacia*, an outcome that had long been anticipated on morphological grounds alone. For example, Pedley (1986) recommended generic segregation of

three subgenera: *A.* subg. *Acacia* as *Acacia* s.s., *A.* subg. *Aculeiferum* as *Senegalia*, and *A.* subg. *Phyllodineae* (the Australian *Acacia*) as *Racosperma*. Other workers in *Acacia*, notably Maslin (1988) and Vassal (1988), did not take up Pedley's segregates. Although they agreed that *Acacia* was polyphyletic (Maslin, 1988), they were unsure of the number of segregates and how these related to one another and to other mimosoid genera (Maslin, 1988; Vassal, 1988). Phylogenetic analyses using morphological characters also demonstrated that *Acacia* was polyphyletic (Chappill & Maslin, 1995; Grimes, 1999). It is notable that Chappill & Maslin advocated conserving the type of *Acacia* to one of the Australian species of *Acacia* in their paper, although no formal

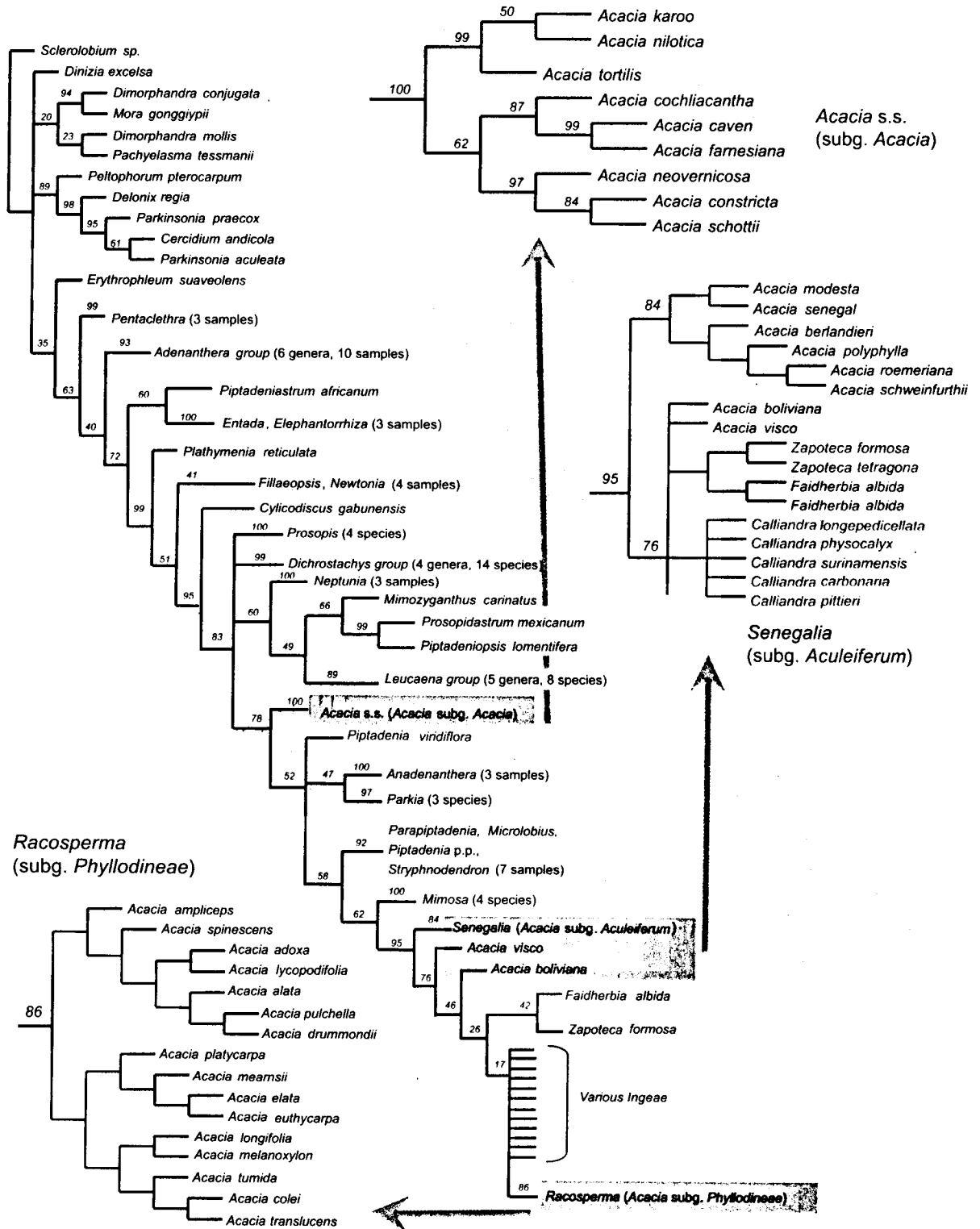


Fig. 1. Strict consensus cladogram from a parsimony analysis of Mimosoideae based on three chloroplast gene regions (Luckow & al. 2003, in press). The three major groups of *Acacia* are shown in detail (with bootstrap values above the nodes), roughly corresponding to Pedley's (1986) three segregates: *Acacia* s.s., *Senegalia*, and *Racosperma*. In addition, there are two species groups of *Acacia* that do not belong to any of the three main species groups and require further study and denser sampling to unequivocally resolve their circumscription and relationships (D. Seigler, pers. comm.).

nomenclatural changes were proposed until after the *Acacia* volumes for the *Flora of Australia* were published in 2001 (Maslin, 2001).

There has never been any confusion about the application of the type of *Acacia*. *Acacia scorpioides* (L.) W. F. Wight is a universally accepted synonym of *Acacia nilotica* (L.) Delile, so retypification of the generic name was proposed on other grounds. The CS put forward two major arguments in favour of their decision:

1. Nomenclatural stability will be best maintained by conserving the name so that it can apply to the Australian species, because there are 960 species of Australian *Acacia*, and only 160–170 species of *Acacia* s.s.

2. The floras of Africa, the Americas, and Asia will have to change to accommodate *Senegalia* anyway, and maintaining the name *Acacia* for half the species in those countries will be ambiguous and lead to confusion in the literature.

Many members of the legume community disagree with the recommendation to retypify *Acacia* and the justifications put forward by both Orchard & Maslin (2003) and Brummitt (2004a). The authors of the arguments presented here represent a broad section of the botanical community from institutions across five continents, including Australia, demonstrating just how widespread the disquiet about this proposal is. We contend that Orchard & Maslin (2003) have not complied with Article 14.12 of the *ICBN*, which states that “Any proposal of an additional name must be accompanied by a detailed statement of the cases both for and against its conservation”. Furthermore, our view is that in a case as contentious and hotly debated as this one (Brummitt, 2004a), simple priority should prevail. We agree with the guidelines set out for conservation by McNeill & al. (2003): “Committees will not be sympathetic to proposals to avoid disadvantageous change in usage in one part of the world at the expense of creating disadvantageous change in another. These situations are what the principle of priority is for”. Endorsement of the *Acacia* proposal by the CS is a departure from this recommendation because it favours conservation over simple priority when conservation would clearly be disadvantageous to large numbers of users throughout the world.

PRECEDENT

Although precedent exists to conserve the name of a large genus with a new type, e.g., *Hedysarum* (Choi & Ohashi, 1998; Brummitt, 2000) and *Centaurea* (Greuter & al. 2001; Brummitt, 2004b), the individual circumstances of such cases must be carefully examined, particularly regarding the impact on the taxon that stands to lose the use of the original type. For example, a taxo-

nomic assessment of *Hedysarum* (Choi & Ohashi, 1996) separated the type, *H. coronarium* L. (along with six other species) from the rest of the species of *Hedysarum*. Without selection of a new type, these 100 or so remaining species then referred to *Hedysarum* would have needed new combinations under *Stracheya* Benth., whereas, if the type were changed, only seven *Hedysarum* species would need new names. Brummitt (2000) noted that the Committee “...is cautious about judging cases like this solely on the number of species in the newly constituted genera, but bearing in mind the familiarity of the name *Hedysarum* and the importance of the genus, it recommends acceptance of the proposal”. In the case of *Centaurea*, 32 species were sacrificed by adopting the name *Bielzia* Schur to prevent 400 to 700 species from losing the name. In both these cases, it appears either that there was no significant impact involving species for which new names were adopted, or that such impacts were not presented to, or taken into account by the CS (Brummitt, 2000, 2004b). In essence, these were parallel situations to *Acacia*, but with more striking numbers of species involved: 100 to 7 (14 : 1) and 400–700 to 32 (13–22 : 1) as against 960 to 161 (6 : 1) with *Acacia*.

In the case of *Myrica*, however, when Verdcourt & Polhill (1997) proposed to conserve the type to apply to the larger tropical segregate (since it otherwise would apply to only two north-temperate species), they were responsible enough to present explicitly the impact concerning the two species that were to go to *Gale*, apparently relying on the strength of numbers to override this impact. The CS (Brummitt, 1999) rejected the proposal stating: “The vote probably reflects the view that when there is a conflict of interests like this, with fairly well balanced arguments either way, it is best to let simple priority and normal typification decide”. It appears that the *Myrica* case differs from the previous two in the explicit presentation of the impact concerning the two species that were to go to *Gale*, and the subsequent consideration of this impact by the CS, despite the impact concerning only two percent of the species.

While acknowledging that the impact of proposal 1584 on *Acacia* s.s. would be significant, its proponents did not provide a balanced overview of the case against conservation (contra Article 14.12). For example, there is no information whatsoever about the economic importance of *Acacia* s.s. in the original proposal (Orchard & Maslin, 2003) nor on the website created by Maslin that apparently figured largely in the CS deliberations. This bias is also apparent in the report of the CS (Brummitt, 2004a), which cites very specific numbers taken from the unrefereed website for cultivated species of *Racosperma*, while species of *Acacia* s.s. are dismissed with the vague statement that “Certainly some African species are also

cultivated for commercial purposes, but it is unlikely that as many species as in Australia are used ...". The onus of providing concrete information about the negative impacts of conservation should be on those advocating conservation, and no decision by a committee should be made without a fair review of both sides of the question. In the absence of any published record of the negative effects of proposal 1584, the split of the CS vote (9 to 6) as well as the significant number of legume taxonomists/biologists who are opposing proposal 1584, are testament to compelling arguments against it. Indeed, clear lines of arguments on both sides of the question were acknowledged by Brummitt (2004b) and he explicitly states that "This proposal has been the most high-profile and vigorously debated case in the history of this committee...". In the absence of consistent application of a principle, it is also hard to ignore the political implications of this proposal, which would preserve *Acacia* for a developed country at the expense of widespread changes across numerous developing countries.

In the *Myrica* decision, the CS noted that the alternative name *Morella* had already been taken up by one Committee member. New combinations in *Racosperma* (the oldest available generic name) for all Australian species have recently been published and are available to be taken up (Pedley, 1986, 2003), but only four combinations have been made in *Vachellia* (the next available name for *Acacia* s.s.). Name changes to the 165+ species of *Acacia* s.s. will not be avoided, but would add considerably to the existing nomenclature. How can it then be argued that the unnecessary creation of additional nomenclature is either stable or conservative?

IMPACT

We take issue with the primacy of numbers of species alone in this decision. If nomenclatural stability were merely a function of numbers of names and/or species, then our job as taxonomists would be simple. However, we must always weigh the wider impact of nomenclatural changes. How many people are affected by a nomenclatural change? How many floras? What are the numbers of economically important species? What are the economic implications to the countries involved? We think that the impact of the proposed name changes will be greater than assumed if the type of *Acacia* is changed.

Species of *Acacia* s.s. are widely distributed throughout Africa, Asia (especially the subcontinent of India), and the Americas (Fig. 2a). In contrast, *Racosperma* (although speciose) is largely confined to Australia and many species are narrow endemics (Fig. 2b). Both of these factors lessen the impact of a name

change. For example, all other things being equal, changing the name of a narrow endemic has far less impact than changing the name of a species of wide distribution. According to Pedley (data from the recent *Flora of Australia*, Maslin, 2001), only about 50 of the 955 Australian species are widespread within Australia. Slightly more than 1/3 of all Australian wattles are found only in Western Australia south of the Tropic of

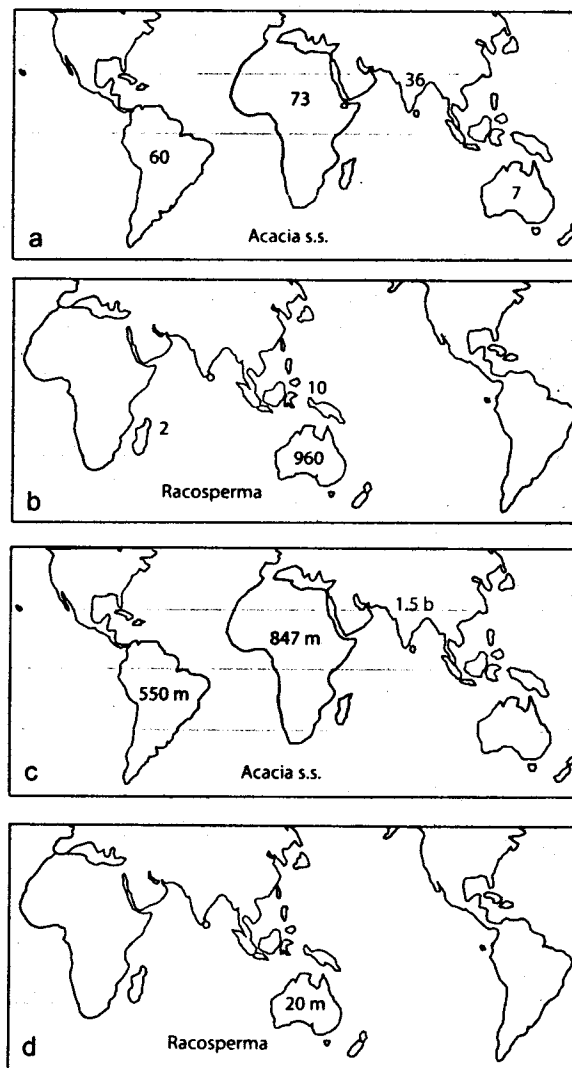


Fig. 2. Maps of the world showing distributions of *Acacia* s.s. (a) and *Racosperma* (b) and world population (c, d; m = million) in these regions. The numbers in a and b represent approximate numbers of species found in each area (from Maslin & al. 2003). *Acacia* s.s. is widely distributed throughout the arid tropical and subtropical regions. *Racosperma* is confined primarily to Australia, with fewer than 20 extra-Australian species found on Pacific and Mascarene Islands, Madagascar, the Philippines, and one species getting into southeast Asia. Distributions redrawn from Maslin & al. (2003). Population levels taken from CIA *World Fact Book* (2004).

Table 1. Distributions of selected species of *Acacia* s.s. Data from ILDIS (2005) with corrections by Christopher Fagg. (I) = introduced, (N) = native, (U) = uncertain.

Acacia farnesiana. Africa: Ethiopia (I), Ghana (I), Libya (I), Mozambique (I), South Africa (I), Tanzania (I), Togo (I), Uganda (I), Zimbabwe (I). Asia: Afghanistan (I), Bhutan (I), Cambodia (I), China (I), India (I), Indonesia-ISO (I), Iran (I), Iraq (I), Japan (I), Laos (I), Malaysia-ISO (I), Pakistan (I), Philippines (I), Ryukyu Is (I), Sri Lanka (I), Taiwan (I), Thailand (I), Vietnam (I). Australasia: Australia (I). Caribbean: Antigua-Barbuda (U), Bahamas (I), Barbados (U), Cayman Is (I), Cuba (I), Dominica (I), Dominican Republic (N), Grenada (U), Guadeloupe (U), Haiti (N), Jamaica (I), Martinique (U), Montserrat (U), Netherlands Leeward Is (N), St. Kitts-Nevis (N), St. Lucia (N), St. Vincent (N). Central America: Belize (N), Costa Rica (N), El Salvador (N), Guatemala (N), Honduras (U), Mexico (North & Central) (N), Nicaragua (N), Panama (N). Europe: France (I), Italy (I), Sicily (I), Spain (I). Indian Ocean: Comoro Is (I), Maldives (I), Mauritius (I), Reunion (I), Rodrigues (I), Seychelles (I). Middle East: Israel (I), Lebanon (I), Saudi Arabia (I), Syria (I). North America: United States (N). Pacific Ocean: Fiji (I), Gilbert Is (I), Hawaii (I), Nauru (I), Northern Marianas (I), Society Is (I). South America: Argentina (N), Bolivia (N), Brazil (N), Colombia (N), Ecuador (N), French Guiana (N), Guyana (N), Peru (N), Surinam (N), Venezuela (N).

Acacia nilotica. Africa: Algeria (N), Angola (N), Botswana (N), Egypt (N), Ethiopia (N), Ghana (N), Guinea Bissau (N), Kenya (N), Libya (N), Malawi (N), Mali (N), Mozambique (N), Niger (N), Nigeria (N), Senegal (N), Somalia (N), South Africa (N), Sudan (N), Tanzania (N), Gambia (N), Togo (N), Uganda (N), Zambia (N), Zimbabwe (N). Asia: China (I), India (N), Iran (N), Iraq (N), Pakistan (N). Australasia: Australia (I). Caribbean: Antigua-Barbuda (I), Bahamas (I), Barbados (I), Cuba (I), Grenada (I), Guadeloupe (I), Martinique (I), Montserrat (I), Puerto Rico (I), St. Lucia (I), St. Martin-St. Barthelemy (I). Indian Ocean: Mauritius (I), Rodrigues (I). Middle East: Israel (N), Oman (N), Syria (N), Yemen (N). North America: United States (I). South America: Galapagos (I), Peru (I).

Capricorn. In the recent flora, 154 species (according to Maslin, the correct number is 160 taxa) are represented by a single dot on the map (a dot covers about 1600 sq. km.). In contrast, species of *Acacia* s.s. have far wider distributions. In Africa, conservative estimates are that 25% of the species cover over 50 degree squares, each of these species covering between 7 and 26 countries (C. Fagg, unpubl.). Nearly 50% of the species cover over 20 degree squares each. Only four species could be considered narrowly endemic, found in a 1 degree square. In Latin America, there are somewhat higher rates of endemism, with about 20% endemics (1 degree square or less), but about 10% are very widespread in areas of 35–60 degree squares (L. Rico, unpubl.; Sousa & Delgado, 1993). The extreme case is *Acacia farnesiana* (L.) Willd., which would change to *Vachellia farnesiana* (L.) Wight & Arn. under retypification. This species is a major component of many ecosystems throughout the world (Table 1). The type, *Acacia nilotica*, applies to a species that is likewise very widespread as well as being economically important (Table 1).

Retypification of *Acacia* will also affect many more countries. Throughout the CS report, they compare Africa with Australia, as though they were comparable entities. Although they are both substantial continents, Australia comprises one country of ca. 20 million people and 7.6 million square kilometers. Africa consists of 47 countries, 874 million people, and 31 million square kilometers (Central Intelligence Agency, 2004; Fig. 2c, d). Furthermore, it will not be just Africa that is affected by the retypification, but also a great number of countries throughout the Americas and Asia (Fig. 2a, c). In effect, we are changing the type of *Acacia* to accommodate one country of 20 million people at the expense of approximately 90 countries worldwide (Fig. 2b, d). Although Africa does indeed have no more claim to the name *Acacia* than Australia (Brummitt, 2004b), the global

community has more of a right to the name than any one country can have.

Under retypification, the cost of the name changes will be borne by those countries least able to afford them. Relative to African, Latin American, and Asian countries, Australia is unquestionably in the best position financially and logistically to undertake nomenclatural changes. There is a large amount of money currently dedicated to databasing all of the major Australian herbarium collections, and it would be relatively simple to implement the nomenclatural changes globally in this database. No such universal database exists to integrate nomenclature throughout Africa, the Americas, Asia, and India.

Orchard & Maslin (2005) imply that the Australian wattles are more widely cultivated and enjoy a larger user community than do the African *Acacia* and that name changes in the *Racosperma* group will thus have a greater impact. We disagree with this. There are strong arguments on both sides for economic importance, and it is easy for either side to play a numbers game. In fact, given the disparity in relative sizes of distributions between *Racosperma* and *Acacia* s.s., one would expect that more technicians, applied researchers, foresters, and range and conservation managers will be disrupted should conservation prevail. However, rather than pursuing this further here, we would simply agree with the CS's conclusion that *Acacia* s.s. and *Racosperma* are of roughly equal economic and ecological importance (Brummitt, 2004a).

The CS pointed out that floras throughout Africa, Asia, and the Americas would have to undergo revision in any case because *Senegalia* is sympatric with *Acacia* s.s. throughout much of its range. Although we agree that having to deal with a recircumscribed *Acacia* in addition to getting to know a new segregate genus will cause confusion in many countries, proposal 1584 does not avoid this phenomenon, and conservation was never intended

to address such peripheral issues, which are of a short-lived nature and are at least predictable to those familiar with the principles of the *ICBN* (Walker & Simpson, 2003).

The Australian *Acacia* are generally referred to as “wattles” both in Australia and elsewhere, and the average person would probably not even connect them with the name “*Acacia*”. In contrast, the common name “*Acacia*” is used throughout Africa and Latin America. Conservation of the name *Acacia* to the Australian wattles will lead to the same kind of confusion that now exists with *Geranium*, where the common name does not correspond to the generic name. Although not an overriding concern, these kinds of changes are burdensome to the people who are least likely to understand the intricacies of taxonomic nomenclature and often lead to great confusion in the horticultural literature. We should try to minimize the impact of any nomenclatural changes on them as much as possible.

Apparently the CS was influenced in its decision by a last-minute communique that “further splitting may be required in the extra-Australian genera” (Brummitt, in reviewing this manuscript), and it was implied that *Acacia* s.s would be smaller than 165 species. No authority was cited for this unsubstantiated rumour. Five genera must be recognized to satisfy the requirements of monophyly; any further splitting is a matter of convenience rather than necessity, and it is highly doubtful that such segregates would be readily taken up (David Seigler, pers. comm.). In fact, *Acacia* s.s is probably the most stable group and least subject to future taxonomic flux. It is certainly the best supported of the three major lineages in all phylogenetic analyses to date (Fig. 1) and probably the most morphologically homogeneous. All of this is irrelevant, however, since nomenclatural decisions cannot be based on “hints leaked out of Africa”, nor guesses about what future taxonomic changes might transpire.

Aside from the immediate negative impacts of proposal 1584, we believe there are also wider repercussions for the overall credibility and predictability of the nomenclatural rules if decisions that contravene the principle of priority are implemented without clear justification. It is ironic that due to the high profile of the genus, and due to the fact that a change was predicted almost two decades ago (Pedley, 1986), few users should be caught off guard by the anticipated change to *Racosperma*. The same cannot be expected with the introduction of *Vachellia*, despite *Acacia* shedding its other subgenera. In this regard, it is noteworthy that plant pathologists and mycologists working in Australia oppose retypification of *Acacia* on precisely these grounds (Walker & Simpson, 2003). They contend that the name *Racosperma* has already been widely accepted in their communities under the assumption that the normal prior-

ity would apply, and that retypification will throw their literature into confusion. We fear that unnecessary retypification will compromise the future predictability of our system of nomenclature and that the impact of proposal 1584 could be felt long after the *Acacia* vs. *Racosperma* issue has been forgotten. The CS’s response to the concern about setting a precedent for other proposals was an assertion that this is a unique case. Only time will tell.

In summary, we think the recommendation to retypeify *Acacia* with an Australian species is ill-considered and will lead to increased instability and perhaps resistance to the application of a new classification for this large and important group of species. In the course of this debate it has been implied that the more vocal arguments emanating from Australia are evidence that the user communities there care more about the proposed changes than those elsewhere. However, it is important to remember that few botanists, let alone wider user communities in Africa and Latin America, have been consulted or even made aware of the proposed changes. Thus in Africa and Latin America strong resistance and resentment can be expected if the proposed changes are imposed.

We believe the arguments presented here are compelling in their own right and outweigh those put forward by Orchard & Maslin (2003). However even if (as acknowledged by Brummitt, 2004a) one views the arguments on either side as more equal than that, we strongly believe that as in the *Myrica* case, it is best to let simple priority and normal typification decide the issue. Exceptions should not be made to the *Code* unless the case for it is overwhelming, and this case certainly is not. Making such exceptions without due consideration of the negative consequences will undermine the *Code* as a whole. We ask all participants to support a discussion of proposal 1584 on the floor of the International Botanical Congress in Vienna.

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