

AN ANALYSIS OF PREFERRED PLANT NOMENCLATURAL REFERENCES
AND NAME CHANGE PROTOCOLS USED BY PUBLIC GARDENS
IN THE UNITED STATES AND CANADA

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by

John T. Manion

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ABSTRACT

There exists among and within public gardens in the United State and Canada a degree of confusion and frustration related to the inconsistencies, and relatively frequent changes in botanical names. I decided to conduct an online survey to explore exactly why these inconsistencies exist and how the issue of name changes is approached. Using various means (list serves, individual invitations, newsletter posting), my survey was distributed to numerous public gardens in the U.S. and Canada. 56 usable surveys were completed and returned. My hope was that from the answers to the 30 questions I asked, I would be able to discern some of the reasons behind the inconsistencies and how some public gardens deal with changes in plant nomenclature. Before synthesizing the results of the survey, I had strongly suspected that few gardens had set policies in place for referencing botanical names and dealing with name changes. My suspicions were confirmed when examining the survey results. By gaining insight into these issues, I was able to formulate a set of recommendations that might, to some degree, ameliorate these problems.

BIOGRAPHICAL SKETCH

Though it wasn't until relatively later in life and having done many other kinds of work that I chose to return to the area of interest I held so dear as a child, and one for which my parents had instilled in me a lifelong love and fascination...the world of plants. After spending several years as an emergency trauma nurse, as well as various other careers, I pursued an undergraduate degree in plant science, after which I completed a year-long curatorial internship at the Scott Arboretum of Swarthmore College. This experience inspired in me a lifelong commitment to the world of public gardens. Subsequently, I was selected as a fellow in Cornell University's Master of Professional Studies in Public Garden Leadership program. My two primary areas of interest are collections curation and education. Botanical nomenclature is a subject for which I have a special fondness. My other personal interests include classical music, poetry, cooking, travel, community involvement and just about anything having to do with plants!

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To all of the individuals in public gardens in the U.S. and Canada that took time to complete my survey, my gratitude.

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CHAPTER 1: INTRODUCTION

Background

That botanical names can be confusing and sometimes overwhelming is a fact often communicated when speaking with visitors to public gardens. Indeed, even within the public garden world, the mention of botanical nomenclature and the frequency with which it changes elicits expressions of dismay or frustration. Why is it that so many people are perplexed by botanical names and avoid them when possible? This may partly be due to the fact that they are in Latin, a language foreign to most people. Moreover, the general lack of consistency in the use and formatting of botanical names among public gardens, and in some cases within public gardens, could very well contribute to the problem. Changes in plant nomenclature, due to a variety of reasons, but most often due to the more sophisticated methods of scientific research such as new molecular phylogenetic techniques, can add to such confusion. “Taxonomic name changes result in a state of confusion for growers, retailers and, most especially, for the end users: home gardeners, landscape contractors and designers, municipalities and botanical gardens” (Valleau 2004, p. 63). An excellent example of name change confusion is the Alaskan cedar, known for many years as *Chamaecyparis nootkatensis* (D. Don) Sudworth. This is a tree that in the last half decade has changed names twice, first to *Xanthocyparis nootkatensis* (D. Don) Farjon & Harder, then more recently to *Callitropsis nootkatensis* (D. Don) Örsted. Other examples include the plant known for so long as *Coleus* spp. having now been reclassified as *Solenostemon* spp. and the genera *Aster* and *Lycopodium* having been reclassified relatively recently. Though some public gardens have implemented these changes, there are many that have not.

Problem

In a 2004 issue of the *Public Garden*, Frank Telewski, in his piece “Options for Display Labels – Revisited”, opens his article with the statement “labeling plants with identification and interpretive text for the public is one of the most basic functions of botanical gardens and arboreta” (Telewski 2004, p. 23). I believe most readers would agree that, implied in this statement, information presented on the display label should be correct and current, at least as much as is widely accepted by the horticultural, botanical and taxonomical communities.

The rapidity with which the field of taxonomy has advanced over the last several years has brought about many changes in plant nomenclature, which have been the source of much confusion to individuals and institutions seeking to remain current in regards to nomenclature. Though the challenge of remaining up-to-date with botanical nomenclature is not new, the many advances in plant taxonomy have added to the challenge. In the time of Linnaeus, plants were categorized using his then highly controversial - and now largely outdated - “sexual system,” based on gross morphology; i.e., the sex, and numbers of plants’ reproductive organs. Even then, when his *Species Plantarum* was first published in 1753, there was significant disagreement about how plant names should be assigned. Now many other methods, most importantly genetic studies, are used by taxonomists to classify plants. Because taxonomists may disagree about the delimitation or placement of a species, there can be no central or primary reference for discerning what the definitive current name is for a plant. Of some relief is the trend toward conserving plant names in cases where changing it would have a significant impact on some sector that has long depended on a specific plant’s name. This is mostly seen with agricultural and other economically significant plants. Nomenclatural conservation is a procedure governed by Article 14.1

of the International Code of Botanical Nomenclature; its purpose is "...to avoid disadvantageous nomenclatural changes entailed by the strict application of the rules, and especially of the principle of priority..." (Greuter et al. 2000). "In 1981, the International Botanical Congress voted to allow conservation of names in use for species of major economic importance and in certain other circumstances." Then in 1993, the Congress stated "...it is now no longer necessary to prove major economic importance to have the name of a species conserved, and any name (at any rank) that might cause nomenclatural instability can now be proposed for rejection."

(<http://www.kew.org/scihort/names.html>)

One need only visit several public gardens in order to observe that there exists a lack of consistency in the nomenclature used on plant labels. This is far from being a new phenomenon; indeed, the issue has most likely caused some degree of confusion since Latin names were first assigned to plants. According to Valleau (p. 63), "in an era of intensive plant breeding and marketing, international trade, and high consumer interest in gardening, the problem may be reaching a critical point around the globe."

After years of observing these inconsistencies, I found myself wondering why such discrepancies exist within the botanical, horticultural and public garden arenas. I suspected that it was due to two reasons: different references for plant names were being used and there was confusion or disagreement about name changes and when to adopt them. I also wondered what steps public gardens were taking to address the issue of current plant nomenclature and nomenclatural changes. Do public gardens have policies (formal or informal) that direct how botanical names are referenced and how changes in nomenclature are approached? Have any gardens worked collaboratively to address these issues? In partial fulfillment of my Masters of Professional Studies program in Public Garden Leadership at Cornell University, I

focused my research efforts on seeking the answers to these questions. The goals of my study were:

- To learn possible reasons for the lack of consistency among and within public gardens regarding current plant names.
- To learn what sources were being used to reference current plant nomenclature in public gardens.
- To learn how the issue of changes in nomenclature was being approached in public gardens.
- To develop a list of the most useful book and online references used by public gardens for plant nomenclature referencing.
- To generate a list of recommendations for public gardens to better facilitate nomenclatural consistency and effectively address botanical name changes within and amongst themselves.

CHAPTER 2: METHODS

In an effort to reach my study goals, I developed and administered an electronic online survey to professionals working directly with botanical nomenclature at public gardens in the USA and Canada. For the survey to be comprehensive, I began by compiling a list of book references as well as online references that I had found useful and that I knew to be frequently used by other public garden staff to reference botanical names. I supplemented this list by interviewing several public garden professionals working with plant nomenclature at public gardens to ask for other references frequently used. I considered all the factors that might possibly lead to inconsistency in plant nomenclature such as limited staff and funding, foci of gardens (aesthetics vs. education or research, etc.), and devised questions to explore these factors. After the trial survey was developed, I distributed it to eight plant nomenclature staff in public gardens who had expressed willingness to assist me in this endeavor, asking for their feedback on the appropriateness and ease of use of the survey (see appendix A) Based of the input from these individuals, I modified the survey to combine thirty multiple choice and open-ended questions.

I used several methods to invite and encourage people to participate in the study: posting an invitation to participate in the survey in the American Public Gardens Association (APGA) monthly newsletter; inviting individuals to take the online web survey via the APGA Collections listserv; sending e-mails to professionals whom I knew worked with plant nomenclature in public gardens; sending e-mails to individuals identified as being involved with plant nomenclature by their titles in the APGA Membership Directory; and posting an invitation to participate in the survey on the message board of a Canadian public garden's website (see appendices C, D, F).

The survey also included questions about the character of each garden and its collections such as garden location, size of budget, type of collections, and primary uses of collections. Additionally, the survey asked about whom makes plant nomenclatural decisions, how they are made and whether policies are in place to aid in these decisions, what book and online references public gardens in the U.S. and Canada are using, and how gardens deal with the growing issue of nomenclatural changes.

To address the important issue of which references gardens were using and which they found to be most important for botanical nomenclature referencing, I included a list of 22 book references and 12 website references. I asked respondents to rate how frequently (most often, often, sometimes, rarely and never) they used each of these selected references.

CHAPTER 3: SUMMARY OF RESULTS

I received 59 responses to the survey. Three were not included in my results because they did not fit the criteria I had outlined in the introduction to my survey, such as stating that the survey was intended for public garden staff in the USA and Canada (one respondent was from Bulgaria). Two respondents' answers were not included because they were not affiliated with public gardens.

Garden characteristics

A great deal of variation existed in the responses from the 56 gardens participating in the survey (Table 1). Generally, most respondents were garden curators located at gardens in 23 states and Canada. Most respondents were from large and small gardens, based on the criteria set forth by APGA based on annual budget (small = gardens with budgets < 1 million; medium = gardens with budgets between 1 – 2 million; large = gardens with budgets > 2 million). When asked about the use of their gardens' collections, most respondents indicated that aesthetics and education were the primary purposes. Gardens' collections were composed mainly of woody and herbaceous plant material and varied widely in number of taxa. I chose to limit my investigation to botanical names only, because exploring the complex issue of cultivars was too broad to be covered within the scope of this study. Though I had stressed this point, some confusion seemed to remain about whether or not to include cultivars in the number of taxa in each garden's collections. I suspected this because the initial answers to this question appeared high; I therefore re-contacted the survey respondents asking for clarification to the question and learned that my

Table 1: Characteristics of gardens responding to survey. (N=56)

Position title of survey respondents*	N
Curator	21
Director of horticulture	11
Plant record staff	14
Taxonomists or botanists	5
Gardeners or horticulturists	5
Garden size based on budget	
Large (budget >2 million)	24
Medium (budget 1-2 million)	9
Small (budget <1 million)	22
Garden location	
Total states represented	23
States with greatest number of gardens responding:	
California	8
Massachusetts	5
Pennsylvania	5
Primary use of collections	
Aesthetic	46
Education	43
Research	18
Concentration of collections	
Woody plant material	47
Herbaceous plant material	29
Native to your region	23
Annuals/tropicals/tender perennials	17
Wild collected	16
Being trialed or evaluated	8
Taxa	
Number of taxa in collections	9,729 – 280 ^a

^aThis study is concerned with botanically named taxa, not cultivar names or trademarks.

*These are the titles of the individuals who responded to my survey.

suspensions were correct; the initial figures submitted by many included cultivars (see appendix G).

Nomenclature referencing policies

To better understand how nomenclatural decisions are made, I asked a series of questions related to this process. Based on survey responses, curators and plant records staff make the most decisions regarding nomenclature. Taxonomists or botanists also have significant input in nomenclatural decisions for those gardens that have such positions. When asked if the garden had a formal (written) policy regarding how to reference current plant names, seven respondents answered “yes” to this question, however further examination of the policies described or sent revealed that actually only three gardens had written procedures that specifically direct how plant names are to be referenced. Examples of these written policies may be found in appendices H, K, and L. When asked if the garden had an informal (unwritten) policy regarding how to reference current plant names, several indicated they did. Sample responses of unwritten procedures included comments such as, “Not yet written, but I have a hierarchical tree to keep the database in order: Brummett for family assignments, TROPICOS & other web sites for current nomenclature, RHS web site for cultivars (if listed there), dear old Hortus III as desperation backup; use a # of web sites in actual practice.” “I first look for a name of a cultivar or a species in the RHS Plant Finder website. If a species isn't listed there I check W3 Tropicos, GRIN, the USDA plants database if native to us. For descriptions of plants I use the RHS dictionary of gardening or floras.” “Horticulturists (doubling as plant recorders) use references they consider to be the most current in respect to the collections for which they are responsible. Where collection plants overlap, individual preferences may sometimes conflict. These differences are generally ironed out in the monthly collections committee meetings.” “If a new name is discovered, we attempt to find the supporting references and ascertain whether it "makes sense" in the grand scheme of things - a bit of a judgment call. Once it is determined that the name change is indeed

valid, we then make the changes in our database. For generic level changes and above, we have started to use our online forums to post these changes with our rationale, for our own documentation, as an aid to other institutions and to inform the public. Once a post is made to these forums, an email is automatically sent out to research, horticultural and educational staff informing them of the discussion. However, we've decided for name changes to species and below, that the number of potential changes makes documentation awkward using this method, so we are still considering how best to do that; For the time being, curators / horticulturists are informed of subgeneric level changes when the new label is given to them and given the reasons why.” Other responses were similar in nature; many gardens indicated that they simply do not have a policy, formal or informal.

In an attempt to explore the reasons for inconsistency among plant names used by public gardens, and to compile a list of recommended references for gardens to use, I asked respondents to rate how often they used each of 22 reference books (see appendix M). Additionally I asked respondents to rate 12 online references (see appendix N) and to rate their preferred referencing method: book or online. These lists of books and online references were based on references I had found useful in my own curatorial work and those I knew to be frequently used by other public garden staff to reference botanical names. I supplemented this list by interviewing several public garden professionals working with plant nomenclature to ask for other references frequently used. Though challenging, I attempted to avoid including many references that were very specific to a particular region or taxa, i.e. The Flora of Maine (1998) or a reference written on a single genus such as *Ilex* or *Magnolia*.

When asked which reference, book or online, gardens used most frequently to check a plant's current botanical name, thirty individuals responded that they use both book and online references about equally. Fifteen respondents answered that they use

book references most frequently while only ten preferred online references to book references.

Regarding which book references were used most often to check a plant's current botanical name, almost half of the respondents cited the Index of Garden Plants: The New Royal Horticultural Society Dictionary, New RHS Dictionary of Gardening, and Michael Dirr's Manual of Woody Landscape Plants: Their Identification, Ornamental Characteristics, Culture, Propagation and Uses as the source they used "most often" and "often." See Table 2 for a list of the nine most often used references and Appendix M for the complete list.

Regarding which online reference were used most often to check a plant's current botanical name, almost half of the respondents cited W3 Tropicos, the International Plant Names Index, and the United States Department of Agriculture's Plants Database as three "most often" and "often" used. See Table 3 for a list of the six most used and Appendix N for the complete list.

Table 2: Most common plant reference books used to check a plant's current botanical name. N=56

Book	n
<u>Index of Garden Plants: The New Royal Horticultural Society Dictionary</u> , Mark Griffiths; Timber Press, 1994 (either book or CD-ROM)	28
<u>New RHS Dictionary of Gardening</u> , Anthony Huxley (editor), et al.; Pan Macmillan, 1999	26
<u>Manual of Woody Landscape Plants: Their Identification, Ornamental Characteristics, Culture, Propagation and Uses</u> , Michael A. Dirr; Stipes Publishing Co., 5th edition, 1998	23
<u>Hortus Third: A Concise Dictionary of Plants Cultivated in the United States and Canada</u> , L.H. Bailey & L.H. Bailey Hortorium Staff; Macmillan, 1976	19
<u>Flora of North America North of Mexico</u> , edited by <u>Flora of North America</u> Editorial Committee; Oxford University Press, 1993-	17
<u>World Checklist and Bibliography of Conifers</u> , A. Farjon; the Royal Botanic Gardens, Kew, 1998	14
<u>RHS Plant Finder</u> ; Royal Horticultural Society, 2003-2004 edition	14
<u>Index Kewensis</u> , Various Authors; Royal Botanic Gardens (either book or CD-ROM)	12
<u>The Plant Book</u> , D.J. Mabberley; Cambridge University Press, 2nd edition, 1997	12

Nomenclature change policies

Regarding the issue of how gardens implement name changes, out of the 53 respondents that answered this question, 49 indicated they do not have a policy for

Table 3: Most common plant online reference websites used to check a plant's current botanical name. N=56

Online website	
W3 Tropicos [Missouri Botanical Garden's VAST (VAscular Tropicos) nomenclatural database and associated authority files] http://mobot.mobot.org/W3T/Search/vast.html	27
IPNI (International Plant Names Index) http://www.ipni.org/index.html	21
Plants Database (U.S. Dept. of Agriculture Plants Database) http://plants.usda.gov/	21
Flora of North America http://hua.huh.harvard.edu/FNA/	16
RHS Plantfinder (Royal Horticultural Society Plantfinder) http://www.rhs.org.uk/rhsplantfinder/plantfinder.asp	14
GRIN (The Germplasm Resources Information Network) http://www.ars-grin.gov/npgs/tax/	13

implementing name changes; four respondents said that they did. However examination of the policies described or sent revealed that only two gardens have written policies that specifically direct how plant name changes are to be considered (see appendices I and J for examples).

Though both of these policies are admirable attempts at addressing the issue of name changes, the two have little in common. One is a specific list of references to check for the status of the name change, i.e. websites, scientific journals, other public gardens, reputable nursery catalogs (see appendix I). Though the other policy (appendix J) also mentions some references to check, it also (very appropriately) stresses that the accepted name must be in compliance with either the *International Code of Botanical Nomenclature* or the *International Code of Nomenclature for Cultivated Plants*. Moreover, it specifies who at the institution is responsible for the

decision. When asked about the existence of an informal procedure for implementing name changes, there were many vague and non-specific answers.

I asked gardens how they discovered a new name. The greatest number of respondents indicated that the most frequent ways by which they became aware of plant nomenclatural changes were through botanical and horticultural journals, followed closely by published monographs, scientific papers, floras, and from other colleagues (Table 4).

Table 4: Indicator of a plant name change. N=56

Indicator	Most Often or Often
Botanical/Horticultural Journal	49
Published Monograph	41
Flora	40
Scientific Paper	40
A Colleague	38
Another organization	16
Nursery Catalog	13
Popular Gardening Magazine	7

After having learned of a consortium of public gardens within a region attempting to collaborate in an effort to standardize names, I included a question in the survey asking if there had been any efforts by gardens to standardize plant names with other gardens in their region. An overwhelming majority of respondents (46 out of 56) answered no to this question. Out of the ten affirmative responses, two reported that they try to use the same plant names used by one other garden in their area; the

respondents from the two other corresponding gardens did not answer yes to any collaboration. The other eight described ways that they check plant names...not ways that they collaborate with other gardens.

Nomenclature change implementation

Beyond understanding how gardens make changes to their nomenclature, I wanted to learn more about the implementation of such changes. First I asked how many plants in their collections had plant name changes in 2003. The greatest number of respondents (19) replied to this question with an answer of 1-5 plants, followed by over 30 plants (14), and then 11-20 plants (9). I then asked about the length of time it took gardens to change an accepted name change on the plant's *accession* label, meaning the information placed on a plant primarily for the purpose of record-keeping and tracking. Almost half of the respondents (26) replied that they change the accession label immediately, followed by 11 who reported that they change the name when the accession label needs to be replaced, and 15 responded with other time frames such as "We normally do changes by garden section so the name change may wait for awhile," "When we encounter it during mapping," "When money is available for labeling," and "During inventory check of an area."

Many plants in a garden include an accession label and a display label, the difference being that a display label is used primarily for the benefit of garden visitors. Though some gardens combine data from accession labels and display labels onto one label, most distinguish between the two. Again, almost half (23) of the gardens indicated that they change the display label immediately; 15 said they change the display label when the display label needs to be replaced; and 15 with other time frames such as "We order display labels once a year, so will order the name change in the next upcoming label order," "When the name appears more accepted in the trade,"

and “As soon as conveniently possible. Our display labels have a very long turnaround time.”

CHAPTER 4: DISCUSSION

Nomenclature referencing policies

Based on the results of this study, it was evident that few (three) of the 56 respondents have set policies in place for how they reference plant names or how they deal with name changes. Two of the three had written policies in place to address how they approach the issue of plant name changes. However, both of these were essentially a list of references to check, not instruction on when and how to accept a name change. This trend may be indicative of a larger trend among public gardens nationwide or worldwide.

In the “Bookshelf” section of two of the 1996 issues of the Public Garden, articles titled “For Plant Record-Keepers, Part 1: The West”; and “Part II: The East” (January, pgs 33-39 and July, pgs 36-41) and then in an article titled “Essential Resources for Curators” in the Winter 2002 issue (pgs 22-31), the subject of preferred references for plant nomenclature were addressed by inquiring what various gardens around the United States were relying on for plant nomenclature references. Many of the references listed were either out-of-date (*Hortus Third*), or regional in nature (*Vascular Plants of Arizona*), facts that likely contribute to the lack of uniformity in nomenclature.

However, in the first two of these two articles, and to a much lesser degree the third, the internet had not yet become the indispensable resource it is today. The obvious significant difference between texts and online references in regard to current plant nomenclature is that with the rapid advances that have been made in the field of taxonomy, the information contained in many texts quickly becomes outdated. A case in point is the historically important compendium of cultivated plants, *Hortus Third*,

compiled by the Liberty Hyde Bailey Hortorium at Cornell University. While this text was very complete in its inclusion of numerous plants that had never been profiled, it has become obsolete in regard to current nomenclature. Even so, when asking in my survey who used this document as a resource to check a names correct current botanical names, 17 out of 56 respondents replied they refer to it “often,” and 11 “sometimes.”

Upon checking some plant names on the most frequently-referenced sites, I discovered that they are not all in agreement over which plant name is most up-to-date or generally accepted. One of the websites listed as most frequently used, The International Plant Names Index (IPNI), was a surprise because of the fact that this site is a compilation of all names ever proposed for a plant, yet it does not designate which name is the most current or generally accepted.

Based on the answers to question #12 (On which plant labels do you place the botanical name?), 82% of gardens surveyed place botanical names on both display and accession labels. This is even more reason to ensure nomenclatural accuracy, as Spencer and Cross (2004, pgs 221-225) state: “The most direct contact between the general public and plant names is through display labels on plants.”

There does not exist a single reference that may be relied upon for checking every plant’s current botanical name. As one respondent commented in his survey:

It has been my experience that taxonomy is a very personal art/science. Much depends on how one rates research of monographs, characters studied personal concepts of what a botanical rank is, etc. Thus *Acer nigrum*, *Acer saccharum* subsp. *nigrum*, *Acer saccharum* var. *nigrum*, and *Acer saccharum* are all validly published names for what is known as Black Maple. Which name a person or garden uses depends on whether you believe the differences are great enough to be a distinct species, a subspecies, variety, or should be included within the variable characteristics of a broadly defined species. One of our staff members once said; ‘A species is whatever a competent taxonomist says it is.’ Now we can ask who is a competent taxonomist!

There is a remarkable collaboration that began with three responding gardens (Mount Auburn Cemetery, Polly Hill Arboretum, New England Wild Flower Society's Garden in the Woods), which were attempting to standardize plant nomenclature in among themselves. This collaboration has since expanded to five gardens, including Tower Hill Botanical Garden, and the Arnold Arboretum of Harvard University. As related to me by the individual leading this effort, the express intent is not necessarily to get all cooperating gardens to use the same names, but rather for each to become aware when they are using a different name than the other gardens and explore the reasons why.

Nomenclature change policies

The fact that so few of the public gardens surveyed have policies in place (two out of 56) to guide the changing of plant names is not surprising, yet is disconcerting. The lack of these policies may be related to several factors, among them: lack of staff time to dedicate to this issue, a lack of precedents or models on which to base a policy, and perhaps most importantly, lack of a definitive resource on which to base plant name decisions. I feel that in most gardens, with the exception of a few staff members, botanical nomenclature is a subject that many would prefer to avoid.

Nomenclature change implementation

It was encouraging to learn from the responses that almost half of the respondents stated that once a name change has been accepted by their institution, they change it on the accession label immediately. Reasons for delaying the change of newly-accepted names on labels are varied and not surprisingly often due to the cost (materials and staff time) of replacing labels.

CHAPTER 5: RECOMMENDATIONS

“Maintaining current and accurate records and labeling is a public service that makes our collections accessible and useful to our visitors who rightly expect to know if, and where, a particular plant is growing on the grounds and assume that it will be labeled” (Bauml 2004).

As I initially suspected, few gardens are effectively dealing with the issues of name changes and consistency in the application of new names. This is due to a variety of reasons. There does appear to be some confusion when discussing plant nomenclature and often people think more along the lines of correct plant identification and description. We must remember that although many synonyms may exist, there is only one correct name for each of the earth’s plants. Principle IV of the International Code of Botanical Nomenclature states, “Each taxonomic group with a particular circumscription, position, and rank can bear only one correct name, the earliest that is in accordance with the Rules...” (Greuter et al. 2000).

Admittedly, finding that one correct name can be a challenge...all the more reason for having mechanisms in place for addressing the issue. As with many areas of science, personal opinions and biases often come into play, in this case evidenced by the statement by one of the respondents: “Horticulturists (doubling as plant recorders) use references they consider to be the most current in respect to the collections for which they are responsible.” However, because there can be such disparity among which references are used, the more these individual preferences can be resisted, and the more uniformity that can be instituted, the better.

In summary, there is much work to be done by most public gardens in regard to addressing the issues of establishing policies for identifying a plant’s currently

accepted name (at least in as much as possible considering the dynamic state of flux in which the process lies) and how to approach the topic of name changes. We, the staff of public gardens, have a responsibility to relay to our visitors, and to our colleagues, correct and current information. Based on the results of this study, I offer the following recommendations.

- Within individual gardens - develop policies (preferably written) to standardize how plant names are referenced – this can be in the form of an algorithm or procedure, similar to the ones used at the United States Botanical Garden (see appendix L), New England Wildflower Society (appendix K), or the Scott Arboretum of Swarthmore College (appendix H). At Coastal Maine Botanical Gardens, the curator has selected the Flora of Maine as the Gardens’ primary reference choice for checking the names of plants growing wild in Maine. These methods standardize and make easier the task of checking correct nomenclature on new (or existing) plants within the garden and decreases the ambiguity involved.
- If using texts, explore appropriate ones that have an added advantage of being updated frequently...an example being the Royal Horticultural Society (RHS) Plant Finder, published every two years.
- Realize that botanical nomenclature is a dynamic science and will likely continue to change. Therefore, maintain a degree of flexibility in policies regarding use of botanical nomenclature.
- Support and strengthen the APGA Nomenclature Committee. Join the committee, write articles dealing with nomenclatural topics and communicate problems, questions, ideas and thoughts using any medium available. Keep dialogues going; this is not an issue that is soon going away.

- Develop means by which new ideas, procedures and information may be disseminated widely to public gardens, such as a listserv, newsletters, etc.
- Form regional nomenclature groups in a manner similar to the New England Nomenclature Consortium – a group representing five public gardens in the region which are attempting to explore the possibility of standardization of names. This is an admirable attempt at standardizing plant names, at least regionally, and could be a model for a national or international project.
- For small gardens with limited resources and staff, consider allying themselves with larger institutions, especially those in the same region
- A follow-up study should be conducted dealing with cultivar names. The need for this type of a study was echoed repeatedly in comments made by survey respondents.
- Encourage the people that design and manage plant databases to keep names up-to-date in their systems. Example: BG-BASE
- Support the use of, and encourage your organization to participate in multi-site searches, which can be accessed through any of its 26 public gardens, all of whom use BG-BASE as their plant database system (see www.plantations.cornell.edu). This feature was developed, and is maintained by the Royal Botanic Garden Edinburgh.
- Establish and nurture connections with individuals and organizations involved with the classification and naming of plants. Examples: Taxonomists; Angiosperm Phylogeny Group; International Association for Plant Taxonomy.
- Maintain a healthy knowledge and curiosity about plant nomenclature in order to remain informed on current issues.

APPENDIX A: REQUEST TO COMPLETE TRIAL SURVEY INITIALLY
SENT TO EIGHT INDIVIDUALS IN MARCH, 2004

Dear XXXX:

I am a graduate student at Cornell University completing a Masters in Public Garden Management. As part of my graduate project, I will be conducting a survey to learn how horticultural organizations, primarily public gardens, reference their plant names and deal with changes in plant nomenclature. Since you have already expressed an interest in assisting me with this project, I am asking you to review this draft of my survey. The purpose of this initial review is to clarify questions that may be confusing and to include questions and/or answer choices that may be helpful to people completing the survey. I would appreciate any comments you may have on improving the enclosed survey.

Please return any comments you may have to me by XXXX.

Thank you,

John Manion

APPENDIX B: REVISED AND FINALIZED ONLINE SURVEY

PLANT NOMENCLATURE SURVEY

This study is being conducted by:

John T. Manion, Graduate Fellow, Master of Professional Studies in Public Garden Management

Department of Horticulture, Cornell University

The study examines how public gardens in the United States and Canada are referencing and making changes to botanical names. This project relies heavily upon the quality of data received; I therefore encourage you to be candid in your responses. Information gathered with this survey may be published, however, anonymity is assured. One of the goals of this study is to develop ideas and guidelines useful to staff in public gardens who work with botanical names. In the final report, I will include case studies from gardens that have developed practical routines or protocols for referencing and making changes to plant names.

It should only take about 20-30 minutes to complete the survey. Please fill it out and return electronically by clicking on "Submit Survey" at the end of the survey by April 15.

The names of all who participate in the survey will be entered in a drawing for a **\$50 gift certificate to Amazon Books**. Please pass this survey on to any colleagues at public gardens who might be willing to participate (more than one person at a garden may complete the survey).

For purposes of this study:

"Public garden" refers to botanical gardens and arboreta, greenhouse collections, gardens at colleges/universities, zoos, museums, parks, or cemeteries. Any garden or plant collection where the public is admitted may be included.

"Accession labels" refers to labels used primarily for tracking/cataloging plants.

"Display labels" refers to labels used primarily for the benefit of garden visitors.

"Taxon" (plural=taxa) refers to any individual category of plant -

Examples of 4 different taxa:

Syringa vulgaris

Syringa ×chinensis

Syringa komarowii ssp. *reflexa*

Syringa meyeri var. *spontanea*

*****NOTE - This study is concerned with botanically named taxa, not cultivar names or trademarks.**

Thank you very much for your assistance!

John T. Manion
Cornell Plantations
One Plantations Road
Ithaca, NY 14850
(607) 255-2400
jtm36@cornell.edu

-
- 1) Your name
 - 2) Your position/title:
 - 3) Name of your garden:
 - 4) In which state/province is your garden located?
 - 5) What is your garden's annual budget?
(if your garden is in Canada, use Canadian dollars)

Choices:

- Annual budget up to \$1 million
- Annual budget between \$1 million and \$2 million
- Annual budget more than \$2 million

- 6) What is the primary use of your gardens collections? (You may check more than one)

*If a primary use of your collections is not listed, please LIST AND RATE the use in the "Additional comments" box below. (Assign one of the same ratings used in the table)

Ratings:

- Highest
- High
- Moderate
- Low
- Lowest
- Not a use

Choices:

Aesthetics
Education
Research

Additional comments:

7) Who is involved in making decisions concerning botanical plant names (not cultivar names or trademarks) at your garden? (You may check and rate more than one)

*If you wish to add a person not listed, please SPECIFY AND RATE the person in the "Additional comments" box. (Assign one of the same ratings used in the table)

Ratings:

Makes final decisions regarding plant names
Has significant input regarding plant names
Has some input regarding plant names
Has no input regarding plant names
Position doesn't exist

Choices:

Curator
Director of Horticulture
Plant Records - Manager/Registrar/Recorder/Specialist
Staff Botanist
Staff Taxonomist

Additional comments:

8) Approximately how many different taxa are in your collections?

9) Which of the following choices describe the concentration(s) of your garden's plant collections? (You may check and rate more than one)

*If you wish to list a concentration not on the list, please SPECIFY AND RATE the concentration in the "Additional comments" box.

Ratings:

Highest
High
Moderate
Low
Lowest
Not a concentration

Choices:

Annuals/Tropicals/Tender Perennials
Herbaceous
Woody
Native to your region
Wild Collected
Being trialed or evaluated

Additional comments:

10) On which of the following plants does your garden place DISPLAY labels?
(You may check more than one)

Choices:

Annuals/Tropicals/Tender Perennials
Herbaceous plants
Woody plants
None

11) On which of the following plants does your garden place ACCESSION labels?
(You may check more than one)

Choices:

Annuals/Tropicals/Tender Perennials
Herbaceous plants
Woody plants
None

12) On which of the following plant labels do you include its botanical name?

Choices:

Accession labels
Display labels
Both
None

13) Does your garden have a written policy regarding how it references botanical names?

If YES, please cut and paste a copy of the policy into the following box, e-mail it to me as an attachment, imbedded in an e-mail, or mail a hard copy to me at my address listed at the beginning and end of this survey.

If NO, please use the following box to describe any routine you might have for referencing botanical names.

14) Does your garden have a written policy regarding changes in plant names?

If YES, please cut and paste a copy of the policy into the following box, e-mail it to me as an attachment, imbedded in an e-mail, or mail a hard copy to me at my address listed at the beginning and end of this survey.

If NO, please use the following box to describe any routine you might have for handling changes in botanical names.

15) What usually indicates to your garden that a plant's name may have changed? (you may check and rate more than one)

Ratings:

- 1 = Most often the first indication
- 2 = Often an indication
- 3 = Sometimes an indication
- 4 = Rarely an indication
- 5 = Never an indication

When a different name...

Choices:

- ...appears at another garden/organization
- ...appears in a botanical/horticultural journal
- ...appears in a flora
- ...appears in a nursery catalog
- ...appears in a popular garden magazine
- ...appears in a published monograph
- ...appears in a scientific paper
- ...is heard from a colleague

16) Please use the following box to list and assign a rating to any other ways that you become aware that a plant's name may have changed.

Ratings:

- 1 = Most often the first indication
- 2 = Often an indication
- 3 = Sometimes an indication
- 4 = Rarely an indication

17) During the year 2003, approximately how many of the labeled (accession or display) taxa in your collections had name changes accepted by your garden?

Choices:

- None
- 1-5
- 6-10
- 11-20
- 21-30
- More than 30
- I don't know

18) Once your garden has accepted a plant's name change, when do you change the name on its ACCESSION label?

Choices:

- Immediately
- When the plant's ACCESSION label needs replacement due to wear/damage?
- Other (please specify in "Additional comments" box)

Additional comments:

19) Once your garden has accepted a plant's name change, when do you change the name on its DISPLAY label?

Choices:

- Immediately
- When the plant's DISPLAY label needs replacement due to wear/damage?
- Other (please specify in "Additional comments" box)

Additional comments:

20) Has any effort been made by your garden to standardize plant names among other gardens in your region?

No

Yes (if "Yes," please briefly describe in "Additional comments" box)

Additional comments:

21) Which of the following sources do you most frequently use to check a plant's CURRENT BOTANICAL NAME (not cultivar names or trademarks)?

Choices:

- Reference BOOKS
- Reference WEBSITES
- We use both about equally

22) Please RATE how often you use EACH of the following reference BOOKS to check a plant's CURRENT BOTANICAL NAME (not cultivar names or trademarks).

*If the edition you use is different from the one listed, please still rate it and then specify in the "Additional comments" box the name of the text (you may cut and paste) and which edition you use.

REFERENCE BOOKS:

Ratings:

Most often
Often
Sometimes
Rarely
Never

Reference Books Choices:

European Garden Flora: A Manual for the Identification of Plants Cultivated in Europe, Both Out-of-Doors and Under Glass, Edited by S.M. Walters...et al.; Cambridge University Press, 1984-

Flora of China, Wu Zhenghi, Peter H. Raven, co-chairs of editorial committee; Missouri Botanic Garden Press, c1999-

Flora of Japan, Jisaburo Ohwi; Smithsonian Institution Press, 1984 Reprint edition

Flora of Japan, edited by Kunio Iwatsuki, et al.; Kodanshiana, Tokyo, c1993-

Flora of North America North of Mexico, edited by Flora of North America Editorial Committee; Oxford University Press, 1993-

Hardy Herbaceous Perennials, Leo Jelitto & Wilhelm Schacht; Timber Press, 3rd edition, 1990

Herbaceous Perennial Plants: A Treatise on Their Identification, Culture, and Garden Attributes, Allan M. Armitage; Stipes Publishing Co., 2nd edition, 1997/98

Hillier Manual of Trees and Shrubs, John Hillier; David & Charles, 2002

Hortus Third: A Concise Dictionary of Plants Cultivated in the United States and Canada, L.H. Bailey & L.H. Bailey Hortorium Staff; Macmillan, 1976

Index of Garden Plants: The New Royal Horticultural Society Dictionary, Mark Griffiths; Timber Press, 1994 (either book or CD-ROM)

Index Kewensis, Various Authors; Royal Botanic Gardens (either book or CD-ROM)

Manual of Cultivated Broad-Leaved Trees and Shrubs, Gerd Krussmann, et al.; Timber Press, 1985/1986

Manual of Cultivated Conifers, Gerd Krussmann, et al.; Timber Press, 1985

Manual of Cultivated Trees and Shrubs Hardy in North America Exclusive of the Subtropical and Warmer Temperate Regions, Alfred Rehder; Dioscorides Press, 2nd edition, 1940

Manual of Vascular Plants of the Northern United States and Adjacent Canada, Henry A. Gleason, Arthur Cronquist; the New York Botanical Garden, 2nd edition, 1991

Manual of Woody Landscape Plants: Their Identification, Ornamental Characteristics, Culture, Propagation and Uses, Michael A. Dirr; Stipes Publishing Co., 5th edition, 1998

New RHS Dictionary of Gardening, Anthony Huxley (editor), et al.; Pan Macmillan, 1999

New York Botanical Garden Illustrated Encyclopedia of Horticulture, Thomas H. Everett; Garland Press, 1980-

The Plant Book, D.J. Mabberley; Cambridge University Press, 2nd edition, 1997

RHS Plantfinder; Royal Horticultural Society, 2003-2004 edition

A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland, J.T. Kartez & R. Kartez; Univ. of North Carolina Press, c1980

World Checklist and Bibliography of Conifers, A. Farjon; the Royal Botanic Gardens, Kew, 1998

25) Please LIST and RATE any other reference books you frequently use to check a plant's CURRENT BOTANICAL NAME (not cultivar names or trademarks).

Please include Title, Author, Edition/Year, Publisher, AND...please rate.

Ratings:

- 1 = most often
- 2 = often
- 3 = sometimes

26) Please RATE how often you use EACH of the following reference WEBSITES to check a plant's CURRENT BOTANICAL NAME (not cultivar names or trademarks).

WEBSITES:

Ratings:

- Most often
- Often
- Some- times
- Rarely
- Never

Websites Choices:

ePIC (electronic Plant Information Centre) Royal Botanic Gardens, Kew
<http://www.kew.org/searchepic/searchpage.do>

Flora of North America
<http://hua.huh.harvard.edu/FNA/>
GRIN (The Germplasm Resources Information Network)
<http://www.ars-grin.gov/npgs/tax/>

ING (Index Nominum Genericorum - U.S. National Herbarium, Department of Botany, Smithsonian Institution)
<http://rathbun.si.edu/botany/ing/ingform.cfm>

IOPI (International Organization for Plant Information)
<http://www.bgbm.fu-berlin.de/IOPI/GPC/query.asp>

IPNI (International Plant Names Index)
<http://www.ipni.org/index.html>

ITIS (Integrated Taxonomic Information System)
<http://www.itis.usda.gov/index.html>

NCU-3e (Names in Current Use for Extant Plant Genera-International Society for Plant Taxonomy)
<http://www.bgbm.org/iapt/ncu/genera/Default.htm>

Plants Database (U.S. Dept. of Agriculture Plants Database)
<http://plants.usda.gov/>

RHS Plantfinder (Royal Horticultural Society Plantfinder)
<http://www.rhs.org.uk/rhsplantfinder/plantfinder.asp>

Royal Botanic Garden Edinburgh – Multisite Searches
<http://rbg-web2.rbge.org.uk/forms/multisite2.html>

W3 Tropicos [Missouri Botanical Garden's VAST (VAscular Tropicos) nomenclatural database and associated authority files]
<http://mobot.mobot.org/W3T/Search/vast.html>

27) Please LIST and RATE any other reference websites you frequently use to check a plant's CURRENT BOTANICAL NAME (not cultivar names or trademarks).

(Please indicate the region or type of plant the website is used for)

Ratings:

- 1 = most often
- 2 = often
- 3 = sometimes

28) Would you be willing to be interviewed by telephone regarding this survey?

No

Yes - if "Yes," please place your e-mail address, telephone number, and the best time to reach you, in the "Additional comments" box.

Additional comments:

29) Are you interested in receiving a summary of this survey's results? If "Yes," please enter your name and e-mail address in the "Additional comments" box.

No

Yes

Additional comments:

30) Please use the box below to add any comments you may have about this survey, or about the topics of the survey.

*When finished filling out survey, please make sure you click on "Submit Survey" at the bottom of this page

Thank you very much for participating in this survey,

John T. Manion
Cornell Plantations
One Plantations Road
Ithaca, NY 14850
(607) 255-2400
jtm36@cornell.edu

This survey was created with WebSurveyor®

APPENDIX C: SURVEY ANNOUNCEMENT IN APGA NEWSLETTER,

APRIL 2004 – NO. 349

HELP WANTED

Nomenclature Survey

John Manion, a graduate fellow in Cornell University's Public Garden Management program, is studying the references public gardens use for botanical nomenclature and how they approach changes in plant names. An invitation to participate in a short survey will soon be posted on the AABGA Plants Collections listserv, which will include a link for survey responses to be submitted electronically. If you do not subscribe to the listserv but would be willing to fill out the survey, please email jm36@cornell.edu for information.

APPENDIX D: APGA COLLECTIONS LISTSERV - INITIAL SURVEY

ANNOUNCEMENT -

POSTED 4/1/04

Dear List Subscribers,

I'd like to ask you to participate in a survey examining how public gardens in the U.S. and Canada are referencing current botanical names, and how they approach changes in plant nomenclature. This is a project I'm conducting as component of my Masters Degree in Public Garden Leadership program at Cornell University. I realize that time is valuable to all, but the survey should only take about 20-30 minutes to complete, can be easily filled out and submitted electronically, and your time spent filling it out will be very much appreciated. I'd also like to ask you to pass the survey link on to anyone not subscribed to this list-serve whom might be willing to participate. I will be following up with some e-mails sent directly to some of you, asking you to complete the survey.

If you do not feel you are the most appropriate person at your organization to complete this survey, please pass it on to whoever would be more appropriate. More than one person at a garden may complete the survey. I'd also like to ask you to encourage your public garden colleagues to participate in the study.

The survey may be easily accessed by clicking on:

<http://atcdb.cit.cornell.edu/survey//wsb.dll/jtm36/NomenclatureSurvey.htm>

If you are willing to participate, PLEASE COMPLETE AND SUBMIT THE SURVEY BY APRIL 15.

A literature search for work published on these topics has yielded little. If you are aware of any relative pieces, I'd appreciate hearing about them.

Many thanks in advance,

John T. Manion
MPS/Graduate Fellow-Public Garden Leadership
Cornell University-Department of Horticulture
http://www.plantations.cornell.edu/education/masters/fellows/2004_manion.cfm

APPENDIX E: AABGA COLLECTIONS LISTSERV 4-DAY SURVEY

REMINDER

My sincere thanks to all of you who have completed my Nomenclature Survey. In order to make my project more relevant, I d like to ask for some more of you to complete the survey. There are several notable public gardens in the U.S. and Canada not yet represented. I'll extend the deadline until this Friday in hopes that some more of you will find the time. Below is the original announcement with a convenient link to the survey.

Appreciatively,

John Manion

APPENDIX F: POST ON UNIVERSITY OF BRITISH COLUMBIA
BOTANICAL GARDEN AND CENTRE FOR PLANT RESEARCH'S GARDEN
FORUM - SCIENCE OF PLANTS SUB-FORUM - BOTANICAL GARDENS
AND ARBORETA THREAD – POSTED APRIL 3, 2004

Nomenclature Survey

I'd like to ask any of you who are directly involved with botanical nomenclature to consider participating in a survey examining how public gardens in the U.S. and Canada are referencing current botanical names, and how they approach changes in plant nomenclature. This is a project I'm conducting as component of my Masters Degree in Public Garden Leadership program at Cornell University. I realize that time is valuable to all, but the survey should only take about 20 minutes to complete, can be easily filled out and submitted electronically, and your time spent filling it out will be very much appreciated. THE NAMES OF ALL WHO PARTICIPATE WILL BE ENTERED IN A DRAWING FOR A \$50 (USD) GIFT CERTIFICATE TO AMAZON BOOKS. I'd also like to ask you to pass the survey link on to anyone not subscribed to this list-serve whom might be willing to participate. I will be following up with some e-mails sent directly to some of you, asking you to complete the survey.

If you do not feel you are the most appropriate person at your organization to complete this survey, please pass it on to whoever would be most appropriate. More than one person at a garden may complete the survey. I'd also like to ask you to encourage your public garden colleagues to participate in the study.

The survey may be easily accessed by clicking on:

<http://atcdb.cit.cornell.edu/survey...atureSurvey.htm>

If you are willing to participate, PLEASE COMPLETE AND SUBMIT THE SURVEY BY APRIL 15.

A literature search for work published on these topics has yielded little. If you are aware of any relative pieces, I'd appreciate hearing about them.

Many thanks in advance,

John T. Manion
MPS/Graduate Fellow-Public Garden Leadership
Cornell University-Department of Horticulture
http://www.plantations.cornell.edu/...2004_manion.cfm

**APPENDIX G: REQUEST FOR CLARIFICATION OF QUESTION #8 – SENT
BETWEEN MAY 11 AND 23, 2004**

Dear XXXX,

Thank you again for taking the time to complete my Plant Nomenclature Survey. I'd like to clarify your answer to question #8 -

“Approximately how many different taxa are in your collections?”

You answered “XXXX” - does this number include cultivars and plants with trademark names, or is it just botanically names taxa, i.e. plants that are a botanical species, subspecies, forma, or variety?

If the figure you gave me DOES include cultivars, etc., please (if possible) give me an estimated (or exact) number of botanically named taxa in your collections?

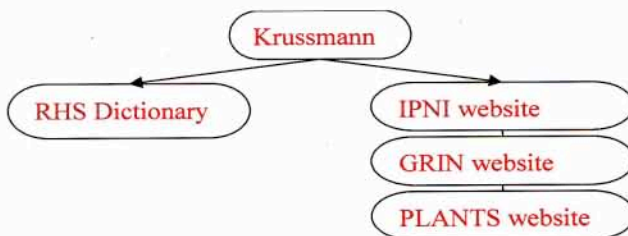
Many thanks,

John Manion

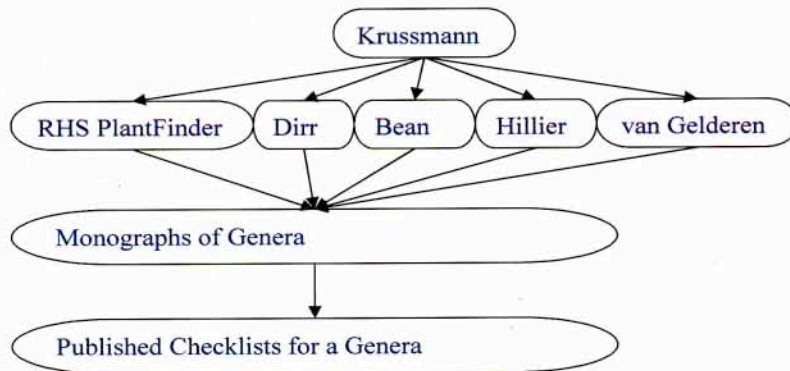
APPENDIX H: PLANT NAME REFERENCE ALGORITHM – THE SCOTT
ARBORETUM OF SWARTHMORE COLLEGE

**The Scott Arboretum of Swarthmore College
Reference Flow Chart for Nomenclature Verification**

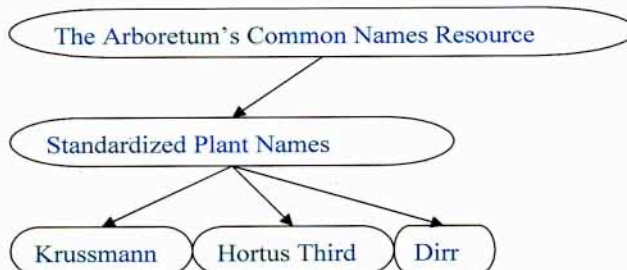
Start all species reference checks with the following:



If searching for a cultivar, continue referencing the below



For common names, the following references are suggested



**APPENDIX I: PLANT NAME CHANGE PROTOCOL– THE SCOTT
ARBORETUM OF SWARTHMORE COLLEGE**

The Scott Arboretum of Swarthmore College

Name Changing Protocol

Steps to Changing a Botanical Name

- 1) Investigate the validity of a name change when curatorial office hears of change.
- 2) Do web search of respected websites to see if they have documented change (within the web site check the references they have used for the name change-needs to be changed in (1) of the listed websites).
 - a. [www.ars-grin](http://www.ars-grin.org) (Grin Taxonomy)
 - b. www.ipni.org/index.html
 - c. <http://rbg-web2.rbge.org.uk/forms/multisite2.html>
 - d. <http://flora.huh.harvard.edu:8080/flora/index.jsp>
 - e. www.magnoliasociety.org/checklist_ndx.html
 - f. www.sp2000.org/
 - g. www.upenn.edu/paflora/dbsearch.html
 - h. www.americanbamboo.org/
 - i. http://tred.cr.usgs.gov/cgi-bin/tred_taxon.cgi
 - j. www.ishs.org/sci/icra.htm
 - k. www.hortax.org
- 3) Consult scientific journals (needs to be changed in (2) journal or magazine)
 - a. The New Plantsman
 - b. Arnoldia
 - c. Conifer Quarterly
 - d. The Garden
 - e. Journal of the American Rhododendron Society
 - f. Holly Society Journal
 - g. International Dendrology Society Journal
 - h. The Journal of the International Oak Society
 - i. Journal of Arboriculture
 - j. Journal of the International Lilac Society
 - k. The Journal of the Magnolia Society
- 4) Consult botanic gardens and arboreta (needs to be changed in (1) botanic garden or arboreta)
 - a. Arnold Arboretum
 - b. New York Botanic Garden
 - c. U. S. National Arboretum
 - d. Missouri Botanic Garden
 - e. Holden Arboretum
 - f. Morton Arboretum
- 5) Consult reputable catalogs
 - a. Heronswood
 - b. Forest Farm
- 6) Once name change has happened complete the following steps:
 - a. Make changes in BG-Base
 - b. Change accession labels
 - c. Make new display labels with the new name and the old name as synonym
 - d. Contact Kelly so she can be aware of changes for brochure changes.
 - e. E-mail staff making them aware of changes.
 - f. The following information needs to be noted in the BG-Base file: (1) website reference, (2) Journal references and (1) botanic garden or arboreta reference.

APPENDIX J: NAME CHANGE POLICY – THE MORTON ARBORETUM

Morton Arboretum - Name Change Policy

Determining Accepted Plant Names at The Morton Arboretum; When a plant is determined to have more than one published name, the Arboretum will determine which name is to be accepted and used at the Arboretum; e.g. in plant records, herbarium, publications, education, etc.; The accepted name should comply with the most current version of 1.) The International Code of Botanical Nomenclature, and 2.) the International Code of Nomenclature for Cultivated Plants.; The person responsible for determining the Arboretum accepted name is the Curator of the Herbarium. In the absence of the Curator, the Director of the Research Program or his designee shall determine the accepted name; Procedure to determine the Accepted Name; 1. Each plant name should be investigated to determine compliance with 1.) The International Code of Botanical Nomenclature and 2.) The International Code of Nomenclature for Cultivated Plants; 2. Pertinent articles in botanical and horticultural literature should be referenced; floras, monographs, journal or periodical articles, standard botanical or horticultural references (Dirr, Huxley, Krussmann, Rehder, etc.); 3.) Pertinent internet web sites should also be referenced: GRIN, USDA Plants, wwwTropicos, Flora North American, Flora of China, etc; 4. Information gathered from the above should be synthesized and a decision made as to which name is to be the accepted name used at The Morton Arboretum.; 5. Other names for the plant will be treated and listed as synonym names in the plant records system.; 6. A list of accepted names and synonyms will be maintained by collections; 7. In the case of name changes the procedures set down in Annotation and Name Change Procedures will be followed.

APPENDIX K: PLANT NAME REFERENCES – NEW ENGLAND

WILDFLOWER SOCIETY

References used for Cultivation, Conservation Notes, and other background information—to be developed

Notes left from last version.....

Primary References for North American Plant Names (in order of priority)

1. Flora of North America Editorial Committee. 1993. *Flora of North America*, 1993 Volumes 1-3, and 22, plus additional volumes as they are published.
2. Kartesz, John T. 1999. *A Synonymized Checklist and Atlas with Biological Attributes for the Vascular Flora of the U.S., Canada and Greenland*, First Edition. Reference access is through the CD called: Kartesz, J.T. and C.A. Meacham, *Synthesis of the North American Flora, Version 1.0*. North Carolina Botanical Garden, Chapel Hill.
3. Gleason and Cronquist. 1991. *Manual of Vascular Plants of Northeastern United States and Adjacent Canada*, Second Ed.

Secondary References for Native Plants not Listed in Primary References:

- Benson, Lyman- *The Cacti of the United States and Canada*, 1982.
- Holmgren, Hoel H.- *Illustrated Companion to Gleason and Cronquist's Manual*. 1998.
- Great Plains Flora Association - *Flora of the Great Plains*, 1986.
- Hitchcock, C.L. et al.- *Vascular Plants of the Pacific Northwest*, 1969.
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References for Exotic Plants:

- The Royal Horticultural Society - *The New Royal Horticultural Society Dictionary of Gardening*, 1992.
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References for Nonvascular Plants:

- Anderson, Crumm- *Mosses of Eastern North America*, Vol. 1 and 2, 1981.
- Conrad, H.S. & P.L. Redfern- *How to Know the Mosses and Liverworts*, 1979.

APPENDIX L: PROCEDURE FOR REFERENCING BOTANICAL NAMES
AT THE UNITED STATES BOTANICAL GARDEN

Verify the name -- Scientific plant names and generally recognized common names are verified using a series of recognized authoritative references. These references are shelved in the Plant Record Office on extended loan from the USBG Library. Generally in researching a plant name, some of the following are consulted: (a) Mark Griffiths' Dictionary of Garden Plants, (scientific and common names of plants in cultivation, some cultivars) (b) the website of the Missouri Botanical Garden, (scientific names of plants not necessarily common in cultivation; <http://mobot.mobot.org/pick/search/pick.html>) (c) The RHS Orchid Information System compact discs, (orchid hybrids, grexes, parentage, hybridizers, awards information) (d) the Synthesis of the North American Flora, (scientific and common names of plants, both native and naturalized, of North America) (e) the latest edition of The Plant Finder (cultivars) (f) the latest edition of Andersen's Horticultural Library (cultivars; <http://plantinfo.umn.edu/arboretum/default.asp>) (g) Manual of Herbaceous Ornamental Plants (common names of commonly cultivated plants) (h) http://www.ars-grin.gov/cgi-bin/npgs/html/tax_search.pl? If the name cannot be found in these sources, other library searches and Internet searches will be conducted. Conflicts in nomenclature inevitably occur. When they do, a number of procedures are followed depending on the circumstances: If different sources list the name differently or if one source accepts the name and another calls it a synonym, then accuracies of the sources are considered. The most recently published or updated source will generally be relied upon. For example, a plant name is listed as current and accepted in An Index of Garden Plants. However, because it was received under a

synonym of this name, other sources are checked. If the plant is native to North America, the name will also be checked in the Synthesis of the North American Flora, and whatever is the correct name in that source will be used. If the Synthesis of the North American Flora and the Missouri botanical Gardens database disagree, then a call will be made to both places to understand the discrepancy. If both cite their names as valid a call to the Smithsonian Botany Department will be made to get their opinion on which is the more valid of the names. (Kyle Wallick, USBG)

APPENDIX M: COMPLETE LIST OF BOOK REFERENCES

1. European Garden Flora: A Manual for the Identification of Plants Cultivated in Europe, Both Out-of-Doors and Under Glass, Edited by S.M. Walters et al.; Cambridge University Press, 1984-
2. Flora of China, Wu Zhenghi, Peter H. Raven, co-chairs of editorial committee; Missouri Botanic Garden Press, c1999-
3. Flora of Japan, Jisaburo Ohwi; Smithsonian Institution Press, 1984 Reprint edition
4. Flora of Japan, edited by Kunio Iwatsuki, et al.; Kodanshana, Tokyo, c1993-
5. Flora of North America North of Mexico, edited by Flora of North America Editorial Committee; Oxford University Press, 1993-
6. Hardy Herbaceous Perennials, Leo Jelitto & Wilhelm Schacht; Timber Press, 3rd edition, 1990
7. Herbaceous Perennial Plants: A Treatise on Their Identification, Culture, and Garden Attributes, Allan M. Armitage; Stipes Publishing Co., 2nd edition, 1997/98
8. Hillier Manual of Trees and Shrubs, John Hillier; David & Charles, 2002
9. Hortus Third: A Concise Dictionary of Plants Cultivated in the United States and Canada, L.H. Bailey & L.H. Bailey Hortorium Staff; Macmillan, 1976
10. Index of Garden Plants: The New Royal Horticultural Society Dictionary, Mark Griffiths; Timber Press, 1994 (either book or CD-ROM)
11. Index Kewensis, Various Authors; Royal Botanic Gardens (either book or CD-ROM)
12. Manual of Cultivated Broad-Leaved Trees and Shrubs, Gerd Krussmann, et al.; Timber Press, 1985/1986
13. Manual of Cultivated Conifers, Gerd Krussmann, et al.; Timber Press, 1985
14. Manual of Cultivated Trees and Shrubs Hardy in North America Exclusive of the Subtropical and Warmer Temperate Regions, Alfred Rehder; Dioscorides Press, 2nd edition, 1940

15. Manual of Vascular Plants of the Northern United States and Adjacent Canada, Henry A. Gleason, Arthur Cronquist; the New York Botanical Garden, 2nd edition, 1991
16. Manual of Woody Landscape Plants: Their Identification, Ornamental Characteristics, Culture, Propagation and Uses, Michael A. Dirr; Stipes Publishing Co., 5th edition, 1998
17. New RHS Dictionary of Gardening, Anthony Huxley (editor), et al.; Pan Macmillan, 1999
18. New York Botanical Garden Illustrated Encyclopedia of Horticulture, Thomas H. Everett; Garland Press, 1980-
19. The Plant Book, D.J. Mabberley; Cambridge University Press, 2nd edition, 1997
20. RHS Plantfinder; Royal Horticultural Society, 2003-2004 edition
21. A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland, J.T. Kartez & R. Kartez; Univ. of North Carolina Press, c1980
22. World Checklist and Bibliography of Conifers, A. Farjon; the Royal Botanic Gardens, Kew, 1998

APPENDIX N: COMPLETE LIST OF ONLINE REFERENCES

1. ePIC (electronic Plant Information Centre) Royal Botanic Gardens, Kew
<http://www.kew.org/searchepic/searchpage.do>
2. Flora of North America <http://hua.huh.harvard.edu/FNA/>
3. GRIN (The Germplasm Resources Information Network)
<http://www.ars-grin.gov/npgs/tax/>
4. ING (Index Nominum Genericorum - U.S. National Herbarium, Department of Botany, Smithsonian Institution) <http://rathbun.si.edu/botany/ing/ingform.cfm>
5. IOPI (International Organization for Plant Information)
<http://www.bgbm.fu-berlin.de/IOPI/GPC/query.asp>
6. IPNI (International Plant Names Index) <http://www.ipni.org/index.html>
7. ITIS (Integrated Taxonomic Information System)
<http://www.itis.usda.gov/index.html>
8. NCU-3e (Names in Current Use for Extant Plant Genera-International Society for Plant Taxonomy) <http://www.bgbm.org/iapt/ncu/genera/Default.htm>
9. Plants Database (U.S. Dept. of Agriculture Plants Database) <http://plants.usda.gov/>
10. RHS Plantfinder (Royal Horticultural Society Plantfinder)
<http://www.rhs.org.uk/rhsplantfinder/plantfinder.asp>
11. Royal Botanic Garden Edinburgh – Multisite Searches
<http://rbg-web2.rbge.org.uk/forms/multisite2.html>
12. W3 Tropicos [Missouri Botanical Garden's VAST (VAScular Tropicos) nomenclatural database and associated authority files]
<http://mobot.mobot.org/W3T/Search/vast.html>

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