

TYPE SPECIES OF THE FIRST 100 GENERA OF LINNAEUS' SPECIES PLANTARUM

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The type concept is finding increasing favor with botanists everywhere. So far as its application to future cases is concerned it may be regarded as already accepted. But when it comes to applying the principle retroactively there is some hesitation on the part of many. Because of the way in which it has been applied by some of the adherents of the American Code, there has been a fear that many well-established names might be superseded if the method were generally used. The rules of the Type-basis Code are more elastic than those of the American Code and would permit a reasonable application of the principle without introducing unnecessary confusion. In my account of the Genera of the Grasses of the United States¹ I typified about 300 genera of grasses according to the rules set forth in the Type-basis Code. In order to test the effect of applying these rules to other genera of flowering plants, I have tentatively typified the first 100 genera of Linnaeus' Species Plantarum. The results are here set forth and analyzed.

Of the 100 genera, 28 contain a single species. These are the types of the respective genera according to any set of rules. Most botanists agree that a generic name should be applied so as to include its original species when there is only one, and one of its original species where there are more than one. However, there are a few cases in which the historic development has followed a different course. An application of the type concept may here cause a profound dislocation of names if a large number of species are involved. Such cases should be considered on their merits and exceptions made if it seems worth while and if a general agreement can be reached.

Among the genera mentioned (often called monotypic genera), there are two cases in which the original species is not included in the genus as now generally accepted. Since the original species is in each case the type, an application of the type concept necessitates a readjustment of the nomenclature of each group. *Alpinia racemosa*, the single species of *Alpinia*, is now referred to *Renealmia*, though the genus *Alpinia*, containing a large number of species, is recognized as valid. Dr. E. D. Merrill has called attention to this case. Among the genera of group I there is one other case of this kind, *Eranthemum capense*, referred to *Daedalacanthus*, though the genus *Eranthemum* with many species is accepted as valid.

¹ U. S. Dept. Agr. Bull. 772. 1920.

The remaining 72 genera, containing originally more than one species, must be typified by selecting one of the species as the type. It is this retroactive application of the type concept that has aroused the most opposition from the adherents of the International Rules because of the fear that well-established names would be needlessly displaced. I think I can demonstrate that the results are not revolutionary and that in the main the fears are groundless. A uniform application of any set of rules will bring to light certain anomalous cases which in some way should be considered and either corrected or validated.

One of the first things to do in selecting a type is to exclude from consideration those species that definitely disagree with the generic description, because certainly an author would not illustrate or typify his own genus with an anomalous species. As there are no generic descriptions in the *Species Plantarum*, the descriptions in the fifth edition of the *Genera Plantarum* (1754) are used to ascertain Linnaeus' concept of the genera included in the *Species Plantarum*. The typification on the basis of the generic description should be done only by those familiar with the taxonomy of the groups. I have not attempted to do this except with the grass genera. As an illustration, we have the genus *Holcus* which does not occur in the first 100 genera now under consideration. The generic description in the *Genera Plantarum* certainly applies only to three of the seven species included in the *Species Plantarum*, the three species related to *Holcus* *Sorghum* which were later segregated as the genus *Sorghum*. The application of the type method here goes contrary to historical development subsequent to Linnaeus and to the general usage of those who recognize the group as distinct from *Andropogon*. In current usage the genus is represented by *Holcus lanatus*.

It is rather exceptional among Linnaean genera to find species definitely excluded in this way from consideration in selecting the type. It is possible that on taxonomic grounds there may be a few changes in the tentative list of type species here presented.

The next point to ascertain is which species the author of the genus appeared to have chiefly in mind, in so far as one species can be singled out. We may assume, unless there is evidence to the contrary, that the representative species to the author would be the one best known to him. This may be shown in four ways: First, one to which he has applied a specific name like *officinalis*, *communis*, *vulgaris*, or *sativus*; second, a well-known economic species; third, a common species of the native flora or one grown by him in a garden; fourth, through a citation in the *Genera Plantarum*. Another method, the selection on the basis of figures accompanying the original description, can not be used here because there are no plates in the *Species Plantarum*. These four methods are used coördinately. Sometimes one can be applied, sometimes another. Often two or more methods lead in the same direction, as in *Hordeum*, of which *H. vulgare* is selected as the

type on the basis of its being an economic species. But it would be indicated as the type through the name *vulgare* and through the Tournefort figure cited in the Genera Plantarum. If different methods conflict, the factors must be considered and a balance struck. In the list submitted there appears to be no conflict except in *Justicia* which is considered separately.

In selecting a native species one assumes that a European species will be better known to Linnaeus than one from some other continent; that a Swedish species would be better known than one from southern Europe; and that one grown in the Hortus Cliffortianus or Hortus Upsaliensis better known than one represented by a herbarium specimen only. One should select a species on the basis of a figure cited in the Genera Plantarum only when there is no doubt as to the identity of the figure, and the method should be used with caution.

After these four methods have been applied there are still some cases in which a selection has not resulted. At this point the historical development should be considered. In these genera, amounting to about 20 percent in our list, the type has been chosen from among the original species now commonly retained in the genus, thus fixing the application of the generic name in accord with current usage.

In case there are more than one residual species, the type is the most common or best known, or, if equally eligible, the first of these.

Among the 72 genera considered there are a few that must receive attention separately.

Justicia contains 9 species of which four are retained in the genus under present usage. The first of these is *J. betonica*. The citation in the Genera Plantarum refers to *J. sexangularis*, which is now usually placed in *Dicliptera*. The selection of this species as the type would change the application of *Justicia* as currently understood. If the citation in the Genera Plantarum is ignored, the type is *J. betonica* and the genus falls in group 5.

Ixia contains two species, both of which are now referred to later genera, *I. africana* to *Aristaea*, *I. chinensis* to *Belamcanda*. On the type basis one of these species, probably the first, should be accepted as the type, and the nomenclature of the other groups adjusted accordingly.

Minuartia contains 3 species, all of which are currently referred to *Alsine*.² The nomenclature of this group has been considered by Sprague and others. The three species, all from Spain, appear to be equally eligible for the type, and the first, *M. dichotoma*, may be selected.

Aira contains 14 species of which four were included in the first use of the name in the Flora Lapponica. The type would ordinarily be chosen

² In the original issue of the Species Plantarum, *Minuartia* appears with a single species, *M. hispanica*. This leaf (pages 89 and 90) was reprinted and inserted in place of the original. A very few copies escaped the correction. An account of the insertion of the corrections is given in Bot. Centralbl. 66: 216. 1896, 67: 5. 1896, and Jour. Bot. 34: 359. 1896. The photographic reprint of the work was made from the original issue.

from these four as they represent Linnaeus' original concept of the genus and there is nothing to show that the concept was altered in the *Species Plantarum*, except by enlargement. Of these four, one, *A. spicata*, is now referred to *Trisetum*. In my account of the Genera of Grasses I selected *A. caespitosa* as the type. The historic development was different. The last-mentioned species was taken out as the type of *Deschampsia* and the other species were referred to other genera, leaving in *Aira*, as commonly accepted, only *A. praecox* and *A. caryophyllea*, species not found in the *Flora Lapponica*. In this case my application of the type method gives a result contrary to current usage.

Leucadendron contains 13 original species, and *Protea* contains two. In the *Index Kewensis* all the original species of *Leucadendron* are referred to *Protea*, and the two species of *Protea* are referred to *Leucadendron*. Both genera are accepted as valid, but neither, as accepted, contains any of its original species. An application of the type method will seriously disturb two large genera. *Leucadendron* and *Protea* are included in the list of conserved names of the International Rules.

The purpose has been to show that the rules as given in the Type-basis Code for the typification of genera when concretely applied do not result in any startling upheaval of nomenclature or radical changes in the application of generic names. The few cases mentioned at the end, only six percent of the list, would require special attention under any set of rules.

The 72 genera in which there are more than one original species are grouped below, each with its type species as selected according to the method outlined. The first four groups are coördinate and the sequence has no significance.

Group 1. Specific name *officinalis*, *vulgaris*, *communis*, or *sativus*.

<i>Jasminum officinale</i>	<i>Verbena officinalis</i>
<i>Syringa vulgaris</i>	<i>Salvia officinalis</i>
<i>Veronica officinalis</i>	<i>Valeriana officinalis</i>
<i>Gratiola officinalis</i>	<i>Crocus sativus</i>
<i>Pinguicula vulgaris</i>	<i>Gladiolus communis</i>
<i>Utricularia vulgaris</i>	<i>Commelina communis</i>

Group 2. The type an economic species.

<i>Piper nigrum</i>	<i>Dactylis glomerata</i>
<i>Saccharum officinarum</i>	<i>Avena sativa</i>
<i>Panicum miliaceum</i>	<i>Lolium perenne</i>
<i>Phleum pratense</i>	<i>Secale cereale</i>
<i>Alopecurus pratensis</i>	<i>Hordeum vulgare</i>
<i>Agrostis stolonifera</i>	<i>Triticum aestivum</i> ³
<i>Poa pratensis</i>	

³ *Triticum aestivum* and *T. hybernum* are equally eligible.

Group 3. Type the commonest or best-known species.

<i>Kaempferia galanga</i>	<i>Cynosurus cristatus</i>
<i>Boerhavia diffusa</i>	<i>Festuca ovina</i>
<i>Salicornia europaea</i>	<i>Elymus sibiricus</i>
<i>Olea europaea</i>	<i>Halostemum umbellatum</i>
<i>Lycopus europaeus</i>	<i>Mollugo verticillata</i>
<i>Milium effusum</i>	<i>Quercus hispanica</i>
<i>Melica nutans</i>	<i>Blitum capitatum</i>
<i>Briza media</i>	

Group 4. Type based on the citation in the Genera Plantarum.

<i>Canna indica</i>	<i>Scirpus lacustris</i>
<i>Phyllirea latifolia</i>	<i>Bromus secalinus</i>
<i>Iris germanica</i>	<i>Eriocaulon decangulare</i>
<i>Cyperus rotundus</i>	

Group 5. One of the residual species.

<i>Amomum cardamon</i>	<i>Schoenus nigricans</i>
<i>Curcuma longa</i>	<i>Eriophorum vaginatum</i>
<i>Corispermum hyssopifolium</i>	<i>Nardus stricta</i>
<i>Nyctanthes arbor-tristis</i>	<i>Phalaris canariensis</i>
<i>Chionanthus virginicus</i>	<i>Uniola paniculata</i>
<i>Circaea lutetiana</i>	<i>Lechea minor</i>
<i>Zizophora capitata</i>	<i>Cephalanthus occidentalis</i>
<i>Monarda fistulosa</i>	<i>Stipa pennata</i>
<i>Anthoxanthum odoratum</i>	<i>Arundo donax</i>
<i>Antholyza cunonia</i>	

SUMMARY

Genera with a single original species.....	28
Genera with more than one original species.....	72
Group 1. Type based on specific name.....	12
Group 2. Type an economic species.....	13
Group 3. Type a well-known species.....	15
Group 4. Type based on citation in Genera Plantarum.....	7
Group 5. Type a residual species.....	19
Special cases.....	6
Total.....	100

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