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Proposal on Article 3: Remove "Form-Genus" Too!

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Reviewed work(s):

Source: *Taxon*, Vol. 28, No. 5/6 (Nov., 1979), pp. 595-598

Published by: [International Association for Plant Taxonomy \(IAPT\)](#)

Stable URL: <http://www.jstor.org/stable/1219813>

Accessed: 15/08/2012 02:24

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<p><b>PROPOSALS TO REVISE ICBN</b></p>
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**PROPOSAL ON ARTICLE 3: REMOVE “FORM-GENUS” TOO!**

The history of paleobotanical nomenclatural provisions within the *International Code of Botanical Nomenclature* is already long and rather complicated. However, it is clear that there have been just two *main* points of view competing for acceptance. One of these sees the application of names to fossil plant parts as so different from giving names to extant plants that many special provisions are required for fossils. Many paleobotanists in this “camp” have held that the special provisions should be very explicit, and should aim toward a comprehensive set of directions for naming fossils, recognizing the additional geochronological dimension for fossils, and the fragmentary and dispersed nature of the fossil record itself. At times this view has prevailed, and we have had a separate appendix to the Code, for fossil plants, as recently as 1959. The paleobotanical appendix was eliminated in 1959, but there is now a move to re-establish it “in spades.” Ultimately, the “true believers” in such an approach would likely favor a separate code for fossil plants. An opposing view is that the application of formal, basically binomial nomenclature to fossil plants is merely a convention, to provide a means of referring to entities encountered. From this point of view, the type-method and the various rules of priority, synonymy, homonymy, and so forth, can be applied just as conveniently to fossils as to any other specimens of plants. While persons who favor this approach do not preclude in any way the use of *informal* nomenclatural “systems” of say, letters and numbers, for various (usually biostratigraphic) purposes, they see no reason for introducing such complicated taxonomic matters into formal nomenclatural practice.

The second author of this proposal and the late James M. Schopf found several decades ago that they were in substantial agreement in favoring the second point of view. They were largely responsible for the elimination of the special paleobotanical appendix from the ICBN at the Montreal Congress in 1959. Until the 1975 Leningrad Congress, however, Schopf favored the retention in the Code of the special concept of “organ-” and “form-genera” for fossils. At Leningrad, in response to a number of competing proposals regarding this subject, Schopf finally agreed with the authors of this proposal that the concept of “organ-genus” was really a taxonomic matter and hard to explain, let alone defend. After considerable debate, in which Dr. Schopf played “devil’s advocate” in making a strong case for retention of the “organ-genus” concept, the Committee brought a report to the floor of the Nomenclatural Section proposing elimination of “organ-genus” from the Code and retaining only “form-genus.” This was adopted by the section and by the Congress. The second author of the present proposal, then and now Secretary of the Committee for Fossil Plants of IAPT, did not realize, however, that the concept of “form-genus” (“not referable to a family”) itself was so tied in with that of “organ-genus” (“referable to a family”) that its retention in the Code leaves the sticky business of family-referability still with us. We now believe that the only way out of this is to move toward completion of the agenda begun with abolition of the paleobotanical appendix in 1959 by also removing “form-genus” from the Code.

At Leningrad the following wording was adopted for part of Article 3 (formerly Note 1, Art. 3):

“Note 1. Since the names of species, and consequently of many higher taxa, of fossil plants are based on fragmentary specimens, and since the connections between these specimens can only rarely be proved, form-genera are distinguished as taxa within which species may be recognized and given names according to this Code. A form-genus may be unassignable to a family, but may be referable to a taxon of higher rank (see Art. 59).

Examples: *Lepidodendron* . . . *Dadoxylon* . . . (same list as in present Code, but deletes all references to form and organ genera)”.

For reasons not fully understood by us, the Editorial Committee for the new Code somewhat changed the wording for Art. 3, as adopted in Leningrad, to retain the family-referability requirement:

“3.1. The principal ranks of taxa in ascending sequence are: species (*species*), genus (*genus*) . . . Thus, except for some fossil plants (see 3.2), each species belongs (is to be assigned) to a genus, each genus to a family, etc.

3.2 Because of the fragmentary nature of the specimens on which the species of some fossil plants are based, the genera to which they are assigned are not assignable to a family, although they may be referable to a taxon of higher rank. Such genera are known as form-genera (*forma-genera*). (see Art. 59.5)

Examples (fossil plants): (Not form-genera) *Lepidocarpon* . . . ; (Form-genera) *Dadoxylon* . . . .”

We thought that by the Committee’s action at Leningrad we had reduced “form-genus” to something like “fossil genus”, making it clear that it *might* be referable to a family but often couldn’t be. What happened was that the Committee’s intended “may be assignable to a family” was changed completely to “are not assignable to a family”. It was apparent that the Editorial Committee went further in revising the exact wording adopted than they should have. However, that is water over the dam, and, further, we now recognize that the matter is so controversial that paleobotanists should have adequate opportunity to air their opinions on it.

This unexpected problem was discussed by correspondence and telephone by the present authors and the late J. M. Schopf, who chaired the meeting in Leningrad and was a member of the Editorial Committee of the Code. In a letter of 17 August, 1978, to Meyen he wrote that he was still attached to the understanding of the “organ-genus” vs. “form-genus” concepts expressed by him in 1969 (Tschudy & Scott) and adopted in the Montreal-Seattle Codes (including the “family criterion”). By telephone, during the summer of 1978, Schopf told Traverse that he admitted that the “organ-” vs. “form-genus” differentiation was a taxonomic matter and didn’t belong in the Code. However, he said that he couldn’t imagine “form-genus” left *in* without a definition that includes the family-referability criterion. Therefore, he and other members of the Editorial Committee had *re-inserted* this provision, believing they were “correcting an error” of the Committee for Fossil Plants at Leningrad. As Secretary of the latter Committee, Traverse was invited to take part in the deliberation of the Editorial Committee in putting together the Leningrad Code, but was unfortunately unable to attend.

We believe that the Sydney Code need *neither* restore the wording actually adopted in Leningrad, *nor* adopt yet another definition of “form-genus”, *let alone* restore the “organ-genus”! We propose instead that “form-genus” should follow “organ-genus” into limbo, because they both inevitably involve matters that are purely taxonomic, which should therefore not be dealt with in the Code.

Let us turn to the sources of the whole problem. These are peculiarities of fossil material (see Meyen, in press):

1. In living plants (Fungi Imperfecti are an exception) each individual, including all parts when found detached, are assignable to a single taxon of any rank and have only a single generic-specific name.

In fossil plants, dispersed parts, even those originally belonging to one individual, when the original connections are not observable, may be referred to several taxa of the same rank and have different generic and/or specific names.

Example: *Stigmaria* Brongniart, *Lepidodendron* Sternberg, *Lepidostrobus* Brongniart.

2. In living plants, all the individuals of a species belong to the same genus, and all the species of a genus belong to the same family.

In fossil plants, various specimens of a species may or may not belong to the same genus, if the latter would be established on whole plants. Various species of a genus may be treated as belonging to different families. Examples: *Pecopteris arborescens* (Schlotheim) Brongniart belongs to Marattiaceae, *P. feminaeformis* Schlotheim to Coenopteridales, and the affinity with higher categories of *P. tajmyrensis* Schvedov is unknown. Specimens of *Stigmaria ficoides* (Sternberg) Brongniart belong to whole plant genera assigned to Lepidodendraceae. Sigil-

lariaceae, Lepidocarpaceae, and perhaps other families.

3. Each living plant is ascribable to the whole sequence of taxa mentioned in Art. 3 (species, genus, family, order, class, division, kingdom).

Fossil plants, if named, should be ascribed to species and genera; higher taxa may be omitted. Example: the affinity of *Rhipidopsis ginkgoides* Schmalhausen is altogether unknown, excepting its attribution to higher plants; it is often mentioned as a problematical ginkgophyte, though it could equally well be a fern.

4. In living plants, different degrees of preservation cannot serve as the only base for establishing separate taxa.

In fossil plants, species and genera may be established for different degrees of preservation. Examples: *Lepidodendron* Sternberg vs. *Aspidiaria* Presl, *Bergeria* Presl, *Knorria* Sternberg; *Taeniopteris* Brongniart vs. *Doratomyllum* Harris (or *Nilssoniopteris* Nathorst).

5. In living plants, different ontogenetic phases of the same life cycle cannot normally serve as the basis for several independent taxa.

In fossil plants, this is quite possible. Examples: the genus *Eddya* Beck may be a seedling of plants, the adult shoots of which belong to *Archaeopteris* Dawson. Independent nomenclature for seeds, microspores and megaspores, and associated shoots also exemplifies this point.

Every fossil genus, even the most thoroughly studied, fits, actually or potentially, at least one of the enumerated points, because in no case does the fossil material yield all the parts of the plant body, and some parts may be unwittingly referred to a separate taxon and hence obtain independent nomenclatural status. This is particularly so with reference to independent palynological nomenclature, even when the affinities of the microspores are known. We do not call a cavate spore *Pleuromeia* Corda even when it is found together with typical *Pleuromeia* and shows the same characters as the spores *in situ*. In many cases we ascribe a genus to a family or order with confidence, but further investigation may reveal other species which fit the diagnosis of the genus, but which belong to another family or order. It is possible, for example, that the oldest known ovules, referred to *Archaeosperma* Pettitt and Beck, may prove to belong to plants with *Archaeopteris* fronds, though *Archaeopteris* is usually thought of as progymnospermous. Incidentally, the ovules are associated with *A. hibernica* (Forbes) Dawson, the type species of *Archaeopteris* Dawson.

Lines of demarcation between "organ-" and "form-genera" or between fossil and living plants, as discussed in the literature and reflected in various previous editions of the Code, correspond to one or more of the five points enumerated above. To reflect all these differences with separate nomenclatural provisions is impossible, because every genus actually or potentially may fulfill all the points or any combination of them. The degree of the approximation of fossil plant taxonomy to that of extant plants is a matter of subjective taxonomic estimation, and hence should *not* be incorporated in the Code.

Fossil plant nomenclature (not taxonomy!) requires that only two special circumstances be reflected in the Code: 1) making it possible to keep genera of fossil plants outside the hierarchy of formally named higher taxa, and 2) making it possible to retain names of taxa established for dispersed parts, when original connection between them is possible, highly probable, or in certain cases definitely proven. The first point is already reflected in Art. 3.1, though the wording needs improvement. The exceptions admitted for fossil plants should be clearly referred to suprageneric taxa only. Directions for attribution of specimens to species, and species to genera, should be the same for living and fossil plants. Authors can continue to speak of "organ-genus" and "form-genus" as a taxonomic opinion, but it is not necessary to have separate nomenclatural provisions for them in the Code.

As a consequence of the above, it is here proposed to amend Art. 3 as follows:

Proposal (36) to revise Article 3 to read:

The principal ranks . . . . Thus, each species belongs (is to be assigned) to a genus, each genus to a family, except that for some fossil plants, genera may be unassignable to higher taxa.

Note 1. The names of species, and consequently of many higher taxa, of fossil plants are often based on fragmentary, dispersed specimens. When an organic connection between parts ascribed to different taxa is shown to exist, the names associated with the dispersed parts may still

continue to be used for those parts.

(Delete the rest of Article 3, with instructions to the Editorial committee to seek suitable examples.)

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### **A PROPOSAL TO EMEND ARTICLE 3.2 OF ICBN**

Proposal (37). Delete the words of Article 3.2 and substitute:

Since the names of taxa of fossil plants are usually based on fragmentary specimens, fossil-genera are distinguished as taxa which may be given names according to this Code. If they are not assignable to a family they may be referable to a taxon of higher rank.

For many years palaeobotanists have argued about the rules of nomenclature which govern the status of fossil taxa, particularly about the criteria to be used in defining them and the need for two different taxa for fossil plants: form-genera and organ-genera. At the 1975 International Botanical Congress the Nomenclature Committee for Fossil Plants attempted to resolve the contemporary difficulties by abolishing the organ-genus, but now that their decisions have been published in *Taxon* (Traverse, 1975; Voss, 1976) and have been incorporated into the Leningrad Version of the Code, albeit in a different form (Stafleu et al., 1978) it can be seen that the present Rules and Recommendations for fossil plants do not make the difficulties any easier; rather the situation is even more confused.

By referring only to "some fossil plants" those other fossils which are assignable to a family, and which were earlier regarded as organ-genera, no longer have any clear nomenclatural status within the Code. But the list of examples does include fossils which are assignable to a family, and refers to them as "(not form-genera)." In the absence of organ-genera, which have been abolished in nomenclature (but not in their taxonomic concept) there is no other taxon available than that of the genus. Clearly this presents substantial taxonomic difficulties because it means that fossil plant parts such as *Lepidocarpon*, *Mazocarpon*, and *Siltaria* (at least) have the same nomenclatural status as modern genera such as *Quercus*. In addition to these confusions within the Leningrad Code itself, further uncertainty has been caused by the very different wording of this Article in the Code to that which appears in the reports of the Committee for Fossil Plants (Traverse, 1975; Voss, 1976). The major differences involve:

- 1) the wording of the section which defines the relationship of the form-genus rank to the family rank;
- 2) the inexplicable limitation to "some" fossil plants only, in Stafleu et al. (1978);
- 3) the style of presentation of the list of examples: compare that quoted in the Leningrad Code to: "(Examples to be in a single list with no reference to form- and organ-genera)" (Voss, 1976); and "Examples: *Lepidocarpon* . . . . *Dadoxylon*. . . . (the same list as in present Code, but delete all references to form and organ genera)." (Traverse, 1975).

Those who support the continued use of both organ-genera and form-genera (e.g., Harris, 1960; Schopf, 1963; Jansonius, 1974; Meyen, 1975) acknowledge the wide range of status of fossil plant genera and enjoy the taxonomic flexibility for familial assignment that the distinction allows. Those who are against the Code making provision for the two taxa, and who favour a