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(011) Proposal to amend the Code regarding the selection of illustrations as neotypes

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(010) Proposal to add a new Note and a new Example after Article 9.6

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According to Art. 9.6 of the *Shenzhen Code* (Turland & al. in *Regnum Veg.* 159. 2018), the definition of syntype is as follows (words in bold below are our emphasis):

“9.6. A syntype is **any specimen cited in the protologue** when there is no holotype, or any one of two or more specimens simultaneously **designated in the protologue** as types (see also Art. 40 Note 1). Reference to an entire gathering, or a part thereof, is considered citation of the included specimens.”

This definition says that a syntype must be a specimen either cited or designated in the protologue. Some authors, however, use the term syntype for specimens not cited in the protologue that are original material as defined in Art. 9.4(a):

“(a) those specimens ... that the author associated with the taxon, and that were available to the author prior to, or at the time of, preparation of the description, diagnosis, or illustration with analysis (Art. 38.7 and 38.8) validating the name”.

To avoid misuse of the term syntype for specimens not cited in the protologue, we propose to add the following new Note and Example to the *Code*.

(010) Add a new Note and a new Example after Art. 9.6:

“*Note 4bis*. Specimens not cited in the protologue that are original material according to Art. 9.4(a) are not syntypes.”

“*Ex. n.* Lavalley (in *Darwiniana* 41: 68. 2003) cited “SIN-TIPOS” (syntypes) of the name *Marattia cicutifolia* Kaulf. (*Enum. Filic.*: 32. 1824). However, they cannot be syntypes because they were not cited in the protologue of that name, where Kaulfuss cited only the locality “Habitat in Brasilia”. Instead, they are original material because they satisfy the definition of that term as given in Art. 9.4(a).”

(011) Proposal to amend the *Code* regarding the selection of illustrations as neotypes

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It is widely held that specimens (sensu the *Shenzhen Code* [Turland & al. in *Regnum Veg.* 159. 2018], Art. 8) are much more informative and useful than illustrations for the application of names, because they offer microscopic and three-dimensional morphological information, and also allow for a number of other types of investigations (e.g. morphological and molecular studies), what is especially relevant as new technologies continue to be developed. This topic has recently been cause of much debate in zoology, and very solid justification has been raised supporting the use of specimens as

nomenclatural types (e.g. Krell in *Nature* 539: 168. 2016; Löbl & al. in *Bull. Zool. Nomencl.* 73: 83–86. 2016; Santos & al. in *Syst. Entomol.* 41: 511–515. 2016; see also Cianferoni & Bartolozzi in *Zootaxa* 4139: 128–130. 2016). It is our opinion that most of these arguments also apply for botany. It is acknowledged that for microorganisms (i.e. microscopic algae and fungi), illustrations can sometimes be more useful for the interpretation and application of names than specimens (see, e.g., Art. 40.5). For these organisms excepted, since 1 January 2007 names of new species and

infraspecific taxa cannot be validly published with illustrations as types (see Art. 40.4), which we believe was a beneficial change to the *Code*. It should be noted that, according to Art. 6.1 footnote of the *Code*, an illustration “designates work of art or a photograph depicting a feature or features of an organism, e.g. a drawing, a picture of a herbarium specimen, or a scanning electron micrograph”.

A neotype is a “new type”, i.e. an element designated to serve as the type that does not belong to the original material of a name (Art. 9.8). In this sense, neotypifications stand in an analogous situation to that of the indication of types of names of new species and infraspecific taxa (Art. 40.4), in that a completely new element is being selected as a nomenclatural type. Despite this similarity, the current version of the *Code* still allows the selection of a drawing or a photograph as neotype (Art. 9.8). We argue that the *Code* should be amended to allow only specimens to be designated as neotypes, microscopic algae and microfungi excepted (see Art. 40.5). A starting date will permit illustrations previously designated as neotypes to retain their type status. Also, it is important to highlight that illustrations would still be eligible to be designated as epitypes (see Art. 9.9), supporting the application of the type when needed.

Also relevant is the matter of inadvertent neotypifications (see Prado & al. in *Taxon* 64: 651. 2015) based on illustrations caused by misunderstandings regarding the nomenclatural status of photographs of specimens (see Staples & Prado in *Taxon* 67: 833–835. 2018).

According to Art. 9.10 of the *Code*, those incorrect typifications (e.g. Austin in *Ann. Missouri Bot. Gard.* 60: 403. 1973; Ronchi & al. in *Syst. Bot.* 41: 166. 2016) are to be automatically corrected to neotypifications. The approval of the present proposal would preclude future instances of this type of error from being effective typifications.

Based on the above comments we are proposing the following change to the *Code*.

(011) Add the following text to Art. 9.8 (new text in bold):

“9.8. A neotype is a specimen or illustration selected to serve as nomenclatural type if no original material exists, or as long as it is missing (see also Art. 9.16 and 9.19(c)). A neotype designated on or after 1 January 2025 must be a specimen, except for names of non-fossil microscopic algae and non-fossil microfungi, for which the type may be an effectively published illustration if there are technical difficulties of specimen preservation or if it is impossible to preserve a specimen that would show the features attributed to the taxon by the author of the name.”

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(012) Proposal to modify Article 9.12

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Art. 9.4 has been amended in the *Shenzhen Code* (Turland & al. in *Regnum Veg.* 159. 2018) to make it clear that original material includes illustrations published as part of the protologue irrespective of whether or not they may have been used in the preparation of the validating description or diagnosis. In designating a lectotype, Art. 9.12 mentions as original material the illustration(s) cited in the protologue, but does not refer to the illustration(s) published as a part of the protologue. We are therefore proposing the following changes in Art. 9.12.

(012) Modify Art. 9.12 as follows (new text in bold, deleted text in strikethrough):

“9.12. In lectotype designation, an isotype must be chosen if such exists, or otherwise a syntype or isosyntype if such exists. If

no isotype, syntype or isosyntype is extant, the lectotype must be chosen from among the paratypes if such exist. If none of the above specimens exists, the lectotype must be chosen from among the **illustrations and uncited specimens and cited and uncited illustrations** that comprise the remaining original material, if such exist.”

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