TYPIFICATION OF EUPHORBIA MACULATA

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The typification of *Euphorbia maculata* Linnaeus (1753) by the specimen in Linnaeus' Herbarium by Wheeler (1939) has occasioned some discussion both published and unpublished as it changed the sense in which this binomial had been used for perhaps a century. Since it has been two decades since this typification was published, and over a decade since commencement of published discussion, and six years since the publication of the last paper which has come to my attention, a reply to these animadversions can scarcely be considered hasty. Also, having had the opportunity to examine in 1954 the specimens in the Linnaean Herbarium and having discussed the matter with Mr. J. E. Dandy, now Keeper of Botany, British Museum (Natural History), and examined pertinent specimens there too, I have had not only Mr. Dandy's appreciated and helpful counsel but also some firsthand information concerning the taxonomic identities of the specimens involved. In addition, conversations with Wm. T. Stearn in 1954 and more extensively in 1959, combined with Stearn's (1957) invaluable scholarly presentation of Linnaeus' methods and the procedure for choosing the types of his species, have given me some understanding of what is involved. However, I must add that neither of these men is to be blamed for either my conclusions or the means by which they were reached.

It is of fundamental importance in studies involving both biological classification as well as pure nomenclature to be well-acquainted with the organisms involved, otherwise the nomenclature may become confused due to inadequate understanding of biological relationships. It is amazing that authors who have made no detailed study of the species complexes involved in this problem can be so positive concerning the identity of the plant portrayed in a plate which does not show the necessary diagnostic characters. Some of these authors have published very positive opinions concerning the identity of a plant shown in a plate which is so vague that I am uncertain what it represents.

Stripping the problem of all pedantic trappings, there are

the following possibilities for the interpretation of *Euphorbia maculata* L. (The self-evident phrase name and italicized description are omitted both for convenience and because no one known to me has proposed to use them, and disregard the specimens and plate.)

1. The specimen in Linnaeus' herbarium labelled *Euphorbia maculata* by Linnaeus.
2. The plate of Plukenet cited by Linnaeus.
3. The specimen in Linnaeus' herbarium labelled *Euphorbia maculata* by Sir James Edward Smith.

The following table summarizes the views of the various writers on interpretation of *Euphorbia maculata* L.:

Writer	Specimen in hb. L. labelled *maculata* by L.	Plukenet plate	Specimen in hb. L. labelled *maculata* by J. E. S.
Linnaeus 1771	Limits application to this element	Probably intended to exclude	Excludes this concept.
Boissier 1862 pp. 23 & 46	Excludes	Doesn't directly mention	Indicates this is the concept.
Wheeler 1939, 1941, 1960	Takes as type	Uncertain as to identity	Excludes as anachronistic
Svenson 1945	Ignores	Takes as type (in sense of *E. supina* Raf.)	Ignores
Fosberg. 1946, 1947, 1953	Takes as type in 1946 & 1947; excludes in 1953	Identifies 1953 as same as L.'s specimen in left column	Excludes as anachronistic
Croizat 1947 & 1948	Dismisses as excluded by Boissier	Ignores	Takes as type

These items will be discussed *ad seriatim:*

1. The specimen labelled 17 *Euphorbia maculata* by Linnaeus, and still in his herbarium, is believed to have been there in 1753. This belief has, so far as I know, not been questioned. Therefore assuming this to be an accepted valid fact, let us proceed to consider the four objections which have been raised against taking the specimen labelled by Linnaeus as the basis for interpreting the species: (1) it bears the number 17 (that of *E. hypericifolia* in Sp. Pl.); (2) it does not bear number 21 (that of *E. maculata* in Sp. Pl.); (3) it disagrees with the specimen in Linnaeus' herbarium labelled 21 *E. maculata* by Sir James Edward Smith; and (4) it differs from customary usage based on Smith's interpretations.

It is obvious that an error was made by Linnaeus in either the number or the name on the sheet labelled by him (according to Savage 1945, p. 85). In this case Linnaeus subsequently (1771, p. 392) emphasized that *E. maculata* was like *E. hypericifolia,* and this is subsequent confirmation that the name *was as intended.* However, the association of 17 with *maculata* may have been more than a coincidence. It appears that *E. maculata* was extracted, perhaps late in the preparation of the treatment of *Euphorbia,* from the hodge-podge called 17. *E. hypericifolia.*

Euphorbia hypericifolia has been variously interpreted, but its various applications agree in that they are erect, relatively large (at least long) leaved plants. For a time the name was applied to the North American plant, probably on the basis of the change of name made by Sir James Edward Smith: He relabelled the specimen labelled *maculata* by Linnaeus in Linnaeus' herbarium *hypericifolia* (Savage 1945 p. 85.). Putting together the information as to who labelled what specimens with what names (Savage 1945, p. 85) with the account of Sir James Edward Smith's actions given by John Torrey (recounted below) plus my notes taken during my examination of Linnaeus' herbarium in 1954 in the light of the critical comments of Mr. Dandy (in conversation), I now understand not only what I understood in 1939, the explanation of the application of *E. macu-*

lata to the small-leaved prostrate plant called *E. supina* by Rafinesque, but now, in addition, the reason for the name *E. hypericifolia* having been applied for a time to the erect large-leaved plant of eastern North America later known as *E. nutans* Lag. or *E. preslii* Guss., and to which I have returned *E. maculata* L. in its original sense in 1939. First will be quoted the report of Torrey (1843, p. 176.):

"Many years ago, I sent specimens of this and the preceding species to Sir J. E. Smith, who assured me that the former agrees precisely with the original *E. hypericifolia* of *Herb. Linn.*, and that the latter is as certainly *E. maculata*. He also stated, that 'Linnaeus seems to have confounded his original smooth specimens of *E. hypericifolia* (numbered 17 as in *sp. pl. ed.* 1) with *E. maculata:* not that they are at all alike, nor is there any foundation for his remark in the 2nd mantissa, p. 392. The first edition of the *Sp. pl.* is here decisive authority. The original specimen of *E. maculata* is smooth, but there is a downy variety from Jamaica, from Browne's herbarium.'"

The specimen which Smith told Torrey was "original *E. hypericifolia* of *Herb. Linn.*" was the specimen labeled 17 *maculata* by Linnaeus, but relabelled *hypericifolia* by Smith according to the information given by Savage (1945, p. 85). Apparently Smith omitted to mention to Torrey the fact that Smith himself changed the name on the specimen labelled *maculata* by Linnaeus' to *hypericifolia*, nor did Smith tell that the specimen in Linnaeus' herbarium taken by Smith as the authentic specimen of *E. maculata* had been so labelled by Smith, not Linnaeus. Torrey, knowing nothing of Smith's changes, (perhaps occasioned by Linnaeus' specimen bearing the number 17), followed Smith's advice in applying both names. The specimen labelled *maculata* by Smith bore, in Linnaeus' hand, the number 21, the number of *E. maculata* in the Species Plantarum, 1753, but bore no name. Hence Smith supplied the name corresponding to the number.

The problem of typifying *E. hypericifolia* is another Pandora's box to be opened later and elsewhere. However, it is well to take this opportunity to record that my action in 1939 was probably anachronistic, for Savage (1945, p.

vi) shows that Linnaeus' specimen was acquired from Patrick Browne probably in 1758 five years after the Species Plantarum was published. N. E. Brown (1913) chose the same specimen as type!

2. The identity of Plukenet's plate (1691, tab. 65, fig. 8) is uncertain. Mr. Dandy was unable to find in 1954 when I was there at the British Museum (Natural History), any specimen on which the plate might have been based, and the plate itself is so poorly drawn and lacking in diagnostic characters and scale that any identification of it must be speculative. Nevertheless, Svenson (1945) identified it as the small-leaved prostrate plant which Wheeler (1939 & 1941) called *E. supina* Raf. Fosberg (1946) equally confidently concluded that the plate portrays the tall erect large-leaved plant long known as *E. nutans* Lag. or *E. Preslii* Guss. It may be significant that Croizat who has studied *Euphorbia* more than either Svenson or Fosberg, does not, so far as I have seen, attempt to identify the plate of Plukenet. Even though a *specimen* from which Plukenet's plate was drawn were extant, it would not have influenced Linnaeus' concept because Linnaeus, according to Mr. Dandy (in conversation in 1954), did not see Plukenet's *specimens*.

3. Of those known to me to have written on the question, only Boissier and Croizat have taken as type the specimen in Linnaeus' herbarium which was labelled *maculata* by Smith. Croizat (1947, p. 154) stated "This specimen (No. 630.11 in Savage's "Catalogue") is inscribed *21. maculata* in an handwriting which is to all appearances Linnaeus' own." Savage (1945, p. 85) indicated that this specimen was labelled "*maculata*" by Smith. Presumably Boissier, like Croizat, thought Linnaeus had labelled this specimen.

Selection of lectotypes must be on a reasonable basis; the specimen selected must agree with the description. Mere mechanical procedure in which numbers on specimens are used in preference to agreement between the specimen chosen and the description given by its author may lead to grievous error. In this case an error was made by Linnaeus (1753). He had one specimen which he labelled 17 *maculata*, and another which he labelled merely 21, but wrote no name on it. Following the system of numbering used by Linnaeus (described by Stearn 1959 pp. 11 & 12), the specimen

numbered 21 would be the type of *E. maculata* because this is the number of *E. maculata* in the Species Plantarum (Linnaeus, 1753). But in this instance Linnaeus supplied an italicized description which Stern (in conversation, Aug., 1959) assured me means that it was based on a specimen before Linnaeus. This description applies well to the specimen labelled 17 *maculata* by Linnaeus; it fails to apply to either the specimen numbered 21 but left unnamed by Linnaeus, or to the plate of Plukenet cited, as diagnostic characters given could not have been drawn from either of these two: (a) Leaves trinerved — this character is conspicuous in 17, but not evident in 21 and not shown by Plukenet; (b) leaves serrate — the toothing of the leaves is obvious in 17, but in 21 a lens is required to discern the minute serrulations, the leaves of the Plukenet plate are at most minutely and bluntly toothed; (c) cyathia (interpreted as simple flowers by Linnaeus) solitary — this fits 17, but in 21 the cyathia are congested on short branchlets in such a way that they would not have been described by Linnaeus as solitary, though they are so portrayed in the Plukenet plate; (d) "calyx" (involucre) red would characterize 17 but in 21 the cyathia are so small, crowded and obscured by vesture and reduced leaves that the involucre would not give the impression of a red calyx, the Plukenet plate being black and white could not have supplied this character.

Having seen and studied these specimens in the Linnaean Herbarium my conclusions are based on first hand observation, not on photographs or plates. However, for those who might wish to confirm these points without traveling to London, there is available the plate based on a photograph of 17 which Wheeler (1941) and Fosberg (1946) have published. In addition, the entire Linnaean Herbarium is available on microfiche published by the International Documentation Centre, Tunba, Sweden. These photographs, though small, show most of the characters discussed above.

Plukenet's plate is so poorly drawn and lacking in diagnostic characters and scale and indication of habit that it is not susceptible of identification beyond the fact that it portrays an immature plant of *Euphorbia* subgenus *Chamaesyce*, and the interpretation of this plate by some authors as representing a particular species is based on neither the

characters of the Plukenet plate, nor anything in Linnaeus Species Plantarum (1753), nor Linnaeus later elucidation of *Euphorbia maculata* in his Mantissa (1771) as being similar to *E. hypericifolia*, but on association and proximity. (According to Mr. Dandy [conversation, 1954] Linnaeus did not see Plukenet's specimens anyway, so they would not have affected his concept.)

The procedure for selection of types is prescribed in the International Code of Botanical Nomenclature (Lanjouw et al., 1956) Appendix IV. Determination of Types. The selection of lectotypes is outlined under section 4. The selection of the specimen labelled *maculata* by Linnaeus agrees with the prescribed procedure in following subsections as detailed below. (The reader can read for himself in his copy of the Code the provisions of these subsections so they will not be quoted here.) The following statement summarizing the basis for the choice of the specimen of *Euphorbia maculata* in Linnaeus' herbarium labelled *E. maculata* by Linnaeus himself will serve as a basis for judging the validity of this choice:

a. The lectotype was designated, in effect, by the original author, Linnaeus, (1771 p. 392).

b. The lectotype, or perhaps almost holotype, was so far as we have any evidence, in the possession of the original author while he prepared the work in which it was published, and the italicized description fits the specimen.

c. The lectotype designated by the original author is a specimen rather than a pre-Linnaean illustration and description.

d. Since the original author had already, in effect, selected the lectotype, later actions by subsequent authors (Smith and Boissier) are of no validity even though they established usage for a period.

e. Linnaeus, the author of the name, in effect, selected the lectotype first (1771, p. 392). — DEPARTMENT OF BIOLOGY, UNIVERSITY OF SOUTHERN CALIFORNIA, UNIVERSITY PARK, LOS ANGELES 7, CALIFORNIA.

Literature Cited

Boissier, Edmond P. 1862. Euphorbieae in Alphonso de Candolle, Prodromus systematis naturalis regni vegetabilis, 15(2): 3-188. Paris.

Brown, N. E. 1913. Euphorbiacea, in Thiselton-Dyer, W. T. Flora of Tropical Africa. Vol. 6, sect. 1: London.

Croizat, Leon M. C. 1947. Euphorbia maculata L. Bull. Torr. Bot. Club. **74**: 153-155.

———————. 1948. Euphorbia maculata a rejoinder. Op. cit. 75: 188.

Fosberg, Francis Raymond. 1946. Application of the name Euphorbia maculata L. Rhodora **48**: 197-200, fig. 1-4.

———————. 1947. Euphorbia maculata again. Bull. Torr. Bot. Club **74**: 332-333.

———————. 1953. Typification of Euphorbia maculata L. Rhodora **55**: 241-243.

Lanjouw, J. et al. 1956. International code of botanical nomenclature. Regnum Vegetabile vol. 8. Utrecht.

Linnaeus, Carolus. 1753. Species Plantarum. Stockholm.

———————. 1771. Mantissa plantarum altera, Generum editionis VI. & Specierum editionis II. Stockholm.

Plukenet, Leonard. 1691. Phytographia. London.

Savage, Spencer. 1945. A catalogue of the Linnaean Herbarium. London.

Stearn, William Thomas. 1957. An introduction to the Species Plantarum and cognate botanical works of Carl Linnaeus. Chap. X. Sources, format, methods and language. Chap. XII. Typification of Linnaean species. (Prefixed to Ray Society facsimile of Linnaeus, Species plantarum, vol. 1) London.

———————. 1959. The background of Linnaeus's contributions to the nomenclature and methods of systematic biology. Systematic Zoology 8 (1): 4-22.

Svenson, Henry Knute. 1945. On the descriptive method of Linnaeus. Rhodora **47**: 273-302, 363-388.

Torrey, John. 1943. Flora of the State of New York, vol. 2. Albany.

Wheeler, Louis Cutter. 1939. A miscellany of New World Euphorbiaceae. — II. Contr. Gray Herb. n. s., **127**: 48-78. Pl. III & IV.

———————. 1941. Euphorbia subgenus Chamaesyce in Canada and the United States exclusive of southern Florida. Rhodora **43**: 97-154, 168-205, 223-286, Pl. 654-668. (Reprinted as Contrib. Gray Herb. 136.)

Calypso in New Hampshire — Though apparently seldom if ever abundant, *Calypso bulbosa* (L.) Oakes is known from various stations in Canada, central and northern Maine, northern Vermont, northern New York, and westward to the Pacific slope, commonly in calcareous swamps of *Thuja occidentalis* L. A scrutiny of the Oakes Ames Orchid Herbarium and of the Gray Herbarium sheets of this species (in which I have been assisted by Mr. Charles Schweinfurth), as well as of the herbarium of the New England Botanical