



## Typifications of five names in *Agarista* (Ericaceae, Vaccinioideae, Lyonieae)

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### Abstract

Five names are typified here as a first step towards the floristic and taxonomic study of Ericaceae in Rio Grande do Sul state, Brazil, and the taxonomic revision of *Agarista*. We reviewed protologues, type specimens (including digital images), and negative photos at F from lost specimens originally deposited at B. Lectotypes are designated for the names *Andromeda chlorantha*, *A. serrulata*, *A. eucalyptoides*, *A. multiflora*, and *A. nummularia*. These lectotypes are designated from duplicates conserved in the herbaria E, F, HAL, G, GH, L, M, NY, S, and W. Additionally, epitypes are also designated for *Agarista chlorantha* and *Agarista nummularia* at ESA and US, respectively.

**Keywords:** *Andromeda*, Berlin-Dahlem herbarium (B), epitypes, lectotypification, Sellow

### Introduction

*Agarista* Don (1834: 788), Ericaceae, is a super-ovariated genus of 32 species (Judd & Luteyn 2006) circumscribed in two sections (Judd 1984). *Agarista* sect. *Agauria* (Candolle 1839: 602) Judd (1984: 339) consists of a single species, *A. salicifolia* (Lamarck 1783: 159) Don (1834: 837), widely distributed in the African continent, Reunion and Mauritius islands and reaching its greatest morphological diversity in Madagascar (Judd 1984, Judd 1995). *Agarista* sect. *Agarista* encompasses 31 species distributed along the Americas in five major biogeographic areas named by Judd (1984): Coastal plains of the southeast United States, Mexican region, Guayana Highlands, the Andean region, and the most diverse Brazilian region, mainly the high elevation areas of Eastern Brazil.

The first two known species of *Agarista*, the North American *Agarista populifolia* (Lamarck 1783:159) Judd (1979: 495) and the African *Agarista salicifolia*, were described by Lamarck (1783) originally in *Andromeda*. South American species of *Agarista* started being described in the beginning of the 19<sup>th</sup> Century also in *Andromeda* (Judd 1834, Judd 1995). Don (1834) described the genus *Agarista* and included many South American and African taxa. Candolle (1839) segregated the American and African species, placing most of the American species in *Leucothoe* sect. *Agastia* Candolle (1839) and the African taxa in *Leucothoe* sect. *Agauria* Candolle (1839). Hooker (1876) proposed *Leucothoe* sect. *Agauria* as the genus *Agauria* J.D.Hooker (1876: 586) and restricted the American species into *Leucothoe* sect. *Agastia*. Gray (1878) maintained the genus *Agauria* and included the American species of *Agarista* in *Leucothoe* Don (Judd 1834, Judd 1995).

Sleumer (1959) accepted the genus *Agauria* and placed the American species in *Leucothoe* sect. *Agastia*. Stevens (1971) indicated that *Agauria* and *Agarista* should be maintained at generic level and commented that these groups are closely related (Luteyn *et al.* 1995). Then, Judd (1979, 1984) recognized both groups in a single genus *Agarista* and, regarding the treatment of George Don (1834), placed the American species in *Agarista* sect. *Agarista* and the African species in *Agarista* sect. *Agauria*, indicating as the type species of the genus *Agarista nummularia* (Chamisso & Schlechtendal 1826: 520) Don (1834: 837) from Eastern Brazil.

Some type specimens of the genus were deposited in the Botanical Museum Berlin-Dahlem (B) (herbarium acronym according to Thiers 2020, continuously updated), which in time “housed the world’s largest collection of

Neotropical types” (Grimé & Plowman 1986). The herbarium was partially destroyed by a fire in March 1943 and many type-specimens were burnt out, including some of *Agarista*. Fortunately, most of these specimens were documented in 1929 by J. Francis Macbride when he travelled to Europe to photograph nomenclatural type specimens (Grimé & Plowman 1986). Nowadays this material constitutes the collection of Berlin Negatives of The Field Museum of Natural History (The Field Museum 2020).

The holotypes of some names that were considered as synonyms of *Agarista* species were not found during the taxonomic treatment of Ericaceae for the flora of the Rio Grande do Sul state, southern Brazil. Sleumer (1959) did no lectotypifications on these names. Judd (1984) made some typifications as part of his revision of the genus, and in some cases he cited the destroyed B type and the fragments from the type (besides the Berlin’s negatives and duplicates) as types, but no lectotype was designated, implying that the fragments of the type specimen in those studies were treated as holotypes. On the other hand, according to Art. 8.3, ex. 9., of the International Code of Nomenclature for algae, fungi, and plants (ICN) (Turland *et al.* 2018) “The fragment is no longer part of the holotype specimen, because it is not permanently conserved in the same herbarium as the holotype. Such fragments have the same status as a duplicate, i.e., an isotype”. Thus, there is no holotype to link to the referred names (Art. 9.1). Since the holotype was destroyed, and according to the ICN a lectotype designation is needed (Art. 9.3 and 9.11).

## Material and methods

The protologues of the species of *Agarista* occurring at Rio Grande do Sul were consulted to revise original type specimen data. Subsequently, the same was carried out for all the names included in synonymy. Taxonomic studies on the genus were then consulted to check if any subsequent typification was performed, resulting in a list of names in need of attention. When herbarium information was unavailable in the protologue, we consulted Taxonomic Literature II (2020) to identify the main herbaria where the collector deposited collections. Therefore, the herbaria BR, E, F, HAL, G, G-DC, GH, K, L, M, MO, NY, P, S, US, and W were surveyed online either through JSTOR Plant Science (2020) or their own herbarium online databases (BGBM 2020, F 2020, MNHNP 2020, NYBG 2020, S 2020, Virtual Herbaria JAQC 2020) to search for all the original material available. When necessary, we contacted the curator to double check for any missing specimens or to confirm data. The material found was carefully revised to confirm whether it agreed with protologue details, check authenticity of label information by examining collector calligraphy, and other annotations and to gather any other label or specimen data that could aid information based oriented decisions. For the material from B, we looked for the photographs of the types in the collection of images Berlin Negatives of The Field Museum of Natural History. Lectotypes and epitypes were chosen following the rules and recommendations of the International Code of Nomenclature for algae, fungi and plants - ICN (Turland *et al.* 2018).

We followed Art. 9.11 of the ICN (Turland *et al.* 2018) to designate the lectotypes. They were elected among the isotypes available following Art. 9.12. In some cases, the best specimen available for lectotypification was not enough to fully recognize the name linked to it. Then, we also indicated an epitype according to Art. 9.9.

## Typifications and notes

*Agarista chlorantha* (Chamisso 1833: 508) Don (1834: 838)

≡ *Andromeda chlorantha* Chamisso (1833: 508)

≡ *Leucothoe chlorantha* (Chamisso) Candolle (1839: 604)

Type:—BRAZIL. *s.l.*, *F. Sellow s.n.* (lectotype, designated here F [V0055220F] [fragment], digital image!; isolectotypes L [L0006619][fragment], digital image!; NY [NY8199][fragment], digital image!; NY [NY8200][fragment], digital image!).

Epitype (designated here):—BRAZIL. Paraná, Quatro Barras, 19.X.1989, *G.G. Hatschbach & O.S. Ribas 53537* (ESA083266).

= *Agarista serrulata* (Chamisso 1833: 506) Don (1834: 838)

≡ *Andromeda serrulata* Chamisso (1833: 506)

≡ *Leucothoe serrulata* (Chamisso) Candolle (1839: 604)

Type:—BRAZIL. (São Paulo [Meisner in Martius, 1863]), *F. Sellow s.n.* (lectotype, designated here E [E00326877], digital image!; isolectotypes K [K000494447], digital image!; F [V0055227F][fragment], digital image!; G [G00419054], digital image!; K [K000494448] digital image!; L [L0006618][fragment], digital image!; NY [NY8207][fragment], digital image!).

Note:—The type of *Andromeda chlorantha* is the gathering *F. Sellow s.n.* originally deposited in the Berlin-Dahlem herbarium (B) and later destroyed by the fire in 1943. The remaining material consists of four sheets with few fragments from original material (F V0055220F, L0006619, NY8199, NY8200) and photos of the Berlin specimen (F and GH). No lectotypification of this name was proposed afterwards. Sleumer annotated some labels of these sheets (dated 1958) and cited them in “Studien über die Gattung *Leucothoe* D. Don” (1959) as “fragment of holotype”. In a similar way, Judd (1984) mentions this material as “frag. of holotype” but, as Sleumer (1959), he interpreted these fragments as holotypes because they were considered part of the holotype. We designated the specimen V0055227F as lectotype, which was indicated by Judd in a label (1982) as the *Andromeda chlorantha* holotype because in fact it is a fragment from the holotype deposited in another collection. This specimen comprises only fragments of leaves and immature fruits, as well as the remaining isotypes, any of them do not comprise enough material to fully represent the concept of the name *Agarista chlorantha*. To complement the specimens lack of information and structures, we are also designating the gathering *Hatschbach, G. & Ribas, O.S. 53537* [ESA083266] as an epitype, since it comprises a fertile branch in accordance with the protologue and is available digitally in *speciesLink* (CRIA, 2020).

The gathering *F. Sellow s.n.* for *Andromeda serrulata* was also deposited in the Berlin-Dahlem herbarium (B) and destroyed by the fire in 1943. The remaining material consists of seven specimens deposited in the herbaria collections E, F, G, K, L and NY. Three of them are fragments (F V0055227F, L000618, NY8207) not enough informative. Among the remaining material (E00326877, G4087, K000494447, K000494448) we elected the specimen E00326877 as the lectotype. Judd in 1982 had already considered this material as an *Andromeda serrulata* isotype and this specimen was chosen because it is better preserved and comprises a complete material with fertile structures. Additionally, this sheet agrees with the protologue and best represents the destroyed material from B (see F photo).

*Agarista eucalyptoides* (Chamisso & Schlechtendal 1826: 518) Don (1834: 837)

≡ *Andromeda eucalyptoides* Chamisso & Schlechtendal. (1826: 518)

≡ *Leucothoe eucalyptoides* (Chamisso & Schlechtendal) Candolle (1839: 605)

≡ *Leucothoe multiflora* var. *eucalyptoides* (Chamisso & Schlechtendal) Meisner in Martius (1863: 155)

Type:—BRAZIL. (Brasilia Meridionalis) Rio Grande do Sul, *F. Sellow s.n.* (lectotype, designated here G [G00323842], digital image!; isolectotypes HAL [HAL0098501], digital image!; HAL [HAL0098591], digital image!; HAL [HAL0107382], digital image!; W [W-Rchb.1889-0082851], digital image!).

= *Agarista multiflora* (Pohl 1828 or 1829: 33) Don (1834: 837)

≡ *Andromeda multiflora* Pohl (1828 or 1829: 33)

≡ *Leucothoe multiflora* (Pohl) Candolle (1839: 605)

≡ *Leucothoe multiflora* var. *pohlii* Meisn. in Martius (1863: 155), *nom. superfl.*

Type:—BRAZIL. Minas Gerais: Rancho Novo, Serra da Mantiqueira, Sep.-Oct. 1819, *J.B.E. Pohl s.n.* (lectotype, designated here W [W0059390], digital image!; isolectotypes W [W0059389], digital image!; W [W0059391], digital image!; W [W19590028023], digital image!; M [M0173318], digital image!; BR [BR000000699639], digital image!)

Note:—The type collection *F. Sellow s.n.* of *Andromeda eucalyptoides* was supposedly deposited in the Berlin-Dahlem herbarium (B) and destroyed by the fire of 1943. However, this material is one of the few that does not have a negative from J. Francis Macbride photos. Chamisso & Schlechtendal (1826) cited the material “Brasiliae meridionalis provincia Rio Grande do Sul legit Sellow” as original material for the name *Andromeda eucalyptoides*. Don (1834) also assumed the same, indicating the specimen as “Native of Brazil, at Rio Grande do Sul”. De Candolle (1839) indicates the type as “in Brasiliae merid. Prov. Rio-Grande do Sul legit Sellow”, indicating the specimen in B. Meisner (1863) does not cite any information about the location or whereabouts of the original material. Sleumer (1959), in the taxonomic revision of *Leucothoe*, indicated as type the specimen NY8202 which is a mixed sheet mounted with assembled fragments of two different collection numbers *Sellow “1137 & 1695”* without an original label with only typewritten data, and duplicates of these numbers cited as “isotypes” deposited at BR, G, K, and NY. Judd (1984) agrees with the protologue assuming “*Sellow s.n.*” as the type specimen, citing isotypes at BR, E, G, K, and NY. We found thirteen specimens deposited in the herbaria BR, E, G, HAL, K, L, and NY or cited in previous works as “typus”, “isotype” and “fragments from holotype” with divergent sheet label information (Sleumer 1959, Judd 1984). The specimen G (G00323842) cited by Candolle (1839) comprises vegetative and flowering structures and is the only one that completely matches collection data in the label as “*Andromeda eucalyptoides*” “Sellow” “Brasiliae Meridionalis” “Schlechtendal 1826”. Therefore, we designate the specimen G00323842 as the lectotype for *Andromeda eucalyptoides*.

From the remaining 12 sheets cited as types by previous authors, we only consider as isolectotypes HAL0098591, HAL0107382, and W-Rchb.1889-0082851, because they are the only Sellow collections comprising fertile and sterile branches and label data with collection locality as “*Brasiliae Meridionalis*” with original Sellow calligraphy. The information in the other nine sheets cited by previous authors (Sleumer 1959, Judd 1984, Judd 1995) are not in accordance with original protologue data. The specimens E0032689, G00342169, HAL00984440, and K000494454 are sterile material and contradict protologue, which is based on flowering branches. Material from NY cannot be considered an isotype as cited by Sleumer (1959) and Judd (1984) because the labels of NY8201 and NY8202 have collector numbers (Sellow 1040 and Sellow 1935 & 1958, respectively) in disagreement with the protologue. Additionally, NY8201 has no fertile structures and NY8202 consists of mixed fragments missing an original label. Sleumer (1958, in the specimen label) indicated BR00000699573 as an “isotypus”, but the locality data in the specimen disagrees with the protologue, and BR00000699609 was collected in Montevideo, Uruguay.

Pohl was the naturalist in charge for the Brazilian Imperial Royal Herbarium at Vienna. In the protologue of *Andromeda multiflora* Pohl (1828 or 1829) the type specimen is referred as deposited at W. The collection site is indicated as “Habitat in montosis, inter frutices; ad Rancho Novo in Serra da Mantiqueira Capitaniae Minas Gerais. Legi mense Septembri et Octobri 1819”. Don (1934) cited this information as “in the province of Minas Geraes, in Serra da Mantiquiera”, De Candolle (1939) as “in Brasiliae prov. Minarum generalium in montanis ad Serra Mantiquiera” and Meisner (1863) does not cite information about the location or where the original material was from, referring only to the previous publications of the name (Pohl 1828 or 1829, Don 1934, De Candolle 1939).

Sleumer wrote in a label dating 1958 that M0173318 is an isotype and that the holotype of *Andromeda multiflora* was not preserved at W. Later, Sleumer (1959) stated in the revision of *Leucothoe* that the type is “apparently no longer available”. Judd (1984) in the review of American *Agarista* cited the W holotype as originally housed at W, but guessed it was destroyed (“holotype, W [destroyed?]”). We found six sheets at W, which are part of the original material studied by Pohl (1828 or 1829) to describe *Andromeda multiflora* and labelled as Pohl s.n.. According to information provided by W curator Dr. Christian Bräuchler (pers. comm.) there is no clear annotation distinguishing a type from any other original material cited by Pohl (1828 or 1829) in W. The specimens W0050389 and W0059390 have Pohl original labels, while W0059391 has no label, but the same annotation (*H. Bras.*) in the right upper corner, appearing to belong to the same set. The specimen W19590028023 comprises a specimen with original label from M and another slip by Sleumer referring it as an “isotype”. The specimen BR000006996390 seems to be also a donation from W, with the note “Comunic. Herb. Caesar. Vindobon. 1839” written in label. Thus, considering the information as the annotations on the specimens and label notes indicated above is possible to confirm that those material are duplicates which belong to a single collection. The type specimen referred as deposited at W was not found. Herewith, the type of *A. multiflora* might be lost or destroyed, as assumed by previous works (Luteyn 1959, Judd 1984). Following Art. 9.3, Art. 9.12 and Art. 9.13 from ICN (Turlando *et al.* 2018) we are designating here the specimen from W [W0059389] as lectotype. The specimen W0059389 is well preserved and has an original label in the sheet with the complete type location indicated.

*Agarista nummularia* (Chamisso & Schlechtendal 1826: 520) Don (1834: 837)

≡ *Andromeda nummularia* Chamisso & Schlechtendal 1826: 520

≡ *Leucothoe nummularia* (Chamisso & Schlechtendal 1826: 520) Candolle (1839: 603)

Type:—BRAZIL. Rio Grande do Sul, (Porto Alegre [Meisn. in Martius 1863]), *F. Sellow 1229* (lectotype, designated here G [G00323837], digital image!; isolectotypes F [V0055221F][fragment], digital image!], HAL [HAL0098441], digital image!, L [L0006635][fragment], digital image!; W [W-Rchb.1889-0082852], digital image!).

Epitype (designated here):—BRAZIL. Rio Grande do Sul, Sapucaia pr. São Leopoldo, *B. Rambo 48695* (US [US02973537-01], digital image!).

Note:—The gathering *F. Sellow 1229* of *Andromeda nummularia* is a similar case of *Agarista chlorantha*, also destroyed by the fire at B in March 1943. The remaining material comprises five specimens deposited in the herbaria F, G-DC, HAL, L, and W. Two of them are fragments (L0006635 and V0055221F) and the remaining (G00323837, HAL0098441, W-Rchb. 1889-0082852) are sterile specimens. We are designating here the specimen G00323837 as a lectotype, because it is in agreement with the protologue and consists of a well-preserved vegetative branch in accordance with the type. However, this specimen is not enough to fully illustrate the concept of the name *Agarista nummularia* because no fertile structures are available. Therefore, we choose the gathering *B. Rambo 48695* [US02973537] as an epitype because it is a fertile specimen from the same region as the type, and is available digitally in *speciesLink* (CRIA, 2020) with an isoeptype digital image also available at the Smithsonian Institution online database (NMNH, 2020).

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