Typification of three species of *Nitella* (*Characeae, Charophyceae*)

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A recent re-examination of the original material of *Nitella axillaris* A.Braun (Abdelahad & al., 2024) showed that the lectotype cannot be critically identified for the purpose of the precise application of the name to a species, because ripe oospores, one of the key morphological traits for the genus *Nitella* C.Agardh (e.g. Sakayama, 2008; Casanova, 2009), are not present in the lectotype (Abdelahad & al., 2024). This makes reasonable the application of the ICN Art. 9.9 (Turland & al., 2018) for epitype designation. *Nitella axillaris* was described based on specimens collected at various localities in Venezuela and México (Braun, 1859: 356; see below). Wood (1965: 685) designated a specimen from México as lectotype. Unfortunately, this material had no ripe oospores (Abdelahad & al., 2024). Consequently, the lectotype of *N. axillaris* cannot be critically identified for purposes of the precise application of the name to a taxon and an epitype can be designated for the lectotype (Art. 9.9). Part of the original material of *N. axillaris* collected in Venezuela had ripe oospores used for SEM (Abdelahad & al. 2024). The decision of Braun on the species identity of syntypes, i.e. directly based on the original author's intent, is followed here, and part of the original material is here designated as epitype. Both specimens listed in the protologue do not conflict with each other in all traceable and comparable morphological traits. The epitype is largely useful because of the presence of ripe oospores allowing precise species identification and delineation. This designation avoids ambiguity and eliminates uncertainty for the species concept of *N. axillaris* thus providing nomenclature stability. It also ensures species concept continuity with the intent of the original author for further improvement and harmonisation of charophyte taxonomy, stimulating further taxonomic studies of the *Characeae* worldwide.

A type for *N. axilliformis* Imahori was not indicated by Imahori (1951: 215) but was based on syntype material from Taiwan (Formosa). The original material was lost in fire from the atomic bombing of Hiroshima at the end of World War II in 1945 (Imahori 1950, 1954; Wood 1965). Only the excellent drawings based on the syntypes (Imahori 1951: pl. 3) can be used for the typification proposed here.

The protologue of *N. dregeana* A.Braun ex Kützing ((Kützing 1849: 517) stated that Kützing examined original material collected by Drège "*Ad caput bonae spei* [Cape of Good Hope] cl. Drege [sic]. 1840 (v. s. [dry material seen] in Herb. Berol.)", but a search at **B** indicated that the type is lost. A specimen of *N. dregeana* in **LE** has a handwritten label of *Chara dregeana* with A. Br[aun, ined., in herb. J.F. Drège. 1840]. This specimen is contemporary and suitable for lectotypification.

Nitella axillaris A.Braun *Monatsberichte der Königlichen Preussische Akademie des Wissenschaften zu Berlin* 1858: 356, 1859
Lectotype (designated by Wood 1965: 685): Mexico: Orizaba, 1853, *F. Müller 355* (**NY** 00887751).
Epitype (here designated for the above lectotype): Venezuela: *In lagunis prope Valle ad Caracas*, March 1854, *Gollmer* (**BM** 013828100); SEM images of oospores from this material are illustrated by Abdelahad & al. (2024: fig. 3).
Registration (of epitype): http://phycobank.org/105431

Nitella axilliformis Imahori *Science Reports of the Kanazawa University* 1 (2): 215, 1951

Syntypes (Imahori 1951: 215, all lost): Taiwan, Tainan Prefecture: 1. Tamio, 12 August 1941, *Imahori 289*; 2. Machoko, 14 August 1941 *Imahori 299*; 3. Kwandensho, 21 August 1941 *Imahori 355*.
Lectotype (icon! here designated): Plate 3 (based on syntypes from Taiwan), Imahori, *Science Reports of the Kanazawa University* 1(2): 221, 1951.
Registration (of lectotype): http://phycobank.org/105497
Syntypes (Imahori 1951: 215): Taiwan, Tainan Prefecture: 1. Tamio, 12 August 1941, *Imahori 289*; 2. Machoko, 14 August 1941 *Imahori 299*; 3. Kwandensho, 21 August 1941 *Imahori 355*.

Nitella dregeana A.Braun ex Kützing *Species algarum*: 517, 1849
≡ *Nitella tricuspis* var. *dregeana* (A.Braun ex Kützing) A.Braun *Monatsberichte der Königlichen Preussische Akademie des Wissenschaften zu Berlin* 1867: 878, 1868.
Lectotype (here designated): [South Africa: Cape of Good Hope, 1840, *J.F. Drège*] (**LE** A0003263; Fig. 1).
Registration (of lectotype): http://phycobank.org/105498
Etymology: Named for Carl Friedrich (Charles Frederick) Drège (1791-1867), the collector.
Note: The original material cited by Kützing at **B** appears to be lost. The specimen stored in **LE** was recognized in 2019 by M.T. Casanova as probably a part of the original material according to her handwritten note (Fig. 1).

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Abdelahad, N., Troia, A., van de Weyer, K., Iberite, M., Piccoli, F. & Casanova, M.T. (2024). A contribution to a better understanding of the *Nitella axillaris* group (Charales, Charophyceae): a taxonomic re-examination of the *Nitella translucens* collected in the Province of Ferrara, Italy. *Plants* 13(3018): 1–11, 9 figures, 1 table.
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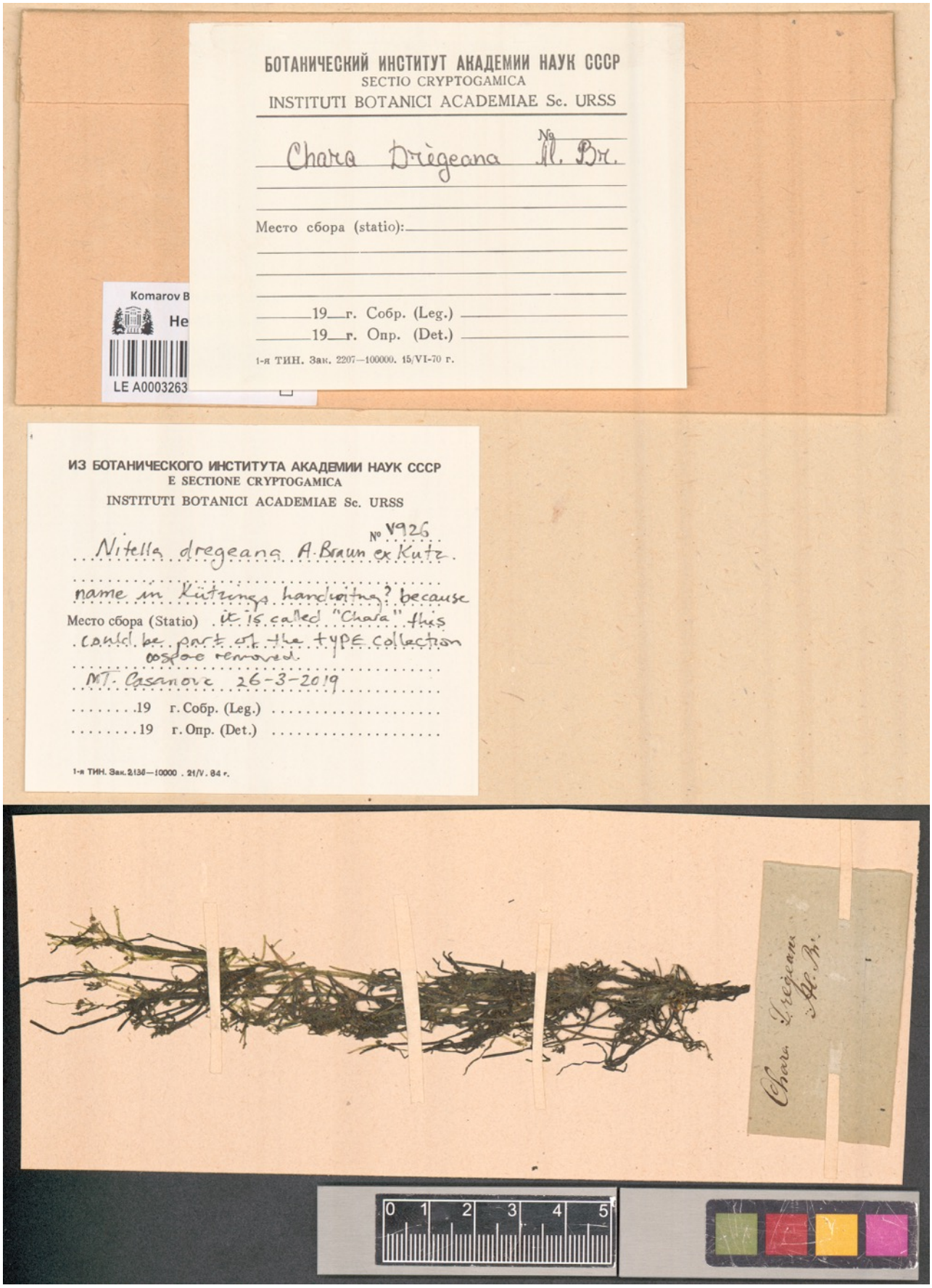

Figure 1. Lectotype of *Nitella dregeana* A.Braun ex Kützing (**LE** A0003263).