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**TYPIFICATION OF FOUR SPECIES OF  
*LINUM* L.: *L. FLAVUM* L., *L. HIRSUTUM* L.,  
*L. EXTRAAXILLARE* KIT., AND *L.*  
*NERVOSUM* WALDST. et KIT.**

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*Key words:* *Linum*, *typification*, *lectotype*, *LINN*, *BP*,  
*herbarium*, *Linnaeus*

Special studies aimed at typification of various taxa described from Ukraine were initiated since 1998 at the M.G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine, within the framework of a research project at the Vascular Plants Department. The results of these investigations are reflected in a series of articles published in scientific journals, mainly the *Ukrainian Botanical Journal* (*Ukrayins'kiy Botanichnyi Zhurnal*, Kiev) and *Botanical Journal* (*Botanicheskiy Zhurnal*, St. Petersburg) [3–9, etc.].

In early botanical publications it was not mandatory to indicate the type (holotype) of the species, and because of that selection of lectotypes or neotypes is needed for many such taxa. Often authors just cited the collection area (or sometimes a collection site, *locus classicus*), or made reference to investigated specimens (authentic material) collected in different geographical points. Thus, lectotypification of species described before the second half of the 20<sup>th</sup> century is often connected with considerable difficulties, which is also true for many taxa occurring in Ukraine or described from our territory [7].

In the process of the detailed taxonomic and floristic investigation of the genus *Linum* L. in the flora of Ukraine, we examined authentic collections of most species of the genus occurring in Ukraine, including digital images and photocopies of authentic specimens deposited at LINN, S-LINN, BP, and specimens from *LE*, *MW*, *KW* herbaria, as well as literary sources and other relevant data [1, 2, 6, 10–19, 21–24].

The main objective of the present article is lectotypification of four species of the genus *Linum*: *L. hirsutum* L., *L. flavum* L., *L. extraaxillare* Kit., and *L. nervosum* Waldst. et Kit.

### **Material and Methods**

As the main basis for lectotypification we used the principle of nomenclatural types introduced by the Cambridge Botanic Congress in 1930 and further developed in subsequent versions of the International Code of Botanical Nomenclature [11].

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Lectotypification of species was based on the digital images of *L. flavum* L., *L. hirsutum* L. (LINN and UPS), *L. extraaxillare* Kit., and *L. nervosum* Waldst. et Kit (BP), as well as images of authentic specimens available in the Internet (see relevant citations below).

## Results and Discussion

The genus *Linum* is represented in Ukraine by about 23 native species [20], the figures varying in different sources depending on taxonomic opinions and species concepts adopted by various authors [2]. Most of these species were described by C. Linnaeus, P. Kitaibel, F. Waldstein, G. Reichenbach, S. Jávorka, K. Rudolph, V. Czernajev (Chernyaev), S. Juzepczuk (Yuzepchuk), M. Klokov, and other botanists. In the course of our studies it has become evident that no formal typification existed for several species of the genus occurring in Ukraine [1, 2, 6,

22, 23], and thus selection of lectotypes was necessary for these taxa. Here we propose lectotypes for four species.

Of special interest are two species of *Linum* described by C. Linnaeus [18], *L. flavum* L. and *L. hirsutum* L., for which no typification was traced in relevant literature and the web site of the Linnaean Plant Name Typification Project [23]. After studying the available digital images of authentic specimens of these species, the authors contacted Dr. Ch. Jarvis, Curator of the LINN Herbarium, who confirmed that no data on typification of these species were known to him. He also provided important additional information regarding existing herbarium specimens that should be considered in the process of lectotypification.

For each species, we provide below the main synonyms, citations of the proto-



Fig. 1. Lectotype of *Linum hirsutum* L. (LINN)

logues and some other basic literature, lectotypes and their authorship, and nomenclatural notes.

*Linum hirsutum* L. 1753. Sp. Pl.: 277; Juz., 1949, Fl. URSS (Фл. СССР), 14: 141; Dobrocz. 1955, Fl. Ukr. SSR (Фл. УРСР), 7: 74; Ockendon & Walters, 1968, Fl. Europ., 2: 210, p. max. p. — *L. cretaceum* Juz. 1949, Fl. URSS (Фл. СССР), 14: 723, in adnot. ad *L. lanuginosum* Juz. — *L. hirsutum* L. subsp. *hirsutum*: Egorova, 1996, Fl. Europae Orient. (Фл. Вост. Евр.), 9: 358.

**Lectotype** (designated here by Optasyuk): Herb. Linn. No. 396.11 (*LINN*).

**Protologue**: «Habitat in Austriae, Tatariae editis raminosis».

**Note**: There is one rather well-preserved plant in the herbarium sheet, with the inflorescence but without roots. In the centre of this sheet there is a number of the herbarium specimen (No. 396—11); at the bottom of the sheet there is a note «3 flavum» (Fig. 1) made by C. Linnaeus. However, in «Species plantarum» the species is given under the number 4.

*Linum flavum* L. 1753, Sp. Pl.: 279; Juz., 1949, Fl. URSS (Фл. СССР), 14: 136; Dobrocz. 1955, Fl. Ukr. SSR (Фл. УРСР), 7: 65; Ockendon & Walters, 1968, Fl. Europ., 2: 207, p. p, excl. pl. taur.; Egorova, 1996, Fl. Europae Orient. (Фл. Вост. Евр.), 9: 351.

**Lectotype** (designated here by Optasyuk & Jarvis): «... Calenburg et Badenae Austriae». Herb. Burser XII: 37 (*UPS*).

**Protologue**: «Habitat in Austria».

**Note**: The authentic material of *L. flavum* is probably represented in *LINN* by one specimen, which the first author initially intended to select as the lectotype. However, Ch. Jarvis (personal communication) indicated that there were at least two other specimens that should be considered when selecting the lectotype. All these specimens have been available to C. Linnaeus by 1753, and there are his notes on all herbarium sheets.

The reasons for selecting the lectotype from the Burser Herbarium

Fig. 2. Lectotype of *Linum flavum* L. (*UPS*, see web link in the text)



[<http://www-hotel.uu.se/evolmuseum/Burser12/Burser-vol12-037.jpg>] need explanation. On the herbarium sheet of the lectotype there are two plants in the flowering phase, without roots. The label indicates: «VIII *Linum* syl. latifolium luteum Bauh. *Linum* [...] Tab. In Calenburg et Badenae Austriae» (Fig. 2). It may well be that this is from where the Austrian provenance came in «Species Plantarum» (Ch. Jarvis, personal communication). When selecting a lectotype, we have given the priority to that specimen because the indicated origin corresponds to that in the prologue. H.O. Juel [12] identified that specimen as *L. flavum* in 1936, and we agree with that identification.

We also have examined other available specimens (digital images and photocopies). One specimen is deposited at S-LINN Herbarium and marked as No. 134.7 [10]. On the herbarium sheet there is one plant with an inflorescence. There are some notes: «*Linum 9 flavum*, Sp. pl. 279» in the right corner and «9 *flavum*» at the bottom of the sheet. There is also a short species diagnosis.

Another specimen is deposited at LINN under No. 396-25. On the front (bottom, right) of the sheet Linnaeus wrote «flavum 9» and a symbol that is associated with specimens that he had received from T. Gerber. On the reverse of the sheet Linnaeus also added «Gerb. 204. *Linum umbellatum luteum*, folio genistae tinctoriae Gerb. 204. *Linum sylv. latifol. luteum* CB. Habitat in desertis inter Tulva & Woroniz [probably Voronezh — Auth.] circa Tawrno & Bielgrod [Belgorod — Auth.]». The localities are as transcribed by S. Savage [21], but there could be misinterpretations, either by Savage or Linnaeus himself, so the geographical names are probably misspelled. In general there we can observe three well preserved plants, but without roots. In the left upper corner of the sheet there is a note by C. Linnaeus, the number «25». The central part of this sheet bears the number of the herbarium specimen (No 396-25). At the bottom to the left there is the number «9», and to the right — «9 *flavum*». Number 9, as with the previous specimen, corresponds to the number of the species in «Species plantarum». This description on the reverse side is important for typification of the species, because the geographical data («in desertis inter Tulva & Woroniz circa Tawrno & Bielgrod») do not correspond to the original citation in the protologue: «Habitat in Austria». Because of that we preferred to select another specimen as the lectotype.

***Linum extraaxillare*** Kit. 1864, *Linnaea*, 32: 573; Juz. 1949, Fl. URSS (Фл. СССР), 14: 115; Dobroc. 1955, Fl. Ukr. SSR (Фл. УРСР), 7: 57; Egorova, 1996, Fl. Europae Orient. (Фл. Вост. Евр.), 9: 355. — *L. perenne* L. subsp. *extraaxillare* (Kit.) Nyman, 1889, *Consp. Fl. Europ.*, Suppl. 2, 1: 71; Ockendon & Walters, 1968, Fl. Europ., 2: 209.

**Lectotype** (designated here by Optasyuk): «*Linum extraaxillare* mihi. Semina sub nom. *L. alpini* missa e Scepusio», in Herb. Kit. No. 208 (BP, 3278).

**Protologue**: «E Scepusio...».

**Note**: This species is described from the modern territory of Slovakia. Three authentic specimens (syntypes) of the species described by P. Kitaibel are deposited at the Herbarium of the Hungarian National Natural History Museum, Budapest

Fig. 3. Lectotype of *Linum extraaxillare* Kit. (BP)

(BP); one of these specimens is selected here as the lectotype. The specimen has two labels. One of them is the draft handwritten label by P. Kitaibel, with the name of the species (underlined by the author), «*Linum extraaxillare mihi*», and the place where it was collected («...e Scepusio»). The specimen completely corresponds to the prologue [13]. The second label indicates: «Herbar. Kitaibel. Mus. nat. hung. fasc. XI, № 208, 3278» (Fig. 3).

Two other specimens of the species (Nos. 206 and 207) do not have the data provided in the prologue [13], and because of that neither of them can be selected with confidence as the lectotype. Both specimens have determination notes (*notae criticae*) by S. Jávorka with confirmation of the species identification, «*Linum extraaxillare*».



*Linum nervosum* Waldst. & Kit. 1805, Pl. Rar. Hung., 2: 109, tab. 105; Juz. 1949, Fl. URSS (Фл. СССР), 14: 92; Dobrocz. 1955, Fl. Ukr. SSR (Фл. УРСР), 7: 51; Ockendon & Walters, 1968, Fl. Europ., 2: 208, p. max p.; Egorova, 1996, Fl. Europae Orient. (Фл. Вост. Евр.), 9: 355. — *L. aucheri* auct. non Planch.: E. Wulf, 1953, Fl. Taurica (Фл. Крыма), 2, 3: 29; Dobrocz. 1987, Manual Vasc. Pl. Ukr. (Опред. высш. раст. Укр.): 218.

**Lectotype** (designated here by Optasyuk): «ad Pancsovam», Herb. Kit. No. 216 (BP, 3286).

**Protologue:** «Crescit in graminosis sylvae Vojloviczensis ad Pancsovam».

**Note:** The lectotype specimen was collected near Panëvo (Pancsova) and Vojlovica, close to Belgrade (Beograd), Serbia. There are two authentic herbarium



Fig. 4. Lectotype of *Linum nervosum* Waldst. et Kit. (BP)

specimens of the species deposited in BP. The specimen No. 216 is selected here as the lectotype. There are two labels: the first draft label indicates the collection area, «ad Pancsovam», which corresponds to the prologue [24] (however, the area indicated in the prologue is wider); the second, printed, label contains the notice «Herbar. Kitaibel. Mus. nat. hung. fasc. XI, No. 216, 3286» (Fig. 4).

The draft label of the second specimen (No. 215, 3285) also contains diverse and detailed information concerning the name of the species (*Linum nervosum* n. sp., underlined by the author), its morphological characters, with the description of the main diagnostic features, and the place of collection. It would have been logical to select that specimen as the lectotype,

but there is no indication of the geographical locality corresponding to that in the prologue. Because of that the preference was given to another specimen.

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ТИПИФІКАЦІЯ ЧОТИРЬОХ ВИДІВ РОДУ *LINUM* L.: *L. FLAVUM* L., *L. HIRSUTUM* L., *L. EXTRAAXILLARE* KIT., *L. NERVOSUM* WALDST. et KIT.

У результаті критико-систематичного опрацювання роду *Linum* L. флори України проаналізовано автентичний матеріал більшості видів цієї групи, які зберігаються в гербаріях *LINN*, *S- LINN*, *BP* (фотокопії зразків), *LE*, *MW*, *KW*. Проведено лектотипіфікацію видів роду *Linum*: *L. hirsutum* L. (Herb. Linn. No. 396.11. — *LINN*); *L. flavum* L. («...Calenburg et Badenae Austriae». Herb. Burser XII: 37. — *UPS*); *L. extraaxillare* Kit. («*Linum extraaxillare mihi*. Semina sub. nom. *L. alpini* missa e Scepusio», in Herb. Kit. No. 208. — *BP*, 3278); *L. nervosum* Waldst. et Kit. («ad Pancsovam», Herb. Kit. No. 216. — *BP*, 3286). Для кожного виду вказані основна синоніміка, номенклатурний тип (за протологом) та лектотип, автор його виділення та місце зберігання.

*Ключові слова:* *Linum*, типіфікація, лектотип, *LINN*, *BP*, гербарій, Лінней

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ТИПИФИКАЦИЯ ЧЕТЫРЕХ ВИДОВ РОДА *LINUM* L.: *L. FLAVUM* L., *L. HIRSUTUM* L., *L. EXTRAAXILLARE* KIT., *L. NERVOSUM* WALDST. et KIT.

В результате критико-систематической обработки рода *Linum* L. флоры Украины проанализирован автентичный материал большинства видов данной группы, который хранится в Гербариях *LINN*, *S- LINN*, *BP* (фотокопии образцов), *LE*, *MW*, *KW*. Проведена лектотипификация видов рода *Linum*: *L. hirsutum* L. (Herb. Linn. No. 396.11. — *LINN*); *L. flavum* L. («... Calenburg et Badenae Austriae». Herb. Burser XII: 37. — *UPS*); *L. extraaxillare* Kit. («*Linum extraaxillare mihi*. Semina sub nom. *L. alpini* missa e Scepusio», in Herb. Kit. No. 208. — *BP*, 3278); *L. nervosum* Waldst. et Kit. («ad Pancsovam», Herb. Kit. No. 216. — *BP*, 3286). Для каждого вида указаны основная синонимика, номенклатурный тип (по протологу) и лектотип, автор его выделения и место хранения.

*Ключевые слова:* *Linum*, типификация, лектотип, *LINN*, *BP*, гербарий, Линней