



ТЕОРЕТИЧНІ ТА ПРИКЛАДНІ ПИТАННЯ

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NEW NOMENCLATURAL COMBINATIONS IN *DYSPHANIA* R. BR. (CHENOPODIACEAE): TAXA OCCURRING IN NORTH AMERICA

Chenopodiaceae, Dysphania, Chenopodium, taxonomy, nomenclature, new combinations, North America

ABSTRACT

The genera *Chenopodium* L. and *Dysphania* R. Br. (Chenopodiaceae) are re-defined. In this article, we consider only the taxa that occur in North America and are mentioned in the forthcoming Vol. 4 of the *Flora of North America north of Mexico* (FNA), because these nomenclatural novelties should be validated prior to the publication of the FNA volume. North American taxa with glandular trichomes, which were previously placed in *Chenopodium* subgen. *Ambrasia* A.J. Scott, are transferred to the genus *Dysphania* R. Br. emend. Mosyakin & Clemants. Eighteen new combinations in *Dysphania* are validated at sectional (4), subsectional (3), and species (11) levels.

The present article is a continuation of our previous publications on infrageneric taxonomy of the genus *Chenopodium* L. sensu lato and related genera of Chenopodiaceae [21–23]. In the course of preparing treatments for the Flora of North America north of Mexico (FNA) and Flora of China (in preparation), new data came into light, which necessitated the present publication.

The policy of the FNA Project is to publish all taxonomic novelties separately, prior to the corresponding FNA volumes. We validate here the new combinations **only for taxa that occur in North America and are mentioned in our FNA treatment**. Other taxa belonging to *Dysphania*, as well as additional taxonomic and phylogenetic arguments, will be considered in more detail in our forthcoming publications.

It is widely recognized that the genus *Chenopodium* L., in its currently accepted broad circumscription, is polyphyletic, and in fact represents an artificial conglomerate of taxa rather than a natural monophyletic unit.

C. Linnaeus recognized *Chenopodium* and *Blitum* L. as separate genera, but at the same time treated in *Chenopodium* some species currently placed in *Suaeda* Forssk. ex J.F. Gmelin, *Bassia* All., and *Kochia* Roth [16]. Many segregate genera were proposed later by other authors: *Teloxys* Moq., *Roubieva* Moq., *Ambrina* Spach, *Neobotrydium* Moldenke, etc. Nomenclatural and taxonomic history of these taxa can be found in literature [1–6; 15; 18–20; 29–37].

The presence of glandular trichomes seems to be a character of high phylogenetic and taxonomic importance in Chenopodiaceae in general and in Chenopodieae in particular. Types of trichomes were used for delimitation of genera, tribes and even subfamilies of the family.

Both glandular trichomes and «mealy» bladder hairs of Chenopodiaceae seem to have common origin: they probably evolved from multicellular uniseriate (non-branched) hairs. The role, morphology, and possible evolutionary significance of these peculiar trichomes of *Chenopodium* s. l. and other Chenopodiaceae were extensively discussed in several publications [8, 26, 30–32, etc.].

According to R.C. Carolin [8], Chenopodiaceae with glandular hairs probably separated from Chenopodiaceae with bladder hairs even at a more basal (earlier) phylogenetic level than the point of divergence of the latter from Atriplicinae. P.G. Wilson [38] noted that the hair type appears to represent a fundamental divergence of phylogenetic significance and the resulting groupings are supported by other less assessable characters found in the leaves, flowers and fruit.

A. W. Weber [35] adopted the name *Teloxys* Moq. [18] for the group of glandular taxa and transferred several species of glandular *Chenopodium* to *Teloxys*. The latter was published simultaneously with *Roubieva* Moq., and thus, if only these two generic names are considered, Weber's choice should stand. However, the generic name *Dysphania* pre-dates both *Teloxys* and *Roubieva*, and «... [I]f *Teloxys*, *Orthosporum*, and *Dysphania* are amalgamated then the oldest name *Dysphania* should be adopted.» [38].

The genus *Dysphania* R. Br. was described by R. Brown [7] as a genus similar or related to Chenopodiaceae («Chenopodeis affinia»). Later it was shifted from a mere section in *Chenopodium* [1–2] to the only genus of a separate family Dysphaniaceae, or even a representative of Illicebraceae [see discussion in 4, 9–12, 17, 25, 29, 36–38]. Recently almost all authors agreed that *Dysphania* is a comparatively small (6–10 species) Australian genus, which occupies a satellite position beside *Chenopodium*.

However, *Dysphania* in its traditional circumscription has no distinct characters clearly separating it from other «glandular chenopods» previously placed in *Chenopodium* subgen. *Ambrosia* A.J. Scott. Reduction in the number of perianth segments to four is observed in the transitional section *Tetrasepala* Aellen described by P. Aellen [2] in *Chenopodium* and subsequently transferred by A.J. Scott [29] to *Dysphania*. The parallel trend in reduction of perianth is also evident in many representatives of *Chenopodium* subgen. *Blitum* (L.) I. Hiitonen. Inflated perianth segments at maturity and a trend toward development of dense spike-like inflorescences are also evident not only in *Dysphania* s. str., but also in South American members of the group usually referred to as *Chenopodium ambrosioides* aggregate. The formation of spike-like inflorescences is one of several general trends in morphological evolution of Chenopodiaceae [13–14]. However, many evolutionary trends in Chenopodiaceae are reversible.

Contrary to the viewpoint expressed by A.J. Scott [29], the Australian monotypic genus *Scleroblitum* (= *Chenopodium* sect. *Atriplicina* Aellen) does not belong to «glandular chenopods». P.G. Wilson [36–37] correctly noted its affinity to *Monolepis* Schrad. and *Chenopodium* sect. *Thellungia* Aellen. In our opinion, *Scleroblitum* is rooted in *Chenopodium* subgen. *Blitum* and is best treated as a separate section of the latter.

Accumulated evidence testify to a close unity and integrity of «glandular chenopods», including *Dysphania*, which is the earliest valid name for the whole group at the genus level. After considering various taxonomic and nomenclatural options, we came to the conclusions that (1) separation of «glandular chenopods» (*Dysphania*) from «mealy chenopods» (*Chenopodium*) is inevitable, and (2) any attempts to further segregate the resulting genus *Dysphania* into narrower natural units of the genus or subgenus level are not feasible now, but could be possible in the future after additional morphological, molecular, cladistic and phytogeographical studies of the group.

Dysphania R. Br. emend. Mosyakin & Clemants differs from *Chenopodium* s. str. in having peculiar types of glandular hairs, a trend toward development of vertical seeds (which is also peculiar to some groups in *Chenopodium* subgen. *Blitum*), patterns in its leaf shape (leaves pinnatisect to erose-dentate, rarely almost entire) and venation (lateral veins above the base of the leaf are usually better developed than in *Chenopodium*), and regularities in development of its inflorescence. Biochemical and karyological characters separating *Dysphania* and

Chenopodium are already available for some species [24, 27–28], but these aspects are in need of special additional studies.

VALIDATION OF NEW COMBINATIONS

Dysphania R. Br. 1810, Prodr. Fl. Nov. Holl.: 411; emend. Mosyakin & Clemants

I. ***Dysphania*** sect. ***Orthospora*** (R. Br.) Mosyakin & Clemants, comb. nov.

Basionym: *Chenopodium* sect. *Orthosporum* R. Br. 1810, Prodr. Fl. Nov. Holl.: 407.

Type: *Chenopodium pumilio* R. Br. [*Dysphania pumilio* (R. Br.) Mosyakin & Clemants], see A.J. Scott [29].

– *Blitum* L. sect. *Orthosporum* (R. Br.) C.A. Mey. in Ledeb. 1829, Fl. Altaica 1: 11, pro parte.

– *Chenopodium* XIV. *Carinata* Standley, 1916, North Amer. Fl. 21: 27 (unranked).

1. ***Dysphania pumilio*** (R. Br.) Mosyakin & Clemants, comb. nov.

Basionym: *Chenopodium pumilio* R. Br. 1810, Prodr. Fl. Nov. Holl.: 407.

– *Teloxys pumilio* (R. Br.) W.A. Weber, 1985, Phytologia 58 (7): 478.

2. ***Dysphania carinata*** (R. Br.) Mosyakin & Clemants, comb. nov.

Basionym: *Chenopodium carinatum* R. Br. 1810, Prodr. Fl. Nov. Holl.: 407.

3. ***Dysphania cristata*** (F. Muell.) Mosyakin & Clemants, comb. nov.

Basionym: *Blitum cristatum* F. Muell. 1858, Transact. Philos. Inst. Victor. 2: 73.

– *Chenopodium cristatum* (F. Muell.) F. Muell. 1864, Fragmenta Phytographiae Australiae 7: 11.

II. ***Dysphania*** sect. ***Adenois*** (Moq.) Mosyakin & Clemants, comb. nov.

Basionym: *Ambrina* sect. *Adenois* Moq. 1840, Chenop. Monogr. Enum.: 39. – *Chenopodium*

sect. *Adenois* (Moq.) L.E. Simón, 1996, Anales Jard. Bot. Madrid 54 (1): 138.

Type: *Chenopodium ambrosioides* L. (lectotype, designated by L.E. Simón, 1996, l.c.: 138.)

– *Chenopodium* sect. *Ambrina* Hook. f. in Benth. & Hook. f. 1880, Gen. Fl. 3: 51.

– *Chenopodium* XIII. *Ambrosioidia* Standley, 1916, North Amer. Fl. 21: 26 (unranked).

– *Chenopodium* sect. *Nigrescentia* Aellen, 1973, Acta Bot. Acad. Sci. Hungar. 19 (1–4): 3.

Opinions vary regarding the proper species concept in this section. Some authors recognize just one extremely polymorphic species *Chenopodium ambrosioides* with numerous infraspecific taxa, while others prefer to recognize several (from 2 to about 10–12) species [4–6, 27, 29–32, etc.].

4. ***Dysphania ambrosioides*** (L.) Mosyakin & Clemants, comb. nov.

Basionym: *Chenopodium ambrosioides* L. 1753, Sp. Pl.: 219.

– *Teloxys ambrosioides* (L.) W.A. Weber, 1985, Phytologia 58 (7): 477.

5. ***Dysphania anthelmintica*** (L.) Mosyakin & Clemants, comb. nov.

Basionym: *Chenopodium anthelminticum* L. 1753, Sp. Pl.: 220.

6. ***Dysphania chilensis*** (Schrad.) Mosyakin & Clemants, comb. nov.

Basionym: *Chenopodium chilense* Schrad. 1832, Ind. Sem. Horti Goetting. (1832): 2.

– *Chenopodium vagans* Standley, 1916, North Amer. Fl. 21: 26.

– *Teloxys vagans* (Standley) W.A. Weber, 1985, Phytologia 58 (7): 478.

III. ***Dysphania*** sect. ***Roubieva*** (Moq.) Mosyakin & Clemants, comb. nov.

Basionym: *Roubieva* Moq. 1834, Ann. Sci. Nat. Bot. (Paris), sér. 2, 1: 292.

Type: *Roubieva multifida* (L.) Moq. [*Dysphania multifida* (L.) Mosyakin & Clemants], the only species originally included in *Roubieva* by A. Moquin-Tandon (l. c.).

– *Chenopodium* sect. *Roubieva* (Moq.) Rouy in Rouy & Foucaud, 1910, Fl. Fr. 12: 53.

– *Chenopodium* subgen. *Ambrosia* sect. *Adenois* subsect. *Roubieva* (Moq.) L.E. Simón, 1996, Anales Jard. Bot. Madrid 54 (1): 138.

7. ***Dysphania multifida*** (L.) Mosyakin & Clemants, comb. nov.

Basionym: *Chenopodium multifidum* L. 1753, Sp. Pl.: 220.

- *Roubieva multifida* (L.) Moq. 1834, Ann. Sci. Nat. Bot. (Paris), sér. 2, 1: 293.
 - *Teloxys multifida* (L.) W.A. Weber, 1985, Phytologia 58 (7): 478.
- IV. **Dysphania** sect. **Botryoides** (C.A. Mey.) Mosyakin & Clemants, comb. nov.
 Basionym: *Chenopodium* sect. *Botryoides* C.A. Mey. in Ledeb. 1829, Fl. Alt. 1: 410.
 Type: *Chenopodium botrys* L. [*Dysphania botrys* (L.) Mosyakin & Clemants], see A.J. Scott [29].
- *Ambrina* sect. *Botryois* Moq. 1840, Chenop. Monogr. Enum.: 36, pro parte, nom. illeg.
 - *Chenopodium* sect. *Botrys* W.D.J. Koch, 1837, Syn. Fl. Germ. Helv.: 607, pro parte, nom. illeg.
- This section is represented by three subsections (see below, IV-a, IV-b, and IV-c).
- IV-a. **Dysphania** sect. **Botryoides** (C.A. Mey.) Mosyakin & Clemants subsect. **Botrys** (Aellen & Iljin) Mosyakin & Clemants, comb. nov.
 Basionym: *Chenopodium* sect. *Botryoides* subsect. *Botrys* Aellen & Iljin, 1936, Fl. URSS 6: 46. [*Chenopodium* sect. *Botrys* W.D.J. Koch, 1837, Syn. Fl. Germ. Helv.: 607, pro parte, nom. illeg.]
- Type: *Chenopodium botrys* L. [*Dysphania botrys* (L.) Mosyakin & Clemants], see A.J. Scott [29].
- *Chenopodium* XII. *Botryes* Standley, 1916, North Amer. Fl. 21: 25 (unranked).
 - *Neobotrydium* Moldenke, 1946, Amer. Midl. Nat. 35: 330.
8. **Dysphania botrys** (L.) Mosyakin & Clemants, comb. nov.
 Basionym: *Chenopodium botrys* L. 1753, Sp. Pl.: 219.
 – *Teloxys botrys* (L.) W.A. Weber, 1985, Phytologia 58 (7): 477.
9. **Dysphania schraderiana** (Schult.) Mosyakin & Clemants, comb. nov.
 Basionym: *Chenopodium schraderianum* Schult. in Roem. & Schult. 1820, Syst. Veget. 6: 260.
 – *Teloxys schraderiana* (Schult.) W.A. Weber, 1985, Phytologia 58 (7): 478.
 – *Chenopodium foetidum* Schrad. 1808, Ges. Naturforsch. Freunde Berlin Mag. 2: 79, non Lam. 1779.
- IV-b. **Dysphania** sect. **Botryoides** (C.A. Mey.) Mosyakin & Clemants subsect. **Incisa** (Standley) Mosyakin & Clemants, comb. nov.
 Basionym: *Chenopodium* XI. *Incisa* Standley, 1916, North Amer. Fl. 21: 25 (unranked).
 Type: *Chenopodium incisum* Poir. [= *Dysphania graveolens* (Willd.) Mosyakin & Clemants], the only species originally included into the group *Incisa* by P.C. Standley [33].
10. **Dysphania graveolens** (Willd.) Mosyakin & Clemants, comb. nov.
 Basionym: *Chenopodium graveolens* Willd. 1809, Enum. Pl. Horti Berol. 1: 290.
 – *Teloxys graveolens* (Willd.) W.A. Weber, 1985, Phytologia 58 (7): 478.
 – *Chenopodium incisum* Poir. in Lam. 1811, Encycl. Mét. Suppl. 1: 392.
- IV-c. **Dysphania** sect. **Botryoides** (C.A. Mey.) Mosyakin & Clemants subsect. **Teloxys** (Moq.) Mosyakin & Clemants, comb. nov.
 Basionym: *Teloxys* Moq. 1834, Ann. Sci. Nat. Bot. (Paris), sér. 2, 1: 289.
 Type: *Teloxys aristata* (L.) Moq. [*Dysphania aristata* (L.) Mosyakin & Clemants], the only species included by A. Moquin-Tandon (l. c.) in *Teloxys*.
- *Chenopodium* sect. *Teloxys* (Moq.) G. Beck in Reichenbach, 1908, Icon. Fl. German. Helvet. 24: 116.
 - *Chenopodium* sect. *Botryoides* C.A. Mey. subsect. *Teloxys* (Moq.) Aellen & Iljin, 1936, Fl. URSS 6: 47.
 - *Chenopodium* X. *Aristata* Standley, 1916, North Amer. Fl. 21: 25 (unranked).
11. **Dysphania aristata** (L.) Mosyakin & Clemants, comb. nov.
 Basionym: *Chenopodium aristatum* L. 1753, Sp. Pl.: 221.
 – *Teloxys aristata* (L.) Moq. 1834, Ann. Sci. Nat. Bot. (Paris), sér. 2, 1: 289.

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НОВІ НОМЕНКЛАТУРНІ КОМБІНАЦІЇ В РОДІ *DYSPHANIA* R. BR. (CHENOPODIACEAE): ТАКСОНИ ФЛОРИ ПІВНІЧНОЇ АМЕРИКИ

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Переглянуто межі та обсяг родів *Chenopodium* L. та *Dysphania* R. Br. (Chenopodiaceae). В даній статті розглянуті лише ті таксономи, котрі трапляються у Північній Америці та згадуються у четвертому томі «Флори Північної Америки» (Flora of North America north of Mexico), оскільки ці нові комбінації мають бути валідизовані до публікації відповідного тому.

Північноамериканські таксономи з залозистим опушенням, котрі раніше відносили до *Chenopodium* subgen. *Ambrosia* A.J. Scott, переведені до роду *Dysphania* R. Br. emend. Mosyakin & Clemants. Вісімнадцять нових комбінацій у роді *Dysphania* запропоновані на рівні секцій (4), підсекцій (3) та видів (11).

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НОВЫЕ НОМЕНКЛАТУРНЫЕ КОМБИНАЦИИ В РОДЕ *DYSPHANIA* R. BR. (CHENOPODIACEAE): ТАКСОНЫ ФЛОРЫ СЕВЕРНОЙ АМЕРИКИ

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Пересмотрены границы и объем родов *Chenopodium* L. и *Dysphania* R. Br. (Chenopodiaceae). В данной статье рассмотрены только те таксоны, которые встречаются в Северной Америке и упоминаются в четвертом томе «Флоры Северной Америки» (Flora of North America north of Mexico), поскольку эти новые комбинации должны быть валидизированы к публикации соответствующего тома.

Североамериканские таксоны с железистым опушением, которые раньше относили к *Chenopodium* subgen. *Ambrosia* A.J. Scott, переведены в род *Dysphania* R. Br. emend. Mosyakin & Clemants. Предложены восемнадцать новых комбинаций в роде *Dysphania* на уровне секций (4), подсекций (3) и видов (11).