

SYNOPSIS ON GENUS *ARTEMISIA* L. (ASTERACEAE DUMORT.) IN THE FLORA OF DNIESTER-PRUT RIVER REGION

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Abstract: The article brings the list of one of the complex genus of Asteraceae Dumort. family – *Artemisia* L. (wormwood), which embodies 10 species in the Dniester-Prut region. The dichotomic key for genus *Artemisia*, morphological description, brief ecological habitat characters, original pictures as well as some economic use features for each species are given.

Key words: flora, Asteraceae, *Artemisia*, biology, ecology, habitats, distribution, economic use.

CONSPECTUL GENULUI *ARTEMISIA* L. (ASTERACEAE DUMORT.) ÎN FLORA INTERFLUVIULUI NISTRU-PRUT

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Rezumat: Articolul prezintă lista unuia dintre cele mai complexe genuri din familia Asteraceae Dumort. – *Artemisia* L. (pelin), care cuprinde 10 specii din flora interfluviului Nistru-Prut. Sunt prezentate: cheia dihotomică pentru determinarea speciilor, descrierea morfologică, caracterele ecologice și staționale, imaginile originale, precum și unele caracteristici de utilizare economică pentru fiecare taxon.

Cuvinte cheie: flora, Asteraceae, *Artemisia*, biologie, ecologie, habitate, corologie, utilizare economică.

INTRODUCTION

The genus *Artemisia* L. – wormwood is one of the largest and at the same time difficult for taxonomy in the family Asteraceae. Despite the large volume of taxonomic papers, there is still enormous confusion, both in the nomenclature and in understanding the volume of individual species of wormwood. As pointed out by I. M. Krashennikov (1946): "The most characteristic feature of the genus *Artemisia* is the large intraspecific polymorphism, which determines the inconsistency in understanding the volume of many species among various authors dealing with issues of the taxonomy of the genus." Despite the obviousness of the problem of finding reliable features for taxonomy, special biomorphological studies of wormwood are few. With the exception of a small number of comprehensive studies only individual representatives of the genus have been studied [5-7, 12, 20-28].

Of particular importance to a comprehensive study of this group is the fact that many species of the genus play an important role in plant communities and are used by humans. Wormwood species are of great economic importance. Many of them are excellent fodder and are fed to cattle, they are especially appreciated as autumn feed. A number of species are used as ornamental plants. All wormwoods are aromatic plants, some of the essential oils are used in perfumery, soap making, less often in the food industry.

Many species are rich in polyacetylenes, flavonoids, terpenoids, and cyanogenic glycosides and are well-known medicinal plants. Drugs based on artemisinin, originally derived from *Artemisia annua*, are particularly important for the treatment of chloroquine-resistant strains of malaria. *Artemisia abrotanum*, *A. absinthium*, *A. dracuncululus* and *A. vulgaris* are widely cultivated as culinary and medicinal herbs. Some are used to stabilize grounds in arid areas.

MATERIALS AND METHODS

During our investigation concerning genus *Artemisia* L. for the flora of Dniester-Prut region we performed all necessary research on field and laboratory examination. Firstly, we reviewed all published literature on the presence of species in the territory, and consulted specimen materials in different scientific herbaria (Herbarium of the National Botanical Garden (Institute) of the Republic of Moldova and Herbarium of the State University of Moldova).

When processing the data on the genus representatives, a morpho-geographical method was used, which allows to consider the morphological variability of plants taking into account the geographical and ecological conditions of growth.

The taxonomy of *Artemisia* species followed by the recent taxonomical literature [11, 29]. The original images of the presented taxa are drawn by Barancean Cristian.

RESULTS AND DISCUSSIONS

Artemisia L. is one of the most complex genera in the Asteraceae family, which comprises worldwide from about 400 to 550 species, distributed practically throughout the Northern Hemisphere, while only a few species grow in the Southern Hemisphere [10, 13, 17, 18, 24-28]. The largest number of species of the genus *Artemisia* is confined to Central and East Asia. A slightly smaller number of specific wormwood variety is observed in the mountainous regions of Central Europe, the Caucasus, North Africa and North America. In the arid and subarid zones of the Holarctic, wormwood taxa often act as dominants of plant communities. By the number of species, the genus *Artemisia* is one of the ten largest genera in many floras of the Northern Hemisphere. Of these, 57 species are given for flora of Europe [14], including 51 species for the flora of Eastern Europe, as well as their numerous hybrids [26]. In the flora of Dniester-Prut river region the genus embodies 10 species.

Genus *ARTEMISIA* L.

Linnaeus, 1753, Sp. Pl.: 845; id. 1754, Gen. Pl., ed. 5: 357

Annual or perennial herbaceous, subshrubs or shrubs, usually aromatic, glabrous or indumentum of basifixed, medifixed, gland-tipped or viscid hairs. Leaves alternate, pinnate, rarely palmately divided or entire. Synflorescences racemose, sometimes spicate, usually grouped into panicles; capitula usually many, often secund, usually small, shortly pedunculate to sessile, heterogamous, disciform. Involucres globose,

ovoid, or ellipsoid; phyllaries in 3 or 4 rows, completely scarious or herbaceous with broad to narrow scarious margin. Receptacle convex or flat. Marginal florets in 1-2 series, 3-10 or more, female; corolla tubular, rarely vasiform, cup-shaped, or conical; style exerted. Disk florets several to many, in 2 or more series, male or bisexual; corolla tubular. Anthers with 2 obtuse basal appendages, apical appendage acute, triangular. Achenes obovoid, ovoid, or oblong, faintly striate. Corona absent or minute.

L e c t o t y p u s: *A. vulgaris* L.

Key to species of *Artemisia*

- 1a. Green plants 2.
 1b. Grayish or silvery coloured plants, pubescent 3.
 2a. Plants glabrous. Apical leaf segments lanceolate, about 1.5 mm wide. Capitula globular, 2-3 mm in diameter. Phyllaries green 3. *A. annua*.
 2b. Plants pubescent, rarely glabrous. Apical leaf segments filiform, about 0.5 mm wide. Capitula ovoid, 1-2 mm in diameter. Phyllaries yellowish 8. *A. scoparia*.
 3a. Leaves two-colored: adaxially green-dark, abaxial white-silvery 1. *A. vulgaris*.
 3b. The leaves are not obviously bicoloured 4.
 4a. Phyllaries glabrous or glabrescent, glossy 5.
 4b. Phyllaries tomentose or grayish-pubescent 7.
 5a. Capitula with only fertile bisexual florets 10. *A. santonica*.
 5b. Capitula with female florets (marginal ones) and male florets (disk ones) 6.
 6a. Leaves leathery; lobes linear-spathulate, 1.5-2 mm wide. Capitula broadly ovoid, 3-4 mm long. Coastal, sandy plants 7. *A. trautvetteriana*.
 6b. Leaves thin, not leathery; lobes linear-lanceolate, 0.5-1 mm wide. Capitula narrow ovoid, 2-3 mm long 6. *A. marschalliana*.
 7a. Herbaceous plants. Leaves up to 15 cm long. Lobules oval-elongated 4. *A. absinthium*.
 7b. Subshrubs with lignified stems at base. Leaves 2.5-3.5 cm long. Lobules linear-lanceolate 8.
 8a. Plants densely silky pubescent, with a thin, elongated rhizome..... 9.
 8b. Plants arachnoid-pubescent, with thickened, usually many-headed rhizome..... 9. *A. lerchiana*.
 9a. Capitula globose, nodding, 2.5-3.5 mm in diameter. Lobules 3-5 mm long. Inflorescence narrow-paniculiform..... 2. *A. pontica*.
 9b. Capitula ovoid or subglobose, 1.5-2 mm in diameter. Lobules 8-12 mm long. Inflorescence broadly-paniculated 5. *A. austriaca*.

Subgenus 1. *Artemisia*. – Cauline leaves linear, usually without intermediate lobule segments. Involucre 2.5-5 mm long and 1.5-3 mm wide. Receptacle convex. Phyllaries indistinctly separated from the bracts. Ligules of marginal florets yellow. Achenes 1.1-1.4 mm long.

Т y п у s: *A. vulgaris* L.

Section 1. *Artemisia*

1. *A. vulgaris* L. 1753, Sp. Pl.: 848; Поляков, 1961, Фл. СССР, 26: 438; Tutin, 1976,

Fl. Europ. 4: 180; Гейдеман, 1986, Определ. высш. раст. МССР, изд. 3: 548; Леонова, 1994, Фл. евр. части СССР, 7: 158; Котов, 1999, Определ. высш. раст. Укр., изд. 2: 340; Negru, 2007, Determ. pl. fl. R. Moldova: 249; Ciocârlan, 2009, Fl. ilustr. a României: 806. (Figure 1).

Herbs, perennial, 50–150(-180) cm tall, sparsely pubescent. Lowermost leaves shortly petiolate; leaf blade 2-pinnatisect. Middle stem leaves \pm sessile; leaf blade elliptic, ovate-elliptic, suborbicular, or ovate-orbicular, 3-10(-15) \times 1.5-6(-10) cm, abaxially densely gray arachnoid tomentose, adaxially sparsely arachnoid puberulent or glabrescent, 1- or 2-pinnatisect or pinnatifid; segments (3 or) 4 or 5, elliptic-lanceolate or linear-lanceolate, 3-5(-8) \times 1-1.5 cm, rachis narrowly winged, few serrate or not. Uppermost leaves pinnatifid; leaflike bracts 3-lobed or entire; lobes or entire bracts lanceolate. Synflorescence an ill-defined panicle, lateral branches often shorter than subtending leaves. Involucre oblong, 3-4 mm long; phyllaries densely arachnoid pubescent. Marginal female florets 7-10. Disk florets 8-20, bisexual. Achenes obovoid or ovoid, 1-1.2 mm long. $2n=16$ [26].

It is a hemicryptophytic plant. The plants bloom in July-September and fructify in August-October. Propagate by seeds.

The plants usually grow in groups or sometimes, occur solitary in forest glades and margins, calcareous slopes, thickets, as ruderal plant along roads and in agricultural lands. A mezophilous plant, specific for ruderal habitats. The species is growing throughout the whole territory of Dniester-Prut river region (Bessarabia). The area of distribution covers the territory of Scandinavian Peninsula, Atlantic, Central and Eastern Europe, Crimea, Mediterranean region, Asia Minor and Middle East, Iran, Caucasus, Western and Eastern Siberia, Far East, Africa (North); in culture in North America [14, 26].

The plant has a long history of use in herbal medicine especially in affections connected to the digestive and gynaecological systems. It possesses antihelmintic, antispasmodic, analgesic, anti-inflammatory, haemostatic, digestive, antibacterial properties. The plant is used for treatment of dysmenorrhea, nervous diseases, epilepsy, depression, insomnia, uterine colic, amenorrhea, flatulence, menopause and menstrual disorders, tumor, dermatitis [2, 19].

Section 2. *Abrotanum* Bess. 1829, Bull. Soc. Nat. Moscou, 1: 222. – *Abrotanum* Neck. 1790, Elem. Bot. 1: 98, nom. illeg. – *Artemisia* subgen. *Abrotanum* (Bess.) Rydb. 1916,

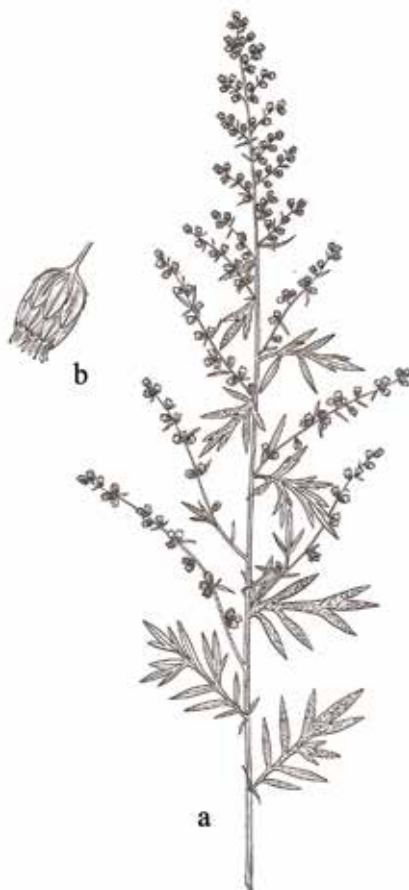


Figure 1. *Artemisia vulgaris* L.

North Amer. Fl. 34, 3: 247. – *Artemisia* sect. *Annua* Ameljcz. 1980, Фл. Красноярск. края, 10: 53. – Herbs, annual or perennial, rarely subshrubs, pubescent, tomentose, or glabrous, rarely arachnoid, without glandular or viscid hairs (sessile glands often present). Leaves 2-4-pinnatisect; lobules pectinate, filiform, narrowly linear, or lanceolate, less than 1(-1.5) mm wide. Capitula hemispheric, globose, or subglobose, rarely ovoid. Phyllary margins scarious, midvein green or sometimes colored. Receptacle glabrous. Marginal florets (1-)3-20; corolla narrowly tubular or rarely narrowly conical, 2- or 3(or 4)-toothed or without teeth. Disk florets (7-)10-80, bisexual, ovaries well developed; style ca. as long as or longer than corolla, branches divergent, recurved at apex.

Т у р у s: *A. abrotanum* L.

2. *A. pontica* L. 1753, Sp. Pl.: 847; Поляков, 1961, Фл. СССР, 26: 461; Tutin, 1976, Fl. Europ. 4: 183; Гейдеман, 1986, Определ. высш. раст. МССР, изд. 3: 548; Леонова, 1994, Фл. евр. части СССР, 7: 160; Котов, 1999, Определ. высш. раст. Укр., изд. 2: 340; Negru, 2007, Determ. pl. fl. R. Moldova: 251; Ciocârlan, 2009, Fl. ilustr. a României: 808. (Figure 2).

Subshrubs or herbs, 30-60(-100) cm tall, with woody rootstock and basal branches, densely pubescent, or stem glabrescent, much branched. Basal leaves in rosettes. Leaves abaxially sparsely pubescent; basal and lower stem leaves: leaf blades ovate or broadly ovate, 2-5 × 1.5-3 cm, 2- or 3-pinnatisect. Middle stem leaves 2-pinnatisect; segments 3 or 4 pairs; lobules elliptic or linear, 3-5 × 0.5-1 mm, obtuse apically. Uppermost leaves and leaflike bracts pinnatisect or entire; lobes of entire leaves linear or linear-lanceolate. Synflorescence a ± narrow panicle. Capitula many, nodding. Involucre globose, 2.5-3(-3.5) mm in diam. Marginal female florets 8-12. Disk florets 30-40, bisexual; corolla limb puberulent or later glabrescent. Achenes obovoid, 1 mm long. $2n=18$ [26].

It is a hemicryptophytic plant. The plants bloom in August-September and fructify in September-October. Propagate by seeds.

The plants usually grow in limestone slopes with steppe vegetation, dry valleys, hill, dry meadows, glades and edges of arid forests, bush thickets. A xerophilous plant, typical for steppe habitats. The species is

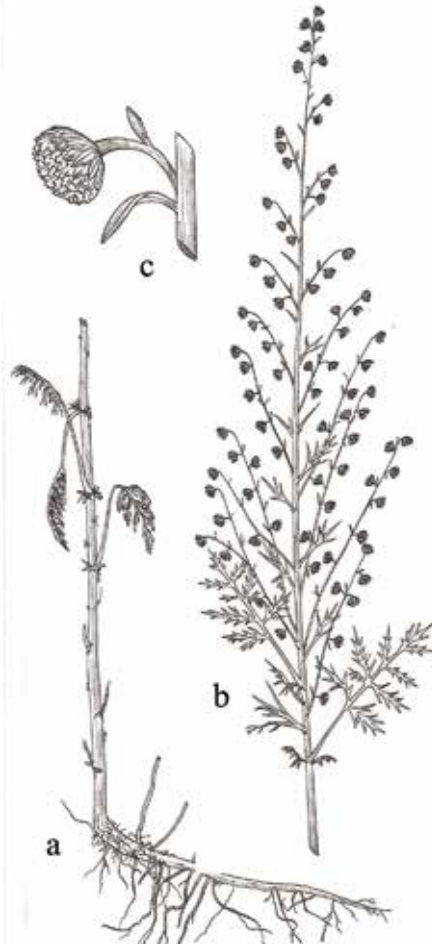


Figure 2. *A. pontica* L.

met sporadically throughout the whole territory of Bessarabia. The area of distribution covers the territory of Central and Eastern Europe, Crimea, Mediterranean region, Asia Minor and Middle (North), Caucasus (Precaucasia), Western Siberia; in culture in North America [14, 26].

The plant has therapeutic properties, such as: appetizing, tonic, analgesic, antihelminthic, antitumor, expectorant. It is used to treat reproductive system affections, amenorrhea, tumours, asthma, injuries [19]. Grows in the collection of medicinal plants of National Botanical Garden of the Republic of Moldova.

3. *A. annua* L. 1753, Sp. Pl.: 847; Поляков, 1961, Фл. СССР, 26: 489; Tutin, 1976, Fl. Europ. 4: 185; Гейдеман, 1986, Определ. высш. раст. МССР, изд. 3: 547; Леонова, 1994, Фл. евр. части СССР, 7: 161; Котов, 1999, Определ. высш. раст. Укр., изд. 2: 339; Negru, 2007, Determ. pl. fl. R. Moldova: 249; Ciocârlan, 2009, Fl. ilustr. a României: 804. (Figure 3).

Herbs, annual, 70-160(-220) cm tall, much branched, sparsely puberulent, soon glabrous, strongly aromatic. Leaves gland-dotted. Lowermost stem leaves: leaf blade ovate or triangular-ovate, 3-7 × 2-6 cm, 3(or 4)-pinnatipartite; segments 5-8(-10) pairs. Middle stem leaves: petiole 1-2 cm; leaf blade 2(or 3)-pinnatisect or pectinatisect; lobules deeply serrate to pectinate; teeth triangular, 1-2 × ca. 0.5 mm; rachis narrowly winged, sparsely serrate or not; midvein prominent adaxially. Uppermost leaves and leaflike bracts 1(or 2)-pinnatipartite. Synflorescence a panicle to 15 × 8 cm, produced from most nodes to form broad, conical compound panicle. Capitula many, shortly pedunculate, closely subtended by whorl of bracteoles, nodding. Involucre globose, 2-3 mm in diam.; phyllaries broad and scarious, ±glabrous. Marginal female florets 10-18. Disk florets 10-30, bisexual; corolla dark yellow or yellow. Achenes ellipsoid-ovoid. $2n=18$ [26].

It is a therophytic plant. The plants bloom in August-September and fructify in September-October. Propagate by seeds.

The plants usually grow in groups or sometimes it occurs solitary in hills, waysides, wastelands, outer forest margins, steppes, forest steppes, dry floodlands, terraces, rocky slopes, roadsides, saline soil. A xeromezophilous plant, typical for ruderal habitats. The species is growing throughout the whole territory of Bessarabia. The area of distribution covers the territory of Eurasia; introduced to North America [14, 26].



Figure 3. *A. annua* L.

Artemisia annua is an important aromatic and medicinal plant that has been used for over 2000 years to treat symptoms associated with fever and malaria. *A. annua* is the main source of artemisinin that have been shown to exhibit antiviral, antimicrobial, anti-inflammatory, anti-parasitic, anti-allergic, immunomodulatory, cytotoxic, contraceptive and antioxidant actions [15, 16, 19].

Section 3. ***Absinthium*** (Lam.) DC. 1805, in Lam. et DC. Fl. Fr., ed. 3, 4: 189. – *Absinthium* Lam. 1778, Fl. Fr. 2: 45. – *Artemisia* subgen. *Absinthium* (Lam.) Rydb. 1916, North Amer. Fl. 34, 3: 247. – *Artemisia* sect. *Artemisia* auct.: Tutin, 1976, Fl. Europ. 4: 180, p. p. – Shrubs, subshrubs, or annual, biennial, or perennial herbs, tomentose or puberulent, rarely arachnoid, without glandular or viscid hairs (sessile glands often present). Leaves 1-3-pinnatisect; lobes or lobules linear or filiform, serrate. Capitula globose or subglobose. Phyllary margin scarious. Receptacle pubescent or chaffy, hairs sometimes deciduous. Marginal florets (2-)4-30, sometimes in 2 series and up to 70; corolla vasiform or narrowly conical, (2-)4-toothed. Disk florets (8-)20-120, bisexual; ovaries well developed; style ca. as long as or longer than corolla, branches divergent, recurved at apex.

L e c t o t y p u s: *A. absinthium* DC.

4. *A. absinthium* L. 1753, Sp. Pl.: 848; Поляков, 1961, Фл. СССР, 26: 515; Tutin, 1976, Fl. Europ. 4: 180; Гейдеман, 1986, Опред. высш. раст. МССР, изд. 3: 547; Леонова, 1994, Фл. евр. части СССР, 7: 162; Котов, 1999, Опред. высш. раст. Укр., изд. 2: 339; Negru, 2007, Determ. pl. fl. R. Moldova: 251; Ciocârlan, 2009, Fl. ilustr. a României: 807. (Figure 4).

Herbs, perennial, 60-180(-220) cm tall, somewhat woody at base, gray sericeous or puberulent. Stems 1-3. Basal leaves: petiole 6-12 cm; leaf blade ovate-elliptic or ovate, 8-12 × 7-9 cm, 2- or 3-pinnatisect; segments 4 or 5 pairs, pinnately lobed; lobules lanceolate-elliptic or linear, 8-15 × 2-4(-7) mm, apex obtuse. Middle stem leaves: petiole 2-6 cm; leaf blade ovate or elliptic-ovate, 2-pinnatisect; lobules linear-lanceolate, 10-25 × 2-3(-5) mm. Uppermost leaves 4-6 × 2-4 cm, pinnatisect or 5-lobed; leaflike bracts 3-lobed or entire; lobes lanceolate or linear-lanceolate. Synflorescence usually a broad conical panicle; primary branches straight, ascending or ±oblique spreading,



Figure 4. *A. absinthium* L.

up to 30 cm and secondary branches up to 12 cm. Capitula shortly pedunculate, nodding. Involucre globose or subglobose, 2.5-3.5(-4) mm in diam.; receptacle hemispheric, densely pubescent. Marginal female florets 15-25; corolla yellow, obliquely 2-toothed. Disk florets 30-70(-90), bisexual; corolla yellow. Achenes oblong, 0.8-1(1.2) mm, with apical corona or not. $2n=18$ [26].

It is a hemicryptophytic plant. The plants bloom in June-September and fructify in July-October. Propagate by seeds and vegetatively.

The plants grow on hillsides, steppe hills, scrub, glades and forest margins, meadows, limestone slopes, as weeds in ruderalized places, along the roads, near settlements, orchards, fields. A typically ruderal species of disturbed habitats. The species is growing throughout the whole territory of Dniester-Prut river region. The area of distribution covers the territory of Scandinavian Peninsula, Atlantic, Central and Eastern Europe, Crimea, Mediterranean region, Asia Minor and Middle East, Iran, Caucasus, West (South) and East (Southwest) Siberia, Himalayas, Africa (North); introduced to North America [14, 26].

Artemisia absinthium L. is an exceptionally bitter herb that has been used as a digestive remedy since biblical times. Aerial parts of *A. absinthium* are used in liquid preparation for treating skin wounds, burns, swellings and ulcers. Modern pharmacological reports have indicated that *A. absinthium* extracts possess antioxidant, hepatoprotective, neuroprotective antimicrobial and anticancer properties. Also, *A. absinthium* is a source of essential oils used for flavouring of vermouth drinks. The plant has a wider use in local folk medicine. The infusion is used even nowadays as a sure remedy for the stomach and liver problems [1, 2, 19].

5. *A. austriaca* Jacq. 1773, Fl. Austr. 1: 61; Поляков, 1961, Фл. СССР, 26: 498; Tutin, 1976, Fl. Europ. 4: 183; Гейдеман, 1986, Опред. высш. раст. МССР, изд. 3: 548; Леонова, 1994, Фл. евр. части СССР, 7: 163; Котов, 1999, Опред. высш. раст. Укр., изд. 2: 340; Negru, 2007, Determ. pl. fl. R. Moldova: 251; Ciocârlan, 2009, Fl. ilustr. a României: 807. (Figure 5).

Subshrubs or herbaceous perennial, 15-30(-40) cm tall, with silvery-gray or silky pubescence. Lower stem leaves petiolate, pinnatisect. Middle and upper stem leaves petiolate; leaf blade 2- or 3-pinnatisect; lobules linear or linear-lanceolate, 8-10(-12)mm long. Upper leaves 3-pinnatisect or entire. Bracts linear, entire. Synflorescence a broad panicle. Capitula numerous,



Figure 5. *A. austriaca* Jacq.

subglobulose or ovoid, 1,5-2 mm in diameter, long pedunculated, patent. Involucre linear-lanceolate or lanceolate. Marginal female florets 5-7. Disk florets 7-8, bisexual. Achenes ellipsoid, cca 1 mm long. $2n=16, 36$ [26].

It is a hemicyptophytic plant. The plants bloom in July-August and fructify in August-October. Propagate by seeds and vegetatively.

The plants grow on stepped hills, limestone rocky slopes, dry meadows, glades and forest edges, shrubs, light forests, pastures. A typically xerophilous species, typical for steppe vegetation. In the Dniester-Prut region common throughout the territory of Bessarabia. The area of species distribution covers Central and Eastern Europe, Crimea, Mediterranean region, Asia Minor (north) and Middle (north and east), Iran (north and northwest), Caucasus, Western Siberia (south), Africa (north); introduced in the Far East (South) [14, 26].

As medicinal plant, *A. austriaca* improves the appetite, is used to treat various infections, such as malaria, tuberculosis, also in reproductive system disorders, dysmenorrhea, wound healing, respiratory affections, fevers, toothache [19].

Subgenus 2. ***Dracunculus*** (Bess.) Peterm. 1848, *Deutschl. Fl.*: 294. – *Artemisia* sect. *Dracunculus* Bess. 1835, *Bull. Soc. Nat. Moscou*, 8: 16. – *Oligosporus* Cass. 1817, *Bull. Soc. Philom. Paris*, 1817: 33. – *Artemisia* subgen. *Oligosporus* (Cass.) Galinis, 1980, *Lietuv. TSR Fl.* 6: 124, sine auct. comb. – Shrubs, subshrubs, or herbs, perennial, annual, or biennial, puberulent or pubescent, often glabrescent, rarely tomentose, without glandular or viscid hairs (sessile glands often present). Leaves 1- or 2-pinnatisect, less often subpalmately 5-7-partite or entire; lobules 0.3-1.5(-2.5) mm wide, or pectinate, less than 1.5×1.5 mm. Capitula globose to ovoid. Phyllary margins scarious. Receptacle glabrous. Marginal florets 2-20(-29); corolla tubular or narrowly conical, often slightly enlarged at base, 2- or 3-toothed. Disk florets 3-20(-35), male; ovaries minute, rarely absent; style shorter than corolla, 2-cleft, lobes usually not divergent, apex clavate or funnelliform.

L e c t o t y p u s: *A. dracunculus* L.

Section 4. ***Campestres*** Korobkov, 1981, *Полыни сев.-вост. СССР*: 112. – *Artemisia* sect. *Scopariae* Krasch. ex Amel'jcz. 1986, *Новое о фл. Сиб.*: 241. – Leaf blade of cauline leaves linear, usually without intermediate segments. Involucre of 2.5-5 mm long and 1.5-3 mm wide. Receptacle convex. Phyllaries distinctly separated from the bracts. Achenes 1.1-1.4 mm long.

L e c t o t y p u s: *A. campestris* L.

6. *A. marschalliana* Spreng. 1826, *Syst. Veg.* 3: 496; Клоков, 1962, *Фл. УРСР*, 11: 328; Леонова, 1994, *Фл. евр. части СССР*, 7: 166; Котов, 1999, *Опред. высш. раст. Укр.*, изд. 2: 340. – *A. inodora* Bieb. 1808, *Fl. Taur.-Cauc.* 2: 295, non Mill. 1768; Гейдеман, 1954, *Опред. раст. МССР*: 281. – *A. campestris* auct. non L.: Гейдеман, 1954, l. c.: 281; Negru, 2007, *Determ. pl. fl. R. Moldova*: 251; Ciocărlan, 2009, *Fl. ilustr. a României*: 808. – *A. campestris* var. *marschalliana* (Spreng.) Poljak. 1961, *Фл. СССР*, 26: 554. – *A. campestris* var. *sericophylla* (Rupr.) Poljak. 1961, *Фл. СССР*, 26: 554. – *A.*

campestris subsp. *campestris* auct.: Tutin, 1976, Fl. Europ. 4: 186, p. p. – *A. arenaria* auct. non DC.: Поляков, 1961, l. c.: 540; Гейдеман, 1975, Определ. высш. раст. МССР, изд. 2: 496. – *A. tschernieviana* Bess. 1835, Bull. Soc. Nat. Moscou, 8: 31; Tutin, 1976, Fl. Europ. 4: 185; Гейдеман, 1986, Определ. высш. раст. МССР, изд. 3: 548; Котов, 1999, l. c.: 340. (Figure 6).

Subshrubs or small shrubs, 30-70(-80) cm tall, with a thick rootstock, gray pubescent or sericeous-pubescent, persistent or glabrescent. Lower stem leaves: petiole 3-6 cm; leaf blade oblong-ovate or ovate, 5-8(-10) × 2-5 cm, 2(or 3)-pinnatisect; segments 4-6 pairs, 3-5-lobuled. Middle and upper stem leaves petiolate; leaf blade 1- or 2-pinnatisect; segments 3 or 4(or 5) pairs; lobules linear or linear-lanceolate, 10-15 × (0.5-)1-1.5 mm, apex mucronulate. Leaflike bracts 3-5-sect or entire. Synflorescence a broad to slender, erect or ascending, conical panicle, sometimes with lateral branches to form compound panicle; branches short, mostly less than 1 cm. Capitula contiguous along ultimate branches, ±sessile, erect. Involucre ovoid or broadly ovoid, 2-3 mm in diam. Marginal female florets 7-9. Disk florets 5-15, male. Achenes ovoid, 1 mm long.

It is a hemicryptophytic plant. The plants bloom in August-September and fructify since early September. Propagate by seeds.

The plants grow in glades and edges of arid light forests, shrubs, steppic hills, limestone rocky slopes, pastures. A typically steppe mesoxerophilous species. In the Dniester-Prut region can be found in arid areas from the center and south. The area of distribution covers Eastern Europe, Crimea, Mediterranean region (east), Asia Minor (north) and Middle (north), Caucasus, Western and Eastern Siberia (south) [26].

7. *A. trautvetteriana* Bess. 1845, Mém. Pres. Acad. Sci, Pétersb. Div. Sav. 4: 464, excl. var. *erecta*; Поляков, 1961, Фл. СССР, 26: 537; Tutin, 1976, Fl. Europ. 4: 185; Леонова, 1994, Фл. евр. части СССР, 7: 168. – *A. arenaria* DC. 1838, Prodr. 6: 94; Котов, 1999, Определ. высш. раст. Укр., изд. 2: 340, p. p.; Васильева и Коваленко, 2003, Консп. флори Півден. Бессарабії: 45. – *A. tschernieviana* auct. non Bess.: Ciocârlan, 2009, Fl. ilustr. a României: 807. (Figure 7).

Subshrubs or small shrubs, 50-70 cm tall, with woody root. Stems numerous, foliate, branched, at early stages short grayish pubescent, at maturity glabrescent, base lignified.

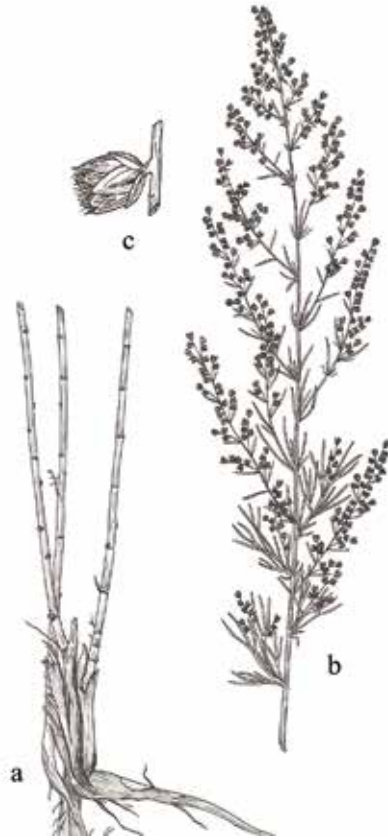


Figure 6. *A. marschalliana* Spreng.

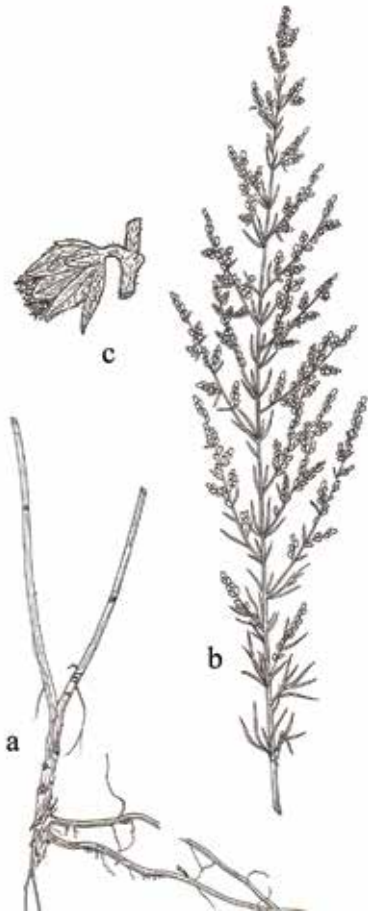


Figure 7. *A. trautvetteriana* Bess.

Leaves subcoriaceous, at first pubescent, at maturity almost glabrous. The lower and those on the sterile stems are long petiole, subverticillate, 5-8 cm long, pinnatisect; lobes 3-7, of 0.7-3(-4) cm length, narrow, linear, at apex spatulate, rounded. Middle and upper stem leaves shorter, sessile, usually divided into 3-7 lobes; bracts simple linear, short. Synflorescence a pyramidal panicle. Capitula numerous, broadly ovoid, 3-4 mm long, sessile and spiciformly arranged on the branches. Phyllaries imbricate, margins scarious. Marginal female florets 5-7. Disk florets 7-9, male. Achenes obovoid, 1-1,2 mm long.

It is a hemicryptophytic plant. Plants bloom in July-September and fructify since early September. Propagate by seeds and vegetatively.

The plants grow on seaside sands. A xeromezophilous species. In the Dniester-Prut region can be rarely met only in the southern part of the region on the territory of Ukraine in the littoral zone. Outside the country is spread in the Eastern Europe (South) [14, 26]. The species is included in the Red Book of vascular plants of Romania as Endangered species [3].

8. *A. scoparia* Waldst. et Kit. 1802,

Descr. Icon. Pl. Rar. Hung. 1: 66, tab. 65;

Поляков, 1961, Фл. СССР, 26: 560; Tutin, 1976, Fl. Europ. 4: 186; Гейдеман, 1986, Определ. высш. раст. МССР, изд. 3: 547; Леонова, 1994, Фл. евр. части СССР, 7: 168; Котов, 1999, Определ. высш. раст. Укр., изд. 2: 340; Negru, 2007, Determ. pl. fl. R. Moldova: 249; Ciocărlan, 2009, Fl. ilustr. a României: 804. (Figure 8).

Herbs, perennial, biennial, or annual, 40-80(-100) cm tall, much branched from lower on stem; branches and leaves gray or yellowish sericeous-pubescent, later glabrescent, strongly aromatic. Lower stem leaves: petiole 2-4 cm; leaf blade ovateoblong or elliptic, 2-3.5 × 1-3 cm, 2- or 3-pinnatisect; segments 3 or 4 pairs; lobules 1 or 2 pairs, 3-5 × 0.2-1 mm. Middle stem leaves sessile; leaf blade oblong or ovate-oblong, 1-2(-4) × 0.5-1.5 cm, 1- or 2-pinnatisect; segments 2 or 3 pairs; lobules filiform, usually curved, 4-8 × 0.2-0.3(-0.5) mm. Uppermost leaves and leaflike bracts 3-5-sect. Synflorescence a broad panicle. Capitula many, shortly pedunculate or sessile. Involucre subglobose, rarely ovoid, 1.5-2 mm in diam. Marginal female florets 5-7. Disk florets 4-10, male. Achenes obovoid or

oblong, 0.6 mm long. $2n=16$, 36 [26].

It is a therohemicryptophyte-therophytic plant. Plants bloom in August-September and fructify in September-October. Propagate by seeds.

The plants grow in habitat with ruderalized vegetation – meadows, forest glades and edges, bushes, steppic hills, limestone slopes, along the roads, near settlements. A xeromezophilous plant, typical for ruderal habitats. In the Dniester-Prut region can be sporadically found throughout the territory. Outside the country is spread in the Atlantic, Central and Eastern Europe, Crimea, Mediterranean region, Asia Minor and Middle East, Iran, Caucasus, Western and Eastern Siberia (South), Far East [14, 26].

It is a medicinal and aromatic plant. The plant has choleric, tonic, antihelminthic, purgative, expectorant, antipyretic, antispasmodic, antifungal, estrogenic properties. It is used to treat hepatobiliary and bladder diseases, respiratory disorders, bronchitis, pneumonia, pharyngitis, cough, mental illness, hysteria, neurosis, anemia, epilepsy, radiculitis, wounds, sprains [19].

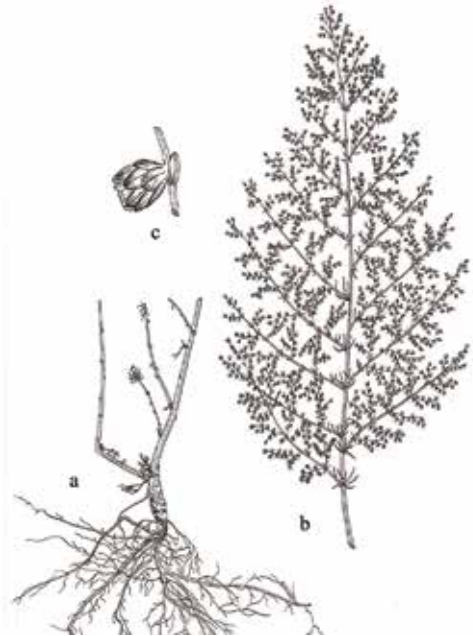


Figure 8. *A. scoparia* Waldst. et Kit.

Subgenus 3. *Seriphidium* (Bess.) Peterm. 1848, *Deutschl. Fl.*: 294. – *Artemisia* sect. *Seriphidium* Bess. 1835, *Bull. Soc. Nat. Moscou*, 1, 8: 222. – *Seriphidium* (Bess.) Poljak. 1961, *Тр. Инст. бот. АН КазССР*, 11: 171. – Shrubs or herbs, caespitose or solitary in annual herbs, strongly aromatic, sterile branched, tomentose, arachnoid pubescent, or glabrescent. Leaves alternate. Lowermost or middle stem leaves 2- or 3(or 4)-pinnatisect, -cleft, pectinately sect, or ternately 3-sect; lobes or lobules narrowly linear, or narrowly lanceolate, rarely filiform, elliptic, or pectinate. Uppermost leaves and leaflike bracts divided or entire. Capitula in narrow or broad panicles, rarely spicate panicles, sessile, ellipsoid or oblong, rarely ovoid, ovoid-campanulate, or globose, heterogamous, disciform. Phyllaries in (3 or)4-6(or 7) series, densely pubescent or arachnoid pubescent. Bisexual florets (1-)3-12(-20); anther appendages linear or linear-lanceolate. Achenes ovoid or obovoid, subcompressed.

L e c t o t y p u s: *A. maritima* L.

Section 5. *Seriphidium* Bess. 1829, *Bull. Soc. Nat. Moscou*, 2, 8: 222. – *Artemisia* sect. *Sclerophyllum* Filat. subsect. *Kazachstanicae* Filat. 1986, *Новости сист. высш. раст.* 23: 227. – *Artemisia* sect. *Halophilum* Filat. 1986, l. c.: 227. – Leaf blade of stem leaves, usually without intermediate segments. Involucre 2.5-5 mm long and 1.5-3 mm wide. The receptacle convex. Phyllaries distinct from the bracts. Marginal florets 4-5,

bisexual, yellow. Achene 1,1-1,9 mm long.

Т у р у s: *A. maritima* L.

9. *A. lerchiana* Weber ex Stechman, 1775, Dissert. Artem: 24, 25, s. str. (excl. var. β); Поляков, 1961, Фл. СССР, 26: 579; Tutin et K. Persson, 1976, Fl. Europ. 4: 181; Леонова, 1994, Фл. евр. части СССР, 7: 170; Котов, 1999, Определ. высш. раст. Укр., изд. 2: 340; Ciocârlan, 2009, Fl. ilustr. a României: 806. (Figure 9).

Subshrubs or small shrubs, with a thick woody rootstock, at the beginning grayish arachnoid pubescent, at maturity partially glabrescent, with shortened, perennial, lignified at base stems, and annual sterile stems, forming an apparent dense caespitose bush. Flowering stems numerous, erect or ascendant, 20-35(-50) cm tall, at top branched. Lower sterile stem leaves with petiole 2-4 cm long; leaf blade elongated, 2(or 3)-pinnatisect; lobules linear 2-3 mm long. Middle stem leaves sessile or short petiolated, at base with pinnatisected auricula. Leaflike upper bracts entire, linear. Synflorescence a narrow, branched panicle. Capitula numerous, sessile or short pedunculated, ovoid, at maturity narrow cup-flowered, 2-2.5(-3) mm long, patent, spiciformly gathered on the inflorescence branches. Phyllaries imbricate, oval, the outer ones densely arachnoid pubescent, the inner ones longer, elongate, with a broad membranous margin, the tip pubescent, in rest glabrous. Marginal florets 4-5, bisexual, yellow or slightly reddish. Achenes elongated-ovoid, 1,6-1,9 mm long. $2n=18$, 36 [26].

It is a hemicryptophytic plant. The plants bloom in September-October and fructify in October-November. Propagate by seeds and vegetatively.

The plants grow on steppe loess slopes. A typically steppic xerophilous species of arid habitats. In the Dniester-Prut region the species is rare and met only in the southern part, along the Prut river valey, between villages Valeni and Giurgiulesti (Cahul district), with a subpopulation surface totaling about 50 hectares, on predominantly semi-arid or arid steppe vegetation – within the most species-rich habitat – the Ponto-Sarmatic steppes – *62C0. [4] The area of species distribution covers the Central Europe (Romania: Dobrogea) and Eastern (South), Crimea, Small and Middle Asia (North-West), Iran, Caucasus, West Siberia (South-West) [14, 26].

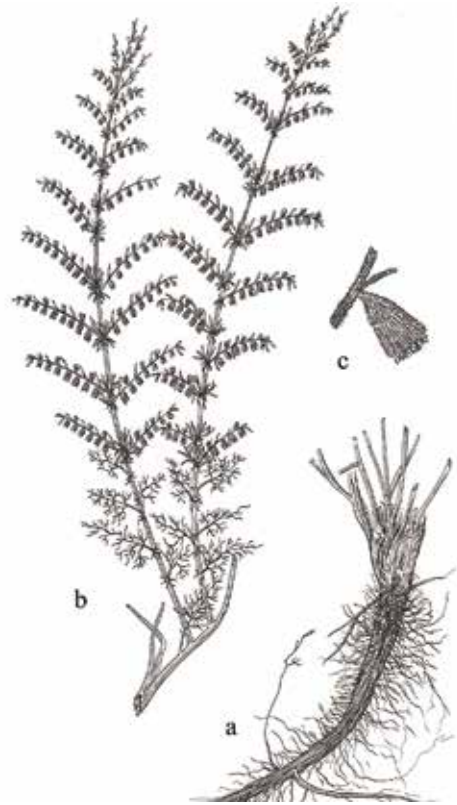


Figure 9. *A. lerchiana* Weber ex Stechman

A. lerchiana is less studied for its applicability in phytotherapy. The major classes of secondary metabolites are the sesquiterpene-lactones and essential oil [8]. As other *Artemisia* species, it possesses antihelmintic effect. The volatile oil is used in respiratory disorders, tracheitis, bronchitis, tuberculosis, and otitis [19].

In some areas of south-eastern Europe, it is well known the importance of *A. lerchiana* and *A. austriaca* that may provide enough forage for herds of sheep and goats in unfavourable winter or early spring months. Grows in the collection of medicinal plants of National Botanical Garden of the Republic of Moldova.

10. *A. santonica* L. 1753, Sp. Pl.: 845; Леонова, 1971, Новости сист. высш. раст. 7: 285; Гейдеман, 1975, Опред. высш. раст. МССР, изд. 2: 496; Tutin et K. Persson, 1976, Fl. Europ. 4: 182; Леонова, 1994, Фл. евр. части СССР, 7: 171; Котов, 1999, Опред. высш. раст. Укр., изд. 2: 340; Васильева и Коваленко, 2003, Консп. флори Півден. Бессарабії: 45; Negru, 2007, Determ. pl. fl. R. Moldova: 249; Ciocârlan, 2009, Fl. ilustr. a României: 806. – *A. monogyne* Waldst. et Kit. 1802, Descr. et Icon. Pl. Rar. Hung. 1: 77, tab. 75; Поляков, 1961, Фл. СССР, 26: 574; Васильева и Коваленко, 2003, l. c.: 45. – *A. salina* auct. non Willd.: Гейдеман, 1954, Опред. раст. МССР: 281. (Figure 10).

Perennial, herbaceous, subshrub, 30-40 (-50) cm tall, with a woody rootstock, at the beginning grayish arachnoid pubescent, at maturity slightly pubescent or glabrescent, with perennial, lignified at base stems. Flowering stems numerous (up to 12-20), thin, erect, at base lignified, at top branched. Lower sterile stem leaves with petiole 2-4(-5) cm long; leaf blade elongated, 2-pinnatisect; lobules narrow-linear, with tip acuminate. Middle stem leaves sessile. Leaflike upper bracts entire, linear. Synflorescence a branched panicle. Capitula numerous, usually pedunculated, obovoid or at maturity narrow-campanulate, erect or nodding. Phyllaries imbricate, wide-membranous emarginate, the outer ones oval, pubescent at keel, the inner ones larger, elongate, smooth, the tip slightly pubescent. Marginal florets 3-4, bisexual, yellow or slightly reddish, sometimes disk florets sterile. Achenes obovoid, cca 1,5 mm long.

It is a hemicryptophytic plant. The plants bloom in August-September and fructify since early September. Propagate by seeds and vegetatively.

The plants grow on salinized grasslands, lake banks. A typically halophytic mesoxerophilous species. In the Dniester-Prut region can be found sporadically

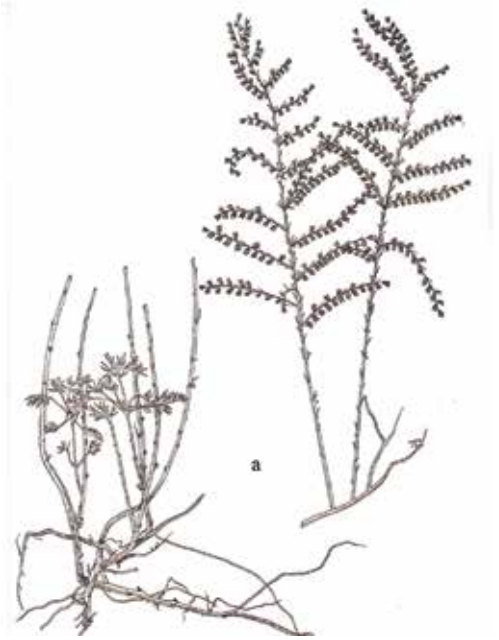


Figure 10. *A. santonica* L.

throughout the territory. Distribution area of species covers Central (South-East) and Eastern (except northern part) Europe, Crimea, Middle Asia (North-West), Caucasus [14, 26].

The aerial part of the plants possesses anthelmintic, antiprotozoal, antigungal effects. It is used to treat some gynaecological disorders, amenorrhea, mental illnesses, hysteria [19].

CONCLUSION

For the territory of the Dniester-Prut region, 10 species of the genus *Artemisia* L. were identified: *A. vulgaris* L. *A. pontica* L. *A. annua* L. *A. absinthium* L. *A. austriaca* Jacq. *A. marschalliana* Spreng. *A. trautvetteriana* Bess. *A. scoparia* Waldst. et Kit. *A. lerchiana* Weber ex Stechman and *A. santonica* L.

The study revealed three rare species of wormwood in the territory of Dniester-Prut region – *Artemisia trautvetteriana* Bess., *A. pontica* L. and *A. lerchiana* Weber ex Stechman. The last two species a met within the boundaries of the Republic of Moldova found mainly in the southern regions, inhabiting Ponto-Sarmatic steppes (*62C0) – the European Union priority habitat type. Therefore we propose to include species *A. pontica* L. and *A. lerchiana* Weber ex Stechman in the list of species protected by law [9], but *A. lerchiana* to be included in the Red Book of Republic of Moldova (4th edition).

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