



***Achillea grandiflora* M. Bieb.**
***Achillea micrantha* Willd.**
***Achillea millefolium* L.**
***Achillea nobilis* L.**
***Achillea ptarmicifolia* (Willd.) Rupr. ex Heimerl**
***Ptarmica ptarmicifolia* Galushko**
ASTERACEAE

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Synonyms

***Achillea millefolium* L.:** *Achillea alpicola* (Rydb.) Rydb.; *Achillea arenaria* A. Heller; *Achillea borealis* subsp. *arenicola* (A. Heller) D.D. Keck; *Achillea borealis* subsp. *californica* (Pollard) D.D. Keck; *Achillea californica* Pollard;

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Achillea gigantea Pollard; *Achillea lanulosa* Nutt.; *Achillea lanulosa* subsp. *alpicola* (Rydb.) D.D. Keck; *Achillea lanulosa* var. *alpicola* Rydb.; *Achillea laxiflora* Pollard & Cockerell; *Achillea megacephala* Raup; *Achillea millefolium* subsp. *borealis* (Bong.) Breitung; *Achillea millefolium* subsp. *occidentalis* (DC.) Hyl.; *Achillea millefolium* var. *alpicola* (Rydb.) Garrett; *Achillea millefolium* var. *arenicola* (A. Heller) Nobs; *Achillea millefolium* var. *asplenifolia* (Vent.) Farw.; *Achillea millefolium* var. *borealis* (Bong.) Farw.; *Achillea millefolium* var. *californica* (Pollard) Jeps.; *Achillea millefolium* var. *gigantea* (Pollard) Nobs; *Achillea millefolium* var. *lanulosa* (Nutt.) Piper; *Achillea millefolium* var. *litoralis* Ehrend. ex Nobs.; *Achillea millefolium* var. *maritima* Jeps.; *Achillea millefolium* var. *megacephala* B. Boivin; *Achillea millefolium* var. *nigrescens* E. Mey.; *Achillea millefolium* var. *occidentalis* DC.; *Achillea millefolium* var. *pacifica* (Rydb.) G.N. Jones; *Achillea millefolium* var. *puberula* (Rydb.) Nobs; *Achillea nigrescens* (E. Mey.) Rydb.; *Achillea occidentalis* (DC.) Raf. ex Rydb.; *Achillea pecten-veneris* Pollard; *Achillea puberula* Rydb.; *Achillea rosea* Desf.; *Achillea subalpina* Greene; *Achillea sudetica* Opitz; *Chamaemelum millefolium* (L.) E.H.L. Krause

Local Names

***Achillea grandiflora*:** Georgian: ჯორთკუდა (jortk'uda)

***Achillea micrantha*:** Georgian: ფარსმანდუკი (parsmanduk'i); Tushetian: მელაკუდა (melakuda)

***Achillea millefolium*:** Russian: Деревей (derebei); Azeri: боймадерен (doimaderei); Armenian: хазаратеревук (chazaraterevyk), Мелетник (Meletnik); Persian: Boodko (بودكو), Bumâdarân, Bumâdarân hezâr barg (بوم‌ادران); Georgian: ფარსმანდუკი (parsmanduk'i), კრავისკუდა (k'ravisk'uda), მელაგუნდა (melagunda); Tushetian: მელაკუდა (Melik'uda.), წყლულის ბალახი (ts'q'lulis balakhi)

English: Common yarrow; (Makashvili 1991; Ketskhoveli et al. 1971–2011; Sokolov 1993)

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Achillea nobilis: Georgian: ტილჭირი (t'ilch'iri), ფარსმანდუკი (parsmanduk'i);

Tushetian: მელაკუდა (melik'uda)

Achillea ptarmicifolia: Georgian: ველური ტარხუნა (veluri tarkhuna)

Botany and Ecology

Achillea grandiflora: Perennial. Rhizome slender, with short underground branches; plants grayish, more or less tomentose; stems 2–3, less often solitary, 20–40(50) cm high, indistinctly angular, usually weakly flexuous, simple, less often weakly branched above, usually with short, densely leafy branches in axils of cauline leaves. Cauline leaves petiolate, linear or oblong, 3–5(10) cm long, often more or less falcate, with wide midrib, pinnately cut; segments usually complicate, often slightly distant in lower and middle cauline leaves, punctate-alveolate on both sides, ovate or oblong, somewhat decurrent, incised or divided in 3–5 ovate, obovate, oblong, rarely lanceolate lobes, entire or sometimes incised toothed, terminating in cartilaginous cusp, less often segments entire. Capitula in compound, dense, somewhat convex, corymbs. Receptacle conical, less often weakly convex. Involucre oblong or oblong-ovoid, 3–4(5) mm long, 2–3 mm in diameter; usually appressed hairy; involucre bracts yellowish-green; outer bracts ovate, others oblong, carinate, with narrow white membranous border; bracts lanceolate, much shorter than tubular florets, membranous, with narrow white margin, glabrous or glandular outside and with few appressed hairs in upper part. Ligules of outer florets yellow, small, 0.8–1.25–1.5 mm long, a fourth to a third as long as involucre, rotund-reniform, with 3 obtuse teeth. Achenes cuneate-oblong, apically truncate, finely rugose, 1.25–1.5 mm long. Flowering June–August; fruiting July–September (October). Caucasus, Ural, on sands, sandy soils, less often in steppe pastures and alkaline meadows, from forest-steppe to desert zones (Shishkin and Boborov 1961).

Achillea micrantha: Perennial. Rhizome woody; whole plant more or less densely pubescent from slightly appressed hairs; stems less numerous, less often solitary, (25)40–70(120) cm high, erect, ribbed-sulcate, straight or weakly flexuous, simple, less often sparingly branched, densely leafy, very rarely with short branches in axils of cauline leaves. Leaves pubescent, with frequent punctate-alveolate glandular hairs on both sides, wide, oblong-lanceolate, pinnately parted, with decurrent oblong-lanceolate, or oblong, crenulate, and obtusely toothed large segments; midrib of leaves serrate-dentate; leaves on nonflowering branches long petiolate, up to 40 cm long; lower cauline leaves petiolate, middle 8–18 cm long, with (0.5)1.5–2.0(3.0)-cm-long middle segments, lower segments smaller, more remote; upper leaves sessile, smaller, uppermost about 1 cm long, filiform-linear, serrate-dentate, or entire. Capitula with few or many flowers, in dense, large (to 10 cm in diameter), compound, convex, unequal corymbs. Receptacle convex to oblong-cylindrical. Involucre oblong-obconical, often with elongate base, or oblong-cylindrical, 3–4 to 9–10 mm long and about 2 mm in diameter; involucre bracts deltoid-oblong, pubescent, pale; bracts oblong-lanceolate, much shorter than florets. All flowers tubular, or outer flowers short-ligulate, often irregular, with small (up to 1 mm long) three-lobed reniform-rotund, bright yellow ligules. Achenes oblong, 1.5–1.75 mm

long. Flowering June–July (September). Caucasus, Middle Asia, on gravel beds in river valleys, on stony, clayey, clayey-sandy soils along irrigation channels, springs and streams, as well as in old fields and open dry mountain slopes, in glades, and along edges of mountain forests and shrub thickets. From foothill plains to upper part of the tree belts (Shishkin and Boborov 1961).

***Achillea millefolium* L.:** Perennial. Rhizome slender, creeping, branched; whole plant more or less covered with fine white hairs; stems few or solitary, usually weakly pubescent (finely floccose), (5)20–60(120) cm high, erect or ascending from base, erect, less often flexuous, simple or branched above, cylindrical, finely sulcate, with short leafy branches in axils of upper and middle cauline leaves. Leaves lanceolate, oblong-lanceolate, or almost linear, punctate-alveolate, twice or thrice pinnately cut, with numerous more or less remote segments (1.5–10 mm apart); lower cauline leaves and leaves of nonflowering branches 10–40 cm long, 0.8–5 cm wide, rachis 1–2 mm wide, leaves usually in upper part with solitary teeth between basal segments; lobes and teeth lanceolate, less often linear, 0.5–1.5 mm long, 0.3–0.4(0.5) mm wide, terminating in short cartilaginous cusp. Capitula in numerous, unequal, compound corymbs, 2–15 cm in dia. Involucre oblong to almost ovoid, 3–4(6) mm long, (2)3–4 (5) mm in dia; involucre bracts green, carinate, with prominent midrib, membranous along margin, often brownish; bracts ovate to oblong-elliptical, membranous, floccose above, with scattered hairs on dorsal surface. Ligules of outer florets white, pink, or red. (1)2–4 mm long, 1.5–3.0(4.5) mm wide, more or less rotund, 2–3-toothed at apex, limb a half as long as involucre; tubular florets up to 20, glandular-hairy on outside. Flowering July–October. Ural, Caucasus, Altai, Middle Asia, on dry forest edges, clearings, in open forests, on dry meadows, slopes, railroad embankments, along roads, on the outskirts of fields (Shishkin and Boborov 1961; Figs. 1, 2, and 3).

***Achillea nobilis*:** Perennial. Rhizome short, many-headed; plants grayish-green, more or less densely lanate-flocculose, sometimes subglabrous; stems few, 3–6, less often up to 12, or solitary, (15)25–35(50) cm tall, erect or slightly ascending, usually sinuate, simple or branched near top, usually densely leafy, finely sulcate, weakly angular and more strongly pubescent below. Leaves ovate or oblong-elliptical, twice pinnately cut, punctate-alveolate on both sides, somewhat antrorse, flat, (2)3–6 cm long, sessile, only lower cauline leaves and those on nonflowering branches petiolate; midrib of leaves narrow, with more or less frequent intermediate cuspidate lobes between middle part and apex (between main segments), lanceolate, deltoid or linear, entire or pinnatifid; leaf segments linear, up to 10–15 mm long, few, distant (especially in lower part of lower cauline leaves), divergent, pinnately cut into entire or often pinnatifid lobes, with small, 0.5–1.0(2.0) mm long, lanceolate or linear, acute lobes, terminating in cartilaginous cusp. Capitula in dense, convex, compound corymbs; receptacle more or less convex, often conical at fruiting. Involucre ovoid, less often oblong-ovoid, 2.0–3.0(3.5) mm long, 1.5–2.0(2.5) mm in diameter; involucre bracts pale, carinate, oblong, with narrow white or less often brown (var. *marginata* C. Koch) membranous margin; bracts membranous, lanceolate, white, transparent, slightly shorter than tubular florets. Ligules of outer florets white or yellowish-white, reniform-rotund, subelliptical or semicircular, truncate at apex, unequal three-toothed, (0.6)1.0–1.6(1.9) mm wide, 1/3–2/7 as long as

Fig. 1 *Achillea millefolium*
(Asteraceae), Bakuriani,
Georgia. (Photo
R.W. Bussmann &
N.Y. Paniagua-Zambrana)



Fig. 2 *Achillea millefolium*
(Asteraceae), Bakuriani,
Georgia. (Photo
R.W. Bussmann &
N.Y. Paniagua-Zambrana)





Fig. 3 *Achillea millefolium* (Asteraceae), Bakuriani, Georgia. (Photo R.W. Bussmann & N.Y. Paniagua-Zambrana)

involucre. Achenes oblong, about 1 mm long. Flowering June–September. Ural, Caucasus, in steppe and forest-steppe zones on chernozems and saline soils, solonchets, chalky and stony outcrops, in *Stipa* and *Festuca* steppes, steppe meadows, old fields, by roadsides, more rarely in thickets of shrubs, along forest edges and in glades, as well as in riverine meadows. In forest and desert zones as an introduced and weed plant, often on railway embankments and in vacant lots and squares in cities (Shishkin and Boborov 1961).

***Achillea ptarmicifolia*:** Perennial. Rhizome creeping, usually with few stems; stems 15–60 cm tall, leafy, branched inflorescence and with long nonflowering branches in leaf axils, glabrous below, in middle part sparsely and above rather densely pubescent with colorless, short, crisped hairs. Leaves green, linear, scattered pubescent beneath with colorless straight hairs; lower leaves 2.5–7.0 cm long, 1.5–4.0 mm wide, biserrate, withering before flowering; upper leaves and those of axillary branches 1–10 cm long, 1–5 mm wide, toothed. Inflorescence corymbose; capitula semiglobose, 4.5–7.0 mm long and 6.5–9.0 mm in diameter (excluding ligules). Involucral bracts imbricate, 3-seriate, broadly lanceolate, 2.3–4.0 mm long and 1.0–1.8 mm wide, with scattered not very long crisped colorless hairs, fimbriate-toothed along margin, yellowish-green in middle, with wide, membranous, light brown frill along margin. Receptacular scales like involucral bracts, reducing from periphery to center. Outer florets 8–12, pistillate, ligulate florets 5.2–10.0 mm long; ligules white, oval, 7–9 mm long and 2.5–3.7 mm wide, with 3 obtuse teeth at apex, disk florets 2.7–3.0 mm long, white, tubular, bisexual, 5-toothed; teeth acute. Achenes broadly oblanceolate, about 2.8 mm long and 1.6 mm wide. Flowering July–August. Caucasus, screes and rocks in subalpine and alpine zones (Shishkin and Boborov 1961; Figs. 4, 5, and 6).

Fig. 4 *Achillea ptarmicifolia* (Asteraceae), Bakuriani, Georgia. (Photo R.W. Bussmann & N.Y. Paniagua-Zambrana)



Fig. 5 *Achillea ptarmicifolia* (Asteraceae), Bakuriani, Georgia. (Photo R.W. Bussmann & N.Y. Paniagua-Zambrana)



Fig. 6 *Achillea ptarmicifolia* (Asteraceae), Bakuriani, Georgia. (Photo R.W. Bussmann & N.Y. Paniagua-Zambrana)

Phytochemistry

Carbohydrates (glucose, galactose, arabinose, inositol), organic acids (aconite, amber), essential oils (azulene, caryophyllene, eucalyptol, borneol, bornyl acetate, pinene, limonene, α -thujone, terpineol, aljojoen, cadinene, camphene, camphor, copaene, cuminaldehyde, cymol, eugenol, farnesene, furfural, gumulene, isoartemisia ketone, isobutyl acetate, limonene, menthol, myrcene, sabinene, α -terpinene, γ -terpinene, terpinol-4, terpinolene), sesquiterpenoids (acetoxyartabsin, acetylbalkanolide, achillicine, achilline, austrocin, balkhanide, dihydroacetoxytamactine, hydroxyachilline, leucodine, millefine, millepholide), alkaloids (betaine, choline, trigonelline, achilleine), cyanogenic compounds, steroids (sitosterol, sitosterol acetate), phenolic compounds, tannins, phenolcarbonic acids (salicylic, coffee), coumarins, flavonoids (apigenin, luteolin, cosmosine, artemethine, kasticine, isorhamnetin, vitexin, sertizine, orientin, quercetin, isovitexin, isoorientin, vicenin), fatty acids (myristic, palmitic, stearic, oleic, linoleic), coumarins, terpenoids (azulene, geraniol, citral, menton, carvone, α -thujone, achilline) (Sokolov 1993).

Local Medicinal Uses

All species are widely used as wound-healing agent and included in a variety of official pharmacopoeia. In the Ural the leaves are chewed for toothache, and the plants are used as diuretic, antitumor, and wound-healing agent. In the Ural the decoction is used as hemostatic for internal bleeding and nosebleeds, as laxatives, and for gastric problems, hemorrhoids, gastritis, stomach ulcers, kidney and urinary

diseases, skin diseases, and burns. In the Caucasus the leaves are used for rheumatism, bronchial asthma, heart disease, and kidney disease; as diuretic, hemostatic, and antipyretic as well as anthelmintic; and for anemia, diarrhea, and amenorrhea. In the Northern Caucasus, *A. grandiflora* is used for conjunctivitis and for diseases of the stomach. A leaf infusion is used in Middle Asia for diseases of the cardiovascular system, stomach problems, hemorrhoids, amenorrhea, metrorrhagia, and toothache and as galactagogue. *Achillea millefolium* is an old well-known hemostatic (Grossheim 1952; Sokolov 1993).

Many medicinal uses have been reported for *A. millefolium* in Iran. It is used for menstruation problems and to stimulate menstruation, to stop bleeding, for wound healing, to relieve asthma and constipation, and as diuretic, anthelmintic, and carminative (Mozaffarian 2013). Infusion of aerial parts is used to treat the abdominal pains, diabetes, anemia, and child fever in Saravan region (Sadeghi et al. 2014). Decoction of flowers is used as antidiabetic in Urmia region (Bahmani et al. 2014). Other species of *Achillea* including *A. eriophora* DC. and *A. wilhelmsii* K. Koch are used for similar applications in the other parts of Iran (Mozaffarian 2008; Mosaddegh et al. 2012; Khajoei Nasab and Khosravi 2014; Sadat-Hosseini et al. 2017; Maleki and Akhane 2018)

***Achillea grandiflora*:** The leaves and the whole plant are used for wound care (Bussmann et al. 2014, 2016a, b, 2017a, b, 2018).

***Achillea micrantha*:** The leaves and the whole plant are used for wound care (Bussmann et al. 2014, 2016a, b, 2017a, b, 2018).

Fig. 7 *Achillea latiloba*
(Asteraceae), Bakuriani,
Georgia. (Photo
R.W. Bussmann &
N.Y. Paniagua-Zambrana)



Achillea millefolium: The leaves are used as anti-inflammatory, cholagogic, diuretic, for kidneys, liver, sore throat, stomach, ulcers, and wounds (Bussmann et al. 2014, 2016a, b, 2017a, b, 2018). The species is widely sold in local markets (Bussmann et al. 2017b).

Achillea nobilis: The leaves and whole plant are being used for wounds. The root extract is used to treat rheumatism (Bussmann et al. 2014, 2016a, b, 2017a, b, 2018).

Local Food Uses

The extracts of all species are used to produce bitter liqueurs (Sokolov 1993).

Achillea millefolium*/*Achillea latiloba: The whole plant is used as filling for Khachapuri. The flowers are used as tea (Bussmann et al. 2014, 2016a, b, 2017a, b, 2018; Figs. 7 and 8).

Local Handicraft and Other Uses

All species as fodder for cattle, sheep, horses, and camels. Planted as ornamental (Sokolov 1993).

Achillea millefolium: The leaves yield a dye for wool and silk (Bussmann et al. 2014, 2016a, b, 2017a, b, 2018).



Fig. 8 *Achillea latiloba* (Asteraceae), Bakuriani, Georgia. (Photo R.W. Bussmann & N.Y. Paniagua-Zambrana)

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