On the identity of five species of Achillea sect. Millefolium subsect. Filipendulinae (Compositae, Anthemideae)

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On the identity of five species of *Achillea* sect. *Millefolium* subsect. *Filipendulinae (Compositae, Anthemideae)*

Abstract

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Based on studies of type material, ill-defined taxa of *Achillea* sect. *Millefolium* subsect. *Filipendulinae* are realigned. The conflicting application of *A. micrantha* is clarified and its correct application for the species later named *A. gerberi* is fixed by corresponding lectotypification. *A. arabica* is found to fully correspond to the later described *A. biebersteinii* and the first name is consequently established for this taxon. *A. sahandica* is found to represent actually *Tanacetum polycephalum* subsp. *heterophyllum*, and the placement of the rare and insufficiently known *A. cuneatiloba* in *A.* subsect. *Filipendulinae* rather than in *A.* subsect. *Millefoliatae* is proposed.

Introduction

Achillea sect. *Millefolium* (Adans.) W. Koch subsect. *Filipendulinae* DC. is a heterogeneous group of 26 yellow-flowering species with its centre of speciation in SE Europe and adjoining Asia. Leaf structure and growth form provide the main diagnostic characters at species level. Spontaneous polyploidy as observed within some taxa accounts for some variation in morphological characters (Thornton-Wood 1993, Valant-Vetschera & Wollenweber 1996). In several cases, flavonoid aglycone profiles confirmed species groups based on morphological characters (Valant-Vetschera & Wollenweber 1996).

The subsection also comprises a few badly recorded species of uncertain status. Based on the study of the original and type material, the realignment of such species, which are related to or have been associated with *A. biebersteinii* Afan. ex Hub.-Mor., is in the focus of this paper.

1. The identity of *Achillea micrantha* Willd., *A. arabica* Kotschy and *A. gerberi* Willd.

Considerable confusion exists about the identity of *Achillea micrantha* Willd. In 1789, Willdenow described *A. micrantha* from Siberia, with reference to Gmelin (1752). For what reason ever, later Willdenow radically emended the concept of *A. micrantha* by retaining the name

and diagnosis but explicitly excluding the synonymy and description ("excluso synonimo et descriptione", Willdenow 1803: 2209) as well as the provenance Siberia given in the protologue. Instead, Tournefort's phrase name "Millefolium orientale erectum luteum" is added as a synonym to the reworded diagnosis, the provenance Cappadocia is stated and a new description provided. Simultaneously (Willdenow 1803: 2196) a new species, *Achillea gerberi* Willd., is published, with a diagnosis identical to that in the protologue of *A. micrantha*, with the same Gmelin reference and also the distribution "Sibiria". The two protologues and the emendation of *A. micrantha* are given in the following.

Achillea micrantha Willd., Tract. Achilleis: 33. 1789

22. ACHILLEA *micrantha* foliis pinnatis pubescentibus: pinnis laciniatis; radio minimo.
Achillea foliis linearibus, pinnatifidis, pubescentibus petiolatis, foliolis incisis, calycibus oblongis. *Gmel. sib.* 2. *pag.* 158. n. 164. *tab.* 83. *fig.* 2.
Habitat in *Sibiria*. 4.

Caulis ramosus fere pedalis teres striatus pubescens. Folia alterna pinnata pubescentia: pinnis trifidis vel pinnatifidis vel laciniatis. Flores in caule et ramis terminales corymbosi lutei. Corymbus subramosus pauciflorus coarctatus. Calyx hemisphaericus; squamis lanceolatis. Corollae radii ad decem emarginatae minimae.

Achillea micrantha Willd. (1789) emend. Sp. Pl. 3: 2209. 1803

*37. ACHILLEA *micrantha*. W.
A. foliis bipinnatifidis pubescentibus, laciniis lanceolatis integerrimis, corymbo composito. W.
A. foliis pinnatis pubescentibus, pinnis laciniatis, radio minimo. *Willd. Ach. p.* 33. *n.* 22. (*excluso synonimo et descriptione.*)
Millefolium orientale erectum luteum. *Tournef. cor.* 37.
Kleinblumige Garbe. W.
Habitat in Cappadocia. 4 (*v. v.*)
Folia *pollicaria vel sesquipollicaria pubescentia pinnata, pinnis tripartitis, laciniis lanceolatis integerrimis.* Corymbus *compositus laxus.* Flores *saturate flavi.* Calyx *oblongus.* Radius *parvus.* W.

Achillea gerberi Willd., Sp. Pl. 3: 2196. 1803

*10. **ACHILLEA** *Gerberi.* **W.**

A. foliis caulinis pinnatifidis, laciniis integerrimis, radicalibus pinnatifidis, laciniis trifidis, corollis radii vix calyce majoribus. W.

A. foliis linearibus pinnatifidis pubeſcentibus petiolatis, foliolis inciſis, calycibus oblongis. *Gmel. ſib. 2. p. 198 t. 83. f. 2.* *

Gerberſche Garbe. W.

Habitat in Sibiria. 4 (*v. ſ.*)

Caulis *digitalis ramoſus adſcendens vel diffuſus, tenui pube obſitus.* Folia *radicalia et infima caulina linearia pinnatifida, laciniis parvis oblongis trifidis; caulina linearia pinnatifida, laciniis breviſſimis oblongis integerrimis.* Corymbi *ſimplices umbellati pauciflori, floribus flavis coarctatis.* Corollae *radii admodum parvae, ad decem fere, vix calyce majores.* W.

A lectotypification of *Achillea micrantha* has not yet been effected. Original material unambigously related to the protologue is not known to exist in the Willdenow herbarium or elsewhere. There is also no evidence that the Tournefort & Gundelsheimer specimen in the Willdenow herbarium annotated "Millefolium cappadocicum rectum luteum", B-W 16356/5, to which Willdenow apparently refers in the emendation of 1803, has in fact been part of the original material of *A. micrantha* in 1789 (about the Tournefort material in the Willdenow herbarium, see Wagenitz 1962). Considering the distribution "Sibiria" given for *A. micrantha* in 1789, this is even rather unlikely. The only element eligible as lectotype of *A. micrantha* is therefore the Gmelin icon. This confirms the view of Afanas'jev & Bočancev (1961) and makes *Achillea micrantha* to the correct name for the Siberian taxon and *A. gerberi* Willd. to a later synonym:

Achillea micrantha Willd., Tract. Achilleis: 33. 1789, emend. Sp. Pl. 3: 2209. 1803. – Lectotype (designated here): [icon] Gmelin, Fl. Sibir. 2: t. 83, fig. 2. 1749.
= *Achillea gerberi* Willd., Sp. Pl. 3: 2196. 1803.

For the taxon from Cappadocia consequently another name must be used. Erroneously taking Willdenow's emendation of *Achillea micrantha* (Willdenow 1803) for the publication of a later homonym, Afanas'jev (1959: 361) published the name *"Achillea biebersteinii",* supposed to be a nomen novum for what he assumed to be a later homonym. This name was subsequently introduced in major floras (Afanas'jev & Bočancev 1961, Huber-Morath 1975, 1986, Richardson 1976), although not being valid as a nomen novum. It cannot either be considered a valid description of a new species by reference to an earlier published Latin diagnosis since no type was designated. This provision was only met by Huber-Morath (1975) with the designation of the Tournefort specimen in the Willdenow herbarium (B-W 16356/5) as the type, and Huber-Morath has consequently to be quoted as the author of this name.

New results, nevertheless preclude *Achillea biebersteinii* Afan. ex Hub.-Mor. from further use. In 1866 Kotschy had described a plant from Arabia under the name *Achillea arabica*. This poorly recorded species has not been considered in recent comprehensive floristic publications (Huber-Morath 1975, 1986). Some reports, however, exist (Schwartz 1938, Migahid 1989), yet with little indications as to diganostic features or relationships.

Achillea arabica was described by Kotschy from a single specimen collected by an unknown German physician ("Arabia Asyr., medicus ignotus legit 1838"). The protologue comprises an icon (Kotschy 1866: t. 1B), which fully agrees in the setup and all depicted details with the correspondingly labelled specimen in the herbarium of the Naturhistorisches Museum Wien (W). This specimen is designated as the lectotype here. Its investigation revealed complete agreement of the morphological features of *Achillea arabica* with *A. biebersteinii*. Already Kotschy (1866) indicated a close affinity of *A. arabica* to "*A. micrantha* [sensu] M. Bieb.", which actually is *A. biebersteinii*. Some variability in the height and size of the corymbs has been noted by the present author among collections from Arabia in the herbarium of the British Museum of Natural History (BH), corresponding to observations in material from the Irano-Turanian region (Huber-Morath 1975, 1986 sub *A. biebersteinii*) and the former USSR (Afanas'jev & Bočancev 1961 sub *A. biebersteinii*). This variation may reflect the occurrence of diploid and tetraploid races, which is not uncommon within *Achillea* (Valant-Vetschera & Wollenweber 1996), but it was considered insufficient for establishing infraspecific taxa (Afanas'jev & Bočancev 1961). This variation may explain the creation of a new species by Kotschy. The known distribution area of this taxon thus ranges from the Arabian Peninsula to Central Asia and E Europe.

Achillea arabica Kotschy in Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Abt. 1, 52: 251. 1866. – Holotype: Arabia, Asyr [Asir], 1838, medicus ignotus legit (W!).
= *Achillea biebersteinii* Afan. ex Hub.-Mor. in Davis, Fl. Turkey 5: 250. 1975. – Holotype: "Millefolium cappadocicum rectum luteum", *[Gundelsheimer & Tournefort]* (B-W 16356/5).
[– *Achillea micrantha* sensu M. Bieb, Fl. Taur.-Caucas. 2: 336. 1808, 3: 548. 1819]
[– *Achillea pubescens* sensu auct. mult., non L.]
[– *Achillea tomentosa* sensu auct. rossic., non L.]
[– *Achillea decumbens* sensu auct. rossic., non Lam.]

According to Afanas'jev & Bočancev (1961), also "*Achillea abrotanifolia* Willd." should be regarded as a synonym of *A. biebersteinii*. However, not Willdenow (1803) but Linnaeus (1753) is the author of this species. The material related to Willdenow's interpretation of this species (B-W 16364) proved to be heterogenous and does not represent *A. arabica*.

2. The identity of *Achillea sahandica* Turrill and *A. cuneatiloba* Boiss. & Buhse

Achillea sahandica was originally described by Turrill (in Gilliat-Smith & Turrill 1930: 396), placed into *A.* subsect. *Filipendulinae* and compared to *A. cuneatiloba* Boiss. & Buhse. The holotype of *A. sahandica* is a specimen from N Iran (above Zindjanab, Sahand Range, 25.-27.6.1929, *Gilliat-Smith 2504*, BM!). The species has not been considered in 'Flora iranica' (Huber-Morath 1986), and there exists only few more material in BM relating to this taxon (N Persia, above Zindjanab, Sahand Range, 1929, *Cowan & Darlington 1859*, N Persia, near Tabriz 1928, *Gilliat-Smith 2427*). Otherwise, this appears to be a rarely collected taxon.

The type specimen of *A. sahandica* reveals a striking difference in leaf segmentation as compared to any other species of *Achillea*, resembling instead the characteristics associated with *Tanacetum*. This assumption was further confirmed by observing floral differences including cypsela structures and the lack of paleae contrary to the paleate flower heads typical of *Achillea*. Comparison with herbarium material of *Tanacetum polycephalum* Sch. Bip. reveals close similarities, particularly to subsp. *heterophyllum* (Boiss.) Podlech (1986: 117). *Achillea sahandica* therefore must be excluded from the genus and instead be added as a further synonym to *Tanacetum polycephalum* subsp. *heterophyllum* (Boiss.) Podlech.

Achillea cuneatiloba Boiss. & Buhse is known only from two collection made in NW Iran and the adjacent Nahičevan (Transcaucasian region) (Huber-Morath 1986). A photocopy of the type specimen (Nemedabad, *F. Buhse*, G-BOIS) obtained from the Herbier Boissier revealed similari-

ties to species of *Achillea* sect. *Millefolium*. In the original diagnosis (Boissier & Buhse 1860) and in a later publication (Boissier 1875) this species was placed in *A.* subsect. *Millefoliatae*, and this position was recently confirmed by Huber-Morath (1986). The colour of the ligulae has been described as pale yellow on the upper surface and as white on the lower surface (Huber-Morath 1986). Similar phenomena are known from the species group of *A. nobilis* L. (Valant-Vetschera 1987), which belongs to the same subsection. However, the evident leaf structures of the type specimen point to a relationship with the species grouped around *A. arabica* (Valant-Vetschera & Wollenweber 1996 sub *A. biebersteinii*) of *A.* subsect. *Filipendulinae*. A similar conclusion has been drawn by Afanas'jev & Bočancev (1961). The ivory colour of the ligulae would not be against such a grouping, as *A. crithmifolia* Waldst. & Kit. of the same group exhibits a similar colour of ligulae (Valant-Vetschera & Wollenweber 1996). A good indicator for a relationship would be the growth form, the formation of rootsuckers being typical for these taxa. However, this is not observable in the type material, lacking basal and underground parts of the plant. Likewise, the original diagnosis is devoid of any such information (Boissier & Buhse 1860). Good field observations of this rare taxon would therefore be required to ascertain its taxonomic position within *Achillea.*

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