

New Species and New Section of the Genus *Achillea* L.  
(*Asteraceae*)

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**Abstract** — Description of *Achillea horanszkyi* UJHELYI sp. n. from the Visegrad Mountains, *Achillea tuzsonii* UJHELYI sp. n. from the Mátra Mountains (Hungary), and *Achillea bulgarica* (DEG. et URUM.) UJHELYI sp. n. from the Balkan Peninsula (Syn.: *Achillea crithmifolia* W. et K. f. *bulgarica* DEG. et URUM.). New Section of genus *Achillea*: Sectio *Crithmifolia* UJHELYI sect. n. with radices cormiferi. With 5 photoplates.

It is 10 years now, that I have dealt with the evolution problems of *Achilleae* of Hungary. The study of the numerous living and herbarium specimens from both this country and abroad is still going on, as is the research in growing locations. My leading principle in this work is the same that I have described in Tihany, in 1970 at the Symposium on the Evolution of Plants in demonstrating the results of my researches on *Koelerias* to the researchers of evolution (UJHELYI 1972). This paper presents only the description of the species new to science, which I have discovered in the course of my research work. All of the species described here have been cultivated through several years in my experimental garden, and these have been processed biosystematically as well. These studies have lead me to realize the fact that there is a 6th section in the genus *Achillea*. The species of this 6th section were classified in various sections. This had to be done because of a misinterpretation of their taxonomic features.

The criticism of the other sections is out of the scope of this paper, but there are several facts suggesting that these are not in all respect of evolutionary values (i.e. related as to their origines), but are rather results of classification.

1. *Achillea horanszkyi* UJHELYI sp. n.

*Planta chamaephytica, usque 36 cm alta, in omnibus partibus subdense adpresso hirsuta, pallide cinereo-viridis, rhizomatibus sublignosis praeter basin caulum emortuorum anni praeteriti caules steriles, foliis coronatos ferentibus, caulinis floriferis simplicibus apice corymbiferis. Caules steriles usque ad 12 cm alti, et 1—1,5 mm crassi, internodiis mediis usque 2 cm longis. Folia caulinum sterilium ambitu lanceolata vel oblongo-elliptica, 4 cm longa, et 1 cm lata, basi apiceque subaequaliter angustata, petiolata, petiola usque 1,2 cm longa, laminae foliorum bipinnate, vel tripinnate fissae, segmentis 0,3—0,4 mm latis, et 1—1,5 mm longis, in apice minutissime obtuse cartilagineis. Caulis florifer usque 34 cm longi, et 1—1,5 mm crassi, cylindrici, internodiis cca. 1 cm longis. Folia caulinum floriferorum sedentia, cca. 3 cm longa, stipulis angustis, laminis ambitu elongato-lanceolato, tri- vel bipinnate partita, segmentis 0,4 mm latis, in apice obtuse cartilagineis, rachidibus parum alatis. Corymbi subdense ter ramificati, coarctati, 3 cm lati. Capitula ovato-cylindrica, 2,5 mm longa, et 1,2 mm crassa. Involucri 2 mm longi, ovato-cylindrici, involucri phyllis scariosis, acutiusculis, cca. 0,6 mm latis, secus nervum medianum prominentem pallide bruneis, den-*

*siuscule hirsutulis, Ligulae pallide flavescentes, parvae, 1 mm longae, tertiae circiter partim involucri aeqantes, retusae, vix 3-crenatae. Flores disci usque 2 mm longi, tubo basi minutissime dilatato, lobis 5, reflexis, acuminatis. Receptaculum paleis hyalinis nitentibus apice minutissime laceratis, bruneis. Achenia compressa, basi angustata, cca. 1 mm longa.*

*Planta diploidea 2n = 18.*

Flore: Julio. — Habitat: In montibus Visogradensis, in locis saxosis andesiticis.

Holotypus adest: In herbario Musei Historico-naturalis Hungarici Budapestini. — Holotypus: *Achillea horanszkyi* UJHELYI sp. n. Hungaria borealis. Montes Visegrádi-hegység. In saxosis caespitibusque andesiticis montis Szamár-hegy sub cacumine, ad fluvii Danubii, prope opp. Esztergom. Alt. 300 m. s. m., in declivi occidentali, 6. VII. 1973., legit JÓZSEF UJHELYI.

Specimen alterum: *Achillea horanszkyi* UJHELYI sp. n. Montes Visegrádi-hegység. In jugo montis Szamár-hegy, in saxosis andesiticis, ad fluvii Danubii, prope opp. Esztergom. 27. VII. 1971., leg. J. UJHELYI.

I dedicate my new species to DR. ANDRÁS HORÁNSZKY, outstanding botanist, who has the best knowledge of the vegetation of the Visegrád Mountains (Horánszky 1964).

This plant living in the thin soil of andesite-scrapes of the glades in the warm western slope among oak-shrubbies in fact is a chamaephyton. In this habitat, however, they are small with height not above 10 to 12 cm, and found sporadically among the dry grass (Plate I, Fig. 1). The flowering plant has a height of 36 cm, and the whole plant is grayish green because of the tiny, adpressed hairs. The lower rhizomic part of the dry plant that has blossomed in the year before, grows sterile cormi. These are, similarly to young sterile cormi gracile. Their cauli are 12 cm long at the most, 1 to 1,5 mm thick, and the leaves of the previous year fallen from the lower part of the cauli. The internodes of these are of 2 cm length. The leafcrown develops on the apex of the cauli with short members of the cauli. The leaves have a broader lanceolate or elongated elliptic shape getting more slender near the apices and bases. The leaves have a length of 5 to 6 cm and a width of 1 to 1,5 cm. Approaching the bases the segments gradually become smaller, so they have petioli of 1 to 1,2 cm. The laminae are bipinnated or tripinnated. The leaf-segments have a width of 0,3 to 0,4 mm and a length of 1 to 1,5 mm are at the apices timly and bluntly cartilagineous. The fertile cormi are 34 cm long and 1 to 1,5 mm thick giving, thus, a gracile shape to the plant. The cauli are cylindrical with the internodia being 1 cm long. The leaves are sessile of about 3 cm length, the stipulae at the bases are narrow, the circumference of the leaves is an elongated lanceolate form, threefold segmented and twofold segmented in the upper part, the segments being 0,4 mm wide and cartilagineous at the apices, similarly to the sterile cormi. The rachises are winged.

The corymbus is compactly threefold ramificating and has a diameter of 3 cm. The capituli are ovoid-cylindrical and have a length of 2,5 mm and a width of 1,2 mm; these are, thus very small compared to other *Achilleae*. The involucrum is not longer than 2 cm, the squamae are scarous tapered against their apices. These are about 0,6 mm wide their central vessels are protruding and have a pale brown colour. The carinae of the ligulae are of a butter-like colour and very small. The carinae are 1 mm long which equals to one third of the involucrum. Their edges are crooked upwards and have a slight triple picot. The achene is flat and has a length of 0,8 mm.

Most similar to this plant is the *Achillea ochroleuca* EHRH. as to its life patterns and habits. The *Achillea ochroleuca* EHRH. grows not only in the sand under hill, but also in the dry, xerothermic rock-grass of the Szamár-hegy, as well. This is, however, a perennic one, its sterile cormi grew out from the stolones, the cauli are covered uniformly by leaves from their origins to the apices, and the lower leaves are fallen down from the several years old cauli, only. The leaves are always pectinate, i.e. simply winged, and the segments are intact. The sterile cormi have a soft cormus, two or three times more thick, the corymbuses are loose, regularly corymbic, the involucra are large, the size of the ligulae is 2 to 2,5 mm, thus, contrary to the *Achillea horanszkyi* UJH. are conspicuous, and have a brimestone yellow colour.

I discovered this new plant in June 1965. I went to visit the bicuspid Szamár-hegy on the edge of the Esztergom plain with my friend, DR. ANDRÁS HORÁNSZKY, researcher of the vegetation of the Visegrád Mountains. My trip concerned the evolution of *Achillea* living in this country. DR. HORÁNSZKY was to show me a location of *Achillea ochroleuca*

EHRH. growing there. In glade of a *Quercus pubescens* WILLD. shrubbery, in an andesite xerothermic rock-grass I found the small, not blooming individuals of the *Achillea horanszkyi* UJH. (Plate I., Fig. 1).

Under optimal conditions in my experimental garden such a tiny plant has grown within three years into a „giant”. The 30 to 40 cm long sterile cormi have spread out forming a corm of leaves of 20 cm diameter on their ends. The fertile root has developed a rich system of cormi with rich flowers even in the lower part. The ramifications originate from the axillae of the tree-leaf like bracteae. The loose, multiple composited corymbuses showed capitula at their ends, which were similar to those of the holotype. After 4 years this individual died off (Plate I., Fig. 2).

Further exploring this location I have found other populations besides the first one, some 40 m distance from the first one, on the other side of the saddle, and there was a third one, too, in glade below the top of the Szamár-hegy. This last population had the greatest number of individuals in it. Blooming plant was found first in the second locality by MR. ISTVÁN MILKOVITS, then my co-worker and my friend. In order to protect it, he did not collect the plant, but the colour-slide of it is presented with herbarium specimen of the holotype. The holotype has been collected by me in 1973, in the glade below the top of the mount. Comparing the picture made by friend botanist DR. DEZSŐ KÓVÁTS (Plate II., Fig. 1) with the picture made of the blooming individual in my experimental garden (Plate II., Fig. 2), the great differences in habits and sizes of the two plants growing in different locations are absolutely manifest.

The meiosis of the new species been studied by genetist DR. GÁBOR VIDA, my friend. The picture presented here of his courtesy (Plate I., Fig. 3. a, b, c) proves that the meiosis processes is ordinary. Thus, we cannot assume that this plant is a hybrid, or a polycormon resulting of a single mutant.

Although the new species has not been found in the surrounding mountains, its larger proliferation cannot be excluded. The failure to recognize this species before might be due to unsatisfactory methods of the systematical research in the past. The relatively hidden place of growth of this plant in the growing location which is not favourable, but is without competition, the three isolated populations in relative long distances, and the genetic studies justify the suggestion that one of the rarest relic endemism is embodied in this floristically hardly recognizable species.

### *Achillea tuzsonii* UJHELYI sp. n.

**Syn.:** *Achillea crithmifolia* W. et K. Descriptiones et Icones rariorum Hungariae, 1802, p. 68. auctorum plurim.

*Planta perennis, robusta, in statu florescenti usque 35 cm, in fructifero 65 cm alta, glabriuscula, viridis, vel subcanescens, rhizomatibus incrassatis, radicibus cor- miferis repentibus subterraneis horizontaliter valde elongatis, ramosis, in ambitu lato polycormiferis. Caules steriles e rhizomatibus- vel radicibus orti. Cormi steriles usque 25 cm alti, et 28 cm lati, Caules steriles usque 5 cm longi, et 4 mm crassi, internodii medii usque 0,5 cm longi. Folia fasciculorum caudiculorum sterilium ambitu ovoidea, usque 21 cm longa, et 6 cm lata, subpetiolata, petioli foliorum sterilium subnulli, vel 0,5 cm longi, laminae foliorum sterilium tripartitae, lacciniis 0,3—1 mm latis, obtusis, rachidibus minute alatis. Caules floriferi simplices, ad 25 cm longi, et 4 mm crassi, sublignosi, in partibus superioribus valde corymbosi, caules fructiferi usque 65 cm longi, et 1,5 mm crassi, robuste corymbiferi. Corymbus 18 cm diametro compositus totu rami corymbi primarii usque 3 cm longi, et 1 mm crassi, angulati, rami tertiae et quartae ordinis flores ferentes (pedunculi). Folia caulina florifera inferiora similia foliis sterilibus lacinis angustis, ambitu oblongo-ovoidea, usque 12 cm longa, et 3,5 cm lata, folia inferiora cormones axillares fasciculiformes gerentes. Folia superiora tripartita, lobi usque 2—2,5 mm lati, rami primarii in apice foliosi, foliis sessilibus usque 3 cm longis. Corymbus ad 18 cm latus, capitulis semiglobosis, 5 mm longis, et 5—6 mm latis, phyllis involucri imbricatis, pallidis, nitentibus 4—4,5 mm longis, et*

*1,8 mm latis, apice obtusis, laceratis, dorso costa crassa prominente percursa, ad marginem ciliolatis. Ligulae flavescentes involucro dimidio breviores, ad 2 mm longae, et 2,6 mm latae, 3-crenatae. Flores disci actinomorphae, 5 lobis squamis receptaculi paleaceis, 2 mm longis. Achenia compressa, obovata, basi arcuate angustata, atrofusca, albide carinata.*

**Flore t:** Junio—Septembro. — **Habitat:** In saxosis andesiticis montium Mátra-hegység, et in Transsylvania meridionalis.

**Holotypus adest:** In herbario Musei Historico-naturalis Hungarici Budapestini. — **Holotypus:** Hungaria borealis. Montes Mátra-hegység. In saxosis andesiticis montis Szamárkő supra Mátra-Szentistván, prope opp. Gyöngyös. Alt. 800 m. s. m. 19. IX. 1968., leg. J. UJHELYI (Plate III.). **Lectotypus fructiferae:** In saxosis andesiticis montis Ágasvár (ad Szamárkő), supra Mátra-Szentistván, prope opp. Gyöngyös. Alt. 800 m. s. m. 5. IX. 1972., leg. J. UJHELYI.

I dedicate the new species to Prof. DR. J. TUZSON, whom I honour as my master in plant-evolution, who was a student of Prof. A. ENGLER.

Compared to its perennial, diploid ancestor, to *Achillea crithmifolia* W. et K., this plant is explicitly robust, the large expanded, blooming specimen being 35 cm high, attaining its state the plant is generally 65 cm high, but the complete ripening of the acheniun is followed by the dying off these cormi. Whereas *Achillea crithmifolia* W. et K. has always a grayishgreen colour because of the relatively dense hairs, *Achillea tuzsonii* Ujh. has leaves mostly glabriuscui, having a rather greenish colour, because the lobi of the leaves are broader, larger, and are not so densely covered by hairs as are those of the diploid progenitor. The rhizomes are thicker, slightly ramifying, later lignifying. From the roots vertically entering the soil there are very thin, c. 2 to 3 mm thick roots growing out which run horizontally and ramify at a certain distance. These roots grew proles generally in the vicinity of roots running vertically. It is thus, that the plant proliferates in areas of several metres of diameter, bringing sterile cormi sporadically upwards, and roots downwards. The said radix cormifer develops, thus, a polycormon of large size (PÉNZES 1960). The sterile cormi coming partly from the rhizomes, and partly from radix cormifer are rather large, having a height of c. 25 cm or more, and a diameter of 28 cm. The sterile cormi are 5 cm long (specimens in the shadow might attain 8 cm in length), 4 mm wide, and the central internodes are of c. 0,5 cm. The circumference of the laminae is egg-shaped with a length of 18 to 21 cm, and its width reaches generally 6 cm, and is hardly petiolate. Those growing in the shadow may reach a length of 1.2 to 2 cm as well. The laminae of sterile leaves are tripartita. The segments are lanceolate with a width of 0.3 to 1 mm, having blunt apices, and the raches are only slightly alate. The blooming cormi are generally simple with a width of c. 25 cm. The specimen collected by LAJOS THAISZ, at the Lower Danube (Transsylvania) in 1901 is ramifying from below, and this specimen has developed numerous corymbuses. The cauli of these are always thick, generally 4 mm, and are sublignose. On their upper part there are large, spreading multiply ramifying complex corymbuses. These cormi can reach the size of 65 cm at the time of the ripening of the achene. The complex corymbus is very large, having a diameter of 18 cm or even more. The primer cauli of the corymbus can be 3 cm large, with a thickness of 1 mm, angulated, whereas the tertiaer and quadrier ones bear the capitula, being, thus, the real pedunculi.

The lower leaves of the sterile cauli are similar to those of the sterile ones; the laminae have an elongated ovoid form, with a length of 12 cm and a width of 3.5 cm. The segments, lobuli are narrow lanceolate forms. From the axillae of the lower leaves there are sterile cormi growing out. The upper leaves are threefold secta or fissa. The size of the segments is 2 to 2.5 mm. At the primary ramification of the corymbus there are leaves similar to the leaves of the cauli, but these are smaller, always sessile, having a length of c. 3 cm, and with broad segments. The capitula have a hemispherical shape of c. 5 mm length and 5 to 6 mm with. The leaves of the involucrum (squamae) are imbricate in a faint yellow colour, shining, their margin being slightly lacerated, and with a thick protruding vessel running through the dorsal part (nervus). On the two sides of this, there is a less developed green band, whereas on the edge of the inner squamae there is a colourless hyaline trimming; the edge of the outer ones is ciliolated. The ligulate flowers are faint yellow, the ligulae are as long as half of the involucrum. The ligulae have a length of 2 mm, and a width of 2.6 mm with a threefold crenated edge. The tubular flowers are actinomorphous, the chaffs of the limbi vorollae 5 lobae, and lobi triangulated with a width of 2 mm. The achene

is 1.5 mm long, and 0.7 mm wide, flat (compressed) and obovate formed. It is slendered to the base, has a darkbrown colour with a white carina on the edges.

The flower blooms in June and at the end of August and in September. I have found it first in September 1966 in the Mátra Mountains, in the western part of it, to be more specific, in the saddle of the Szamárkő and Ágasvár hills. It was in an andesite soil, on a glade of *Fagetum silvaticae*. I have visited again this location in 1968, 1972 and in 1974. At the same time I have found specimens in our Herbarium from the Mátra Mountains, and even from the Southern Carpathian Mountains. In cultivation, as grown together with specimens of the diploid *Achillea crithmifolia* W. et K. under similar conditions, both species kept their characteristic features. The diploid specimens demonstrate an absolute similarity with the holotype kept in our Kitaibel Herbarium. The several years study of the living material collected from various locations, has proved to me that these can impossibly be phenotypes, locational variants.

Studying *Achillea bulgarica* (DEG. et URUM.) Ujh. to be described below together with the herbarial material, we can suppose that the material containing three species might have lead to the misunderstanding in which F. EHRENDORFER has regarded *Achillea crithmifolia* W. et K. as a „Sippe” very rich in forms (EHRENDORFER 1953).

It differs from its progenitor, *Achillea crithmifolia* W. et K., primarily in its habit. The diploid *Achillea crithmifolia* W. et K. is always small, has a small circumference, and is very gracilis. Everything, from its radix-diameter through the fertile cauli to the corymbus, capitulum and achénium every part of it is smaller. Whereas the *Achillea tuzsonii* Ujh. is more greenish in colour, the *Achillea crithmifolia* W. et K. has more hairs on all of it parte giving thus a silvery grayishgreen colour. The radix cormifer described with the *Achillea tuzsonii* Ujh. is characteristic as well to the *Achillea crithmifolia* W. et K. which develops the same polycormons.

### 3. *Achillea bulgarica* (DEG. et URUM.) UJHELYI sp. n.

**Syn.** *Achillea crithmifolia* W. K. var. *bulgarica* DEG. et URUM., IV. K. URUMOFF: Nova additamenta ad floram Bulgariae, Spisanie na Balgarskata Akad. na Nauk., V. Sopija, 1912, p. 16. — *Achillea millefolium* L. subsp. *crithmifolia* W. et K. var. *bulgarica* DEG. et UR., STOJANOFF, N. et STEFANOFF, B. Flore de la Bulgarie, Sophia, 1925, p. 1128. — *A. crithmifolia* W. K. f. *bulgarica* DEG. et URUM., HAYEK, A. Prodromus Floraen peninsulae Balcanicae, 2, Dahlém bei Berlin, 1928, p. 639. — *A. millefolium* L. subsp. *crithmifolia* (W. K.) var. *bulgarica* DEG. et URUM., STOJANOV, N. i STEPHANOV, B. Flora na Balgarija, Sophia, 1933, 1007. — *A. Crithmifolia* (W. K.) var. *bulgarica* DEG. et UR. STOJANOV, N. i STEPHANOV, B. Flora na Balgarija, Sophia 1948, p. 1154. — *A. crithmifolia* W. K. f. *bulgarica* DEG. et URUM., STOJANOV, N., STEPHANOV, B., KITANOV, B. Flora na Balgarija, Sophia, 1967, p. 1092. — *A. crithmifolia* W. et K. subsp. *bulgarica* (DEG. et URUM.) BÄSSLER. in herb.

*Planta perennis, in statu florescenti 30 cm, in fructifero 50 cm alta, tota planta dense villosa, rufescens, vel argenteo-viridis, rhizomatibus 2—3 cm longis, incrassatis, radicibus cormiferis repentibus subterraneis horizontaliter valde elongatis, ramosis, in ambito lato polycormiferis. Caules steriles usque 5 cm longi, et 1,8 cm crassi, internodii medii 3 mm longi. Folia fascicularium caudiculorum sterilium ambitu elongato-elliptica, usque ad 4 cm longa, et 8 mm lata, sessilia, laminae foliorum sterilium bivalve tripartitae, laciinis 0,5 mm latis, acutis, in cacumine minutissime cartilagineis, rachidibus minute alatis. Caules floriferi simplices, ad 28 cm longi, et 2,5 mm crassi, in parte inferiori sublignosi, in apice corymbos ferentes. Corymbus compositus totus 5 cm diametro, rami corymbi primarii usque 2 cm longi, et 0,3 mm crassi, minute sulcati, rami secundae et tertiae ordinis flores ferentes (pedunculi). Folia caulinum floriferorum inferiora similia foliis caulinum sterilium, basi petiolati dilatato, stipulis laciiniatis, ambitu cylindrica, usque 5 cm longa, et ad 1 cm lata, laciinis deltoideis, acuminatis, 0,6 mm latis, in cacumine cartilagineis. Folia superiora similia inferioribus, sed parum breviora, usque ad 4 cm longa, tripartita, rami primarii corymbi in*

*apice bracteas similes foliis caulinis; sed minores gerentes. Corymbus ad 5 cm latus, capitulis cylindricis, 4 mm longis, et 2 mm crassis phyllis involucri semiimbricatis, pallidis, nitentibus, usque 3,5 mm longis, et 1 mm latis, aqice obtusis, laceratis, dorso costa crassa prominente percursa, ad marginem sparse ciliatis. Ligulae flavae, involucro in quartam partem breviores, ad 0,9 mm longae, et 1 mm latae, 3-crenatae. Flores disci actinomorphae, minutissime 5 lobis, squamis receptaculis paleaceis, 1,8 mm longis, acutis, 0,2 mm latis. Achenia 0,9 mm longa, et 0,4 mm lata, compressa, obovoidea, basi arcuate minute angustata, atrofusca, albide carinata.*

F l o r e t : Junio—Julio. — H a b i t a t : In graminosis collinis Peninsulae Balkanicae.

Holotypus adest: In Herbario Musei Historico-naturalis Hungarici Budapestini. — Holoty whole: Nro. 383. Flora Bulgarica. *Achillea crithmifolia* W. K. var. *bulgarica* DEG. et URUM. Ad Trnovo, 190, I. K. URUMOFF. Determinatio: scripta Degenii. (BP).

E xemplaria altera: Nr. 669. Jv. K. URUMOV, plantae Bulgariae exsiccatae. *Achillea crithmifolia* var. *bulgarica* DEG. URUM. In collinis et graminosis prope Trnovo, d 29/IV. 1901, legi Jv. K. URUMOV. Scripta Urumovii. Schedula Bässleri: *Achillea crithmifolia* W. et K. ssp. *bulgarica* (DEG. et URUM.) BÄSSLER, rev. M. BÄSSLER, Jena, 1960 (BP). — Specimina examinata: FRIV. hb. tunc. *Achillea crithmifolia* L. 247. Rumelia (BP); Hb. Sadl. 11172. *Achillea crithmifolia* L. Rumelia, FRIVALDSZKY (BP); *Achillea distans* WALD. et KIT. Macedonia FRIVALDSZKY. Schedula Bässleri: *Achillea crithmifolia* W. et K.\* A. setacea, rev. M. BÄSSLER, Jena 1960. With the\* sign. exemplar. *Achillea bulgarica* (DEG. et URUM.) UJH. rev. (BP); *Achillea crithmifolia* L. Balkan, 1835. FRIVALD. (BP); *Achillea crithmifolia* LIN. in sub Alpinis Carlovae, 1835, FRIVALDSZKY (BP); DR. A. DE DEGEN, iter orientale a. 1890. *Achillea crithmifolia* W. K. Boiss. Fl. or. III. p. 257. Thracia, in agro Byzantino: In valle Kestene-suju prope Yeni-Makallé. Legi d. 2. Jun. (BP); Plantae in Bulgaria sub. ausp. C. KECK a TH. PICHLER lectae 1890. *Achillea odorata* KOCH. In aridis prope Philippopolim. Majo. det. DR. VELENovsky (BP); TH. PICHLER Fl. bulgarica. *Achillea odorata* KOCH. In decl. arenos. m. Tschendemtepe pr. Philippopolimm. Junio 1890. Scripta Jávorkae: Specimen in herb. Simk. inter A. pannonica SCHEELE. Rev. Jávorkae: est A. crithmifolia W. et K. Schedula Bässleri: *Achillea crithmifolia* W. et K. ssp. *bulgarica* (DEG. et URUM.) BÄSSLER, rev. M. BÄSSLER Jena 1960 (BP); Plantae Rumeliae orientalis exsiccatae curante DR. DE DEGEN A. 1892 A. J. WAGNER lectae. *Achillea* Ad vias prope pagum Čepelare, d. 25. Jun. (BP); 3. IVAN K. URUMOV Herbarium. *Achillea crithmifolia* W. et K. Ad var. *bulgaricam* DEG. et URUM. (scripta Jávorkae) Ad p. Karš distr. Pleven. 1926, leg. IV. K. URUMOV. Schedula Bässleri: *Achillea crithmifolia* W. et K. ssp. *bulgarica* (DEG. et URUM.) BÄSSLER, rev. M. BÄSSLER Jena 1960 (BP); 49 Distr. Pleven Bulgariae: Ad Lukevit *Achillea crithmifolia* W. et K. var. *bulgarica* DEG. et URUM., 1925. I. K. URUMOV (scripta Jávorkae). Schedula Bässleri: *Achillea crithmifolia* W. et K. ssp. *bulgarica* (DEG. et URUM.) BÄSSLER, rev. M. BÄSSLER Jena 1960 (BP); 130 Jv. K. URUMOV, plantae Bulgariae exsiccatae. *Achillea crithmifolia* W. K. (scripta Degeni), Ad Dragalevee d. 23/VI. 1918, legi Jv. URUMOV (BP); 494 Flora Bulgarica. *Achillea crithmifolia* W. K. (scripta Degeni). Ad Belovo, 1909 leg. I. K. URUMOFF. (BP); 375. Flora Bulgarica. *Achillea crithmifolia* W. K. (scripta Degeni) m. Balkan, 190, leg. I. K. URUMOFF. (BP); 319. Jv. K. URUMOV, plantae Bulgariae exsiccatae. *Achillea crithmifolia* W. K. var. (scripta Degeni). In graminosis ad Kamenica m. Rhodope, d. 10/VII. 1912, legi Jv. K. URUMOV (BP); 259. Jv. K. URUMOV, plantae Bulgariae exsiccatae. *Achillea crithmifolia* W. et K. (scripta Jávorkae). In graminosis siccis ad Imdola m. Rhodope, d. 18/VII. 1912, legi Jv. K. URUMOV. (BP); Flora Bulgarica *Achillea crithmifolia* W. K. Prope mont. Strandža, pag. Göktepe. In apricis, ad vias. Alt. 4—500 m. 1936. VII. 17. 1.: DR. PÉNZES A. (BP); Flora bulgarica. *Achillea crithmifolia* var. *bulgarica*. Mt. Strandza, prope pag. Kurti. Leg. SZUJKÓNÉ L. J., 1960, Jun. 7. det. DR. PÉNZES A. (BP); Flora bulgarica *Achillea crithmifolia* W. K. Mt. Pirin, in valle Banderica. Leg. BARTHA A. et DR. PÉNZES A. 1935. VII. 27. (BP); Flora Bulgarica. *Achillea crithmifolia* f. *bulgarica* (DEG.) URUM. Mont. Pirin, in valle Banderica. In apricis solo calcareo. Alt. 1600 m. 1936. aug. 2. leg. DR PÉNZES A. (BP); PÉNZES A.: Flora Bulgarica exsiccata. *Achillea crithmifolia* W. K. f. *bulgarica*

DEG. URUM. Prope Sveti Vrač. Mont. Pirin Solo granitico. In apricis. Alt. ca 270 m, 1938. júl. 2. leg. PÉNZES ANTAL (BP); *Achillea crithmifolia* W. K. f. *bulgarica* DEG. et URUM, Sveti Vrač, Popina Laka (Bulgaria) Regio praealpina. Alt. 1300—1350 m. 1938. VII. 4. leg. DR. UJHELYI J. det. DR. PÉNZES. Schedula Bässleri: *Achillea crithmifolia* W. et K. rev. M. BÄSSLER Jena 1960 (BP); Flora bulgarica. *Achillea crithmifolia* W. K. In jugo montis Trojan. Legit J. JEANPLONG, 1956, Jul. 18. det. DR. PÉNZES A. (BP); Flora Bulgariae *Achillea crithmifolia* W. et K. Montes Vitosa. Ad marg. quercketis pr. pg. Bojna. Alt. 900 m. 6. VII. 1962. 1. et d. T. Pócs (BP); 3736. Herbarium Acad. Paedag. Agriensis Flora Bulgariae. *Achillea crithmifolia* W. et K. Montes Vitosa. Ad marg. quercketis pr. pg. Bojna. Alt. 900 m. s. m. 6. 7. 1962. leg. et det. T. Pócs (BP); Bulgaria. Dobrudzansko plato. In siccis gramineis, ad pag. Balčik, prope opp. Varna. Alt. cca. 300 m. s. m. 26. VI. 1969, leg. J. UJHELYI sub nomine *Achillea bulgarica* (DEG. et URUM.) UJH. (BP); Bulgaria meridionalis. Montes Rhodope. In pascuis, prope pag. Bačkovo, 2. VII. 1969. leg. J. UJHELYI sub nom. *Achillea bulgarica* (DEG. et URUM.) UJH. (BP). **Serbia:** DR. J. ANDRA-SOVSZKY, Iter Balcanicum 1916—17. *Achillea crithmifolia* W. K. (det. DR. PÉNZES A.) Serbia: in monte Zvečan prope Mitrovia. legi d. 2. VI. 1917. (BP); Flora Serbica. *Achillea odorata* K. In pascuis m. Krstilovica solo granit. 800 m. 20. 6. 1896. legit LUJO ADAMOVIC, Vranja. Schedula Bässleri: *Achillea crithmifolia* W. et K. rev. M. BÄSSLER Jena 1960 (BP); **Macedonia:** J. DÖRFLER, Iter Turcicum secundum 1893. No. 210. *Achillea crithmifolia* W. K. (scripta Degeni). Macedon. centr. In petrosis inter Roizdan at Allchar, 21/VI. 1.: DÖRFLER (BP); *Achillea crithmifolia* (scripta Degeni) 410. Plantae Macedonicae. In saxosis calcareis. mt. Dzena pag. Lundzi op. Ghevgheli, alt 1000 m, in annum 6/10 leg. 'Dimonie' (BP); altera exemplaria: alt. 1200 m. (BP); J. BORNMÜLLER: Plantae Macedoniae. No. 1246. *Achillea crithmifolia* W. K. Üsküb: in monte Wodno, ad pagum Neresi, 600 m. 1917. V. 24. leg. et determ. J. BORNMÜLLER (BP). **Montenegro:** DR. J. ANDRA-SOVSZKY, Iter Balcanicum 1916—17. *Achillea crithmifolia* W. K. (det. PÉNZES A.) Montenegro: in declivibus lapidosis supra Brešnik prope Ipek., legi d. 18. VII. 1917. (BP). **Albania:** *Achillea odorata* L. Albania. Klisura Prizren. Bistrice, 5. V. 1913. leg. KOŠANIN. Schedula Bässleri: *Achillea crithmifolia* W. et K. rev. M. BÄSSLER Jena 1960 (BP).

The plant is a perennial one. In its blooming state its height is about 30 cm, sometimes more or less than that. Specimen in the state of achenia was not at my disposal, as everybody has collected it in its blooming state. My living plant I have brought from Bulgaria in 1969 has reached this height in my experimental garden at the time of ripening of achenia. The whole plant is densely villous, has a brownish colour or is silvery green. It has a thick, short — 2 to 3 cm long — rhizome out of which grows the later lignifying radix cormiferous. This, in turn, develops upwards blooming, and partly sterile cormi, and downwards adventive roots. At the original location, in the dry and warm ambiance, these horizontal roots bring the corm in a relatively short time. The horizontal roots of the *Achillea bulgarica* (DEG. et URUM.) UJH. were several metres long in the loose, fertile soil of my experimental garden developing one cormus at a time. These informed me where does the original plant expands. The caule of the sterile plants is about 5 cm long and 1.8 mm thick with the internodes having a length of about 3 mm. The circumference of the laminae of sterile cormi is an elongated elliptic having a length of about 4 cm and a width of c. 8 mm; the leaves are sessile, the lamina is three- or four-fold parted, the individual laciniae having a width of 0.5 mm with sharp apices and very small cartillages on their ends; the rachis is slightly alated. The blooming cormi are simple, having a length of 25 to 30 cm, and a thickness of 2.5 mm; their lower part is sublignous, and at the top of the caulis is the corymbus. The complex corymbus has a diameter of about 5 to 6 cm; the cauli of the primary corymbus are 2 cm long and 0.3 mm thick; these are slightly sulcated. The secondary and tertiary cauli are, however, pedunculi bearing the capitula. The lower leaves of the fertile cauli are similar to the sterile ones, the bases of the petioli are more wide, and the stipulae are laciniated; the laminae have a rather cylindrical form, and sometimes the segments of leaves are longer, making, thus, also the circumference more oval shaped. The lamina has a width of 1 to 1.5 cm, the laciniae having deltoid shape, with sharp apices and very small cartillages on their ends. The upper leaves are similar to the lower ones, except that these are shorter, c. 4 cm, and are tripartita; the bracteae of the branches of the corymbus are similar to the leaves of the cauli, but are smaller. The corymbus has a diameter of 5 to 6 cm, the capitulum are cylindrical with a length of 4 mm, and a thickness of 2 mm. The involucrum leaves of the capitulum are half-imbricated, have a faint yellow colour, are shining, sometimes are covered with hair. These have a length of 3.5 mm, and a width of 1 mm, have blunt apices, the edges are lacerated, and the margins are sometimes ciliolated. The ligulate flowers are yellow, the

ligulae are equal to one quarter of the involucrum, having a length of 0.9 mm, and a width of 1 mm, and lightly crenated. The tubular flowers are actinomorphous, slightly 5-lobed, the char palaeaceuses or 8 mm long, and acute in a width of 0.2 mm, and are palaeaceuted. The achene has a length of 0.9 mm, a width of 0.4 mm, are compressed, and have the shape of a tortured egg, slendering slowly to the base. It is grayish brown with a thick, white carina on the edges.

The new species have been recognized by DR. ÁRPÁD DE DEGEN as a special taxon in the collection of K. URUMOV Bulgarian botanist (Jv. K. URUMOV used to sent his collections to Á. DE DEGEN for determination). Á. DE DEGEN and Jv. K. URUMOV have described this as a *crithmifolia* W. et K. very well both from its locus classicus, as from other Hungarian locations.

I have known *Achillea crithmifolia* W. et K. from all of its Hungarian locations when in 1969 in a Bulgarian location I have met the new species. It was striking at first that is not identical with PÁL KITAIBEL's species. I have grown this plant in my experimental garden together with *Achillea crithmifolia* W. et K., and with *Achillea tuzsonii* Ujh. The comparative study of the three holotypes, and the comparative studies of the very rich living material of our herbarium has resulted in a satisfactory answer to the question of evolutional taxonomic evaluation of the *Achillea bulgarica* (DEG. et URUM.) Ujh.

The *Achillea crithmifolia* W. et K. material of our main collection has been revised by M. BÄSSLER (the DEGEN collection was not lent then). On some specimen of our collection he gave the rank of a subspecies to the plant, but he was not consequent throughout. He regarded the specimens as subspecies which had a more profuse haircover (see the list of data).

This diploid species cannot, however, be a derivate of the *Achillea crithmifolia* W. et K., and as seen from the point of view of floral evolution the situation is rather the opposite.

There is no suggestion in the literature that the *Achillea micrantha* M. B. would also be a relative to the *Achillea crithmifolia* W. et K. This might be due to the fact, that E. BOISSIER in following DE CANDOLLE, classifies the species living in Mid-Asia, in the Caucasus and in Mesopotamy to the Filipendulinae subsection, whereas he puts *Achillea crithmifolia* W. et K. to the subsection Millefoliatae, as did DE CANDOLLE. I do not know why A. HAYEK mentions *Achillea biebersteinii* AFAN (-*A. micrantha* M. B.) concerning Bulgaria, but in knowing the Bulgarian specimens I suppose the data of *Achillea micrantha* M. B. refer to the new species. A. HAYEK mentions in his Prodromus the new species as a variety of the *Achillea crithmifolia* W. et K. I have not seen the holotype of MARCHALL VON BIEBERSTEIN, but the new species is not the same as the *Achillea micrantha* M. B. preserved in our collection. The capitula of these are larger, and the ligulae are smaller in relation to the capitulae. The flowers are dark yellow.

The criticism of the other Balcan *Achillea crithmifolia* W. et K. determination is beyond the scope of this paper. These differ (I have seen specimens from Bulgaria to Albania) from the *Achillea crithmifolia* W. et K. mainly in the whole plant being profusely covered hairs, has a relative large size, and every parts of it being slightly larger than those the *Achillea bulgarica* (DEG. et URUM.) Ujh. I have collected a specimen of it in the summer of 1974 in Bulgaria, this time was however, much too short, so as it would allow the determination of the taxonomical situation of these plants.

#### *Achillea* sectio *Crithmifolia* UJHELYI sect. n.

*Plantae perennes, vel suffrutices, astoloniferae, radicibus cormiferis repentinibus subterraneis, foliis tripartitis, laciniis integris, obtusis, interdum parum cartilagineis. Ligulae albae-pallidae, vel luteae, acheniae obovatae carinis albis.*

Following from the above explanations it is hardly necessary to emphasize what has lead me to the description of the new section as a result of evolutional studies and not of classifying activities. The discovery of the radicles cormiferi of the *Achillea crithmifolia* W. et K., the *Achillea tuzsonii* Ujh. and the *Achillea bulgarica* (DEG. et URUM.) Ujh. has been the result of my observation on a rich material of species and specimens. The collectors could not have discover this special characteristic of the plants, as the plants were torn away from the radicles running in the soil. It is hardly believable, however, that it was

not discovered in the *Achillea nobilis* L., and in its related species. These species were regarded as having no stolones (BÄSSLER 1963).

I have known from my experiences this characteristic of several radices (*Cirsium arvense* [L.] SCOP., *Convolvulus arvensis* L.) but I did not think that this very characteristic of the *Achillea crithmifolia* W. et K. has been discovered by someone else. The textbook of W. TROLL informed me about the work of WERNER RAUH (RAUH 1936) which described the morphological conditions of the „Wurzelsprosse” or „Wurzelknospe” of the *Achillea crithmifolia* W. et K. In Chapter 7 of this work he writes about their diagnostic significance, and describes both *Achillea crithmifolia* W. et K., and *Inula britannica* L. as members of the genus having „Wurzelsprosse”. But, this is not the only species which forms its polycormons in such a way. There is e.g. *Achillea nobilis* L., which is very common in Europe. This characteristic is well represented by the photograph of *Achillea tuzsonii* Ujh., and *Achillea nobilis* L. (Plate V., Figs. 1—2). The photographed specimens were grown in my experimental garden. The detailed anatomic description is omitted in this paper. The many related characteristics of the two species are well demonstrated by the fact that *Achillea nobilis* L. collected from the area of *Achillea crithmifolia* W. et K. is often determined as *Achillea crithmifolia* W. et K.

Although it was hard to found radices cormiferous in herbarium specimens of other species, simply because during collection, these radices are torn off from the plant, I have succeeded to determine radix cormiferous in the following species: Sectio *Millefolium* (TOURN.) KOCH subsectio *Millefoliatae* (DC.) BOISS.: here were classified *Achillea nobilis* L., *Achillea odorata* L., *Achillea ligustica* ALL., and *Achillea crithmifolia* W. et K., and of course, under this name, also *Achillea tuzsonii* Ujh., and *Achillea bulgarica* (DEG. et URUM.) Ujh.; subsectio *Filipendulinae* (DC.) BOISS.: *Achillea biebersteinii* AFAN (A. *micrantha* M. B.) *Achillea Smithii* (S. S.) HAY.. The most far out was classified the *Achillea Frasii* SCHULTZ BIP., i.e. into the Sectio *Ptarmica* (TOURN.) KOCH. This and its polyploid derivate, *Achillea pastricensis* HEIMERL, are known from the high mountains of Greece, Albania, Macedonia, Epirus, Montenegro, Jonia, and from the Mount Ida of Asia-Minor. I have not seen specimen from the plant *Achillea Hayekiana* HEIMERL, but as A. HEIMERL mentions it as a close relative of the mentioned two species, there is a high probability that it is a member of this evolutionary line.

The *Achillea Frasii* SCHULTZ BIP. and the mentioned closest relatives of it demonstrate a way of life characteristic to high mountains, and this way of life is well known. These types, however do not show evolutionary lines, but on the contrary, these are the most conspicuous examples of parallel convergency. In the present case, we can see this parallelism in one of the genus of *Dicotyledoneae*. The lower ligniferous some years functioning ramification system originated from radices cormiferous of the species living on high mountains are not homologous with the externally similar branch system of others chamaephyton species of the genus *Achillea*, living also on high mountains. No parallelism can be mentioned here.

The fasciculi of the sterile cormi, the lamination system of the leaves, the similar structure of the folia caulina, the shape of the segments, the obtuse apices, the edentated rachis, and the shape of the acheneum, the similar carina structure, all show that these sub-alpine species are members of the Sectio *Crithmifolia* Ujh.

There is no need, I think, to emphasize that the shortening of the corymbus and of the pedunculi of the capitula, and as a consequence, the compactness of the corymbus, and the becoming greater of the capitulum and of the flowers are results of the subalpine conditions.

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#### Plate I.

Fig. 1. *Achillea horanszkyi* UJHELYI sp. n. in original place (mt. Szamár-hegy). — Fig. 2. *Achillea horanszkyi* UJHELYI sp. n. in the experimental garden. — Fig. 3. Meiosis of the *Achillea horanszkyi* UJHELYI sp. n. n = 9, a = diplotene, b = diakinesis, c = metaphase,  $\times 1000$  (DR. G. VIDA).

#### Plate II.

Fig. 1. Holotype of *Achillea horanszkyi* UJHELYI sp. n. in original place (mt. Szamár-hegy), fotos DR. D. KOVÁTS. — Fig. 2. *Achillea horanszkyi* UJHELYI sp. n. in the experimental garden (original).

#### Plate III.

Holotype of *Achillea tuzsonii* UJHELYI sp. n.

#### Plate IV.

Holotype of *Achillea bulgarica* (DEG. et URUM.) UJHELYI sp. n.

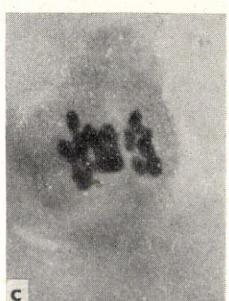
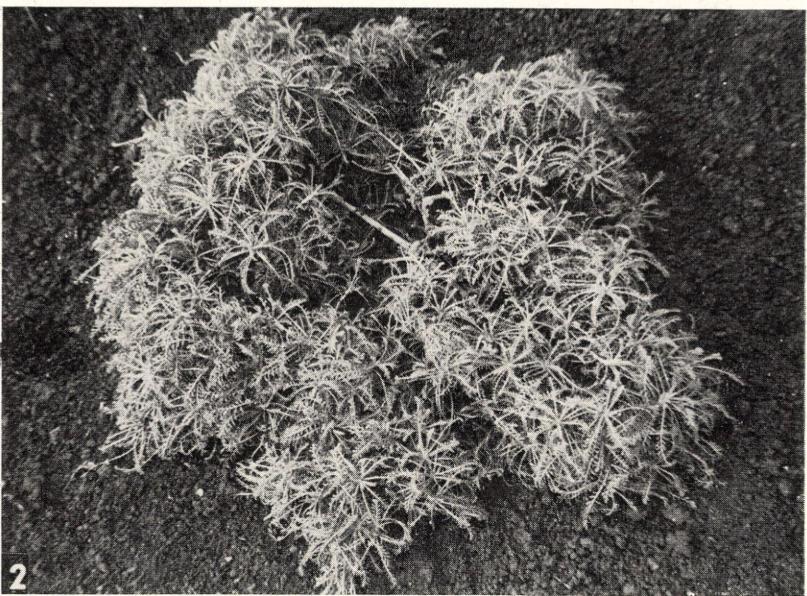
#### Plate V.

Fig. 1. Radix cormifer of *Achillea tuzsonii* UJHELYI sp. n. originated from experimental garden. — Fig. 2. Radix cormifer of *Achillea nobilis* L., originated from experimental garden.

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## Plate I.



**Plate II.**

## Plate III.



Achillea species nova

Specimen collected by Mr. J. C. Gray, in the mountains of California, near the headwaters of the San Joaquin River, about 10 miles from the town of Mariposa, in the month of June, 1853.

## Plate IV.



Plate V.

