

A note on *Aster amellus*

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ABSTRACT: Two cytotypes occurring within *Aster amellus* L., diploid ($2n=18$) and hexaploid ($2n=54$) are briefly discussed. Evidence is presented that they are specifically distinct both in quantitative and qualitative characters. The hexaploid cytotype is shown to be identical with what was described as *Aster scepusiensis* KITAIBEL ex KANITZ 1863. The name *A. amellus* L. should be reserved for the diploids.

KEYWORDS: *Aster amellus*, *A. scepusiensis*, morphology, geographical distribution, ecology and biology of cytotypes

Introduction

In the past decades it has been realized, intuitively rather than consciously, that *A. amellus* L. is not a homogeneous species. It is known to vary over a wide range especially in growth form, indumentum, shape of leaves, number of heads per stem, shape of involucre bracts and size of flowers, but, in the absence of a monographic study, attempts to treat this variation taxonomically have not been very successful. It might have been hoped that the recent discovery in Central Europe of two ploidy levels within the species, one diploid ($2n=18$), the other hexaploid ($2n=54$), both very well characterized by their morphology and geographical distribution and easy to recognize, would instigate some change but, regrettably, this has not happened. Both the cytotypes continue to be united under the name of *A. amellus* L.

Results

Historical - Before the chromosome numbers were known authors of Central European floras often used the name *A. amelloides* BESSER to accommodate plants of *A. amellus* with acute involucre bracts. Following REICHENBACH (1831), such authors include HAYEK & HEGI (1918) who reduced it to a forma and WAGENITZ (1964-1979) who included *A. amelloides* in *A. amellus*. MÁJOVSKÝ & al. (1978) straightforwardly identified hexaploid *A. amellus* with *A. amelloides* BESSER. Unfortunately, it has until now passed unnoticed that this epithet cannot be used because *A. amelloides* BESSER 1822 is illegitimate, being a latter homonym of *A. amelloides* HOFFM. 1800. Other authors sought a solution in associating the deviating plants of *A. amellus* with *A. scepusiensis* KITAIBEL ex KANITZ. This was published with a detailed diagnosis in KANITZ (1863) to accommodate plants complying precisely with the present hexaploids. No locality is mentioned, but it is evident from the name that the place of occurrence was Spiš, a region in N. Slovakia (Latin Scepusia, German Zips, Hungarian Szepes). KITAIBEL's epithet was adopted by SAGORSKI & SCHNEIDER (1891) and POLÍVKA, DOMIN & PODPĚRA (1928) at the varietal level to treat plants from that region characterized by acute involucre bracts. DOSTÁL (1989) reduced KITAIBEL's name to a subspecies and applied it to hexaploid plants from Slovakia and Moravia - a sound proposal which has however received no later support.

The cytotypes - Relatively few counts are available for Central European *A. amellus* (see Tab. 1) but, combined with morphological characters and geographical distribution (see below), they reveal a definite pattern. Diploids are known to occur in Bohemia whereas hexaploids have been reported from Slovakia, Lower Austria and Moravia. So far, no tetraploids ($2n=36$) have been detected in this area but it would be strange if the connecting link between diploid and hexaploid cytotypes were indeed missing.

Morphological characters - To gain an insight into the morphology, ecology, geographical distribution, biology, etc. of the cytotypes, field studies were carried out mainly in localities or areas from which material for karyological analysis had already been collected. They covered, for diploids, C. and N. Bohemia, and for hexaploids, parts of Moravia (vicinity of Olomouc and Brno and Pavlovské kopce hills near Mikulov) and the vicinity of Mödling and Hardegg in Lower Austria. This field survey was then complemented by a study of herbarium material (BRNM, BRNU, K, LE, OLM, PR, PRC, WU) including the voucher specimens for the chromosome counts.

Reviewing the morphological characters of the cytotypes, clear differences can be seen (Tab. 2). Hexaploids are usually much more robust (thus conforming to the traditional idea of polyploidy) and are mainly distinguished by their large and many fewer heads and larger florets and achenes than in the diploids. The most conclusive character separating hexaploids from diploids is the shape of involucre bracts. Other characters, as for instance the shape of the leaves (whether entire or dentate) are of lesser importance.

Tab. 1. Chromosome counts in *Aster amellus* s.l.

Locality	Author
Diploids (2n=18)	
C. Bohemia: Javorka hill, nr. Karlštejn (distr. Beroun)	HOLUB, MĚSÍČEK & JAVŮRKOVÁ 1970
W.C. Bohemia: Čertova skála hill, nr. Týřovice (distr. Rakovník)	KOVANDA 1984
N. Bohemia: Bílá stráň protected area, nr. Litoměřice (distr. Litoměřice)	KRAHULCOVÁ 1990
Hexaploids (2n=54)	
N. Slovakia, Spiš: Baba hill, nr. Svit	MÁJOVSKÝ & AL. 1970
S. Moravia: vicinity of Brno	DVOŘÁK & DADÁKOVÁ 1974
W. Slovakia: Veterník hill, nr. Skalica	MÁJOVSKÝ & al. 1978
W. Slovakia: Záhorská nížina lowland	MÁJOVSKÝ & MURÍN 1987
W. Slovakia: Devínska Kobyla hill, nr. Bratislava	MÁJOVSKÝ & MURÍN 1987
W. Slovakia: Javorníky Mts.	MÁJOVSKÝ & MURÍN 1987
Lower Austria: Eichkogel hill, nr. Mödling	DOBEŠ & al. 1997
Lower Austria: Kreuzmaiss, nr. Hardegg	KOVANDA 1999 unpublished
N. Moravia: U Strejčkova lomu nature reserve, nr. Krčmaň (distr. Olomouc)	KOVANDA 1999 unpublished
S. Moravia: S. slope of Stolová hora hill, nr. Klentnice (distr. Břeclav)	KOVANDA 1999 unpublished

Tab. 2. Morphological characters of the *Aster amellus* cytotypes

	Diploids (2n=18)	Hexaploids (2n=54)
Height	(10-) 20-30 cm	30-50 (-70) cm
Heads	Many, usually more than 5, 24-38 mm in diameter	Few, (1-) 2-5 (-8), 34-56 mm in diameter
Involucral bracts	Obtuse	Acute
Disk-florets	5-6 mm long	7-8 mm long
Ligules of ray-florets	10-17 mm long	16-22 mm long
Achenes	2.6-2.9 mm long	3.7-3.9 mm long

Ecology - Both diploid and hexaploid cytotypes occur in similar habitats: dry steppe grassland, scrub, woodland margins, rocky or stony slopes etc. in warm regions. Limestone is often preferred but both can be occasionally found thriving on neutral or acid substrata.

Geographical distribution - Herbarium studies revealed that plants with the characters of hexaploids occur in Austria (Lower Austria, Styria, Carinthia, Tyrol), Slovenia, N. Italy (Trieste), Serbia, Germany (Bavaria), Czech Republic (Moravia), Slovakia, S. Poland and the Ukraine (vicinity of Lvov). Diploids are known with certainty only from Bohemia but they are likely to extend farther towards the west and north-west.

It would seem that diploid and hexaploid *A. amellus* replace each other in terms of geographical distribution (this is now certain as far as Bohemia and Moravia is concerned) but further chromosome counts and field studies are desirable to confirm this contention and perhaps to discover some tetraploids.

Biology - No differences can be seen between the cytotypes. Both diploids and hexaploids are sexually reproducing perennials flowering prolifically from late July to late October. The onset of flowering may vary slightly depending on temperature, altitude, sunshine and other environmental factors. An abundance of fully viable achenes is produced every year. Despite the high degree of polyploidy, there is no indication of apomixis in the hexaploids.

Taxonomic treatment - The presence of two easily recognizable ploidy levels within one Linnean species is hardly tenable from a taxonomic viewpoint. The karyological evidence now available, in conjunction with morphological differences and geographical distribution, support the treatment of the hexaploid cytotype of *A. amellus* as a separate species for which the name *A. scepusiensis* KITABEL ex KANITZ *Linnaea* 32: 373, 1863 is available. This epithet relates beyond any doubt to plants in which the hexaploid chromosome number was counted for the first time. The name *A. amellus* L. should henceforth be reserved for the diploid cytotype.¹ A new name will have to be coined for the tetraploids, if they are found and if they prove to be equally distinct in their morphology and geographical distribution.

A. amelloides BESSER, described illegitimately from what is now a part of the Ukraine, should have, according to the original diagnosis (BESSER 1822) a many-headed inflorescence ("magis multiflorus quam *A. amellus*"). In the *Flora USSR* (TAMAMSCHJAN 1959), "*A. amelloides* BESSER" is described as having, inter alia, many heads and densely hairy involucre bracts; these characters make it impossible for it to be equated with the Central European hexaploids, even though a hexaploid chromosome number was published for it (see HUZIWARA 1962).

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¹ LINNAEUS (1753) says in his original diagnosis of *A. amellus*: "Aster foliis lanceolatis obtusis scabris trinervis integris, pedunculis nudiusculis corymbosis, squamis calycinis obtusis".

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