

**ON THE OCCURRENCE OF
LEUCANTHEMUM ATRATUM (JACQ.) DC. SPECIES
IN ROMANIAN FLORA**

Liviu FILIPAȘ, Gheorghe COLDEA

Institutul de Cercetări Biologice, str. Republicii, nr. 48, RO-400015 Cluj-Napoca

e-mail: lfilipas@gmail.com

Abstract: Mentions of this species are due to a confusion with *L. adustum* (W.D.J. Koch) Gremlı (syn. *Chrysanthemum leucanthemum* L. ssp. *saxicola* (W.D.J. Koch) Hayek, *L. vulgare* Lam. ssp. *subalpinum* (Schur) Tzvelev, *L. maximum* auct., non (Ramond) DC., *L. margarite* (Gáyer ex Jáv.) Soó) or with *L. gaudinii* Dalla Torre (syn. *L. praecox* (Horvatic) Horvatic, *L. ırcutianum* (Turcz.) DC. *L. vulgare* Lam. ssp. *triviale* (Gaudin) Briq. et Cavill. pro parte).

All recent mentions of *L. atratum* (Jacq.) DC. in the Romanian flora are errors; the species should be removed from the flora of our country.

Keywords: flora, occurrence confusion.

The species *Leucanthemum atratum* (Jacq.) DC. (syn. *Chrysanthemum atratum* L.) is considered endemic for Austria [1]. Also, *Flora Europaea*, [11] doesn't indicate the occurrence of this species in the Romanian flora. However, recently Ciocârlan (2000) and Oprea (2005) mention the occurrence of the species in the flora of our country, based on the work of XIXth century botanists (Rodnei, Bucegi, Parâng, Retezat, Făgăraș mountains).

To elucidate the problem of the species possible occurrence in Romania we have investigated the sources of information that could mention this species in our country.

First of all, we checked the herbarium material from *Herbarium Universitatis Clujensis* (CL). The herbarium doesn't contain even a single sheet with *Leucanthemum atratum* (Jacq.) DC. collected from Romania. The *Brukenthal museum Herbarium from Sibiu* didn't contain sheets with this species either. The herbarium sheet ascribed to *Leucanthemum atratum* (Jacq.) DC. collected from Făgăraș mountains (Bârcaciu peak) actually belongs to the species *Leucanthemum waldsteinii* (Schultz Bip.) Pouzar (C. Drăgulescu, verbal communication). Taking these aspects into consideration, we have checked the bibliographical data supporting the presence of the species in Romania.

At the 105 page of the 3rd volume of his book, Baumgarten (1816) mentions from the “Transylvanian Alps” only the occurrence of *Chrysanthemum atratum* Jacq. but not the occurrence of *Chrysanthemum atratum* L. From the authors description of the species (page 105-106) we can conclude that he presents *Chrysanthemum leucanthemum* L. ssp. *saxicola* (W.D.J. Koch) Hayek (syn. *Leucanthemum vulgare* Lam. ssp. *subalpinum* (Schur) Tzvelev, *Leucanthemum adustum* (W.D.J. Koch) Gremlı, *Leucanthemum margarite* (Gáyer ex Jáv.) Soó). This observation is also supported by the fact that the author doesn't describe the subspecies *Chrysanthemum leucanthemum* L. ssp. *saxicola* (W.D.J. Koch) Hayek as a part of the species *Chrysanthemum leucanthemum* L.. In conclusion, this author doesn't indicate the occurrence of *Leucanthemum atratum* (Jacq.) DC. in the Romanian flora, he describes another taxon, respectively the subspecies *Chrysanthemum leucanthemum* L. ssp. *saxicola* (W.D.J. Koch) Hayek.

Later, Schur [8] at page 338, presents the species *Leucanthemum atratum* Schur. The author mentions the following synonyms for the species: *Chrysanthemum atratum* Jacq. non L. and *Leucanthemum montanum* DC. pro parte γ *atratum* Koch. In the species description, Schur quotes Baumgarten's book. We can conclude that Schur doesn't support the occurrence of *Leucanthemum atratum* (Jacq.) DC. in the Romanian flora either, as he mentions the same taxon as Baumgarten (*Chrysanthemum leucanthemum* L. ssp. *saxicola* (W.D.J. Koch) Hayek).

Porcius (1885) at page 110, includes in the species *Chrysanthemum leucanthemum* L. the taxon δ *atratum* Koch. So, Porcius made a clearly distinction between the taxon δ *atratum* Koch and *Leucanthemum atratum* (Jacq.) DC. This author doesn't mention the occurrence of *Leucanthemum atratum* (Jacq.) DC. in flora of our country either.

Simonkai (1887) at page 313 presents the taxon *Tanacetum subalpinum* Schur as "variety", part of *Tanacetum leucanthemum* L.. Simonkai gives the following synonyms for the variety: *Chrysanthemum atratum* Baumg. et auct. trans. non L. and *Chrysanthemum montanum* DC. pro parte α *adustum* Porc. Simonkai presents this taxon properly, as a subordinate of the species *Chrysanthemum leucanthemum* L., which is synonymous with ssp. *saxicola* (W.D.J. Koch) Hayek. So, this source doesn't support either the presence of the species *Leucanthemum atratum* (Jacq.) DC. in the Romanian flora.

Prodan (1939) describes *C. subalpinum* Schur together with *C. leucanthemum* L. (page 1015), mentioning the following characteristics: the involucre's foliole are black on the margin; the achenes are slightly coronulate. As we can see, in this case also the description fits ssp. *saxicola* (W.D.J. Koch) Hayek.

In his work Borza (1949), at the page 278, also mentioned the taxon *C. subalpinum* Schur, as "variety", of *C. leucanthemum* L.

In the Romanian Flora [10] there is no clear distinction between *Chrysanthemum atratum* Jacq. and *Chrysanthemum leucanthemum* L., the dichotomous key presenting the characters that separate the two species being ambiguous:

- 9a** alpine plants, usually smaller than 25 cm, always with only one anthodium.....**10**
- 9b** plants from mountainous or low altitude fields or cultivated, taller than 30 cm, smaller only in exceptional cases, rarely with only one anthodium.....**11**
- 10b** basal leaves smaller than the stem leaves; the stem leaves are oblanceolate or lanceolate deeply dentate, with teeth \pm curved towards the exterior.....***Chrysanthemum atratum***
- 11a** entire leaves, sometimes cut, rarely with the entire limb incised, but in this case the lacinia are undivided. The achenes of the tubular flowers have \pm a coronule.....**12**
- 12b** the superior and middle stem leaves are spatulate, lanceolate or elongate, more or less wide at the base, sessile or very slowly attenuate, often dentate or auriculate at the base, 4-7 times longer than wide, the basal leaves sometimes round.....**13**
- 13a** leaves attenuate only at the base, obtuse at the tip, with the teeth usually pointing towards the exterior.....***Chrysanthemum leucanthemum***

As we can see, the two taxa are not clearly delimited. Both species can have individuals with one anthodium, the form of the middle stem leaves is variable, more or less lanceolate; the margin of the leaf is incised and the teeth curved towards the exterior. Also, the presence of the achenes coronule, characteristic for *L. atratum*, is not included in the differentiating characters for the two species.

In the description of the species *Chrysanthemum atratum* Jacq. it is clearly specified that the achenes have a coronule, but *Chrysanthemum leucanthemum* L. can also have coronules at the achenes of the tubular flowers.

For a better differentiation between *Leucanthemum atratum* (Jacq.) DC and *L. vulgare* Lam. we will describe the diagnostic characters for the two species, as mentioned in the Austrian flora [1]:

1 - The middle stem leaves are wider in the upper third. At the base, again, a little wider, with thicker and longer teeth, that have distinct auricles. The membranous margin of the involucrel folioles is pale-brown to dark-brown. All the achenes lack the coronule, rarely radial flowers having very small coronules (*Leucanthemum vulgare* agg.).....**2**
 – Simple stem, with no leaf in the upper half, sometimes in the upper third; usually has only one anthodium. The middle stem leaves have their maximal width near the middle, and are slightly attenuate (narrowed) at the base. The teeth of the limb aren't congested, and the base of the leaf is not auriculate.....**3**
2 - The stem is usually branched, with more than one anthodium. The longest basal leaves are over 3 cm. The middle stem leaves are approximately 5 x longer than wide, irregularly penate lobate to penate divided, and in the lower part auriculate and more or less amplexicaule. The margin of the folioles is pale-brown.....*L. vulgare* Lam. (*s. str.*)
 – The stem is in most cases simple, sometimes with longitudinal brown-red lines and most of the times with only one anthodium. The basal leaves are a little over 3 cm. The middle stem leaves are 6x longer than wide, regularly deeply serrate-dentate, obviously narrowed towards the base, without or only with small auricles. The membranous margin of the involucrel folioles is dark black-brown.....*L. gaudinii* Dalla Torre
3 - The achenes of the tubular flowers without a coronule. The margin of the involucrel folioles is pale-brown to dark black-brown.....**4**
 – All the achenes with clearly developed coronules. The margin of the involucrel folioles is dark black.....**5**
4 At least few basal spatulate leaves are still present. Leaf lamina rapid narrowed on the stem. The margin of the involucrel folioles is brown. The middle stem leaves with parallel margins, finely and regular toothed. Superior leaves entire.....*L. adustum* (W.D.J. Koch) Greml
5 The middle stem leaves teeth triangular, often directed towards the tip. The stem is straight, at the base moderately ascendant, glabrous. The inferior stem leaves petiolate, cuneate-elongated with 3-8 (20) teeth (coarsely serrate-dentate).....*L. atratum* (Jacq.) DC.

Table 1: The main differentiating morphological characters between the species *L. atratum*, *L. gaudinii* and *L. adustum* (Adler et al., 1994)

	<i>L. atratum</i> (Jacq.) DC.	<i>L. gaudinii</i> Dalla Torre	<i>L. adustum</i> (W.D.J. Koch) Greml
stem	- (10) 20-40 cm. high, - simple - straight, at the base moderate ascendant, glabre	- (10) 20-30 (40) cm. high - usually simple, with no branches	- 20-60 cm high
stem leaves	- The inferior leaves petiolate, cuneate-elongated with 3-8 (20) teeth, coarsely serrate-dentate, - leaf teeth triangular, often directed towards the tip - not auriculate	- The middle stem leaves are 6x longer than wide, - regularly deeply serrate-dentate, obviously narrowed towards the base, - without or only with small auricles	
anthodium	- often with only one anthodium - 3-6 cm. ø	- often with only one anthodium - (3) 4-6 cm ø	
involucrel folioles	- margin of the involucrel folioles is dark black	- margin of the involucrel folioles is dark black-brown	-margin of the involucrel folioles is pale-brown
achene	- All achenes with clearly developed coronules	- All achenes lack the coronule, rarely radial flowers having very small coronules	-al achenes lack the coronules

The morphological resemblance between *L. atratum* (Jacq.) DC. *L. gaudinii* Dalla Torre and *L. adustum* (W.D.J. Koch) Gremlı can be observe from table 1. Also, populations of these species are present in subalpine.

Both the herbarium material and the bibliographical data do not sustain the occurrence of *L. atratum* (Jacq.) DC. in the Romanian flora. Mentions of this species in the flora of our country are due to the confusion with *L. adustum* (W.D.J. Koch) Gremlı, or with *L. gaudinii* Dalla Torre (syn. *L. praecox* (Horvatic) Horvatic, *L. ircuitianum* (Turcz.) DC, *L. vulgare* Lam. ssp. *triviale* (Gaudin) Briq. et Cavill. pro parte.

In conclusion mentions of *L. atratum* (Jacq.) DC. in Romanian flora are caused by an error and this species should be removed from the flora of our country.

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CONSIDERAȚII ASUPRA PREZENȚEI SPECIEI *LEUCANTHEMUM ATRATUM* (JACQ.) DC ÎN FLORA ROMÂNIEI

(Rezumat)

Leucanthemum atratum (Jacq.) DC. (syn. *Chrysanthemum atratum* L.) este o specie endemică in Flora Austriei [1], cu arealul limitat doar la Alpii nord-estici (*Flora Europaea*). Recent, Ciocârlan (2000) și Oprea (2005), pe baza datelor corologice din Flora României (vol. 9) menționează această specie ca fiind prezentă și în flora țării noastre.

Material de herbar cu *Leucanthemum atratum* (Jacq.) DC. colectat din Carpații României nu există nici în herbarul CL și nici în herbarul Muzeului Brukenthal din Sibiu, iar datele bibliografice nu susțin prezența speciei *L. atratum* (Jacq.) DC. în flora României. Citarea acestei specii se datorează unor confuzii fie cu *L. adustum* (W.D.J. Koch) Gremlı (syn. *Chrysanthemum leucanthemum* L. ssp. *saxicola* (W.D.J. Koch) Hayek, *L. vulgare* Lam. ssp. *subalpinum* (Schur) Tzvelev, *L. maximum* auct., non (Ramond) DC., *L. margarite* (Gáyer ex Jáv.) Soó) fie cu *L. gaudinii* Dalla Torre (syn. *L. praecox* (Horvatic) Horvatic, *L. ircuitianum* (Turcz.) DC. *L. vulgare* Lam. ssp. *triviale* (Gaudin) Briq. et Cavill. pro parte).

Toate citările recente ale speciei *L. atratum* (Jacq.) DC. în flora României sunt eronate și această specie trebuie eliminată din flora țării noastre.

Specia *Leucanthemum atratum* (Jacq.) DC. se deosebește de *L. gaudinii* Dalla Torre și *L. adustum* (W.D.J. Koch) Gremlı cu care se aseamănă și se poate confunda, prin aceea că toate achenele (fructele discului) au o coronulă bine dezvoltată; marginea hipsofilelor involucrale este neagră; frunzele concentrate pe jumătatea inferioară a tulpinii, ceva mai groase/voluminoase, au pe fiecare parte numai câte 3-10 dinți. *Leucanthemum atratum* (Jacq.) DC. Este o specie calcofilă, subalpină-alpină.