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Amaranthus blitum L. subsp. *emarginatus* (MOQ. ex ULINE et W. L. BRAY) CARRETERO, MUÑOZ GARM. et PEDROL. the new invasive subspecies native to the tropics occurs now also in Slovakia and Hungary

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JEHLÍK V. & ZALIBEROVÁ M. (2005): *Amaranthus blitum* subsp. *emarginatus* (MOQ. ex ULINE et W. L. BRAY) CARRETERO, MUÑOZ GARM. et PEDROL. the new invasive subspecies native to the tropics occurs now also in Slovakia and Hungary. – Thaiszia – J. Bot. 15, Suppl. 1: 115-120. – ISSN 1210-0420.

Abstract: During the research of the synanthropic flora and vegetation in the river harbours, river banks and similar sites in the Central Europe, we have found the subspecies *Amaranthus blitum* L. subsp. *emarginatus* (MOQ. ex ULINE et W. L. BRAY) CARRETERO, MUÑOZ GARM. et PEDROL.. [in var. *pseudogracilis* (THELL.) LAMBINON, (Fig. 2,3)] also in Slovakia (2004) and Hungary (1982, 1994). We have determined it as a locally new adventive subspecies that belongs to the taxonomic group of *Amaranthus blitum* agg. The *A. b.* subsp. *emarginatus* is native to the tropics of the northern and southern hemisphere. It grows in sites rich on nitrates such as natural riverbanks or ruderal and segetal sites. It invades some parts of Europe and North America where it behaves like a neoindigenophyt or epecophyt.

Keywords: synathropic flora and vegetation, *Amaranthus blitum* agg., *Amaranthus blitum* subsp. *emarginatus*, neoindigenophyt, epecophyt.

Introduction and methods

In the last decades, the Central European scientists are interested in a group of taxa of *Amaranthus blitum* agg. (cf. Hügin 1986, 1987, Wißkirchen (1995: 66 – 72), Wißkirchen & Haeupler (1998: 61), Walter & Dobeš (2004). During the research of the synanthropic flora and vegetation in the river harbours, riverbanks and similar sites in Slovakia and Hungary, we have found new adventive subspecies of *Amaranthus blitum* L. subsp. *emarginatus* (Moq. ex Uline et W. L. Bray) Carretero, Muñoz Garm. et Pedrol., that belongs to this taxa group. The differential characteristics that differ two subspecies (*Amaranthus blitum* subsp. *emarginatus* and *A. b.* subsp. *blitum*) from each other were published for example in Wißkirchen (1995: 70) and Rothmaler, Jäger & Werner (2002: 209). They are as follows:

a/ Plants dark green to blue or red (purple) green. Leaves firstly red, often with light or dark spot. Tepals 3, equal or longer than 1.5 mm long female flower, often acuminate (at the apex). Seeds (1.0-)1.1-1.5 mm long. In root-crop fields and in ruderal habitats..... ***A. b.*** subsp. ***blitum***

b/ Plants mainly light green and not reddish. Leaves spotless. Tepals 2-3, as long as 1 mm long femal flowers, obtuse (at the apex). Seeds (0.7-) 0.8-1,1 mm long. On moist or wet sandy banks, fields and ruderal habitats.... .....***A. b.*** subsp. ***emarginatus*** s.l.

The used names of other taxa were unified according to Marhold & Hindák (1998) and the names of syntaxa according to Jarolímek et al. (1997)

Results

According to our field experience and the research of specimens stored at PRA (Herbarium of Institute of the Botany, Academy of Sciences of the Czech Republic, Průhonice), Wißkirchen's taxonomic conception (Wißkirchen 1995: 61) is eligible. This conception divides *Amaranthus blitum* s. l. into two subspecies – *Amaranthus blitum* subsp. *blitum* (Fig. 1) and *Amaranthus blitum* subsp. *emarginatus*. The subspecies of *A. b.* subsp. *emarginatus* can be split up into two varieties - *A. blitum* subsp. *emarginatus* var. *emarginatus* (Moq. ex Uline et W. L. Bray) Lambinon and *A. blitum* subsp. *emarginatus* var. *pseudogracilis* (Thell.) Lambinon (Fig. 2, 3). *A. blitum* subsp. *blitum* apperently comes from Mediteran. *A. blitum* subsp. *emarginatus* is native to the tropics of southern and northern hemispheres. In Europe and North America adventive and behaves like a neoindigenophyt or epecophyt and locally as an invasive species (cf. Wißkirchen 1995).

Amaranthus blitum subsp. *emarginatus* var. *emarginatus*: stem prostrat, inflorescence of axillary spicate clusters or very short spicate clusters. *Amaranthus blitum* subsp. *emarginatus* var. *pseudogracilis* (Fig. 2, 3): stem mainly ascending to arcuate and nodding, inflorescence long, thin and obviously interrupted apical spicate clusters. Similary to *A. blitum* subsp. *blitum*, its large stem leaves are deeply cut in a sharp angle and the terminal spikes are long

and branching. Contrary to *A. blitum* subsp. *blitum,* the spikes of *A. b.* subsp. *emarginatus* var. *pseudogracilis* are narrow, slender and usually discontinuous.

In the field, it can be rather difficult to distinguish *Amaranthus blitum* subsp. *emarginatus* from the prostrate forms of *A. blitum* subsp. *blitum* var. *blitum*, which were also mentioned in some papers (for example f. *procumbens* Spenner). On the other hand, the determination of *A. blitum* subsp. *emarginatus* var. *pseudogracilis* is less difficult, although transitional forms of *A. blitum* var. *blitum* were mentioned in some German and Austrian papers (Wißkirchen 1995, Walter & Dobeš 2004: 650, 668).

We have found and collected *Amaranthus blitum* subsp. *emarginatus* var. *pseudogracilis* in two localities in Slovakia. The 1st locality: **Gabčíkovo**, WSW from the town, **Nad mlynmi,** left bank of the Danube river, ruderal site, 116 m above sea level, 27. 7. 2004 (leg. V. Jehlík, M. Zaliberová et J. Májeková, Fig. 2). We assume that the species was introduced to this area during the last flood. A few individuals grew there. The 2nd locality: **Vysoká pri Morave**, 4 km S from the town, near to the locality Mäsiarky, left bank of the Morava river, gravel and sand terrace, 140 m above sea level, 2. 10. 2004 (leg. V. Jehlík, M. Zaliberová et J. Májeková, Fig. 3). The vegetation in which the species was growing belongs to the association of *Chenopodio rubri-Polygonetum brittingeri* Lohmeyer 1950, the alliance of *Chenopodion glauci* Hejný 1974 (Jarolímek et al. 1997). The species pattern is as follows:

Relevé 1: Borská nížina, Vysoká pri Morave, Mäsiarky, left bank of the Morava river (5 m from the bank), longitude 16°54´2 6,8´´, latitude 8°17´21,1´´, area 2,5x10 m, vegetation cover 70 %, hight 10-30 cm, gravel-sandy soil, 2. 10. 2004, M. Zaliberová, V. Jehlík, J. Májeková.

E_1 *Chenopodium polyspermum* 2b, *Persicaria lapathifolia* subsp. *lapathifolia* 2b, *Chenopodium rubrum* 2a, *Amaranthus blitum* subsp. *emarginatus* var. *pseudogracilis* 1, *Bidens frondosa* 1, *Cyperus fuscus* 1, *Persicaria brittingeri* subsp. *brittingeri* 1, *Plantago uliginosa* 1, *Rumex maritimus* 1, *Atriplex prostrata* +, *Carduus crispus* +, *Chenopodium ficifolim* +, *Conyza canadensis* +, *Dichostylis micheliana* +, *Echinochloa crus-galli* +, *Epilobium* sp. +, *Filaginella uliginosa* +, *Lycopus europaeus* +, *Mentha arvensis* +, *Potentilla supina* +, *Ranunculus sceleratus* +, *Rorippa amphibia* +, *R. palustris* +, *Salix alba* +, *Scrophularia nodosa* +, *Urtica dioica* +, *Veronica anagallis-aquatica* +, *Xanthium* sp. +, *Chenopodium glaucum* r, *Sonchus asper* r.

Besides this locality we have also found *A. blitum* subsp. *emarginatus* var. *pseudogracilis* in the 15th river kilometre by the ground elevation point 139,7, on the left bank of the Morava river, at he same level as the Austrian town of Marcheg, approximately 1/2 km to the SE from relevé 1, 2. 10. 2004 (V. Jehlík, M. Zaliberová et J. Májeková). A few individuals grew there.

Amaranthus blitum subsp. *emarginatus* have not been recorded on the territory of Czech Republic yet. We and our Hungarian colleagues have so far collected *A. blitum* subsp. *emarginatus* var. *pseudogracilis* in two localities in Hungary: 1st locality: **Györ**, on the yard of an oil-plant processing factory , 1 individual, 10. 9. 1982 (leg. P. Erdös, V. Jehlík et P. Szalai PRA); 2nd locality:

Dunaújváros, bank of the Danube river in the industrial harbour near the town, a few individuals. 6. 7. and 7. 9. 1994 (both leg. V. Jehlík et A. Terpó PRA). We also have collected *A. blitum* subsp. *blitum* var. *blitum* in this locality (6. 7. 1994, leg. V. Jehlík et A. Terpó PRA).

A. blitum subsp. *emarginatus* var. *pseudogracilis* is referred to in some papers mainly from Austria (Walter & Dobeš 2004). Both varieties are mentioned in these German works: Hügin 1986, 1987; Wißkirchen 1995 and Wißkirchen & Haeupler 1998. In the comparison to the European countries that are situated further to the west, the spreading of both varieties of *Amaranthus blitum* subsp. *emarginatus* on the territories of Slovakia, Hungary and probably also Czech republic is only at an early stage. For this reason it is very important to pay close attention to the dynamics of this species. According to Frey 1974, *A. blitum* subsp. *emarginatus* s. l. is not likely to occur in Poland.

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Fig. 1 ***Amaranthus blitum*** L. subsp. ***blitum*** var. ***blitum*** (Herb. PRA). Photo P. Jehlík

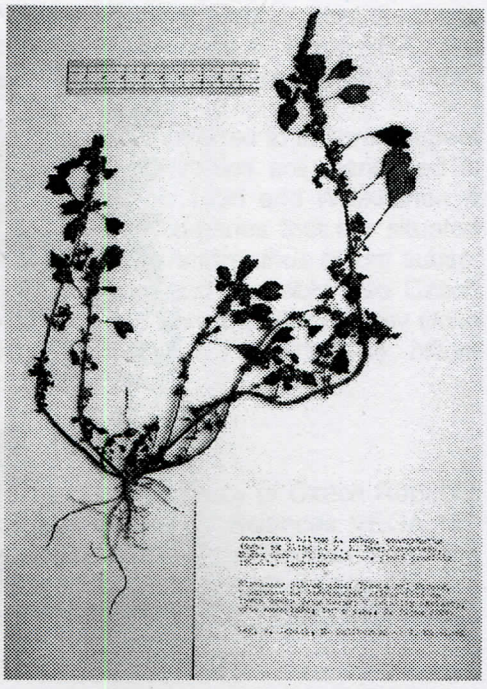

Fig. 2 ***Amaranthus blitum*** **subsp.** ***emarginatus*** **(MOQ. ex ULINE et W. L. BRAY) CARRETERO et al., var.** ***pseudogracilis*** **(THELL.) LAMBINON, herbarium specimen from the locality in Gabčíkovo. Photo P. Jehlík**

Fig. 3 ***Amaranthus blitum*** **subsp.** ***emarginatus*** **(MOQ. ex ULINE et W. L. BRAY) CARRETERO et al., var.** ***pseudogracilis*** **(THELL.) LAMBINON, herbarium specimen from the locality in Vysoká pri Morave. Photo P. Jehlík**