

## A few taxa new to the flora of North Korea

Nové druhy pro flóru Severní Koreje

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During the expeditions to North Korea (D.P.R.K.) we have found a few taxa (*Amaranthus powellii* S. WATSON, *Azolla pinnata* R. BR., *Bromus commutatus* SCHRADER, *Chenopodium strictum* ROTH, *Eichhornia crassipes* (C.F.P. MART.) SOEMS-LAUB. in A. et C. DC., *Potentilla sapina* subsp. *costata* SOJÁK, *Scirpus iscenis* SCHIMIZU, *Setaria macrocarpa* LUCZNIK), absent from the North Korean botanical literature (ANONYMUS 1979, 1984). The composition of the communities in which these species occurred is documented mostly by phytosociological relevés.

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During botanical expeditions to North Korea (D.P.R.K.), between June to July 1984 and September to October 1986, some taxa that were new for the North Korean flora were found. The composition of communities in which the newly found species were present is characterized by phytosociological relevés using the Zürich-Montpellier school (BRAUN-BLANQUET 1964).

The nomenclature of the species answers to that used in the Flora Coreana — Appendix (ANONYMUS 1979). Voucher specimens of our findings are deposited at PR.

### *Amaranthus powellii* S. WATSON

It is native of North America from where it spreads to Europe. The species is not listed in the flora of the USSR (ILJIN 1936, VOROSHILOV 1982), the flora Mandshurica (KITAGAWA 1979) and flora of Japan (OHWI 1965).

In North Korea, the species was found in the NW part of the City of Pyongyang; 39°00' N, 125°40' E; altitude 40 m; on railway tracks near a power station; 9. 9. 1986.

Relevé: Exp. W, slope 19°, area 18 m<sup>2</sup>, E<sub>1</sub> = 80 %

*Digitaria sanguinalis* 3, *Eleusine indica* 2, *Fagopyrum esculentum* 2, *Amaranthus powellii* 1, *Amaranthus retroflexus* 1, *Portulaca oleracea* 1, *Chenopodium album* agg. 1, *Glycine max* 1, *Centipeda minima* 1, *Solanum nigrum* +, *Senecio vulgaris* +, *Eragrostis multicaulis* +, *Cyperus nipponicus* +, *Chenopodium glaucum* +, *Setaria viridis* +, *Echinochloa crus-galli* +, *Brassica pekinensis* +, *Hybiscus trionum* r, *Euphorbia humifusa* r.

Other taxa of the genus *Amaranthus* L. listed in the Flora Coreana (ANONYMUS 1979): *A. ascendens* LOIS., *A. caudatus* L., *A. mangostanus* L., *A. retroflexus* L., *A. tricolor* L. and *A. viridis* L.

### *Azolla pinnata* R. BR.

A native species of S. Africa and S. E. Asia. We have not found any references about this species in the North Korean botanical literature. According to Dr. F. D. Ott (personal communication) this species is previously known from the Korean region, but absent from the North Korean botanical literature. The taxonomic relation of our material to *Azolla japonica* FR. et SAV. ex NAKAI is not quite clear for us.

The species was found in ponds in a park near the Potongang river in Pyongyang City; 39°00' N, 125°40' E; altitude 50 m; 7. 9. 1986.

Relevé: area 9 m<sup>2</sup>, E<sub>1a</sub> (emerged herbs) = 10 %, E<sub>1b</sub> (floating herbs) = 100 %, E<sub>1c</sub> (submerged plants) = 95 %

E<sub>1a</sub>: *Nelumbo nucifera* 2,

E<sub>1b</sub>: *Azolla pinnata* 5, *Nelumbo nucifera* 1, *Spirodela polyrrhiza* 1, *Ceratophyllum demersum* 1,

E<sub>1c</sub>: *Ceratophyllum demersum* 5.

### *Bromus commutatus* SCHRADER

It comes from C. Europe and the European part of the USSR. Secondary occurrence closest to North Korea: Coastal region of the Soviet Far East (VOROSHILOV 1982).

In North Korea, the species was recorded from ruderal places influenced by human activity, at Waudoo beech near Nampo harbour; 38°45' N, 125°25' E; altitude 0—10 m; 14. 7. 1984.

The other taxa of the genus *Bromus* L. in the Flora Coreana (ANONYMUS 1979) are only listed: *B. japonicus* THUNB., *B. jesoensis* OHWI, *B. remotiflorus* (STEUD.) OHWI and *B. richardsonii* LINK.

### *Chenopodium strictum* ROTH

Apparently a native of Central Asia, from where it was distributed all over the world. In the Flora of the USSR (ILJIN 1936) it is presented as a rare species of Siberia. KITAGAWA (1979) and OHWI (1965) did not record this species from the East Asian area.

The species was found in Pyongyang City (on Salmul street in the NW); 39°00' N, 125°40' E; altitude 40 m; in ruderal sites in trampled communities of *Plantaginetea majoris* R. TX. et PREISING in R. TX. 1950; 9. 9. 1986.

Relevé: Exp. E, slope 5°, area 9 m<sup>2</sup>, E<sub>1</sub> = 80 %, E<sub>0</sub> = 5 %

E<sub>1</sub>: *Chloris virgata* 4, *Plantago depressa* 2, *Aster fastigiatus* 1, *Chenopodium strictum* +, *Setaria viridis* +, *Zoysia japonica* +, *Erigeron canadensis* +, *Senecio vulgaris* +, *Cyperus microiria* +, *Sonchus asper* +, *Digitaria sanguinalis* +, *Trifolium repens* +, *Rudbeckia laciniata* var. *hortensis* +, *Taraxacum* cf. *platycarpum* +, *Cynodon dactylon* +, *Potentilla supina* subsp. *costata* r, *Euphorbia humifusa* r, *Ixeris dentatus* r,

E<sub>0</sub>: *Bryum argenteum* HEDW. 1, *Bryum* spec. (steril.) 1.

The species was found also at the foot of the Myohyangsan Mts. in Hyansan City; 40°03' N, 126°10' E; altitude 110 m; near the Hyansan Hotel, in ruderal places, on the gravelly alluvium of a stream; 15. 9. 1986.

Relevé: area 16 m<sup>2</sup>, E<sub>1</sub> = 75 %, E<sub>0</sub> = 5 %

E<sub>1</sub>: *Digitaria sanguinalis* 3, *Digitaria ciliaris* 3, *Chenopodium album* agg. 1—2, *Setaria glauca* 1, *Setaria viridis* 1, *Echinochloa crus-galli* 1, *Polygonum hydropiper* 1, *Trifolium repens* 1, *Chenopodium strictum* +, *Acalypha australis* +, *Cyperus microiria* +, *Solanum nigrum* +, *Euphorbia humifusa* +, *Plantago asiatica* +, *Siegesbeckia pubescens* +, *Erigeron canadensis* +, *Eleusine*

*indica* +, *Cassia nomane* +, *Comelina communis* +, *Artemisia asiatica* +, *Amaranthus retroflexus* r, E<sub>0</sub>: *Bryum argenteum* l.

Other taxa of the genus *Chenopodium* L. in Flora Coreana (ANONYMUS 1979):

*C. acuminatum* WILLD. (incl. var. *virgatum* MOQ.), *C. album* L. (incl. var. *centrorubrum* MAK.), *C. ambrosioides* L., *C. bryoniaefolium* BUNGE, *C. glaucum* L., *C. hybridum* L., *C. koraiense* NAK., *C. stenophyllum* (MAK.) KOIDZ. In addition, *C. ficifolium* SM. was published by DOSTÁLEK (1986).

*Eichhornia crassipes* (C. F. P. MART.) SOLMS-LAUB. in A. et C. DC.

<sup>2</sup> A native of tropical and temperate America, spreading from there to tropical and subtropical zones all over the world (SCULTHORPE 1967). Apparently introduced to North Korea as an ornamental plant of garden ponds, it has spread from there to other water biotopes.

The species was found in pools and ponds connected with old arms of the Potongang river in Pyongyang City. The plant formed either monocoenose communities (cover 100 %, height 50—150 cm), communities with *Lemna paucicostata* and *Spirodela polyrhiza* (cover 75—90 %), or communities with *Nelumbo nucifera* (see below).

Relevé: area 20 m<sup>2</sup>, E<sub>1a</sub> (emerged herbs) = 60 %, E<sub>1b</sub> (floating herbs) = 60 %, E<sub>1c</sub> (submerged herbs) = 5 %; 7. 9. 1986

E<sub>1a</sub>: *Eichhornia crassipes* 3, *Nelumbo nucifera* 2,

E<sub>1b</sub>: *Nelumbo nucifera* 3, *Lemna paucicostata* 3, *Spirodela polyrhiza* +,

E<sub>1c</sub>: *Ceratophyllum demersum* +, *Hydrilla verticillata* +.

*Potentilla supina* subsp. *costata* SOJÁK

All plants of *Potentilla supina* obtained from North Korean anthropogenic communities were determined by Dr. J. Soják as a new subspecies — *Potentilla supina* subsp. *costata*. The subspecies was described by SOJÁK (1987: 272) as a taxon distributed from the Ural to Vladivostok and northern China, and from Turkey to Kashmir and Soviet central Asia in the south.

In North Korea, it was found in the following localities:

1. Province of Ryangan, environs of the village of Naegok; 41°35' N, 128°25' E; altitude 850—900 m; 11. 10. 1986.
2. Province of North Pyongyang, Myohyangsan Mts., near the Pohyon temple: 40°00' N, 126°20' E; altitude 200 m; 12.—20. 9. 1986.
3. Province of South Pyongyang, Anju, slopes on the outskirts of the town; 39°40' N, 125°35' E; altitude 40 m; 27. 9. 1986.
4. Province of South Pyongyang, environs of Jonpchu barrage; 39°40' N, 125°50' E; altitude 15 m; 26. 9. 1986.
5. Province of Pyongyang City, Pyongyang City; 39°00' N, 125°40' E; altitude 40—50 m; 7.—10. 9. 1986.
6. Province of South Hvanghe, Sujansan Mts.; 38°05' N, 125°40' E; altitude 190 m; 30. 9. 1986.
7. Province of Kaesong City, Kaesong City; 38°57' N, 126°40' E; altitude 10 m; 21. 10. 1986.

The species occurred in ruderal communities with a dominant position in the community *Polygono-Potentilletum supinae* and also in other communities

dominated by *Polygonum hydropiper*, *Chloris virgata*, *Eleusine indica* and *Polygonum aviculare*, *Eleusine indica* and *Eragrostis multicaulis*, *Plantago asiatica*, *Plantago depressa*.

Phytosociological relevés with *Potentilla supina* subsp. *costata* in North Korea are documented in MUCINA et al. (in press).

### *Scirpus isceensis* SHIMIZU

The species was described by SHIMIZU (1967). MIYAWAKI et OHBA (1969) considered it as being a dominant of a *Scirpetum isceensis* community of the river Nagara, Honshu Island, Japan. So far reports of the species are available from Japan only.

In North Korea, the species was found near the town of Hedju: 38°05' N, 125°40' E; on the coast of the Yellow Sea (East Sea); 1. 10. 1986. It occurred in two communities. The first is identical to that in Japan, *Scirpetum isceensis* MIYAWAKI et OHBA 1969.

Relevé: area 20 m<sup>2</sup>, E<sub>1</sub> = 55 %;

E<sub>1</sub>: *Scirpus isceensis* 4, *Suaeda japonica* +, *Suaeda maritima* +.

The second community was described by KOLBEK et al. (1989) as a new association:

Relevé: area 16 m<sup>2</sup>, E<sub>1</sub> = 50 %;

E<sub>1</sub>: *Triglochin maritimum* 3, *Scirpus isceensis* 2, *Eleocharis acicularis* 2, *Phragmites communis* 2, *Carex scabrifolia* +, *Spergularia salina* +.

### *Setaria macrocarpa* LUCZNIK

Syn.: *Setaria foberi* auct. non HERRMANN

At present, this species is distributed throughout North America, Europe and East Asia, Mandshuria (KITAGAWA 1979), Japan (OHWI 1965) and the Soviet Far East (VOROSHILOV 1982).

In North Korea, the species was found in ruderal places near roads and in soybean fields:

1. Province of Pyongyang City, Pyongyang City, NW part of the city and its environs near the river Taedongang; 39°00' N, 125°40' E; altitude 40–50 m; 6.–10. 9. 1986.
2. Province of South Pyongyang; environs of Thaesong barrage; 38°55' N, 125°25' E; altitude 50 m; 11. 9. 1986.
3. Province of South Pyongyang; Anju City and its environs; 39°40' N, 125°35' E; altitude 20 m; 27. 9. 1986.
4. Province of North Pyongyang, Myohyangsan Mts., environs of the Pohyon tempel; 40°00' N, 126°20' E; altitude 230 m; 17. 9. 1986.

Relevé (locality no. 3): Exp. NW, slope 30°, area 25 m<sup>2</sup>, E<sub>1</sub> = 80 %

E<sub>1</sub>: *Digitaria ciliaris* 4, *Glycine max* 2, *Elscholtzia patrinii* 2, *Setaria macrocarpa* 1, *Cyperus microiria* 1, *Comelina communis* 1, *Phyllanthus ussuriensis* 1, *Viola madshurica* 1, *Acalypha australis* +, *Cassia nomame* +, *Glycine soja* +, *Xanthium* cf. *strumarium* +.

Other taxa of the genus *Setaria* BEAUV. in the Flora Coreana (ANONYMUS 1979): *S. autumnalis* OHWI, *S. chondrachine* (STAUD.) HONDA, *S. gigantea* (RR. et SAV.) MAK., *S. italica* (L.) BEAUV., *S. lutescens* (WEIGEL.) HUBB. and *S. viridis* (L.) BEAUV.

### SOUHRN

Během botanických výzkumů v Severní Koreji (KILDR) v letech 1984 a 1986 byly nalezeny druhy, které nebyly dosud z tohoto území uváděny. Jsou to: *Amaranthus powellii* S. WATSON, *Azolla pinnata* R. BR., *Bromus commutatus* SCHRADER, *Chenopodium strictum* ROTH, *Eichhornia*

*crassipes* (C. F. P. MART.) SOEMS-LAUB. in A. et C. DC., *Potentilla supina* subsp. *costata* SOJÁK, *Scirpus isensis* SHIMIZU, *Setaria macrocarpa* LUCZNIK. V článku jsou uvedeny všechny zjištěné lokality zmíněných druhů.

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#### Methoden zur Pflanzenhormonanalyse

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