

ANDREAS SCHULER

Contribution to the flora of northern and central Greece

Abstract

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New localities and records of major chorological significance are presented for 46 taxa rare or neglected in Greece, most of them of a Central European or Eurasian distribution, meeting their southernmost limits of occurrence in the northern part of the country. *Hieracium brevifolium* and *Succisa pratensis* are reconfirmed for the flora of Greece.

Key words: vascular plants, chorology, Central European elements, southernmost limits.

Introduction

During fieldwork in 1998-2002 in mountains and wetlands of northern Greece including the islands of Thasos and Samothraki, the phytocoenological and ecological behaviour of Central European vascular plant species at their southernmost limits of occurrence in Greece was investigated (Schuler 2004). Of c. 3500 specimens collected in this context, 46 taxa turned out to represent rare or undercollected species, or records of major phytogeographical interest which are discussed here. The records underline the still existing gaps in the knowledge of the colline and montane flora of Greece even in apparently well investigated areas such as the lakes Prespa and Kerkini, or Mt Voras. Selected additions to the flora of Greece based on these collections (*Cenchrus incertus* M. A. Curtis, *Epilobium adenocaulon* Hausskn., *Hieracium camkorijense* Zahn, *Thalictrum simplex* L. subsp. *simplex* and *Triglochin palustre* L.) have already been published elsewhere (Raus & Schuler, Schuler in Greuter & Raus 2005: 58, 60, 62, 64, Schuler & Snogerup in Greuter & Raus 2006: 724).

In the following list, attention is paid to observations on site conditions and accompanying taxa in order to characterise the habitat of the species under discussion. Division of floristic regions and mountain names follow Strid & Tan (1997). The naming of the administrative districts is in accordance with the program "I. Kapodistrias" for the reform of the primary level of local government in Greece (<http://www.ypes.gr/kapodistrias>). All specimens mentioned below are in the author's private herbarium (herb. Schuler), with a set of duplicates deposited in the herbarium of the Botanic Garden and Botanical Museum Berlin-Dahlem (B). Important localities mentioned in the text are shown in Fig. 1.

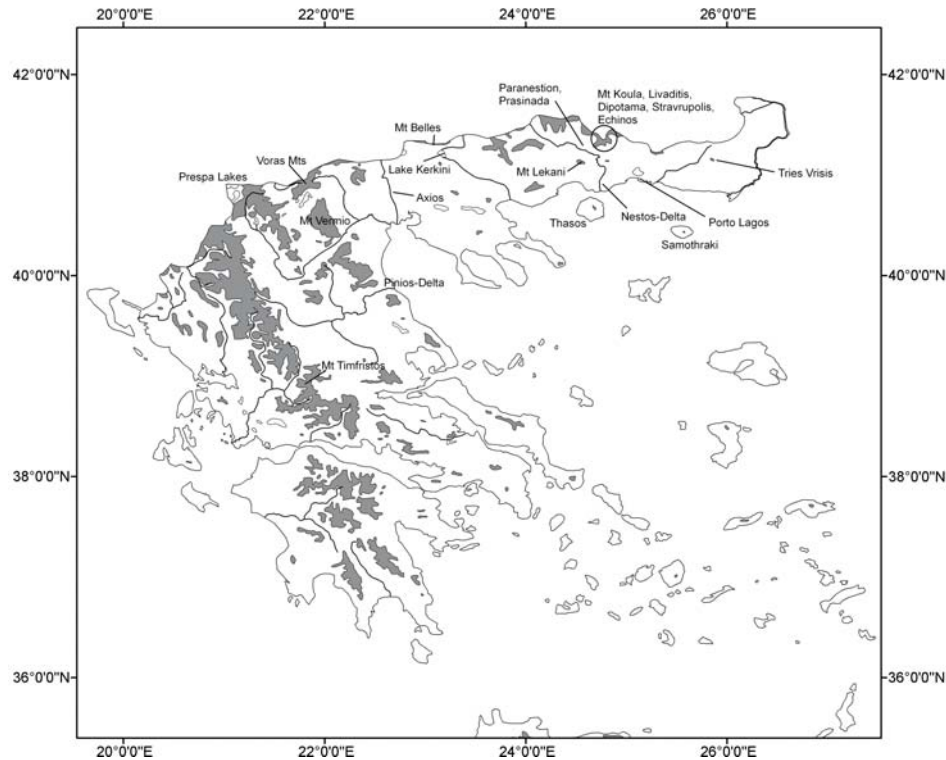


Fig. 1. Map of important localities mentioned in the text.

List of the taxa

Pteridophyta

Blechnaceae

Blechnum spicant (L.) Roth – Nomos Evros, Dimos Samothraki, along river Fonias (40°28'N, 28°38'E), ravine with *Alnus glutinosa*, on granite, 650 m, 13.8.1998, *Schuler 99/1359*. – New to Samothraki. The species was found in a ravine near river Fonias, which enters the Aegean Sea close to Akri Fonias. It grows there in a shady, damp and humus-rich crevice, the typical habitat of *B. spicant* in Greece (Christiansen in Strid 1986: 36), together with *Alnus glutinosa* (L.) G. Gaertn. and *Calamagrostis arundinacea* (L.) Roth.

Gymnospermae

Pinaceae

Abies alba Mill. – Nomos Serres, Dimos Petritsi, Mt Belles (Kerkini), above Petritsi (41°20'N, 23°15'E), mixed *Abies-Fagus* forest, 1100-1200 m, 17.8.2000, *Schuler 00/438*. – This species, common on mountains of Central and S Europe, reaches its southern distribution limit in northernmost Greece. Previous records are published from Mts Varnous, Falakron and Rodopi (Christensen in Strid & Tan 1997: 2, map 1). On Mt Belles, *A. alba* was found on a NE facing slope associated with *Fagus sylvatica* L. subsp. *sylvatica*, *Luzula luzuloides* (Lam.) Dandy & Wilm. subsp. *luzuloides*, *Galium pseudaristatum* Schur, *Gymnocarpium dryopteris* (L.) Newman and *Milium effusum* L. Nearby, in a moist ravine, *Circaea lutetiana* L. and *Impatiens noli-tangere* L. were noticed.

Picea abies (L.) H. Karst. – Nomos Drama, Dimos Paranestion, Mt Varvara, Dipotama area, c. 20 km NE of Paranestion (41°24'N, 24°40'E), mixed *Fagus-Pinus-Picea* forest, on gneiss and gneiss-schist, 1440 m, 18.9.1998, *Schuler* 98/576; *ibid.*, Mt Koula, c. 15 km NE of Livaditis towards “Partheno Dasos” (41°22'N, 24°42'E), clearing in *Fagus* forest, on gneiss and gneiss-schist, 1440 m, 6.9.1998, *Schuler* 98/504; Nomos Kavala, Dimos Orinu, Mt Lekani, E of village Lekani, near Drimotopos (41°09'N, 24°29'E), ruderal places along road, on gneiss and gneiss-schist, 1000 m, 8.6.2001, *Schuler* 856. – These new records represent the southernmost localities of spruce in Europe. Previously this rare boreal element of the Greek flora was reported only from the Central Rodopi Mts, at altitudes between 1300 and 1800 m (Christensen in Strid & Tan 1997: 4). The collections from Mt Lekani and Mt Koula belong to single trees growing along forest roads in the montane *Fagus* zone, whereas on Mt Varvara *Picea abies* forms mixed stands with *Fagus sylvatica* L. and *Pinus sylvestris* L.

Cupressaceae

Juniperus sabina L. – Nomos Kavala, Dimos Orinu, Mt Lekani, near “Dasiko Simblegma Lekanis” (41°11'N, 21°30'E), dry grassland, on limestone, 980 m, a single plant only, 17.9.1998, *Schuler* 98/569. – A new locality for this rare and scattered shrub. In NE Greece it was hitherto known only from Mt Falakron (Quézel & Contandriopoulos 1968: 19). Christensen (in Strid 1986: 48) published further records of *J. sabina* from N central Greece (Mts Tzena, Pinovon) and Sterea Ellas (Parnassos).

Taxaceae

Taxus baccata L. – Nomos Evros, Dimos Samothraki, along river Fonias (40°28'N, 28°38'E), *Platanus* gallery, on granite, 650 m, 13.8.1999, *Schuler* 99/1358. – New to the island of Samothraki, previously only reported from the Greek mainland and the islands of Evvia and Thasos (Christensen in Strid & Tan 1997: 15). A small group of *T. baccata* trees was found by the upper course of river Fonias, close to the ravine where *Blechnum spicant* was collected (see that entry above). Accompanying tree species were *Platanus orientalis* L. and a few individuals of *Alnus glutinosa* and *Fraxinus ornus* L.

Dicotyledones

Betulaceae

Betula pendula Roth – Nomos Imathia, Dimos Naussa, Mt Vermio above Kato Seli (40°34'N, 22°01'E), in mixed *Fagus-Pinus* forest, on limestone, 1420 m, 23.6.2001, *Schuler* 1099; Nomos Florina, Dimos Prespa, National Park of Limni Prespa, banks of Lake Megali Prespa (40°49'N, 21°06'E), *Salix-Betula* stand, on alluvial deposits, 860 m, 6.7.1999, *Schuler* 99/877. – A northern element of the Greek flora confined to the northernmost parts of the mainland, in W Makedonia previously known to occur only as far south as Mt Paiko (Athanasiadis & Drossos 1990: 53). The specimen from Mt Vermio verifies a report by Chochliouros & Georgiadis (1997: 106) thus extending the known range of *Betula pendula* to the south. As a pioneer species, *B. pendula* grows in very different habitats, chiefly mixed and deciduous forests in the montane region, but is also known from wetland areas, e.g., the flood-plain habitats along river Nestos (*Schuler* 2000: 426) and the shore of Lake Megali Prespa where it is associated with *Salix alba* L. and *Phragmites australis* (Cav.) Steud.

Caprifoliaceae

Viburnum opulus L. – Nomos Florina, Dimos Prespa, around Lake Mikri Prespa, *Quercus* wood near Mikrolimni (40°45'N, 21°08'E), on alluvial deposits, 860 m, 16.7.2001, *Schuler* 1425. – Recently published as new to Greece by Strid (in Greuter & Raus 2000: 232) although Arabatzis & al. (1998: 330) reported *V. opulus* already from Neochori (Nomos Pella, Eparchia Almopias) near a stream. At Lake Mikri Prespa, *V. opulus* was found at the edge of a *Quercus*

stand by a wet meadow where *Carex riparia* Curtis, *Filipendula ulmaria* (L.) Maxim., *Gra-tiola officinalis* L. and *Lysimachia vulgaris* L. were noticed.

Caryophyllaceae

Silene multicaulis subsp. *sporadum* (Halácsy) Greuter & Burdet – Nomos Xanthi, Dimos Stavropolis, c. 2 km E of Livaditis (41°18'N, 24°41'E), dry pastures, on gneiss and gneiss-schist, 1300 m, 7.9.1998, *Schuler* 98/533; Nomos Kavala, Dimos Orinu, Mt Lekani, north of village Lekani, near Agia Panagia (41°10'N, 24°30'E), dry grassland, on gneiss and gneiss-schist, 850 m, 8.6.2001, *Schuler* 845. – New to the mainland of Thrace. *S. multicaulis* subsp. *sporadum* is a Greek endemic, restricted to the eastern part of the range of the species. According to Greuter (in Strid & Tan 1997: 290), the taxon is known from the islands of Evvia, Samothraki, the N Sporades and the mountains of the adjacent mainland (Mts Athos, Pilio, Pangeo). The new records enlarge its known range northeastwards, close to the Bulgarian border. East of Livaditis, *S. multicaulis* subsp. *sporadum* was associated with *Cytisus procumbens* (Willd.) Spreng., *Euphrasia rostkoviana* Hayne, *Gymnadenia conopsea* (L.) R. Br., *Juniperus communis* L. subsp. *communis*, *Luzula luzuloides* subsp. *rubella* (Mert. & W. D. J. Koch) Holub, *Polygala major* Jacq., *Platanthera chlorantha* (Custer) Rchb., *Potentilla erecta* (L.) Raeusch., *Vaccinium myrtillus* L. and *V. vitis-idaea* L. At Mt Lekani, *Armeria canescens* (Host) Boiss. and *Rhinanthus sintenisii* (Sterneck) Soó were found with *S. multicaulis* subsp. *sporadum*.

Chenopodiaceae

Chenopodium ambrosioides L. – Nomos Xanthi, Dimos Stavropolis, 1-2 km S of Neochori (41°13'N, 24°38'E), pioneer habitats in the flood-plain along river Nestos, on alluvial deposits (gravel, sand), 80 m, 5.9.1998, *Schuler* 98/487. – Scattered in Greece but rare in the NE part and hitherto not reported from Thrace.

Chenopodium pumilio R. Br. – Nomos Serres, Dimos Petritsi, N of Sidirokastro (41°18'N, 23°20'E), banks of river Strimonas, pioneer community, 90 m, 18.8.2000, *Schuler* 00/444. – Rare in Greece, previously reported only from Mt Kato Olimbos and the Pinios delta (Bergmeier 1988: 40). At river Strimonas, *C. pumilio* was met on sandy-gravelly banks together with other therophytes such as *Crypsis schoenoides* (L.) Lam., *Amaranthus albus* L. and *Chenopodium botrys* L.

Compositae

Artemisia vulgaris L. – Nomos Kavala, Dimos Thasos, Limenaria (40°38'N, 24°35'E), ruderal habitat, 50 m, 6.7.2000, *Schuler* 00/328. – New to the island of Thasos. The species was found close to the sports field of Limenaria at the southern tip of the island.

Bombycilaena erecta (L.) Smoljan. – Nomos Florina, Dimos Prespa, National Park of Mikri Limni Prespa, lakeside road to Pili (40°47'N, 21°04'E), *Juniperus* woods, on limestone, 870 m, 6.7.1999, *Schuler* 99/885. – Rare in Greece. Published as new to Greece by Raus & al. (in Greuter & Raus 1998: 165) based on collections from Volos (Thessaly) and Orestiada (Thrace). The above collection substantiates an earlier report from the Prespa area by Pavlides (1985: 180). *B. erecta* was found in an open juniper wood together with *Arrhenatherum elatius* (L.) J. Presl & C. Presl, *Bupleurum glumaceum* Sm., *Catapodium rigidum* (L.) Dony, *Convolvulus althaeoides* L., *Koeleria nitidula* Velen., *Nigella arvensis* L., *Orlaya daucorlaya* Murb., *Petrorhagia saxifraga* (L.) Link, *Sideritis montana* L., *Thymus sibthorpii* Benth. and *Xeranthemum annuum* L.

Hieracium brevifolium Tausch – Nomos Xanthi, Dimos Stavropolis, c. 2 km N of Paschalia between Paranestion and Neochori (41°15'N, 24°35'E), flood-plain of river Nestos, pioneer habitats, on alluvial deposits (gravel, sand), 90 m, 5.9.1998, *Schuler* 98/499 (det. Gottschlich). – The collection reconfirms old records for Greece by Rechinger (1936: 643) and Zahn (1922: 933). Rechinger found "*Hieracium latifolium* subsp. *brevifolium* var. *cestianum*" near Edessa

(W Makedonia) and Zahn reports “*Hieracium brevifolium* subsp. *brachyphyllum* var. *pelicola*” from Zagora (Thessaly, Mt “Peldon” = Pelion). According to Gottschlich (pers. comm.), the taxon is not rare in the Balkan Peninsula but undercollected due to its late flowering time. In the riverine habitats along river Nestos, *H. brevifolium* was found on poorly vegetated banks under trees of *Populus nigra* L.

Cruciferae

Cardamine bulbifera (L.) Crantz – Nomos Evros, Dimos Sufli, Tris Vrisis area, E of Kallithea (41°08'N, 26°01'E), *Alnus* gallery along stream, on gneiss and gneiss-schist, 640 m, 12.6.1999, *Schuler* 99/600; Nomos Xanthi, Dimos Topiru, Nestos gorge (41°06'N, 24°44'E), riparian forest, on alluvial deposits, 40 m, 14.4.1999, *Schuler* 99/83. – Not previously recorded from E of the border between Macedonia and Thrace (Mt Koula; Tan in Strid & Tan 2002: 179, map 1030). The population found at Tris Vrisis, N of Alexandrupolis, is the easternmost in Greece. The record from the Nestos gorge, in a riparian forest of *Populus alba* L., *P. nigra* L. and *Ulmus minor* Mill. with dominating *Hedera helix* L. in the herb-layer, represents one of the lowest altitudes of occurrence of *Cardamine bulbifera* in Greece known so far.

Cardamine impatiens L. subsp. *impatiens* – Nomos Xanthi, Dimos Stavrupolis, Echinis area, W of Pachni (41°18'N, 24°51'E), damp, ruderal habitat along stream, on silicate rock (gneiss, schist), 800 m, 19.5.2001, *Schuler* 544; *ibid.*, near the road Xanthi-Stavrupolis (41°12'N, 24°51'E), *Alnus* gallery along stream, on alluvial deposits, 200 m, 29.5.2001, *Schuler* 01/256. – Previously only reported from the Rodopi Mts above 1100 m (Tan in Strid & Tan 2002: 18, map 1041). The new records extends the distribution range southwards to the foothills of the mountain range near Stavrupolis (see also Schuler 2000: 422). W of Pachni additional northern elements such as *Artemisia vulgaris* L., *Tanacetum vulgare* L., *Salvia glutinosa* L., *Aegopodium podagraria* L. and *Barbarea vulgaris* R. Br. were noticed, as well as the Balkan endemic *Cardamine amara* subsp. *balcanica* Marhold & al.

Rorippa amphibia (Crantz) Besser – Nomos Serres, Dimos Petritsi, Lake Kerkini S of Akritochori (41°15'N, 23°09'E), *Phalaris* reed, on alluvial deposits, 80 m, 2.6.2000, *Schuler* 00/142. – Rare in Greece and previously not reported from Lake Kerkini. The species was found on the northern lake shore, growing together with *Chenopodium album* L., *Euphorbia villosa* Willd. (see that entry below), *Phalaris arundinacea* L. and *Stachys palustris* L.

Matthiola sinuata (L.) R. Br. – Nomos Chalkidiki, Dimos Sithonia, along the road from Nikitas to Neos Marmaras near the Tavern “Drosa” (40°07'N, 23°46'E), ruderal vegetation near the beach, 3-5 m, 4.4.1999, *Schuler* 99/7. – New to the Sithonia peninsula, not mentioned by Pavlides (1976: 52). In NE Greece hitherto reported only from the Athos peninsula and the islands of Thasos and Samothraki (Livaniou-Tiniakou in Strid & Tan 2002: 167, map 1010).

Teesdalia coronopifolia (Bergeret) Thell. – Nomos Evros, Dimos Samothraki, Ano Meria (40°28'N, 25°38'E), northeastern hill slopes, phrygana and *Juniperus* scrub, 850-900 m, 27.5.1999, *Schuler* 99/459. – New to Samothraki. *T. coronopifolia* is quite common on the Kiklades but scattered or undercollected on the mainland (Tan in Strid & Tan 2002: 252, map 1161). On Samothraki the taxon was found associated with *Galium divaricatum* Lam., *G. samothracicum* Rech. f., *Hypericum olympicum* L., *Potentilla micrantha* DC., *Rumex acetosella* subsp. *acetoselloides* (Balansa) Den Nijs, *Rumex scutatus* L., *Sanguisorba minor* subsp. *muricata* (Spach) Briq. and *Vulpia ciliata* Dumort.

Dipsacaceae

Succisa pratensis Moench – Nomos Xanthi, Dimos Stavrupolis, c. 2 km E of Livaditis (41°18'N, 24°41'E), fens between pastures, on gneiss and gneiss-schist, 1300 m, 7.9.1998, *Schuler* 98/540; *ibid.*, 6.7.2001, *Schuler* 1221. – Actually the southernmost known population on the Balkan Peninsula of this species, which is otherwise recorded from adjacent Bulgaria and F.Y.R. Macedonia (Stefanoff & Jordanoff 1931: 368, Andreev & al. 1992: 371, Janić 1990: 217). The collection reconfirms the single, old record for Greece by Kitanov (1943: 274) from Mt Falakron. The habitat of *S. pratensis* E of Livaditis is a depression with wet pastures

and fens where other typical fen species such as *Carex echinata* Murray, *C. pallescens* L., *C. serotina* Mérat, *Drosera rotundifolia* L., *Eriophorum latifolium* Hoppe and *Parnassia palustris* L. grow.

Ericaceae

Arbutus andrachne L. – Nomos Pella, Dimos Aridea, Mt Voras, valley between Loutraki and Orma (40°58'N, 21°53'E), rocky slopes and limestone cliffs, 650 m, 31.7.1999, *Schuler 99/1303*. – This E Mediterranean species, the character species of the association *Arbuto andrachne-Quercetum icilis*, occurs mostly in evergreen forest and macchia of coastal lowlands and foothills throughout the thermo- and meso-Mediterranean zone. In interior Greece and at higher altitude, *A. andrachne* is rare and restricted to calcareous cliffs, gorges, etc. On Mt Voras the species grows in a narrow and steep valley NE of Loutraki, accompanied by, e.g., *Asperula purpurea* (L.) Ehrend. subsp. *purpurea*, *Eryngium palmatum* Pančić & Petrović, *Euphorbia baselices* Ten., *Fumana ericoides* (Cav.) Gand., *Ramonda nathaliae* Pančić & Petrović and *Stachelina uniflosculosa* Sm.

Euphorbiaceae

Euphorbia villosa Willd. – Nomos Serres, Dimos Petritsi, Lake Kerkini S of Akritochori (41°15'N, 23°09'E), *Phalaris arundinacea* reed, 80 m, 2.6.2000, *Schuler 00/140*. – A species rare in Greece, known from the mainland and the island of Andros (Kit Tan, pers. comm.). The population at the shore of Lake Kerkini has glabrous stems and the leaves are only sparsely pubescent on the lower surface. It shares the habitat with *Rorippa amphibia* (see that entry above).

Fagaceae

Quercus petraea Liebl. subsp. *petraea* – Nomos Florina, Dimos Prespa, National Park of Lake Mikri Prespa, SE of Vrondero (40°42'N, 21°03'E), fields and pastures near the lake, 860 m, 22.7.2000, *Schuler 00/397*. – This subspecies is rare in Greece and new to the Prespa area (not mapped for NW Greece by Christensen in Strid & Tan 1997: 47, map 68). Only single trees were found growing between fields and pastures close to the shore of Lake Mikri Prespa. Pavlides (1985: 204), who studied the Prespa area intensively, lists some records of *Q. petraea* from different forests and woodlands at altitudes of 940-1750 m (Pisoderi, Andartiko, Mt Vrondero, Mt Ayoneri, Mt Perivolaki). During my own field work there I only recognized *Q. petraea* subsp. *medwediewii* (A. Camus) Menitsky in these places.

Leguminosae

Lathyrus sylvestris L. – Nomos Kavala, Dimos Keramoti, Nestos delta (40°52'N, 24°47'30"E), *Phragmites* reed along the river, c. 2 km from the sea, on alluvial deposits (sand, clay), 5 m, 31.8.1998, *Schuler 98/448*. – There are no previous published records from NE Greece of this species (e.g., Athanasiadis & Drossos 1990, Voliotis 1981) which is scattered in Greece and restricted to the northern part of the mainland (Kit Tan, pers. comm.). On the banks of river Nestos only single plants of *L. sylvestris* were found in a reed dominated by *Phragmites australis*.

Onagraceae

Epilobium dodonaei Vill. – Nomos Xanthi, Dimos Stavropolis, c. 1-2 km S of Neochori (41°13'N, 24°38'E), flood-plain along river Nestos, pioneer habitats, on alluvial deposits (gravel), 80 m, 5.9.1998, *Schuler 98/491*. – New to NE Greece. Gravelly river banks are preferred habitats of *E. dodonaei*. In the above locality it is accompanied by further pioneer species such as *Anchusa officinalis* L., *Artemisia campestris* L., *Cichorium intybus* L., *Chondrilla juncea* L., *Centaurea grisebachii* subsp. *confusa* (Halácsy) Dostál, *Euphorbia seguieriana* subsp. *niciana* (Novák) Rech. f. and *Melilotus albus* Medik. (see also Schuler 2000: 425).

In other parts of Greece *E. dodonaei* is also known from roadsides and tracks (Snogerup in Strid 1986: 648).

Papaveraceae

Chelidonium majus L. – Nomos Fithiotida, Dimos Ag. Georgios Timfristos, Mt Timfristos, village of Neochori (38°58'N, 21°52'E), on walls, 900 m, 11.5.2001, *Schuler 461*. – The species is known to occur only in the northern half of Greece (Kadereit in Strid & Tan 2002: 95, map 887). Its presence on Mt Timfristos extends the distributional range southwards close to Sterea Ellas. *C. majus* grows on a wall in the village of Neochori together with *Myrrhoides nodosa* (L.) Cann., *Galium aparine* L., *Stellaria pallida* (Dumort.) Crépin, *Fumaria officinalis* L., *Alliaria petiolata* (M. Bieb.) Cavara & Grande, *Bromus sterilis* L. and *Veronica hederifolia* L.

Polygonaceae

Persicaria amphibia (L.) Gray – Nomos Florina, Dimos Prespa, National Park of Lake Mikri Prespa, area called Opagia (40°49'N, 21°06'E), bean fields and irrigation ditches, on alluvial deposits, 860 m, 19.7.2000, *Schuler 00/377*; *ibid.*, around Lake Mikri Prespa (40°44'N, 21°07'E), ruderal places between fields, along ditches, on alluvial deposits, 860 m, 16.7.2001, *Schuler 1434*; Nomos Larissa, Dimos Efrimeno, Pinios delta between national road and railway (39°55'N, 22°28'E), ponds, on alluvial deposits, 20 m, 23.6.1999, *Schuler 99/672*. – Rare and scattered in Greece, mainly in the north (Papastergiadou & Babalonas 1993), with single localities in Peloponnisos (Lake Stimpalia) and on the island of Lesvos (Snogerup & Snogerup in Strid & Tan 1997: 87). In the Pinios delta *P. amphibia* was associated with *Utricularia vulgaris* L. The records from Lake Mikri Prespa refer to the terrestrial form of *P. amphibia*, which has been collected before in Greece only on the island of Kerkira (Snogerup & Snogerup in Strid & Tan 1997: 87).

Persicaria minor (Huds.) Opiz – Nomos Florina, Dimos Melitti, Mt Kajmakčalan, E of Achlada (40°54'N, 21°42'E), *Salix alba* gallery, 900 m, 21.8.1999, *Schuler 99/1410* (det. Raus). – Second known locality in Greece of this species, which was previously recorded only from the Prespa area (Snogerup & Snogerup in Strid & Tan 1997: 90, map 158). The species grows on the muddy bank of a creek having its source on the western slopes of Mt Kajmakčalan. *Cirsium creticum* (Lam.) d'Urv., *Cynodon dactylon* (L.) Pers., *Festuca arundinacea* Schreb., *Juncus articulatus* L., *Persicaria lapathifolia* subsp. *pallida* (With.) S. Ekman & Knutsson, *Rumex palustris* Sm. and *Trifolium fragiferum* L. were observed as accompanying species.

Rumex aquaticus L. – Nomos Imathia, Dimos Naussa, Mt Vermio above Ano Seli (40°37'N, 21°57'E), fen on flysch, 1750 m, 24.6.2001, *Schuler 1157*. – Rare in Greece and hitherto only reported from Mts Voras and Rodopi (Snogerup & Snogerup in Strid & Tan 1997: 98, map 179). At Mt Vermio, *R. aquaticus* was found in a *Caricetum paniculatae*, associated with *Carex paniculata* L., *C. pallescens* L., *Deschampsia cespitosa* (L.) P. Beauv., *Equisetum palustre* L., *Festuca arundinacea* Schreb., *Filipendula ulmaria* (L.) Maxim., *Geum coccineum* Sm., *Juncus inflexus* L., *J. thomasi* Ten., *Poa pratensis* L. and *Ranunculus repens* L.

Rumex pulcher subsp. *raulinii* (Boiss.) Rech. f. – Nomos Kavala, Dimos Stavrupolis, valley of river Nestos SW of Stavrupolis (41°10'N, 24°41'E), on alluvial deposits, 70 m, 29.6.2000, *Schuler 00/259*. – New to the Kavala area. In Greece the taxon is common in the Aegean area but rare in the northern part of the mainland (Snogerup & Snogerup in Strid & Tan & 1997: 104, map 196). The collection from the foothills of the Rodopi Mts represents its northernmost known occurrence in Greece. The plant was found on disturbed ground between fields, accompanied by other ruderal species such as *Artemisia vulgaris* L., *Ballota nigra* L., *Bromus tectorum* L., *Chenopodium album* L. and *Sorghum halepense* (L.) Pers.

Ranunculaceae

Ranunculus ophioglossifolius Vill. – Nomos Xanthi, Dimos Avdira, Loutra, c. 8 km W of Porto Lagos (41°01'N, 25°03'E), ponds around the thermal spring of Loutra, on alluvial and coastal deposits, 1-5 m, 28.4.1999, *Schuler 99/200*. – New to the mainland of Thrace, previously only reported there from the island of Samothraki (Strid in Strid & Tan 2002: map 828). *R. ophioglossifolius* was found in wet places around small ponds together with *Ranunculus sardous* Crantz and *Rorippa sylvestris* (L.) Besser, in submerse habitats also with *Ranunculus aquatilis* L.

Rosaceae

Sanguisorba officinalis L. – Nomos Drama, Dimos Paranestion, Mt Koula, c. 22 km NE of Livaditis (41°22'N, 24°46'E), fen in *Fagus* forest, on gneiss and gneiss-schist, 1500 m, 6.9.1998, *Schuler 98/526*; Nomos Xanthi, Dimos Stavropolis, c. 2 km E of Livaditis (41°18'N, 24°41'E), fens between pastures, on gneiss and gneiss-schist, 1300 m, 7.9.1998, *Schuler obs.* – New to NE Greece (see Persson in Strid 1986: 400). The fen on Mt Koula is situated on a slope surrounded by a *Fagus* forest called “Partheno Dasos” (virgin forest) by locals, but this is not a virgin forest at all. The impact of forest management and other human activities are quite obviously. The water balance of the fen is regulated by a spring. The stand includes further species typical for fens and wet grasslands such as *Carex flacca* Schreb. subsp. *flacca*, *C. rostrata* Stokes, *Filipendula ulmaria* (L.) Maxim., *Molinia arundinacea* (see that entry below), *Myosotis nemorosa* Besser, *Nasturtium officinale* R. Br. and *Potentilla erecta*. Nearby, in the herb layer of the *Fagus* forest, further Central European and boreal elements occur (*Circaea lutetiana*, *Impatiens noli-tangere*, *Luzula luzuloides* subsp. *luzuloides*, *L. sylvatica* (Huds.) Gaudin, *Paris quadrifolia* L., *Prenanthes purpurea* L., *Pyrola minor* L., *Sanicula europaea* L., *Vaccinium myrtillus*). In the second of the above cited localities *S. officinalis* was observed together with *Succisa pratensis* (see that entry above).

Santalaceae

Comandra umbellata subsp. *elegans* (Spreng.) Piehl – Nomos Florina, Dimos Prespa, Mt Kirko (Varnunda), E of Kallithea (40°47'N, 21°09'E), W slope of the mountain, mixed *Quercus-Fagus* woods, on granite and granodiorite, 1100 m, 7.6.2000, *Schuler 00/152*. – According to Snogerup & Snogerup (in Strid & Tan 1997: 61), this taxon is rare and scattered on the Greek mainland. The new locality is situated at the eastern boundary of the National Park of Lake Mikri Prespa, where *C. umbellata* subsp. *elegans*, together with *Trifolium patulum* Tausch, dominates the herb layer of a mixed deciduous forest.

Scrophulariaceae

Euphrasia hirtella Jordan – Nomos Xanthi, Dimos Stavropolis, Rodopi Mts E of Livaditis (41°18'N, 24°41'E), fen, on gneiss-schist, 1300 m, 6.7.2001, *Schuler 1219*. – Rare in Greece and only reported from the Elatia and Zagradenia areas (Central Rodopi Mts). In contrast to Vitek (in Strid & Tan 1991: 238), who reports this arctic-alpine species in Greece from “dry meadows”, *E. hirtella* was found near Livaditis in a wet Scheuchzerio-Caricetea community together with *Agrostis castellana* Boiss. & Reuter, *Carex echinata*, *C. nigra* (L.) Reichard, *Drosera rotundifolia*, *Eriophorum latifolium*, *Festuca rubra* L., *Genista depressa* M. Bieb., *Molinia arundinacea* (see that entry below) and *Sphagnum contortum* Schultz.

Umbelliferae

Chaerophyllum bulbosum L. subsp. *bulbosum* – Nomos Drama, Dimos Paranestion, c. 1 km S of Paranestion (41°16'N, 24°31'E), riparian forest, on alluvial deposits, 100 m, 12.6.2001, *Schuler 870*. – First found in Greece by Strid & Franzen (1982: 15), rare in the country and restricted to the NE part of the mainland. The new record from river Nestos represents the lowest known altitude of occurrence in Greece. *C. bulbosum* subsp. *bulbosum* was found at the edge of an *Alnus glutinosa* stand lining the river.

Urticaceae

Urtica pilulifera L. – Nomos Rodopi, River Filiouri (Lissos) NW of Arriana (41°07'N, 25°51'E), *Platanus orientalis* wood, on alluvial deposits, 70 m, 26.4.1999, *Schuler 99/176*. – Common in the Aegean area but rare in NE Greece, not mapped for mainland Thrace by Carlström (in Strid & Tan 1997: 58, map 88).

Monocotyledones**Amaryllidaceae**

Leucojum aestivum L. – Nomos Kavala, Dimos Nestos, c. 4 km E of Monastiraki (40°52'N, 24°47'E), clearing in a *Populus* plantation, on alluvial deposits, 10 m, 7.4.1994, *Leibfritz & Schuler 230*. – Rare in Greece, not mapped by Raus (1991: 569) and Bareka & Kamari (2000: 304) for the Nestos delta, where a rather small population was found in *Populus × canadensis* plantations probably as a trace of a preceding, now destroyed Leucojo-Fraxinetum. Nearby populations had been found SSE of Xanthi (Stefanov 1921) and on the island of Thasos (Strid & Tan 1998: 79). Apparently the species was more widespread in former times, now being extinguished in many places after draining or clear-cutting of primary riparian forests.

Cyperaceae

Schoenoplectus mucronatus (L.) Palla – Nomos Xanthi, Dimos Stavropolis, c. 1-2 km S of Neochori (41°13'N, 24°38'E), flood-plain habitats along the river Nestos, reeds, wet places, on alluvial deposits (gravel, sand), 80 m, 5.9.1998, *Schuler 98/493*; Nomos Kavala, Eparchia Nestou, Ajiasma (40°54'30"N, 24°39'E), Segetalflora in Reisfeldern, 2 m, 4.10.1992, *Raus & Schiers 19698* (B); Nomos & Eparchia Serron, Ano Kamila (41°04'N, 23°26'E), Segetalflora in Reisfeldern, 60 m, 6.10.1992, *Raus & Schiers 19847* (B); Nomos & Eparchia Thesalonikis, Anatolikon (40°30'N, 22°34'E), Segetalflora in Reisfeldern östlich des Axios, 10 m, 8.10.1992, *Raus & Schiers 19873* (B); *ibid.* (40°37'N, 22°41'E), westlich des Axios, 10 m, 8.10.1992, *Raus & Schiers 19882* (B); Nomos & Eparchia Pierias, 2 km N Ejinion (40°32'N, 22°34'E), Segetalflora in Reisfeldern südlich des Aliakmon, 5 m, 8.10.1992, *Raus & Schiers 19886* (B); Nomos & Eparchia Fthiotidhos, 2 km E Anthili (38°51'N, 22°31'E), Segetalflora in Reisfeldern des Sperchiosdeltas, 2 m, 11.10.1992, *Raus & Schiers 20021* (B). – Mentioned for “Gr” in Flora Europaea (DeFilipps in Tutin & al. 1980: 278) based on a single published record from the island of Kefallina (Phitos & Damboldt 1985: 164). In publications on natural Greek wetlands (Babalonas 1981, Drossos 1992, Pavlides 1985, Sarika-Hatzinikolaou & al. 2003) *S. mucronatus* is not listed. It seems that the species occurs chiefly on ruderal or cultivated land, especially in rice fields, and is not able to compete in natural habitats.

Schoenoplectus supinus (L.) Palla – Nomos Florina, Dimos Prespa, isthmus between the Prespa lakes (40°49'N, 21°06'E), mud community on alluvial deposits, 850 m, 23.8.1999, *Schuler 99/1420*; Nomos & Eparchia Florina, Mikrolimni (40°44'50"N, 21°07'E), Seichtwasserzone und Schlammflächen am Ostufer des Kleinen Prespa-Sees, 850 m, 31.8.1989, *Raus & Schiers 13641* (B). – Very rare in Greece. Between the lakes Mikri and Megali Prespa *S. supinus* was found in an Isoëto-Nanojuncetea community together with *Alopecurus aequalis* Sobol., *Bidens tripartita* L., *Cyperus fuscus* L., *Gnaphalium luteo-album* L., *Juncus articulatus* L., *Potentilla supina* L. and *Scirpoides holoschoenus* (L.) Soják.

Gramineae

Calamagrostis pseudophragmites (Haller f.) Koel. – Nomos Drama, Dimos Paranestion, Elatia area, Stavrorema (41°29'N, 24°21'E), reed along the stream, 1380 m, 13.8.1998, *Schuler 98/329*; *ibid.*, Rodopi Mts above Paranestion, c. 6.5 km along the road to Prasinada (41°18'N, 24°30'E), banks of stream Arkudorema, on granite and granodiorite, 200 m, 17.7.2002, *Schuler*

2008; *ibid.*, 1 km S of Paranestion (41°16'N, 24°31'E), flood-plain habitats along the river Nestos, *Salix alba* forest, on alluvial deposits, 100 m, 28.7.1998, *Schuler 98/192*; Nomos Kavala, Dimos Chrisupolis, c. 5 km SE of Chrisupolis, 2 km S of the Nestos Café (40°58'N, 24°38'E), river banks, on alluvial deposits (sand, clay), 10 m, 21.8.1998, *Schuler 98/392*; Nomos Xanthi, Dimos Stavrupolis, banks of river Nestos S of Stavrupolis (41°10'N, 24°42'E), tall herb communities, on alluvial deposits, 60 m, 29.6.2000, *Schuler 00/280*; *ibid.*, SE of Neochori (41°12'N, 24°38'E), flood-plain habitats along the river Nestos, on alluvial deposits, 80 m, 1.7.2000, *Schuler 00/282*; *ibid.*, Dimos Topiru, banks of river Nestos S of Toxotes (41°03'N, 24°45'E), tall herb communities, on alluvial deposits, 20 m, 8.7.2000, *Schuler 00/334*; Nomos Rodopi, Dimos Maronia, river Filiouri SE of Neo Sidirochori (41°02'N, 23°35'E), mud communities, on alluvial deposits, 15 m, 6.6.1999, *Schuler 99/531*; Nomos Ioannina, Dimos Papigo, Vikos gorge (39°57'N, 20°42'E), *Platanus-Alnus* gallery along the river, on alluvial deposits, 500 m, 1.8.2001, *Schuler 1780*. – First reported as new to Greece by Damanakis & Scholz (1990: 414). Actually, *C. pseudophragmites* is quite common along running waters in the colline and montane zone in N Greece. Previous records from the Nestos area were only from upstream Dafnonas (Kirchhoff & Petermann 1992: 27, Schuler 2000: 426). Probably the spreading of the species into the Nestos delta is caused by anthropogenic impact on the water balance. North of Paranestion two dams and a hydroelectric power plant have been constructed. After bringing the power station into service in 1996, the water temperature of river Nestos has fallen significantly and the water run-off has been regulated. Apparently these changes favoured the dispersal of *C. pseudophragmites*. In parallel, *Deschampsia cespitosa* (L.) P. Beauv., formerly restricted to meadows and fens at montane and alpine levels, is now found on lower river banks S of Neochori whilst the local population of the thermophilic grass *Paspalum paspalodes* (Michx.) Scribn. declined dramatically.

Cleistogenes serotina (L.) Keng – Nomos Ioannina, Dimos Papigo, Vikos gorge (39°57'N, 20°42'E), dry, open grassland along the river, on alluvial deposits, 500 m, 1.8.2001, *Schuler 1782*. – Rare in Greece, preferring dry, open grassland on sandy or pebbly soils (see also Schuler 2000: 426). Adjacent to the new locality, in a riverine forest dominated by *Alnus glutinosa* and *Platanus orientalis*, the Euro-Siberian elements *Salvia glutinosa* L., *Calamagrostis pseudophragmites* (see preceding entry), *Festuca gigantea*, *Solidago virgaurea* L. and *Artemisia vulgaris* were noticed.

Elymus caninus (L.) L. – Nomos Imathia, Dimos Naussa, Mt Vermio, above Kato Seli, near the Katafigio (40°33'N, 21°58'E), *Salix elaeagnos* gallery along stream, on alluvial deposits, 1080 m, 14.7.2000, *Schuler 00/365*; Nomos Pella, Dimos Aridea, Mt Voras, valley between Orma and Loutraki (40°57'N, 21°54'E), *Alnus* gallery, on limestone, 450 m, 20.7.2001, *Schuler 1581*; Nomos Serres, Dimos Achladochorio/Orini, Mt Vrontus (Lailas) (41°16'N, 23°35'E), around “Dasiko Filakio”, ruderal places, on granite, 1400 m, 11.7.2001, *Schuler 1340*; Nomos Drama, Dimos Paranestion, c. 1 km S of Paranestion (41°16'N, 24°31'E), riparian forest, on alluvial deposits, 100 m, 12.6.2001, *Schuler 877*. – Not mentioned for “Gr” in Flora Europaea, but occurrence first confirmed by Eleftheriadou & Raus (1996: 481). The late discovery of *E. caninus* in Greece is due to the fact that most botanists, no matter whether domestic or from abroad, search mainly for endemic or otherwise spectacular species (see Snogerup & Snogerup 2000: 267) and are not interested in riparian forests, flood-plain vegetation or wetlands (except coastal), which do house an azonal vegetation with a lot of northern floristic elements such as *Festuca gigantea*, *Leersia oryzoides* (see next entry) and *Aegopodium podagraria*.

Leersia oryzoides (L.) Sw. – Nomos Kavala, Dimos Keramoti, c. 5 km SE of Chrisupolis, 2 km S of the Nestos Café (40°58'N, 24°38'E), river banks, on alluvial deposits (sand, clay), 10 m, 1.9.1998, *Schuler 98/463*; *ibid.*, Dimos Stavrupolis, 1-2 km S of Neochori (41°13'N, 24°38'E), banks and flood-plain habitats of river Nestos, alluvial deposits, 80 m, 6.7.2001, *Schuler 2028*. – Rare in Greece and known only from the northern part of the mainland from

where it was first published by Raus & al. (in Greuter & Raus 1999: 65), Snogerup & Snogerup (2000: 269) and Schuler (2000: 423). *L. oryzoides* is certainly more widespread along Greek streams and rivers than the records indicate, but often overlooked because of its late and often incomplete flowering (Raus & al. in Greuter & Raus 1999: 66).

Molinia arundinacea Schrank – Nomos Ioannina, Dimos Konitsa, Mt Smolikas above Pades (40°04'N, 20°54'E), opening in *Pinus* woodland, wet meadow on serpentine, 1600 m, 7.7.2002, *Schuler 1811*; Nomos Larissa, Dimos Goni, Mt Kato Olimbos, SE of Kalipefki (39°58'N, 22°28'E), wet meadows and springs, on alluvial deposits, 1050 m, 19.7.2002, *Schuler 2013*; Nomos Pella, Dimos Aridea, Mt Voras, valley between Orma and Loutraki (40°57'N, 21°53'E), *Alnus* gallery, on limestone, 500 m, 20.7.2001, *Schuler 1573*; Nomos Drama, Dimos Paranestion, Mt Koula, c. 22 km NE of Livaditis (41°22'N, 24°46'E), fen in *Fagus* forest of “Partheno Dasos”, gneiss and gneiss-schist, 1500 m, 6.9.1998, *Schuler 98/524*; *ibid.*, Rodopi Mts above Paranestion, c. 6.5 km along the road to Prasinada (41°18'N, 24°30'E), banks of stream Arkudorema, on granite and granodiorite, 200 m, 17.7.2002, *Schuler 2009*; Nomos Xanthi, Dimos Stavrupolis, Rodopi Mts NE of Livaditis (41°18'N, 24°40'E), fens and wet pastures in *Fagus* forest, on gneiss and gneiss-schist, 1150 m, 14.6.2001, *Schuler 953*; *ibid.*, 6.7.2001, *Schuler 1179*; *ibid.*, E of Livaditis (41°18'N, 24°41'E), fen on gneiss-schist, 1300 m, 6.7.2001, *Schuler 1212*. – Not listed for Greece by Damanakis & Scholz (1990) and mentioned with uncertain distribution in Flora Europaea (Tutin in Tutin & al. 1980: 254); previously reported by Schuler (2000: 426) from the banks of river Nestos. *Molinia arundinacea* is scattered in N Greece (Kit Tan, pers. comm.) and grows usually in fens, wet meadows and along stream banks.

Poa jubata A. Kern. – Nomos Xanthi, Dimos Avdira, Loutra, c. 8 km W of Porto Lagos (41°01'N, 25°03'E), dry, open grassland around the thermal spring, on alluvial and coastal deposits, 1-5 m, 18.4.1999, *Schuler 99/112*. – “Very rare” in Greece (Damanakis & Scholz 1990: 418) and hitherto only reported from the Ionian Islands (Scholz 1986: 395). This record is the first for NE Greece. *P. jubata* was found on sandy, open ground around the thermal spring “Loutra” growing there together with *Carex divisa* Huds., *Geranium dissectum* L., *Matricaria chamomilla* L. and *Myosotis ramosissima* Schult.

Orchidaceae

Epipogium aphyllum Sw. – Nomos Pella, Dimos Aridea, Mt Voras, mountain between Sarakini and Panagitsa (40°53'N, 21°53'E), *Fagus* forest, on limestone, 1400 m, 1.8.1999, *Schuler 99/1316*. – Rare and scattered in N Greece. Karagiannakidou & Babalonas (1981) mapped previous findings from the Pindos Mts and N central Greece. Recently Athanasiadis & al. (2000: 271) reported *E. aphyllum* from NE Greece. On Mt Voras *E. aphyllum* was found on a E facing slope, associated with *Cephalanthera rubra* (L.) Rich., *Fagus sylvatica* subsp. *sylvatica*, *Lamium montanum* (Pers.) Kabath, *Hieracium racemosum* Willd., *Monotropa hypopitys* L., *Neottia nidus-avis* (L.) Rich., *Orthilia secunda* (L.) House and *Viola reichenbachiana* Boreau.

Typhaceae

Typha laxmannii Lepechin – Nomos Kavala, Dimos Chrisupolis, Aladjagiola area c. 2 km N of Chrysopolis (41°01'N, 24°43'E), wet ruderal habitat near an irrigation canal, fluvatile deposits, 10-20 m, 21.8.1998, *Schuler 98/391*; Nomos Serres, Eparchia Sintikis, Kerkini-See 1 km südlich Limnochori, Kanäle und Grabenböschungen östlich des Seeuferdamms, 80 m, 19.9.1988, *Raus 13113* (B); Nomos & Eparchia Dramas, Nerofraktis (41°03'30"N, 24°08'E), Entwässerungskanäle zwischen Agrarflächen, 40 m, 6.10.1992, *Raus & Schiers 19909* (B); Nomos Kavala, Eparchia Nestos, Nestosdelta bei Agiasma, Wassergräben und Salzwiesen, 5 m, 3.10.1988, *Raus 13467* (B); Nomos & Eparchia Xanthis, Kirnos (40°59'N, 24°46'E), Maisfelder und Entwässerungsgräben, 10 m, 2.10.1992, *Raus & Schiers 19584* (B); Nomos Evrou, Eparchia Alexandroupoleos, Metallia Kirkis (40°59'30"N, 25°50'E), offener *Typha-*

Sumpf und Auwaldrest in einem Bachtal, 200 m, 21.9.1992, *Raus & Schiers 18605* (B); *ibid.*, Eparchia Orestias, Ardas-Tal zwischen Kiprinos und Komara (41°34'40"N, 26°13'30"E), Flussufer und Sandbänke des Ardas, 60 m, 4.9.1989, *Raus & Schiers 13878* (B); *ibid.*, Marasia (41°39'30"N, 26°28'E), *Typha*-Sumpf und nasse Straßengräben am südlichen Ortsrand, 40 m, 5.9.1989, *Raus & Schiers 13910* (B). – Rare in Greece, previous records published by Zaganiaris (1940), Kunkel (1996: 125) and Sarika & al. (2005: 80).

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Address of the author:

Andreas Schuler, Offenhauser Str. 2, D-89231 Neu-Ulm, Germany; e-mail: andreasschuler@gmx.net