Contribution to the vascular plant flora of the Utrish area, a relic sub-Mediterranean ecosystem of the Russian Black Sea Coast

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Abstract

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The Utrish area, including the projected Utrish Nature Reserve, is situated in the NW Transcaucasus on the Abrau Peninsula between Novorossiysk and Anapa and shelters the only relic ecosystems of arid sub-Mediterranean forests in Russia. Our revision of the species inventory of the Utrish area revealed a total of 848 vascular plant species, of which 148 (all flowering plants) were newly recorded during 2002-06 and are listed in the present contribution, among them 15 new records for the NW Transcaucasus. Six species were collected before 1960 and have not been recollected since. 50 species reported in previous publications were found to be based on misidentifications and have to be excluded from the checklist of the Utrish area. The significance of the Utrish area for biodiversity conservation is illustrated by the fact that 43 of the 514 species listed in the forthcoming new Russian Red Data Book and six species listed in the Red Data Book of Krasnodarsky Kray occur in the Utrish area.

Key words: spermatophytes, species inventory, Transcaucasus, Abrau Peninsula.

Introduction

The Utrish area is situated on the Abrau Peninsula between Novorossiysk and Anapa in the NW Transcaucasus on the Russian coast of the Black Sea. The particular significance of the area relies on the presence of a relic arid sub-Mediterranean vegetation, being the only occurrence of Mediterranean vegetation in Russia, which links this territory to the southern coast of Crimea, Ukraine, where largely the same vegetation and a similar flora is present.

First detailed floristic data on the flora of the Abrau Peninsula were published by Flerov & Flerov (1926), but their collections were entirely lost. They indicated 991 species for the Anapa-Novorossiysk coastal area, but only 654 were documented by specimens. Some of their records are doubtful and believed to be erroneous according to recent studies of vascular flora of NW Transcaucasus (Zernov 2000). Later the flora of the Abrau Peninsula was studied during individ-

ual trips of a number of botanists, but it never received special interest. Zernov (2000) reported for the whole territory of NW Transcaucasus (c. 5100 km^2) from Anapa to Tuapse 1461 species substantiated by herbarium specimens (preserved at MOSP). Zernov collected in the Utrish area in 1996-99, and cited specimens for 28 rare and very rare species (Zernov 2000). Later he published an illustrated guide for plants of NW Transcaucasus (Zernov 2002).

Tutors and students of the Biogeography Department of the Moscow University have been visiting annually the Abrau Peninsula for studies in field camps since 1997. A preliminary checklist of 485 species based on collections and observations in the Utrish area during 1997-99 was published as a brief manual for students (Syomina & Suslova 2000). Further 268 species were reported by Seregin & Suslova (2002). Field work in the years 2002 till 2006 and a recent revision of the species inventory of the Utrish are by the present authors revealed 148 new records of vascular plant species for the area, which are listed in the present contribution. Critical evaluation of species identifications previous published showed that 50 species were reported due to misidentifications and have to be excluded from the checklist of the Utrish area.

Material and methods

The Utrish area according to our definition includes the c. 230 km^2 of the projected Utrish Nature Reserve and the adjacent areas with relic sub-Mediterranean vegetation, including a strip of the Black Sea coast c. 20 km long from the Sukko river mouth in the northwest to the Ozereyka river valley in the east.

All entries in the present contribution as well as in the checklist of the vascular plants of the Utrish area, which is published in the electronic supplement to the present paper (at http://www.bgbm.org/willdenowia/willd37/seregin+suslova.htm) are substantiated by herbarium specimens.

The new records for the Utrish area in the present contribution are based on recent collections by the present authors (134 records) and on specimens collected by O. A. Leontyeva, G. N. Ogureeva, G. V. Kryutchkova, S. E. Tcherenkov, A. A. Tishkova (Khaug), Y. I. Kuznetsova, etc. (all at MWG). About 2000 specimens are preserved in MWG, duplicates were transferred to K and LE. The abbreviations of the herbaria follow Holmgren & Holmgren (1998-).

Study area

The Utrish area is situated on the south-faced slope of the Navagir Ridge, the northwesternmost range of the Great Caucasus system, right on the border of the Anapa and Novorossiysk districts of Krasnodarsky Kray.

Ecology and topography. – The Navagir Ridge is formed of flysch layer 250-350 m thick, which is a combination of maritime carbonate sedimentary rocks accumulated in the lower Palaeogene (i.e. carbonate argillite with frequent interlayers of sandstone and aleurolite). The lower stratum of the upper Cretaceous consists of carbonate marl with interlayers of limestone, aleurolite and clay. It can be observed in the brook valleys. Valley bottoms are filled with alluvial deposits up to 15 m thick.

The coastal cliffs of the Utrish area are formed by abrasion. Presence of dislocated beds facing the coast and clay interlayers led to combined rockfalls and landslides caused by seismic and gravitation processes. These phenomena are powerful but rare. Pseudolagoons are formed between landslide masses on the foot of coastal slopes, cut by shingle strand from the sea. The largest ancient landslide mass, which slipped down from nearby Mt Lysaya, forms the Cape of Maly Utrish.

The Navagir Ridge is delimited in the north by the Sukko River valley. The south-faced slope of the Navagir Ridge is cut by seven narrow gorges, or “shchel”. From west to east they are the following: Vodopadnaya Shchel, Bazovaya Shchel, Shirokaya Shchel, Lobanova Shchel, Navagirskaya Shchel, Mokraya Shchel and Sukhaya Shchel. Further east there are three large valleys, namely Dyurso, Abrau and Ozereyka. The Navagir Ridge reaches elevations up to 500 m, the

height of the slopes in the distal parts of the gorges is thus 300-350 m. The length of the gorges is 3-8 km, the distance between their mouths 2-2.5 km. Their beds have water in winter and early spring and fall dry afterwards but the brooks are permanent in Vodopadnaya Shchel, Mokraya Shchel and Topolnaya Shchels. The Dyurso and the Ozereyka rivers are permanent streams up to 10 m wide and Abrau Lake is one of the largest freshwater lakes in the NW Caucasus. The closed drainage basin of the Sukhoy Liman freshwater lake, with an area of c. 100 ha in spring, is situated near the headwaters of Bazovaya Shchel at an altitude of 280 m. The basin is characterized by a temperate (less arid) climate; several spring brooks aliment the lake.

Climate. – The climate of the Abrau Peninsula is sub-Mediterranean with typically Mediterranean cool rainy winters without stable snow cover and hot dry summers. Cold air masses, however, penetrate frequently in winter and the summer precipitation minimum is not so pronounced. Average day temperature on the coast is +1 °C in January and +23 °C in July. The mean annual precipitation is c. 500-600 mm with a maximum in winter.

Vegetation. – Altitudinal differentiation forms two belts of natural vegetation, but the borders of the plant communities are mosaic-like. Slope aspect and steepness also differentiate the plant communities.

The lower altitudinal belt (0-200 m on south-faced slopes) is represented by relic ecosystems of arid sub-Mediterranean forests, which are in Russia restricted to the narrow strip of the Black Sea Coast between Anapa and Tuapse. In the sparsely populated Utrish area these forests are still in (semi-)natural condition, mainly composed of *Juniperus oxycedrus, J. excelsa, J. foetidissima, Pistacia mutica, Quercus pubescens, Carpinus orientalis* and *Paliurus spina-christi*. Fragments of *Pinus brutia* forests occur on the coastal escarpments near Maly Utrish.

The upper altitudinal belt (above 150 m, but down to 50 m in gorges) is represented by broad-leaved forests with sparse herbaceous cover. Forests of *Fagus orientalis, Carpinus caucasica, C. orientalis, Quercus petraea, Fraxinus excelsior* s.l. predominate here over less distributed forests of *Acer laetum, Tilia begoniifolia,* etc. Steep slopes are covered with *Pinus kochiana* forests.

The bryophyte flora includes 119 species of mosses and 9 species of liverworths (Ignatova & al. 2006).

Additions to the flora of the Utrish area

We report 148 species so far not mentioned for the Utrish area.The taxon name is followed by references to Grossheim's (1949) Guide to the Caucasus flora and the Flora of the northern Russian Black Sea coast by Zernov (2002), so far listed there. Names preceded by an asterisk (*) denote a new record for the NW Transcaucasus.

Magnoliophyta

Boraginaceae

Anchusa azurea Mill. (Zernov 2002: 195; *A. italica* Retz.: Grossheim 1949: 298) – *Seregin C-88;* 12.6.2001, *Kryutchkova;* 9.6.2005, *Suslova* (MWG); rare.

Myosotis micrantha Lehm. (Grossheim 1949: 291, Zernov 2002: 196) – *Seregin C-792* (MWG); rare.

M. suaveolens Waldst. & Kit. (Zernov 2002: 196; *M. sylvatica* auct. non Hoffm.: Grossheim 1949: 291) – *Seregin C-602; Seregin & al. C-722* (MWG); frequent.

Onosma taurica Willd. (Grossheim 1949: 293, Zernov 2002: 194) – *Seregin C-64* (MWG); rare.

Symphytum tauricum Willd. (Grossheim 1949: 288, Zernov 2002: 195) – 6.1999, *Suslova;* 4.6.2000, *Suslova & Leontyeva; Seregin C-45* (MWG); frequent.

Cannabaceae

Humulus lupulus L. (Grossheim 1949: 579, Zernov 2002: 96) – *Seregin C-628* (MWG); rare.

Caprifoliaceae

Viburnum opulus L. (Grossheim 1949: 244, Zernov 2002: 221) – 19.6.2004, *Suslova; Seregin & al. C-740* (MWG); rare.

Caryophyllaceae

Agrostemma githago L. (Grossheim 1949: 545, Zernov 2002: 112) – *Seregin & Lozhkina C-537* (MWG); very rare.

Cerastium glutinosum Fries (Grossheim 1949: 537, Zernov 2002: 111) – *Seregin & al. C-718, C-754, C-765, C-769, C-772, C-802* (MWG); frequent.

Dichodon anomalum (Willd.) Rchb. (Zernov 2002: 110; *Cerastium anomalum* Willd.: Grossheim 1949: 534) – *Seregin C-689* (MWG); rare.

Scleranthus polycarpos L. (Grossheim 1949: 543; *S. annuus* L.: Zernov 2002: 112, p.p.) – 14.6. 2004, *Suslova; Seregin & al. C-766;* 12.6.2005, *Suslova* (MWG); infrequent.

**S. uncinatus* Schur (Grossheim 1949: 543) – *Seregin C-696* (MWG); very rare.

Chenopodiaceae

Atriplex patula L. (Grossheim 1949: 568, Zernov 2002: 106) – *Seregin C-703* (MWG); very rare.

Bassia hirsuta (L.) Asch. (Zernov 2002: 106; *Echinopsilon hirsutum* (L.) Moq.: Grossheim 1949: 570) – *Seregin C-700 (*MWG); very rare.

Kochia prostrata (L.) Schrad. (Grossheim 1949: 570, Zernov 2002: 106) – *Seregin & Shcherbakov C-685* (MWG); rare.

Compositae

Arctium lappa L. (Grossheim 1949: 474, Zernov 2002: 244) – *Seregin & Lozhkina C-572* (MWG); infrequent.

Artemisia santonicum L. (Zernov 2002: 242) – 9.6.1999, *Suslova; Seregin C-558* (MWG); rare.

A. taurica Willd. (Grossheim 1949: 465, Zernov 2002: 242) – 10.6.1997, *Kuznetsova & Tishkova;* 6.1998, *Suslova* (MWG); infrequent.

Bidens frondosa L. (Zernov 2002: 238) – *Seregin C-632 (*MWG); very rare.

Crepis pannonica (Jacq.) K. Koch (Grossheim 1949: 519, Zernov 2002: 257) – *Seregin & Lozhkina C-598a; Seregin C-601* (MWG); very rare.

Erigeron canadensis L. (Grossheim 1949: 442; *Conyza canadensis* (L.) Cronq.: Zernov 2002: 234) – *Seregin & Lozhkina C-595* (MWG); rare.

Grindelia squarrosa (Pursh) Dunal. (Zernov 2002: 233) – 8.1994, *Tishkova;* 23.6.2005, *Suslova* (MWG); rare.

Inula britannica L. (Grossheim 1949: 448, Zernov 2002: 235) – *Seregin C-690* (MWG); very rare.

Jacobaea erucifolia subsp. *arenaria* (Soó) B. Nord. & Greuter (*Senecio grandidentatus* Ledeb.: Zernov 2002: 243; *S. arenarius* M. Bieb., nom. illegit.: Grossheim 1949: 469) – 6.2001, *Kryutchkova; Seregin & Shcherbakov C-674* (MWG); rare.

**Lapsana grandiflora* M. Bieb. (Grossheim 1949: 503) – *Seregin C-627* (MWG); very rare.

Leontodon hispidus L. (Grossheim 1949: 504, Zernov 2002: 255; *L. hastilis* auct. non L.: Grossheim 1949: 504) – 17.6.2004, *Suslova* (MWG); rare.

**Scolymus hispanicus* L. (Grossheim 1949: 502) – 6.1999, *Suslova;* 15.6.2000, *Suslova;* 20.6. 2005, *Suslova* (MWG); very rare.

Scorzonera hispanica L. (Grossheim 1949: 511, Zernov 2002: 254) – 6.2001, *Leontyeva; Seregin & Suslova C-238* (MWG); rare.

Tragopogon brevirostris DC. (Grossheim 1949: 507, Zernov 2002: 254) – *Seregin C-787* (MWG); infrequent.

Cruciferae

Alyssum desertorum Stapf (Grossheim 1949: 395, Zernov 2002: 129) – *Seregin & Suslova C-340; Seregin & Lozhkina C-520, C-533* (MWG); infrequent.

A. hirsutum M. Bieb. (Grossheim 1949: 395, Zernov 2002: 129) – *Seregin C-63* [fl.]; *Seregin & Suslova C-340* (MWG); rare.

A. tortuosum Willd. (Grossheim 1949: 396, Zernov 2002: 129) – *Seregin & Lozhkina C-522* (MWG); rare.

A. trichostachyum Rupr. (Grossheim 1949: 396, Zernov 2002: 129) – 5.1996, *Leontyeva* (MWG); rare.

Arabidopsis thaliana (L.) Heynh. (Grossheim 1949: 381, Zernov 2002: 126) – *Seregin & al. C-771, C-809, C-821, C-825* (MWG); infrequent.

Barbarea vulgaris R. Br. s.l. (Grossheim 1949: 388, Zernov 2002: 127; *B. arcuata* (J. & C. Presl) Rchb.: Grossheim 1949: 388) – *Seregin & Suslova C-289; Seregin C-617; Seregin & al. C-805* (MWG); infrequent.

**Clypeola jonthlaspi* L. (Grossheim 1949: 397) – 11.6.2004, *Suslova; Seregin & al. C-748* (MWG); very rare.

Crambe koktebelica (Junge) N. Busch (Grossheim 1949: 385, Zernov 2002: 132) – 12.6.2004, *Suslova;* 14.6.2004, *Suslova* (MWG); infrequent.

Lepidium perfoliatum L. (Grossheim 1949: 372, Zernov 2002: 132) – *Seregin C-566, C-656* (MWG); infrequent.

Myagrum perfoliatum L. (Grossheim 1949: 397, Zernov 2002: 128) – *Seregin C-650* (MWG); rare.

Raphanus maritimus Sm. (Grossheim 1949: 384, Zernov 2002: 132) – *Seregin & Suslova C-180* (MWG); very rare.

Sinapis arvensis L. (Grossheim 1949: 384, Zernov 2002: 131) – *Seregin C-563* (MWG); rare.

Syrenia montana (Pall.) Klok. (Zernov 2002: 126, *S. aucta* Klok.: Grossheim 1949: 403) – *Seregin & al. C-814* (MWG); very rare.

Cyperaceae

Carex distans L. (Grossheim 1949: 665, Zernov 2002: 75) – 6.1998, *Suslova* (MWG); very rare.

C. otrubae Podp. (Zernov 2002: 67; *C. compacta* auct. non Lam.: Grossheim 1949: 658) – *Kozhin M-111* (MWG); rare.

C. pendula Huds. (Grossheim 1949: 662, Zernov 2002: 75) – *Seregin & al. C-843* (MWG); very rare.

Euphorbiaceae

Euphorbia chamaesyce L. (Grossheim 1949: 179, Zernov 2002: 161) – *Kadetov Kr-28* (MWG); rare.

E. condylocarpa M. Bieb. (Grossheim 1949: 182, Zernov 2002: 161) – *Seregin & Shcherbakov C-680* (MWG); very rare.

E. leptocaula Boiss. (Grossheim 1949: 184, Zernov 2002: 164) – *Seregin C-51; Seregin, Suslova C-237* (MWG); infrequent.

Fagaceae

Quercus robur L. (Grossheim 1949: 269, Zernov 2002: 95) – *Seregin & Suslova C-298* (MWG); infrequent.

Fumariaceae

Corydalis caucasica DC. (Grossheim 1949: 364, Zernov 2002: 122) – *Seregin & al. C-760;* 28.3.2006, *Zavyalova & Fedulova;* 29.3.2006, *Kadetov & Fedulova;* 1.4.2006, *Kadetov & Fedulova* (MWG); frequent.

Gramineae

Aegilops neglecta Bertol. (*A. triaristata* auct. non Willd.: Grossheim 1949: 719; *A. triuncialis* L.: Zernov 2002: 62, p.p.) – 9.6.1999, *Suslova;* 24.6.1999, *Suslova* (MWG); frequent.

A. triuncialis L. (Grossheim 1949: 720, Zernov 2002: 62, p.p.) – *Seregin C-655, C-662* (MWG); rare.

Agrostis stolonifera L. (Zernov 2002: 52; *A. alba* L., nom. ambig.: Grossheim 1949: 689, p.p.) – *Seregin & Shcherbakov C-667* (MWG); rare.

Alopecurus arundinaceus Poir. (Zernov 2002: 52; *A. ventricosus* Pers.: Grossheim 1949: 687) – *Seregin C-626* (MWG); very rare.

Arrhenatherum elatius (L.) J. & C. Presl (Grossheim 1949: 695, Zernov 2002: 53) – *Seregin & Lozhkina C-556* (MWG); very rare.

Bromus squarrosus L. (Grossheim 1949: 711, Zernov 2002: 59, p.p.) – 5.6.2003, *Ogureeva; Seregin & Lozhkina C-540* (MWG); rare.

Cleistogenes serotina (L.) Keng (Zernov 2002: 55; *Diplachne serotina* (L.) Link: Grossheim 1949: 697) – *Seregin & al. C-831* (MWG); infrequent.

Eragrostis minor Host (Grossheim 1949: 698, Zernov 2002: 55) – *Seregin & al. C-755* (MWG); rare.

Festuca arundinacea subsp. *orientalis* (Hack.) K. Richt. (Zernov 2002: 57; *F. arundinacea* Schreb.: Grossheim 1949: 707) – *Seregin & Lozhkina C-552* (MWG); rare.

F. callieri (Hack.) Markgraf (Zernov 2002: 58; *F. sulcata* auct. non Nym.: Grossheim 1949: 708, p.p.; *F. ovina* auct. non L.: Grossheim 1949: 708, p.p.) – *Seregin & Suslova C-152; Seregin & Lozhkina C-576* (MWG); frequent.

F. rupicola Heuff. (Zernov 2002: 57; *F. sulcata* auct. non Nym.: Grossheim 1949: 708, p.p.; *F. ovina* auct. non L.: Grossheim 1949: 708, p.p.) – 9.6.1997, *Tishkova; Seregin C-588, C-591* (MWG); infrequent.

Glyceria arundinacea Kunth (Grossheim 1949: 705, Zernov 2002: 57) – 11.6.2000, *Suslova* (MWG); very rare.

G. notata Chevall. (Zernov 2002: 56; *G. plicata* (Fries) Fries: Grossheim 1949: 705) – *Seregin C-633* (MWG); very rare.

Lolium rigidum Gaud. (Grossheim 1949: 713, Zernov 2002: 58) – *Seregin & Lozhkina C-535* (MWG); infrequent.

Psilurus incurvus (Gouan) Schinz & Thell. (Zernov 2002: 58; *P. aristatus* (L.) Lange: Grossheim 1949: 713) – *Seregin & Lozhkina C-557, C-575* (MWG); infrequent.

Setaria verticillata (L.) P. Beauv. (Grossheim 1949: 680, Zernov 2002: 49) – 18.6.2000, *Suslova* (MWG); very rare.

Stipa pennata L. (Zernov 2002: 50; *S. joannis* Celak.: Grossheim 1949: 685) – 6.1998, *Suslova; Seregin & Suslova C-233* (MWG); infrequent.

**Taeniatherum crinitum* (Schreb.) Nevski (*Hordeum crinitum* (Schreb.) Desf.: Grossheim 1949: 720) – 6.1998, *Suslova;* 6.1998, *Levik;* 6.1999, *Suslova* (MWG); very rare.

Grossulariaceae

**Ribes aureum* Pursh. – *Seregin & Lozhkina C-532* (MWG); very rare, introduced.

Hyacinthaceae

Scilla bifolia L. (Grossheim 1949: 621, Zernov 2002: 81) – 27.3.2006, *Zavyalova & Fedulova;* 27.3.2006, *Lobysheva;* 28.3.2006, *Kadetov;* 30.3.2006, *Kadetov* (MWG); common.

Juglandaceae

Juglans regia L. (Grossheim 1949: 271, Zernov 2002: 93) – *Seregin C-634* (MWG); infrequent, introduced.

Juncaceae

Juncus bufonius L. (Grossheim 1949: 639, Zernov 2002: 76, p.p.) – *Seregin C-621* (MWG); very rare.

Labiatae

Betonica officinalis L. (Grossheim 1949: 337; *Stachys officinalis* (L.) Trev.: Zernov 2002: 203) – 17.6.2004, *Suslova* (MWG); very rare.

Chaiturus marrubiastrum (L.) Rchb. (Grossheim 1949: 336, Zernov 2002: 204) – 14.6.2005, *Suslova* (MWG); very rare.

Lycopus exaltatus L. fil. (Grossheim 1949: 349, Zernov 2002: 205) – *Seregin & Suslova C-691* (MWG); rare.

Marrubium peregrinum L. (Grossheim 1949: 329, Zernov 2002: 201) – 23.6.2005, *Suslova* (MWG); very rare.

Mentha aquatica L. (Grossheim 1949: 350, Zernov 2002: 206) – *Seregin C-699* (MWG); very rare.

M. pulegium L. (Grossheim 1949: 350, Zernov 2002: 206) – 10.8.1991, *Leontyeva* (MWG); very rare.

**Scutellaria hastifolia* L. (Grossheim 1949: 326) – *Seregin & Suslova C-692* (MWG); very rare.

Stachys germanica L. (Grossheim 1949: 338, Zernov 2002: 203) – *Seregin & Suslova C-693;* 14.6.2005, *Suslova* (MWG); very rare.

Leguminosae

Astragalus fragrans Willd. (Grossheim 1949: 144, Zernov 2002: 152) – *Seregin C-25* (MWG); very rare.

A. hamosus L. (Zernov 2002: 151; *A. brachyceras* Ledeb.: Grossheim 1949: 125) – 9.6.2004, *Suslova* (MWG); very rare.

**A. humifusus* Willd. (*A. viciifolius* DC.: Grossheim 1949: 132) – 11.6.2000, *Suslova; Seregin & Suslova C-316; Seregin C-791* (MWG); very rare.

A. onobrychis L. (Grossheim 1949: 139, Zernov 2002: 152) – *Seregin & Lozhkina C-593* (MWG); very rare.

Genista patula M. Bieb. (Grossheim 1949: 107, Zernov 2002: 144; *G. patula* var. *elatior* (Moench) Grossh.: Grossheim 1949: 107) – 16.6.2002, *Leontyeva & Suslova* (MWG); very rare.

Medicago rigidula (L.) All. (Grossheim 1949: 114, Zernov 2002: 147) – 11.6.2000, *Suslova; Seregin C-562* (MWG); rare.

Melilotus hirsutus Lipsky (Grossheim 1949: 115, Zernov 2002: 147) – *Seregin C-637* (MWG); infrequent.

Trifolium bonannii C. Presl (Grossheim 1949: 117, Zernov 2002: 148) – 14.6.2000, *Suslova; Kozhin & Suslova Kr-48* (MWG); very rare.

T. pratense L. (Grossheim 1949: 121, Zernov 2002: 148) – *Seregin & Suslova C-276* (MWG); infrequent.

Vicia tenuifolia Roth (Grossheim 1949: 158, Zernov 2002: 154; *V. variabilis* auct. non Freyn: Grossheim 1949: 158) – *Seregin C-612* (MWG); rare.

Liliaceae

Gagea pusilla (F. W. Schmidt) Schult. & Schult. fil. (Grossheim 1949: 610, Zernov 2002: 79; *G. chanae* Grossh.: Grossheim 1949: 610) – 27.3.2006, *Kadetov;* 29.3.2006, *Kulikova* (MWG); rare.

G. villosa (M. Bieb.) Duby s.l. (Zernov 2002: 79; *G. arvensis* Dumort.: Grossheim 1949: 610; *G. dubia* Terr.: Grossheim 1949: 610) – 30.3.2006, *Kadetov* (MWG); very rare.

Linaceae

Linum squamulosum (Zernov 2002: 159; *L. perenne* auct. non L.: Grossheim 1949: 169) – 14.6.2005, *Suslova* (MWG); very rare.

Lythraceae

**Lythrum tribracteatum* Spreng. (Grossheim 1949: 188) – 15.6.2002, *Suslova; Kozhin & Suslova Kr-84* (MWG); very rare.

Monotropaceae

Monotropa hypopitys L. (Grossheim 1949: 525; *Hypopitys monotropa* Crantz: Zernov 2002: 186) – 17.6.2004, *Suslova;* 22.6.2005, *Suslova* (MWG); rare.

Onagraceae

Epilobium lanceolatum Seb. & Mauri (Grossheim 1949: 191, Zernov 2002: 173) – 17.6.2004, *Suslova* (MWG); very rare.

E. tetragonum L. (Zernov 2002: 174; *E. adnatum* Griseb.: Grossheim 1949: 192; *E. lamyi* F. Schultz: Grossheim 1949: 192) – *Seregin & Suslova C-697* (MWG); very rare.

Orchidaceae

Cephalanthera damasonium (Mill.) Druce (Zernov 2002: 89; *C. lonchophyllum* (L. fil.) Mansf.: Grossheim 1949: 646) – 8.6.2003, *Ogureeva* (MWG); very rare.

Epipactis microphylla (Ehrh.) Sw. (Grossheim 1949: 647, Zernov 2002: 88) – 11.6.2001, *Kryutchkova;* 15.6.2004, *Suslova* (MWG); rare.

Orobanchaceae

Lathraea squamaria L. (Grossheim 1949: 356, Zernov 2002: 216) – *Seregin & al. C-735* (MWG); infrequent.

**Orobanche purpurea* Jacq. (Grossheim 1949: 354) – *Seregin C-625* (MWG); rare.

O. ramosa L. (Grossheim 1949: 353, Zernov 2002: 217) – 11.6.2001, *Kryutchkova; Seregin C-710* (MWG); infrequent.

Polygonaceae

**Polygonum aviculare* L. s.str. (Grossheim 1949: 589, p.p.) – *Seregin & Lozhkina C-578; Seregin C-709* (MWG); infrequent.

**P. bellardii* All. (*P. aviculare* auct. non L.: Grossheim 1949: 589, p.p.) – *Seregin C-645* (MWG); very rare.

P. neglectum Bess. (Zernov 2002: 103; *P. aviculare* auct. non L.: Grossheim 1949: 589, p.p.) – *Seregin & Suslova C-135; Seregin & Privalova C-160* (MWG); infrequent.

P. persicaria L. (Grossheim 1949: 591, Zernov 2002: 102) – *Seregin & Suslova C-407* (MWG); rare.

Rumex conglomeratus Murr. (Grossheim 1949: 585) – *Seregin C-610* (MWG); very rare.

***R. patientia* L. (Grossheim 1949: 585) – *Seregin & Lozhkina C-554; Seregin C-665* (MWG); infrequent.

Ranunculaceae

Adonis flammea Jacq. (Grossheim 1949: 60, Zernov 2002: 120) – 6.2002, *Suslova* (MWG); rare.

Ceratocephala falcata (L.) Pers. (Grossheim 1949: 52, Zernov 2002: 118) – 1.4.2006, *Kadetov & Fedulova* (MWG); very rare.

Nigella arvensis L. (Grossheim 1949: 45, Zernov 2002: 117) – 30.6.1999, *Suslova* (MWG); rare.

Ranunculus illyricus L. (Grossheim 1949: 55, Zernov 2002: 119) – 4.5.2000, *Leontyeva* (MWG); very rare.

R. oxyspermus Willd. (Grossheim 1949: 55, Zernov 2002: 120) – *Seregin & al. C-730 (*MWG); very rare.

R. repens L. (Grossheim 1949: 57, Zernov 2002: 119) – *Seregin C-613* (MWG); very rare.

R. trachycarpus Fisch. & C. A. Mey. (Grossheim 1949: 54, Zernov 2002: 119) – 1.6.2000, *Suslova; Seregin & Lozhkina C-543; Seregin C-609* (MWG); rare.

Rosaceae

Crataegus monogyna Jacq. (Grossheim 1949: 75, Zernov 2002: 138, p.p.) – *Seregin C-712; Seregin & al. C-739* (MWG); rare.

Potentilla canescens Bess. (Grossheim 1949: 82, Zernov 2002: 139) – 27.6.1996, *Tishkova & Kuznetsova;* 9.6.1997, *student group;*10.6.2002, *Suslova* (MWG); frequent.

P. caucasica Juz. (Grossheim 1949: 83, Zernov 2002: 139) – *Seregin & al. C-756* (MWG); rare.

Rosa agrestis Savi (Zernov 2002: 140; *R. micrantha* auct. non Smith: Grossheim 1949: 92) – *Seregin C-711* (MWG); very rare.

R. corymbifera Borkh. s.l. (Grossheim 1949: 92; Zernov 2002: 141) – *Seregin & Lozhkina C-567, C-571* (MWG); infrequent.

R. villosa L. (Zernov 2002: 140; *R. pomifera* Herm.: Grossheim 1949: 91) – *Seregin C-560* (MWG); rare.

Rubus anatolicus (Focke) Hausskn. (Zernov 2002: 138; *R. sanguineus* auct. non Friv.: Grossheim 1949: 76) – *Seregin & Lozhkina C-585; Seregin C-664* (MWG); frequent.

R. caesius L. (Grossheim 1949: 76, Zernov 2002: 138) – *Seregin C-608* (MWG); rare.

R. canescens DC. (Zernov 2002: 138; *R. tomentosus* Borkh., nom. illegit.: Grossheim 1949: 78; *R. lloydianus* G. Genev.: Grossheim 1949: 78) – *Seregin & Lozhkina C-586; Seregin C-649; Seregin & Shcherbakov C-668* (MWG); frequent.

Rubiaceae

Cruciata chersonensis (Willd.) Ehrend. (Zernov 2002: 219; *Galium chersonense* auct. non Boiss.: Grossheim 1949: 249, p.p.) – 6.1998, *Suslova;* 9.6.1999, *Suslova; Seregin & Lozhkina C-538; Seregin C-785, C-786* (MWG); frequent.

C. taurica (Willd.) Soó (Zernov 2002: 220; *Galium vernum* auct. non Scop.: Grossheim 1949: 249) – 9.6.1999, *Suslova* (MWG); infrequent.

Salicaceae

Salix caprea L. (Grossheim 1949: 726, Zernov 2002: 92) – 19.6.2004, *Suslova; Seregin & al. C-840* (MWG); rare.

S. triandra L. (Grossheim 1949: 725, Zernov 2002: 92) – *Seregin & Suslova C-390; Seregin C-629, C-639* (MWG); rare.

Saxifragaceae

Saxifraga tridactylites L. (Grossheim 1949: 96, Zernov 2002: 135) – *Seregin & al. C-745* (MWG); very rare.

Scrophulariaceae

Linaria biebersteinii Bess. (Grossheim 1949: 305, Zernov 2002: 210) – 31.7.1992, *Tishkova & Kuznetsova* (MWG); rare.

Veronica spicata subsp. *barrelieri* (Schott) Murb. (Zernov 2002: 213; *V. spicata* L.: Grossheim 1949: 315, p.p.) – 6.2001, *Kryutchkova* (MWG); rare.

Solanaceae

Atropa bella-donna subsp. *caucasica* (Kreyer) V. Avet. (Zernov 2002: 207; *A. caucasica* Kreyer: Grossheim 1949: 296; *A. bella-donna* L. p.p.) – 17.6.2002, *Suslova* (MWG); rare.

Sparganiaceae

Sparganium erectum subsp. *neglectum* (Beeby) K. Richt. (Zernov 2002: 40; *S. neglectum* Beeby: Grossheim 1949: 723; *S. polyedrum* (Asch. & Graebn.) Juz.: Grossheim 1949: 723) – *Kozhin & Dudov Kr-39* (MWG); very rare.

Tiliaceae

Tilia platyphyllos Scop. (Grossheim 1949: 163, Zernov 2002: 168) – *Seregin C-622; Seregin & Shcherbakov C-673; Seregin & al. C-842* (MWG); infrequent.

Typhaceae

Typha angustifolia L. (Grossheim 1949: 724, Zernov 2002: 40) – *Seregin C-663* (MWG); very rare.

Ulmaceae

Ulmus glabra Huds. (Zernov 2002: 95; *U. scabra* Mill.: Grossheim 1949: 581) – *Seregin C-592; Seregin & Lozhkina C-599* (MWG); infrequent.

Umbelliferae

Anethum graveolens L. (Grossheim 1949: 231, Zernov 2002: 183) – *Seregin C-644* (MWG); very rare.

Anthriscus caucalis M. Bieb. (Zernov 2002: 178; *A. vulgaris* Pers. non Bernh.: Grossheim 1949: 217) – *Seregin & al. C-731, C-750, C-813, C-838* (MWG); infrequent.

Berula erecta (Huds.) Coville (Zernov 2002: 182; *B. angustifolia* Mert. & W. D. J. Koch: Grossheim 1949: 229) – *Seregin C-630* (MWG); very rare.

Torilis leptophylla (L.) Rchb. fil. (Grossheim 1949: 218, Zernov 2002: 179) – 6.1997, *Suslova* (MWG); very rare.

T. nodosa (L.) Gaertn. (Grossheim 1949: 218, Zernov 2002: 179) – *Seregin & Lozhkina C-544, C-570* (MWG); infrequent.

Urticaceae

Urtica urens L. (Grossheim 1949: 579, Zernov 2002: 97) – *Seregin & Lozhkina C-521* (MWG); very rare.

Valerianaceae

Valeriana officinalis L. (Grossheim 1949: 258, p.p., Zernov 2002: 222) – 17.6.2004, *Suslova* (MWG); rare.

**Valerianella coronata* (L.) DC. – 5.1996, *Leontyeva;* 1.6.2000, *Suslova & Leontyeva* (p.p.); 3.6.2000, *Suslova* (p.p.) (MWG); infrequent.

**V. echinata* (L.) DC. – *Seregin & al. C-746* (MWG); very rare.

V. lasiocarpa (Stev.) Betcke (Grossheim 1949: 255, Zernov 2002: 225) – *Seregin & Lozhkina C-596* (MWG); very rare.

V. rimosa Bast. (Grossheim 1949: 256, Zernov 2002: 222) – *Seregin & al. C-235* (MWG); very rare.

Violaceae

Viola dehnhardtii Ten. (Zernov 2002: 171; *V. alba* auct. non Bess.: Grossheim 1949: 409, p.p.) – *Seregin & Lozhkina C-600* (MWG); infrequent.

V. kitaibeliana Schult. (Grossheim 1949: 412, Zernov 2002: 171) – 29.3.2006, *Kadetov & Fedulova;* 30.3.2006, *Kadetov & Fedulova;* 1.4.2006, *Kadetov & Fedulova* (MWG); infrequent.

Vitaceae

Vitis vinifera L. (Grossheim 1949: 203, Zernov 2002: 168) – 6.1998, *Levik;* 6.1999, *Suslova* (MWG); infrequent, introduced.

Exclusions from the flora of the Utrish area

Our recent revision of the vascular plant species inventory of the Utrish area revealed 33 species erroneously indicated by Syomina & Suslova (2000) as a result of misidentifications: *Actaea spicata* L., *Aegilops biuncialis* Vis., *Calystegia sepium* (L.) R. Br., *Campanula trachelium* L., *Carduus crispus* L., *Catabrosa aquatica* (L.) Beauv., *Celtis caucasica* Willd., *Cerastium holosteoides* Fries, *Cirsium arvense* (L.) Scop., *Elytrigia intermedia* (Host.) Nevski, *Equisetum pratense* Ehrh., *Euphorbia seguieriana* Neck., *Juncus conglomeratus* L., *Lathyrus hirsutus* L., *Leontodon autumnalis* L., *Linaria vulgaris* Mill., *Nepeta pannonica* L., *Padus avium* Mill., *Polygonatum multiflorum* (L.) All., *Potentilla argentea* L., *Rorippa palustris* (L.) Bess., *Salicornia perennans* Willd. (*S. herbacea* auct. non L.)., *Silybum marianum* (L.) Gaertn., *Sisymbrium altissimum* L., *Solanum dulcamara* L., *Stachys byzantica* K. Koch, *Symphytum grandiflorum* DC., *Taeniatherum asperum* (Simonk.) Nevski, *Veronica peduncularis* M. Bieb., *Vinca minor* L., *Viola hirta* L., *Vitis sylvestris* C. C. Gmel. and *Xanthium strumarium* L.

Further 17 misidentified species were listed by Seregin & Suslova (2002): *Adonis aestivalis* L., *Brassica "arvensis", Catabrosa aquatica* (L.) Beauv., *Chamaecytisus ruthenicus* (Woloszcz.) Klás-

ková, *Geranium molle* L., *Gypsophila perfoliata* L., *Lithospermum officinale* L., *Lycopsis orientalis* L., *Oxytropis pallasii* Pers., *Polygonum patulum* M. Bieb., *Ranunculus sardous* Crantz, *Raphanus raphanistrum* L., *Rumex aquaticus* L., *R. pseudonatronatus* (Borb.) Murb., *Salix fragilis* L. *Scutellaria altissima* L. and *Trifolium tumens* M. Bieb.

Species yet to be confirmed

Six rare species substantiated by specimens, most of them listed for the Utrish area by Zernov (2000), were collected before 1960 and have not been recollected since: *Aeluropus littoralis* (Gouan) Pall. (28.6.1956, *Shreter,* MOSM), *Allium moschatum* L. (25.9.1956, *Smirnova,* MOSM), *Atriplex saggitata* Borkh. (26.5.1911, *Palibin & Vorobeyev,* LE), *Polycnemum arvense* L. (25.9.1956, *Smirnova,* MOSM), *Teucrium scordioides* Schreb. (24.8.1924, *Poyarkova,* LE) and *Tragopogon tuberosus* K. Koch (21.4.1907, *Busch & Busch,* LE).

18 species, which were observed by us but not collected, are not included in the checklist. As these reports seem in general to be reliable (several documented by photographs), they are listed here to stimulate further search for their confirmation. These are *Acer tataricum* L., *Angelica pachyptera* Ave-Lall., *Apera spica-venti* (L.) Beauv., *Arum maculatum* L., *Cakile euxina* Pobed., *Carex sylvatica* Huds., *Dryopteris filix-mas* (L.) Schott, *Echium italicum* L., *Erigeron podolicus* Bess., *Festuca gigantea* (L.) Vill., *Gladiolus tenuis* M. Bieb., *Hieracium* sp., *Lathyrus niger* (L.) Bernh., *Linum nodiflorum* L., *Lycium barbarum* L., *Portulaca oleracea* L., *Sonchus arvensis* L. and *Tanacetum vulgare* L.

Localities of special floristic interest

The checklist of the Urtish area currently comprises a total of 848 species (see electronic supplement). This figure is one of the highest among local floras in Russia. The rarest of these species are concentrated in eight localities.

(1) Drainage basin of the Sukhoy Liman Lake. – Rare plants inhabit freshwater lake and its shore, mesophytic meadows, forest margins, and ruins of small former settlement. Here are the single occurrences of *Alopecurus aequalis*, *Berteroa incana*, *Bunias orientalis*, *Butomus umbellatus*, *Chaiturus marrubiastrum*, *Conium maculatum*, *Cystopteris fragilis, Epilobium roseum, Fragaria vesca, Hypericum hirsutum, Inula britannica, Lathyrus pratensis, Lythrum tribracteatum, Mentha arvensis, M. longifolia, Myosurus minimus, Potamogeton* aff. *berchtoldii, Potentilla supina, Ranunculus repens, Reseda luteola, Rorippa austriaca, Rubus caesius, Rumex conglomeratus, Scirpus lacustris, Scrophularia scopolii, Scutellaria hastifolia, Silene noctiflora, Sparganium erectum* subsp. *neglectum, Stachys germanica, Veronica officinalis*.

(2) Steppic southern slopes of Navagir Ridge. – Situated above Sukhoy Liman Lake, petrophytic steppic plots with *Stipa* spp. are mixed here with arid groves of *Paliurus spina-christi*, *Carpinus orientalis,* etc. Exclusively here occur *Gagea villosa*, *Galatella dracunculoides*, *Linum squamulosum*, *Melampyrum arvense*, *Ranunculus illyricus*, *Sedum hispanicum*, *Silene dichotoma* and *Valerianella rimosa*.

(3) Lower part of the Ozereyka River valley. – It is the easternmost part of the study area, where some species have the westernmost limits of their ranges. The most interesting habitats are herbaceous petrophytic slopes, arid light forests with *Juniperus* spp., ruderal habitats, river banks and marshy valley bottom. The single localities of *Ajuga pseudochia, Argyrolobium biebersteinii, Artemisia caucasica, Asphodeline taurica, Astragalus fragrans, Bupleurum brachiatum, Campanula maleevii, Carex melanostachya, Centaurea sterilis, Cephalanthera cucullata, Cephalaria transsylvanica, Cervaria caucasica, Chamaecytisus wulffii, Crambe steveniana, Dianthus pallens, Euphorbia petrophila, E. squamosa, Galanthus plicatus, Galatella villosa, Galium biebersteinii, Genista albida, G. humifusa*, *Gladiolus tenuis, Glechoma hederacea, Helianthemum canum, Inula ensifolia, Jacobaea vulgaris, Jurinea stoechadifolia, Mespilus germanica, Onosma taurica, Orchis picta, Petasites hybridus, Phalaroides arundinacea, Phlomis tuberosa, Potamogeton crispus, Potentilla astracanica, Psoralea pontica, Rumex sanguineus, Scorzonera turkeviczii, S. vulgaris,*

Setaria verticillata, Steveniella satyrioides, Thymus helendzhicus, Trigonella cretacea and *Vicia dasycarpa*.

(4) Herbaceous glades and forest margins in the headwaters of Bazovaya Shchel. – A small locality but unexpectedly interesting, due to the single occurrences of *Cruciata pedemontana, Epilobium tetragonum, Scleranthus uncinatus, Trifolium hirtum* and *Vicia serratifolia*.

(5) Top of Navagir Ridge. – Situated between steppic glades and the headwaters of Topolnaya Shchels, it is interesting due to moist climatic conditions, which determine alternation of broad-leaved forests with picturesque meadows on forest glades with mesophytic *Leucanthemum vulgare, Trifolium hybridum, T. medium, T. pratense* and *Galium rubioides*. There are several permanent shady pools, which is a very rare habitat here. Only here are found *Betonica officinalis, Epilobium lanceolatum, Juncus bufonius, Ranunculus meyerianus, R. sceleratus, Vicia tenuifolia,* etc.

(6) Lobanova Shchel. – Situated below the confluence of Tretya Topolnaya Shchel, Vtoraya Topolnaya Shchel and Pervaya Topolnaya Shchel, it is the best studied and most diverse forest gorge with a number of interesting sites, such as sulphur spring, cataracts, wet shady cliffs, bottom meadows, etc. Here are the single localities of *Alopecurus arundinaceus*, *Glyceria arundinacea*, *Lathraea squamaria, Lotus tenuis, Prunella laciniata, Rosa agrestis, Salvia tomentosa, Sorbus taurica, Viburnum opulus* and *Vicia loiseleurii*.

(7) Mt Lysaya (c. 300 m) is well noticeable maritime summit with large live scree on south-faced and west-faced slopes with petrophytic plant communities. A foot of the mount was used for a long time as a permanent rubbish heap, that is why a number of the rarest weeds were collected there. The single localities of *Agrostemma githago, Astragalus humifusus, Axyris amaranthoides, Clypeola jonthlaspi, Medicago romanica, Myosotis micrantha, Ribes aureum, Saxifraga tridactylites, Scandix pecten-veneris, Urtica urens* and *Valerianella echinata*.

(8) Cape of Maly Utrish. – The coastal habitats are very diverse and include saline coastal lakes, salt-marshes, strip of coastal shingle and short grass meadows, the latter are fully covering the cape. Here are the single localities of *Carex distans, Centaurium pulchellum, Ceratocephala falcata, Euphorbia chamaesyce, Puccinellia distans, Ranunculus oxyspermus, Scolymus hispanicus, Tragus racemosus, Tribulus terrestris* and *Trifolium bonannii*.

Conservational aspect

The forthcoming upated Red Data Book of Russia comprises 514 species of vascular plants (Varlygina, pers. comm.) of the c. 12 500 species of the Russian flora (Czerepanov 1995). Among these 514 species are no less than 43 species (Varlygina, pers. comm.) recorded in the Utrish area: *Anacamptis pyramidalis* (L.) Rich., *Anemone blanda* Schott & Kotchy, *Asphodeline taurica* (M. Bieb.) Endl., *Astragalus arnacantha* M. Bieb., *Atropa bella-donna* subsp. *caucasica* (Kreyer) V. Avet., *Campanula komarovii* Maleev, *Cephalanthera cucullata* Rchb. fil. (= *C. floribunda* Woron.), *C. damasonium* (Mill.) Druce, *C. longifolia* (L.) Fritsch, *C. rubra* (L.) Rich., *Colchicum umbrosum* Stev., *Crambe koktebelica* (Junge) N. Busch, *C. steveniana* Rupr., *Eryngium maritimum* L., *Euphorbia rigida* M. Bieb., *Galanthus plicatus* M. Bieb., *Genista albida* Willd., *G. humifusa* L., *Glaucium flavum* Crantz, *Himantoglossum caprinum* (M. Bieb.) K. Koch, *Iris pumila* L. s.l., *Juniperus excelsa* M. Bieb., *J. foetidissima* Willd., *Limodorum abortivum* (L.) Sw., *Lonicera etrusca* Santi, *Onosma polyphylla* Ledeb., *Ophrys caucasica* Grossh., *O. oestrifera* M. Bieb., *Orchis mascula* (L.) L., *O. picta* Loisel., *O. punctulata* Lindl., *O. purpurea* Huds., *O. simia* Lam., *Paeonia daurica* Andrz. (= *P. caucasica* (Schipcz.) Schipcz.), *Pinus brutia* Ten. (= *P. pityusa* Stev.), *Pistacia mutica* Fisch. & C. A. Mey., *Staphylea pinnata* L., *Sternbergia colchiciflora* Waldst. & Kit., *Steveniella satyrioides* (Stev.) Schltr., *Stipa pennata* L., *S. pulcherrima* K. Koch, *Taxus baccata* L. and *Veronica filifolia* Lipsky.

Six species of the Utrish flora are protected on regional level (Nagalevsky 1994): *Chamaecytisus wulffii* (V. Krecz.) Klásková, *Cladium martii* (Roem. & Schult.) K. Richt., *Ephedra distachya* L., *Juniperus oxycedrus* L., *Ruscus ponticus* Grossh. and *Valeriana officinalis* L.

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