Skvortsovia: 1(4): 257 – 278 (2014)

Skvortsovia
http://skvortsovia.uran.ru/
ISSN 2309-6497 (Print)
ISSN 2309-6500 (Online)

Conference abstracts

Third Conference in Memory of Prof. Alexey Skvortsov

Main Botanical Garden, Russian Academy of Sciences, Moscow. 11 March 2014

Received: 30 August 2014 | Accepted by Ivan A. Schanzer: 30 December 2014 | Published on line: 31 December 2014

Conference overview

Ivan A. Schanzer

Main Botanical Garden of Russian Academy of Sciences, Botanicheskaya St. 4, 127276 Moscow, Russia
Email: ischanzer@gmail.com

The 3rd Conference in memory of Prof. Alexey Skvortsov was held at the Main Botanical Garden of the Russian Academy of Sciences on March 11, 2014. The Conference was organized by the Moscow Branch of the Russian Botanical Society and supported by the Main Botanical Garden and Moscow University. As with the two previous conferences, and despite its brief one-day format, the Conference gathered botanists and ecologists, 48 in all, from Moscow and other cities of Central Russia: Ryazan, Bryansk, Orel, and Smolensk, who presented their talks and took part in discussions. The span of the talks was as wide as the interests of Prof. Skvortsov, from floristic studies and adventive plants, to morphology and ethnobotany. Most of the lecturers were, as expected, from the Main Botanical Garden and Moscow University, the places where Alexey Konstantinovich worked for most of his life.

The Conference talks were presented in three oral sessions. The first session was mainly devoted to the problems of plant invasions, but also some topics in such areas as palinology and plant morphology. An exciting historical investigation into Prof. Skvortsov's field studies on the flora of Ryazan Region in Russia was presented by Prof. Marina Kazakova at the end of the session.

The second session was held after lunch and included a variety of talks on plant introduction, reproductive biology, and conservation, problems that A.K. Skvortsov paid much attention to when working at the botanical gardens both of Moscow University and the Academy. This session started with a talk by colleagues from Moscow University that revealed a lot of interesting facts about Skvortsov's life and his role in planning and starting the University botanical garden.

The third session, in the evening, was short but exciting. The first two talks by Dr. Michael Ignatov and colleagues dealt with mosses. Dr. Ivanov presented a novel method of computer analysis of moss leaf cellular structure and its development in space and time. Then Dr. Ignatov demonstrated fascinating opportunities offered by their database on the moss flora of Russia. The two closing talks were about field expeditions: Dr. Lyudmila Ozerova's trip to South Africa, and Alexey Skvortsov's field trips in various years, presented by Dr. Larisa Kramarenko in a slide show compiled from a mixture of photographs, and covering his trips through Russia and America.

Abstracts of the twenty-two talks, translated from Russian by Irina Kadis, are presented below.

Ecological features of meadows in the southeastern part of the buffer zone surrounding the Polistovsky State Nature Reserve (Pskov Region)

O.V. Cherednichenko

Biological Faculty, Lomonosov Moscow State University, Vorobyevy Gory 1, 119991 Moscow, Russia
Email: sciapoda@mail.ru

The zone of restricted economic activity around Polistovsky Reserve includes significant areas of meadows, both maintained and abandoned. The goal of the study was to provide ecological assessment of these meadows in accordance with the plant community type and usage mode. Seventy-seven relevés were produced within the southeastern part of the buffer zone surrounding Polistovsky Reserve.

All the surveyed meadows were attributed to two orders within the Class Molinio-Arrhenatheretea. Meadows of Arrhenatheretalia Order were located on the outskirts of populated settlements and used as hayfields and pastures. Meadows belonging to *Molinietalia* occurred in abandoned lots, where meadow maintenance was discontinued during the late 20th century. Ordination methods revealed that soil nitrogen and moisture content, along with light conditions, are critical ecological factors determining the differentiation of plant communities.

Features of leaf structure in common heather, *Calluna vulgaris* (L.) Hull.

O.E. Cherepanova and I.V. Petrova

Russian Academy of Sciences, Ural Branch: Institute Botanic Garden, Yekaterinburg, 8 Marta St. 202a, 620144, Russia
Email: botgarden.olga@gmail.com; irina.petrova@botgard.uran.ru

The earliest preserved collection of common heather dates back to 1736 (St. Petersburg Botanical Garden Herbarium). Representatives of Ericaceae have been studied comprehensively in multiple treatments across the world, but studies of morphology and anatomy of *Calluna vulgaris* (L.) Hull. within the Russian territory are scarce.

Common heather has been perceived by taxonomists as a species lacking any infraspecific entities, so one may expect to find considerable uniformity in phenotypical /morphological characters in populations across its geographic range. The authors have analyzed five populations from the eastern and western part of the range, each represented by 30 samples. Fourteen anatomical-morphological parameters were analysed using factor analysis. Western populations (from London, Bordeaux, and Gomel) and eastern ones (from Zavodouspenskoye, a community near Yekaterinburg, and Kurgan, both in the Tobol River basin) formed two distinct groups due to differences in linear parameters (length and width) of parenchymal cells. The discovered differences between populations in the western and eastern part of the species range may provide evidence of microevolutionary divergent processes within *C. vulgaris*.

This work was supported by the Russian Foundation for Basic Research (RFBR Grant № 12-04-01482-a).

Armeria maritima (Miller) Willd. in Eurasia

I.A. Fadeyeva

Smolensk State University, Przhevalskogo St. 4, 214000 Smolensk, Russia
Email: irfadeeva@rambler.ru

Flora Europaea lists 43 species of the genus *Armeria* Willd. Within *A. maritima* (Miller) Willd., a species found on the Russian territory, 10 subspecies have been recognized, two of which, *A. maritima* subsp. *elongata* (Hoffm.) Bonnier and *A. maritima* subsp. *sibirica* (Turcz. ex Boiss.) Nyman, may occur in Russia. The rest of the subspecies include *A. maritima* subsp. *maritima*, *A. maritima* subsp. *miscella* (Merino) Malag., *A. maritima* subsp. *halleri* (Wallr.) Rothm., *A. maritima* subsp. *purpurea* (W.D.J.Koch) Á.Löve & D.Löve, *A. maritima*

subsp. *alpina* (DC.) P.Silva, and *A. maritima* subsp. *barcensis* (Simonk.) P.Silva (da Silva, 1972). Diagnostic characters used for delineation of species and subspecies within the genus *Armeria* have been discussed elsewhere (Fadeyeva, 2013). The author concentrated on studying *A. maritima* subsp. *elongata* and subsp. *sibirica*, in order to confirm their presence and clarify their geographical ranges within Russia.

The survey of *A. maritima* subsp. *elongata* included 183 herbarium samples located at KW, LE, LW, LWKS, MHA, MSK, MSKU and MW. Fifteen natural populations were studied during 2009-2013, 11 in Russia and 4 in Ukraine and Belarus. *A. maritima* subsp. *elongata* has been reported from Northern, Central, Western, and Eastern Europe, in the north reaching southern/central parts of northern European countries: Finland, Sweden, Norway, Iceland, and Denmark**.** It is known from Baltic States: Estonia, Latvia, and Lithuania; within Central Europe, it occurs in Austria, Romania, Poland, Hungary, Germany, Slovakia, Czech Republic, and Slovenia; in Western Europe this subspecies is found in Britain and France; and in Belarus, Ukraine, and Russia within Eastern Europe. In Russia, this subspecies reaches only the western regions, its eastern range limit running across St. Petersburg, Pskov, Novgorod, Tver, Smolensk, Kaluga, Bryansk, Kursk, and Kaliningrad Regions.

A significant input to the clarification of *A. maritima* subsp. *elongata* range within Russia was made by A.K.Skvortsov. In 1983, he located a population in Kaluga Region (MHA, "on partially exposed sand at the margin of an old pine stand near Terben, Khvastovichi District"). In 1982, in search of the plant, Skvortsov undertook a 6–7-kilometer-long survey along the bank of the Khmara River in Smolensk Region, close to the town of Pochinka, but did not locate any plants (Skvortsov 1998). He discovered a population on the high (right) bank of the Ugra River, near Vysokoye, Ugra District, Smolensk Region (MHA).

The herbarium survey of *A. maritima* subsp. *sibirica* yielded 732 samples in LE, LAPL, MHA, LE, LAPL, MAG, MW and SASY, while the field survey included 2160 specimens in eight Russian regions: northern European Russia, the Urals, Siberia, the Lake Baikal Region, central, southern, and northern Far East, and Maritime Province. The study of a large number of individuals has demonstrated a lack of uniformity in the expression of diagnostic characters within all of the studied parts of the range. Based on the presence of trichomes on leaves and peduncles, the author has segregated 4 morphological forms (with glabrous leaves and peduncles, with glabrous leaves and pubescent peduncles, with pubescent leaves and glabrous peduncles, with pubescent leaves and peduncles) and provided a detailed description of these forms for all the eight geographical regions.

The obtained data confirm that two subspecies of *A. maritima* occur within Russia, *A. maritima* subsp. *elongata* and *A. maritima* subsp. *sibirica* Nyman. The latter has been found to produce four different morphological character combinations, which allowed the author to segregate four eco-forms.

The author would like to express sincere gratitude to Dr. Vladimir Novikov, Director of the Moscow University Botanical Garden, for his continuous support and multiple consultations.

References

Silva, A.R.Pinto da, 1972. *Armeria* Willd. in Tutin T.G., Heywood, V.H., Burges, N.A., Moore, D.M., Valentine, D.H. Walters, S.M. and Webb, D.A. (eds.) Flora Europaea 3. Cambridge University Press: 30–38.

Fadeyeva, I.A. 2013. Subspecies of *Armeria maritima* (Miller) Willd. in the territory of Russia. Proceedings of XIII Congress of Russian Botanical Society, Tolyatti, September 16-22, 2013, 75–76. (In Russian)

Skvortsov, A.K. 1998. Contribution to the flora of Smolensk Oblast. Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol. 103: 44–52. (In Russian)

History of alien *Bidens* L. species expansion into Europe

M.A. Galkina

Main Botanical Garden of Russian Academy of Sciences, Botanicheskaya St. 4, 127276 Moscow, Russia
Email: mawa.galkina@gmail.com

Alien beggar-ticks (*Bidens* L.) species have repeatedly reached Europe and then Russia. Herbarium collections (KW, LE, MHA, MW and P) provide evidence of these introductions, and literature data can be found in *Flora Europaea* (1976). Many beggar-ticks species with their showy flowers are quite ornamental, attractive from the horticultural standpoint. Starting from the 18th century, 13 species of *Bidens* have been introduced to European botanical gardens. Of these, 10 are of American origin, two are African (*B. acuticaulis* Sherff and *B. biternata* (Lour.) Merr. et Sherff), and one is from East Asia (*B. parviflora* Willd.). By and large, North and South America can be considered the center of *Bidens* species diversity. In his monograph on the genus *Bidens*, Sherff (1937) listed 70

species for just boreal North America, while for both American continents the species number exceeded 170.

Not all those species that overcome a geographical barrier (such as an ocean or mountain range) are capable of securing an ecological niche in their new land, that is, become naturalized, and it is only a fraction of those naturalized that succeed in moving from ruderal to pristine habitats, that is, become invasive. Six *Bidens* species are now known in Europe only from historical herbarium collections, all of which represent cultivated plants; they have not been encountered in Europe later on. The following species presumably never escaped cultivation and have never been found in natural communities: *B. acuticaulis* Sherff, *B. bipontina* Sherff, *B. biternata* (Lour.) Merr. & Sherff, *B. chrysantha* (L.) DC., *B. ferulaefolia* DC., and *B. parviflora* Willd. Seven species, *B. aurea* (Aiton) Sherff, *B. bipinnata* L., *B. connata* Muehl. ex Willd., *B. frondosa* L., *B. pilosa* L., *B. subalternas* DC., and *B. vulgata* Greene did escape and became naturalized, thus overcoming not just geographical, but also ecological obstacles. Two of these, *B. connata* and *B. frondosa*, have become invasive in European Russia, being able to also overcome the phytocoenological barrier.

References

Sherff, E.E. 1937. The genus *Bidens.* Publications of the Field Museum of Natural History. Botanical Series, Chicago, 16: 16–74.

Tutin, T.G. 1976**.** *Bidens* L. in Tutin T.G., Heywood, V.H., Burges, N.A., Moore, D.M., Valentine, D.H. Walters, S.M. and Webb, D.A. (eds.) Flora Europaea 4. London, Cambridge University Press: 139–140.

Oxalis stricta L.: a study of the reproductive biology in Tver Region (Russia)

M. I. Khomutovskiy

441-109, 124498 Zelenograd, Russia
Email: maks-bsb@yandex.ru

Research conducted in Tver Region revealed the fact that vegetative reproduction was scant in *Oxalis stricta* L. The proportion of flowers yielding fruit averaged 70.3%, ranging from 50 to 100%. Despite the rather high rate of fruiting, seed production was low, as compared to that in plants from South Karelia, where it had been reported to be on average 1100 seeds per plant per season (Rokhlova, 2013). Plants from Tver Region produced

approximately 4 times less seeds, on average only 262 each, per season. Seeds from Tver Region, however, had a higher germination rate in the lab, 22%. The prediction is that wherever *O. stricta* is introduced, it is there to stay and is thus going to further expand its range within Tver Region.

References

Rokhlova, Ye.L. 2013. Reproductive potential of *Xanthoxalis stricta* (L.) Small, a new species in the flora of South Karelia. In: V.P.Viktorov, Ed. (ed.) Systematic and Floristic Research in Northern Eurasia Internat. Conf. Proc., Moscow Pedagogic State University, Moscow: 188–191. (In Russian)

GIS application *Rare and protected plants of Oryol Region*: a retrospective view and plans for the future

L.L. Kiseleva

Komsomolskaya St. 95, Oryol State University, Faculty of natural science, Department of Botany, 302026 Oryol, Russia
Email: llkiseleva@ya.ru

A map layer for locations of rare and protected plants in Oryol Region created in 1999 in the GIS MapInfo environment currently contains information regarding 5065 locations of 400 vascular plant species. Of these, more than 2500 locations have precise coordinates obtained via a GPS device.

This layer constitutes a basis for the monitoring and analyses of rare plant populations in the area. It has been used for the production of the 'Oryol Region Red Book' (2007), the 'Tourist Atlas for the Orlovskoye Polesye National Park' (2007, 2011), and the 'Atlas of Rare and Protected Plants of Oryol Region' (2012).

The accumulated cartographic data is going to be used for two region-scale projects: the Flora of the Oka River Basin and the Flora of the Central Chernozem Belt. It will also serve as a basis for updates of the major and supplementary checklists in the second edition of the Oryol Region Red Book, planned for publication in 2017.

Pattern and randomness in tree crown development: the case of pendulous birch, *Betula pendula* Roth

M.V. Kostina, G.V. Bityugova, A.M. Dubakh

Sholokhov Moscow State University for the Humanities, Verkhnyaya Radishchevskaya St. 16-18, 109240 Moscow, Russia
Email: mkostina@list.ru

From the beginning of its development, a tree crown constitutes a system of subordinate axes (the trunk and branches) developing and dying off in a certain order. Starting from the time the tree enters the generative stage, the role of shoots producing staminate aments gradually increases. As a result of axis aging, the part played by dormant buds in the crown formation becomes more important, as their growth is initiated by the axis exposure to light. Shoot development from dormant buds may result in a significant prolongation of the axis' lifetime (a few times as long). In pendulous birch, the predictable process of subordinate axes formation is often interrupted due to death of the apical meristem in annual shoots right at the moment of their intensive growth. The frequency and timing of these mostly endogenously inflicted events is random. Such interruptions result in formation of particularly robust limbs, sometimes a double-leader structure. Therefore, the crown of a pendulous birch is the result of both regular and stochastic processes.

Variegated scouring rush, *Equisetum variegatum* Schleich. ex F.Weber & D.Mohr, (Equisetaceae): biology, ecology, and conservation

M.V. Kostina, Ye.O. Korolkova and M.V. Kulak

Sholokhov Moscow State University for the Humanities, Verkhnyaya Radishchevskaya St. 16-18, 109240 Moscow, Russia
Email: mkostina@list.ru

Equisetum variegatum Schleich. ex F.Weber & D.Mohr is a vanishing species assigned to Category One in the Red Book of Moscow Region, yet its biology and the factors causing its decline are poorly understood. Presumably the decline is due to alteration and elimination of its habitat.

During 2012-2013 the authors conducted a study of the morphology, anatomy and geographical distribution of *E. variegatum* within Russia and explored factors limiting its range.

The study of morphology and anatomy yielded the following generalizations regarding the growth and formation of the shoot systems:

1. A new ramet starts to form with a plagiotropically developing shoot; later on the shoot development becomes orthotropic.
2. Two types of shoot growth have been observed, monopodial, the typical one for the species, and sympodial, which is much rarer.

Our observations support the hypothesis that alteration and elimination of habitat is the major factor restricting the spread of the species.

The spread of *Amelanchier* Medik. species in Europe

A.G. Kuklina

Main Botanical Garden, Russian Academy of Sciences, Botanicheskaya St. 4, 127276, Moscow, Russia
Email: alla_gbsad@mail.ru

North America is the richest continent in species of *Amelanchier* Medik. (Rosaceae): according to Jones (1946), there are at least 18. Until the 19th century, only two species were known from Eurasia, *A. ovalis* Medik. and *A. asiatica* (Siebold & Zucc.) Endl. ex Walp. The earliest known introduction to Europe, dated 1590, was that of *A. canadensis* (L.) Medik. from Quebec, Canada to France. During the 17th and 18th centuries, the apomictic lineages successfully adapted to the new environment, and as a result, new morpho-types must have evolved in Europe, *A. spicata* (Lam.) K.Koch and *A. lamarckii* F.G.Schroed.

The prerequisite to the next stage of *Amelanchier* expansion in Europe was the widespread introduction of *A. spicata* (1869) and *A. lamarckii* (1968) in the 19th and 20th centuries. The next direction of introduction was northwards, though the process was partially limited by the species' hardiness. Being comparatively less hardy, *A. lamarckii* became naturalized in Western and Northern Europe only within a restricted territory covering England, Germany, Belgium, Holland, Denmark, and Sweden. It rarely occurs in Eastern Europe and is effectively absent from Russia.

The hardier of the two species, *A. spicata*, has been introduced over a significant area in Central and Northern Europe along with European Russia including its northern part. Starting from the mid-20th century, wide-ranging introductions of *A. spicata* were made, their starting point being well defined as the northern pre-Uralia (Kudymkar, Perm Region) and their destinations ranging from the Baltic States, southern and southeastern Russia to West Siberia and the Far East. By the 1980's *A. spicata* had become so well adapted in temperate European Russia that it was able to overcome the community barrier and enter natural habitats as an

invasive species. In Tver, Kaluga, and Bryansk Regions, it has become a species-transformer, i.e., an invasive plant capable of changing the character of ecosystems (Kuklina 2011).

Currently, *A. spicata* appears to be evolving further and, according to the author's hypothesis, has produced new hardy ecotypes recorded in 1994 in Leningrad Region and in 2013 in Moscow Region, though their genotypes have yet to be studied.

In the 20th and 21st centuries *A. alnifolia* (Nutt.) Nutt. ex M.Roem. was locally recorded from some areas in Western and Central Europe and within Russia it has become naturalized in Perm, Vyatka, Leningrad, Moscow, Tula, and Orel Regions.

A. ovalis Medik. does not extend anywhere beyond its natural range in Europe. In temperate European Russia it is frost-killed when growing taller than the level of snow cover.

References

Jones, G.N. 1946. American species of *Amelanchier.* University of Illinois, Urbania. III

Kuklina, A.G. 2011. Naturalization of *Amelanchier* species from North America in a secondary habitat. Russ. J. Biol. Invas. 2: 103–107. http://www.sevin.ru/invasjour/

Directions of research for the conservation and expansion of *ex situ* biodiversity in the genus *Iris* L. based on the ornamental plant collection in the Main Botanical Garden, Russian Academy of Sciences

N.A. Mamayeva

Main Botanical Garden of Russian Academy of Sciences, Botanicheskaya St. 4, 127276 Moscow, Russia
Email: mamaeva_n@list.ru

The genus *Iris* L. currently embraces more than 200 species, and the number of cultivars already exceeds 80000. The traditionally popular bearded irises, *I. hybrida* hort. have been losing their leading position as cultivated plants, hence the need for strategic modifications in the collection acquisitions. While formerly the research was mainly concentrated on bearded irises, today it includes two major directions. One priority is conserving the existing collection of garden varieties of bearded irises, particularly for the purpose of demonstrating microevolutionary processes. The introduction of dwarf bearded and intermediate bearded varieties still remains important for the Russian Federation regions with a temperate climate. The other strategic direction is a study of biodiversity in beardless irises including the Siberians, Spurias, Japanese, water-loving, and those poorly known. The main goal for this direction is expanding the *ex situ* biodiversity of irises and the formation of collections

depicting the current world trends in iris cultivation. Collecting vintage cultivars and those of domestic selection (mostly created in the USSR) certainly never loses its popularity.

Biosafety in New Zealand: a botanist's impressions

S.R. Mayorov

Biological Faculty, Lomonosov Moscow State University, Vorobyevy Gory 1, 119991 Moscow, Russia
Email: saxifraga@mail.ru

It is well known that New Zealand is one of those countries whose flora has suffered a great deal from invasions by alien species. In order to prevent new invasions, a strict quarantine policy has been implemented there at the national level. Air travellers arriving in New Zealand, while still on board the plane, have to describe their luggage in detail and claim that they don't carry any food or seeds, that their footware is not contaminated, etc. Upon passing through Customs, everyone has to go through a mandatory biosafety check, during which luggage is surveyed not just with the help of high-tech equipment, but also by trained dogs.

On South Island, where we visited, towns are mostly situated along the eastern shore with its temperate climate and flat terrain beneficial for agriculture. The natural vegetation here has been effectively eliminated. The Tasman Sea coast, on the contrary, is characterized by mountainous topography and high humidity; population density is very low there. The vegetation is quite natural, alien species being restricted to human settlements and roads. Of invasive species, only *Myriophyllum aquaticum* Verdc. occurred amidst a rather special palustrine habitat dominated by *Dacrycarpus dacrydioides* (A.Rich.) de Laub. (Podocarpaceae). The difference between the east and west coasts is drastic. For example, in communities dominated by *Ficinia spiralis* (A.Rich.) Muasya & de Lange (Cyperaceae) on the sand dunes of the Tasman Sea coast, there were no alien species found, while in a similar situation on the outskirts of the City of Christchurch native plants were scarce (*F. spiralis*, *Myoporum laetum* G. Forst., *Coprosma repens* Hook. f., *Cordyline sp*.) and some (two species of *Phormium* J.R.Forst. & G.Forst.) appeared to be planted. Meanwhile, the total species number was close to 50. The most prominent aliens appeared to be *Lupinus arboreus* Sims, *Carpobrotus edulis* (L.) N.E.Br., *Ammophila arenaria* (L.) Link, and *Anisantha sterilis* (L.) Nevski.

This drastic contrast must be attributed for the most part to the climatic differences: while on the east coast the annual precipitation is 600-800 mm, on the west coast it is a few thousand. The only climate on Earth that is similar can be found in southern South America.

Strict quarantine can prevent new diaspore introductions to a certain extent. However, botanical gardens of New Zealand contain rich collections and the green industry is very well developed. Transformations of alien species, which may abruptly advance from the lag phase to active expansion, are unpredictable, and more alien species will inevitably escape from cultivation. For example, right now there is a very active spread of *Thymus vulgaris* L., which has been grown as an aromatic and ornamental plant. Agricultural land, residential areas, water and near-water habitats have been actively acquired by alien species. Barren heights and moist forests are relatively more resistant to advancing alien plants.

Lichen biodiversity in the Galichya Gora Reserve (Lipetsk Region)

E. E. Muchnik

Institute of Forest Research, Russian Academy of Sciences, Uspenskoye, Odintsovsky Distr., Moscow Region 143030, Russia
Email: eugenia@lichenfield.com

The Reserve territory consists of 6 clusters, all of them located within the Northern Don River Botanical Region, which is rich in relict and rare species. While lichens in the Reserve had been studied for more than a century, a more systematic inventory was started in the last decade of the 20th century. The checklist currently includes 149 species, a number constituting 53.6% of Lipetsk Region lichen biota, while the area of the Reserve (230.5 hectares) equals just 0.01% of the Region area. Apparently, the regional lichen biota is very well represented in the Reserve. The lichen lists for individual areas have yielded the following numbers: Galichya Gora—70 species, Morozova Gora—79, Plyushchan—70, Bykova Sheya—47, Vorgolskoye and Voronov Kamen—45. As a result of fires, which affected the Reserve territories in 2010, 39 lichen species were lost from Morosova Gora and 5 from Bykova Sheya. Lichen biota development after the fire has to be monitored through regular surveys undertaken once every 10 years.

A.K. Skvortsov in the Moscow State University Botanical Garden

V.S. Novikov, K.V. Kiseleva, G.V. Degtyareva

Botanical Garden, Lomonosov Moscow State University, 119899 Moscow, Russia
Email: info-bg.msu@yandex.ru

A.K. Skvortsov worked in the Moscow University Botanical Garden from the time of the new territorial acquisition in 1952 until 1972. He established and curated the Plant Systematics Department and introduced into the collection a vast variety of plants from various regions of Russia and adjacent territories along with plants from faraway countries including the North American Continent.

His work with species and varieties of the genera *Festuca* L., *Lonicera* L., *Armeniaca* Scop., *Salix* L., and *Betula* L. has been continued by his students and colleagues. Skvortsov's concepts concerning the development of one of the central Garden areas are currently being implemented.

As an authoritative scientist, head of the employee union, chief editor of the institutional paper and an active participant of conferences and meetings, Skvortsov played an important role in the establishment of the institution.

Alexey Konstantinovich had a unique personality. Apparently, no matter where he applied himself, he was destined to become a high-ranking specialist in botany; however, it was in the Moscow University Botanic Garden where he started. His evolvement into a renowned botanist is inseparable from his work in this institution.

Umbelliferae and traditional music

T.A. Ostroumova[1] and M.M. Kryukova[2]

[1] Botanical Garden, Lomonosov Moscow State University, 119899 Moscow, Russia
[2] Pushkin Lyceum № 1500, Moscow, Russia
Email: ostroumovata@gmail.com; shygry@gmail.com

One of the most ancient musical instruments is the Pan flute made of hollow culms of herbaceous plants. Flutes consisting of several pipes were in use in Russia up until the start of the 21st century. They have been described in detail from Kursk Region (*kugikly*), Bryansk and Kaluga Regions (*dudki*), Komi Republic (*kuima chipsan*), and Perm Region, where they are used by the Komi-Permyaks (*pelyanyas*). A pipe involves a culm node (constituting the pipe bottom) together with an internode fragment, which does not have any holes along its length.

The pitch and tone quality depend upon the pipe diameter, length, and plant species in use. In Russia the pipes are mostly made of carrot-family plants (*Angelica* L.), though in Kursk Region of reeds, *Phragmites australis* (Cav.) Trin. ex Steud. The authors have studied the internode anatomy in *Angelica sylvestris* L. and *A. archangelica* L. The epidermis, collenchyma, and cortex are not lignified, the vascular bundles form a ring, the interfascicular space being completely filled with sclerenchyma, and the central primary parenchyma also becomes lignified. In *P. australis*, it is the epidermis, sub-epidermal sclerenchyma and the basic tissue of the culm that become lignified. The sturdiness of the musical instrument, retention of its form upon drying, and the sound quality can all be attributed to the presence of this solid lignified cylinder.

Expedition to the Eastern Cape Province, South Africa in October 2013

L.V. Ozerova

Main Botanical Garden of Russian Academy of Sciences, Botanicheskaya St. 4, 127276 Moscow, Russia
Email: lyozerova@yandex.ru

The expedition was organized by the South African National Biodiversity Institute (SANBI). The participants included Drs. Ernst Van Jaarsveld, the Succulent Collection Curator in the Kirstenbosch National Botanical Garden and Ricardo Riddles, Curator of Succulent Exhibits in the Karoo Desert National Botanical Garden.

One of the goals was to find and collect *Erythrina acanthocarpa* E.Mey., an endemic of Queenstown District in Eastern Cape Province. The low, prickly, spring-flowering shrub is very attractive with its red-green flowers. It was cultivated in England in the early 19th century, but has disappeared from nurseries since. Though the expedition never found any natural populations, some plants were discovered on farm land (Grey Craig Farm). Another task was to find, produce population assessments, and collect herbarium samples and propagules from representatives of the genus *Gasteria* Duval (Asphodelaceae). According to Dr. E.Van Jaarsveld, the genus embraces 23 species, nearly all of which occur in Eastern Cape. It is not easy to locate these succulent, rosette-forming plants, unless one has precise coordinates. The plants are hidden amidst dense thickets of sclerophilous or thorny shrubs (Nama Karoo Biome and Albany Thicket Biome) and their leaf pattern, featuring olive-color spots organized in stripes, helps them blend in with the surrounding stony surface, an adaptation providing protection from herbivorous animals looking for the juicy foliage. Most *Gasteria* species have

an amazing ability to turn defeat into victory when the leaves are trampled upon or consumed as broken fragments root easily and produce new rosettes.

G. disticha (L.) Haw. var. *robusta* van Jaarsv., the endemic of Nama Karoo Biome, was the first one located by the expedition. An endemic of Bavianskloof, *G. rawlinsonii* Oberm., is the only one in the genus that has pendulous branching shoots up to 1 meter long. It is found in poor habitats on quartzite sandstone at 300-700 m a.s.l., inaccessible rocks protecting it well from carnivorous animals. Leaf fragments in this species don't have the ability to root. All *Gasteria* have tall peduncles and are pollinated by sunbirds.

Viscum crassulae Eckl. & Zeyh., a succulent shrub parasitic on the branches of *Portulacaria afra* Jacq. was quite difficult to find. It becomes conspicuous on the host plant only during the fruiting period, when birds are attracted to its juicy, red berries. The first experimental inoculation of cultivated *P. afra* was conducted in 1996 in the Kirstenbosch Botanical Garden. The seed of *V. crassulae* is imbedded in a viscous substance, which helps the seed fixation on the host plant and facilitates prompt germination.

Albany Thicket Biome is a community of sclerophilous, thorny, and succulent shrubs up to 2 meters tall. *Euphorbia tetragona* Haw. and *E. grandidens* Haw. tower over the thickets, as these attain a height of 10-14 meters. Succulents (*Aloe* L., *Pachypodium* Lindl., *Gasteria*, *Haworthia* Duval spp.) form the understory, while many bulb-forming plants also play an important role.

Many plants have proved to be not just difficult to find, but also hard to collect. For example, *Brunsvigia* Heist. features enormous bulbs firmly anchored in the stony substrate and *Pachypodium succulentum* (L. f.) Sweet conceals its large juicy caudex deep underground.

Ornamental plants from the flora of Central Asia in the Main Botanical Garden, Russian Academy of Sciences

I.V. Pavlova

Main Botanical Garden of Russian Academy of Sciences, Botanicheskaya St. 4, 127276 Moscow, Russia
Email: irpavlova@lenta.ru

The Central Asia Plant Exhibit is one of the oldest in the Main Botanical Garden, RAS. It was founded in the late 1930's by Prof. M.V.Kultiasov. At the time he was employed with the Moscow Botanical Garden of the USSR Academy of Sciences on the Vorobjevy Hills. In 1946 the collection was transferred to the Flora Department of the Main Botanical Garden in Ostankino and was first open to the public there in 1953. The plants are arranged in groupings

imitating actual landscapes in Central Asia. Natural plant communities served as models for plant arrangements. The following communities are represented in the exhibit: deserts, tugai (riparian woods in Central Asia), montane steppes, hardwood forests, dark coniferous forests, juniper (archa) stands, and also subalpine and alpine meadows.

More than 1100 plant species have been evaluated for introduction over the entire lifetime of the exhibit. The exposition was at its richest (520 species) during the 1980's, when curated by Zoya R. Alferova. Currently, it contains 150 species: 25 trees, 50 shrubs, 70 perennials, 3 bi-annuals, and 2 annuals, including 25 rare or endangered species. Unfortunately, the exhibit is now lacking quite a few highly ornamental plants that had flourished here for years before they were merely stolen during the 1990's. They included *Fritillaria eduardii* Regel, *F. pallidiflora* Schrenk, *Allium karataviense* Regel, *A. cristophii* Trautv., *Eremurus robustus* (Regel) Regel, *Tulipa greigii* Regel. While some of these still exist in nurseries, others have completely disappeared.

The remaining plants are the most stable, without any special horticultural requirements, many of them capable of spreading on their own, either vegetatively or by seed. Not only are they well adjusted to the Moscow climate, but they are also quite tolerant to anthropogenic stresses. Some of these plants are rather popular as ornamentals, others are still rare. The most ornamental and tenacious are the species listed here. Of perennials, these are *Aconogonon alpinum* (All.) Schur, *A. bucharicum* (Grigorjev) Holub, *A. hissaricum* (Popov) Soják, *Achnatherum splendens* (Trin.) Nevski, *Dianthus superbus* L., *Dictamnus angustifolius* G. Don f. ex Sweet, *Ferula kelleri* Koso-Pol., *F. penninervis* Regel et Schmalh., *F. tenuisecta* Korovin, *F. ugamica* Korovin, *Inula helenium* L., *Lavatera thuringiaca* L., *Ligularia heterophylla* Rupr., *Serratula coronata* L., *Tulipa kaufmanniana* Regel, *T. tarda* Stapf., while among bi-annuals, they are *Coronaria coriacea* (Moench) Schischk. et Gorschk., *Daucus carota* L., and *Isatis tinctoria* L. The most promising among shrubs are *Amygdalus nana* L., *Berberis integerrima* Bunge, *B. sphaerocarpa* Kar. et Kir., *Caragana laeta* Kom., *Halimodendron halodendron* (Pall.) Druce, *Lonicera karelinii* Bunge ex P. Kir., *L. korolkowii* Stapf, *Spiraea chamaedrifolia* L., *Tamarix hohenackeri* Bunge, *T. meyerii* Boiss., and *T. ramosissima* Ledeb. and among trees, *Abies sibirica* Ledeb., *Acer semenovii* Regel et Herder, *Malus niedzwetzkyana* Dieck, *Prunus divaricata* Ledeb., and *Sorbus tianschanica* Rupr.

Of 150 currently represented species, 92 (61%) have been grown for more than half a century. Of these, 7 species (5%) have been in cultivation for more than 70 years, 36 (24%) for more than 60 years, and 49 (32%) for more than 50 years. Most plants have been collected or

originate from natural populations. Species from intermediate mountain heights have proved to be the most promising for cultivation regardless of their provenance.

A study of seed reproduction in common heather, *Calluna vulgaris* (L.) Hull.

I.V. Petrova, Y.D. Mishikhina and N.S. Sannikova

Botanical Garden, Ural Branch, Russian Academy of Sciences, 8 Marta St. 202a, 620144 Yekaterinburg, Russia
Email: irina.petrova@botgard.uran.ru

Common heather, a dominant plant of the pine forest, is a typical pyrophytic species, adapted to regeneration after fire. Its seeds are accumulated in the soil bank and stimulated by high temperatures. A ground fire supposedly suppresses the entomofauna in the forest litter, particularly *Trips* spp., which during some years may consume nearly all of the heather seed.

An increase in plant density from 30 to 105 m^{-2} was observed in a pine forest with moss groundcover in the Tobol River Basin (Malaya Sosva Reserve). It correlated with the increase in the area of substrate mineralization from 25 to 90% caused by the fire that had occurred 11 years earlier. The annual height increments of plants approximated to an ascending curve, which signified their high vigor. The age composition analysis revealed a germination peak during the period of 3-6 years after the fire and subsequent gradual diminishing of the seed germination rate.

This work was supported by the Russian Foundation for Basic Research (RFBR Grant № 12-04-01482-a).

Inflorescence development in some representatives of Celastrales: is there a conflict with molecular phylogenetic data?

I.A. Savinov

Moscow State University of Applied Biotechnology, Talalikhina St. 33, 109316 Moscow, Russia
Email: savinovia@mail.ru

Original data on the inflorescence morphogenesis in some Celastrales have been checked against the contemporary phylogenetic concept for the order, which is largely based on comparative molecular analyses. Special emphasis was laid on the specifics of initiation and dynamics of the inflorescence development in species of *Euonymus* L., *Celastrus* L., and *Tripterygium* Hook.f. used as model objects. Additionally, extremely specialized inflorescences of *Salacia* L. and *Sarawakodendron* Ding Hou along with those of a few species of *Brexia*

Noronha ex Thouars were included in the study. The sequence of flower development is basipetal in all the studied species. Acropetal development has been observed in representatives of Stackhousiaceae. No evidence of the inflorescence reduction was found in species of *Parnassia* L.

Molecular phylogenetics data have indicated a close relationship between *Celastrus* and *Tripterygium* (Mu, *et al*., 2012; Simmons *et al*., 2012). The data obtained by the author suggest that the initiation and rhythm of thyrsoid inflorescence development in these genera, *Tripterygium* always having a terminal flower and species of *Celastrus* having either indeterminate or determinate types of inflorescence, may be considered as morphological markers fully congruent with molecular characters. They are also supportive of a close relationship between the two genera. This conclusion, however, may sound contradictory to our previous generalizations, which were based on carpological comparisons. While the fruit of *Celastrus* is a tri-locular loculicidal many-seeded capsule featuring characteristic differentiation of the pericarp and spermoderm, in *Tripterygium* it is a single-seeded, nut-like, three-winged fruit, having a highly specialized pericarp-spermoderm system.

The genus *Salacia* together with a few closely related taxa represents the subfamily Salacioideae I.Savinov et Melikian (Coughenour *et al*., 2011), a sister taxon for Sarawakodendroideae. The affinity between *Salacia* and *Sarawakodendron* is confirmed by similarities in the formation of their few-flowered inflorescences.

The highly specialized *Salacia* inflorescences resemble those of *Brexia* due to similarities in the rhythm of their development, their formation from collateral buds, and also partial (cluster-by-cluster) mode of flowering (Savinov, 2013).

References:

Coughenour, J.M., Simmons, M.P., Lombardi, J.A., Yakobson, K. and Archer, R.H. 2011. Phylogeny of Celastraceae subfamily Hippocrateoideae inferred from morphological characters and nuclear and plastid loci. Molec. Phylogen. Evol. **59**: 320–330.

Mu, X.Y., Zhao, L.C. and Zhang, Z.X. 2012. Phylogeny of *Celastrus* L. (Celastraceae) inferred from two nuclear and three plastid markers. J. Plant. Res. 125: 619–630.

Simmons, M.P., Bacon, C.D., Cappa, J.J. and McKenna, M.J. 2012. Phylogeny of Celastraceae Subfamilies Cassinoideae and Tripterygioidea inferred from morphological characters and nuclear and plastid loci. Syst. Bot. 37(2): 456–467.

Simmons M.P., McKenna M.J., Bacon C.D., Yakobson K., Cappa J.J., Archer R.H.,

Ford A.J. 2012. Phylogeny of Celastraceae tribe Euonymeae inferred from morphological characters and nuclear and plastid genes. Molec. Phylogen. Evol. 61 (1): 9–20.

Savinov, I.A. 2013. Nekotorye osobennosti morfogeneza sotsvetiy v rode *Brexia* Noronha ex Thouars (Celastraceae). Mod. Phytomorphol. 3: 161–165. (in Russian)

On the notion of species expansion and its employment in studies of adventive flora

A.V. Shcherbakov

Biological Faculty, Lomonosov Moscow State University, Vorobyevy Gory 1, 119991 Moscow, Russia
Email: shch_a_w@mail.ru

A number of native species in Eastern Europe are currently expanding their geographical ranges due to natural or socio-economical changes, hence the need to differentiate between these and alien (adventive) taxa. The author proposes 3 criteria as an aid when making such a distinction.

1. A species enters the area directly from its primary range.
2. Propagules are transported by natural means (including the involvement of human beings provided that technology or contemporary transportation means are not involved).
3. A species penetrates natural habitats or anthropogenic habitats having natural analogs in the area (for example, depending on their hydrology, artificial reservoirs around Moscow may be similar to either upland or bayou lakes).

If a species fits all three criteria, then it should be classified as an expanding native one; yet if one or more conditions are not fulfilled, the plant is classified as adventive.

Shoot system formation in *Quercus robur* L. in Moscow Region: the variability of structural units in individual trees at the pre-generative stage

M.N. Stamenov

Mkr. G, 29-70, Pushchino, Moscow Region, 142290 Russia
Email: mslv-eiksb@inbox.ru

The variability of annual shoot growth patterns is described for pre-generative specimens of *Quercus robur* L. in a range of light situations within the following plant communities in Moscow Region: an overgrown meadow, a clearing in a hardwood forest canopy, pine and early successional forest lots with either sparse or dense understories. Typification of annual shoot systems is based on the number of elementary shoots contributing

to the annual growth, branching, if any, age of lateral shoots and their additional seasonal growth. Shoot systems are ranged in accordance with the combination of these characters. The variability of shoot systems is highest in the most open situation of a dry meadow. Branched patterns are dominant in full sun and in open woodland stands with a sparse understory; unbranched shoots prevail in situations with a dense understory. Variability of shoot system types increases with age.

Lupins: pretty or a pity?

Yu.K. Vinogradova

Main Botanical Garden of Russian Academy of Sciences, Botanicheskaya St. 4, 127276 Moscow, Russia.
Email: gbsad@mail.ru

Lupins are by all means beautiful, but at the same time they are horrible. It is wonderful to see those colourful spike-like racemes adorning parks and squares; yet upon escaping cultivation, lupins turn into terrible aggressors. In Kaluga and Smolensk Regions, for example, *Lupinus polyphyllus* Lindl. has formed entire, literally endless, single-species fields. It has been also expanding along railroads. Despite its reputation as a highly invasive species, *L. polyphyllus*, is still commonly cultivated as an ornamental plant under the name Russell Hybrid or *L.* ×*regalis* Bergmans. In gardening manuals one can find an account of J. Russell's hybridization work. His crossings between *L. polyphyllus*, *L. arboreus* Sims, and *L. nootkatensis* Donn ex Sims and subsequent selection resulted, in 1911, in the formation of a complex that has since served as the primary material for the majority of the currently cultivated lupin lineages. If such a colourful cultivar is grown at a certain spot for a prolonged time period, its inflorescences are progressively replaced by ones of the wild type. The same process can be observed when yellow-flowered low-alkaloid lupin is planted on arable land: after 3 or 4 years the field tends to be occupied by blue-flowered plants.

I observed one of the above-mentioned parental species of the cultivated lupin, *L. arboreus*, in Ireland, in the National Botanic Gardens (Dublin). The plant appeared unattractive to such an extent that the reason for its involvement in the hybridization with *L. polyphyllus* remained unclear. Although the shoots suffered from a significant aphid infestation, flowering was abundant. However, not a single fruit was produced.

In October 2013, I observed *L. arboreus* growing on South Island, New Zealand. A notorious invasive species on the eastern coast, this plant had taken over the protected coastal dunes there due to its nitrogen-fixing ability. As well as cross-pollination, *L. arboreus* is

capable of self-pollination. It is pollinated by a bumblebee, *Bombus terrestris* L., also an invasive species. The flowers of *L. arboreus* are protandrous: the stamens produce viable pollen 1-2 days earlier than the stigma becomes receptive. However, there remains an opportunity for self-pollination because some pollen grains stay in the flower until the stigma ripens, the fringed margin of the keel petal serving as an obstacle to their dispersion. Flower development in *L. arboreus* is similar to that in *L. polyphyllus*: at first stamens with large, elongate anthers ripen and disperse pollen, then those with small round anthers considerably overgrow the former ones and disperse their pollen, so that a single flower produces pollen twice. Fruits are produced in large numbers. Legumes may contain from 4 to 10 locules. Seeds are of a uniform dark gray colour. Seedlings are very abundant, forming a continuous carpet along trails.

An increase in nitrogen content in the soil caused by lupins has resulted in infringement by other alien weeds, so that native species are now represented on the dunes by just a few; *Desmoschoenus spiralis* (A.Rich.) Hook.f., *Phormium tenax* J.R.Forst & G.Forst, *Myoporum laetum* G.Forst, and *Coprosma repens* A.Rich. At the same time, the following alien species are abundant: *Ammophila arenaria* (L.) Link, *Anisantha diandra* (L.) Nevski, *Leymus* Hochst. spesies, *Arctotis* L. species, *Senecio elegans* L., *Cytisus scoparius* (L.) Link, *Carpobrotus edulis* (L.) N.E.Br., *Banksia integrifolia* L.f., and more.

L. polyphyllus has also successfully joined the flora of New Zealand. The latter flowers two weeks later than *L. arboreus*. Despite the fact that New Zealand has one of the most efficient government policies for protection of the native flora, both lupin species are still grown as ornamentals in private gardens and downtown flower beds. One can find promotional flyers in travel agencies with images of garden lupins forming colourful displays around mountain lakes. Images of lupin inflorescences are also used for chocolate wrapping, on post cards, and in showcase window decor.

Indeed beauty is power, and the more beautiful the alien plant is, the more challenging becomes the task of treating it as an unwanted element of a flora.

Notes on the reproductive biology and systematics of genus *Aspidistra* Ker Gawl. (Asparagaceae)

N.A. Vislobokov

Faculty of Biology, Lomonosov Moscow State University, 1, 12, Leninskie Gory, 119234 Moscow, Russia
Email: n.vislobokov@gmail.com

The genus *Aspidistra* Ker Gawl. includes more than 130 species occurring in southern China and northern Vietnam. Along with descriptions of new species, some recent research has been dedicated to clarification of the status of certain taxa within the genus.

Reproductive biology in *Aspidistra* as well as functional aspects of diverse flower structures remains poorly known. *A. paucitepala* N.Vislobokov, M.S. Nuraliev & D.D.Sokoloff is a species having flowers with low merism**,** a character appearing unique not only for the genus, but the entire order Asparagales.

It has been observed that the flowers of *A. phanluongii* Vislobokov are visited by flies of the family Phoridae. Another species recently described from northern Vietnam, *A. xuansonensis* Vislobokov (Vislobokov *et al*., 2014) is pollinated by Cecidomyiidae flies. Ants have also been found to play a role in the reproductive cycle of *Aspidistra*.

References

Vislobokov, N.A., Sokoloff, D.D., Degtjareva, G.V., Valiejo-Roman, C.M. and Kuznetsov, A.N. 2014. *Aspidistra xuansonensis* (Asparagaceae), a new species from northern Vietnam. Phytotaxa 173: 226–234.