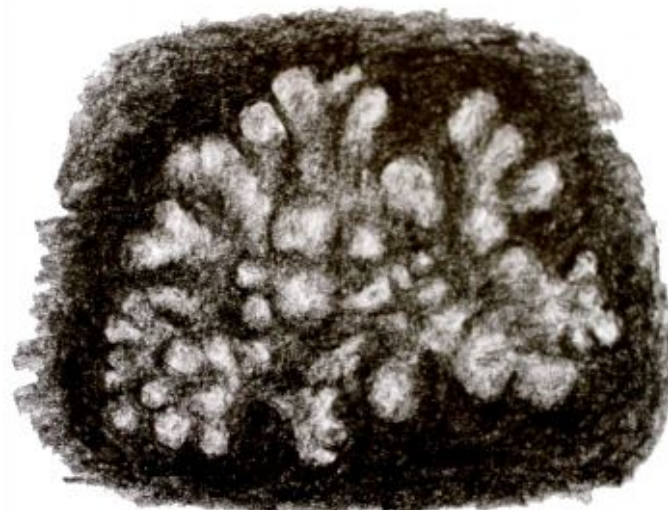


*Arid lichens from the Red Data Book of Ukraine:
studying, conservation and perspectives*

Final report - details

Project leader: Olga Nadyeina

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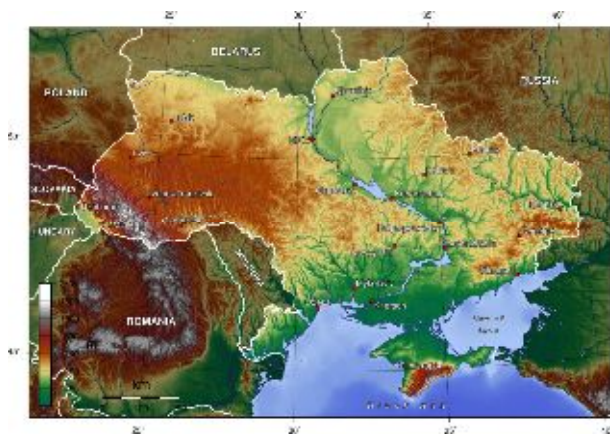


Aspicilia feuticulosa

Kyiv, 2011

Work's Objectives and origin of our idea

Ukrainian Steppes are western part of Eurasian Steppe Area (marked yellow on the map right), therefore some arid species have their west boundary in Ukraine or occasionally occur here after disjunction. Contrariwise, steppe landscapes in Ukraine are influenced by anthropogenic pressure (as plugging-up, network of settlements, mines etc.). Lichens are important component of steppe ecosystems and usually used as bioindicators. In a whole we can consider many species as vulnerable because of their occurrence is endangered. Scientifically based algorithm for evaluation of the species to be included in the Red Data Books was developed by IUCN (2001) and adaptation for work with lichens was proposed (Scheidegger & Goward, 2002; Zavarzin & Muchnik, 2005). There are 52 lichens included the Red Data Book of Ukraine (2009) and 11 from them are ecologically arid (*Agrestia hispida* (Mereschk.) Hale & W.L. Culb., *Aspicilia fruticulosa* (Eversm.) Flagey, *A. vagans* Oxner, *Cetraria steppae* (Savicz) Kärnefelt, *Fulgensia desertorum* (Tomin) Poelt, *Leptogium schraderi* (Bernh.) Nyl., *Seiophora lacunosa* (Rupr.) Froden, *Squamarina cartilaginea* (With.) P. James, *S. lentigera* (Weber) Poelt, *Xanthoparmelia camtschadalis*, *X. ryssolea* (Ach.) O. Blanco, A. Crespo, Elix, D. Hawksw. & Lumbsch). The criteria for including of those lichens were based mainly on number of scattered reports and the impression from the few experienced lichenologists. However comprehensive documentation of changes in the lichen flora of Ukraine does not exist. Mentioned situation with red-data-listed lichens in Ukraine inspire us to check all their known localities and discover a new ones. We decide to concentrate attention only on arid lichens because of steppe ecotops in Ukraine are more changed and we risk to loose knowledge about present lichen diversity and threats to lichens. Our aim was also concentrated to adopt idea of nature conservation and social monitoring of the distribution of rare terricolous lichens in Steppe and Forest-steppe zones of Ukraine. We were planned our work so that school organizations of young naturalists from main regions of Ukraine could contribute in.



Topography map of Ukraine (left) reflect zonal landscapes which were typical for this area more then 200 years ago. Really, the natural habitats are very fragmented: you can see on the map (right, showed by grey dots and lines) how territory of Ukraine is networked by settlements, transport and industrial systems. However, there are more naturally saved areas in Ukraine, then those one with official protected status (right, showed red).

Project team:



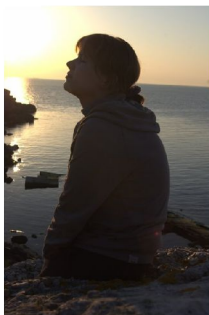
Nadyeina Olga, project leader, Young Researcher at the Department of Lichenology and Bryology, M.G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine, lichenologist (defended PhD thesis in 2009).

Noting lichen data in the Kherson region, photo by L. Dymytrova



Dymytrova Ludmyla, Researcher at the Department of Lichenology and Bryology, M.G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine, lichenologist (defended PhD thesis in 2009).

Noting lichen data in the Crimean Nature Reserve, photo by C. Scheidegger



Nazarchuk Yulia, Senior Lecture of Botanical Department, I.I. Mechnikov National University in Odessa, lichenologist (PhD thesis submitted).

Investigating lichens in the Zmeinyi island (Odessa region)



Khodosovtsev Olexander, Prof., Head of Botanic Branch, Kherson State University, lichenologist.

Studying lichens in the Askania-Nova Biosphere Reserve, photo by C. Scheidegger.

Our collaboration: project team & colleagues, joint expeditions (several examples)



With Prof. M. Boyko (Kherson State University), Prof. A. Yena (Sympheropol State University), Dr. P. Boyko (Kherson Agricultural University), T. Boyko (Kherson State University), April 2010.



With Dr. A. Gromakova (Kharkiv National University) and N. Rusina (Luhansk State Reserve), May 2011.



With G. Naumovych (Kherson State University). June 2010.



With Dr. M. Peregrym (T. Shevchenko National University of Kyiv) and Dr. V. Kolomyichuk (Kholodny Institute of Botany), April 2011.



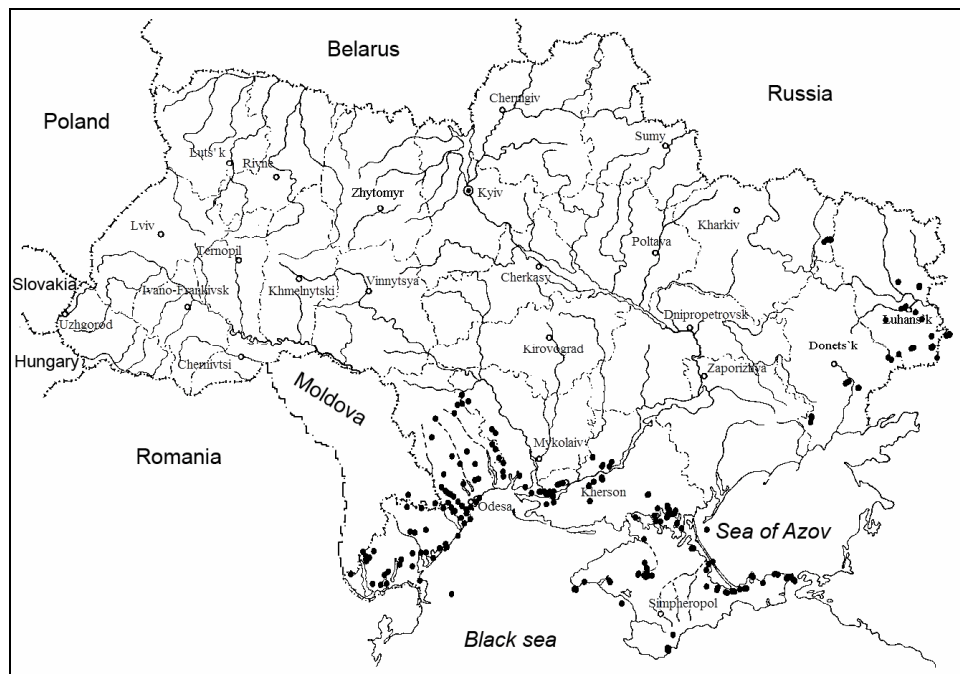
With Dr. I. Moysyenko (Kherson State University) during Ukrainian Conference in honour of J. Pachosky, explanation of cryptogame role in sand weathering intensity, Aleshkivsky Pisky National Park, Oct 2010.



With Prof. C. Scheidegger (Federal Institute for Forest, Snow and Landscape Researches WSL, Switzerland) – classic of lichen conservation biology and Dr. V. Shapoval, May 2010.

Studying and assessment

Based on data, obtained from literature records or public Herbaria (KW, KHER, MSUD, CWU)¹, we design and construct DataBase for terricolous arid lichens (c. 1000 specimens). So, we mapped old localities of those lichens and planned our fields according to this localities. We carried out 6 expeditions to saved steppe localities during 2009-2011 years (Fig.), namely in Odessa, Kherson, Mykolaiv, Zaporizhzhya, Donetsk, Luhansk Regions and Autonomic Republic Crimea. During our fields we checked if there are still terricolous arid lichens (including Red-data-booked lichens) occur, and also describe terricolous lichen associations according to Braun-Blanquet protocol. Areas without protection status as well as protected areas were investigated: Biosphere Reserves "Askania-Nova", "Chornomorsky" & "Dunajskyi"; National Nature Parks "Aleshkivsky Pisky", "Azovo-Syvashskyi", "Kalararsky Step", "Byloberezhzha Sviatoslava", "Nyzhniodnystrovskyi", "Tuzla's Lymans"; Regional Landscape Parks "Chudova Gavan", "Kinburnska Kosa", "Tarutynsky Step"; and "Karantype" Nature Reserve, branch of the Ukrainian Steppe Nature Reserve "Kamjani Mohyly", branches of Luhansk Nature Steppe Reserve "Provalsky Step", "Trehizbenka Steppe" and "Stanychno-Luhanske". We completed lists of lichen species for "Annals of Nature" of mentioned protected areas.



Localities, checked during project time

¹ KW – Herbaria of M.H. Kholodny Institute of Botany; KHER – Kherson State University; MSUD – I.I. Mechnikov National University of Odessa; CWU – V.N. Karazin National University of Kharkiv.



Searching and recognizing of terricolous lichens, fixing coordinates and describing of association on the model steppe plot. Vicinities of Sary-Bash village, steppe Crimea, April 2010: O. Khodosovtsev, L. Dymytra, O. Nadyeina, P. Boyko.



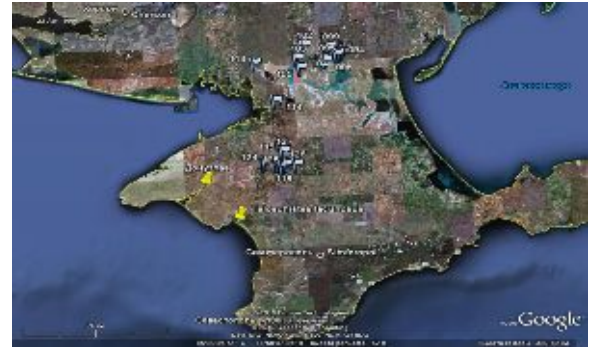
The only in flat part of Ukraine locality of vagrant steppe lichen *Aspicilia fruticulosa*: still exist after 1927 year, when was registered firstly. Donetsk Region, May 2011: A. Gromakova.



Model steppe plot for terricolous lichen association description. "Provalsky Step" Reserve, Luhansk Region, May 2011: Syrenko I., Khodosovtsev O., Rusina N., Gromakova A., Dymytra L.



Rare Red-Data-Booked terricolous vagrant lichens: *Aspicilia fruticulosa*, *Agrestia hispida*, *Xanthoparmelia ryssolea*, *X. camtschadalis*, *Cetraria steppae*.



Other Red-Data-Booked vagrant lichen *Seiophora lacunosa* – occurs scarcely in coastal zone. A population of this species is not stable and each year “migrates” from site to site by wind. But in spite of this and also recreation area near Eupathoria city, there are still exist population of the species (last record was in 1867).

:

Our team also had prepared scientific justification for the new protected areas creation: National National Park "Naddniprianski Areni" (Kyiv Region), Botanical Reserves "Bely Gory", "Zhemchuzhyna Perevalshyny", "Mykhailivskiy Kanion" (Luhansk Region) and Landscape Reserves "Nagolnianski Visoty" (Luhansk Region), "Ushkalski Visoty" (Kherson Region), "Kualnytsky" and "Tiligul Balki" (Odessa Region). Those objections now send to Ministry of Ecology and Nature Protection of Ukraine (to the Protection Area Business Department).

The scientific papers also were prepared:

Надеїна О.В., Дмитрова Л.В., Ходосовцев О.Є., Бойко Т.О., Ходосовцева Ю.А. Перші кроки до застосування категорій Червоного списку Міжнародного союзу охорони природи (IUNC): досвід з епігейними лишайниками України // Матеріали міжнародної конференції «Рослинний світ у Червоній книзі України: впровадження Глобальної стратегії збереження рослин» (11-15 жовтня 2010 р., м. Київ). – Київ: Альтерпрес, 2010. – С. 32-37. Published.

Ходосовцев О.Є., Бойко М.Ф., Надеїна О.В., Ходосовцева Ю.А., 2011: Лишайникові та мохові угруповання нижньодніпровських арен: синтаксономія та індикація дефляційних процесів. *Чорноморськ. ботан. ж.*, в.7:00-00. Edited.

Надеїна О.В., Луцак Т.В., Блюм О.Б. 2011: Види групи *Cetraria aculeata* (Parmeliaceae) в Україні: проблеми та перспективи ідентифікації і охорони // *Чорноморськ. ботан. ж.*, в.7:00-00. Edited.

Nadyeina O.V., Khodosovtsev O.Ye., Nazarchuk Yu. S., Dymytriva L.V. Arid lichens from Red Data Book of Ukraine – Assessment, Conservation and Perspectives // Abstract for International Association of Lichenology Symposium "Lichens: from genome to ecosystem in changing world". Bangkok, Thailand, Jan 2012. Accepted.

Those papers deal with clarifying of taxonomy of terricolous arid lichens with problematic delimitation: *Cetraria steppae*, *Xanthoparmelia rysssolea* and *X. camtschadalis*, and also firstly in Ukraine we prepare papers about terricolous lichen associations selected according to Braun-Blanquet protocol. Also we took part in the Conference "Plant Kingdom in the Red Data book of Ukraine: implication of global strategy of plant conservation" (Kyiv, 2010). Result of the current project will be reported at International lichenological Symposium "Lichens: from genome to ecosystem in changing world" in Jan 2012. Also, some publications are in progress, including those clarifying taxonomic boundaries and diagnosis of several phenotypically plastic species: *Cetraria steppae/aculeata*, *Xanthoparmelia ryssonea/pokorny*, *Xanthoparmelia camtschadalis/deserthorum/subdiffuens*, *Cladonia furcata ssp.furcata / ssp. subrangiformis /Cladonia rangiformis*, *Cladonia foliaceae/convoluta* and some else.

Cladonia furcata (incl. ssp. subrangiformis) vs Cladonia rangiformis

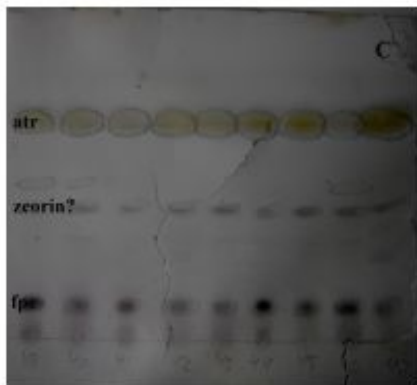


Трищинуватість корового шару *Cl. furcata*

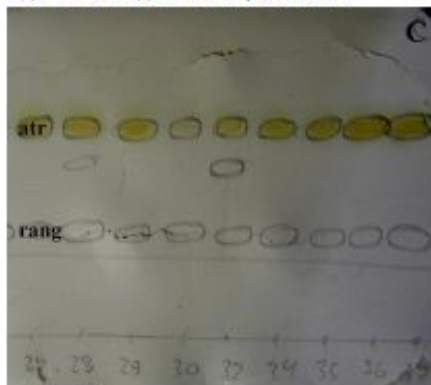


Рельєфні водоростеві ареоли *Cl. rangiformis*

У нашому матеріалі обидва підвиди *Cladonia furcata* мали фумарпроцетрарову кислоту і атранорин, а також слідові кількості зворину (ТШХ).
Крпельні реакції чіткі: К+жовтіє, Р+оранжевіє до іржаво-червоного



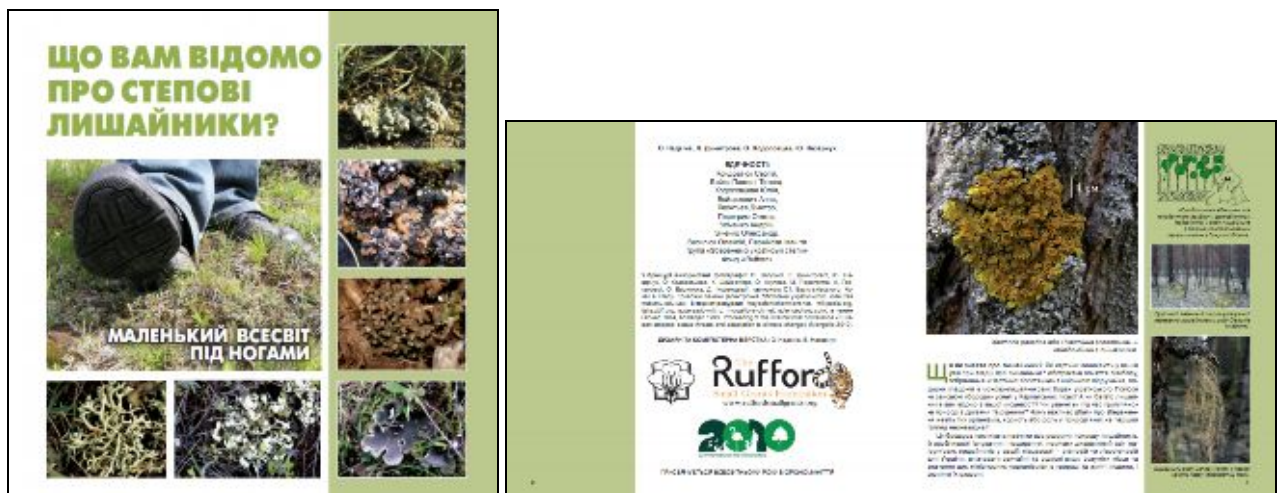
У нашому матеріалі атранорин та рангіформова кислота (ТШХ).
Крпельні реакції нечіткі: реакція з Р повільна і місцями (локально) проявляється (стає червоною серцевина), місцями її немає; реакція з К від дуже слабо помітної і неясної до ясно жовтого кольору, що у деяких випадках стає оранжевим.



Fragment from Monograph in progress "Terricolous lichens in the Ukrainian Steppes: assessment, conservation, perspectives". Illustration for the close species delimitation.

Conservation

Nature conservation is impossible without changing mind of main citizens who have no special eco-, geo- or biological education. However not so much is known about lichens and especially their role in nature, history of humanity, general aesthetic and pharmacologic qualities. The value of lichens is more clear in tundra landscapes where, e.g. "Deer's Moss" (lichens from genus *Cladonia*, normally *Cladonia rangiferina*, *Cl. alpestris*, *Cl. mitis*) or are main food for deer. Also locals in boreal or alpine areas know "Iceland Moss" (*Cetraria islandica*) because of its classical pharmacological value or "British soldier lichen" (*Cladonia cristatella*) because of its aesthetic beauty. On the contrary, locals know nothing about steppe lichens and understand steppes like place with *Stipa*, *Artemisia*, *Thymus*, in a best case – habitat for bird birds or marmots. Nevertheless many fungi, alga and lichens inhabit steppes and play significant role in the functionality of steppe like ecosystem. To enrich local's stereotype about steppe we published and distributed between locals Brochure "What do you know about steppe lichens? Minute world under your feet". Brochure total of 20 pages with colored pictures, photographs and clarifying text, with circulation 700 issues (Fig.) was sent to more then 150 organizations in the Ukrainian Steppes districts (protected areas, school specialized on ecology and biology studying, universities, administrations and peoples with active life position, see list further).



Brochure "What do you know about steppe lichens? Minute world under your feet", its 2nd and 3rd pages. Circulation 700 issues, 20 pages. Available as pdf on <http://pryroda.in.ua/step/biblio/lichens/> or <http://www.lichens.od.ua/events.shtml>, or as hard copy on request.

Brochure introduce readers with lichens itself, their peculiarities of micro-habitats and distributional pattern, teach how to recognize them locally, remind some interesting facts from human's history, which are connected with lichens; teach to recognize common and are terricolous arid lichens, understand them as part of steppe ecotope, show role of different species in the stage of steppe succession and advise, what everyone can do for lichens and nature conservation. Particularly, emphasized such lichen specify comparing with other organisms (plants, animals

mainly) like impossibility of their introduction and protection in the Botanical Gardens. Lichens just can be saved into their native localities, or otherwise – in the Herbaria either on the pages of scientific papers. Also, from practical point of view significance of lichens and their relation with other soil inhabitants for soil stability, decreasing of weathering intensity, oxygen and water circulation in soil are shown.

To make conversation with publicity more easy, we created open group “Lichens all around us” in “the-former-soviet” social network Vkontakte (<http://vkontakte.ru/club29217268>, Fig.): everybody can share pictures, ask questions, and found collaboration between each others.

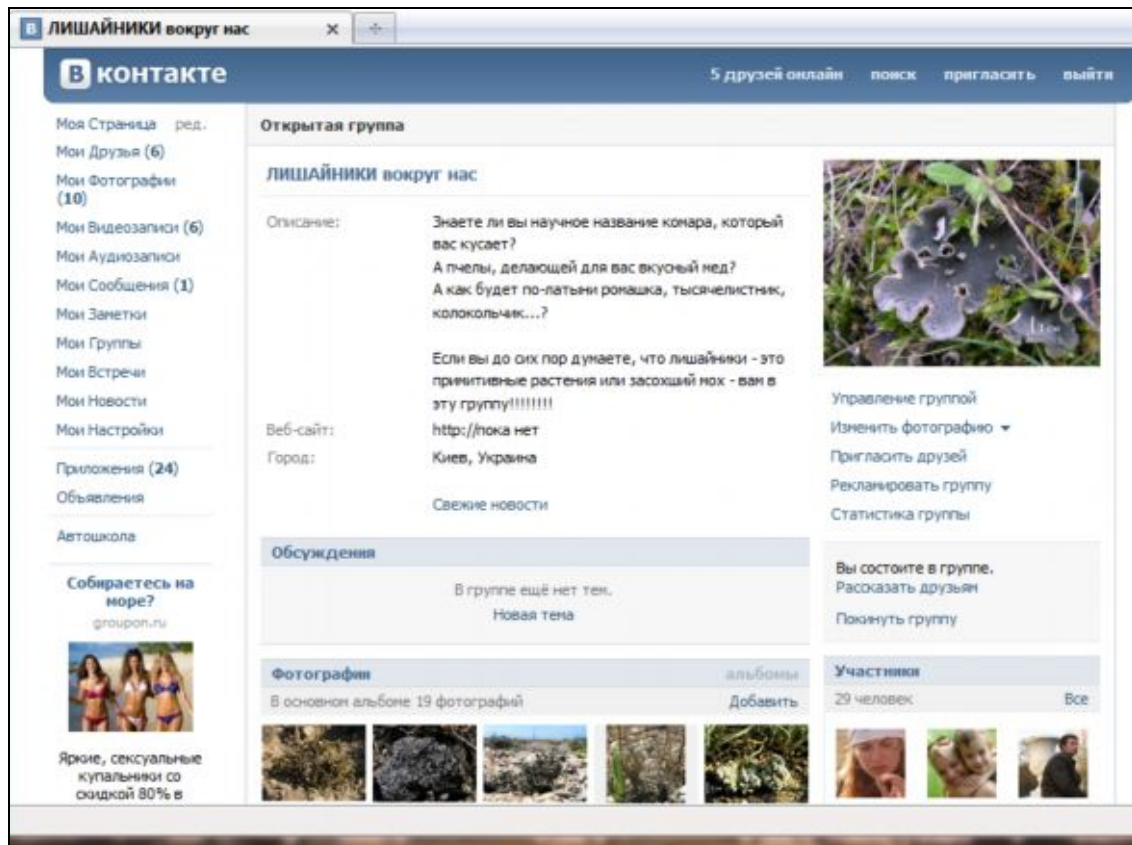


Fig. Main page of our group “Lichens all around us” social network Vkontakte.

We believe ecological education and mind can be realized effectively if deal with different levels of society: from school- or student-citizens to stuff from protection areas and Ministry of Ecology and Nature protection of Ukraine or similar governmental organizations. Therefore, we distribute our informative Brochure to

1) School organizations with bio-, eco- or nature conservation profile (total – 101):

Alchevsk City Ecological-Naturalistic Center (Luhansk Reg.)

Ananjiv House of Naturalists (Odessa Reg.)

Anthatsit City Ecological-Naturalistic Center (Luhansk Reg.)

Artsiz District Station of Young Naturalists (Odessa Reg.)

Bakhchisarai Town Station of Young Naturalists (AR Crimea)

Balaklia District Station of Young Naturalists (Kharkiv Reg.)

Balta District Station of Young Naturalists (Odessa Reg.)

Berdiansk City Station of Young Naturalists (Zaporizhzhia Reg.)

Bilozerka District Station of Young Naturalists (Kherson Reg.)

Brianka City Station of Young Naturalists (Luhansk Reg.)

Cherkasy Region Ecological-Naturalistic Center (Cherkasy Reg.)

Chornuhyno District Station of Young Naturalists (Poltava Reg.)

Chuguiv House of Youth's Arts (Kharkiv Reg.)

Crimean Republican Center for Ecological-naturalistic art for pupils (AR Crimea)

Dniprodzherzhynsk Children Ecological Center for Youth (Dnipropetrovsk Reg.)

Dnipropetrovsk District Center of Ecological-Naturalistic Art for pupils (Dnipropetrovsk Reg.)

Dnipropetrovsk Regional Ecological-Naturalistic Center for youth (Dnipropetrovsk Reg.)

Dobropillya District Ecological-Naturalistic Center for Youth (Donetsk Reg.)

Don Ecological-Naturalistic Center of Volnovakha District (Donetsk Reg.)

Donetsk Region Ecological-Naturalistic Center (Donetsk Reg.)

Dzhankoi Town Station of Young Naturalists (AR Crimea)

Dzhankoy District Center of Environmental and Naturalistic Art pupils (AR Crimea)

Enakievo City Ecological-Naturalistic Center (Donetsk Reg.)

Feodosia City Center for Environmental and Naturalistic Art for pupils "Intellect" (AR Crimea)

Gadiach District Station of Young Naturalists (Poltava Reg.)

Genichesk District Station of Young Naturalists (Kherson Reg.)

Globyno Ecological-Naturalistic Center of School Youth (Poltava Reg.)

Holoprystan District Station of Young Naturalists (Kherson Reg.)

Illichiv City Center of Ecologically-Naturalistic Arts of School Youth (Odessa Reg.)

Izmail City Station of Young Naturalists (Odessa Reg.)

Izum City Station of Young Naturalists (Kharkiv Reg.)

Kahovka City Station of Young Naturalists (Kherson Reg.)

Karlivka District Station of Young Naturalists (Poltava Reg.)

Kharkiv Region Palace of Youth's Arts, Applied Biology Department (Kharkiv Reg.)

Khartsyzk City Station of Young Naturalists (Donetsk Reg.)

Kherson Region Ecological-Naturalistic Center of School Youth (Kherson Reg.)

Khorol District Ecological-Naturalistic Center of School Youth (Poltava Reg.)
Kotelva District Station of Young Naturalists (Poltava Reg.)
Kotovsk City Station of Young Naturalists (Odessa Reg.)
Krasnoarmeisk District Station of Young Naturalists (Donetsk Reg.)
Krasnogvardyisk Station for Young Naturalists of Dnipropetrovsk City (Dnipropetrovsk Reg)
Krasnoperekopsk Town Station of Young Naturalists (AR Crimea)
Kremenchug Ecological-Naturalistic Center of School Youth (Poltava Reg.)
Kupjansk City Station of Young Naturalists (Kharkiv Reg.)
Lenin Distric Station for Young Naturalists of Dnipropetrovsk City (Dnipropetrovsk Reg)
Leskiv District Station of Young Naturalists (Cherkasy Reg.)
Lokhvytsia City Ecological-Naturalistic Center (Poltava Reg.)
Lozova City Station of Young Naturalists (Kharkiv Reg.)
Lubny City Station of Young Naturalists (Poltava Reg.)
Luhansk Region Ecological-Naturalistic Center (Luhansk Reg.)
Magdaliv District Station of pupils (Dnipropetrovsk Reg)
Makiivka City Station of Young Naturalists (Donetsk Reg.)
Marganets City Ecological-Naturalistic Center (Dnipropetrovsk Reg)
Marinsk District Station of Young Naturalists (Donetsk Reg.)
Melitopol Ecological-Naturalistic Center for Youth (Zaporizhzhya Reg.)
Mykolaiv City Station of Young Naturalists (Mykolaiv Reg.)
Mykolaiv Region Ecological-Naturalistic Center of School Youth (Mykolaiv Reg.)
Myrgorod City Center of Ecological-Naturalistic Arts for School Youth (Poltava Reg.)
Myrgorod District Station of Young Naturalists (Poltava Reg.)
Myrhorod District Station of Young Naturalists (Poltava Reg.)
National Ecological-Naturalistic Center of School Youth, main office, Kyiv
Noovoarkhangel'sk District Station of Young Naturalists (Kyrovograd Reg.)
Novoazovsk District Touristic-Ecological Center "Edelweiss" (Donetsk Reg.)
Novokahovka City Station of Young Naturalists (Kherson Reg.)
Novoodessa District Station of Young Naturalists (Mykolaiv Reg.)
Novosanzhary District Station of Young Naturalists (Poltava Reg.)
Novotroitsk District Station of Young Naturalists (Kherson Reg.)
Nykopol City Ecological-Naturalistic Center (Dnipropetrovsk Reg)

Nyzhniosiroyozy District Station of Young Naturalists (Kherson Reg.)

Odessa Ecological-Naturalistic Center "Afalina" (Ecological-Naturalistic Center of Suvorov District from Odessa City)

Odessa Ecological-Naturalistic Complexes "Yunnatsky" (Odessa Reg.)

Oleksandria City Station of Young Naturalists (Kyrovograd Reg.)

Pavlograd City Station for Young Naturalists (Dnipropetrovsk Reg)

Pavlograd District Ecological-Naturalistic Center (Dnipropetrovsk Reg)

Pervomaisk City Station of Young Naturalists (Mykolaiv Reg.)

Podolski Society of Naturalists (Khmelnysky Reg.)

Poltava Region Ecological-Naturalistic Center of School Youth (Poltava Reg.)

Pyriatyn District Station of Young Naturalists (Poltava Reg.)

Reni District Station of Young Naturalists (Odessa Reg.)

Rovenki City Ecological-Naturalistic Center (Luhansk Reg.)

Rubizhne City Station of Young Naturalists (Luhansk Reg.)

Sakhnovshyna District Station of Young Naturalists (Kharkiv Reg.)

Severodonetsk City Station of Young Naturalists (Luhansk Reg.)

Shakhtarsk District Station of Young Naturalists (Donetsk Reg.)

Shyshary branch of Poltava Region Ecological-Naturalistic Center of School Youth (Poltava Reg.)

Smila Ecological-Naturalistic Center (Ecology and Nature Conservation Department) (Cherkasy Reg.)

Spolian District Station of Young Naturalists (Cherkasy Reg.)

Starobesheve District Station of Young Naturalists (Donetsk Reg.)

Sverdlovsk City Station of Young Naturalists (Luhansk Reg.)

Svitlovodsk City Station of Young Naturalists (Kyrovograd Reg.)

Tern District Station of Young Naturalists of Kryvyi Rig City (Dnipropetrovsk Reg)

Tsarychanka District Station of Young Naturalists (Kyrovograd Reg.)

Uman Ecological-Naturalistic Center (Cherkasy Reg.)

Velykonovoselky District Station for Young Naturalists (Donetsk Reg.)

Verkhniodniprovsky District Ecological-Naturalistic Center (Dnipropetrovsk Reg)

Yevpatoria Town Station of Young Naturalists (AR Crimea)

Zaporizhzhya City Children's Botanical Garden (Zaporizhzhya Reg.)

Zaporizhzhya Region Station of Young Naturalists (Zaporizhzhya Reg.)

Zhoven District Station of Young Naturalists of Kryvyi Rig City (Dnipropetrovsk Reg)

Zovty Vody Ecological-Naturalistic Center (Kyrovograd Reg.)

2) Protected areas administration (total – 16)

Dnypro-Oril Nature Reserve (Dnipropetrovsk reg.)

Elanetsky Step Nature Reserve (Mykolaiv reg.)

Karantyp Nature Reserve (AR Crimea)

Luhansk Nature Reserve National Academy of Sciences of Ukraine (Luhansk reg.): "Provalsky step", "Trehizbensky Step", "Stanychno-Luhanske" branches

National Nature Park "Gomolshansky Lisy" (Kharkiv reg.)

National Nature Park "Sviaty Gory"

Opuk Nature Reserve (AR Crimea)

Regional Landscape Park "Donetsk Kriazh"

Regional Landscape Park "Kalararskyi" (AR Krimea)

Regional Landscape Park "Priingulsky"

Ukrainian Steppe Nature Reserve: "Komytivsky Step", "Kamjani Mohyly", "Kreidova Flora" (Donetsk reg.), "Mikhailivska Tsilina" (Sumy reg.) branches

3) Peoples with active position, colleagues (including abroad, total - 62):

Akulov O.Yu. – mycologist (Kharkiv)

Akutina O.V. – economist (Kyiv)

Bezrodnova O.V. – botanist (Kharkiv)

Blum O.B. – lichenologist (Kyiv)

Bondar I.F. – ecologist (Dnipropetrovsk)

Burkovsky O. – journalist, biologist (Dnipropetrovsk)

Chegoroka P.T. – ornithologist, Senior Lecture (Dnipropetrovsk)

Darienko T.M. – algologist (Kyiv)

Didukh Ya.P. – geobotanist (Kyiv)

Fadorenko N.M. – lichenologist (Kyiv)

Fedorenko V.P. – engineer (Kharkiv)

Fedorenko Yu.P. – Senior Lecture (Kharkiv)

Galkina A. – teacher of biology (Mykolaiv)

Gromakova A.B. – lichenologist (Kharkiv)

Halici G.M. – lichenologist (Ersies University, Kayserly, Turkey)

Heluta V.P. – mycologist (Kyiv)

Ivko S.O. – ornithologist

Kashevarov G.P. – lichenologist (Kyiv)

Kolomyichuk V.P. – botanist (Melitopol)

Kondratuyk S.Ya. – lichenologist (Kyiv)

Konoreva L. – lichenologist (Popar-alpine Botanical Garden, Apaty, Russia)

Kostyshin V. – forester (Lviv)

Kryvomaz T. – mycologist (Kyiv)

Leontjev D.V. – mycologist (Kharkiv)

Leshenko L.M. – school teacher (Kharkiv)

Lutsak T.V. – lichenologist (Kyiv)

Makryi T.V. – lichenologist (Central Siberian Botanical Garden, Novosibirsk, Russia)

Manik D. – zoologist, Seniour Lecture (Dnipropetrovsk)	Ryzhenko O.K. – teacher of biology (Feodosia)
Merkulova O.S. – lichenologist (Institute of Steppes, Orenburg, Russia)	Saidahmedova N.B. – botanist (Zmiev)
Mikhailuk T.I. – algologist (Kyiv)	Scheidegger C. – lichenologist (Federal Institute for Forest, Snow and Landscape Researches, Birminsdorf, Switzerland)
Mosiakin S.L. – botanist (Kyiv)	Smylianskyi I. – biologist (Siberian Ecological Center, Novosibirsk)
Mutchnik E.E. – lichenologist (Institute of forest research RAS, Moskow, Russia)	Trotsuk V. – forester (Lviv)
Nyporko S.O. – bryologist (Kyiv)	Urbanavichus G.P. – lichenologist (Popar-alpine Botanical Garden, Apatyty, Russia)
Ordynets O. – mycologist (Kharkiv)	Vasylyuk O.V. – entomologist (Kyiv)
Peregrym I.L. & M.I. – school teachers (Luhansk)	Vojtsekhovich A.O. – algologist (Kyiv)
Peregrym M.M. – botanist (Kyiv)	Vojtsekhovich A.O. – lichenologist (Kyiv)
Peregrym O.M. – botanist (Kyiv)	Zadorozhnyi K.N. – editor-biologist (Kharkiv)
Popova L.P. – lichenologist (Kyiv)	Zavorotna G. – archeologist (Donetsk)
Prylutskyi O. – mycologist (Kharkiv)	Zhezhera M. – algologist (Kharkiv)
Reush N.V. – forester (Rakhiv)	Zinenko O. – gerpetologist (Kharkiv)
Roms O.G. – lichenologist (Kyiv)	
Rusina N. – lichenologist (Luhansk Nature Reserve NANU)	

4) Administrative governmental resources (total – 16):

Ministry of Ecology and Nature Resources of Ukraine, Governmental Service of Nature Protection

Lugansk Regional Council (Nature Resources Department)

Donetsk Regional Council (Ecology and Nature Resources Department)

Zaporizhzhya Regional Council (Department of Land, Environment and Natural Resources)

Odessa Regional Council (Use of Natural Resources Department)

Kirovograd City Council (Department of Land Relations and Environmental Protection)

State Department of Environmental Protection in Mykolaiv region

State Department of Environmental Protection in the Luhansk region

State Department of Environmental Protection in the Donetsk region

State Department of Environmental Protection in the Kharkiv region

State Department of Environmental Protection in the Dnipropetrovsk region

State Department of Environmental Protection in the Zaporizhzhya region

State Department of Environmental Protection in the Kirovograd region

State Department of Environmental Protection in the Odessa region

State Department of Environmental Protection in the Poltava region

State Department of Environmental Protection in the Kherson region

National Committee for Crimea Environment

A bit more than 8 months after distribution of the Brochure, we received already comments, additional questions to be clarified, additional requests for Brochure issues, photos and specimens to complete our current project and even small scientific reports about lichens around. Also local kids and historic-cultural journals ("Parostok", "Biology for inquisitives", "Saint business") express their interest to enlighten in their journals some issues about lichens and steppe conservation. Our Brochure was useful during University and School courses of biology teaching, because of very illustrative and provides available information about conservational problems and lichens itself. Presentation of Brochure was carried out in the Kherson and Odessa branches of Small Academy of Sciences of Ukraine, in the National Ecological-Naturalistic Center (Kyiv), Odessa Region Center of out-of-school Education "Yunnatsky", Crimean Republican out-of-school Educational Organization "Center for Ecological-Naturalistic Arts of School Youth" (Sympheropol).

We received feedbacks from following organizations:

Severodonetsk City Station of Young Naturalists (Luhansk Reg.)

Svitlovodsk City Station of Young Naturalists (Kyrovograd Reg.)

Mykolaiv Region Ecological-Naturalistic Center of School Youth (Mykolaiv Reg.)

Crimean Republican Center for Ecological-naturalistic art for pupils (AR Crimea)

Kherson Region Ecological-Naturalistic Center of School Youth (Kherson Reg.)

Dnypro-Oril Nature Reserve (Dnipropetrovsk reg.)

Dnipropetrovsk National University

It should be mentioned that for the moment people still do not distinguish with 100% sure lichens from other groups of organisms. In the sending from school organizations, there are still some specimens of aphylophoroid fungi and mosses between lichens. Also, people sent everything they were interested and could collect – including mosses, fungi and epiphytic lichens. Just sending from Mykolaiv contain real terricolous lichens among epiphytic and epilythic ones. Nevertheless we consider this as positive and suppose, that necessary some time to accept lichens in minds at all, accumulate ideas of conservation, and after a time people will know better those objects.

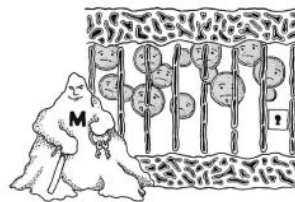


ЛИШАЙНИКИ НАЙХИТРИШІ ТА НАЙМУДРІШІ

Лишайники не є організмами, вони є асоціацією гриба з водорістю, що існують разом у так званих симбіотичних відносинах. Тіло лишайника (або талом, слань) сформоване грибом, а водорість знаходиться всередині. Лишайниковий гриб живиться за рахунок цукрових сіклик, що виробляє водорість, а водорість, окутана гіфами гриба, отримує надійний захист від несприятливих умов середовища. Тобто, лишайники є автономними та самодостатніми і не залежать від наявності органічних речовин зовні. Такі відносини між двома різними організмами є унікальними у природі, тому деякі вчені метафорично називають лишайники «грибами, що винайшли сільське господарство». Дійсно, взаємодія між компонентами лишайника нагадує сільськогосподарську діяльність людини, наприклад, вирощування картоплі або розведення овець. Культури картоплі загинуть без догляду господаря (засохнуть, будуть поїдені колорадським жуком чи іншими шкідниками, занедбаються у бур'янах), але і людина без картоплі свого життя не уявляє. Так і лишайникові гриби «одомашнили»

водорості для свого харчування і навіть включили їх у своє тіло — щоб поживне джерело завжди було поруч. Тож лишайникові гриби є «найхитрішими» або «найхитрішими» серед інших грибів, що залежать у своєму існуванні від живлячого субстрату рослини чи тваринного походження. Пасаж, що лишайники винайшли сільське господарство набагато раніше, ніж почався розвиток людської цивілізації. Однак, як плата лишайників за таку незалежність, їхня слабкість у конкурентній боротьбі за місце існування з іншими організмами: вони розвиваються повільніше ніж, скажімо, трав'янисті рослини або мохи, які ділять з ними одну й ту саму екологічну нішу. Обмін речовин і зріст у лишайників відбувається дуже повільно: у найбільш «швидких» з них слань збільшується лише на кілька міліметрів за рік.

Оже, лишайники — це гриби, що пристосувалися до існування в асоціації з водоростями. У світі нараховується близько 15 000 таких грибів, з них понад 1 500 (або 10%) зростають в Україні. Переважна більшість лишайників утворена грибами від-



длі *Ascomycota*, що співіснують з водоростями роду *Trebouxia* (требухсія). У степовій зоні України за попередніми розрахунками зростає близько 400 видів лишайників, що трапляються на корі дерев, на мохах, кам'янистих відслоненнях або на ґрунті. Напругтові лишайники, що зростають у степу, є найбільш вразливими у сучасному світі, коли саме існування степових екоотопів знаходиться під загрозою повного знищення. Крім того, зазвичай ця група лишайників лишається маловідомою широкому колу і є малодослідженою фахівцями. Тому у нашому проєкті ми зосередили увагу на дослідженні саме цієї групи степових лишайників.

Як можна допомогти у реалізації проєкту?

Інформація — найцінніша складова будь-якого дослідження, роботи і спілкування. Тому для нас дуже важливими є ваші спостереження та відомості про лишайники, що зростають у вашому регіоні. Як саме ви можете повідомити про це, залежить від вашого бажання і можливостей: можна надіслати фотографії степових ландшафтів вашої місцевості і фотографії лишайників або зразки лишайників. При цьому

ДУЖЕ ВАЖЛИВО не забирати з природи цілу слань лишайника! Часто у природі не можна з достовірністю сказати, до якого виду належать певний зразок лишайника. Для точного визначення у лабораторії достатньо частинки лишайника (наприклад, збирається кілька лопатей або гілочок слані лишайника, 2–3 см у діаметрі), тоді як для збереження біорізноманіття необхідно, щоб у природному місцезростанні зберігалась більша частина лишайника, що може розмножуватись і поширюватись на даній території. Всі лишайники здатні розмножуватись вегетативно частинками слані, навіть ті, що разом з вегетативним мають статеве розмноження спорами. Таким чином, після того, як ви відбрали маленькій шматочок слані, лишайникова особина продовжує існувати у природі без загрози знищення, а ми маємо її частину у гербарії — для достовірної документування зростання у певний проміжок часу.

Зразки збирають у пасервові конверти. На конверті має бути зафіксована інформація про те, де зібрано зразок: область, район, населений пункт чи околиця, заповідна чи не заповідна територія, як використовується територія (пасовище, занедбане поле, балкова сільгоспнеуздія), ПІВ колектора, дата збору і ваші контактні дані.

Усі питання, побажання і відгуки щодо проєкту, а також зразки і фотографії лишайників люблямо просимо надіслати на адресу:

04074 м. Київ-074, вул. Вишгородська, 19
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Fig. Publication with illustrations in kid's journal "Parostok": "Lichens are more wise and tricky".

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