

Svetlana Markovskaja

CONTACT INFORMATION

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EDUCATION AND ACADEMIC DEGREE

1993 – Ph. D., Biomedicine Sciences, Biology. (diploma DA 002309), Institute of Botany, Lithuania. Ph.D. thesis "Aquatic mycobiota from the eastern part of Lithuania"
1989 - 1992 Ph.D. student, Institute of Botany, Lithuania
1987 M.Sc. Biologist, biology and chemistry teacher, Natural Sciences, Vilnius University, Lithuania.
1981–1987 student, Faculty of Natural Sciences of Vilnius University

PROFESSIONAL EXPERIENCE

2001 – until now Senior Researcher, Laboratory of Mycology, Institute of Botany (since 2010 Nature Research Centre)
1994 – 2001 Researcher, Laboratory of Mycology, Institute of Botany
1992-1994 Assistant, Laboratory of Mycology, Institute of Botany

RESEARCH INTERESTS

Terrestrial and aquatic anamorphic fungi, *Ascomycetes* and *Oomycetes* (biodiversity, distribution, ecology, biology, taxonomy and phylogeny), invasive mycology, quarantine fungi, medical mycology, human mycoses, forest pathology. Bioelectromagnetics, electroporation and the effects of pulsed electromagnetic fields on fungi and bacteria. Traditional and molecular methods in fungal identification, population genetics and phylogenetics, DNA barcoding.

More than 100 scientific publications (scientific papers - 74, reports at the conferences – 44) on the topic of mycology and microbiology, plant pathology, bioelectronics in peer reviewed scientific journals and about a half of them with impact factor (CA WoS). Majority of the publications focus the topic of fungal diversity, genetics, phylogeny, taxonomy and ecology, electroporation and the effects of pulsed electromagnetic fields on biological objects.

Language skills (CEFR): English C1- B2; Polish C1- B2 ; Russian C2; Lithuanian C2

PUBLICATIONS

Scientific articles published in journals (books), indexed in „Clarivate Analytics Web of Science“ database (with citation index)2018-2022:

1. Laas M., Adamson K., Barnes I., Janoušek J., Mullett M.S., Adamčíková K., Akiba M., Beenken L., Braganca H., Bulgakov T.S., Capretti P., Cech T., Cleary M., Enderle R., Ghelardini L., Jankovský L., **Markovskaja S.**, Matsiakh I., Meyer J.B., Oskay F., Piškur B., Raitelaitytė K., Sadiković D., and Drenkhan R., 2022. Diversity, migration routes, and worldwide population genetic structure of *Lecanosticta acicola*, the causal agent of brown spot needle blight. – *Molecular Plant Pathology*. First published: 11 August 2022; <https://doi.org/10.1111/mppp.132572022>
2. Raitelaitytė K., Adamson K., **Markovskaja S.**, Paulauskas A., Mullett M., Drenkhan R., 2022. Genetic structure of the pine needle pathogen *Lecanosticta acicola* in Lithuania and northern Poland. – *Plant Pathology*. First published: 06 October 2022; <https://doi.org/10.1111/ppa.13655>
3. Ilyukhin, E., **Markovskaja, S.**, Elgorban, A.M., Al-Rejaie, S.S., Maharachchikumbura, S.S.N., 2022. Genomic Characteristics and Comparative Genomics Analysis of *Parafenestella ontariensis* sp. nov. – *Journal of Fungi*, 8, 732. <https://doi.org/10.3390/jof8070732>
4. Stankevičiūtė M., Sauliūtė G., Makaras T., Čapukoitienė B., Vansevičiūtė G., **Markovskaja S.**, 2022. Biomarker responses in perch (*Perca fluviatilis*) under multiple stress: Parasite co-infection and multicomponent metal mixture. – *Environmental Research*, 207, 1 May 2022, 112170. <https://doi.org/10.1016/j.envres.2021.112170>
5. Mullett M. S., Drenkhan R., Adamson K., Boron P., Lenart-Boron A., Barnes I., Tomšovský M., Jánošíková Z., Adamčíková K., Ondrušková E., Queloz V., Piškur B., Musolin D. L., Davydenko K., Georgieva M., Schmitz S., Kačergius A., Ghelardini L., Kranjec Orlovič J., Müller M., Oskay F., Hauptman T., Halász Á., **Markovskaja S.**, Solheim H., Vuorinen M., Heinzemann R., Hamelin R.C. and Konečný A., 2021. Worldwide Genetic Structure Elucidates the Eurasian Origin and Invasion Pathways of *Dothistroma septosporum*, Causal Agent of Dothistroma Needle Blight. – *Journal of Fungi*, 7, 111. <https://doi.org/10.3390/jof7020111>
6. Švedienė, J., Novickij, V., Žalneravičius, R., Raudonienė, V., **Markovskaja, S.**, Novickij, J., Paškevičius, A. 2021. Antimicrobial Activity of L-Lysine and Poly-L-Lysine with Pulsed Electric Fields. – *Applied Sciences*, 11, 2708. <https://doi.org/10.3390/app11062708>
7. **Markovskaja S.**, Raitelaitytė K., Kačergius A., Kolmakov P., Vasilevich V., 2020. Occurrence of Dothistroma needle blight in Lithuania and Belarus: The risk posed to native Scots Pine forests. – *Forest Pathology*, e12626. <https://doi.org/10.1111/efp.12626>
8. Raitelaitytė K., **Markovskaja S.**, Paulauskas A., Hsiang T., Oszako T., 2020. First molecular detection of *Lecanosticta acicola* from Poland on *Pinus mugo*. – *Forest Pathology*, e12589. <https://doi.org/10.1111/efp.12589>
9. Drenkhan R., Ganley B., Martín-García J., Vahalík P., Adamson K., Adamčíková K., Ahumada R., Blank L., Bragança H., Capretti P., Cleary M., Cornejo C., Davydenko K., Diez J. J., Doğmuş Lehtijärvi H. T., Dvořák M., Enderle R., Fourie G., Georgieva M., Ghelardini L., Hantula J., Ioos R., Iturriza E., Kanetis L., Karpun N. N., Koltay A., Landeras E., **Markovskaja S.**, Mesanza N., Milenković I., Musolin D. L., Nikolaou K., Nowakowska J. A., Ogris N., Oskay F., Oszako T., Papazova-Anakieva., Paraschiv M., Pasquali M., Pecori F., Rafoss T., Raitelaitytė K., Raposo R., Robin C., Rodas C. A., Santini A., Sanz-Ros A. V., Selikhovkin A. V., Solla A., Soukainen M., Soulioti N., Steenkamp E. T., Tsopeles P., Vemić A., Vettraino A. M., Wingfield M.J., Woodward S., Zamora-Ballesteros C., Mullett M.S., 2020. Global Geographic Distribution and Host Range of *Fusarium circinatum*, the Causal Agent of Pine Pitch Canker. – *Forests*, 11, 724; <https://doi.org/10.3390/f11070724>

10. Elvira-Recuenco M., Cacciola S. O., Sanz-Ros A. V. , Garbelotto M., Aguayo J., Solla A., Mullett M., Drenkhan T., Oskay F., Aday Kaya A. G., Iturritxa E., Cleary M., Witzell J., Georgieva M., Papazova-Anakieva I., Chira D., Paraschiv Marius., Musolin D. L., Selikhovkin A. V., Varentsova E.Y., Adamčíková K., **Markovskaja S.**, Mesanza N., Davydenko K., Capretti P., Scanu B., Gonthier P., Tsopelas P., Martín-García J., Morales-Rodríguez C., Lehtijärvi A., Doğmuş Lehtijärvi H. T., Oszako T., Nowakowska J. A., Bragança H., Fernández-Fernández M., Hantula J., Díez J.J., 2020. Potential interactions between invasive *Fusarium circinatum* and other pine pathogens in Europe. – *Forests*, 11, 7; <https://doi.org/10.3390/f11010007>.
11. Zamora-Ballesteros C., Díez J. J., Martín-García J., Witzell J., Solla A., Ahumada R., Capretti P., Cleary M., Drenkhan R., Dvořák M., Elvira-Recuenco M., Fernández-Fernández M., Ghelardini L., Gonthier P., Hernández-Escribano L., Ioos R., **Markovskaja S.**, Martínez-Álvarez P., Muñoz-Adalia E. J., Nowakowska J.A., Oszako T., Raposo R., Santini A., Hantula J. 2019. Pine Pitch Canker (PPC): Pathways of Pathogen. Spread and Preventive Measures. – *Forests*, 10, 1158; <https://doi.org/10.3390/f10121158>.
12. Novickij V., Staigvila G., Gudiukaitė R., Zinkevičienė A., Girkontaitė I., Paškevičius A., Švedienė J., **Markovskaja S.**, Novickij J., Lastauskienė E., 2019. Nanosecond duration pulsed electric field together with formic acid triggers caspase-dependent apoptosis in pathogenic yeasts. – *Bioelectrochemistry*, 128: 148-154. (ISSN: 1567-5394), <https://doi.org/10.1016/j.bioelechem.2019.04.007>
13. Iršėnaitė R., Arslanova T., Kasparavičius J., Kutorga E., **Markovskaja S.**, Motiejūnaitė J., Taraškevičius R., Matulevičiūtė D., 2019. Effects of a great cormorant colony on wood-inhabiting fungal communities in a coastal Scots pine forest. – *Fungal Ecology*, 41: 82-91, <https://doi.org/10.1016/j.funeco.2019.03.010>
14. Novickij V., Lastauskienė E., Staigvila G., Girkontaitė I., Zinkevičienė A., Švedienė J.; Paškevičius A., **Markovskaja S.**, Novickij J., 2019. Low concentrations of acetic and formic acids enhance the inactivation of *Staphylococcus aureus* and *Pseudomonas aeruginosa* with pulsed electric fields. – *BMC Microbiology* 19(73):1-7 <https://doi.org/10.1186/s12866-019-1447-1>
15. Novickij V., Zinkevičienė A., Perminaitė E., Čėsna R., Lastauskienė E., Paškevičius A., Švedienė J., **Markovskaja S.**, Novickij J. and Girkontaitė I., 2018. Non-invasive nanosecond electroporation for biocontrol of surface infections: an in vivo study – *Scientific Reports*, 8(14516):1-9, ISSN: 2045-2322.
16. Lastauskienė E., Novickij V., Zinkevičienė A., Girkontaitė I., Paškevičius A., Švedienė J., **Markovskaja S.**, Novickij J., 2018. Application of pulsed electric fields for the elimination of highly drug-resistant *Candida* grown under modelled microgravity conditions. – *International Journal of Astrobiology*, <https://doi.org/10.1017/S1473550418000332> (Published online: 04 September 2018, pp. 1-7).
17. Novickij V., Švedienė J., Paškevičius A., **Markovskaja S.**, Eglė Lastauskienė E., Zinkevičienė A., Girkontaitė I., Novickij J., 2018. Induction of different sensitization patterns of MRSA to antibiotics using electroporation. – *Molecules*, 23(7), 1799 <https://doi.org/10.3390/molecules23071799>
18. Novickij V., Zinkevičienė A., Valiulis J., Švedienė J., Paškevičius A., Lastauskienė E., **Markovskaja S.**, Novickij J., Girkontaitė I., 2018. Different permeabilization patterns of splenocytes and thymocytes to combination of pulsed electric and magnetic field treatments. – *Bioelectrochemistry*, 122: 183-190. <https://doi.org/10.1016/j.bioelechem.2018.04.006>
19. Motiejūnaitė J., Buožytė R., Gražina Adamonytė G., Iršėnaitė R., Kasparavičius J., Kutorga E., **Markovskaja S.**, Stakėnas V., Klyukina E., 2018. Residual Effect of Induced Water Stress and Nitrogen Addition on the Mycobiota in Scots Pine Stands. – *Russian Journal of Ecology*, 49(3): 226–231. <https://doi.org/10.1134/S1067413618030050>
20. Adamson K., Mullett M. S., Solheim H., Barnes I. , Müller M. M., Hantula J., Vuorinen M., Kacergius A., **Markovskaja S.**, Musolin D. L., Davydenko K., Keča N. , Ligi K.

- Priedite, R. D., Millberg H., Drenkhan R., 2018. Looking for relationship between the populations of *Dothistroma septosporum* in northern Europe and Asia. – Fungal Genetics and Biology, 110:15-25. <https://doi.org/10.1016/j.fgb.2017.12.001>
21. Novickij V., Lastauskienė E., Švedienė J., Grainys A., Grainys A., Staigvila G., Paškevičius A., Girkontaitė I., Zinkevičienė A., **Markovskaja S.**, Novickij J., 2018: Membrane Permeabilization of Pathogenic Yeast in Alternating Sub-microsecond Electromagnetic Fields in Combination with Conventional Electroporation – Journal of Membrane Biology, 251(2) : 189-195; <https://doi.org/10.1007/s00232-017-9951-4>
22. Novickij V., Lastauskienė E., Švedienė J., Grainys A., Staigvila G., Paškevičius A., Girkontaitė I., Zinkevičienė A., **Markovskaja S.**, Novickij J., 2018: Pulsed electric field-assisted sensitization of multidrug-resistant *Candida albicans* to antifungal drugs.– Future Microbiology. 13(5): 535–546 , <https://doi.org/10.2217/fmb-2017-0245>

Other reviewed scientific publications (books, books' chapters, collections of articles, articles, textbooks and etc.):

1. Ilyukhin E., Bulgakov T., **Markovskaja S.**, 2021. First record of *Eutypella vitis* causing branch dieback on new host trees in Canada. – Studies in Fungi 6(1), 71–77, <https://doi.org/10.5943/sif/6/1/3> (ISSN 24654973)
 2. Novickij V., Gudiukaitė R., Zinkevičienė A., Girkontaitė I., Paškevičius A., Švedienė J., **Markovskaja S.**, Novickij J., Lastauskienė E. 2018. Discovery of the new super-resistant phenotype of *Candida* yeasts grown under the modeled microgravity conditions.- Acta biochemica Polonica. Warszawa: Polskie Towarzystwo Biochemiczne. ISSN 0001-527X. Vol. 65, suppl.1 (2018), p. 51.
 3. Stankevičiūtė M., Jurgelėnė Ž., Greiciūnaitė J., **Markovskaja S.**, Kazlauskienė N., Baršienė J., 2018. Geno-, cytotoxicity and toxicity induced by *Saprolegnia parasitica* and cadmium alone and in combination to *Oncorhynchus mykiss*. International Conference Protection and Restoration of the Environment XIV, (July 3-6, 2018, Thessaloniki, Greece): In book of proceedings 795-804 pp., (ISBN: 978-960-99922-4-4)
 4. Hantula J., Martinez-Alvarez P., Adamson K., Ahumada R., Braganca H., Capretti P., McCarthy N., Drenkhan R., Dvorak M.M., Martin-Garcia J., Gonthier P., **Markovskaja S.**, Raposo R., Ribeiro D., Botella L., Solla A., Vainio E., Diez J., 2018. Pine Pitch Canker Disease (PPC): Pathways of Disease Spread and Preventive Measures. Dimompal S.L. Palencia, Spain. 12 p.
 5. Selikhovkin A.V., **Markovskaja S.**, Vasaitis R., Martynov A.N., Musolin D.L., 2018. Phytopathogenic Fungus *Fusarium circinatum* and Potential for Its Transmission in Russia by Insects. Russian Journal of Biological Invasions, 2018, Vol. 9, No. 3, pp. 245–252. ISSN 2075-1117, Original Russian Text © published in Rossiiskii Zhurnal Biologicheskikh Invazii, 2018, No. 2, 53–63 [Фитопатогенный гриб *Fusarium circinatum* и возможности его распространения насекомыми в России - Российский Журнал Биологических Инвазий, 2: 53-63 (УДК 632.4:632.7)]
 6. Musolin D.L., **Markovskaya S.I.**, Selikhovkin A.V., 2018. New to Europe and potentially dangerous for Russia pathogen *Fusarium circinatum*, causing pitch canker of pine. Plant Protection and Quarantine (Moscow), 3: 28–30 (In Russian: Мусолин Д.Л., Марковская С.И., Селиховкин А.В., 2018. Новый для Европы и потенциально опасный для России патоген *Fusarium circinatum*, вызывающий язвенный рак сосны. Защита и карантин растений, (ISSN: 1026-8634) 3: 28-30.
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PARTICIPATION IN INTERNATIONAL AND NATIONAL SCIENTIFIC PROGRAMMES AND PROJECTS

- 2021 – 2024 “Multiple stressors on threshold levels: interactive effects of parasites infestation and pollution in aquatic organisms” Research Council of Lithuania (MULTIS), Role: Investigator
- 2017 – 2020 „Defining taxonomic identity, ecology and distribution of fungi in coniferous forests (FUNGID)”. Research Council of Lithuania. Role: Investigator
- 2015-2019 “COST ACTION FP1406 „PINE PITCH CANKER – STRATEGIES FOR MANAGEMENT OF GIBBERELLA CIRCINATA IN GREENHOUSES AND FORESTS” (PINESTRENGTH), European Commission, Cooperation in Science and Technology (COST) Brussel , Role: Member of the Management Committee
- 2016 – 2018 “Electro-magnetoporation mediated biocontrol of the microgravity affected and skin infections causative microorganisms”, Research Council of Lithuania, Towards future technologies program, Role: Investigator
- 2011 – 2015 “COST ACTION FP 1102, „Determining invasiveness and risk of Dothistroma (DIAROD), European Commission, Cooperation in Science and Technology (COST) Brussel Role: Member of the Management Committee.
- 2012 – 2014 Participant „Colony of Great Cormorants in forest ecosystem – hypertrophication effect and rates of dynamic (KOREKO)” Research Council of Lithuania, National research programme ‘Ecosystems in Lithuania: Climate Change and Human Impact’.
- 2010 – 2011 “Changes in biotic and abiotic ecosystem components induced by an invasive species: case study of the Great cormorant (KORMORANAI)” Research Council of Lithuania. Role: Investigator

INTERNSHIP AND TRAINING

- 2014 Internship, visiting Researcher, University of Brno, Czech Republic
- 2002 Internship, visiting Researcher, V. Komarov Botanical Institute in Sankt–Petersburg, Russia
- 1996 Internship, visiting Researcher, Agricultural University in Warsaw
- 1995 Internship, visiting Researcher, The Royal Veterinary and Agricultural University in Copenhagen, Denmark
- 1990-1993, 1998 Internship, visiting Researcher, Botanical institute in Kiev, Ukraine

PARTICIPATION IN SCIENTIFIC CONFERENCES

1. Ritelaitytė, **Markovskaja S.**, Oszako T., Paulauskas A., 2019. The current situation of *Fusarium circinatum* and other quarantine pine pathogenic fungi in Lithuania. COST Action FP1406 PINESTRENGTH (Pine pitch canker – strategies for management of *Gibberella*

- circinata* in greenhouses and forests) Final Conference, 26-28 March, 2019, Skopje, North Macedonia. Book of Abstracts, 20 p.
2. Davydenko K., Nowakowska J., Raitelaitytė K., **Markovskaja S.**, Burokienė D., Oszako T., 2019. Susceptibility of Lithuanian, Polish and Ukrainian provenances of *P. sylvestris* to *Fusarium circinatum* and possible strategies for biocontrol. COST Action FP1406 PINESTRENGTH (Pine pitch canker – strategies for management of *Gibberella circinata* in greenhouses and forests) Final Conference, 26-28 March, 2019, Skopje, North Macedonia. Book of Abstracts, 29 p.
 3. Drenkhan R., Adamson, K., Laas, M., Raitelaitytė K., **Markovskaja, S.** 2019. Invasive pine pathogens in northern Europe. XXV IUFRO World Congress, 29 sept - 5 October 2019, Curitiba, PR, Brazil,. Abstracts of the XXV IUFRO World Congress: Forest Research and Cooperation for Sustainable Development. Pesquisa florestal brasileira (Brazilian journal of forestry research). Special issue (2019), 39, 443 p., e 201902043,) - Colombo : Embrapa Florestas. Special issue: ISSN 1809-3647 (print), ISSN 1983-2605 (online), 768 p., 2019
 4. Novickij V., Zinkevičienė A., Lastauskienė E., Švedienė J., Paškevičius A., **Markovskaja S.**, Novickij J. & Girkontaitė I., 2018. Biocontrol of skin infections causative *Pseudomonas aeruginosa* using nanosecond pulsed electric fields: an in vivo study - BioEM2018 Conference. The Joint Annual Meeting of The Bioelectromagnetics Society and the European BioElectromagnetics Association. 2018 June 24-29, Piran, Portorož, Slovenia. Book of Abstracts, 64-65 pp. (http://www.bioem2018.org/wp-content/uploads/2018/06/BioEM2018_Final_Programme_2018-05-29.pdf).
 5. Stankevičiūtė M., Jurgelėnė Ž., Greiciūnaitė J., **Markovskaja S.**, Kazlauskienė N., Baršienė J., 2018. Geno-, cytotoxicity and toxicity induced by *Saprolegnia parasitica* and cadmium alone and in combination to *Oncorhynchus mykiss*. International Conference Protection and Restoration of the Environment XIV, (July 3-6, 2018, Thessaloniki, Greece): In book of proceedings 795-804 pp., (ISBN: 978-960-99922-4-4):
 6. Raitelaitytė K., **Markovskaja S.**, Leonovič E., Paulauskas A. 2018. Fungal diseases of urban pines in Lithuania. The Kataev Memorial Readings – X. Dendrobiotic Invertebrates and Fungi and their Role in Forest Ecosystems. Vol. 2. Phytopathogenic Fungi, Problems of Forest Pathology and Forest Protection / Proceedings of the International Conference. Saint Petersburg (Russia), October, 22–25, 2018. Book of abstracts. (D. L. Musolin and A. V. Selikhovkin (eds.). – Saint Petersburg (Russia); Saint Petersburg State Forest Technical University, 2018. – 26-27 p., ISBN 978-5-9239-1054-4; DOI: 10.21266/SPBFTU.2018.KATAEV.2

PARTICIPATION IN THE STUDY PROCESS

Member of the Scientific Doctoral Committee in the Field of Science – Mycology and Plant Pathology (Diana Marčiulytė, 2015)

Supervising of Vilnius University bachelor (Mažena Vasilevskaja, Vilnius University (VU), 2009; Ana Ragelskaja, VU, 2014) and master students (Edita Paknienė, VU, 2002; Justinas Baublys, VU, 2020) and PhD student (Kristina Raitelaitytė, Nature Research Centre and Vytautas Magnus university, 2016-2020) in the area of mycology and plant pathology.

Guest lecturer Vilnius University (Fungal community and ecology, 2019, 2022(MSc))

OTHERS

Member of the Lithuanian Mycological Society (LMD)