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References

- Abramova A. L. A., Savicz-Ljubitskaja L. I. & Z. N. Smirnova. 1961. *Opredelitel Listostebelnich Mchov Arktiki SSSR*. Moskva: Izdatelstvo Akademii Nauk SSSR.
- Afonina O. M. & I. V. Czernyadjeva. 1995. *Mosses of the Russian Arctic: check-list and bibliography*. *Arctoa* 5: 99–142.
- Ahti T. & P. Isoviita. 1962. *Dicranum leioneuron* Kindb. and the other *Dicranum* mosses inhabiting raised bogs in Finland. *Archivum Societatis Zoologicae Botanicae Fennicae "Vanamo"* 17: 68–79.
- Allen B. 1998. *The genus Orthodicranum (Musci: Dicranaceae) in Maine*. *Evansia* 15: 9–20.
- Alsos I. G., Elvebakk A & G. W. Gabrielsen. 1998. *Vegetation exploitation by barnacle geese Branta leucopsis during incubation on Svalbard*. *Polar Research* 17: 1–14.
- Altschul S. F., Gish W. , Miller W. , Myers E. W. & D. J. Lipman. 1990. *Basic Local Alignment Search Tool*. *Journal of Molecular Biology* 215: 403–410.
- Amann J. J., Meylan C., & P. Culmann. 1918. *Flore des mousses de la Suisse, Deuxième partie, Bryogéographie de la Suisse*. Lausanne: Imprimeries réunies Pp. 49-62.
- Bell D., Long D. G., Forrest A. D., Hollingsworth M. L., Blom H. H. & P. M. Hollingsworth. 2012. *DNA barcoding of European Herbertus (Marchantiopsida, Herbertaceae) and the discovery and description of a new species*. *Molecular Ecology Resources* 12: 36–47.
- Bellolio-Trucco, G. & R. R. Ireland. 1990. *A taxonomic study of the moss genus Dicranum (Dicranaceae) in Ontario and Quebec*. *Canadian Journal of Botany* 68: 867–909.
- Bergsten J., Bilton D. T., Fujisawa T., Elliott M., & M. T. Monaghan. 2012. *The Effect of Geographical Scale of Sampling on DNA Barcoding*. *Systematic Biology* 61: 851–869.
- Bickford, D., D. J. Lohman, N. S. Sodhi, P. K. L. Ng, R. Meier, K. Winker, K. K. Ingram & I. Das. 2007. *Cryptic species as a window on diversity and conservation*. *Trends in Ecology & Evolution* 22: 148–155.
- Biomatters. 2010. Geneious v5.3.6. Available at: <http://www.geneious.com>.
- Bisang I. & J. Ehrlén. 2002. *Reproductive Effort and Cost of Sexual Reproduction in Female Dicranum polysetum*. *Bryologist* 105: 384–397.
- Borsch, T. & D. Quandt. 2009. *Mutational dynamics and phylogenetic utility of noncoding chloroplast DNA*. *Plant Systematics and Evolution* 282: 169–199.
- Bouckaert R., J. Heled, D. Kühnert, T. Vaughan, C.-H. Wu, D. Xie, M. A. Suchard, Rambaut A. & A. J. Drummond. 2014. *BEAST 2: A software platform for bayesian evolutionary analysis*. *PLoS Computational Biology* 10: e1003537.
- Briggs D. 1965. *Experimental taxonomy of some British species of the genus Dicranum*. *New Phytologist* 64: 366–366.
- Brotherus V. F. 1906. *Musci (Laubmoose) III*. In Engler A. & K. Prantl [eds] *Die Natürlichen*

Pflanzenfamilien Teil 3. Leipzig: Englemann. Pp. 92-197.

- Brotherus V. F. 1923. *Die Laubmoose Fennoskandias*. Helsingfors: Akademische Buchhandlung. P. 635.
- Bruch P., Schimper W. P. & T. Gümbel. 1847. Dicranaceae. In Schimper W. P. [ed.] *Bryologia Europea seu genera muscorum europaeorum vol I*. Stuttgart: Sumptibus Librariae E. Schweizerbart. P. 44.
- Buryová B. & A. J. Shaw. 2005. *Phenotypic plasticity in Philonotis fontana (Bryopsida: Bartramiaceae)*. *Journal of Bryology* 27: 13–22.
- Callaghan T. V., Björn L. O., Chernov Y., Chapin T., Christensen T. R., Huntley B., Ims R. A., Johansson M., Jolly D., Jonasson S., Matveyeva N., Panikov N., Oechel W., Shaver G., Elster J., Henttonen H., Laine K., Taulavuori K., Taulavuori E. & C. Zöckler. 2004. *Biodiversity, distributions and adaptations of Arctic species in the context of environmental change*. *Ambio* 33: 404–417.
- Carstens B. C., Pelletier T. A., Reid N. M. & J.D. Satler. 2013. *How to fail at species delimitation*. *Molecular Ecology* 22: 4369-4383.
- Carter B. E. 2012. *Species delimitation and cryptic diversity in the moss genus Scleropodium (Brachytheciaceae)*. *Molecular Phylogenetics and Evolution* 63: 891–903.
- CBOL Plant Working Group. 2009. *A DNA barcode for land plants*. *Proceedings of the National Academy of Sciences of the United States of America* 106: 12794–12797.
- Chapman M. G. & A.J. Underwood. 1999. *Ecological patterns in multivariate assemblages: information and interpretation of negative values in ANOSIM tests*. *Marine Ecology Progress Series* 180: 257-265.
- Chopra R. S. 1975. *Taxonomy of Indian mosses: An introduction*. New Delhi: CSIR. P. 631.
- Chopra, R. N. 1998. *Topics in Bryology*. New Delhi: Allied Publishers Limited. P. 202.
- Clarke K. R. 1993. *Non-parametric multivariate analyses of changes in community structure*. *Australian Journal of Ecology* 18: 117-143.
- Corley M. F. V. 1991. *The habitat range of Dicranum leioneuron Kindb.* *Journal of Bryology* 16: 485–486.
- Cornelissen J. H. C., Lang S. I., Soudzilovskaia N. A. & H. J. During. 2007. *Comparative cryptogam ecology: a review of bryophyte and lichen traits that drive biogeochemistry*. *Annales of Botany* 99: 987–1001.
- Cox C. J., Goffinet B., Wickett N. J., Boles S. B. & A.J. Shaw. 2010. *Moss diversity : A molecular phylogenetic analysis of genera*. *Phytotaxa* 9: 175 – 195.
- Crawford M., Jesson L. K. & P. J. Garnock-Jones. 2009. *Correlated evolution of sexual system and life-history traits in mosses*. *Evolution* 63:1129–1142.
- Crosby M. R., Magill R. E., Allen B. & S. He. 1999. *A Checklist of Mosses. Prospectus*. St. Louis: Missouri Botanical Garden. P. 21.
- Crum H. A. & L. E. Anderson. 1981. *Mosses of eastern North America volumes 1*. New York: Columbia University Press. Pp. 151-217.
- Dandotiya D., Govindaparyi H., Suman S. & P. L. Uniya. 2011. *Checklist of the bryophytes of India*. *Archives for Bryology* 88: 1-126.
- Dierssen K. 2001. *Distribution, ecological amplitude and phytosociological classification of European bryophytes*. *Bryophytorum Bibliotheca* 56: 1–289.
- Dinnage R., Cadotte M. W., Haddad N. M., Crutsinger G. M. & D. Tilman. 2012. *Diversity of plant evolutionary lineages promotes arthropod diversity*. *Ecology Letters* 15: 1308–1317.

- Dong S., Schäfer-Verwimp A., Meinecke P., Feldberg K., Bombošch A., Pócs T., Schmidt A. R., Reitner J., & H. Schneider. 2012. *Tramps, narrow endemics and morphologically cryptic species in the epiphyllous liverwort Diplasiolejeunea*. *Molecular Phylogenetics and Evolution* 65: 582–594.
- Dong W., Liu J., Yu J., Wang L. & S. Zhou. 2012. *Highly variable chloroplast markers for evaluating plant phylogeny at low taxonomic levels and for DNA barcoding*. *PLoS one* 7: e35071,
- Donskov D. G. 2011. *On the leaf fragility in Dicranum (Dicranaceae, Bryophyta)*. *Arctoa* 20: 99–105.
- Draper I. & L. Hedenäs. 2009. *Circumscription of European taxa within the Sciuro-hypnum reflexum complex (Brachytheciaceae, Bryophyta), based on molecular and morphological data*. *Taxon* 58: 572–584.
- Edwards S. V, Liu L. & D. K. Pearl. 2007. *High-resolution species trees without concatenation*. *Proceedings of the National Academy of Sciences of the United States of America* 104: 5936–5941.
- Ehrlén J. Bisang I. & L. Hedenäs. 2000. *Costs of sporophyte production in the moss, Dicranum polysetum*. *Plant Ecology* 149:207–217.
- Epstein H. E., Calef M. P., Walker M. D., Chapin F. S. III & A. M. Starfield. 2004. *Detecting changes in arctic tundra plant communities in response to warming over decadal time scales*. *Global Change Biology* 10: 1325–1334.
- Ezard, T., Fujisawa T. & T. Barraclough. 2009. *splits: SPecies' Limits by Threshold Statistics*. R package version 1.0-19. Available at: <http://r-forge.r-project.org/projects/splits>.
- Farris J. S., Källersjö M., Kluge A. G. & C. Bult. 1994. *Testing significance of congruence*. *Cladistics* 10:315–319.
- Fontaneto D., Herniou E. A., Boschetti C., Caprioli M., Melone G., Ricci C. & T.G. Barraclough. 2007. *Independently evolving species in asexual bdelloid rotifers*. *PLoS biology* 5: e87.
- Frey W. & M. Stech. 2009. *Marchantiophyta, Bryophyta, Anthocerotophyta*. In Frey W. [ed.] *Syllabus of Plant Families. A. Engler's Syllabus der Pflanzenfamilien, 13th ed., Part 3 Bryophytes and seedless Vascular Plants*. Stuttgart: Gebr. Borntraeger Verlagsbuchhandlung. P. 419.
- Frisvoll A. & Elvebakk A. 1996. *Bryophytes*. In Elvebakk A. & Pestrud P. [eds.] *A catalogue of Svalbard plants, fungi, algae and cyanobacteria*. Oslo: Norsk Polarinstitutt Skifter. Pp. 57–172.
- Gao C. & S. He. 1999. *Sphagnaceae–Leucobryaceae. 1*. In Gao C. & Crosby M. R. [eds.] *Moss flora of China*. Beijing, New York and St. Louis: Science Press & Missouri Botanical Garden. P. 273.
- Goffinet B. & A. J. Shaw. 2009. *Bryophyte Biology. 2nd Edition*. Cambridge: Cambridge University Press. P. 565.
- Goffinet B., Cox C. J., Shaw A. J. & T. A. J. Hedderson. 2001. *The Bryophyta (mosses): systematic and evolutionary inferences from an rps4 gene (cpDNA) phylogeny*. *Annales of Botany* 87:191–208.
- Gordon C., Wynn J. M., S. J. Woodin. 2001. *Impacts of increased nitrogen supply on high Arctic heath: the importance of bryophytes and phosphorus availability*. *New Phytologist* 149: 461–471.
- Gornall J. L., Jónsdóttir I. S., Woodin S. J., van der Wal R. 2007. *Arctic mosses govern below-ground environment and ecosystem processes*. *Oecologia* 153: 931–41.

- Grout A. J. 1937. *Dicranum*. In Grout A. [ed.] *Moss flora of North America north of Mexico*. Newfane, Vermont: published by the author. Pp. 77–89.
- Hagen I. 1915. *Forarbejder til en norsk løvmosflora*. Trondheim: Kongel. Norske Vidensk. Selsk. Skr. P. 192.
- Hassel K., Segreto R. & T. Ekrem. 2013. *Restricted variation in plant barcoding markers limits identification in closely related bryophyte species*. *Molecular Ecology Resources* 13:1047–1057.
- Hebert P. D. N., Cywinska A., Ball S. L. & J.R. DeWaard. 2003. *Biological identifications through DNA barcodes*. *Proceedings of the Royal Society B Biological Sciences* 270: 313–321.
- Hedderson T. A., Murray D. J., Cox C. J. & T. L. Nowell T. L. 2004. *Phylogenetic relationships of haplolepidous mosses (Dicranidae) Inferred from rps4 gene sequences*. *Systematic Botany* 29: 29–41.
- Hedenäs L. & I. Bisang I. 2011. *The overlooked dwarf males in mosses—Unique among green land plants*. *Perspectives in Plant Ecology, Evolution and Systematics* 13: 121–135.
- Hedenäs L. & I. Bisang. 2004. *Key to European Dicranum species*. *Herzogia* 17: 179–197.
- Hedenäs L. & P. Eldenäs. 2007. *Cryptic speciation, habitat differentiation, and geography in Hamatocaulis vernicosus (Calliergonaceae, Bryophyta)*. *Plant Systematics and Evolution* 268: 131–145.
- Hedenäs L. 2008. *Molecular variation in Drepanocladus aduncus s.l. does not support recognition of more than one species in Europe*. *Journal of Bryology* 30: 108–120.
- Hedenäs L., Bisang I., Lüth M. & N. Schnyder. 2006. *Variation in Dicranum majus in central, western and northern Europe*. *Journal of Bryology* 28: 293–298.
- Heinrichs J., Klugmann F., Hentschel J. & H. Schneider. 2009. *DNA taxonomy, cryptic speciation and diversification of the Neotropical-African liverwort, Marchesinia brachiata (Lejeuneaceae, Porellales)*. *Molecular Phylogenetics and Evolution* 53: 113–21.
- Heinrichs, J., J. Hentschel, K. Feldberg, A. Bombosch & H. Schneider. 2009. *Phylogenetic biogeography and taxonomy of disjunctly distributed bryophytes*. *Journal of Systematics and Evolution* 47: 497–508.
- Hernández-Maqueda R., Quandt D., Werner O & J. Muñoz. 2008. *Phylogeny and classification of the Grimmiaceae/Ptychomitriaceae complex (Bryophyta) inferred from cpDNA*. *Molecular Phylogenetics and Evolution* 46: 863–77.
- Hesse C., Jalink L. M., Stech M. & J. D. Kruijer. 2012. *Contributions to the moss flora of Edgeøya and Barentsøya, Svalbard (Norway)*. *Polish Botanical Journal* 57: 167–179.
- Holland B. R., Huber K. T., Moulton V. & P. J. Lockhart. 2004. *Using consensus networks to visualize contradictory evidence for species phylogeny*. *Molecular Biology and Evolution* 21: 1459–1461.
- Hollingsworth M. L., Clark A., Forrest L. L., Richardson J., Pennington R. T., Long D. G., Cowan R., Chase M. W., Gaudeul M. & P. M. Hollingsworth. 2009. *Selecting barcoding loci for plants: Evaluation of seven candidate loci with species-level sampling in three divergent groups of land plants*. *Molecular Ecology Resources* 9: 439–457.
- Hollingsworth P. M., Graham S. W., P. D. Little. 2011. *Choosing and using a plant DNA barcode*. *PLoS ONE* 6: e19254.
- Hudson J. M. G. & G. H. R. Henry. 2010. *High Arctic plant community resists 15 years of experimental warming*. *Journal of Ecology* 98: 1035–1041.

- Huelsenbeck J. P. & F. Ronquist. 2001. *MRBAYES: Bayesian inference of phylogenetic trees*. *Bioinformatics* 17: 754–755.
- Ignatova E. A. & V. F. Fedosov. 2008. *Species of Dicranum (Dicranaceae, Bryophyta) with fragile leaves in Russia*. *Arctoa* 17: 63–83.
- Ireland R. R. 2002. *Dicranum brevifolium* new to the moss flora of Michigan and the Eastern United States. *Michigan Botanist* 41: 27–30.
- Ireland R. R. 2007. *Dicranum* (Family Dicranaceae). In Zander R. H. [ed.] *Flora of North America*. New York and Oxford: Oxford University Press. Pp. 397–420.
- Jasmin J.-N., Rochefort L. & G. Gauthier. 2008. *Goose grazing influences the fine-scale structure of a bryophyte community in arctic wetlands*. *Polar Biology* 31: 1043–1049.
- Jennings O. E. 1951. *A manual of the mosses of western Pennsylvania and adjacent regions*. Indiana: University of Notre Dame Press. P. 412.
- Klazenga, N. 2012. Australian Mosses Online. 33. Dicranaceae: *Dicranum*. http://www.anbg.gov.au/abrs/Mosses_online/Dicranaceae_Dicranum.pdf
- Kluge A. G. 1989. *A concern for evidence and a phylogenetic hypothesis of relationships among Epicrates (Boidae, Serpentes)*. *Systematic Zoology* 38: 7–25.
- Konstantinova N. A. & A. D. Potemkin. 1997. *Liverworts of the Russian Arctic: an annotated check-list and bibliography*. *Arctoa* 6: 125–150.
- Krab J., Cornelissen J. H. C., Lang S. I. & R. S. P. Logtestijn. 2008. *Amino acid uptake among wide-ranging moss species may contribute to their strong position in higher-latitude ecosystems*. *Plant and Soil* 304: 199–208.
- Kress W. J., Wurdack K. J., Zimmer E. A., Weigt L. A. & D. H. Janzen. 2005. *Use of DNA barcodes to identify flowering plants*. *Proceedings of the National Academy of Sciences of the United States America* 102: 8369–8374.
- Kruskal J. B. 1964. *Multidimensional scaling by optimizing goodness of fit to a non-metric hypothesis*. *Psychometrika* 29: 1–27.
- Kubatko L. S. & J. H. Degnan. 2007. *Inconsistency of phylogenetic estimates from concatenated data under coalescence*. *Systematic Biology* 56: 17–24.
- La Farge C., Shaw A. J. & D. H. Vitt. 2002. *The circumscription of the Dicranaceae (Bryopsida) based on the chloroplast regions trnL — trnF and rps4*. *Systematic Botany* 27: 435–452.
- Lang A. S. & M. Stech. 2014. *What's in a name? Disentangling the Dicranum scoparium species complex (Dicranaceae, Bryophyta)*. *Systematic Botany* 39: 369–379.
- Lang A. S., Kruijer J. D. & M. Stech. 2014. *DNA barcoding of arctic bryophytes- an example from the moss genus Dicranum (Dicranaceae, Bryophyta)*. *Polar Biology* 37: 1157–1169.
- Lang A. S., Tubanova D. & M. Stech. In press. *Species delimitations in the Dicranum acutifolium complex (Dicranaceae, Bryophyta)*. *Journal of Bryology*.
- Lang S. I., Cornelissen J. H. C., Shaver G. R., Ahrens M., Callaghan T. V., Molau U., Ter Braak C. J. F., Hölzer A. & R. Aerts. 2012. *Arctic warming on two continents has consistent negative effects on lichen diversity and mixed effects on bryophyte diversity*. *Global Change Biology* 18: 1096–1107.
- Lang, A. S. & Y. Naciri. 2010. *New chloroplast primers for intraspecific variation in Dicranum scoparium Hedw. (Dicranaceae) and amplification success in other bryophyte species*. *Molecular Ecology Resources* 10: 735–737.
- Lawton E. 1971. *Moss Flora of Pacific Northwest*. Nichinan: Hattori Botanical Laboratory. Pp. 72-

- Leaché A. D. & B. Rannala. 2010. *The accuracy of species tree estimation under simulation: a comparison of methods*. Systematic Biology 60: 126–137.
- Leliaert F., Verbruggen H., Wysor B. & O. De Clerck. 2009. *DNA taxonomy in morphologically plastic taxa: algorithmic species delimitation in the Boodlea complex (Chlorophyta: Cladophorales)*. Molecular Phylogenetics and Evolution 53: 122–133.
- Lindberg O. S. 1865. *Adnotationes bryologicae*. Botaniska Notiser 4: 73- 81.
- Lindberg, O. S. & Arnell, H. W. 1890. *Musci asiae borealis. II Laubmose*. Kongliga Svenska Vetenskaps Academiens Handlingar 23: 74-83.
- Liu L. & D. K. Pearl. 2007. *Species trees from gene trees: reconstructing Bayesian posterior distributions of a species phylogeny using estimated gene tree distributions*. Systematic Biology 56: 504–514.
- Liu Y., Cao T. & X.-J. Ge. 2011. *A case study of DNA barcoding in Chinese Grimmiaceae and a moss recorded in China for the first time*. Taxon 60: 185–193.
- Liu Y., Yan H.- F., Cao T. & X.- J. Ge. 2010. *Evaluation of 10 plant barcodes in Bryophyta (Mosses)*. Journal of Systematics and Evolution 48: 36–46.
- Longton R. E. 1988. *Adaptations and strategies of polar bryophytes*. Botanical Journal of the Linnean Society 98: 253–268.
- Longton R. E. 1997. *The role of bryophytes and lichens in polar ecosystems*. In Woodin S. J. & M. Marquiss [eds.] *Ecology of Arctic Environments*. Oxford:Blackwell Science Ltd. Pp. 69–96.
- Medina R., Lara F., Goffinet B., Garilleti R. & V. Mazimpaka. 2012. *Integrative taxonomy successfully resolves the pseudo-cryptic complex of the disjunct epiphytic moss Orthotrichum consimile s. l. (Orthotrichaceae)*. Taxon 61: 1180–1198.
- Miller M. A., Pfeiffer W. & T. Schwartz. 2010. *Creating the CIPRES Science Gateway for inference of large phylogenetic trees*. Proceedings of the Gateway Computing Environments Workshop (GCE), 14 Nov. 2010, New Orleans, LA. Pp. 1 - 8. <http://www.phylo.org>
- Monaghan M. T., Wild R., Elliot M., Fujisawa T., Balke M., Inward D. J. G., Lees D. C., RanaivosoloR., Eggleton P., Barraclough T. G. & A. P. Vogler. 2009. *Accelerated species inventory on Madagascar using coalescent-based models of species delineation*. Systematic biology 58: 298–311.
- Mönkemeyer W. 1927. *Die Laubmose Europas: Andreaeales-Bryales*. In Rabenhorsts D. L. [ed.] *Kryptogamen-Flora von Deutschland, Österreich und der Schweiz*. Leipzig: Akademische Verlagsgesellschaft m. b. H. Pp. 171–231.
- Müller C. 1949. *Synopsis Muscorum Frondosorum omnium hucusque cognitorum Vol 1*. Berlin: Alb. Foerstner. Pp.351-415.
- Müller K. 2004. *SeqState – primer design and sequence statistics for phylogenetic DNA data sets*. Applied Bioinformatics 4: 65–69.
- Natcheva R. & N. Cronberg. 2004. *What do we know about hybridization among bryophytes in nature?* Canadian Journal of Botany 82: 1687–1704.
- Noguchi A. & Z. Iwatsuki. 1987. *Illustrated moss flora of Japan Part 1*. Nichinan: Hattori Botanical Laboratory. Pp. 203-229.
- Nyholm E. 1953. *Bryologiska notiser*. Botanika Notiser. 3:290–300.
- Nyholm E. 1954. *Musci*. In The Botanical Society of Lund [ed.] *Illustrated moss flora of Fennoscandia*. Lund: CWK Gleerups. Pp. 61–71.

- Nyholm E. 1987. Fissidentaceae-Seligeriaceae. In Nyholm E. [ed] *Illustrated Flora of Nordic Mosses Fasc. 1*. Copenhagen and Lund: Nordic Bryological Society. Pp. 47–58.
- Okitsu S., Minami Y., Kanda H. 1998. *Relationship between plant occurrences and surface conditions on a recently deglaciated moraine at Ny-Alesund, Svalbard, Arctic Norway*. Proceedings of the NIPR Symposium on Polar Biology 11: 119–127.
- Oksanen J., Blanchet F. G., Kind, R., Legendre P., Minchin P. R., O'Hara R. B., Simpson G. L., Solymos P., Stevens M. H. H. & H. Wagner, H. 2013. *Vegan: Community Ecology Package*. R package version 2.0-6. <http://CRAN.R-project.org/package=vegan>.
- Otnyukova T. N. 2001. *Notes on Dicranum (Dicranaceae, Musci) in Russia. 1. Dicranum nipponense found in Far East*. Arctoa: 157–160.
- Otnyukova T. N. 2007. *Notes on Dicranum (Dicranaceae, Musci) in Russia. 2. Dicranum pseudoacutifolium sp. nov. from North Siberia*. Arctoa 16: 163–168.
- Paradis E., Claude J. & K. Strimmer. 2004. *APE 3.0-8: analyses of phylogenetics and evolution in R language*. Bioinformatics 20: 289–290.
- Pereira M. R., de S. Dambros C. & C.E. Zartman. 2013. *Will the real Syrrhopodon lepreurii please stand up? The influence of topography and distance on phenotypic variation in a widespread Neotropical moss*. The Bryologist 116: 58–64.
- Peterson W. 1979. *A revision of the genera Dicranum and Orthodicranum (Musci) in North America north of Mexico*. Ph. D. thesis. Edmonton, Alberta: University of Alberta.
- Pichonet A. & S. R. Gradstein. 2012. *Male dwarfism in the genus Dicranum (Dicranaceae)-a review*. Cryptogamie, Bryologie 33: 299–311.
- Podpěra J. 1954. *Dicranum*. In Podpěra J. [ed.] *Conspectus muscorum Europaeorum*. Praha: Československé akademie v. d. Pp. 141–153.
- Pons J., Barraclough T. G., Gomez-Zurita J., Cardoso A., Duran D. P., Hazell S., Kamoun S., Sumlín W. D. & A. P. Vogler. 2006. *Sequence-Based Species Delimitation for the DNA Taxonomy of Undescribed Insects*. Systematic Biology 55: 595–609.
- Poulakakis N., Russello M., Geist D., & A. Caccone. 2012. *Unravelling the peculiarities of island life: vicariance, dispersal and the diversification of the extinct and extant giant Galápagos tortoises*. Molecular Ecology. 21:160–173.
- Posada D. & K. A. Crandall. 1998. *MODELTEST: Testing the model of DNA substitution*. Bioinformatics 14: 817–818.
- Powell J. R. 2012. *Accounting for uncertainty in species delineation during the analysis of environmental DNA sequence data*. Methods in Ecology and Evolution 3: 1–11.
- Qiu Y.-L., Li L., Wang B., Chen Z., Knoop V., Groth-Malonek M., Dombrowska O., Lee J., Kent L., Rest J., Estabrook G. F., Hendry T. A., Taylor D. W., Testa C. M., Ambros M., Crandall-Stotler B., Duff J., Stech M., Frey W., Quandt D. & C. C. Davis 2006. *The deepest divergences in land plants inferred from phylogenomic evidence*. Proceedings of the National Academy of Sciences of the United States of America 103: 15511–15516.
- Quandt D. & M. Stech. 2004. *Molecular evolution of the trnTUGU-trnFGAA region in bryophytes*. Plant Biology 6: 545–554.
- R Development Core Team. 2013. *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria. Available at: <http://www.r-project.org>.
- Rambaut A. & A. J. Drummond. 2007. *Tracer v1.5*. Available at <http://beast.bio.ed.ac.uk/Tracer>.

- Raubeson L. A., Peery R., Chumley T. W., Dziubek C., Fourcade H. M., Boore J. L. & R. K. Jansen. 2007. *Comparative chloroplast genomics: analyses including new sequences from the angiosperms Nuphar advena and Ranunculus macranthus*. BMC Genomics 8: 174.
- Rittmeyer, E. N. and C. C. Austin. 2012. *The effects of sampling on delimiting species from multi-locus sequence data*. Molecular Phylogenetics and Evolution 65: 451–463.
- Ronquist F. & J. P. Huelsenbeck. 2003. *MRBAYES 3: Bayesian phylogenetic inference under mixed models*. Bioinformatics 19: 1572–1574.
- Ronquist F., Huelsenbeck J. P. & P. van Dermark. 2005. *MrBayes3.1 manual*, Draft 5/17/2005. http://mrbayes.csit.fsu.edu/mb3.1_manual.pdf
- Rowntree J. K., Cowan R. S., Leggett M., Ramsay M. M. & M. F. Fay. 2010. *Which moss is which? Identification of the threatened moss Orthodontium gracile using molecular and morphological techniques*. Conservation Genetics 11: 1033–1042.
- Sagmo Solli I. M., Soderstrom L., Bakken S., Flatberg K. I. & B. Pedersen. 1998. *Reproductive phenology of Dicranum majus in central Norway*. Journal of Bryology 20: 311–321.
- Sagmo Solli I. M., Soderstrom L., Bakken S., Flatberg K. I. & B. Pedersen. 2000. *Studies of fertility of Dicranum majus in two populations with contrasted sporophyte production*. Journal of Bryology 22: 3–8.
- Sakurai, K. 1951. *A new classification of the genus Dicranum in Japan (1)*. Journal of Japanese Botany 28: 359–364.
- Såstad S. M., Pedersen B. & K. Digre. 1999. *Habitat-specific genetic effects on growth rate and morphology across pH and water-level gradients within a population of the moss Sphagnum angustifolium (Sphagnaceae)*. American Journal of Botany 86: 1687–1698.
- Såstad S. M. 1998. *Genetic and environmental sources of variation in leaf morphology of Sphagnum fallax and Sphagnum isoviitae (bryopsida): comparison of experiments conducted in the field and laboratory*. Canadian Journal of Botany 77: 1–10.
- Savicz-Lyubitskaya L. I. & Z. N. Smirnova. 1970. *The handbook of the mosses of the USSR. The Acrocarpous mosses*. Leningrad: Academy of Science of the USSR. P. 824.
- Schofield W. B. 1992. *Bryophyte distribution patterns*. In Bates J. W. & A. M. Farmer [eds.] *Bryophytes and Lichens in a Changing World*. Oxford: Clarendon Press. Pp. 103–130.
- Sérgio C., Ochyra R. & A. Séneca. 1995. *Dicranum crassifolium (musci, Dicranaceae), a new species from southern Europe*. Fragmenta Floristica et Geobotanica 40: 203–214.
- Silvestro D. & I. Michalak. 2012. *raxmlGUI: a graphical front-end for RAxML*. Organisms Diversity and Evolution 12: 335–337.
- Simmons M. P. & H. Ochoterena. 2000. *Gaps as characters in sequence-based phylogenetic analyses*. Systematic Biology 49: 369–381.
- Smith A. J. E. 2004. *The moss flora of Britain and Ireland. Second Edition*. Cambridge University Press: Cambridge. P. 1026.
- Sotiaux A., Enroth J., Olsson S., Quandt D. & A. Vanderpoorten. 2009. *When morphology and molecules tell us different stories: a case-in-point with Leptodon corsicus, a new and unique endemic moss species from Corsica*. Journal of Bryology 31: 186–196.
- Spitale, D., and A. Petraglia. 2010. *Palustriella falcata (Brid.) Hedenäs (Amblystegiaceae, Bryopsida) with pluristratose lamina: morphological variability of specimens in springs of the Italian Alps*. Plant Systematics and Evolution 286: 59–68.
- Stamatakis A. 2006. *RAxML-VI-HPC: maximum likelihood-based phylogenetic analyses with*

- thousands of taxa and mixed models. *Bioinformatics* 22: 2688–2690.
- Staples G. W., Imada C. T., Hoe W. J. & C. W. Smith. 2004. A revised checklist of Hawaiian mosses. *Tropical Bryology* 25:35–69.
- Stech M. & D. Quandt. 2010. 20,000 species and five key markers: The status of molecular bryophyte phylogenetics. *Phytotaxa* 9: 196–228.
- Stech M. & W. Frey. 2008. A morpho-molecular classification of the mosses (Bryophyta). *Nova Hedwigia* 86: 1–21.
- Stech M. 1999. A reclassification of Dicranaceae (Bryopsida) based on non-coding cpDNA sequence data. *Journal of the Hattori Botanical Laboratory* 86: 137–159.
- Stech M. 2004. Supraspecific circumscription and classification of *Campylopus* Brid. (Dicranaceae, Bryopsida) based on molecular data. *Systematic Botany* 29: 817–824.
- Stech M. & W. Frey. 2008. A morpho-molecular classification of the mosses (Bryophyta). *Nov. Hedwigia* 86:1–21.
- Stech M., Kolvoort E., Loonen M. J. J. E., Vrieling K. & J. D. Kruijer. 2011. Bryophyte DNA sequences from faeces of an arctic herbivore, barnacle goose (*Branta leucopsis*). *Molecular Ecology Resources* 11: 404–408.
- Stech M., Pfeiffer T. & W. Frey. 2006. Molecular relationships and divergence of palaeoaustral *Dicranoloma* species (Dicranaceae, Bryopsida). *Studies in austral temperate rain forest bryophytes* 31. *Journal of the Hattori Botanical Laboratory* 100: 451–464.
- Stech M., Veldman S., Larraín J., Muñoz J., Quandt D., Hassel K. & H. Kruijer. 2013. Molecular species delimitation in the *Racomitrium canescens* complex (Grimmiaceae) and implications for DNA barcoding of species complexes in mosses. *PLoS ONE* 8: e53134.
- Stech M., Werner O., González-Mancebo J. M., Patiño J., Sim-Sim M., Fontinha S., Hildebrandt I. & R. M. Ros. 2011. Phylogenetic inference in *Leucodon* Schwägr. subg. *Leucodon* (Leucodontaceae, Bryophyta) in the North Atlantic region. *Taxon* 60: 79–88.
- Steele P. R., Pires J. C. 2011. Biodiversity assessment: state-of-the-art techniques in phylogenomics and species identification. *American Journal of Botany* 98: 415–425.
- Steere W. C. 1978. *The Mosses of Arctic Alaska*. *Bryophytorum Bibliotheca* 14: 1–508.
- Sugiura C., Kobayashi Y., Aoki S., Sugita C. & M. Sugita. 2003. Complete chloroplast DNA sequence of the moss *Physcomitrella patens*: evidence for the loss and relocation of *rpoA* from the chloroplast to the nucleus. *Nucleic Acids Research* 31: 5324–5331.
- Sukkharak, P., S. R. Gradstein & M. Stech. 2011. Phylogeny, taxon circumscriptions, and character evolution in the core *Ptychanthoideae* (Lejeuneaceae, Marchantiophyta). *Taxon* 60: 1607–1622.
- Swofford D. L. 2002. *PAUP*: Phylogenetic analysis using parsimony (*and other methods)*. version 4. Sunderland: Sinauer Associates Inc.
- Takaki N. 1964. A revision of Japanese *Dicranum*. *Journal of the Hattori Botanical Laboratory* 27: 73–123.
- Takaki N. 1972. Geographical distribution of Japanese *Dicranum* species in the Northern Hemisphere. *Journal of the Hattori Botanical Laboratory* 35: 31–40.
- Talavera G., Dincă V. & R. Vila. 2013. Factors affecting species delimitations with the GMYC model: insights from a butterfly survey. *Methods in Ecology and Evolution* 4: 1101–1110.
- Taylor J. W., Jacobson D. J., Kroken S., Kasuga T., Geiser D. M., Hibbett D. S. & M. C. Fisher. 2000. Phylogenetic species recognition and species concepts in fungi. *Fungal Genetics and Biology*

31: 21–32.

- Terasawa K., Odahara M., Kabeya Y., Kikugawa T., Sekine Y., Fujiwara M. & N. Sato. 2007. *The mitochondrial genome of the moss Physcomitrella patens sheds new light on mitochondrial evolution in land plants*. *Molecular Biology and Evolution* 24: 699–709.
- The Plant List (2013). Version 1.1. <http://www.theplantlist.org>
- Tropicos.org, Missouri Botanical Garden, 2014, Available at <http://www.tropicos.org>
- Tuba Z., Slack N. G., Stark L. R. 2011. *Bryophyte Ecology and Climate Change*. Cambridge University Press: Cambridge. P. 528.
- Tubanova D. Y. & E. A. Ignatova. 2011. *A new species of Dicranum (Dicranaceae, Bryophyta) from Asiatic Russia*. *Arctoa* 20: 183–190.
- Tubanova D. Y., Goryunov D. V, Ignatova E. A. & M. S. Ignatov. 2010. *On the taxonomy of Dicranum acutifolium and D. fuscescens complexes (Dicranaceae, Bryophyta) in Russia*. *Arctoa* 19: 151–164.
- Tuomikoski R., Koponen T. & T. Ahti. 1973. *The mosses of the island of Newfoundland*. *Annales Botanici Fennici* 10: 217–264.
- Turmel M., Otis C. & C. Lemieux. 2002. *The chloroplast and mitochondrial genome sequences of the charophyte Chaetosphaeridium globosum: insights into the timing of the events that restructured organelle DNAs within the green algal lineage that led to land plants*. *Proceedings of the National Academy of Sciences of the United States of America* 99: 11275–11280.
- van der Wal R., R. W. Brooker. 2004) *Mosses mediate grazer impacts on grass abundance in arctic ecosystems*. *Funct Ecol* 18: 77–86.
- van der Wal R., van Lieshout S. M. J. & M. J. E. Loonen. 2001. *Herbivore impact on moss depth, soil temperature and arctic plant growth*. *Polar Biology* 24: 29–32
- van der Wijk R., Margadant W. D. & P. A. Florschütz. 1962. *Index Muscorum*. International Bureau for Plant Taxonomy and Nomenclature of the International Association for Plant Taxonomy: Utrecht. P. 535.
- Vanderpoorten A. & A. J. Shaw. 2010. *The application of molecular data to the phylogenetic delimitation of species in bryophytes : A note of caution*. *Phytotaxa* 9: 229–237.
- Vanderpoorten A. & B. Goffinet. 2006. *Mapping uncertainty and phylogenetic uncertainty in ancestral character state reconstruction: an example in the moss genus Brachytheciastrum*. *Systematic Biology* 55: 957–971.
- Vitt D. H. 1984. *The classification of Bryopsida*. In Schuster, R. M. [ed.] *New manual of bryology, vol 2*. Nichinan: The Hattori Botanical Laboratory. Pp. 696–759.
- von Cräutlein M., Korpelainen H., Pietiläinen M., J. Rikkinen. 2011. *DNA barcoding: a tool for improved taxon identification and detection of species diversity*. *Biodiversity and Conservation* 20: 373–389.
- Wahlenberg G. 1814. *Flora Carpatorum Principalium exhibens plantas in montibus Carpaticis inter flumina Waagum et Dunajetz eorumque ramos Arvam et Popradum crescentes, cui praemittitur Tractatus de altitudine, vegetatione, temperatura et meteoris horum montium in genere*. Gottingae: Impensis Vandenhöck et Ruprecht P. 408.
- Wahren C.- H., Walker M. D., M. S. Bret-Harte. 2005. *Vegetation responses in Alaskan arctic tundra after 8 years of a summer warming and winter snow manipulation experiment*. *Global Change Biology* 11: 537–552.

- Walker D. A., Reynolds M. K., Daniëls F. J. A., Einarsson E., Elvebakk A., Gould W. A., Katenin A. E., Kholod S. S., Markon C. J., Melnikov E. S., Moskalenko N. G., Talbot S. S., Yurtsev B. A. & the other members of the CAVM Team. 2005. *The Circumpolar Arctic vegetation map*. *Journal of Vegetation Science* 16: 267.
- Wang R. J., Cheng C. L., Chang C. C., Wu C. L., Su T. M. & S. M. Chaw. 2008. *Dynamics and evolution of the inverted repeat-large single copy junctions in the chloroplast genomes of monocots*. *BMC Evolutionary Biology* 8: 36.
- Whitlock B. A., Hale A. M. & P. A. Groff. 2010. *Intraspecific inversions pose a challenge for the trnH-psbA plant DNA barcode*. *PLoS ONE* 5: e11533.
- Winter M., Devictor V. & O. Schweiger. 2013. *Phylogenetic diversity and nature conservation: where are we?* *Trends in Ecology and Evolution* 28: 199–204.
- Yao H., Song J., Liu C., Luo K., Han J., Li Y., Pang X., Xu H., Zhu Y., Xiao P. & S. Chen. 2010. *Use of ITS2 region as the universal DNA barcode for plants and animals*. *PLoS ONE* 5: e13102.
- Zaldívar-Riverón A., Martínez J. J., Ceccarelli F. S., De Jesús-Bonilla V. S., Rodríguez-Pérez A. C., Reséndiz-Flores A., & M. A. Smith. 2010. *DNA barcoding a highly diverse group of parasitoid wasps (Braconidae: Doryctinae) from a Mexican nature reserve*. *Mitochondrial DNA* 21:18–23.
- Zhang J., Kapli P., Pavlidis P. & A. Stamatakis. 2013. *A general species delimitation method with applications to phylogenetic placements*. *Bioinformatics* 29: 2869–76.

