

# Environment status estimation of the forest communities based on floristic surveys in the Mordovia State Nature Reserve, Russia

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## Supplementary Materials

**Table S1** Characteristics of the vascular plant flora occurring in 161 plots studied in the Mordovia State Nature Reserve, European Russia

Species	Family	Frequency of occurrence	Life form
<i>Pinus sylvestris</i> L.	Pinaceae	84.5	Phanerophyte
<i>Frangula alnus</i> Mill.	Rhamnaceae	83.9	Nanophanerophyte
<i>Picea abies</i> (L.) H.Karst.	Pinaceae	80.1	Phanerophyte
<i>Sorbus aucuparia</i> L.	Rosaceae	80.1	Phanerophyte
<i>Betula pendula</i> Roth	Betulaceae	73.9	Phanerophyte
<i>Quercus robur</i> L.	Fagaceae	66.5	Phanerophyte
<i>Lysimachia europaea</i> (L.) U.Manns & Anderb.	Primulaceae	63.4	Geophyte
<i>Vaccinium myrtillus</i> L.	Ericaceae	63.4	Chamaephyte
<i>Convallaria majalis</i> L.	Asparagaceae	62.7	Geophyte
<i>Luzula pilosa</i> (L.) Willd.	Juncaceae	62.1	Hemicryptophyte
<i>Maianthemum bifolium</i> (L.) F.W.Schmidt	Asparagaceae	51.6	Geophyte
<i>Rubus saxatilis</i> L.	Rosaceae	47.2	Chamaephyte
<i>Melampyrum pratense</i> L.	Orobanchaceae	42.2	Therophyte
<i>Dryopteris carthusiana</i> (Vill.) H.P.Fuchs	Polypodiaceae	41.6	Hemicryptophyte
<i>Rubus idaeus</i> L.	Rosaceae	41.0	Nanophanerophyte
<i>Vaccinium vitis-idaea</i> L.	Ericaceae	40.4	Chamaephyte
<i>Dryopteris filix-mas</i> (L.) Schott	Polypodiaceae	39.1	Hemicryptophyte
<i>Fragaria vesca</i> L.	Rosaceae	37.3	Hemicryptophyte
<i>Carex digitata</i> L.	Cyperaceae	34.8	Hemicryptophyte
<i>Rubus holostea</i> (L.) M.T.Sharple & E.A.Tripp	Caryophyllaceae	34.8	Chamaephyte
<i>Pteridium pinetorum</i> C.N.Page & R.R.Mill	Dennstaedtiaceae	31.7	Geophyte
<i>Acer platanoides</i> L.	Sapindaceae	29.8	Phanerophyte
<i>Tilia cordata</i> Mill.	Malvaceae	29.2	Phanerophyte
<i>Lonicera xylosteum</i> L.	Caprifoliaceae	28.0	Nanophanerophyte
<i>Melica nutans</i> L.	Poaceae	26.7	Hemicryptophyte
<i>Lolium giganteum</i> (L.) Darbysh.	Poaceae	24.2	Hemicryptophyte
<i>Orthilia secunda</i> (L.) House	Ericaceae	23.6	Chamaephyte
<i>Rubus polonicus</i> Weston	Rosaceae	23.6	Nanophanerophyte
<i>Asarum europaeum</i> L.	Aristolochiaceae	23.0	Hemicryptophyte
<i>Calamagrostis arundinacea</i> (L.) Roth	Poaceae	21.7	Hemicryptophyte
<i>Molinia caerulea</i> (L.) Moench	Poaceae	21.7	Hemicryptophyte
<i>Solidago virgaurea</i> L.	Asteraceae	21.1	Hemicryptophyte
<i>Euonymus verrucosus</i> Scop.	Celastraceae	18.0	Phanerophyte
<i>Melampyrum nemorosum</i> L.	Orobanchaceae	16.1	Therophyte
<i>Oxalis acetosella</i> L.	Oxalidaceae	16.1	Geophyte
<i>Corylus avellana</i> L.	Betulaceae	15.5	Phanerophyte
<i>Poa nemoralis</i> L.	Poaceae	15.5	Hemicryptophyte
<i>Lysimachia vulgaris</i> L.	Primulaceae	14.9	Hemicryptophyte
<i>Carex pilosa</i> Scop.	Cyperaceae	14.3	Hemicryptophyte
<i>Betula pubescens</i> Ehrh.	Betulaceae	13.0	Phanerophyte
<i>Hypericum perforatum</i> L.	Hypericaceae	11.8	Hemicryptophyte
<i>Veronica chamaedrys</i> L.	Plantaginaceae	11.8	Chamaephyte
<i>Salix cinerea</i> L.	Salicaceae	11.2	Phanerophyte
<i>Aegopodium podagraria</i> L.	Apiaceae	10.6	Hemicryptophyte
<i>Lathyrus vernus</i> (L.) Bernh.	Fabaceae	10.6	Hemicryptophyte
<i>Milium effusum</i> L.	Poaceae	10.6	Hemicryptophyte
<i>Viola mirabilis</i> L.	Violaceae	10.6	Hemicryptophyte
<i>Calamagrostis canescens</i> (Weber) Roth	Poaceae	9.9	Hemicryptophyte
<i>Carex pallescens</i> L.	Cyperaceae	9.3	Hemicryptophyte

Species	Family	Frequency of occurrence	Life form
<i>Veronica officinalis</i> L.	Plantaginaceae	9.3	Chamaephyte
<i>Epilobium angustifolium</i> L.	Onagraceae	8.1	Hemicryptophyte
<i>Glechoma hederacea</i> L.	Lamiaceae	8.1	Hemicryptophyte
<i>Carex canescens</i> L.	Cyperaceae	7.5	Hemicryptophyte
<i>Carex rostrata</i> Stokes	Cyperaceae	7.5	Helophyte and Hemicryptophyte
<i>Platanthera bifolia</i> (L.) Rich.	Orchidaceae	7.5	Geophyte
<i>Equisetum sylvaticum</i> L.	Equisetaceae	6.8	Geophyte
<i>Eriophorum vaginatum</i> L.	Cyperaceae	6.8	Hemicryptophyte
<i>Populus tremula</i> L.	Salicaceae	6.8	Phanerophyte
<i>Viola rupestris</i> F.W.Schmidt	Violaceae	6.8	Hemicryptophyte
<i>Stellaria media</i> (L.) Vill.	Caryophyllaceae	6.2	Therophyte and Hemicryptophyte
<i>Vaccinium uliginosum</i> L.	Ericaceae	6.2	Nanophanerophyte
<i>Anthoxanthum odoratum</i> L.	Poaceae	5.6	Hemicryptophyte
<i>Carex lasiocarpa</i> Ehrh.	Cyperaceae	5.6	Helophyte
<i>Carex vesicaria</i> L.	Cyperaceae	5.6	Helophyte
<i>Daphne mezereum</i> L.	Thymelaeaceae	5.6	Nanophanerophyte
<i>Galium mollugo</i> L.	Rubiaceae	5.6	Hemicryptophyte
<i>Pilosella officinarum</i> Vaill.	Asteraceae	5.6	Hemicryptophyte
<i>Juncus effusus</i> L.	Juncaceae	5.6	Hemicryptophyte
<i>Juniperus communis</i> L.	Cupressaceae	5.6	Nanophanerophyte
<i>Lysimachia thyrsiflora</i> L.	Primulaceae	5.6	Hemicryptophyte
<i>Pulmonaria obscura</i> Dumort.	Boraginaceae	5.6	Hemicryptophyte
<i>Salix caprea</i> L.	Salicaceae	5.6	Phanerophyte
<i>Antennaria dioica</i> (L.) Gaertn.	Asteraceae	5.0	Hemicryptophyte
<i>Calamagrostis epigejos</i> (L.) Roth	Poaceae	5.0	Hemicryptophyte
<i>Comarum palustre</i> L.	Rosaceae	5.0	Chamaephyte
<i>Pilosella echinoides</i> (Lumn.) F.W.Schultz & Sch.Bip.	Asteraceae	5.0	Hemicryptophyte
<i>Hieracium umbellatum</i> L.	Asteraceae	5.0	Hemicryptophyte
<i>Scirpus sylvaticus</i> L.	Cyperaceae	5.0	Helophyte and Geophyte
<i>Carex nigra</i> (L.) Reichard	Cyperaceae	4.3	Geophyte
<i>Lolium pratense</i> (Huds.) Darbysh.	Poaceae	4.3	Hemicryptophyte
<i>Viscaria vulgaris</i> Röhl.	Caryophyllaceae	4.3	Hemicryptophyte
<i>Calla palustris</i> L.	Araceae	3.7	Helophyte
<i>Carex elongata</i> L.	Cyperaceae	3.7	Hemicryptophyte
<i>Cicuta virosa</i> L.	Apiaceae	3.7	Hemicryptophyte
<i>Rhododendron tomentosum</i> Harmaja	Ericaceae	3.7	Nanophanerophyte
<i>Linnaea borealis</i> L.	Caprifoliaceae	3.7	Chamaephyte
<i>Mercurialis perennis</i> L.	Euphorbiaceae	3.7	Hemicryptophyte
<i>Sambucus racemosa</i> L.	Viburnaceae	3.7	Phanerophyte
<i>Chimaphila umbellata</i> (L.) W.P.C.Barton	Ericaceae	3.1	Chamaephyte
<i>Poa pratensis</i> L.	Poaceae	3.1	Hemicryptophyte
<i>Rumex acetosella</i> L.	Polygonaceae	3.1	Hemicryptophyte
<i>Stellaria graminea</i> L.	Caryophyllaceae	3.1	Hemicryptophyte
<i>Viburnum opulus</i> L.	Viburnaceae	3.1	Phanerophyte
<i>Angelica sylvestris</i> L.	Apiaceae	2.5	Hemicryptophyte
<i>Epipactis helleborine</i> (L.) Crantz	Orchidaceae	2.5	Geophyte
<i>Hieracium sylvularum</i> Jord. ex Boreau	Asteraceae	2.5	Hemicryptophyte
<i>Polygonatum multiflorum</i> (L.) All.	Asparagaceae	2.5	Geophyte
<i>Polygonatum odoratum</i> (Mill.) Druce	Asparagaceae	2.5	Geophyte
<i>Prunella vulgaris</i> L.	Lamiaceae	2.5	Hemicryptophyte
<i>Pyrola chlorantha</i> Sw.	Ericaceae	2.5	Chamaephyte
<i>Salix aurita</i> L.	Salicaceae	2.5	Nanophanerophyte
<i>Scutellaria galericulata</i> L.	Lamiaceae	2.5	Hemicryptophyte
<i>Achillea millefolium</i> L.	Asteraceae	1.9	Hemicryptophyte
<i>Alnus glutinosa</i> (L.) Gaertn.	Betulaceae	1.9	Phanerophyte
<i>Athyrium filix-femina</i> (L.) Roth	Aspleniaceae	1.9	Hemicryptophyte
<i>Calluna vulgaris</i> (L.) Hull	Ericaceae	1.9	Chamaephyte
<i>Carex leporina</i> L.	Cyperaceae	1.9	Hemicryptophyte
<i>Clinopodium vulgare</i> L.	Lamiaceae	1.9	Hemicryptophyte
<i>Gymnocarpium dryopteris</i> (L.) Newman	Aspleniaceae	1.9	Geophyte
<i>Hylotelephium maximum</i> (L.) Holub	Crassulaceae	1.9	Hemicryptophyte
<i>Lemna minor</i> L.	Araceae	1.9	Helophyte
<i>Menyanthes trifoliata</i> L.	Menyanthaceae	1.9	Helophyte
<i>Prunus padus</i> L.	Rosaceae	1.9	Phanerophyte
<i>Paris quadrifolia</i> L.	Melanthiaceae	1.9	Geophyte
<i>Pyrola rotundifolia</i> L.	Ericaceae	1.9	Chamaephytea
<i>Vicia sylvatica</i> L.	Fabaceae	1.9	Hemicryptophyte
<i>Alchemilla</i> sp.	Rosaceae	1.2	Hemicryptophyte

Species	Family	Frequency of occurrence	Life form
<i>Campanula patula</i> L.	Campanulaceae	1.2	Hemicryptophyte
<i>Campanula rotundifolia</i> L.	Campanulaceae	1.2	Hemicryptophyte
<i>Carex acuta</i> L.	Cyperaceae	1.2	Helophyte
<i>Carex brunnescens</i> (Pers.) Poir.	Cyperaceae	1.2	Hemicryptophyte
<i>Carex globularis</i> L.	Cyperaceae	1.2	Geophyte
<i>Erigeron annuus</i> (L.) Desf	Asteraceae	1.2	Therophyte
<i>Galium palustre</i> L.	Rubiaceae	1.2	Hemicryptophyte
<i>Lycopus europaeus</i> L.	Lamiaceae	1.2	Hemicryptophyte
<i>Phleum pratense</i> L.	Poaceae	1.2	Hemicryptophyte
<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	Poaceae	1.2	Helophyte and Geophyte
<i>Plantago major</i> L.	Plantaginaceae	1.2	Hemicryptophyte
<i>Poa annua</i> L.	Poaceae	1.2	Therophyte
<i>Ranunculus acris</i> L.	Ranunculaceae	1.2	Hemicryptophyte
<i>Scrophularia nodosa</i> L.	Scrophulariaceae	1.2	Hemicryptophyte
<i>Thelypteris palustris</i> Schott	Aspleniaceae	1.2	Geophyte
<i>Valeriana officinalis</i> L.	Caprifoliaceae	1.2	Hemicryptophyte
<i>Aconitum septentrionale</i> Koelle	Ranunculaceae	0.6	Hemicryptophyte
<i>Actaea spicata</i> L.	Ranunculaceae	0.6	Hemicryptophyte
<i>Agrostis capillaris</i> L.	Poaceae	0.6	Hemicryptophyte
<i>Alopecurus pratensis</i> L.	Poaceae	0.6	Hemicryptophyte
<i>Artemisia campestris</i> L.	Asteraceae	0.6	Chamaephyte
<i>Peucedanum palustre</i> (L.) Moench	Apiaceae	0.6	Geophyte
<i>Carex atherodes</i> Spreng.	Cyperaceae	0.6	Geophyte
<i>Carex limosa</i> L.	Cyperaceae	0.6	Geophyte
<i>Carex loliacea</i> L.	Cyperaceae	0.6	Hemicryptophyte
<i>Carlina biebersteinii</i> Bernh. ex Hornem.	Asteraceae	0.6	Hemicryptophyte
<i>Centaurea phrygia</i> L.	Asteraceae	0.6	Hemicryptophyte
<i>Chamaedaphne calyculata</i> (L.) Moench	Ericaceae	0.6	Nanophanerophyte
<i>Cirsium heterophyllum</i> (L.) Hill	Asteraceae	0.6	Hemicryptophyte
<i>Cirsium oleraceum</i> (L.) Scop.	Asteraceae	0.6	Hemicryptophyte
<i>Dactylis glomerata</i> L.	Poaceae	0.6	Hemicryptophyte
<i>Dryopteris cristata</i> (L.) A.Gray	Polypodiaceae	0.6	Hemicryptophyte
<i>Equisetum fluviatile</i> L.	Equisetaceae	0.6	Helophyte
<i>Fallopia convolvulus</i> (L.) Á.Löve	Polygonaceae	0.6	Therophyte
<i>Filipendula ulmaria</i> (L.) Maxim.	Rosaceae	0.6	Hemicryptophyte
<i>Galeopsis bifida</i> Boenn.	Lamiaceae	0.6	Therophyte
<i>Galeopsis speciosa</i> Mill.	Lamiaceae	0.6	Therophyte
<i>Galium odoratum</i> (L.) Scop.	Rubiaceae	0.6	Hemicryptophyte
<i>Glyceria fluitans</i> (L.) R.Br.	Poaceae	0.6	Helophyte
<i>Juncus conglomeratus</i> L.	Juncaceae	0.6	Hemicryptophyte
<i>Knautia arvensis</i> (L.) Coult.	Caprifoliaceae	0.6	Hemicryptophyte
<i>Lamium maculatum</i> (L.) L.	Lamiaceae	0.6	Hemicryptophyte
<i>Lycopodium clavatum</i> L.	Lycopodiaceae	0.6	Chamaephyte
<i>Malus domestica</i> (Suckow) Borkh.	Rosaceae	0.6	Phanerophyte
<i>Malus sylvestris</i> (L.) Mill.	Rosaceae	0.6	Phanerophyte
<i>Moehringia trinervia</i> (L.) Clairv.	Caryophyllaceae	0.6	Therophyte and Hemicryptophyte
<i>Oenanthe aquatica</i> (L.) Poir.	Apiaceae	0.6	Helophyte
<i>Pimpinella saxifraga</i> L.	Apiaceae	0.6	Hemicryptophyte
<i>Poa palustris</i> L.	Poaceae	0.6	Hemicryptophyte
<i>Persicaria amphibia</i> (L.) Delarbre	Polygonaceae	0.6	Helophyte and Geophyte
<i>Persicaria hydropiper</i> (L.) Delarbre	Polygonaceae	0.6	Therophyte
<i>Persicaria maculosa</i> Gray	Polygonaceae	0.6	Therophyte
<i>Potentilla argentea</i> L.	Rosaceae	0.6	Hemicryptophyte
<i>Ranunculus sceleratus</i> L.	Ranunculaceae	0.6	Hemicryptophyte
<i>Ribes nigrum</i> L.	Grossulariaceae	0.6	Nanophanerophyte
<i>Scheuchzeria palustris</i> L.	Scheuchzeriaceae	0.6	Geophyte
<i>Jacobaea vulgaris</i> Gaertn.	Asteraceae	0.6	Hemicryptophyte
<i>Solanum dulcamara</i> L.	Solanaceae	0.6	Nanophanerophyte
<i>Spirodela polyrhiza</i> (L.) Schleid.	Araceae	0.6	Helophyte
<i>Taraxacum officinale</i> F.H.Wigg.	Asteraceae	0.6	Hemicryptophyte
<i>Urtica dioica</i> L.	Urticaceae	0.6	Geophyte
<i>Utricularia minor</i> L.	Lentibulariaceae	0.6	Hydrophyte
<i>Utricularia vulgaris</i> L.	Lentibulariaceae	0.6	Hydrophyte

Note: Names of species and families refer to the POWO database (<http://www.plantsoftheworldonline.org/>); Frequency of occurrence was calculated as the ratio of the number of study plots where a species was found to the total number of the studied plots (161); life forms are designated according to the Raunkiaer [25] classification.