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LIPARIS LOESELII

Daina Roze^{1,2}, Dace Megre^{1,3}, Gunta Jakobsone¹

¹9,33ÄDFLRQØDLVERWQLVNDLVGUY²DXJDYSLOV8QLYHUVLWWH
³/DWYLMDV8QLYHUVLWWH

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Mikrobiotopu augu sabiedrību floristisko sastāvu pētīja 16 Lēzela lipares populācijās. Tajās konstatēja 12 sūnu un 44 vaskulāro augu sugas, no kurām desmit sugu bija sastopamas vairāk kā 30 % mikrobiotopu. Izmantojot Ellenberga indikatorvērtības vaskulārajiem augiem un Dilla indikatorvērtības sūnām, ieguva mikrobiotopu augu sabiedrību ekoloģisko raksturojumu. Pētījumā konstatēja, ka Lēzela lipares Latvijas populācijām ir plašāka tolerance pret augtenes reakciju, mitrumu, gaismu, kontinentalitāti, temperatūru, un slāpekli pēc mikrobiotopu augu sabiedrību vidējām indikatorvērtībām un lauka mērījumiem. Lēzela lipares mikrobiotopu izpētes rezultāti sniedz jaunu priekšstatu par aizsargājamās sugas ekoloģiju tuvu areāla ziemeļu robežai.

Raksturvārdi: Orchidaceae, indikatorvērtība, augu sabiedrība, augtene, sukcesija

IEVADS

2UKLGHMXGLPWDV VXJDVLUYLHQDVQRDSGUDXGWNMPDXJXVXJH
(Fay & Chase, 2009; Swarts & Dixon, 2009). ASGUDXGWDVLUQH WLNDLHQGFLV
RUKLGHMX VXJDV EHW DU-VXJDV DU VDPJ-SODX DUHØX WGDV N-PLWUMR
/HODOLSDUHLparis loeselii (L.) Rich. (Kull & +XWFKLQ2006). /HODOLSDUHLU
FLUNXPERUHØD VXJD NXUD VDVWRSDPD (LURS LM-6LEULM-XQ EHPHDPHUL
LHPRWDVN X0HXVHOHWDO/XHU .XOO+XWFKLQJV 7DXJ
PLWURV XQNDLQ RVELRWRSBMDXYVH WLSNKM DV XQJ XSXUYRVPLWUV-
SDYV-SDPHVWRV ODXNRV XQ NDUMHURV JUYMRV JUDQWDLQV-XQ PLWU
SXUYDLQXVNXMNRNXPHX PDOVDUPHUFIOLEDJWXXQV PLODLQXHHUXNUD
DLDPXJRGDNDU-VWDUSNSX LHSODNV-*DQHQL1953; Steyermark, 1963;
)HRGRURY 6FRJJDQ ORRUH 3WHUVRQH %LUNPDQH
:KHHOHUHWDO&HSXUWH%URZQ3DZOLNRZVNL
/HOD OLSDUH VDPJ-UHWL VDVWRSDPD YLV-ÄDWYLMDV WHULWRU
SRSXOF LMDURQV WXYX VXJDV DUHØD LPHPHX UREHDL &HSXUWH .XXVNHV
DO 3DUSDLQRPJX/HODOLSDUHVGYRWQLXVNDWDNDLQ R VXSUYXV
3DNDOQH7DVLUYLHQVQRUHWNVDVWRSDPDM LHP ELRWRS LHPXQDLMP
Latvijas teritorijas (ap KD .DDLQR X-SXUYX DXJWHQH V LU ELVNDV
YLVELHNS+!7DEDND3DNDOQH XJLSLHOJRMXLHPVDPDPEDUEDV
YLHOXSDLIRVIRUD XQ VOSHND GDXGKPD P XQ SDVWLSULQWDEDUEDV YLH
VDPDLQD SXUYLHP UDNVWXUJR DXJX VDNVRSDFW MXP-SDU
/DWYLMDVOLPQRJQRSXUYXYHSPHMLMX/HODOLSDUHN RQVWDWVDDXJX
VDELHGUEVNXUDV SLHGHU VHSWLWLDV RFLFLMP-marisci Allorge 1922,
Rhynchosporetum albae W. Koch 1926, *Caricetum lasiocarpae* Osvald 1923 em

Dierssen 1982, *Caricetum rostratae* 5EHO *Eleocharitetum quinqueflorae*
/GL *Schoenetum ferruginei* Du Rietz 1925, *Chrysohypno-Trichophoretum*
alpini DGDp

7RPU QH NDWU-ÐXJX VDELHGUE-NXUD SLHGHU PLQWDMP-DVRFLF
/HOD OLSDUH EÛ VDVWRSDPD 3RSXOFMDV SDW% NOWEÛQH DWNDUJD
QHSLHFLHÐPR VSHFLILVNR YLGHV DSVW%NRSXPDNXUX QRGURLQDHNRO
± PLNURELWRSL 7LH VDPDLQD NUDVX YLGHV IDNWRUX LPDL% LHW
ODEYONXV DXJÐQDV DSVW%NND/LWHUDWÛ-ÐWURGDPL DWLÛJL
YLHGRNLSDU/HOD OLSDUHV PLNURELWRSD OLHOXPX 3LHPUDP0DVDÛ/HW
SRSXOFMDV SWMXPX YHLFD îP OLHORV PLNURELWRWSRVglaukumos
0F0DVWHU EHW 0LHOQR GDEDV UHHUYW-3ROLM-SDUKPobiotopiem
XNDWMDSDUDXJODXNXPXVDUSODWEXP%HGQRUÛLUDVDULSUDWQH
SDU /HOD OLSDUHV PLNURELWRWSX DXJX VDELHGUEX VXJX VNDLWX MR DX
LHWYHUDUPLNURELWRSD WXYXPÐXJRX-VXJDV 0F0DVWHU VDUDNVWLH
YDVNXOUR DXJX XQ VHDV VQX VXJDV VDYXNUW %HGQRUÛYLGML
YDVNXOURDXJXXQYLHQXVQXVXJX9LVDWELOVWRN-VXJDV HNROR&MDL/
PLNURELWRWSX DXJX VDELHGUEX VDVWYV XQ VXJX VDVWRSDPED DSUDN
DXVWUXPX GDDV SRSXOFWMP-0,25 m² OLHORV PLNURELWRWSRV NXURV
QRUGDSWMPDÐXWRUL:KHHOHUHWDO LURWL VSHFLILVNV VXEVDWUVV
UHPV 7RPU DUM-SWMP-WUNVW SUHFN /HOD OLSDUHV PLNURELWRWSLH
VSHFLILVNRDSVW%NDSUDNVWD
/HOD OLSDUHV /DWYLM DV SRSXOFMDV SWMXPÐ XGHYXPV ELMD
/HOD OLSDUHV PLNURELWRWSX DXJX VDELHGUEX HNROR&VN-SDWQEDV
(OOHQEHUJD LQGLNDWRUYUWEDV YDVNXOUDMLHP DXJLHP XQ 'LOOD L
VÐP-ÐU'+ XQ WHPSHUDWÛDV OD&NXPX ,HJWLH SWMXPÐ UHKOWWL
VQLHJWX LQWQLVNL SDPDWRWX ELRWSX XQ PLNURELWRWSX VDJ
DSVDLPQLHNRÐQDVSDVNXPLÛWUGHVLHVSMXSRSXOFMXVDJODEÐQDL

0\$(5,6810(72'(6

Sugas raksturojums

/HOD OLSDUH LU QHOLHOV GDXCNGWDXJV (LURSDV SRSXOFMVDX
DXJVWXPV YDUL•QR FP OG] FP .RPDURY *DOHQLHNV
1DWNHYLÐYVQDXVNLHQH)HRGRURY 0RRUH %DURQLÐ
?nbfh\5HWNÐWURGDPDVQRUGHVNDSDW%LPULLUPDNL ± OG] cm
YDL OLHONOG] FP 3URFKDND 9HOLVHN &HSXUWH /HOD
OLSDUHL LU GLYL YLHQV RWUDP EODNXV QRYLHWRWL QHVWLH VSROL
LHSULHNM-JDGD WNOYHLGD ODSX PDNVWX DWOLHNV-1HVWRV VSROX
KRULRQWQV VW(NORQ) 1980; Ng & Hew, 2000). Pavedienveida saknes
(McGregor et al., 1986; Sell & Murrell, 1996QR YD VDV SUYHLGQHN VW VSROD
DWVWVW-SDYDVDU EHW UXGHQLHWERM5DV&XVWHQ & Whigham,
2002/DSDV LU GLYDV JDQGUÛUHWMXQRVDF VSGJDV LHJDUHQHLSWLVND
ROYHLGJL ODQFHVLVNDV 0RRUH 0F*UHJRU HW DO &HSXUWH

\$LHGØ ODSDV LU GHOWHQL DDV OGJPDQL GHOWHQDV LHGL QHVDWXU C
\$XJOLVLUSRJDD6NODVLUVNDV SXWHN'YHLGJDVWVRLGRJYDLUNL
WÑVWRE \$IGLWWL \$IGLWWL *KDQL YLGML ± VNOX OF0DVWHU
2001).

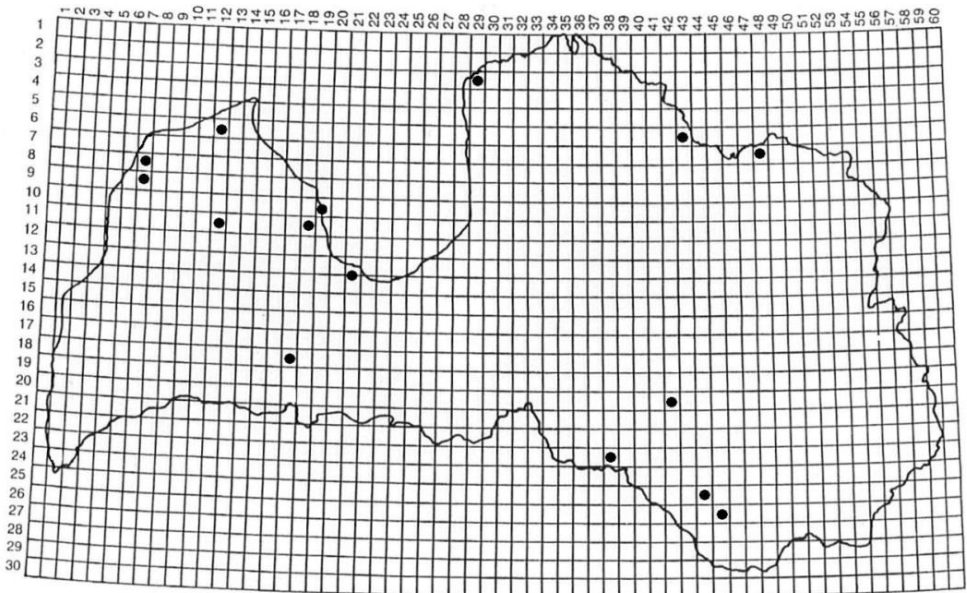
9DLUXPV OLSDUX \$QWV VXJXLU VXEWURSX HSLIWL \$7HOD OLSDUHV
YHLGV LU HSLIWL VNV /HOD OLSDUHV SDWL4 YDU VDNK VNV DNDH QHV Y
JUX FHURV VQX NOMLHQ XQ FLK V XQRNULWXX NRNX VWXPEUX YLUVPDV &
1987; Wheeler et al., 1998).

Pētījuma objekts

/DXND S'WMXPX VDJDWYR DQ LPDQWRMD /DWYLM DV 365 IORUDV KR
PDWHULONVZj_ /DWYLM DV 8QLYHUVLW WHV %LROR \$MDV LQVWLW
ODERUDWRULMDV KHUEULMD NDUWRW NX 'DEDV DLJDUGEDV SUYDOG
SUYDOGEDV VLVWPDV ARQMLUPELMDU VXJXXQELRWR SXHN VSHUWXVQLH
LQIRUPELMSDU /HOD OLSDUHV DVWMDXQD YLHWXLY OLQRWHLFD WRS LHGE
GDGLHP(LURSDV 6DYLHQEDV DLJDUMDPDMLHPELRWRSLHPXQDWUDDQV
GDGRV SXQNWRVSLHOLNXPV 3'WMXPXSLHOLNXPVDWWOR DQDLLPDQWF
ELROR \$VNV LQYHQWDULFLMDV NYDGUWX WNOX NXU YLHQD WNOD HOHP
70,70 km² DWWOV LZ dZ b j .DUWH DWELOVW /DWYLM DV YDVNXOUR DXJX
IORUDV LGHYXPRV LPDQWRWDMP NDUWP XOCUW—DWWOV
DWURGDV GLYDV S'WV—SRSXOFLMDV MR NDUW•LPDQWRWDLV DWUDC
SXQNWWQHDWVSRJXRWDNVRQDV DVWRSDPEDVELHXPXNYDGUW—

JDG LHJXYD /HOD OLSDUHV SRSXOFLMX DWWOV PLNURELRWR SX
DXJX VDELHGUEOR \$VNR UDNVWXURMXPX 3DU /HOD OLSDUHV PLNUR
S'WMXPX VNDWMDP ² OLHOXSODWEX OLNURELRWRSDOLHOXPDLY OLQRWH

- SBN ± HJZM
 [REDACTED] [REDACTED]
 [REDACTED]
 [REDACTED]
- [REDACTED] ± /HOD OLSDUHV SDWL4 DXJ SD YLHQDP YDL QHOLH
 JUXSV-WLH VDNKMDV VQX FLK V NOMLHQ NDU VQVNXUDV DXJ
 YDVNXOUR DXJX FHURV YDL WR VDNK XQ VDNQH SLQXP-PLNUR
 LHSODNV—
- [REDACTED]



DWWOV/HODOLSDUHV *Liparis loeselii* PLNURELRWRSXWMRKHWDV
 Figure 1 Study sites of *Liparis loeselii* micro-habitats.

OGXPEOHVSXUYVVDULDHHUDNUDVWDVONEXSXUYV%HGQHV
 SXUYV%DLHNXHHUDNUDVWDVONEX(QJXUHVHHUDDXVWUXPXNUDVVWVSLH
 /HSVWHV(QJXUHVHHUD2UKLGHMXWDNDVJDOV*DLHHUDNUDVWDVONEX
 .DLHHUDHHUDGLHQYLGXNUDVVW±.OWHQHVHHUDNUDVWDVONEX
 3HOKSXUYV3WHUHHUDYLJD3ODWHQHV SXUYV DONXNDUMHUV
 6WURSDNDUDNUDVWDVONEXHEUXVHHUDNUDVWDSXUYV

OLNURELRWRSX XYNLWL YHLFD/HOD OLSDUHV SRSXOFMDV GDELV
 3WWDMV-SRSXOFMLV-PLNURELRWRSX VNDLWV YDULMD QR YLHQD.OWHQV
 VONEXOGYDLUNN-DON XNDUMHUVXSXUYV3RSXOFMLXDWLEUJOLHOXPD
 G° PLNURELRWRSXP UDNVWXUJVDXJX VDELHGUEDV DSUDNVWDDQL
 PLNURELRWRSX NXUD VXJX VDVWYV XQ SURMHNWYDLV VHJXPV YLVSUH
 NRQNUWVSRSXOFMDVDXJDDQDVDSVWNXSDDWQEDV

3WVMP-LPDQWRWR MGLHQX VNDLGURMXPV DXFVVDVYKOUR
 ODNVWDXJX FHULNXURV VQV-DXJRLH/HOD OLSDUHV SDWLSSDDXJWVWLQR
 OPHQLPSDOXYDLOJVVWRDOLHWXVODLNQHDSOGDGMVNDURRODNVWDXJX
 FHULNXURV VQV-DXJRLH/HOD OLSDUHV SDWLSSDDXJWVWLQRWLHVGHQVOPHQ
 YDLOJVVWRDOLHWXODLNDSOGDGMVLYDLSLOQJL

Pētījuma metodes

PHWFLMDVDSUDNVW D QD

**LRWRSX SLHGHUEDV (LURSDV 6DYLH QDV SDE DLVDUJMDPDM LHP I
QWHLNDQLPDQVRMD DWYLMEDV IRQD LYWUGW-ELRWRSX QWHLNDQ
PHWRGLNXQDHG**

0LNURELRWRSRVUHS VWUMDV QXSDSDU DXJXXQLHGDXJXVXJDVQRV
SURMHNWYR VHJXPX SF % QDQDN NRPELQV VHSWLK EDOOX VNDQDV
nav sastopama; + ± PDNSDUYDLDWVHYL LHNHVPSOU ± 5±20 %; 2 ± 20±40
%; 3 ± 40±60 %; 4 ± 60±80 %; 5 ± 80± PLNURELRWRS D SODWEDV 9DVNXOUR
DXJX VXJX QRVDXNXPL DWELOVW /DWYLM DV YDVNXOUR DXJX IORUDV W
*DYULORYD XOFV VQX VXJX QRVDXNXPL DWELOVW /DWYLM DV VQX VDUDN
EROLD

0LNURELRWRSXDXJXVDELHNRORXN UDNVWXURMXPDLHJ D QD

0LNURELRWRSX HNRORX VNR SDWQEX QRVNDL GURD QDL LHJXYD DXJ
HNRORX VNR UDNVWXURMXPX ,PDQWRMD VHDV (OOHQEHUJ D LQGI
YDVNXOU DMLHPDXJ EHP5 tenes reakcija (pH), F ± mitrums, L ± gaisma, K ±
NRQWLQH QWDOLWVSHUDWUDV OSHNOLV XQSLHFDV 'LOODLQGLNDWRUY
VQPS ± augtenes reakcija (pH), F ± mitrums, L ± gaisma, K ± NRQWLQH QWDOLWV
T ± WHPSHUDWUD (OOHQEHUJ HW DO (OOHQEHUJ Mueller-Dombois &
Ellenberg, 0LNURELRWRSXDXJXVDELHGUEPDSULQMD

- augtenes reakcijas, mitruma, gaismas, NRQWLQH QWDOLWVHV WHPSHUDV
VOSHND YLGMV-LQGLNDWRUYUWEDV (OOHQEHUJ VNDQ-YDVN
VXJP-
- augtenes reakcijas, mitruma, gaismas, kontinentDOLWVHV XQ WHPSHUDWU
YLGMV-LQGLNDWRUYUWEDV'LOODVNDQVQXVXJP-
- **██████████**

MEV -'LOODLQGLNDWRUYUWEXVNDQ-

7HPSHUDWUDV XQ DXJWHQH V UHDFN LQGLNDWRUYUWEX WLFDP
SUEDXGHL 6FKDIIHUV 6NRUD DVWRX SRSXOFMLN NURELRWRSRV /HOD
OLSDUHVLHG D QDVPDNLXPDPYDLDXJXQREULH D QDVODLN D LNDLQWHU
OGYHLFDWHPSHUDWUDV XQDXJWHQH V UHDFN LMDVS+PUMS desmit
DWNURMXPXRV ,PDQWRMD ODXND PUMXPLHP SLHPURWX 303PHYUX 3+
WHPSHUDWUDVGLVSOHMXNXUDSUHFLJWVHELMDS+XQ&

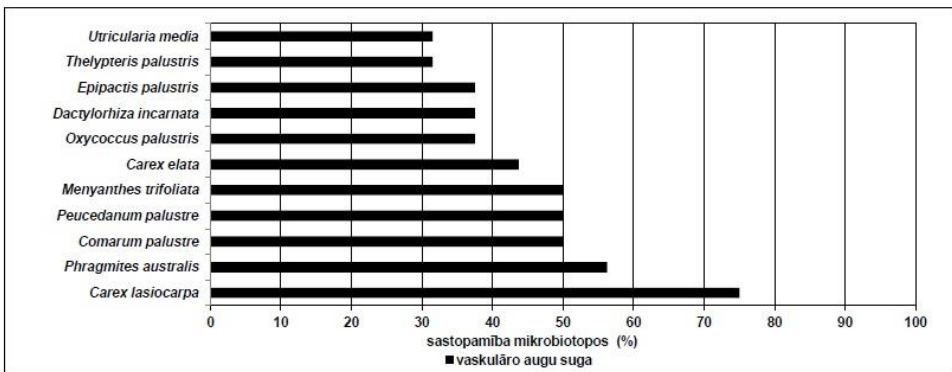
3WMXPLPDQWRMD DGDSW WX ,JDXQLMDV XQ 6RPLMDV DLVDUJMDPRI
PRQLWRULQJDPHWRGLNXQV WIULHWDONDU DWYLM DV IDWXUD
YLHWXPRQLWRULQJDODNVWDXJXVXJXPRQLWRULQJDPHWRGLNXQ RQ

5(8/77,

3WMXPD REMHNWL DWUDGMRSDRVDYLHQEDV SDE DLVDUJMDPDM
biotopos: 2190 *Mitras starpkāpu ieplakas*, 7140 *Pārejas purvi un slīkšņas*, 7210*
Kaļķaini zāļu purvi ar dižo aslapi, 7230 *Kaļķaini zāļu purvi* SLHOLNXPV

0LNURELRWRSX DXJX VDELHGUEV NRQVWDWMD YDVNXOUR DXJ
YDVNXOUR DXJX VXJDV VDVWRSDPDV YDLUNURELRWRSX DXJX
VDELHGUEX

DWWOV SLHOLNXPV3NDXJXJUVOICarex lasiocarpa (KUKNRQVWDWMD
75,00 %, parasto niedri *Phragmites australis* &DY7ULQHFWHXGĀHW
SXUYD YUQNMYComarum palustre / SXUYD UTWGLOPOLucedanum palustre (L.)
Moench., trejlapu puplaksi *Menyanthes trifoliata* / ÅPLNURELRWRSX
0LNURELRWRSXDXJXVDEINRGVVDWMD VQX VXJDVQRNXUPGHYLDV VXJDV
ELMD WLNDL YLHQ-PLNURELRWRSX DXJX VDELHGUEV LYDV VQX+VXJDV
struplapu sfagns *Sphagnum flexuosum* Dozy et Molk. un grieztais sfagns
Sphagnum contortum 6FKXOWELMDVDVWRSDPDVGLYVEHWLHVUWDLVVIDJQ
Sphagnum rubellum :LOV ÅVULMV- PLNURELRWRSX DXJX VDELHGUEV-
,QYDYRFLWHMPMXVXJXNOWEĒWQLQHNQVWDWMD

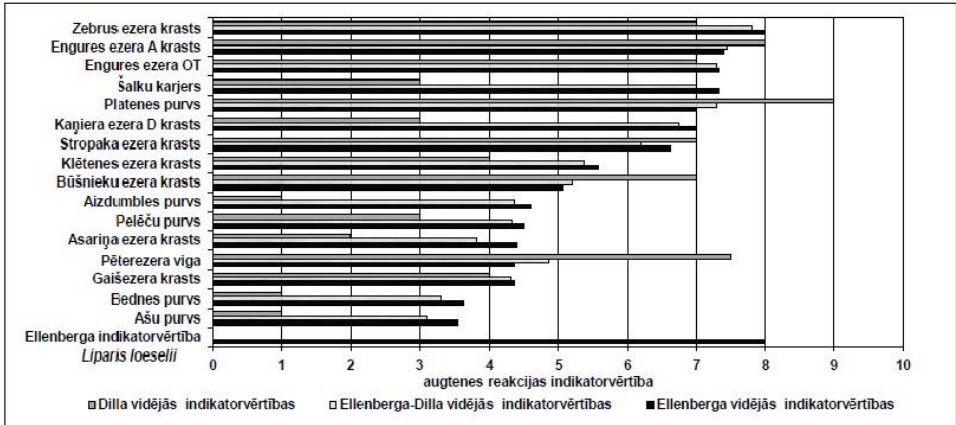


DWWOVHODOLSDUHVPLNURELRWRSRVELHNVDVWRSDPVYDVNXOURDXJXVXJDV
Figure 2 The most frequent vascular plant species (% of the total number of micro-habitats)
in micro-habitats of *Liparis loeselii*.

0LNURELRWRSX DXJX VDEINRGVHV UHNDNPLNDV LQGLNDWRUYUWED
YDULMDDWVOV

- ~~SPHAGNUM~~
- ~~LCM~~
- ~~SPHAGNUM~~
- ~~MOG~~
- R ~~PL~~

LQGLNDWRUYUWEXVND0—
 0LNURELRWRSX DXJWHQ•YHLNWLH DXJWHQH V UHDFNFLMDV PUMX
 PLQ OGPD[VYDULH HJHUD NUDVWD VONOG]
 no min 7,18 OGPDβODWHQHVSXUY—SLHOLNXPV



DWW0VHOD OLSDUHV PLNURELRWRSX DXJX VDELHGUEX YLGMV DXJWHQH V
 LQGLNDWRUYUWEDV
 Figure 3 Mean indicator values of substrate reaction in micro-habitats of *Liparis loeselii* plant communities.

0LNURELRWRSXDXJXVDELHGUEX YLGMV LQGLNDWRUYUWEDVYDULMD

- [Symbol]
 - [Symbol]
 - [Symbol]
 - [Symbol]
- 'LOODLQGLNDWRUYUWEXVNDODWW0V

0LNURELRWRSXDXJXVDELHGUEX YLGMV LQGLNDWRUYUWEDVYDULMD

- [Symbol]
 - [Symbol]
 - [Symbol]
 - [Symbol]
- Dilla
 LQGLNDWRUYUWEXVNDODWW0V

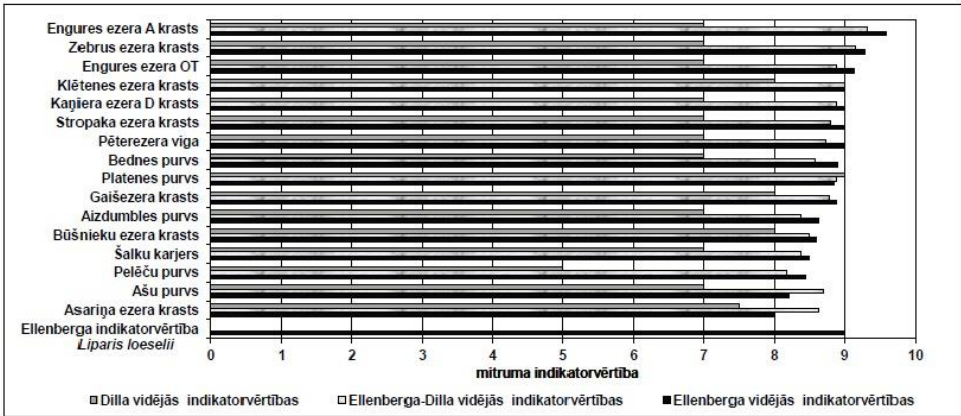


Figure 4 Mean indicator values of moisture in micro-habitats of plant communities with *Liparis loeselii*.

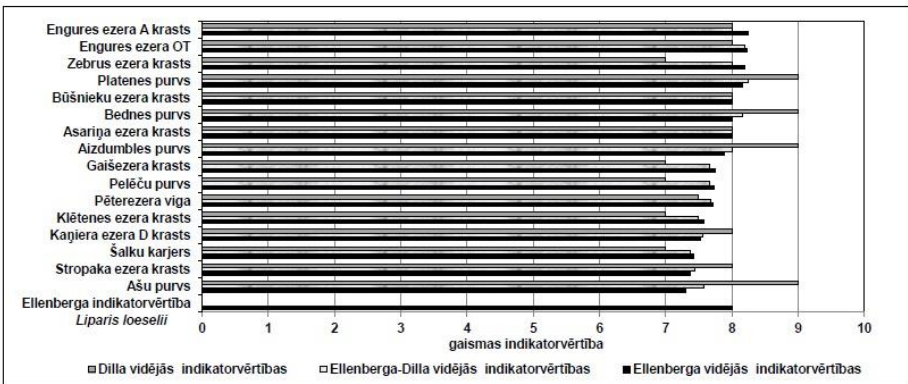
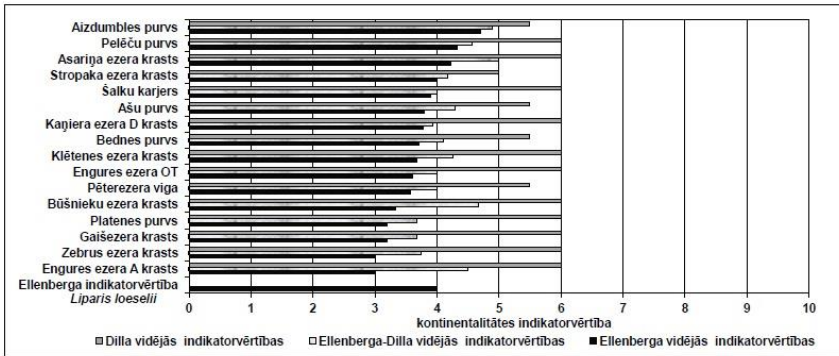


Figure 5 Mean indicator values of light in micro-habitats of plant communities with *Liparis loeselii*.

0LNURELRWRSX DXJX VDEINRQWEXHQHQWDOILVGMHLQGLNDWRUYUWED YDULMD

- [Symbol] [Symbol]
 - [Symbol] [Symbol]
 - [Symbol] [Symbol]
 - [Symbol] [Symbol]
- ±LOGV



DWWOV/HOD OLSDUHV PLNURELRWRSX DXJX VDELHGUEX YLGMV- NRQWLO
LQGLNDWRUYUWEDV

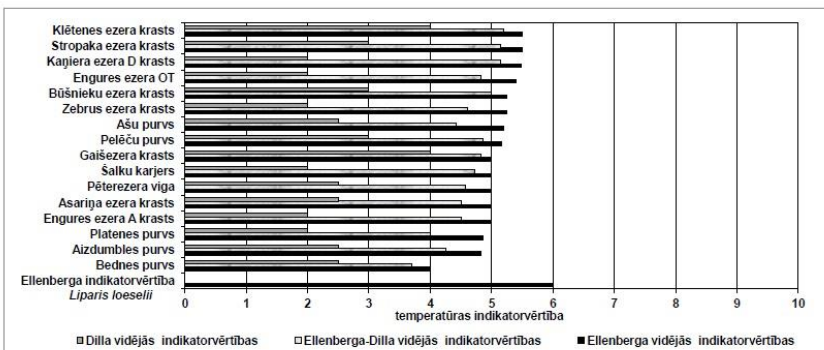
Figure 6 Mean indicator values of continentality in micro-habitats of plant communities with *Liparis loeselii*.

OLNURELRWRSXDXJXVDEWHGSEFXDWYDGMVLQGLNDWRUYUWEDVYDULMD

- [Symbol]
- [Symbol]
- [Symbol]

'LOODLQGLNDWRUYUWEXVNDODWWOV

OLNURELRWRSRV YHLNWLH WHPHSHUDWUDV PUMXPPYQULMD QR
OGPD DONXNDUMHU-OG PLQ OG z max 31,40
DONXNDUMHUSLHOLNXPV



DWWOV/HOD OLSDUHV PLNURELRWRSX DXJX VDELHGUEX YLGMV- WHPHSH
LQGLNDWRUYUWEDV

Figure 7 Mean indicator values of temperature in micro-habitats of plant communities with *Liparis loeselii*.

PLN UREL R WRSX DXJX VDELHGUEXVOSHNDYLGMLV LQGLNDWRU
 YUWEDVYDULMDQR\$DULDHHUDNUVDVWVONEDOGJOWHQHV
 HUD NUDVWD VONEXQ HEUXV HUD NUDVWD SXUYV (OOHQEHUJD LQGL
 VNDOD- WWOV

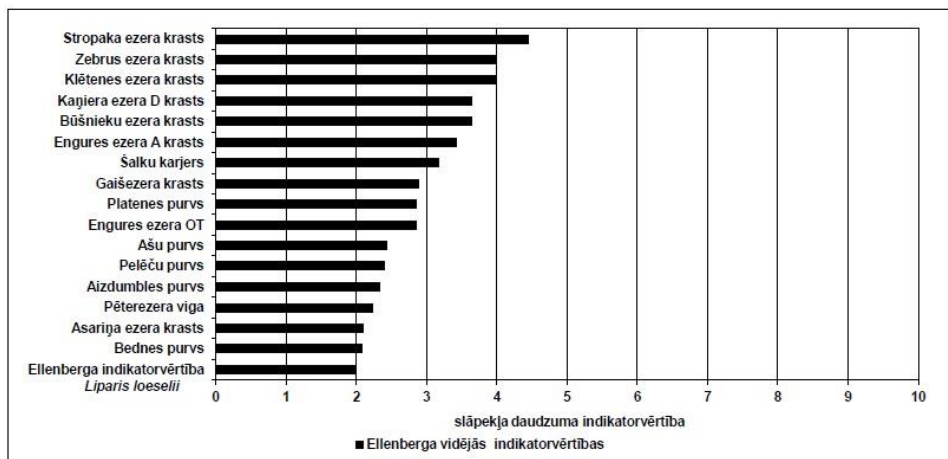


Figure 8 Mean indicator values of nitrogen in micro-habitats of plants communities with *Liparis loeselii*.

DISKUSIJA

Lēzela lipares mikrobiotopu augu sabiedrību ekoloģiskās īpatnības

PLN UREL R WRSX DXJX VDELHGUEXVOSHNDYLGMLV LQGLNDWRU
 YUWEDVYDULMDQR\$DULDHHUDNUVDVWVONEDOGJOWHQHV
 HUD NUDVWD VONEXQ HEUXV HUD NUDVWD SXUYV (OOHQEHUJD LQGL
 VNDOD- WWOV

(2. SLHOLNXPV 9DVNXOUR DXJX VXJX VNDLWX PLN UREL R WRSX DXJX VDELHGUEXVOSHNDYLGMLV LQGLNDWRU
 YUWEDVYDULMDQR\$DULDHHUDNUVDVWVONEDOGJOWHQHV HUD NUDVWD VONEXQ HEUXV HUD NUDVWD SXUYV (OOHQEHUJD LQGL
 VNDOD- WWOV

ND YDVNXOUR DXJX VXJDV VDVWRSDPDV YDLUN-N—PLN UREL R WRSX DXJX VDELHGUEXVOSHNDYLGMLV LQGLNDWRU
 YUWEDVYDULMDQR\$DULDHHUDNUVDVWVONEDOGJOWHQHV HUD NUDVWD VONEXQ HEUXV HUD NUDVWD SXUYV (OOHQEHUJD LQGL
 VNDOD- WWOV

JUVOLC *Carex elata* SO SDUDVW Q LHGUH SXUYD GHJXHQH *Phragmites palustris* (L.)
 &UDQW XQ VWYODSX GHJXSLDNVWVWH *Ha incarnata* /6Ry SWLUEQR
 YDVNXOUDMLHP DXLNDP WUV VQX VXJDV NRQVWDWMD YDLUNV—HOD OI
 PLN UREL R WRSX DXJX VDELHGUEV SLHOLNXPV OLN UREL R WRSX DXJX VD
 IORULVWL VNDLV VDVWYDQRWHLNDQD YDLHJW /HOD OLSDUHV SRSXOFLM
 DXJX VDELHGUEX HNROR\$ VNR UDNV QVXHLRWSX HNV WDWX SDU /HOD OLS
 /DWYLM DVSR SXOFLMDVHNROR\$ VNDMPSDWQEP—

Augtenes reakcija. /LWHUDWŪ-ĐWURGD PDV QRUGHV SDU /HOD OLS
 DXJDX QX NDDLQV-XQ PLWUV-DXJWHQV &HG HUEHUJ /IURWK 0F0DVWHU
 2001) ar augstu kalcija satuUX jG ! XQ SDHPHV ĢHX DWVORGHV YLHWP—

&HGHEHUIJ /IURWK EHW QH RWL VNEV-DXJWHQV<ZojZfz b f
 /HODOLSDUHV/DWYLM DV SRSXOF LMX PLNUREL RWR SRV YHLNWR DXJWHQH
 PUMXPX UHXOWWL SDUGMD ND PLNUREL RWR SX DXJWHQH V UH DNFLMD LU
 OGJEL VNDL S+ /GJL GDWL DWURGDPL /HOD OLSDUHV H KLMDV
 SRSXOF LMDV DSVWNL PLWUXPD LQGLNDWRUYUWEDV (OOHQEHUJ 3WWR PLNUREL RWR SX
 9HOLVHN 6DYXNUW 3ROLM 0LHOQR GDEDV UHHUYWD /HODOLSDUHV SRSXOF
 S W M X P N R Q V W D W M D N D N G U D V G X E X U H D N F L M D F P G L X P L 7 , 2 0
 %HGQRUJOOHQEHUJDVNDO- /HODOLSDUHV LQGLNDWRUYUWEDUDNVWXUR
 YMLVNEVXQEL VNVNDDLQV DXJWHQV (OOHQEHUJ 3WWR PLNUREL RWR SX
 DXJXVDELHGUEX VXJX YLGMV LQGLNDWRUYUWEDV (OOHQEHUJDVNDODN
 VNEV-OGJEL VNV-DXJWHQV DWVWODWHQH V SXUYD XQ 3WUHHUD YLJ
 PLNUREL RWR SX DXJX VDELHGUEX VXJX YLGMV LQGLNDWRUYUWEDV 'LO
 DWUVQR DXJX VDELHGUEX VXJX YLGMV LQGLNDWRUYUWEDV (OOHQEHUJ
 7DV DSOLHFLQD DEX VNDQX LPDQWRDQDV QHSLHFLH DEX DNHND P
 DXJWHQH V UH DNFLMDV UDNVWXURMXPDLHJ DQDL DSVWLSULQRW QRUC
 VDELHGUEV NXUV VYDUJD QRPH LU VQ-LOOD LQGLNDWRUYUWEX LPDQW
 VQLHG SUHF N X DXJX VDELHGUEX HNROR VNR UDNVWXURMXPX 6DOPL 3
 kalCIFILU VXJX% DURQLD & HSXUWHX V NDWW /HODOLSDUH/DWYLM LUDU
 SODX DXJWHQH V UH DNFLMDV WROHUDQFH V DPSOLWGX WR DSOLHFLQME
 PLNUREL RWR SRV YHLNWLHDXJWHQH V UH DNFLMDV PUMXPX 9LVWLFDPNW
 /HOD OLSDUHV DMDV SRSXOF LMDV DWUDDQRV WXYX DUHOD LPHX
 SWURGDPDV QRUGHV NDGRV DSVWNRV SRSXOF LMDV LHP EUYVQLD V DU PD
 konkurenci (Morin, 2011).

Mitrus. /HODOLSDUHV LQGLNDWRUYUWEDV (OOHQEHUJDVNDODN
 YML DHUWDV DDXV OOHQEHUJ 3WWR PLNUREL RWR SX DXJX VDELHGUEX
 YLGMV PLWUXPD LQGLNDWRUYUWEDV (OOHQEHUJDVNDODNVWXURMDI
 QH VODSMV-OGJLWHLNWL VODSMV YML DHUWV-DXJWHQV 6DYXNUW (OOH
 YLGMV LQGLNDWRUYUWEDV DSVWNL PLWUXPD LQGLNDWRUYUWEDV (OOHQEHUJ
 DHUWDV DXJWHQV -QRUGD ND PLNUREL RWR SRV /HOD OLSDUHV SDW
 GDXGJ DGJR YDVNXOUR DXJX VDNQH XQ VDNX SLQXPDXJRD MV VQV YDL VQ
 FLRV XQ NOMLHQ WGP PLWUXPD YLGMV LQGLNDWRUYUWEDV (OOHQEHUJ
 QHUDNVWXUR UHORV /HOD OLSDUHV VDNX DXJDDQDV DSVWNVXV 3UHF N X SU
 SDUPLNUREL RWR SX PLWUXPD DSVWNL LHPNXURVDWURGDV /HODOLSDUHV V
 VQLHG D 'LOOD LQGLNDWRUYUWEDV NDV UDNVWXURMD PLD X D Q N Q YLGA
 DSVWNVXV YDLU SNVHLS WWR PLNUREL RWR SX DXJX VDELHGUEX DWVWODV Q
 ND SXUYL LU ELRWRSL DU PDLQTX PLWUXPD UHF X & URQN)HQQHVV\
 (OOHQEHUJ WGD MRVSD DQRPH LU PLNUREL RWR SLHPNXURV /HODOLSDUH
 SDWLHLU ODEYONL DXJDDQDV DSVWNL OLNUREL RWR SX YDVNXOUR DXJX V
 VDNQH X SLQXPDXJRV VQDVLQGLQDNUVDV PLWUXPD UHFDVYUWEDV /H
 OLSDUHV GYRWVSM DV QRGUR LQDQDL WDPLU VYDUJD QRPH MRPVX YHLNW
 OLSDUHV YHFIW D V Q R Q D W R P L V N V X E I H V S W M X P L 5 R H H W D O 5 R H H W
 DODDWNOMDND /HODOLSDUHL WUNVWPLWUXXQVODSMX YLHWXDXJLHPU
 DHUHQP D V X J L D U G X X E Y L Y D U S D F L H V W W L N D L V O D L F J X D S S O D Q X E H W Q H
 DWUDDQRVDQDHURENHG & Fennesy, 2001; Lambers et al., 2008).

Gaisma. /HOD OLSDUH DXJ ELRWRSRV DU VNUDMX YHIFWFLMX -RQH
 &HGHUEHJ /TURWK 0F0DVWHU 3UDVJXPX SF JDLVPDV DSOLHFLQD
 DU/HODOLSDUHVPRUIRORSGMYD VJDQGU\$UHWM LQRVYCHDSV DODSXIRUPD
 SDWV VDOGLQRE QHOLHOLH LPUL NDV WR UDNVWXUR N-YLHQDV MRVODV
 1997; Pianka, 2000; Xu et al., 2009) /HOD OLSDUHV JDLVPDV YUWED (OOHQEHUJ
 LQGLNDWRUYUWEX VUDO-UDNVWXUR JDLVPDV SUDVJDV VAWR (OOHQEHUJ
 PLNURELRWRSX DXJX VDELHGUEX VXJX YLGMV-LQGLNDWRUYUWEDV SF
 Ellenberga-'LOOD XQ 'LOOD VNDODV VQLHGD OGJX UHXOWWX DWWOV UDNV
 PLNURELRWRSXDXJXVDELHGUEDVNGDMLQRQRWDV OGJDLVPDV SUDVJDV
 ka GDM LQRQRWRVDSVWNRV/HODOLSDUHVSDWLDXJJDGMXPRVMDFLWXY
 DXJX YLUVHPHV GDDV YHLGRMD VNUDMX SURMHNWYR VHJXPX QHWUDXF
 *DLH HUD NUDVWD VONED .OWHQHV HHUD NUDVWD VONED 3HOK SXUYV 7G
 gaismas indikDWRUYUWEXUGWMX DQDOMHPYU PLNURELRWRSYDVNXOUR
 VXJX SURMHNWY-VHJXPX QX DXJX VYRMXPD LHVSM DP-LHWHNPH \$LUED
 VXJXSURMHNWYR VHJXPX/HODOLSDUHV PLNURELRWRSXQSUMELRWRSDGI
 LQIRUPFLMXSDUVXJDLCDHPYUJDDQDVDSVWNLHP
 .RQWLQH QWDOLW WHXQWHP/HODOLSDUHVNRQWLQH QWDOLW WHV
 (OOHQEHUJ LQGLNDWRUYUWEX VUDO-UDNVWXUR VXERNHQLVNDV D
 (OOHQEHUJ QDOLMRW PLNURELRWRSXDXJX VDELHGUEDVNRQVWDWMDDV
 sWDUS (OOHQEHUJ YLGMPLQGLNDWRUYUWEPXQ 'LOOD YLGMPLQGLNDW
 9LGMV-VXJX LQGLNDWRUYUWEDV (OOHQEHUJ LQGLNDWRUYUWEX VUDO
 VDELHGUEDV N-YML VXERNHQLVNDV OGJRNHQLVNDV 6DYXNUW VXJX
 LQGLNDWRUYUWEDV DQONVNXURDXJXVDELHGUEDV N-YML VXERNHQLVN
 VXENRQWLQH QWODV WXUNOW VXENRQWLQH QWODV VXJX YLGM LQGLNDV
 QR SWWDM PPLNURELRWRSXDXJX VDELHGUEP DWWOV 5HXOWW VDSVWLSU
 NDDUNRQWLQH QWDOLW QHLYQRVYHGMRLQGLNDWRUYUWEXLPDQWRDQDI
 VYDUJD XQ SUHFNX UHXOWWX VQLHGJ (OOHQEHUJ LQGLNDWRUYUWEX
 LPDQWRDQD /HODOLSDUHV PLNURELRWRSXDXJX VDELHGUEDV LU YML VXI
 OGJYML VXENRQWLQH QWODV NDV SDUGD/HODOLSDMDV SRSXOFMDV SOD
 WROHUDQFHV DPSOLWGX SUHWNRQWLQH QWDOLW WL
 /HOD OLSDUHV WHPSHUDWUDV YUWED (OOHQEHUJ LQGLNDWRU
 UDNVWXURDXJDXPUHQRV XQ VLOWNRV NOLPDWLVRV DSVWNRV NDV D
 DSVWNLHP DUHOD FHQWGLDMDXVHO HW DO (OOHQEHUJ
 0LNURELRWRSX DXJX VDELHGUEX VXJX YLGMV-LQGLNDWRUYUWEDV (O
 UDNVWXUR PUHQL VLOWXV NOLPDWLVRV DSVWNRV VDYNDQXLOOD
 YVRV YVRV OGJPUHQL YVRV NOLPDWLVRV DSVWNRV DWWOV 9LGMV-
 LQGLNDWRUYUWEDV (OOHQEHUNDO-UDNVWXURMD DXJDXPUHQL YVRV
 PUHQL VLOWRV NOLPDWLVRV DSVWNRV EHGDDQDV XQ DXJX QREULHD
 PLNURELRWRSRVYHLNWD MRV WHPSHUDWUDV PUMXPRVNRQVWDWMDLH
 tempHUDWUDV VYUWREDEV '& OGJ'& SLHOLNXPV
 Ellenberga-'LOODYLGMV LQGLNDWRUYUWEDV XQWHPSHUDWUDV PUMXPLPL
 DXJWHQ•DSVWLSULQMD ND /HOD OLSDUHV /DWYLM DV SRSXOFMD LU
 WHPSHUDWUDV WROHURBQKNGHODFHQWUODMGDH HXVHOHWDO

6OSHND GDXGKPV /LWHUDWÙÐWURGD PDV QRUGHV ND /HOD OLSDUH
 DU VOSHND QDEDGJV-DXJWHQV &DVH :KHHOHU HW DO 0F0DVWHU
 6DYXNUW /HOD OLSDUHV VOSHND YUWED SF OOHQEHUJD LQGLNDWRUYUV
 VNDODV UDNVWXUR DXJÐQX DU EDUEDV YLHOPQDEDGJDV UHWNDXJOJNV
 (OOHQEHUJ 3WMXP-NRQVWDWMDND /HOD OLSDUHV PLNURELRWRSX DXJ
 VDELHGUE DV DWURGDV JDQ DU VOSHND QDEDGJV-DXJWHQV-SHDDU YLGM
 GDXGKPV RWL UHWL DU VOSHND EDJWV-DXJWHQV-DWYLDV
 SRSXOFLMDV LU SODAX WROHUDQFHV GLDSDRQX SUHW VOSHND GDXGK
 3DOLHOLQVX VOSHND GDXGKPV-SWMXP-NRQVWDWMD 6WURSDND HHUDNU
 .OWHQHV HUD NUDVWD VONKQ HEUXV HHUD NUDVWD SXUYÐWV VOV ,HVSMD
 ND DXJX DWPLUXR GDX XNUÐQV-XQ VDGDOÐQV-DXJWDMRV FHURV PHÐ
 NUDVWX VONM.OWHQHV HHUV NÐU ÐQWURSRJQDLV SLHVURMXPV 6WUR
 HHUV YHLGRMD EDJWNV DXJÐQV NVXV 'DELVN-VXNFHVLMDV JDLW-DM
 PLNURELRWRSRV VNXÐV DXJW YDVNXOUR DXJX VXJDV NXUDV SF (OOHQEH
 (OOHQEHUJ VDVWRSDPDV YLGM L DXJOJRV XQ DXJOJRV DXJÐQDV ÐSVWNRV
 SDUDVW-QLHGUH (LURSDV YLONQDGH *europaeus* L., EUX% LYHUHQH
Scutellaria galericulata L. XQSDUDVVSXUYSDSDUJGV *palustris* 6FKRWWR
 VXJX SURMHNWY-VHJXP SLHDXJXP UDGD /HOD OLSDUHL QHODEYÐJXV I
 DSVWNVXV MNVXNFHVLMDV DJUQR VWDGLMXV VXJLDU ODEXNRORQLÐQD
 NRQNXUÐQDVVSMX/DPEHUVHWDO

3WMXPV SDUGMD ND LQWHUSUHWMRW VOSHND YLGMV-LQGLNDV
 PLNURELRWRSX DXJX VDELHGUEÐDU QHOLHOX VXJX VNDLW% MHP Y
 SURMHNWYDLV VHJXPV S'YLHQD EDUEDV YLHOP-SUDVJND VXJDV SDWÐNO
 PLNURELRWRSDDXJX VDELHGUE-SDOLHOLQD VOSHND YLGMRLQGLNDWRU
 VQLHGGRWQHSUHF% SULHN%WDWXSDU VOSHND GDXGKPV DXJWHQVSLHPUDP
 ezera krasta SXUYD /HOD OLSDUHV PLNURELRWRSDDXJX VDELHGUE-SDUDVW
 SURMHNWYDLV VHJXPV LU QHOLHOX EHW WV-DXJWV-VOSHND
 LQGLNDWRUYUWEDSDOLHOLQDPLNURELRWRSDDXJXVDELHGUE DV YLGM

/HOD OLSDUHV /DWYLDV-SRSXPL PLNURELRWRSX DXJX VDELHGUEX L
 YÐ VHFLQW ND WLNDL (OOHQEHUJD LQGLNDWRUYUWEX LPDQWRÐQD QHV
 SULHN%WDWX SDU /HOD OLSDUHV PLNURELRWRSX DXJX VDELHGUEX HNROR
 SDWQEP-3UHFNR SULHN%WDWX SDU /HOD OLSDUHV VYLDV SRSXOFLMD
 HNROR%VNDMP-SDWQEP-VQLHGJ (OOHQEHUJ DYLGMR LQGLNDWRUYUW
 LPDQWRÐQD 3WMXP-NRQVWDWMDND /HOD OLSDUHV /DWYLDV SRSXOFLMP
 WROHUDQFHSUHWDXJWHQH VUHDNFLMXPLWUXPXJDLVPXNRQW%LQHQWDC
 VOSHND 7R DSVWLSULQMD DU PLNURELRWRSRV YHLNWLH DXJWHQH
 WHPSHUDWÙDVPMXPL

Sukcesijas ietekme un Lēzela lipares biotopu apsaimniekošana

'DELVNLH SXUYLLU QRWXUJL SUHWLQYDYR FLWHHPMX VXJX LHQNDQ
 WGR VX JX SDUGÐQV-OLHFLQD SDU SXUYX NYDOLWWHV VDPDQ
 %QLD 3WWR /HOD OLSDUX /DWYLDV SRSXOFLMXELRWRSDXJX VDELHGU
 LQYDYV-FLWHHPMX VXJDV QHNRQVWDWMD NDV OLHFLQD SDU R ELRWRSD

/HODOLSDUHV/DWYLM DVSRXSXOFLMX SWSMXPRV NRQVWDWMD ND OLHONR DSGUDXGMPX DL VXJDL UGD HNVS DQVYVYLHV IORUDV VXJDV NXUDV GDEL VNV VXNFHVLMDV JDLW V WUDXML SDQLHOLQD SDUDVW SXUYV WUWHgale /SDUDVW QLHG UHJUX GLPW DV & \$SHUDFHDH -XV VXJDV SDL GLD VODSH NXUDV YDU YHLGRWIFRQas audzes (Roze et al., E S T EHPHDPHULNDV .OLQX NDOQX /HOD OLSDUHV SRSXOFLMX SWSMXPRV NRQVWDWMD ND OLHONR DSGUDXGMPX DL VXJDL UGD HNVS DQVYVYLHV SURMHNWYVHJXPDSLHDXJXPV OF0DVWHU 5ROI VPHLHU /HODO ipares /DWYLM DV SRSXOFLMX SWSMXPRV NRQVWDWMD ND NRQNXUMRR VXJX SURMHNWYVHJXPDSLHDXJXPV SDVOLNWLQD /HOD OLSDUHV DXJDDQV PLNURELRWRS 3DU WR OLHFLQMD SDWXLHG NRSDV DVV LPLHNDQV XQ OD. DVLPHWULMDV DQVNDU UHSURGXNFLMDV VHNPMX SDYMLQDQV 5RH HW D5RHHWDOE3DOLHOLQRWLHVNRQNXUMRR VXJXSURMHNWYDMDPVHJXPDU URGDV QH WLNDL QHSLHPURWL JDLVPDV DSVWNL EHW WLHN WUDXFWD (Cronk & Fennessy, 2001), kas L HODOLSDUHLN D X JDPNXUDPWUNVWPLWUXYL DXJLHP UDNVWXUJR DQDWRPLVN V X EYHV VWUXNWUX LU SDL QRPJD DSSC JDGMXPRV

6DXV HPHV RUKLGHM X GLPW DV VXJX DWUDGX DSV DLPQLHNRDQ H YLHWMR VXJXSURMHNWYVHJXPDVDPDQDQSDXDXQ -DQHPRYDHWDO 2005). /DWYLM DSGUDXGWNV LU /HOD OLSDUHV SRSXOFLMDV NDDLQDMRV NDDLQRVK SXUYRV DU GLR DVORL W VXNFHVLMDQRWLHN YL VWUN 5RH HW D /LWHUDWU DWURGD PDV QRUGHV ND DU G X WRSX DSV DLPQLHNRDQ L PDQWRSDXDXQ:KH HOHUHW DO \$QLDEOHQV MRVODV RUKLGHM X VXJPNXUDV LU JDLVPDV SUDVJDV XQ VWUDXML DWVWVW YH H WFLMDV V SUDNWL YOR SDXDXQ DXJXVW YDL VHSWHPEU XOO 2RVWHUPHLMHU HDUWPDQ 7RPU PVX SWSMXPL SDUGD ND /HOD OLSDUHV /DWYLM DV SRSXOFLMX ELRWRSX DSV DLPQLHNRDQ YODPV LPDQWRW GDXGJDGJR O SDXDXQ IHEUXPDUWMR /HODOLSDUHV V NODV QRJDWDYRMD RNVSK EHP EHW VNOX LELUDQD VNDV QDSD PDUW -7XUNO WHQLHFLHD PD QH WLNDL ODXNXPXL SDXDXQ DLSHODNPXQ GDXGJDGJ DMLHPODNVWD XJLHPNXUXF /HOD OLSDUH EHW DU WONX NRULGRUX YHLGRDQD 7LH VHNPV VNOX L\$OD 5RH HW DO D XQ MDXQX PHWDSRSXOFLMX YHLGRDQD stermeijer & Hartman, 2014) 7DVLU VYDUJL MR /HODOLSDUHV SRSXOFLMDV QHYHLGR VNOX (Thompson, 1987; Fenner & Thompson, 2005; Whigham et al., 2006) 3DXDQDQV ELHX PVNDWUJ DGMXPLULQGL YLGXOV XQDWN DUJV QRNRQNXUMRR VXJXS V HJXPDSLHDXJXPDSLHPUDJLHUVNL QDFLRQODMSDUN 3ROLMDSDXDXQ YH UHLH WURVJDGRVSHUVRQJNRPXQLNFLMDDUSDUNDERWQLLODFLHM5RPD

3WMPXNRQVWDWMD ND VXNFHVLMDV JDLW QRWLHNSDN SHQLVND / ELRWRSX DL DXJDDQDsto priedi *Pinus sylvestris* /SKD EUX *Betula pubescens* (KUK 3WHUHUD YLJD PHOQDONVQL glutinosa (L.) Gaertn., baltalksni *Alnus incana* /ORHQFK. DL HUDHHUDGLHQYLGXNUDVVVDONXNDUMH SDUDVWRSXUYPLWL %QLHNX HHVONASDIONB NUNOX *Salix cinerea* L. DONXNDUMHUV YLONX NUNOX *marinifolia* /XQHPREUX *Betula humilis* 6FKUDQN 3HOK SXUYV LDXJDXQ JDOYHQRNUW QRYURMD ELRWRSRV NXU / OLSDUHV PLNURELRWRS L DWUDGV NRQWDNWAIPROA YDLPVXVX NRQW

PHX YDL NUPMX GRV JDGMXPRV LHWHLFDPV VHNRMNDXJX SURMHNWY—
VHJXPDSLHDXJXPDPQHSLHFLHDPEDV JDGMXPYHLFRW VMHXSXDXDQX XQ N
FLUDQX UHVSHNWMRW /HOD OLSDUHV VNOX LELUDQDV ODLNX .RNDXJX
seJXP VDPDLQDQD /HOD OLSDUHV /DWYLM DV SRSXOFMLX S'WMXPD ODLN-
/HOD OLSDUHV DWUDGQDONXNDUMHJG XQ. DLHUDHJUDGLHQYLGXNUD
JDGXQ6WURSDNDHJHUDNUVDVON54 JDG—

LX SDU HNVWHQVYDV JDQDQDVVLDQDV SLHUHGL /HOD OLSDUHV
ELRWSXDSVDLPQLHNRDQSLHHMDPDMQLWHUDWULU PDJWURGD PDV QRU
LPDQWRDQXPLWUYSYVDXJRX/HOD OLSDUHV SRSXOFMLX X'WXUDQ6XQGE
HW DO HPRW YU /HOD OLSDUHV /DWYLM DV SRSXOFMLDVS QHVWVSROD
DWUDDQRVVXEVWUWDYLUVNUWNUUSDSLOGXVRUJDQLVNRYLHOXQRQ
SDOLHOLQWX PLWUXPD GDXGKPX LHVSMDPV ND HNVWHQVYD JDQDQD
GHGLQDQD LHP-KHHOHU HW DO QDY SLHPURWNDLV DSDLPQLHNRDQDV
veLGV/DWYLM DV/HOD OLSDUHV ELRWSXXXWXUDQDL

3\$(,&@)\$

RDNVWDDXWVWHLFDV\$QHVHL3ULHGHL8YLKDL9DOGD
%DURQLDL 'DFHL 6PWLHL9LMDL.UHLOHL3WHULP%YIQGNDP, HYDL 5RHL
XQ, HYDL 5UQHL SDU VQLHJWR DWEDOVWX S'WMXHDWHIIFEDQLJLHUVNL
QDFLRQO-SDUND 3ROLMD ERWQLLP 0DFLHM 5RPDQVNL SDU LHVSMX LHSD
/HOD OLSDUHV DXJDQDVDSVW'XSDWQEPXQELRWSXDSVDLPQLHNRDQDVS
3'WMXPV WDSLVDU (6SMHNWD\$WEDOVWV'DXJDYSLOV8QLYHUVLWW
VWXGLMXVWHQRDQDQV. 2009/0140/1DP/1.1.2.1.2/IPIA/VIAA/015) un
VDOVWVS'WMXPDSURJUDPPD(2017) projekta ĀDWYLM DVHNRVLVWPXYUWEDX
WVGLQDPLNDNOLPDWDLHWHNP(9.10)QVLØXDWEDOVWX

/,7(5\$E\$

Anon., 2007. /DWYLM DV 1DWXUD YLHWX PRQLWRULQJV % SLHOLNXPV 0HWRX ND
KWWSSELRGLYGDEDJRYOYIROIROODWXUD - -WHULWRQIMXRULQJD
PHWRQD -JDGEUHGDNFLMDPRQBPHWBQBSEBPHWRNDWDORJVS
VNDWWV

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§QLA / D 3XUYD ELRWRSL *UP-§QL\$SUHG *Eiropas Savienības aizsargājami biotopi Latvijā. Noteikšanas rokasgrāmata. 2. precizētais izdevums. Latvijas Dabas fonds, Vides aizsardzības un reģionālās attīstības ministrija, Rīga, 207+244.*

§QLA / E 7210. *Kalkāinie zāļu purvi ar dižo aslapi. Grām.: Auniņš, A. (red.) Eiropas Savienības aizsargājami biotopi Latvijā. Noteikšanas rokasgrāmata. 2. SUHFLVDLVLGHYXPV/DWYLM DVQEDVGRVDLVYDUGEDVXQUH\$RQOVDWVWVE PLQLVWULMD5J236.*

§QLA / F 7230. *Kalkāinie zāļu purvi. Grām.: Auniņš, A. (red.) Eiropas Savienības aizsargājami biotopi Latvijā. Noteikšanas rokasgrāmata. 2. precizētais izdevums.*

- /DWYLM DV 'DEDV IRQGV 9LGHV DLYDUGEDV XQ UH&RQOV-DWWVWEDV PLQLV
241±244.
- QLUHG** *Eiropas Savienības aizsargājami biotopi Latvijā. Noteikšanas
rokasgrāmata. 2. precizētais LGHYXPV /DWYLM DV 'DEDV IRQGV 9LGHV DLYDUGEDV
UH&RQOV-DWWVWEDV PLQLVWULMD5JD*
- EROLAŠ /DWYLM DV VQXVDU DNWVVeģētācija, 3. SIA PIK, Rīga, 47–87.
- %DURQLØ9 /HODOLSDUH*UP.DYDFV*UHG *Latvijas daba. Enciklopēdija, 3.
/DWYLM DV(QFLNORSGLMD5JD*
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in DaEUZND6WDQHQH DU6LHGOFH3RØØØG *University Research and Conservation* 1±
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Bloomfield Hills, 253.
- &HGHEUJ % /URWK 0 HGV *Svenska djur och växter i det europeiska
nätverket Natura 2000. ArtDatabanken, SLU, Uppsala.*
<http://www.artdata.slu.se/publikationer/svenska-djur-vaxter.asp> VNDWVV
- &HSXUWH % *Latvijas vaskulāro augu flora 7: Orhideju dzimta (Orchidaceae).
Latvijas 8QLYHUVLWVWH5JD*
- &HSXUWH% /HODOLSDUH*Liparis loeselii* /5LFK*UPQGUXDLWLWV*UHG
*Latvijas Sarkanā grāmata. Retie un aizsargājami augi un dzīvnieki, 3. Vaskulārie
augiDWEMDVQLHUVLWVWHVLROR&MDVLQVWL578&57D.*
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- LZZdZ E Deybgy =ehlgbdk Gdhlhju_flhbqkdb_hijhku bamqgby bhhh khklZZ nehju aZiZghc EZlbb < dg L ZZdZ E j^ Флора и растительность Латвийской ССР. урземский геоботанический район. Зинатне, Рига, 86-120. (in Russian)**

STUDY ON MICRO-HABITATS FOR UNDERSTANDING THE ECOLOGY AND MANAGEMENT REQUIREMENTS OF *LIPARIS LOESELII* POPULATION IN LATVIA

Daina Roze, Dace Megre, Gunta Jakobsone

Summary

The species composition of the plant communities in micro-habitats of 16 *Liparis loeselii* populations was studied. In total, 12 moss species and 44 vascular plant species were recorded. 10 species of vascular plants were observed in more than 30 % of micro-KDELWDWV (OOHQEHUJ LQGLFDWRU YDOXHV IRU YDVFYXODU SODQWV) values for mosses were used for ecological characterization of the micro-habitats of *Liparis loeselii*. As suggested by the mean indicator values of plant communities in micro-habitats and field measurements of pH and temperature in micro-habitats, the *Liparis loeselii* population in Latvia has a wider tolerance against substrate reaction, moisture, light, continentality, temperature and nitrogen variations. The results of this study provide a new insight into *Liparis loeselii* micro-habitats and ecology of this species close to the northern limits of its distribution range.

Keywords: Orchidaceae, indicator value, plant community, substrate, succession.

I. PIELIKUMS. 3WMXPDLHWDVXQWDMVAVVWRSDPLH(LURSDV6DYLHQEDVDLYDUJMDPDLHELWRSL
 APPENDIX 1 Study sites and KDELWDVVOLVWHGLQWKH(XURSHDQ8QLRQY pārejasVIDWāy/slidmāwēL YH

3WMXPDLHWD Study site	.YDGUAW Square grid cell	.RRUGLQWDV Coordinates	(LURSDV6DYLHQEDVDLYDUJMDPDLVELRWR +DELWDWVW\$HOLVWHGLQWKH(XURSHDQ8QLRQY Directive
3WHUHHUJLJD	6/12	57f38'.... N; 22f13'.... E	2190 <i>Mitras starpkāpu teplakas</i> 2190 <i>Humid dune slacks</i>
Aizdumbles purvs	23/38	56f09'.... N; 25f35'.... E	7140 <i>Pārejas purvi un slīksņas</i> 7140 <i>Transition mires and quaking bogs</i>
YDULHHUDNVDVON	11/12	57f10'.... N; 22f18'.... E	
KSXUYV	7/48	57f30'.... N; 21f46'.... E	
Bednes purvs	6/43	57f36'.... N; 26f11'.... E	
%DLHNXHHUDNVDVON	8/7	57f26'.... N; 21f37'.... E	
*DLHHUDNVDVON	25/44	55f56'.... N; 26f29'.... E	
.OWHQVHHUDNVDVON	6/43	57f36'.... N; 26f13'.... E	7140 <i>Pārejas purvi un slīksņas</i> 7140 <i>Transition mires and quaking bogs</i>
3HOKSXUYV	20/43	56f10'.... N; 26f42'.... E	
6WURSDNDHHUDNVDVON	26/45	56f15'.... N; 26f51'.... E	
Engures ezera austrumu krasts pie Lepstes	10/19	57f17'.... N; 23f08'.... E	7210* <i>Kaļķaini zāļu purvi ar dižo aslapi</i> 7210* <i>Calcareous fens with Cladium mariscus and species of the Caricton davallianae</i>
Engures ezers ± Orthideju takas JDOVNUHL VSXVH	11/18	57f15'.... N; 23f08'.... E	

3./.,8063WXPDPYLHWDVXQWDMYVDVWRSDDLH(LURSDV6DYLHQEDVD~~E~~WVW~~H~~XUSLQMXPV
\$3(1';6WXGVLWHVDQGDDELWDWVOLVWHGLQWKH(XURSHDQ8QLRQ'+DELWDVWV'LUHFWLYH(8tthHtdQ)WLVQWK

.DL4HUDDHHUDGLHQYLGXN	13/14/21	56,58'.... N; 23,27'.... E	7230 <i>Kalkaini zāļu purvi</i> 7230 <i>Alkaline fens</i>
Platenes purvs	9/7	57,52'.... N; 21,43'.... E	
DONXNDUMHUV	3/29	57,51'.... N; 24,27'.... E	
Zebrus ezera krasts	18/17	56,38'.... N; 22,59'.... E	

2. PIELIKUMS. ~~ĀMODOLSDUHVPLNURELRWRSXDXJXVDELHGUEXVXJDVWRSURMHNW~~
~~XQVDVWRSDPEDVELH&PVS&W&MXPXYLHW&~~

APPENDIX 2 Species composition, cover and frequency (%) of species in the plant communities of study sites of *Liparis loeselii*.

6XJDVODWQLVNDLVQRV Species	3Wmvieta Study site																Sasto- SDP- ba, % Freque nc y, %
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
9DVNXO&LHDXJL9DVFXODUSODQWV																	
<i>Alnus glutinosa</i>	*	*	*	*	*	*	*	*	+	*	*	*	*	+	*	*	12,50
<i>Alnus incana</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	+	*	*	6,25
<i>Andromeda polifolia</i>	+	*	*	+	*	*	*	+	*	*	*	+	*	*	*	*	25,00
<i>Betula humilis</i>	+	*	*	*	*	*	*	*	*	*	+	*	*	*	*	*	12,50
<i>Betula pubescens</i>	*	*	+	+	*	*	*	*	*	*	+	+	*	*	*	*	25,00
<i>Carex buxbaumii</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	+	*	*	6,25
<i>Carex elata</i>	*	*	*	*	*	+	*	1	+	3	*	*	*	*	1	+	37,50
<i>Carex flava</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	*	6,25
<i>Carex hostiana</i>	*	*	*	*	*	*	*	*	*	*	*	*	2	*	*	*	6,25
<i>Carex lasiocarpa</i>	*	+	*	1	1	+	*	1	1	1	+	2	2	*	+	+	75,00
<i>Carex panicea</i>	*	*	*	*	*	*	*	*	*	*	*	*	1	*	+	*	12,50
<i>Carex rostrata</i>	*	*	*	*	+	*	*	*	*	*	*	*	*	*	*	*	6,25
<i>Cirsium palustre</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	+	*	*	6,25
<i>Cladium mariscus</i>	*	*	*	*	*	1	2	*	1	*	*	*	*	*	*	+	25,00
<i>Comarum palustre</i>	+	+	+	+	+	*	*	+	*	*	*	+	*	*	+	*	50,00
<i>Dactylorhiza incarnata</i>	+	*	*	*	*	*	*	*	+	*	+	+	+	+	*	*	37,50
<i>Drosera anglica</i>	+	*	*	+	+	*	*	*	*	*	*	+	*	*	*	*	25,00
<i>Drosera rotundifolia</i>	*	+	+	+	*	*	*	*	*	*	*	*	*	*	*	*	18,75
<i>Epipactis palustris</i>	+	+	*	*	*	*	*	*	+	*	*	*	+	+	*	*	37,50
<i>Equisetum fluviatile</i>	*	*	*	*	+	*	*	*	*	*	*	*	*	*	*	*	6,25
<i>Equisetum variegatum</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	5	*	*	6,25
<i>Eriophorum angustifolium</i>	*	*	*	*	1	*	*	*	*	*	*	1	*	*	*	*	12,50
<i>Eriophorum latifolium</i>	*	*	*	*	1	*	*	+	*	1	*	*	*	*	*	*	18,75
<i>Eriophorum vaginatum</i>	1	*	*	1	*	*	*	*	*	*	*	*	*	*	*	*	12,50
<i>Frangula alnus</i>	*	*	*	*	*	*	*	+	*	*	+	*	*	*	*	*	12,50
<i>Liparis loeselii</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	100,00
<i>Lycopus europaeus</i>	*	*	*	*	*	*	*	+	+	*	*	*	+	+	*	*	25,00
<i>Menyanthes trifoliata</i>	*	+	+	+	+	*	*	+	*	+	+	+	*	*	*	*	50,00
<i>Myrica gale</i>	*	*	*	*	+	*	*	*	*	*	*	*	*	*	*	*	6,25
<i>Oxycoccus palustris</i>	*	+	+	+	*	*	*	+	*	+	*	+	*	*	*	*	37,50
<i>Parnassia palustris</i>	*	*	*	*	*	*	*	+	*	*	*	*	*	+	*	*	12,50
<i>Peucedanum palustre</i>	*	+	*	+	+	*	*	*	+	+	*	+	*	*	+	*	50,00
<i>Phragmites australis</i>	+	*	*	*	+	1	1	*	1	*	*	*	1	+	+	+	56,25
<i>Pinus sylvestris</i>	+	*	+	*	*	*	*	*	*	*	+	+	*	*	*	*	25,00
<i>Potentilla erecta</i>	*	*	*	*	*	*	+	*	+	*	*	*	*	*	*	*	12,50
<i>Primula farinosa</i>	*	*	*	*	*	*	+	*	*	*	*	*	*	+	*	*	12,50
<i>Rhynchospora alba</i>	*	1	2	1	*	*	*	*	*	*	2	*	*	*	*	*	18,75
<i>Salix cinerea</i>	*	*	*	*	*	*	*	*	*	*	*	+	*	*	*	*	6,25

2. PIELIKUMS. ~~HODOLSDUHVPLNURELWRSDXDXJXVDELHGUEXVXJDVWRSURMHNW
XQVDVWRSDPEDVELHX&PVS*WMXPXYLHWVWXUSLQMXPV~~

APPENDIX 2 Species composition, cover and frequency (%) of species in the plant communities of study sites of *Liparis loeselii* (continued).

<i>Salix rosmarinifolia</i>	*	*	*	*	+	*	*	*	*	*	*	*	*	*	*	*	6,25	
<i>Scheuchzeria palustris</i>	*	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	6,25	
<i>Schoenus ferrugineus</i>	*	*	*	*	*	1	1	*	1	*	*	*	1	*	*	*	25,00	
<i>Scutellaria galericulata</i>	*	*	*	*	*	*	*	*	+	*	*	*	*	*	*	*	6,25	
<i>Thelypteris palustris</i>	*	*	+	*	*	*	*	+	*	+	*	+	*	*	+	*	31,25	
<i>Trichophorum alpinum</i>	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	6,25	
<i>Utricularia intermedia</i>	*	*	*	*	+	+	+	*	+	*	*	+	*	*	*	*	31,25	
6QDV0RVVHV																		
<i>Aulacomnium palustre</i>	*	*	*	*	*	*	*	*	*	*	*	*	*	*	4	*	*	6,25
<i>Calliergonella cuspidata</i>	*	*	*	*	*	*	*	*	*	*	*	3	*	*	+	*	6,25	
<i>Calliergon cordifolium</i>	*	*	*	*	*	*	*	1	*	1	*	*	*	*	*	*	12,50	
<i>Campylium stellatum</i>	*	*	*	*	*	*	1	*	*	*	*	*	*	*	*	+	6,25	
<i>Cinclidium stygium</i>	*	*	*	*	*	1	*	*	*	*	*	*	*	*	*	*	6,25	
<i>Paludella squarrosa</i>	*	*	*	*	*	*	*	*	*	*	*	1	*	*	*	*	6,25	
<i>Scorpidium scorpioides</i>	*	*	*	*	*	*	*	*	*	*	*	*	3	*	*	*	6,25	
<i>Sphagnum contortum</i>	*	2	*	*	2	*	*	*	*	*	*	*	*	*	*	*	12,50	
<i>Sphagnum fuscum</i>	*	*	2	2	*	*	*	*	*	*	*	*	*	*	*	*	6,25	
<i>Sphagnum flexuosum</i>	*	*	2	*	*	*	*	*	*	*	3	*	*	*	*	*	12,50	
<i>Sphagnum rubellum</i>	3	*	+	3	*	*	*	*	*	*	*	*	*	*	*	*	18,75	
<i>Sphagnum subsecundum</i>	*	3	*	*	*	*	*	*	*	*	*	*	*	*	*	*	6,25	

3WMPDYLHWDV6WXGVLWHV&GXPEOHVSXUYDULDHHUDNVDVWVON
~~X SXUYV %HGQHV SXUYV %QLHNX HHUDNVDVW VON (QJXUHV HHUD
DXVWUXPXNVDVWVSLH/HSVWHV (QJXUHV HHUD2UKLGHMXWDNDVJDOV*DLHHUDNVDVW
VON DLHHUDHGLHQYLGXNVDVW ±.OWHQHV HHUDNVDVWVON
3HOKSXUYV3WHUHHUDYLD3ODWHQHV SXUYV DONXNDUMHUV
6WURSDNDH HHUDNVDVWVON DEUX VHHUDNVDVWDSXUYV~~

3. PIELIKUMS. /DXNDPUMXPLS+XQW&HODOLSDUHVPLNURELWRWSRV
 APPENDIX 3)LHOQPHDVXUHPHQWVS+DQGWE&LQKUBERWDWYRI is loeselii.

3WMXPDYLHW Study site	Datums Date	pH			WE		
		Min	Max	9LGMDLV š. 0HDQš(Min	Max	9LGMDLV š. 0HDQš(
VDULDHHUD NUDVWDVONE	20.08.2013	4,40	5,90	“	22,00	24,10	“
%DLHNXHHUD NUDVWDVONE	22.08.2013	5,93	6,72	“	21,60	24,10	“
Engures ezera austrumu krasts pie Lepstes	27.06.2013	6,56	8,28	“	25,40	27,80	“
Engures ezera Orhideju takas gals	27.06.2013	6,66	7,78	“	23,30	29,10	“
*DLHHUDNUDV VONE	13.07.2013	5,10	6,28	“	27,00	27,30	“
3HOKSXUYV Platenes purvs	13.07.2013	5,80	6,94	“	21,80	23,10	“
DONXNDUMHU	13.06.2013	7,14	8,44	“	26,70	31,40	“
	01.07.2013	6,96	8,65	“	16,40	21,40	“