**S1 Table. List of the studied material of *Lepidium s.l.* used for the phylogenetic-based analyses.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Taxón | Origin / Source / Collector | GenBank accession number | | | |
| ITS1 | ITS2 | *trn*T-*trn*L spacer | *trn*L-*trn*F spacer |
| *L. africanum* (Burm.f.) DC.1 | South Africa, Cape Province, Williston District / PRE, 95056-102 / G. Germizhuizen | AJ582441 | AJ582498 | AY015703, AY015704 | \_ |
| *L. apetalum* Willd.1 | China, Beijing / B.G. Beijing, China / s.n. | AJ582466 | AJ582514 | AY015823 | \_ |
| *L. aletes* J.F.Macbr.2 | Paraguay, Guaira, Cordillera de Ybytyruzú / MO 3927367 / E. Zardini | FM178548 | FM178549 | AM991817 | \_ |
| *L. arbuscula* Hillebr.1 | Hawaii, Oahu , Makua Valley, Ohikilolo Ridge / National Tropical BG Lawai, Kauaii, Hawaii, 945176 / S. P. Pearlman | AJ582451 | AJ582517 | AY015707, AY015708 | \_ |
| *L. armoracia* Fisch. et Mey.1 | Arabian Republic Yemen, Shibam / K, MWC 2307 / A. G. Miller 408 | AJ582454 | AJ582502 | AY015709, AY015710 | \_ |
| *L. aschersonii* Thell.1 | Australia, Victoria, Lake Omeo / La Trobe Univ., Australia, s.n. / N. H. Scarlett | AJ582426 | AJ582483 | AY015711, AY015712 | \_ |
| *L. austrinum* Small1 | USA, Texas, Hidalgo Co. / DAV Tucker Herbarium, Univ. of California, Davis, 17451 / L. H. Shinners | AJ582467 | AJ582515 | AY015715, AY015716 | \_ |
| *L. banksii* Kirk1 | New Zealand, Abel Tasman National Park, Totaranui / Dept. of Conservation, Auckland Conservancy, 942179 / P. de Lange | AJ582433 | AJ582490 | AY015717, AY015718 | \_ |
| *L. bidentatum* Montin1 | Hawaii, Kauaii, Haupu / National Tropical BG Lawai, Kauaii, Hawaii, 925054 / S. P. Pearlman | AJ582468 | AJ582516 | AY015719, AY015720 | \_ |
| *L. bipinnatifidum* Desv.1 | Bolivia, La Paz, railway station / Osnabrück Univ., Germany / K. Mummenhoff & H. Brüggemann 451 | AJ582446 | AJ582522 | AY015721, AY015722 | \_ |
| *L. bonariense* L.1 | Chile, Prov. Atacama, Dept. Valle Iorquera / CETYBO, 3078 / O. Zöllner | AJ582458 | AJ582506 | AY015723, AY015724 | \_ |
| *L. campestre* (L.) R. Br.1 | France, Meurthe-et-Moselle, Villers-les-Nancy / BG Nancy, France / s.n. | AJ582412 | AJ582469 | AY015725, AY015726 | \_ |
| *L. capense* Thunb.1 | South Africa, Cape Province / PRE, 95056/49 / H. C. Taylor | AJ582452 | AJ582500 | AY015727, AY015728 | \_ |
| *L. capitatum* J.D. Hooker & Thomson2 | China, Qinghai, Yushu Xian / MO, 04920182 / D.E. Boufford et al. | FM178552 | FM178553 | AM991818 | \_ |
| *L. cardamine* L.2 | Spain / INIA Madrid, Index 1990, 421-1572-68 / s.n. | FM178554 | FM178555 | AM991819 | \_ |
| *L. cartilagineum* (J.Meyer) Thell.2 | Germany, Thuringia / BG Univ. Jena, Index 1994/95, No. 1916 / s.n. | AM991703 | AM991704 | AM991820 | \_ |
| *L. chichicara* Desv.2 | Bolivia, Depto. La Paz, Prov. Murillo, La Paz - Cota Cota / MO, 04594519 / St. G. Beck 11148 | AM991705 | AM991706 | AM991821 | \_ |
| *L. cordatum* Willd. ex DC.2 | Mongolia / BG Kopenhagen, Index No. 4170 / s.n. | AM991707 | AM991708 | AM991822 | \_ |
| *L. costaricense* Thell.2 | Costa Rica, Monteverde / Univ. Osnabrück, Germany / K. Mummenhoff 446 | AM991711 | AM991712 | AM991825 | \_ |
| *L. depressum* Thell.2 | Bolivia, Depto. La Paz / MO, 3197061 / J.C. Solomon 11457 | AM991717 | AM991718 | AM991826 | \_ |
| *L. desertorum* Eckl. & Zeyh.1 | South Africa, Cape Province / PRE, 95056/68 / M B. Bayer | AJ582453 | AJ582501 | AY015729, AY015730 | \_ |
| *L. desvauxii* Thell.1 | Australia, Victoria, Townsend / La Trobe Univ., Australia / N. H. Scarlett s.n. | AJ582429 | AJ582486 | AY015731, AY015732 | \_ |
| *L. dictyotum* A. Gray1 | USA, California, San Luis Obispo Co. / Tucker Herbarium, Univ. of California, Davis, 32057 / E. C. Twisselmann | AJ582415 | AJ582472 | AY015733, AY015734 | \_ |
| *L. echinatum* Hewson2 | Australia / Bentley Delivery Centre, Australia / s.n. | AM991719 | AM991720 | AY015735, AY015736 | \_ |
| *L. fasciculatum* Thell.1 | Australia, Victoria, river road near Lake Walla Walla / La Trobe Univ., Australia, s.n. / J. H. Browne | AJ582428 | AJ582485 | AJ582562 | \_ |
| *L. ferganense* Korsh.1 | Russia, Moscow / BG Moscow, Russia / s.n. | AJ582449 | AJ582519 | AY015737, AY015738 | \_ |
| *L. flavum* Torr.1 | USA, Nevada, Churchill Co., Slate Mountain / MO / A. Tiehm & P. Lott, 4011 | AJ582444 | AJ582524 | AY015739, AY015740 | \_ |
| *L. flexicaule* Kirk1 | New Zealand / Auckland BG, cultivated plants, 950769 / s.n. | AJ582430 | AJ582487 | AY015741, AY015742 | \_ |
| *L. fremontii* S. Wats.1 | USA, California, Joshua Tree Desert / Univ. Osnabrück, Germany / H. Hurka, s.n. | AJ582456 | AJ582504 | AY015815 | \_ |
| *L. graminifolium* L.2 | Germany, Göttingen / OSBU 90-08-0096-50 / s.n. | AM991721 | AM991722 | AM991823 | \_ |
| *L. heterophyllum* (DC.) Benth.2 | Germany, Lauferbacherhof/Ahr / Univ. Osnabrück, Germany / s.n. | AM991693 | AM991694 | AY015816 | \_ |
| *L. hirtum* (L.) Sm. ssp. *calycotrichum* (Kunze) Thell.2 | Spain, North Almeria / ETSIA, 427-0926-66 / s.n. | AM991695 | AM991696 | AY015817 | \_ |
| *L. hirtum* (L.) Sm. ssp. *dhayense* (Manby) Thell.2 | Morocco, near Oukaimeden / ETSIA, 428-2178-72 / s.n. | AM991697 | AM991698 | AY015818 | \_ |
| *L. hirtum* (L.) Sm. ssp. *hirtum*2 | France, Dept. Aude, Montagne de Tauch / BG Univ. Liege, Belgium, 85-3863 / s.n. | AJ582413 | AJ582470 | AY015819 | \_ |
| *L. hirtum* (L.) Sm. ssp. *nebrodense* (Rafin) Thellung2 | Italy, Sizilia / ETSIA, 429-6201-83 / s.n. | AM991699 | AM991700 | AY015820 | \_ |
| *L. hirtum* (L.) Sm. ssp. *petrophilum* (Cosson) Thell.2 | Spain, Sierra Nevada / BG Marburg, Germany, 83-80 / s.n. | AM991701 | AM991702 | AY015821 | \_ |
| *L. hyssopifolium* Desv1 | Australia, Victoria, Beveridge / La Trobe Univ., Australia, 70-296-940 / N. H. Scarlett | AJ582435 | AJ582492 | AY015743, AY015744 | \_ |
| *L. jaredii* Brandegee2 | USA, California / Univ. of California, Davis 131808 / P. Shiffman | AM991733 | AM991734 | AM991824 | \_ |
| *L. lasiocarpum* Nutt.1 | USA, California, Joshua Tree Desert / ETSIA, 430-1738-69 / s.n. | AJ582455 | AJ582503 | AY015745, AY015746 | \_ |
| *L. latifolium* L.1 | Germany, Leipzig, garbage dump / BG Leipzig, Germany / P. Gutte | AJ582447 | AJ582521 | AY015747, AY015748 | \_ |
| *L. latipes* Hook.1 | USA, California, Solano Co. / Tucker Herbarium, Univ. of California, Davis, 37209 / J. M. Tucker | AJ582416 | AJ582473 | AY015749, AY015750 | \_ |
| *L. leptopetalum* F. Muell.2 | Australia, Viktoria / La Trobe Univ., Australia / s.n. | AM991737 | AM991738 | AY015751, AY015752 | \_ |
| *L. linifolium* (Desv.) Steud.2 | Australien, Carnavon / Kings Park & BG, Perth, Australia / s.n. | AM991739 | AM991740 | AY015753, AY015754 | \_ |
| *L. lyratum* L.1 | Iran, mountains near Abadeh / ETSIA, 433-3758-75 / s.n. | AJ582448 | AJ582520 | AY015755, AY015756 | \_ |
| *L. meyenii* Walpers1 | Peru, Dept. Junin, Huayre / M. Hermann, Intern. Potato Center, Quito, Ecuador, JTA-106 / J. Anco | AJ582445 | AJ582523 | AY015757, AY015758 | \_ |
| *L. montanum* Nutt.1 | USA, Arizona, Shonto / BG Univ. Liege, Belgium, s.n. / s.n. | AJ582457 | AJ582505 | AY015759, AY015760 | \_ |
| *L. muelleri-ferdinandi* Thell.1 | Australia, New South Wales , Menindee Lakes / La Trobe Univ., Australia, s.n. / J. H. Browne | AJ582427 | AJ582484 | AY015761, AY015762 | \_ |
| *L. myriocarpum* Sond.1 | South Africa, Cape Province, Vaalbos National Park / PRE, 95056/53 / P. C. Zietsman | AJ582442 | AJ582499 | AY015763, AY015764 | \_ |
| *L. naufragorum* Garnock-Jones & D.A. Norton1 | New Zealand / P. de Lange, cultivated plants, Dept. Conserv., Auckland Conservancy, New Zealand, 950771 / s.n. | AJ582422 | AJ582479 | AY015765, AY015766 | \_ |
| *L. nitidum* Nutt.1 | USA, California , Table Mountains / Univ. Osnabrück, Germany / H. Hurka, 338 | AJ582414 | AJ582471 | AY015767, AY015768 | \_ |
| *L. oblongum* Small1 | Cultivated plants / BG Copenhagen, Denmark / s.n. | AJ582462 | AJ582510 | AY015769, AY015770 | \_ |
| *L. oleraceum* Sparrm.1 | New Zealand, Port Waikato, Ngatutura Point / Dept. Conserv., Auckland Conservancy, New Zealand, 941265 / P. de Lange | AJ582434 | AJ582491 | AY015771, AY015772 | \_ |
| *L. orbiculare* St. John2 | USA, Kanai / Smithsonian Institution Washington D.C. / Wood & Perlman 2814US | AM991743 | AM991744 | AM991828 | \_ |
| *L. oxycarpum* Torrey & A.Gray1 | USA, California, Merced Co. / Tucker Herbarium, Univ. of California, Davis, 115743 / C. A. & L. P. Janeway | AJ582417 | AJ582474 | AY015773, AY015774 | \_ |
| *L. oxytrichum* Sprague1 | Australia, Northern Territorium / National BG Canberra, Australia / s.n. | AJ582424 | AJ582481 | AY015775, AY015776 | \_ |
| *L. papillosum* F. Muell.1 | Australia, Victoria, Red Cliffs, Bottle Bend River / T.H. Browne, Australia / s.n. | AJ582425 | AJ582482 | AY015777, AY015778 | \_ |
| *L. pedicellosum* F. Muell.2 | Australia / PERTH, Australia, PRP 641 / s.n. | AM991745 | AM991746 | AY015779, AY015780 | \_ |
| *L. perfoliatum* L.2 | BG Vácrátót, Hungary / BG Vácrátót, Hungary / s.n. | AM991747 | AM991748 | AY015781, AY015782 | \_ |
| *L. phlebopetalum* (F. Muell.) F. Muell.2 | Australia / Kings Park & BG, Perth, Australia / S 446-93 | FM178556 | FM178556 | AY015783, AY015784 | \_ |
| *L. pholidogynum* F. Muell.2 | Australia / PERTH, Australia, PRP 640 / s.n. | AM991749 | AM991750 | AY015785, AY015786 | \_ |
| *L. pinnatifidum* Ledeb.1 | USA, California, Yolo Co. / Tucker Herbarium, Univ. of California, Davis, 96441 / A. M. Shapiro | AJ582464 | AJ582512 | AY015787, AY015788 | \_ |
| *L. pinnatum* Thunb.1 | South Africa, Cape Province, Drinkriver farm / PRE, 95056/45 / K. A. Dahlstrand | AJ582439 | AJ582496 | AY015827 | \_ |
| *L. pseudohyssopifolium* Hewson1 | Australia, Victoria, Mitre Rock, near Mt. Arapiles / La Trobe Univ., Australia / N. H. Scarlett s.n. | AJ582431 | AJ582488 | AY015789, AY015790 | \_ |
| *L. pseudopapillosum* Thell.1 | Australia, Victoria, Kamarooka Forest / La Trobe Univ., Australia / N. H. Scarlett et al. s.n. | AJ582423 | AJ582480 | AY015791, AY015792 | \_ |
| *L. pseudotasmanicum* Thell.1 | Australia, Victoria, George National Park / La Trobe Univ., Australia s.n. / N. H. Scarlett et al. | AJ582432 | AJ582489 | AY015826 | \_ |
| *L. quitense* Turcz.1 | Ecuador, Prov. Tungurakua, road from Pillaro to Ambato / MO, 3792042 / C. E. & M. Ceron | AJ582463 | AJ582511 | AY015793, AY015794 | \_ |
| *L. rigidum* Pomel2 | Algerien, Teniet-el-Haad / F. Hellwig, Göttingen, Germany / s.n. | AM991755 | AM991756 | AY015828 | \_ |
| *L. ruderale* L.1 | Germany, Borgholzberg near Oldenburg / BG Oldenburg, Germany, s.n. / s.n. | AJ582465 | AJ582513 | AY015795, AY015796 | \_ |
| *L. sativum* L.1 | Denmark, Jersie / BG Copenhagen, Denmark, s.n. / s.n. | AJ582459 | AJ582507 | AY015828 | \_ |
| *L. schinzii* Thell.1 | South Africa, Orange Free State Excelsior, Korannaberg / PRE, 95056/6 / J. du Perez | AJ582440 | AJ582497 | AY015797, AY015798 | \_ |
| *L. serra* H. Mann1 | Hawaii, Kauai, Kalalau valley near Puu O Kila / National Tropical B.G. Lawai, Hawaii, Kauaii, 915398 / S.P. Pearlman | AJ582450 | AJ582518 | AY015799, AY015800 | \_ |
| *L. sisymbrioides* ssp. *kawarau* (Petrie) Thell.1 | New Zealand, Central Otago, Slapjack Creek / P. de Lange, Dept. Conserv., Auckland Conservancy, New Zealand, 950766 / R. B. Allen | AJ582419 | AJ582476 | AY015801, AY015802 | \_ |
| *L. sisymbrioides* ssp.*matau* (Petrie) Thell.1 | New Zealand, Central Otago, Galloway / P. de Lange, Dept. Conserv., Auckland Conservancy, New Zealand , 950767 / R. B. Allen | AJ582418 | AJ582475 | AY015803, AY015804 | \_ |
| *L. sisymbrioides* Hook.f. ssp. *sisymbrioides*1 | New Zealand, Central Otago, Pisa Flats / P. de Lange, Dept. Conserv., Auckland Conservancy, New Zealand , 950768 / R. B. Allen | AJ582420 | AJ582477 | AY015805, AY015806 | \_ |
| *L. spinescens* DC.1 | Israel, Upper Galilee / BG Univ. Tel Aviv, Israel, s.n / s.n. | AJ582461 | AJ582509 | AY015807, AY015808 | \_ |
| *L. spinosum* Ard.1 | Turkey, Central Anatolia, near Gaziantep / ETSIA, 436-6229-83 / s.n. | AJ582460 | AJ582508 | AY015824 | \_ |
| *L. tayloriae* Al-Shezbaz2 | Chile, Atacama Region, Copiapo Prov. / MO, 4355023 / C.M. Taylor et al. 10804 | AM991765 | AM991766 | AM991832 | \_ |
| *L. tenuicaule* Kirk1 | New Zealand, Kakanui, Shag Point / P. de Lange, Dept. Conserv., Auckland Conservancy, New Zealand, 950191 / P. de Lange | AJ582421 | AJ582478 | AY015809, AY015810 | \_ |
| *L. thurberi* Wooton2 | USA / Univ. of California, Davis 40791 / D. Miller | AM991767 | AM991768 | AM991833 | \_ |
| *L. trifurcum* (Sond.) Marais1 | South Africa, Cape Province, SW slopes of Pakhuispiek, cedarberg / PRE, 95056-111 / H. C. Taylor / s.n. | AJ582438 | AJ582495 | AY015811, AY015812 | \_ |
| *L. villarsii* Gren. & Godron ssp. *reverchonii* (Deb.) Breist.2 | Spain, Guadalajara / Ministerio de Agricultura Pesca y Alimentacion, Spain, 7015-86 / s.n. | AM991771 | AM991772 | AY015825 | \_ |
| *L. virginicum* L.3 | Mexico, Carrizal Chico, riverbed / Univ. of Osnabrück, Germany / R.Stöckmann & K. Bosbach, s.n. | AF283496 | AF283497 | AY015813, AY015814 | \_ |
| *Cardaria draba* (L.) Desv. ssp. *chalepensis* (L.) O.E. Schulz2 | Iran, Karadj / ETSIA, 168-3706-75 / s.n. | AM991773 | AM991774 | AY015695, AY015696 | \_ |
| *Cardaria pubescens* (C.A. Mey.)4 | USA, Wyoming / MO, 4005756 / s.n. | AJ628279 | AJ628280 | AY015697, AY015698 | \_ |
| *Coronopus didymus* (L.) Sm.4 | France, Brittany, Pabu / BG of Potsdam, Index 1995/96, 1745 / s.n. | AM991775 | AM991776 | AM991834, AM991835 | \_ |
| *Coronopus integrifolius* (DC.) Spreng.2 | South Africa, Cape Prov. / PRE, 95056/231 / N. Jürgens 28005 | AM991777 | AM991778 | AM991836, AM991837 | \_ |
| *Coronopus niloticus* (Del.) Spreng.2 | Sudan, Jebel Aulia / WAG, 0143228 / G.J.H. Amshoff s.n. | AM991781 | AM991782 | AM991840 | \_ |
| *Coronopus rhytidocarpus* Makl2 | Argentina, Tierra del Fuego / Brassicaceae collection, Osnabrück Univ / B. Neuffer s.n. | AM991783 | AM991784 | AM991841, AM991842 | \_ |
| *Coronopus serratus* Desv.2 | Argentina, Prov. Corrientes / MWC 2320 / Troels Myndel Pedersen 1766 | AM991785 | AM991786 | AM991843, AM991844 | \_ |
| *Coronopus squamatus* (Forssk.) Asch4 | Portugal, Aljezur (Odeceixe) / BG of Lisbon, Index 1994, No. 239 / s.n. | AJ628287 | AJ628288 | AM991845, AM991846 | AM991938 |
| *Coronopus violaceus* (Munby) Kuntze4 | Morocco, N. Azrou / INIA Madrid, Index 1990, No. 206 / s.n. | AJ628289 | AJ628290 | AM991847, AM991848 | AM991939 |
| *Stroganowia affghana* (Boiss.) Pavlov2 | Iran / MO / K.H. Rechinger 53578 | AM991787 | AM991788 | AM991849, AM991850 | \_ |
| *Stroganowia brachyota* Kar. & Kir.2 | Kazakhstan Tian-Shan / MW / s.n. | AM991791 | AM991792 | AM991851 | \_ |
| *Stroganowia litwinowii* Lipskyi2 | Turkmenistan / MO / V.V. Nykitin s.n. | AM991795 | AM991796 | AM991853, AM991854 | \_ |
| *Stroganowia sagittata* Kar. & Kir.2 | Kazakhstan / OSBU 04-0307-50-00 / s.n. | AM991799 | AM991800 | AM991856 | \_ |
| *Winklera patrinoides* Regel2 | Turkmenistan, Terra Kulab / UPS / s.n. | AM991811 | AM991812 | AM991860 | \_ |
| *Winklera silaifolia* Korsh.2 | Tajikistan, Lake Kizilkul / MW / s.n. | AM991813 | AM991814 | AM991861 | \_ |
| *Hornungia petraea* (L.) Reichenbach4 | Italy, Alto Adige / Univ. Osnabrück, Germany / s.n. | AJ628293 | AJ628294 | AY015699, AY015700 | \_ |

1 Sequences taken of taxa from Mummenhoff et al. 2003

2 Sequences taken of taxa from Mummenhoff et al. 2009

3 Sequences taken of taxa from Mummenhoff et al. 2001

4 Sequences taken of taxa from Mummenhoff et al. 2004

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2. Mummenhoff K, Polster A, Muhlhausen A and Theissen G. *Lepidium* as a model system for studying the evolution of fruit development in Brassicaceae. J Exp Bot. 2009;60: 1503-1513.
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4. Mummenhoff K and Muehlhausen A. Molekulare Analysen zur Systematik der Tribus Heliophileae (Brassicaceae) in Sued-Afrika. Unpublished; 2004.