**Table S1**. Taxa included in the repeatome analysis of Loliinae with information on taxon authorship, detailed localities and vouchers, and sources of cytogenetic and genomic data. Group: BL, broad-leaved Loliinae; FL, fine-leaved Loliinae; Sch, Schedonorus. Chromosome number (2n), Ploidy, Genome size (2C, pg), Monoploid genome size (1Cx, pg; 1Cx, Mbp) and Genbank accession codes for plastome and nuclear ribosomal 35S and 5S genes are given for each sample. Values in bold correspond to new data generated in this study. Outgroups used in the phylogenomic analyses: *Oryza sativa, Brachypodium distachyon*.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Taxon** | **Code** | **Group** | **Locality** | **2n** | **Ploidy** | **2C(pg)** | **1Cx (pg)** | **1Cx (Mbp)** | **Genbank accession No.** | | | **Data source** |
| **Plastome** | **35S rDNA** | **5S rDNA** |
| *Festuca africana* (Hack.) Clayton | FF | Broad-Leaved | Uganda: Gahinga; Namaganda 190Vg; MHU1603 | 70 | 10x | --- | --- | --- | SAMN14647044; Github | MT145277 | **xxxx** | 2n: Namaganda et al. 2006; genome data: this study |
| *Festuca amplissima* Rupr. | GG | Broad-Leaved | Mexico: Chihuahua; Barranca del Cobre; PC. 17573 | 42 | 6x | --- | --- | --- | SAMN14647045; Github | MT145278 | **xxxx** | 2n: Bolkhouskikh et al. 1969; genome data: this study |
| *Festuca caldasii* (Kunth) Kunth | NN | Broad-Leaved | Ecuador: Catamayo; Chinchas-Tambara; HUTPL14055 | 28 | **4x** | **20.36** | 5.09 | 4978.02 | SAMN14647047; Github | MT145280 | **xxxx** | 2n, 2C, genome data: this study |
| *Festuca durandoi* Clauson | PP | Broad-Leaved | Portugal: Serra Arga; Alto do Espinheiro | 14 | 2x | 14.66 (4x) | 3.66 | 3584.86 | SAMN14647050; Github | MT145283 | **xxxx** | 2n: Devesa & Martinez-Segarra 2020; 2C: Smarda & al. 2008; genome data: this study |
| *Festuca lasto* Boiss. | HH | Broad-Leaved | Cadiz: Jerez de la Frontera; Los Alcornocales; UZ 29.08 | 14 | 2x | --- | --- | --- | SAMN14647058; Github | MT145291 | **xxxx** | 2n: Harper et al. 2004; genome data: this study |
| *Festuca mekiste* Clayton | AM | Broad-Leaved | Kenya: Mt. Elgon National Park, Kambi Mtamaiwa; Carvalho 4521 | --- | --- | --- | --- | --- | **xxxx** | **xxxx** | **xxxx** | genome data: this study |
| *Festuca molokaiensis* Soreng, P.M. Peterson & Catalán | II | Broad-Leaved | USA: Hawai: Molokai, BISH 728771 | --- | --- | --- | --- | --- | SAMN14647061; Github | MT145294 | **xxxx** | genome data: this study |
| *Festuca paniculata* (L.) Schinz & Thell | QQ | Broad-Leaved | Spain: Caceres, Puerto de los Castaños, UZ 40.07 | 14 | 2x | 7.65 | 3.83 | 3740.85 | SAMN14647064; Github | MT145297 | **xxxx** | 2n, 2C: Smarda et al. 2008; genome data: this study |
| *Festuca parvigluma* Steud. | JJ | Broad-Leaved | China: Baotianman; Henan; Neixiang Xian; MO 4922557 | 28 | 4x | --- | --- | --- | SAMN14647065; Github | MT145298 | **xxxx** | 2n: Tateoka 1954; genome data: this study |
| *Festuca scabra* Vahl | AP | Broad-Leaved | South Africa: KwaZulu Natal; Cathedral Peak; UZ-SA047 | 28 | 4x | --- | --- | --- | **xxxx** | **xxxx** | **xxxx** | 2n: Spies & Plessis 1986; genome data: this study |
| *Festuca spectabilis* Jan | LL | Broad-Leaved | Bosnia-Hercegovina: Troglav; Sajkovacko zdrlo | 42 | 6x | --- | --- | --- | SAMN14647071; Github | MT145304 | **xxxx** | 2n: Markgraf-Dannenberg 1980; genome data: this study |
| *Festuca superba* Parodi ex Türpe | RR | Broad-Leaved | Argentina: Jujuy; Yala; Laguna Rodeo; PC 356.08 | 56 | 8x | --- | --- | --- | SAMN14647072; Github | MT145305 | **xxxx** | 2n: Dubcovsky & Martinez 1992; genome data: this study |
| *Festuca triflora* J.F. Gmel. | MM | Broad-Leaved | Morocco: Rif Mountains, Bab Barret-Ketama; PC 39.17 | 14 | 2x | **7.84** | 3.92 | 3833.76 | SAMN14647073; Github | MT145306 | **xxxx** | 2n, 2C, genome data: this study |
| *Festuca abyssinica* Hochst. ex A. Rich. | AB | Fine-Leaved | Tanzania: Kilimanjaro; Afroalp O-DP-42737 | 28 | 4x | --- | --- | --- | SAMN14647043; Github | MT145276 | **xxxx** | 2n: Namaganda et al. 2006; genome data: this study |
| *Festuca asplundii* E.B. Alexeev | AC | Fine-Leaved | Ecuador: Loja; Saraguro; HUTPL14046 | --- | 6x | **21.23** | 3.54 | 3460.49 | SAMN14647046; Github | MT145279 | **xxxx** | 2n: Smarda & Stancik 2006; 2C, genome data: this study |
| *Festuca capillifolia* Dufour ex Roem. & Schult. | SS | Fine-Leaved | Morocco: Middle Atlas; Ifrane National Park; PC 77.17 | 14 | 2x | --- | --- | --- | SAMN14647048; Github | MT145281 | **xxxx** | 2n: Devesa & Martinez-Segarra 2020; genome data: this study |
| *Festuca chimborazensis* E.B. Alexeev | AD | Fine-Leaved | Ecuador: Riobamba; Chimborazo; HUTPL14066 | 42 | 6x | **13.48** | 2.25 | 2197.24 | SAMN14647049; Github | MT145282 | **xxxx** | 2n, 2C, genome data: this study |
| *Festuca eskia* Ramondex DC. | OO | Fine-Leaved | Spain: León, Picos de Europa, Colladines, FE321 | 14 | 2x | 5.7 | 2.85 | 2787.3 | SAMN14647051; Github | MT145284 | **xxxx** | 2n: Kerguelen 1975; 2C: Marques et al. 2016; genome data: this study |
| *Festuca fimbriata* Nees | AE | Fine-Leaved | Argentina: Misiones; Dpto. Apóstoles; UZ 498.08 | 42 | 6x | --- | --- | --- | SAMN14647053; Github | MT145286 | **xxxx** | 2n: Dubcovsky & Martinez 1992; genome data: this study |
| *Festuca francoi* Fern. Prieto, C. Aguiar, E. Días & M.I. Gut | TT | Fine-Leaved | Portugal: Açores; Terceira; MS4403 | 12 | 2x | --- | --- | --- | SAMN14647057; Github | MT145290 | **xxxx** | 2n: Sequeira et al. 2009; genome data: this study |
| *Festuca gracillima* Hook. F. | AF | Fine-Leaved | Argentina: Tierra de Fuego; Estancia San Pablo; UZ482.08 | 42 | 6x | --- | --- | --- | SAMN14647055; Github | MT145288 | **xxxx** | 2n: Dollenz 1978; genome data: this study |
| *Festuca holubii* Stančík | AG | Fine-Leaved | Ecuador: Saraguro; route to Cerro de Arcos; HUTPL14071 | --- | --- | --- | --- | --- | SAMN14647056; Github | MT145289 | **xxxx** | genome data: this study |
| *Festuca ovina* L. | UU | Fine-Leaved | Rusia: Leningradskaya Oblast’; Gatchinskii Raion; PC 54 | 14 | **2x** | 4.82 | 2.41 | 2356.98 | SAMN14647062; Github | MT145295 | **xxxx** | 2n, 2C: Smarda & al. 2008; genome data: this study |
| *Festuca pampeana* Speg. | VV | Fine-Leaved | Argentina: Buenos Aires; Sierra de la Ventana; PC 428.08 | 56 | 8x | --- | --- | --- | SAMN14647063; Github | MT145296 | **xxxx** | 2n: Dubcovsky & Martinez 1988; genome data: this study |
| *Festuca procera* Kunth | AH | Fine-Leaved | Ecuador:Chimborazo; Riobamba; HUTPL14079 | 28 | 4x | **14.88** | 3.72 | 3638.16 | SAMN14647067; Github | MT145299 | **xxxx** | 2n: Smarda & Stancik 2006; 2C, genome data: this study |
| *Festuca pyrenaica* Reut. | WW | Fine-Leaved | Spain: Huesca; Pyrenees, Tobacor | 28 | 4x | --- | --- | --- | SAMN14647068; Github | MT145300 | **xxxx** | 2n: Kerguelen 1975; genome data: this study |
| *Festuca pyrogea* Speg. | XX | Fine-Leaved | Argentina: Tierra de fuego, Cabo San Pablo; PC 494.08 | --- | --- | --- | --- | --- | SAMN14647069; Github | MT145302 | **xxxx** | genome data: this study |
| *Festuca rubra* L. | AN | Fine-Leaved | Argentina: Tierra de fuego; Cabo Annicolta; UZ 03.09 | 42 | **6x** | 13.68 | 2.28 | 2229.84 | **xxxx** | **xxxx** | **xxxx** | 2n, 2C: Smarda et al. 2008; genome data: this study |
| *Megalachne masafuerana* (Skottsb. & Pilg. ex. Pilg.) Matthei | AJ | Fine-Leaved | Chile: Juan Fernandez islands; Masafuera; L. Gaete. 9150 (0S) | --- | --- | --- | --- | --- | SAMN14647075; Github | MT145308 | **xxxx** | genome data: this study |
| *Vulpia ciliata* Dumort. | YY | Fine-Leaved | Spain: Toledo; Mar de Ontígola; UZ 109.07 | 28 | 4x | 8.28 | 1.38 | 1349.64 | SAMN14647076; Github | MT145309 | **xxxx** | 2n: Stace & Cotton 1980; 2C: Smarda et al. 2008; genome data: this study |
| *Festuca arundinacea* Schreb *arundinacea* | AX | Schedonorus | Spain: Coruña: Ferrol | 42 | 6x | 17.46 | 2.91 | 2845.98 | **xxxx** | **xxxx** | **xxxx** | 2n, 2C: Kopecky et al. 2010; genome data: this study |
| *Festuca arundinacea subsp. atlantigena* (St.-Yves) Auquier | AY | Schedonorus | Morocco: Atlas mountains, ABY BN 807 | 56 | 8x | 16.22 | 2.03 | 1982.895 | **xxxx** | **xxxx** | **xxxx** | 2n, 2C: Ezquerro-López et al. 2017; genome data: this study |
| *Festuca arundinacea* Schreb. subsp. *arundinacea* var. *letourneuxiana* (St.-Yves) Torrecilla & Catalán | CC | Schedonorus | Morocco: Atlas Mountains, ABY BN 400 | 70 | 10x | 19.7 | 1.97 | 1926.66 | SAMN14647059; Github | MT145292 | **xxxx** | 2n, 2C: Ezquerro-López et al. 2017; genome data: this study |
| *Festuca dracomontana* H.P. Linder | AQ | Schedonorus | South Africa: TVL; Haernertsburg; PRE 66429 | --- | --- | --- | --- | --- | **xxxx** | **xxxx** | **xxxx** | genome data: this study |
| *Festuca fenas* Lag. | AA | Schedonorus | Spain:W Mediterranean; PI289654 | 28 | 4x | 10.48 | 2.62 | 2562.36 | SAMN14647052; Github | MT145285 | **xxxx** | 2n, 2C: Ezquerro-López et al. 2017; genome data: this study |
| *Festuca fontqueri* St.-Yves | BB | Schedonorus | Morocco: Rif Mountains; Talassemtane National Park, PC 59.17 | 14 | 2x | **5.54** | 2.77 | 2709.06 | SAMN14647054; Github | MT145287 | **xxxx** | 2n: Favarger et al. 1980; 2C, genome data: this study |
| *Festuca gigantea* (L.) Vill. | AO | Schedonorus | Norway: 12/P2007 | 42 | 6x | 20.75 | 3.46 | 3382.25 | **xxxx** | **xxxx** | **xxxx** | 2n, 2C: Smarda et al. 2008; genome data: this study |
| *Festuca gudoschnikovii* Stepanov | AR | Schedonorus | Russia:Krasnoyarskii Krai; Yermakovskii Raion; PC 87 | 28 | 4x | --- | --- | --- | **xxxx** | **xxxx** | **xxxx** | 2n: Probatova et al. 2017; genome data: this study |
| *Festuca mairei* St.-Yves | DD | Schedonorus | Morocco: Atlas Mountains; PI-610941 | 28 | 4x | 10.04 | 2.51 | 2454.78 | SAMN14647060; Github | MT145293 | **xxxx** | 2n, 2C: Ezquerro-López et al. 2017; genome data: this study |
| *Festuca pratensis* Huds. | EE | Schedonorus | UK: England, USDA PI 283306 | 14 | 2x | 6.5 | 3.25 | 3178.5 | SAMN14647066; Github | MT145301 | **xxxx** | 2n, 2C: Kopeckyet al. 2010; genome data: this study |
| *Festuca simensis* Hochst. ex A. Rich. | AS | Schedonorus | Kenya: Mt. Kenya, Meteorological station; Namaganda 1750 | 28 | 4x | --- | --- | --- | **xxxx** | **xxxx** | **xxxx** | 2n: Namaganda et al. 2006; genome data: this study |
| *Lolium canariense* Steud | AT | Schedonorus | Spain: Canary Islands; USDA PI 320544 | 14 | 2x | 4.3 | 2.15 | 2102.7 | **xxxx** | **xxxx** | **xxxx** | 2n: Inda & Wolny 2013; 2C: Huchinson et al. 1979; genome data: this study |
| *Lolium perenne* L | AL | Schedonorus | UK: Wales; USDA PI 619001 | 14 | 2x | 5.51 | 2.76 | 2694.39 | **xxxx** | **xxxx** | **xxxx** | 2n: Inda & Wolny 2013; 2C: Smarda et al. 2008; genome data: this study |
| *Lolium persicum* Boiss. & Hohen | AK | Schedonorus | Georgia: USDA PI 314446 | 14 | 2x | 6.4 | 3.2 | 3129.6 | **xxxx** | **xxxx** | **xxxx** | 2n: Inda & Wolny 2013; 2C: Huchinson et al. 1979; genome data: this study |
| *Lolium rigidum* Gaudin | AV | Schedonorus | Turkey: USDA PI 545604 | 14 | 2x | 5.49 | 2.75 | 2684.61 | **xxxx** | **xxxx** | **xxxx** | 2n: Inda & Wolny 2013; 2C: Smarda et al. 2008; genome data: this study |
| *Lolium saxatile* H. Scholz & S. Scholz | AW | Schedonorus | Spain: Canary islands; Fuerteventura; | --- | --- | --- | --- | --- | **xxxx** | **xxxx** | **xxxx** | genome data: this study |
| *Micropyropsis tuberosa* Romero-Zarco & Cabezudo | AU | Schedonorus | Spain: Huelva: Almonte; UZ89.07 | 14 | 2x | --- | --- | --- | **xxxx** | **xxxx** | **xxxx** | 2n: Romero-Zarco 1988; genome data: this study |
| *Brachypodium distachyon* (L.) P.Beauv. | --- | --- | Spain: Caceres; UZ 28.07 | 10 | 2x | --- | --- | --- | NC\_011032.1 | Phytozome Bd21 v.3.1 | ---- | ---- |
| *Oryza sativa* L. | --- | --- | China: National Hybrid Rice Research and Development Center (NHRRDC); China |  | 2x | --- | --- | --- | AY522331.1 | AP008215 | ---- | ---- |