**Supplementary material**

**Table S1.** Rate of advance (RA) of golden mussel in watersheds of South America.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year of Finding** | **RA (Km/year)** | **Hydrographic basin** | **Direction of advance of the mussel** | **References** |
| 1998 | 171 | Paraguay river | Against the current a | [34,36] |
| 2001 | 030 | Uruguay river | Against the current | [38] |
| 2006 | - - | Upper Paraná river (Paranaiba river) | Against the current | [92] |
| 1999 | 240 | Middle and lower Paraná river | Against the current | [37] |
| 2003 | 250 | Lower Paraná river | Against the current | [38] |
| 2011 | 245 | Upper Paraná river (Grande river) | Against the current a | [28,34] |
| 2011 | 477 | São Francisco river | In favor of the current a | [28,34] |
| 2015 | 473 | Middle and lower São Francisco river | In favor of the current a | [17] |
| 2017 | 200 | Lower São Francisco river | In favor of the current | ***This study*** |

*a calculated rate not made by the authors (distance covered/years).*

**Table S2.** Sampling details and Haplotypes Codes for mitochondrial cytochrome c oxidase subunit I (*Cox1*) gene for the golden mussel *Limnoperna fortunei.* n, sample size in different populations; nh, number of haplotypes; **$** 2,160 specimens in Asia (735) and South America (1,425) identified (Haplotypes Codes); **$$** haplotypes’ identity, according to [45] and [48]; & reference doesn’t describe collection site or Latitude/Longitude; black - exclusive haplotype of Asia; blue - haplotype present in Asia and South America; red - exclusive haplotype of South America; *bold italic* - haplotypes identified in this study; bold - haplotypes observed continentally in South America; ***T.S.*** *-* this study; *\*larvae and adults*; \*\*not described by the authors or haplotypes with another acronym (=100% similarity); \*\*\*sequences (<99.6% similarities); %.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ID** | **Collection site and Country (Latitude; Longitude)** | **mtDNA** | | | **Ref.** |
| **n$** | **nh** | **Haplotypes Codes$$** |
| *Asia* | |  |  |  |  |
| TW1 | Sun Moon Lake, Taiwan (23.842°; 120.872°) | 26 | 3 | ***Lfm03***, **Lfm08**, Lfm19 | [46] |
| TW2 | Shiandau, Fusing Township, Taiwan (24.806°; 121.252°) | 28 | 2 | ***Lfm03***, **Lfm08** | [46] |
| JP1 | Daido intake station, Yodo River, Japan (34.745°; 135.551°) | 20 | 4 | ***Lfm03***, **Lfm09**, Lfm20–21 | [46] |
| JP2 | Yahagi River, Toyota, Japan (35.112°; 137.194°) | 23 | 4 | **Lfm09**, Lfm20–21, **Lfm27** | [46] |
| JP3 | Lake Ohshio, Tomioka, Japan (36.223°; 138.876°) | 30 | 6 | **Lfm09**, Lfm20–21, **Lfm27**–29 | [46] |
| JP4 | Oshio, Japan (36.225°; 138,878°) | 8 | 5 | **Lfm09**, **Lfm15**, Lfm20, Lfm21, **Lfm27** | [66] |
| JP5 | Nagara, Japan (35.078°; 136,693°) | 6 | 3 | **Lfm09**, Lfm20, **Lfm27** | [66] |
| JP6 | Lake Ohshio, Gunma, Japan (36.223°; 138.876°) & | 1 | 1 | Lfm20\*\* | [60] |
| JP7 | Japan (36°; 138°) & | 1 | 1 | K01 (=**Lfm09**)\*\* | 10 |
| JP8 | Hirakata, Yodo River, Japan (34.810°; 135.625°) | 20 | 3 (3) | K01(=**Lfm09**), K03(=Lfm20), K04(=Lfm21)\*\* | [48] |
| JP9 | Katata, Lake Biwa, Japan (35.115°; 135.924°) | 20 | 3 (3) | K01(=**Lfm09**), K03(=Lfm20), K04(=Lfm21)\*\* | [48] |
| JP10 | Chomeiji, Lake Biwa, Japan (35.167°; 136.059°) | 20 | 3 (3) | K01(=**Lfm09**), K03(=Lfm20), K04(=Lfm21)\*\* | [48] |
| JP11 | Fujigasaki, Lake Biwa, Japan (35.499°; 136.175°) | 6 | 3 (3) | K01(=**Lfm09**), K03(=Lfm20), K04(=Lfm21)\*\* | [48] |
| JP12 | Kawasami, Lake Yodo, Japan (35.531°; 136.190°) | 20 | 3 (3) | K01(=**Lfm09**), K03(=Lfm20), K04(=Lfm21)\*\* | [48] |
| JP13 | Aburashima, Ibi River, Japan (35.143°; 136.667°) | 20 | 4 (4) | K01(=**Lfm09**), K02(=**Lfm27**), K03(=Lfm20), K04(=Lfm21)\*\* | [48] |
| JP14 | Aburashima, Nagara River, Japan (35.147°; 136.671°) | 20 | 4 (4) | K01(=**Lfm09**), K02(=**Lfm27**), K03(=Lfm20), K04(=Lfm21)\*\* | [48] |
| JP15 | Makai, Kiso River, Japan (35.250°; 136.689°) | 20 | 4 (4) | K01(=**Lfm09**), K02(=**Lfm27**), K03(=Lfm20), K04(=Lfm21)\*\* | [48] |
| JP16 | Fusoucho, Yahagi River, Japan (35.113°; 137.193°) | 20 | 3 (3) | K01(=**Lfm09**), K03(=Lfm20), K04(=Lfm21)\*\* | [48] |
| JP17 | Koshiozu, Lake Koshiozu, Japan (34.606°; 137.097°) | 20 | 4 (4) | K01(=**Lfm09**), K02(=**Lfm27**), K03(=Lfm20), K04(=Lfm21)\*\* | [48] |
| JP18 | Myougou, Ure River, Japan (34.997°; 137.656°) | 20 | 4 (4) | K01(=**Lfm09**), K02(=**Lfm27**), K03(=Lfm20), K04(=Lfm21)\*\* | [48] |
| JP19 | Ohmine, Lake Akiba, Japan (34.974°; 137.827°) | 20 | 4 (4) | K01(=**Lfm09**), K02(=**Lfm27**), K03(=Lfm20), K04(=Lfm21)\*\* | [48] |
| JP20 | Minamigoka, Lake Ohshio, Japan (36.225°; 138.878°) | 20 | 3 (3) | K01(=**Lfm09**), K03(=Lfm20), K04(=Lfm21)\*\* | [48] |
| JP21 | Midono, Lake Takenuma, Japan (36.237°; 139.022°) | 20 | 4 (4) | K01(=**Lfm09**), K02(=**Lfm27**), K03(=Lfm20), K04(=Lfm21)\*\* | [48] |
| JP22 | Matsudo, Edo River, Japan (35.787°; 139.892°) | 20 | 7 (6) | K04(=Lfm21),K05(=**Lfm11**),K07(=***Lfm03***),K08(Lfm37),K10(=Lfm29),K11(=**Lfm11**),K12(=**Lfm12**)\*\* | [48] |
| JP23 | Tobarisshinden, Lake Tega, Japan (35.865°; 139.995°) | 20 | 6 (5) | K04 (=Lfm21), K05 (=**Lfm11**), K06 (=Lfm21), K07(=***Lfm03***), K08(=Lfm37), K09 (=**Lfm05**)\*\* | [48] |
| JP24 | Nishihozue, Kobai River, Japan (36.251°; 139.996°) | 20 | 5 (4) | K04 (=*Lfm21*)*,* K05 (=**Lfm11**), K07 (=***Lfm03***), K08(=Lfm37), K13(=***Lfm03***)\*\* | [48] |
| JP25 | Toride, Tone River, Japan (35.891°; 140.057°) | 20 | 6 (5) | K04 (=*Lfm21*)*,* K05 (=**Lfm11**), K07 (=***Lfm03***), K08(=Lfm37), K12(=**Lfm12**), K21 (=**Lfm11**), K18\*\* | [48],11 |
| JP26 | Amimachi, Lake Kasumigaura, Japan (36.043°; 140.232°) | 20 | 6 (4) | K04 (=Lfm21), K05 (=**Lfm11**), K06 (=Lfm21), K08(=Lfm37), K11(=**Lfm11**), K17(=**Lfm11**)\*\* | [48] |
| JP27 | Sakae, Lake Inba,Japan (35.821°; 140.251°) | 20 | 4 (4) | K04 (=Lfm21), K05 (=**Lfm11**), K07 (=***Lfm03***), K08(=Lfm37)\*\* | [48] |
| JP28 | Sawara, Lake Tone, Japan (35.902°; 140.505°) | 20 | 5 (5) | K04 (=Lfm21), K05 (=**Lfm11**), K07 (=***Lfm03***), K08(=Lfm37), K09 (=**Lfm05**)\*\* | [48] |
| JP29 | Ga, Lake Tonamisakaura, Japan (35.901°; 140.610°) | 20 | 4 (4) | K04 (=Lfm21), K05 (=**Lfm11**), K07 (=***Lfm03***), K08(=Lfm37) | [48] |
| KR | Korea Institute of Water and Environment, Korea (36.401°; 127.413°) | 20 | 3 | **Lfm11,** Lfm21, Lfm26 | [46] |
| CH1 | Lake Poyang, China (29.185°; 116.014°) | 41 | 4 | ***Lfm03***, **Lfm11**, Lfm24–25 | [46] |
| CH2 | Pengxi River, Yunyang County, China (30.948°; 108.680°) | 22 | 3 | ***Lfm03***, **Lfm11**, Lfm30 | [46] |
| CH3 | Xiongjiang, Minqing County, China (26.327°; 118.744°) | 44 | 9 | ***Lfm02, Lfm03***, Lfm06, **Lfm11**–**12**, **Lfm27**, Lfm31–33 | [46] |
| CH4 | Luohe River, Zhejiang Province, China (28.878°; 121.165°) | 30 | 6 | ***Lfm03***, **Lfm11**, Lfm21, Lfm35, **Lfm36**–37 | [46] |
| CH5 | Xizhijiang, China (23.030°; 114,518°) | 9 | 8 | ***Lfm03***, **Lfm11**, **Lfm15**, **Lfm36**, **Lfm38**, Lfm41, Lfm42, Lfm43 | [29] |
| *South America* | |  |  |  |  |
| SOB | Sobradinho Hydroelectric Power Plant, Brazil (-9.404°; -40.815°) | 30 | 8 | ***Lfm03***, **Lfm11**, **Lfm15**, **Lfm36**, **Lfm38**, **Lfm39,** Lfm41, Lfm42 | [29] |
| VIF | Ilha das Flores, Brazil (-10.454°; -36.531°) | 18 | 4 | ***Lfm02, Lfm03*, *Lfm04*** | ***T.S.*** |
| BGM | Brejo Grande marina, Brazil (-10.454°; -36.531°) | 19 | 3 | ***Lfm02, Lfm03*, *Lfm04*** | ***T.S.*** |
| MRS | Mouth of the São Francisco river, Brazil (-10.439; -36.426°) | 19 | 5 | ***Lfm01,*** ***Lfm02, Lfm03*, *Lfm04*** | ***T.S.*** |
| CO | Corumbá, Brazil (-18.997°; -57.654°) | 29 | 5 | ***Lfm01,*** ***Lfm02, Lfm03*, *Lfm04,*** Lfm05 | [45-47] |
| COR | Corumbá, Brazil (-19.006°; -57.680°) | 19 | 11 | ***Lfm01, Lfm02, Lfm03, Lfm04***, **Lfm05**, Lfm06-**09**, Lfm10, **Lfm38** | [29] |
| VOL | Volta Grande Hydroelectric Power Plant, Brazil (-20.029°; -48.219°) | 30 | 10 | ***Lfm01, Lfm02, Lfm03,*** **Lfm05**, Lfm06-**09**, Lfm10, **Lfm38** | [29] |
| IGA | Igarapava Hydroelectric Power Plant, Brazil (-20.781°; -51.633°) | 31 | 10 | ***Lfm02, Lfm03, Lfm04***, **Lfm05**, Lfm06-**09**, Lfm10, **Lfm15** | [29] |
| JUP | Jupiá Hydroelectric Power Plant, Brazil (-20.781°; -51.633°) | 16 | 9 | ***Lfm02, Lfm03, Lfm04,*** **Lfm05**, Lfm06-**09**, Lfm10 | [29] |
| ROS | Rosana Hydroelectric Power Plant, Brazil (-22.594°; -52.878°) | 14 | 2 | ***Lfm03,*** **Lfm05** | [29] |
| POR | Porto Primavera Hydroelectric Power Plant, Brazil (-22.495°; -53.016°) | 32 | 3 | ***Lfm02, Lfm03,*** **Lfm39** | [29] |
| BAR | Porto Hidroviário Bariri (-22.155°; -48.746°) | 28 | 10 | ***Lfm02, Lfm03, Lfm04,*** **Lfm05**, Lfm06-**09**, Lfm10, **Lfm38** | [29] |
| BON | Barra Bonita Hydroelectric Power Plant, Brazil (-22.513°; -48.746°) | 31 | 3 | ***Lfm03,*** **Lfm36, Lfm38** | [29] |
| RB | Río Baía, Alto Rio Paraná, Brazil (-22.686°; -53.253°) | 27 | 5 | ***Lfm01, Lfm02, Lfm03, Lfm04,*** **Lfm05** | [45-47] |
| IT1 | Itaipú Hydroelectric Power Reservoir, Brazil (-25.408°; -54.590°) | 32 | 6 | ***Lfm01, Lfm02, Lfm03, Lfm04,*** **Lfm05**-06 | [45-47] |
| IT2\* | Itaipú Hydroelectric Power Reservoir, Brazil (-25.408°; -54.589°) | 51 | 4 | ***Lfm01, Lfm02, Lfm03, Lfm04,*** **Lfm05** | [49] |
| IT3 | Itaipú Hydroelectric Power Plant, Brazil (-25.409°; -54.606°) | 25 | 2 | ***Lfm03,*** **Lfm05** | [29] |
| IRB | Iguassu river basin, Brazil (-25; -54°) & | 1 | 1 | ***Lfm01***\*\*\* | [41] |
| CX1\* | Salt. Caxias Hydroelectric Power Reservoir, Brazil (-25.420°; -52.114°) | 49 | 2 | ***Lfm03,*** **Lfm05** | [49] |
| CX2 | Salt. Caxias Hydroelectric Power Plant, Brazil (-25.543°; -53.496°) | 34 | 3 | ***Lfm02, Lfm03,*** **Lfm05** | [29] |
| OS\* | Salt. Osório Hydroelectric Power Reservoir, Brazil (-25.536°;-53.009°) | 28 | 2 | ***Lfm03,*** **Lfm05** | [49] |
| PQ | Iguassu National Park, Brazil (-25.600°; -54.393°) | 58 | 3 | ***Lfm02, Lfm03,*** **Lfm05** | [49] |
| YR | Yabebiry River, Misiones, Argentina (-27.297; -55.543) | 27 | 5 | ***Lfm02, Lfm03, Lfm04,*** **Lfm05** | [45-47] |
| MAC | Machadinho Hydroelectric Power Plant, Brazil (-27.523°; -51,784°) | 20 | 10 | ***Lfm02, Lfm03, Lfm04,* Lfm05**, Lfm06-**09**, Lfm10, **Lfm15** | [29] |
| YD | Yaciretá Dam, Brazil, Paraguay and Argentina (-27.471°; - 56.704°) | 34 | 4 | ***Lfm01, Lfm03, Lfm04,*** **Lfm05** | [45-47] |
| PR | Paraná River, Santa Tecla, Corrientes, Argentina (-27.605; -56.385°) | 26 | 6 | ***Lfm01, Lfm02, Lfm03, Lfm04,*** **Lfm05**, Lfm06 | [45-47] |
| BAL | Balsa Barreto (-29.864°; -51.718°) | 15 | 10 | ***Lfm02, Lfm03, Lfm04,*** **Lfm05**, Lfm06-**09**, Lfm10, **Lfm38** | [29] |
| AMA | Amarópolis Hydroelectric Power Plant, Brazil (-29.946°; -51.893°) | 24 | 2 | ***Lfm03,*** Lfm06 | [29] |
| DMA | Dom Marco Hydroelectric Power Plant, Brazil (-30.096°; -52.493°) | 21 | 2 | ***Lfm03,*** **Lfm05** | [29] |
| POA1 | Jacuí River, Brazil (-29.990°; -51.271°) | 1 | 1 | ***Lfm01***\*\* | [66] |
| POA2 | Porto Alegre, Brazil (-34.803°; -57,938°) | 31 | 2 | ***Lfm03,*** **Lfm05** | [29] |
| FE | Federación, Salto Grande Lake, Argentina (-30.992°; -57.915°) | 24 | 6 | ***Lfm01, Lfm03, Lfm04,*** **Lfm05**, Lfm07–**08** | [45] |
| CA-1 | Cayasta, Santa Fe, Argentina (--31.183; -60.080°) | 27 | 6 | ***Lfm01, Lfm02, Lfm03, Lfm04,*** **Lfm05**-06 | [45] |
| CA-2 | Cayasta, Santa Fe, Argentina (-31.186; -60.033°) | 32 | 4 | ***Lfm01, Lfm03, Lfm04,*** **Lfm05** | [45,47] |
| SG | Salto Grande Dam, Uruguay (-31.195°; -57.905°) | 48 | 8 | ***Lfm01, Lfm03, Lfm04,*** **Lfm05**, **Lfm09**, Lfm10, **Lfm11**–**12** | [45,47] |
| PU | Puerto Luis, Salto Grande Lake, Argentina (-31.257°; -57.907°) | 26 | 7 | ***Lfm01, Lfm02, Lfm03, Lfm04,*** **Lfm05**, **Lfm11**, Lfm18 | [45,47] |
| PEL | Pelotas, Brazil (-31.811°; -52,389°) | 31 | 3 | ***Lfm03,*** **Lfm05**, Lfm06 | [29] |
| SA | Setubal Lagoon, Santa Fe, Argentina (-31.635°; -60.681°) | 30 | 5 | ***Lfm01, Lfm02, Lfm03, Lfm04,*** **Lfm05** | [45-47] |
| SO | Sao Gonçalo Channel, Brazil (-31.811°; -52.388°) | 34 | 5 | ***Lfm03, Lfm04,*** **Lfm05**-06, Lfm10 | [45-47] |
| UR | Uruguay River, Colon, Argentina (-32.152°; -58.188°) | 23 | 4 | ***Lfm02, Lfm03,*** **Lfm05**, Lfm17 | [45-47] |
| RT | Río Tercero Dam, Cordoba, Argentina (-32.213°; -64.473°) | 59 | 6 | ***Lfm01, Lfm03, Lfm04,*** **Lfm05**-06, Lfm13 | [45-47] |
| EC | Del Este Channel, Buenos Aires, Argentina (-34.346°; -58.519°) | 24 | 6 | ***Lfm01, Lfm02, Lfm03***, **Lfm05**, Lfm07, Lfm14 | [45-47] |
| CR | Carapachay River, Buenos Aires, Argentina (-34.398°; -58.594°) | 29 | 7 | ***Lfm01, Lfm02, Lfm03, Lfm04,*** **Lfm05**, Lfm06-07 | [45,47] |
| TI | Lujan River, Tigre, Buenos Aires, Argentina (-34.415°; -58.578°) | 24 | 5 | ***Lfm01, Lfm02, Lfm03, Lfm04,*** **Lfm05** | [45-47] |
| SF | Lujan River, San Fernando, Argentina (-34.428°; -58.552°) | 30 | 5 | ***Lfm01, Lfm02, Lfm03, Lfm04,*** **Lfm05** | [45,47] |
| BA | Buenos Aires city, Argentina (-34.606°; -58.346°) | 52 | 6 | ***Lfm01, Lfm02, Lfm03, Lfm04,*** **Lfm05**-06 | [45,47] |
| QU | Quilmes, Buenos Aires, Argentina (-34.716°; -58.214°) | 22 | 4 | ***Lfm03,*** Lfm05, Lfm06–07 | [45-47] |
| PL | Punta Lara, Buenos Aires, Argentina (-34.782; -58.011°) | 21 | 4 | ***Lfm03, Lfm04,*** **Lfm05**, **Lfm15** | [45,47] |
| SL | Santa Lucía River, Canelones, Uruguay (-34.522°; -56.494°) | 26 | 5 | ***Lfm01, Lfm03, Lfm04,*** **Lfm05**, Lfm10 | [45-47] |
| PLA | La Plata, Argentina (-30.033°; -51.240°) | 21 | 4 | ***Lfm03,*** **Lfm09**, **Lm15**, **Lfm27** | [29] |
| MA | Magdalena, Buenos Aires, Argentina (-35.013°; -57.536°) | 22 | 7 | ***Lfm01, Lfm02, Lfm03, Lfm04,*** **Lfm05**-06, Lfm16 | [45-47] |

10GenBank: FW369972(574 bp); 11GenBank: AB828679 (658 bp); ***T.S.*** (~555 bp).