Table S1. The accession numbers of the sequences of the red snapper *Lutjanus purpureus*/*Lutjanus campechanus* obtained in this study.

| Gene | Location | GenBank Accession Numbers | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FADS2, Intron 8 | Rio Caribe-VEN | MT415042 | MT415032 | MT415039 | MT415040 | MT415044 | MT415041 | | |
| | Nueva Esparta-VEN | MT415010 | MT415018 | MT415011 | MT415019 | MT415012 | MT415013 | MT415020 | MT415021 |
| | Campeche-MEX | MT415014 | MT415052 | MT415027 | MT415015 | MT415043 | MT415016 | MT415017 | MT415026 |
| | Tabasco-MEX | MT415045 | MT415053 | MT415038 | MT415049 | MT415036 | MT415037 | | |
| | South Veracruz-MEX | MT415046 | MT415034 | MT415031 | MT415047 | MT415048 | MT415050 | MT415051 | MT415035 |
| | North Veracruz-MEX | MT415028 | MT415033 | MT415022 | MT415029 | MT415023 | MT415024 | MT415025 | MT415030 |
| mtDNA D-loop | Rio Caribe-VEN | MT409349 | MT409350 | MT409351 | MT409352 | MT409353 | MT409354 | | |
| | Nueva Esparta-VEN | MT409355 | MT409356 | MT409357 | MT409358 | MT409359 | MT409360 | MT409361 | MT409362 |
| | Campeche-MEX | MT409385 | MT409386 | MT409387 | MT409388 | MT409389 | MT409390 | MT409391 | MT409392 |
| | Tabasco-MEX | MT409379 | MT409380 | MT409381 | MT409382 | MT409383 | MT409384 | | |
| | South Veracruz-MEX | MT409371 | MT409372 | MT409373 | MT409374 | MT409375 | MT409376 | MT409377 | MT409378 |
| | North Veracruz-MEX | MT409363 | MT409364 | MT409365 | MT409366 | MT409367 | MT409368 | MT409369 | MT409370 |

Table S2. The accession numbers of the sequences of the red snapper *Lutjanus purpureus* and *Lutjanus campechanus* published in GenBank, that were used in the analyses.

| Gene | Location | GenBank Accession Numbers | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| mtDNA D-loop | Bahia-BRA | KC123142 | KC123143 | KC123144 | KC123145 | KC123146 | KC123147 | KC123148 | KC123150 |
| | | KC123152 | KC123153 | KC123154 | KC123155 | KC123156 | KC123157 | KC123160 | KC123161 |
| | | KC123162 | KC123163 | KC123164 | KC123165 | KC123166 | | | |
| | Ceará-BRA | KC123098 | KC123099 | KC123101 | KC123102 | KC123103 | KC123105 | KC123106 | KC123107 |
| | | KC123109 | KC123110 | KC123111 | KC123113 | KC123114 | KC123115 | KC123117 | KC123119 |
| | | KC123121 | KC123122 | KC123123 | KC123126 | KC123127 | KC123128 | KC123129 | KC123130 |
| | | KC123132 | KC123134 | KC123135 | KC123136 | KC123137 | KC123139 | | |
| | North Coast-BRA | KC122931 | KC122933 | KC122935 | KC122939 | KC122940 | KC122944 | KC122945 | KC122948 |
| | | KC122950 | KC122951 | KC122953 | KC122954 | KC122955 | KC122959 | KC122960 | KC122962 |
| | | KC122966 | KC122969 | KC122970 | KC122971 | KC122972 | KC122973 | KC122975 | KC122976 |
| | | KC122980 | KC122981 | KC122984 | KC122988 | KC122993 | KC122996 | KC122997 | KC123001 |
| | | KC123002 | KC123003 | KC123006 | KC123007 | KC123008 | KC123017 | KC123018 | KC123020 |
| | | KC123023 | KC123024 | KC123025 | KC123031 | KC123033 | KC123035 | KC123036 | KC123041 |
| | | KC123042 | KC123044 | KC123054 | KC123055 | KC123069 | KC123070 | KC123073 | KC123076 |
| | | KC123080 | KC123083 | KC123085 | KC123088 | KC123090 | | | |
| | Mississippi-USA | AF356764 | AF356765 | AF356766 | AF356767 | AF356768 | AF356769 | AF356770 | AF356771 |
| | | AF356772 | AF356773 | AF356774 | AF356775 | | | | |
| | Florida-USA | AF356750 | AF356751 | AF356752 | AF356753 | AF356754 | AF356755 | AF356756 | AF356757 |
| | Luisiana-USA | AF356758 | AF356759 | AF356760 | AF356761 | AF356762 | AF356763 | | |
| FADS2, Intron 8 | Brazil | KT869393 | KT869394 | KT869395 | KT869396 | KT869397 | KT869398 | KT869399 | KT869400 |
| | | KT869401 | KT869402 | KT869403 | KT869404 | KX448439 | KX448440 | KX448443 | KX448444 |
| | | KX448445 | KX448446 | KX448447 | KX448448 | KX448449 | KX448450 | KX448451 | KX448452 |
| | | KX448453 | KX448454 | KX448455 | KX448456 | KX448457 | KX448458 | KX448459 | KX448460 |
| | | KX448461 | KX448462 | KX448463 | KX448464 | KX448465 | KX448466 | KX448467 | KX448468 |
| | | KX448469 | KX448470 | KX448471 | KX448472 | KX448473 | KX448474 | KX448475 | KX448476 |
| | | KX448477 | KX448478 | KX448479 | KX448480 | KX448481 | KX448482 | KX448483 | KX448484 |
| | | KX448485 | KX448486 | KX448487 | KX448488 | KX448489 | KX448490 | | |

Table S3. The accession numbers of the sequences of the species *Lutjanus peru*, *Lutjanus synagris* and *Lutjanus guttatus*, used to calculate the consensus sequences for the phylogenetic analysis.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *Lutjanus peru* | KR362299 | MH751823 | MH751788 | MH751805 | MH751872 | MH751865 | MH751855 | MH751832 |
| | MH751822 | MH751804 | MH751802 | MH751764 | MH751882 | MH751874 | MH751851 | MH751838 |
| | MH751828 | MH751821 | MH751817 | MH751792 | MH751787 | MH751779 | MH751795 | MH751786 |
| | MH751893 | MH751888 | MH751868 | MH751853 | MH751847 | MH751841 | MH751840 | MH751775 |
| | MH751772 | MH751771 | MH751825 | MH751884 | MH751867 | MH751864 | MH751839 | MH751826 |
| | MH751815 | MH751763 | MH751894 | MH751887 | MH751846 | MH751844 | MH751824 | MH751810 |
| | MH751800 | MH751790 | MH751760 | MH751836 | MH751806 | MH751883 | MH751845 | MH751833 |
| | MH751818 | MH751794 | MH751878 | MH751875 | MH751871 | MH751854 | MH751850 | MH751849 |
| | MH751834 | MH751789 | MH751776 | MH751768 | MH751766 | MH751761 | MH751807 | MH751843 |
| | MH751842 | MH751827 | MH751784 | MH751774 | MH751773 | MH751889 | MH751886 | MH751820 |
| | MH751816 | MH751812 | MH751809 | MH751798 | MH751793 | MH751783 | MH751782 | MH751780 |
| | MH751778 | MH751770 | MH751762 | MH751862 | MH751861 | MH751897 | MH751876 | MH751869 |
| | MH751863 | MH751858 | MH751835 | MH751830 | MH751829 | MH751808 | MH751767 | MH751895 |
| | MH751890 | MH751881 | MH751866 | MH751857 | MH751831 | MH751819 | MH751814 | MH751813 |
| | MH751803 | MH751781 | MH751765 | MH751892 | MH751769 | MH751877 | MH751860 | MH751852 |
| | MH751811 | MH751759 | MH751880 | MH751797 | MH751777 | MH751870 | MH751856 | MH751837 |
| | MH751785 | MH751896 | MH751801 | MH751791 | MH751885 | MH751873 | MH751859 | MH751796 |
| | MH751848 | MH751799 | MH751891 | MH751879 | | | | |
| *Lutjanus guttatus* | KT724723 | MH751628 | MH751745 | MH751696 | MH751687 | MH751738 | MH751692 | MH751691 |
| | MH751690 | MH751689 | MH751664 | MH751641 | MH751633 | MH751625 | MH751622 | MH751621 |
| | MH751616 | MH751705 | MH751683 | MH751669 | MH751661 | MH751656 | MH751649 | MH751601 |
| | MH751635 | MH751756 | MH751752 | MH751751 | MH751750 | MH751746 | MH751744 | MH751740 |
| | MH751735 | MH751734 | MH751731 | MH751723 | MH751721 | MH751718 | MH751704 | MH751703 |
| | MH751699 | MH751688 | MH751686 | MH751685 | MH751681 | MH751678 | MH751671 | MH751663 |
| | MH751662 | MH751659 | MH751658 | MH751651 | MH751638 | MH751630 | MH751624 | MH751615 |
| | MH751599 | MH751597 | MH751673 | MH751758 | MH751757 | MH751755 | MH751753 | MH751743 |
| | MH751742 | MH751727 | MH751724 | MH751722 | MH751720 | MH751717 | MH751716 | MH751715 |
| | MH751713 | MH751707 | MH751706 | MH751702 | MH751697 | MH751695 | MH751680 | MH751677 |
| | MH751674 | MH751670 | MH751666 | MH751657 | MH751655 | MH751654 | MH751650 | MH751643 |
| | MH751639 | MH751636 | MH751620 | MH751618 | MH751617 | MH751614 | MH751612 | MH751610 |
| | MH751609 | MH751608 | MH751607 | MH751604 | MH751602 | MH751600 | MH751596 | MH751595 |
| | MH751594 | MH751749 | MH751748 | MH751741 | MH751739 | MH751737 | MH751730 | MH751729 |
| | MH751725 | MH751710 | MH751698 | MH751682 | MH751679 | MH751676 | MH751665 | MH751653 |
| | MH751652 | MH751647 | MH751646 | MH751634 | MH751632 | MH751631 | MH751627 | MH751623 |
| | MH751619 | MH751611 | MH751603 | MH751598 | MH751754 | MH751747 | MH751732 | MH751728 |
| | MH751719 | MH751714 | MH751712 | MH751709 | MH751700 | MH751694 | MH751693 | MH751684 |
| | MH751675 | MH751672 | MH751667 | MH751648 | MH751645 | MH751642 | MH751640 | MH751637 |
| | MH751613 | MH751606 | MH751605 | MH751593 | MH751736 | MH751733 | MH751701 | MH751668 |
| | MH751626 | MH751711 | MH751644 | MH751708 | MH751660 | MH751726 | MH751629 | |
| *Lutjanus synagris* | KC123168 | KC123169 | MG211231 | MG211220 | MG211236 | MG211233 | MG211228 | MG211208 |
| | MG211202 | MG211232 | MG211226 | MG211221 | MG211218 | MG211212 | MG211210 | MG211209 |
| | MG211206 | MG211203 | MG211196 | MG211187 | MG211182 | MG211181 | MG211179 | MG211178 |
| | MG211222 | MG211234 | MG211230 | MG211229 | MG211227 | MG211223 | MG211217 | MG211211 |
| | MG211204 | MG211201 | MG211200 | MG211194 | MG211191 | MG211186 | MG211177 | MG211189 |
| | MG211225 | MG211224 | MG211219 | MG211216 | MG211215 | MG211214 | MG211213 | MG211207 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | MG211205 | MG211199 | MG211198 | MG211197 | MG211195 | MG211193 | MG211192 | MG211190 |
| | MG211188 | MG211185 | MG211184 | MG211183 | MG211180 | MG211176 | MG211235 | EF656482 |
| | EF656483 | | | | | | | |

Table S4. Measures of mitochondrial DNA based on the D-loop region from red snapper captured in the western Atlantic.

| Region | Population | Samples | Polymorphic Sites | Nucleotide Diversity | Tajima's D | P value |
|---|---|---|---|---|---|---|
| USA | | 26 | 82 | 0.017±0.009 | -1.618 | 0.032* |
| | Florida | 8 | 49 | 0.019±0.011 | -1.117 | 0.166 |
| | Mississippi | 12 | 55 | 0.017±0.009 | -1.168 | 0.115 |
| | Louisiana | 6 | 29 | 0.013±0.008 | -1.098 | 0.149 |
| Mexico | | 30[a] | 79 | 0.016±0.008 | -1.499 | 0.042* |
| | North Veracruz | 8 | 35 | 0.013±0.008 | -1.046 | 0.170 |
| | South Veracruz | 8 | 39 | 0.014±0.009 | -1.137 | 0.162 |
| | Tabasco | 6 | 26 | 0.014±0.009 | 0.260 | 0.590 |
| | Campeche | 8 | 35 | 0.017±0.010 | -0.089 | 0.450 |
| Venezuela | | 14[a] | 85 | 0.027±0.014 | -0.950 | 0.153 |
| | Rio Caribe | 6 | 54 | 0.027±0.016 | -0.670 | 0.308 |
| | Margarita | 8 | 63 | 0.027±0.015 | -0.613 | 0.272 |
| Brazil | | 112 | 226 | 0.029±0.014 | -1.600 | 0.024* |
| | North Coast | 61 | 185 | 0.029±0.014 | -1.506 | 0.036* |
| | Ceará | 30 | 139 | 0.029±0.015 | -1.378 | 0.086 |
| | Bahia | 21 | 118 | 0.028±0.014 | -1.382 | 0.062 |

[a] Samples analyzed in this study. *Statistically significant values of the Tajima's D test.

Table S5. Measures of nuclear DNA based on the Intron 8 (FADS2) from red snapper captured in the western Atlantic.

| Region | Population | Samples | Polymorphic Sites | Nucleotide Diversity | Tajima's D | P value |
|---|---|---|---|---|---|---|
| Mexico | | 30[a] | 4 | 0.003±0.002 | 0.000 | 1.000 |
| | North Veracruz | 8 | 4 | 0.002±0.002 | 0.000 | 1.000 |
| | South Veracruz | 8 | 5 | 0.003±0.002 | -1,610 | <0.001* |
| | Tabasco | 6 | 4 | 0.004±0.003 | 0.000 | 1.000 |
| | Campeche | 8 | 4 | 0.004±0.003 | 0.000 | 1.000 |
| Venezuela | | 14[a] | 10 | 0.004±0.003 | -2.189 | 0.002* |
| | Rio Caribe | 6 | 7 | 0.005±0.003 | -3.067 | <0.001* |
| | Margarita | 8 | 9 | 0.006±0.004 | -2.183 | <0.001* |
| Brazil | | 62 | 33 | 0.012±0.006 | -0.334 | 0.417 |
| | North Coast | 62 | 33 | 0.012±0.006 | -0.334 | 0.397 |

[a] Samples analyzed in this study. *Statistically significant values of the Tajima's D test.

Table S6. Pairwise $F_{ST}$ values (above the diagonal) and the associated *P* value (below the diagonal) from the comparison among populations using the mtDNA D-loop sequences. (NV = North Veracruz; SV = South Veracruz; TB = Tabasco; CP = Campeche; NE = Nueva Esparta; RC = Rio Caribe; LA = Louisiana; MS = Mississippi, FL = Florida; CN1 = Coast North Brazil (46° and 50° W); CN = Coast North Brazil; CE = Ceará; BA = Bahia). *Statistically significant.

| Population | USA | | | Mexico | | | | Venezuela | | | Brazil | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FL | MI | LA | NV | SV | TB | CP | RC | NE | CN | CE | BA |
| **FL** | - | -0.016 | -0.057 | 0.039 | 0.001 | 0.094 | 0.036 | 0.162 | 0.200 | 0.126 | 0.169 | 0.130 |
| **MI** | 0.730 | - | -0.050 | 0.025 | 0.044 | 0.132 | 0.074 | 0.134 | 0.182 | 0.110 | 0.149 | 0.111 |
| **LA** | 0.973 | 0.991 | - | 0.019 | -0.014 | 0.092 | 0.062 | 0.128 | 0.182 | 0.083 | 0.126 | 0.088 |
| **NV** | 0.072 | 0.315 | 0.288 | - | 0.008 | 0.074 | 0.063 | 0.126 | 0.167 | 0.089 | 0.135 | 0.095 |
| **SV** | 0.441 | 0.117 | 0.468 | 0.423 | - | 0.005 | 0.046 | 0.162 | 0.207 | 0.112 | 0.162 | 0.119 |
| **TB** | 0.018* | 0.018* | 0.135 | 0.090 | 0.496 | - | 0.053 | 0.159 | 0.211 | 0.172 | 0.225 | 0.174 |
| **CP** | 0.108 | 0.027* | 0.144 | 0.171 | 0.153 | 0.135 | - | 0.173 | 0.188 | 0.107 | 0.156 | 0.116 |
| **RC** | <0.001* | 0.027* | 0.063* | 0.045* | <0.001* | <0.001* | <0.001* | - | -0.024 | -0.050 | 0.043 | 0.044 |
| **NE** | <0.001* | <0.001* | <0.001* | <0.001* | <0.001* | <0.001* | <0.001* | 0.532 | - | 0.038 | 0.047 | 0.056 |
| **CN** | <0.001* | 0.027* | 0.009* | 0.009* | <0.001* | <0.001* | 0.009* | 0.991 | 0.072 | - | -0.014 | -0.014 |
| **CE** | <0.001* | <0.001* | <0.001* | <0.001* | <0.001* | <0.001* | <0.001* | 0.973 | 0.297 | 0.856 | - | -0.007 |
| **BA** | <0.001* | <0.001* | <0.001* | <0.001* | <0.001* | <0.001* | <0.001* | 0.964 | 0.171 | 0.982 | 0.802 | - |

Table S7. Pairwise $F_{ST}$ values (above the diagonal) and the associated *P* value (below the diagonal) from the comparison among populations of red snapper using the sequences of the Intron 8 of the FADS2 gene. (NV = North Veracruz; SV = South Veracruz; TB = Tabasco; CP = Campeche; NE = Nueva Esparta; RC = Rio Caribe; LA = Louisiana; MS = Mississippi, FL = Florida; CN = Coast North Brazil (46° and 50° W). *Statistically significant.

| Population | Mexico | | | | Venezuela | | Brazil |
|---|---|---|---|---|---|---|---|
| | NV | SV | TB | CP | RC | NE | CN |
| **NV** | - | 0.179 | -0.013 | -0.171 | -0.088 | -0.046 | 0.106 |
| **SV** | 0.270 | - | -0.089 | 0.173 | 0.056 | 0.156 | 0.179 |
| **TB** | 0.621 | 0.928 | - | -0.036 | -0.111 | -0.007 | 0.118 |
| **CP** | 0.991 | 0.243 | 0.595 | - | -0.126 | -0.087 | 0.074 |
| **RC** | 0.505 | 0.234 | 0.613 | 0.712 | - | -0.174 | -0.016 |
| **NE** | 0.450 | 0.072 | 0.387 | 0.514 | 0.901 | - | -0.002 |
| **CN** | 0.027* | < 0.001* | 0.009* | 0.050* | 0.630 | 0.450 | - |