**Appendix A. Supplemental Materials: Cytochrome *c* oxidase subunit I gene (COI) DNA Barcoding**

The 5’ end of the mitochondrial Cytochrome *c* oxidase subunit I gene (COI; i.e., the DNA barcode gene, ~650 base pairs (bp)) was sequenced from all individuals included in the final filtered SNP datasets (*Diaphus dumerilli*, N = 42; *Lepidophanes guentheri*, N = 44; *Ceratoscopelus warmingii*, N = 87). Genomic DNA extraction, polymerase chain amplification (PCR), and Sanger Sequencing was performed for most samples (n = 151) by the Canadian Centre for DNA Barcoding (CCDB) (Steinke and Hanner, 2010) and deposited in the Barcode of Life Data System (BOLD, http://www.boldsystems.org). An additional three *D. dumerilii* (Set 1) and 15 *C. warmingii* (Set 2) samples were DNA barcoded in-house (see amplification reaction, thermal cycling, and sequencing conditions below, Table S1 and Table S2).

Table S1. PCR conditions for amplification of the mitochondrial Cytochrome *c* oxidase subunit I gene for three *D. dumerilii* samples.

|  |  |
| --- | --- |
| Reactant [conc] | Volume (µL) |
| dH20 | 34.3 |
| dNTP [10mM] | 8.0 |
| 10X Buffer  | 5.0 |
| Forward primer [10µM] | 1.25 |
| Reverse primer [10µM] | 1.25 |
| HotStar Taq Polymerase | 0.2 |
| Template DNA | 1.0 |

The COI gene of three *D. dumerilii* individuals (MX0640-5, MX0640-6, DPND 3294) were amplified in a final volume of 50-µL, per the reaction conditions outlined in Table S1 (Forward primer: 5’-TCAACCAACCACAAAGACATTGGCAC-3’; Reverse primer: 5’-TAGACTTCTGGGTGGCCAAAGAATCA-3’; Ward et al., 2005) and with the following thermal profile: 15 minute (min) denaturation at 95°C, followed by 35 cycles of 94°C for 1 min, 50°C for 1 min, and 72°C for 2 min, with a final extension of at 72°C for 5 min. Following amplification, electrophoresis of PCR products was performed using a 1.2% TBE agarose gel to check for successful amplification and proper sizing of resultant amplicons. Following amplification, PCR products were purified in-house using QIAquick PCR purification Kits (Qiagen Inc.) or sent to GENEWIZ, Inc. (South Plainfield, NJ) for enzymatic PCR clean-up. All resultant products were sequenced by GENEWIZ using BigDye Terminator v3.1 cycle sequencing reactions on an ABI 3730xl. Sequences were checked for errors and trimmed using the program CLC Sequence Viewer 8.0 (http://www.qiagenbioinformatics.com/).

Table S2. PCR conditions for amplification of the mitochondrial Cytochrome *c* oxidase subunit I gene for 15 *C. warmingii* samples.

|  |  |
| --- | --- |
| Reactant [conc] | Volume (µL) |
| dH20 | 10.2 |
| 100X BSA | 0.1 |
| MgCL2 [25mM] | 2.0 |
| dNTP [10mM] | 1.5 |
| 5X GoTaq Green PCR buffer | 4.0 |
| Forward primer [10µM] | 0.5 |
| Reverse primer [10µM] | 0.5 |
| GoTaq Green Polymerase | 0.2 |
| Template DNA | 1.0 |

The COI gene of 15 *C. warmingii* individuals (RIE 0129, RIE 0198, RIE 0607, RIE 0616, RIE 0629, RIE 0630, RIE 0631, RIE 0632, RIE 0666, RIE 0667, RIE 0669, RIE 0714, RIE 0759, RIE 0768, RIE 0801) were amplified in a final volume of 20-µL, per the reaction conditions outlined in Table S2 (Forward primer: 5’-TTCTCCACCAACCACAARGAYATYGG-3’; Reverse primer: 5’-CACCTCAGGGTGTCCGAARAATCARAA-3’) and with the following thermal profile: 2 min denaturation at 94°C, followed by 30 cycles of 94°C for 1 min, 50°C for 1 min, and 72°C for 1 min, with a final extension of at 72°C for 5 min. Following amplification, electrophoresis of PCR products was performed using a 1% TBE agarose gel to check for successful amplification and proper sizing of resultant amplicons. PCR clean-up was performed using a standard PEG protocol. Purified PCR products were double-strand sequenced using the BigDye Terminator v3.1 cycle sequencing kit (Applied Biosystems, Inc), followed by sequencing on a ABI 3730 at the Yale Keck School of Medicine. Sequences were checked for errors and trimmed using the program Sequencher 5.1.

Table S3. *Diaphus dumerillii* specimen identification number (#), NCBI GenBank Accession Number (#), and DNA sequence length in base pairs (bp) of the mitochondrial Cytochrome *c* oxidase subunit I gene.

|  |  |  |
| --- | --- | --- |
| Specimen ID # | GenBank Accession # | Length (bp) |
| MX0609\_1 | [MN621521](http://www.ncbi.nlm.nih.gov/nuccore/MN621521) | 652 |
| MX0609\_2 | [MN621515](http://www.ncbi.nlm.nih.gov/nuccore/MN621515) | 652 |
| MX0609\_3 | [MN621531](http://www.ncbi.nlm.nih.gov/nuccore/MN621531) | 652 |
| MX0611\_1 | [MN621518](http://www.ncbi.nlm.nih.gov/nuccore/MN621518) | 652 |
| MX0611\_4 | [MN621532](http://www.ncbi.nlm.nih.gov/nuccore/MN621532) | 652 |
| MX0611\_5 | [MN621517](http://www.ncbi.nlm.nih.gov/nuccore/MN621517) | 652 |
| MX0613\_1 | [MN621511](http://www.ncbi.nlm.nih.gov/nuccore/MN621511) | 652 |
| MX0619\_2 | [MN621530](http://www.ncbi.nlm.nih.gov/nuccore/MN621530) | 652 |
| MX0636\_2 | [MN621525](http://www.ncbi.nlm.nih.gov/nuccore/MN621525) | 652 |
| MX0640\_1 | [MN621513](http://www.ncbi.nlm.nih.gov/nuccore/MN621513) | 652 |
| MX0640\_2 | [MN621533](http://www.ncbi.nlm.nih.gov/nuccore/MN621533) | 652 |
| MX0640\_3 | [MN621527](http://www.ncbi.nlm.nih.gov/nuccore/MN621527) | 610 |
| MX0640\_5 | [MN621512](http://www.ncbi.nlm.nih.gov/nuccore/MN621512) | 626 |
| MX0640\_6 | [MN621524](http://www.ncbi.nlm.nih.gov/nuccore/MN621524) | 626 |
| RIE\_1027 | [MN621516](http://www.ncbi.nlm.nih.gov/nuccore/MN621516) | 652 |
| RIE\_1028 | [MN621535](http://www.ncbi.nlm.nih.gov/nuccore/MN621535) | 652 |
| RIE\_1029 | [MN621514](http://www.ncbi.nlm.nih.gov/nuccore/MN621514) | 652 |
| RIE\_1030 | [MN621528](http://www.ncbi.nlm.nih.gov/nuccore/MN621528) | 652 |
| RIE\_1031 | [MN621529](http://www.ncbi.nlm.nih.gov/nuccore/MN621529) | 652 |
| RIE\_109 | [MN621509](http://www.ncbi.nlm.nih.gov/nuccore/MN621509) | 650 |
| RIE\_110 | [MN621534](http://www.ncbi.nlm.nih.gov/nuccore/MN621534) | 652 |
| RIE\_111 | [MN621510](http://www.ncbi.nlm.nih.gov/nuccore/MN621510) | 652 |
| RIE\_112 | [MN621522](http://www.ncbi.nlm.nih.gov/nuccore/MN621522) | 652 |
| RIE\_587 | MF041178 | 652 |
| RIE\_608 | MF041514 | 652 |
| RIE\_711 | [MF041495](http://www.ncbi.nlm.nih.gov/nuccore/MF041495) | 652 |
| RIE\_664 | MF041263 | 652 |
| RIE\_808 | [MN621520](http://www.ncbi.nlm.nih.gov/nuccore/MN621520) | 652 |
| RIE\_995 | [MN621519](http://www.ncbi.nlm.nih.gov/nuccore/MN621519) | 652 |
| DPND\_2571 | MG856556 | 652 |
| DPND\_2572 | MG856739 | 652 |
| DPND\_3294 | [MN621526](http://www.ncbi.nlm.nih.gov/nuccore/MN621526) | 622 |
| DPND\_3297 | MG856395 | 640 |
| DPND\_3333 | MG856741 | 652 |
| DPND\_3334 | MG856780 | 652 |
| DPND\_3335 | MG856695 | 652 |
| DPND\_3336 | MG856627 | 652 |
| DPND\_3337 | MG856769 | 652 |
| DPND\_3382 | MG856536 | 652 |
| DPND\_3383 | MG856602 | 652 |
| DPND\_3464 | MG856534 | 652 |
| DPND\_3532 | MG856870 | 652 |

Table S4. *Lepidophanes guentheri* specimen identification number (#), NCBI GenBank Accession Number (#), and DNA sequence length in base pairs (bp) of the mitochondrial Cytochrome *c* oxidase subunit I gene.

|  |  |  |
| --- | --- | --- |
| Specimen ID # | GenBank Accession # | Length (bp) |
| MX0614\_1 | [MN621492](http://www.ncbi.nlm.nih.gov/nuccore/MN621492) | 652 |
| MX0614\_2 | [MN621489](http://www.ncbi.nlm.nih.gov/nuccore/MN621489) | 651 |
| MX0617\_4 | [MN621503](http://www.ncbi.nlm.nih.gov/nuccore/MN621503) | 652 |
| MX0631\_1 | [MN621494](http://www.ncbi.nlm.nih.gov/nuccore/MN621494) | 652 |
| MX0631\_2 | [MN621485](http://www.ncbi.nlm.nih.gov/nuccore/MN621485) | 652 |
| MX0631\_3 | [MN621505](http://www.ncbi.nlm.nih.gov/nuccore/MN621505) | 631 |
| MX0631\_4 | [MN621487](http://www.ncbi.nlm.nih.gov/nuccore/MN621487) | 652 |
| MX0631\_5 | [MN621491](http://www.ncbi.nlm.nih.gov/nuccore/MN621491) | 648 |
| MX0649\_1 | [MN621501](http://www.ncbi.nlm.nih.gov/nuccore/MN621501) | 652 |
| MX0654\_1 | [MN621499](http://www.ncbi.nlm.nih.gov/nuccore/MN621499) | 652 |
| MX0659\_1 | [MN621484](http://www.ncbi.nlm.nih.gov/nuccore/MN621484) | 652 |
| MX0659\_2 | [MN621508](http://www.ncbi.nlm.nih.gov/nuccore/MN621508) | 652 |
| MX0664\_1 | [MN621502](http://www.ncbi.nlm.nih.gov/nuccore/MN621502) | 652 |
| MX0664\_2 | [MN621486](http://www.ncbi.nlm.nih.gov/nuccore/MN621486) | 652 |
| MX0664\_3 | [MN621490](http://www.ncbi.nlm.nih.gov/nuccore/MN621490) | 652 |
| MX0696\_1 | [MN621506](http://www.ncbi.nlm.nih.gov/nuccore/MN621506) | 652 |
| MX0696\_2 | [MN621507](http://www.ncbi.nlm.nih.gov/nuccore/MN621507) | 652 |
| MX0697\_1 | [MN621496](http://www.ncbi.nlm.nih.gov/nuccore/MN621496) | 652 |
| RIE\_227 | MF041063 | 652 |
| RIE\_228 | MF041427 | 652 |
| RIE\_250 | MF040975 | 652 |
| RIE\_318 | MF041403 | 652 |
| RIE\_319 | MF041575 | 652 |
| RIE\_320 | MF041473 | 641 |
| RIE\_321 | MF041278 | 652 |
| RIE\_565 | MF041483 | 652 |
| RIE\_600 | MF041508 | 643 |
| RIE\_601 | MF041103 | 652 |
| RIE\_640 | [MN621488](http://www.ncbi.nlm.nih.gov/nuccore/MN621488) | 652 |
| RIE\_641 | [MN621495](http://www.ncbi.nlm.nih.gov/nuccore/MN621495) | 652 |
| RIE\_710 | [MN621493](http://www.ncbi.nlm.nih.gov/nuccore/MN621493) | 652 |
| DPND\_3414 | MG856460 | 652 |
| DPND\_3415 | MG856724 | 652 |
| DPND\_3416 | MG856793 | 652 |
| DPND\_3417 | MG856902 | 652 |
| DPND\_3418 | MG856784 | 652 |
| DPND\_3419 | MG856773 | 652 |
| DPND\_3420 | MG856591 | 652 |
| DPND\_3421 | MG856683 | 652 |
| DPND\_3535 | MG856436 | 652 |
| DPND\_3561 | MG856443 | 652 |
| DPND\_3562 | MG856607 | 652 |
| DPND\_3563 | MG856652 | 652 |
| DPND\_3726 | MG856524 | 652 |

Table S5. *Ceratoscopelus warmingii* specimen identification number (#), NCBI GenBank Accession Number (#), and DNA sequence length in base pairs (bp), and field identification (ID; if different than the specimen ID) of the mitochondrial gene Cytochrome *c* oxidase subunit I gene.

|  |  |  |  |
| --- | --- | --- | --- |
| Specimen ID # | GenBank Accession # | Length (bp) | Additional Field ID |
| BS\_400 | [MN621545](http://www.ncbi.nlm.nih.gov/nuccore/MN621545) | 652 | P14-400 |
| BS\_401 | [MN621543](http://www.ncbi.nlm.nih.gov/nuccore/MN621543) | 652 | P14-401 |
| BS\_402 | [MN621595](http://www.ncbi.nlm.nih.gov/nuccore/MN621595) | 645 | P14-402 |
| BS\_403 | [MN621589](http://www.ncbi.nlm.nih.gov/nuccore/MN621589) | 652 | P14-403 |
| BS\_404 | [MN621602](http://www.ncbi.nlm.nih.gov/nuccore/MN621602) | 652 | P14-404 |
| BS\_405 | [MN621597](http://www.ncbi.nlm.nih.gov/nuccore/MN621597) | 652 | P14-405 |
| BS\_406 | [MN621569](http://www.ncbi.nlm.nih.gov/nuccore/MN621569) | 652 | P14-406 |
| BS\_411 | [MN621605](http://www.ncbi.nlm.nih.gov/nuccore/MN621605) | 652 | P14-411 |
| BS\_414 | [MN621577](http://www.ncbi.nlm.nih.gov/nuccore/MN621577) | 652 | P14-414 |
| BS\_415 | [MN621549](http://www.ncbi.nlm.nih.gov/nuccore/MN621549) | 652 | P14-415 |
| BS\_416 | [MN621572](http://www.ncbi.nlm.nih.gov/nuccore/MN621572) | 652 | P14-416 |
| BS\_417 | [MN621598](http://www.ncbi.nlm.nih.gov/nuccore/MN621598) | 652 | P14-417 |
| BS\_418 | [MN621586](http://www.ncbi.nlm.nih.gov/nuccore/MN621586) | 652 | P14-418 |
| BS\_420 | [MN621564](http://www.ncbi.nlm.nih.gov/nuccore/MN621564) | 652 | P14-420 |
| BS\_423 | [MN621587](http://www.ncbi.nlm.nih.gov/nuccore/MN621587) | 652 | P14-423 |
| BS\_424 | [MN621551](http://www.ncbi.nlm.nih.gov/nuccore/MN621551) | 652 | P14-424 |
| BS\_426 | [MN621580](http://www.ncbi.nlm.nih.gov/nuccore/MN621580) | 621 | P14-426 |
| BS\_429 | [MN621568](http://www.ncbi.nlm.nih.gov/nuccore/MN621568) | 652 | P14-429 |
| BS\_430 | [MN621596](http://www.ncbi.nlm.nih.gov/nuccore/MN621596) | 652 | P14-430 |
| BS\_431 | [MN621600](http://www.ncbi.nlm.nih.gov/nuccore/MN621600) | 652 | P14-431 |
| BS\_434 | [MN621556](http://www.ncbi.nlm.nih.gov/nuccore/MN621556) | 652 | P14-434 |
| BS\_435 | [MN621609](http://www.ncbi.nlm.nih.gov/nuccore/MN621609) | 652 | P14-435 |
| DPND\_3863 | MG856440 | 652 | N/A |
| DPND\_3879 | MG856757 | 652 | N/A |
| DPND\_3881 | MG856691 | 652 | N/A |
| DPND\_3918 | MG856728 | 652 | N/A |
| DPND\_4027 | MG856654 | 652 | N/A |
| DPND\_4028 | MG856862 | 652 | N/A |
| DPND\_4070 | MG856847 | 652 | N/A |
| DPND\_4071 | MG856637 | 652 | N/A |
| DPND\_4072 | MG856830 | 652 | N/A |
| DPND\_4073 | MG856822 | 652 | N/A |
| DPND\_4074 | MG856473 | 652 | N/A |
| DPND\_4089 | MG856467 | 652 | N/A |
| DPND\_4090 | MG856850 | 652 | N/A |
| DPND\_4095 | MG856833 | 652 | N/A |
| DPND\_4164 | MG856576 | 652 | N/A |
| DPND\_4165 | MG856493 | 652 | N/A |
| DPND\_4171 | MG856538 | 652 | N/A |
| DPND\_4217 | MG856422 | 652 | N/A |
| DPND\_4260 | MG856873 | 652 | N/A |
| DPND\_4261 | MG856854 | 652 | N/A |
| DPND\_4262 | MG856686 | 652 | N/A |
| DPND\_4288 | MG856514 | 652 | N/A |
| DPND\_4289 | MG856441 | 652 | N/A |
| DPND\_4290 | MG856727 | 652 | N/A |
| PS\_036 | [MN621604](http://www.ncbi.nlm.nih.gov/nuccore/MN621604) | 652 | PS0036 |
| PS\_041 | [MN621608](http://www.ncbi.nlm.nih.gov/nuccore/MN621608) | 652 | MX0579-01 |
| PS\_042 | [MN621607](http://www.ncbi.nlm.nih.gov/nuccore/MN621607) | 652 | MX0579-02 |
| PS\_043 | [MN621566](http://www.ncbi.nlm.nih.gov/nuccore/MN621566) | 652 | MX0581-01 |
| PS\_045 | [MN621555](http://www.ncbi.nlm.nih.gov/nuccore/MN621555) | 652 | MX0581-03 |
| PS\_049 | [MN621599](http://www.ncbi.nlm.nih.gov/nuccore/MN621599) | 652 | MX0583-01 |
| PS\_050 | [MN621573](http://www.ncbi.nlm.nih.gov/nuccore/MN621573) | 652 | MX0583-02 |
| PS\_051 | [MN621576](http://www.ncbi.nlm.nih.gov/nuccore/MN621576) | 652 | MX0583-03 |
| PS\_052 | [MN621588](http://www.ncbi.nlm.nih.gov/nuccore/MN621588) | 652 | MX0583-04 |
| PS\_053 | [MN621550](http://www.ncbi.nlm.nih.gov/nuccore/MN621550) | 652 | MX0583-05 |
| PS\_055 | [MN621557](http://www.ncbi.nlm.nih.gov/nuccore/MN621557) | 652 | MX0580-01 |
| PS\_056 | [MN621552](http://www.ncbi.nlm.nih.gov/nuccore/MN621552) | 652 | MX0580-02 |
| PS\_057 | [MN621547](http://www.ncbi.nlm.nih.gov/nuccore/MN621547) | 652 | MX0580-03 |
| PS\_058 | [MN621546](http://www.ncbi.nlm.nih.gov/nuccore/MN621546) | 652 | MX0580-04 |
| PS\_059 | [MN621553](http://www.ncbi.nlm.nih.gov/nuccore/MN621553) | 652 | MX0580-05 |
| PS\_060 | [MN621565](http://www.ncbi.nlm.nih.gov/nuccore/MN621565) | 652 | MX0580-06 |
| PS\_061 | [MN621562](http://www.ncbi.nlm.nih.gov/nuccore/MN621562) | 652 | MX0580-07 |
| PS\_062 | [MN621592](http://www.ncbi.nlm.nih.gov/nuccore/MN621592) | 652 | MX0580-08 |
| PS\_063 | [MN621571](http://www.ncbi.nlm.nih.gov/nuccore/MN621571) | 652 | MX0580-09 |
| PS\_064 | [MN621584](http://www.ncbi.nlm.nih.gov/nuccore/MN621584) | 652 | MX0580-10 |
| PS\_065 | [MN621575](http://www.ncbi.nlm.nih.gov/nuccore/MN621575) | 652 | MX0580-11 |
| PS\_066 | [MN621601](http://www.ncbi.nlm.nih.gov/nuccore/MN621601) | 652 | MX0580-12 |
| RIE\_1020 | [MN621603](http://www.ncbi.nlm.nih.gov/nuccore/MN621603) | 652 | N/A |
| RIE\_1021 | [MN621559](http://www.ncbi.nlm.nih.gov/nuccore/MN621559) | 652 | N/A |
| RIE\_1022 | [MN621544](http://www.ncbi.nlm.nih.gov/nuccore/MN621544) | 652 | N/A |
| RIE\_129 | [MN621561](http://www.ncbi.nlm.nih.gov/nuccore/MN621561) | 663 | N/A |
| RIE\_198 | [MN621583](http://www.ncbi.nlm.nih.gov/nuccore/MN621583) | 597 | N/A |
| RIE\_496 | [MN621606](http://www.ncbi.nlm.nih.gov/nuccore/MN621606) | 652 | N/A |
| RIE\_607 | [MN621563](http://www.ncbi.nlm.nih.gov/nuccore/MN621563) | 597 | N/A |
| RIE\_616 | [MN621574](http://www.ncbi.nlm.nih.gov/nuccore/MN621574) | 597 | N/A |
| RIE\_629 | [MN621539](http://www.ncbi.nlm.nih.gov/nuccore/MN621539) | 597 | N/A |
| RIE\_630 | [MN621567](http://www.ncbi.nlm.nih.gov/nuccore/MN621567) | 597 | N/A |
| RIE\_631 | [MN621591](http://www.ncbi.nlm.nih.gov/nuccore/MN621591) | 663 | N/A |
| RIE\_632 | [MN621582](http://www.ncbi.nlm.nih.gov/nuccore/MN621582) | 597 | N/A |
| RIE\_666 | [MN621593](http://www.ncbi.nlm.nih.gov/nuccore/MN621593) | 597 | N/A |
| RIE\_667 | [MN621540](http://www.ncbi.nlm.nih.gov/nuccore/MN621540) | 597 | N/A |
| RIE\_669 | [MN621585](http://www.ncbi.nlm.nih.gov/nuccore/MN621585) | 597 | N/A |
| RIE\_759 | [MN621558](http://www.ncbi.nlm.nih.gov/nuccore/MN621558) | 663 | N/A |
| RIE\_768 | MN621579 | 663 | N/A |
| RIE\_801 | [MN621554](http://www.ncbi.nlm.nih.gov/nuccore/MN621554) | 663 | N/A |
| RIE\_933 | [MN621581](http://www.ncbi.nlm.nih.gov/nuccore/MN621581) | 652 | N/A |

**Appendix B. Supplemental Materials: Single Nucleotide Polymorphism Results**

**Fig. S1.** Plot of Admixture’s cross-validation error values for *K* = 1-5 for: (**A**) 42 samples of *Diaphus dumerilii* collected from the Gulf of Mexico during three temporal periods (2011, 2015, and 2016) and genotyped at 2577 SNPs; (**B**) 44 samples of *Lepidophanes guentheri* collected from the Gulf of Mexico during three temporal periods (2011, 2015, and 2016) and genotyped at 3462 SNPs; (**C**) 65 samples of *Ceratoscopelus warmingii* collected fromthe Gulf of Mexico during three temporal periods (2011, 2015, and 2016) and genotyped at 1804 SNPs; (**D**) 87 total samples of *C. warmingii* collected from the Gulf of Mexico (N = 65) and from Bear Seamount, western North Atlantic (2014; N = 22) genotyped at 1804 SNPs (Cwar-SNP-all).



(B) *L. guentheri*

(A) *D. dumerilii*

 

(C) *C. warmingii* (GOM & Bear)

(C) *C. warmingii* (GOM-only)

**Fig. S2.** Plot of the Bayesian Information Criterion (BIC) vs. number of clusters (*K*) of: (**A**) 42 samples of *Diaphus dumerilii* collected from the Gulf of Mexico (GOM) during three temporal periods (2011, 2015, and 2016) and genotyped at 2577 SNPs; (**B**) 44 samples of *Lepidophanes guentheri* collected from the GOM during 2011, 2015, and 2016 and genotyped at 3462 SNPs; (**C**) 65 samples of *Ceratoscopelus warmingii* collected from the GOM during 2011, 2015, and 2016 and genotyped at 1804 SNPs; and (**D**) 87 total samples of *C. warmingii* collected from the GOM (N = 65) and Bear Seamount, western North Atlantic (N = 22) and genotyped at 1804 SNPs (Cwar-SNP-all).

 

**(B) *C. warmingii* (1784 SNPs)**

**(A) *C. warmingii* (20 SNPs)**

**Fig. S3.** Biplot displaying the first two principal components (x-axis = component 1, y-axis = component 2) of a Principal Component Analysis of *Ceratoscopelus warmingii* samples collected from the GOM (N = 65; red circles) and Bear Seamount, Western North Atlantic (N = 22; blue circles) at (**A**) 20 candidate outlier SNPs (Cwar-SNP-outlier), and (**B**)1784 putatively neutral SNPs (Cwar-SNP-neutral).
Abbreviations: GOM: Gulf of Mexico; Bear: Bear Seamount, western North Atlantic.

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Ward, R.D., Zemlak, T.S., Innes, B.H., Last, P.R., Hebert, P.D. (2005) DNA barcoding Australia’s fish species. [Philosophical Transactions of The Royal Society B Biological Sciences](https://www.researchgate.net/journal/0962-8436_Philosophical_Transactions_of_The_Royal_Society_B_Biological_Sciences), 360(1462): 1847-1857.