Programa de Monitoramento da Biodiversidade Aquática da Área Ambiental I – Porção Capixaba do Rio Doce e Região Marinha e Costeira Adjacente

MATERIAL SUPLEMENTAR

**A7MPGP-S5**

**Câmara Técnica**

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**MATERIAL SUPLEMENTAR A7MPGP-S5**

Tabela 1. Espécies de peixes recifais e estuarinos amostrados por localidade com número total de amostras coletados por área, baseado em 40 indivíduos por área das espécies coletadas e porcentagem coletada (%) até o momento. Os cinco estuários de coleta são: RC-Rio Caravelas, RD-Rio Doce, RI-Rio Ipiranga, SM-Rio São Mateus e PA – Rio Piraque-açu. As quatro áreas recifais coletas: A1-Norte de Abrolhos e Royal Charlotte, A2-Sul do banco de Abrolhos, A3-Plataforma estreita entre Linhares e Piúma, A4-Marataízes e norte do RJ.

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| **Amostras de peixes recifais e estuarinos - Genética de população** | | | | | | | | | | | | | |  |
| **Recifais** | | | | | | | | | | | | | |  |
| **Espécie** | Ano 1 | | | | | Transição | | | | | | | |  |
| **Área 1** | **Área 2** | **Área 3** | **Área 4** | **%** | **Área 1** | **Área 2** | **Área 3** | | | **Área 4** | | **%** |  |
| *Epinephelus morio* | 40 | 40 | 16 | 0 | 60% | 40 | 40 | 16 | | | 4 | | 63% |  |
| *Mycteroperca bonaci* | 40 | 40 | 29 | 2 | 69% | 40 | 40 | 32 | | | 3 | | 72% |  |
| *Mycteroperca venenosa* | 0 | 9 | 40 | 0 | 31% | 0 | 9 | 40 | | | 0 | | 31% |  |
| *Mycteroperca interstitialis* | 2 | 40 | 5 | 31 | 49% | 2 | 40 | 6 | | | 32 | | 50% |  |
| *Cephalopholis fulva* | 40 | 40 | 40 | 10 | 81% | 40 | 40 | 40 | | | 10 | | 81% |  |
| *Ocyurus chrysurus* | 40 | 40 | 0 | 0 | 50% | 40 | 40 | 0 | | | 0 | | 50% |  |
| *Lutjanus analis* | 40 | 40 | 40 | 16 | 85% | 40 | 40 | 40 | | | 36 | | 98% |  |
| *Lutjanus jocu* | 40 | 40 | 15 | 0 | 59% | 40 | 40 | 15 | | | 0 | | 59% |  |
| Total | **242** | **289** | **185** | **59** | 69% | **242** | **289** | **189** | | | **85** | | 72% |  |
| **Estuarinos** | | | | | | | | | | | | | |  |
| **Espécie** | Ano 1 | | | | | Transição | | | | | | | |  |
| **CA** | **DO** | **IP** | **SM** | **%** | **CA** | **DO** | **IP** | **SM** | | | **PA** | **%** |  |
| *Chirocentrodon bleekerianus* | 40 | 37 | 40 | 35 | 95% | 40 | 37 | 40 | 35 | | | 29 | 91% |  |
| *Conodon nobilis* | 40 | 26 | 39 | 32 | 85% | 40 | 33 | 39 | 35 | | | 7 | 77% |  |
| *Isopisthus parvipinnis* | 40 | 40 | 40 | 38 | 98% | 40 | 40 | 40 | 39 | | | 32 | 96% |  |
| *Pellona harroweri* | 40 | 39 | 40 | 37 | 97% | 40 | 40 | 40 | 37 | | | 33 | 95% |  |
| *Trinectes paulistanus* | 21 | 36 | 11 | 14 | 51% | 22 | 36 | 11 | 14 | | | 4 | 44% |  |
| *Micropogonias furnieri* | 1 | 5 | 0 | 25 | 19% | 1 | 5 | 0 | 25 | | | 1 | 16% |  |
| *Larimus breviceps* | 38 | 39 | 40 | 40 | 98% | 38 | 40 | 40 | 40 | | | 40 | 99% |  |
| *Lycengraulis grossidens* | 40 | 23 | 39 | 39 | 83% | 40 | 40 | 40 | 39 | | | 4 | 82% |  |
| Total | **260** | **245** | **249** | **260** | *79%* | **261** | **271** | **250** | | **264** | | **150** | 75% |  |

Tabela 2. Marcadores microssatélites de seis espécies de peixes que se encontram descritos na literatura prospectados pelo laboratório Allgenetics (Espanha), durante o período de transição (outubro/2019 e março/2020).

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| Multiplex | Locus | Repetição (Motif) | Tamanho do fragmento | Forward primer (5’-3’) | Reverse primer (5’-3’) | Fluorescência |
| *Conodon nobilis* | | | | | | |
| 1 | AG Cno 465 | AG | 95 | CACAGCCAAAGCCCTTCC | GAGAGAGTGTGCTTGGGACA | FAM |
| AG Cno 064 | AC | 197 | CGGCTTCTCTTTGGAATCAG | CGGTCAGTAAGGGATATCAGC | FAM |
| AG Cno 474 | AC | 92 | TGGACTCCTCTTTGTATTGTGC | CTCCACACCCATCGTCAGA | HEX |
| 2 | AG Cno 436 | AG | 126 | TCTTTCTTCAGAGAGCTGGGTT | AACTCGCAGGAGGTAAAGCA | FAM |
| AG Cno 353 | AC | 99 | AGAAGTCACAGAAGGCCAGC | TGATGCAGAGCTTTACACGG | NED |
| 3 | AG Cno 110 | AC | 110 | GACGAAATCGTGACATTCCC | CACATCTCAGTGTGTGCTGC | FAM |
| AG Cno 373 | AG | 241 | TGACATGCTTAGATGAGCCCT | CAACAGGATACGTCTGCGTC | HEX |
| AG Cno 014 | AC | 97 | AATTCTTGGCAGTTGGATGG | CGCTCATTCATCTGTCTTTGTC | NED |
| 4 | AG Cno 275 | AG | 123 | TGGATCTCAATAGGCTTCGG | TATTTATCACATCGCCTCCC | FAM |
| 5 | AG Cno 288 | AC | 127 | CTCTCAGAGACGCGCACA | ACCTCACACCTGTAGCACCC | FAM |
| 6 | AG Cno 252 | AC | 90 | CTGAGGTGTCACTCTCGCTC | ACAGTCTGAGAAGTTAGTTTGGACA | FAM |
| AG Cno 164 | AC | 92 | TAGCCAATCGCACCCTAGTC | CGTGCTTTATTATTCCTGTCCTG | NED |

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| Multiplex | Locus | | Repetição (Motif) | | Tamanho do fragmento | | Forward primer (5’-3’) | | Reverse primer (5’-3’) | | | Fluorescência |
| *Isopisthus parvipinnis* | | | | | | | | | | | | |
| 1 | AG Ipa 150 | | AC | | 92 | | GTGCATATGAGGGTGCACAT | | GGGTATTTATGTGAGGTGGAAGA | | | FAM |
| AG Ipa 001 | | AC | | 94 | | TTCTCCAGCTCCACCTCTCT | | CAAACTGCAGTGGTCTCCTG | | | HEX |
| AG Ipa 134 | | AC | | 107 | | TGTACCGTAAGCAACATCCG | | TGTCTCAAACGTGATCACACC | | | NED |
| 2 | AG Ipa 076 | | AC | | 114 | | GAACTCAGCTTTGTACGGTGAA | | AAATGGGCCAGTGGTTGTAT | | | FAM |
| AG Ipa 357 | | AC | | 110 | | TTCCGTCTCCACTAACTGGG | | TGCGTGGAGTTTATCTCTGG | | | HEX |
| AG Ipa 492 | | AG | | 92 | | GGAGAGAAGGAGAAAGAAGGG | | GTGGTGCCTAGCCAGCTATC | | | NED |
| 3 | AG Ipa 214 | | AC | | 190 | | CAGTAATCTGAAGTCAGTGGAGCA | | ATTAGGACTGACCTCCATCACTC | | | FAM |
| AG Ipa 187 | | AC | | 294 | | TCCAGTGCCAGGAGAAGTAA | | TCTCCTCCTTTATGGCTTGTTT | | | FAM |
| AG Ipa 406 | | AC | | 149 | | ATCCTCACCCTTGCAGGAC | | GTTTGGACTGCTCCTGCTG | | | HEX |
| AG Ipa 387 | | AG | | 249 | | CGCAAGGTCTGTTTGCTAGA | | CGGGATCTTGACTGGACATC | | | HEX |
| 4 | AG Ipa 139 | | AC | | 95 | | GCGTTTGCCTACCTAAAGCA | | TCATTCTGAGCAGATGGTCG | | | FAM |
| AG Ipa 478 | | AC | | 140 | | ATCCTTAACGTGTGTAGCAAACT | | ATAATCTTTGACATCACTTTCATGACT | | | HEX |
| *Larimus breviceps* | | | | | | | | | | | | |
| 1 | AG Lbr 175 | | AC | | 159 | | GCCACCAGGAAGTTGACATT | | CCGCCTAACTGAAGGATCAC | | | FAM |
| AG Lbr 092 | | AC | | 277 | | TGTCAGCTGTCTGAACCGTC | | GCAAACCCATCTCCACATTT | | | FAM |
| AG Lbr 345 | | AC | | 149 | | CATACTTTGCCAACGGAGGT | | CAGGTGAATCTCATACCCGC | | | NED |
| 2 | AG Lbr 195 | | AC | | 104 | | TGTGCTCACACTTCCTCTGG | | CCACAGTCTCCCACTCATCA | | | FAM |
| AG Lbr 060 | | AC | | 128 | | CCTCTCGGCTAAGGCTCTTT | | TTATGCAATTGGTCTGGCAA | | | HEX |
| AG Lbr 443 | | AC | | 115 | | CTAGCATCATGGACAGCGAC | | GCGACAGTCAGCAGGACATA | | | NED |
| 3 | AG Lbr 301 | | AG | | 154 | | TTGAAGGTCAGGAAGACGCT | | CTCAACATCCCACAGTGCAT | | | FAM |
| AG Lbr 076 | | AG | | 176 | | GGTCTCACTCTCAGGGTTGC | | ACTACGACTCCCATGATGCC | | | HEX |
| AG Lbr 332 | | AC | | 98 | | GCTGCAGTGACCAATGTCTG | | CAGCGGCTAATAAAGCGAAC | | | NED |
|  | AG Lbr 499 | | AAC | | 107 | | GCAGCATGCTATATTCCGCT | | CTGCTTCGCTCCTCTGAAAT | | | FAM |
| 4 | AG Lbr 331 | | AG | | 210 | | CAGCCGTCAACCAGACAATA | | GAGTGGCATTGATTGCTGAA | | | FAM |
|  | AG Lbr 372 | | AG | | 91 | | TTCTGAATGGTGGCAAACTG | | GCTTTCAACAGGCCCTCATA | | | HEX |
| Multiplex | Locus | | Repetição (Motif) | | Tamanho do fragmento | | Forward primer (5’-3’) | | Reverse primer (5’-3’) | | | Fluorescência |
| *Pellona harroweri* | | | | | | | | | | | | |
| 1 | | AG Pha 427 | | AC | | 137 | | TGGTCTTTGAACCTGCCAAT | | CTCACAAAGGAACATGCAGC | FAM | |
| AG Pha 205 | | AC | | 112 | | ACACTCAAAGAAGTGCCGCT | | TGGCTGGTCTGGTGGTAGAT | HEX | |
| AG Pha 047 | | AC | | 111 | | AGTTTAGGTGTGCCTGGGTG | | CAGCCTTGGTTAGCTGCTCT | NED | |
| 2 | | AG Pha 097 | | AG | | 130 | | GGGATAAGGGAGTGGAGAGG | | TGTTTCACTTGACTCCCACG | NED | |
| AG Pha 268 | | AC | | 249 | | CTTTGTGGGCAGAGTCTCGT | | GTGGCCATGCAGTCAACTAA | NED | |
| 3 | | AG Pha 215 | | AC | | 137 | | AGAGGCACGTCTGCAATCTC | | CCTATTGATTCACGGTGGCT | FAM | |
| AG Pha 050 | | AAAC | | 146 | | CTTTGGGCATTTAGCCATGT | | CCTTGAGGGTGACCAATGAT | HEX | |
| AG Pha 353 | | AC | | 291 | | GGAGGAAGACCAGGTGTGAA | | TTTGGGTGCTGTGTAAACCC | HEX | |
| AG Pha 122 | | AC | | 97 | | CTCTGCCTTCCTGCTCTTTG | | GGCTGTAGGCACCACAGTTT | NED | |
| 4 | | AG Pha 300 | | AC | | 105 | | TCAGGCCTACTCATGCCATT | | GATGCTTCCTCGGTGTTAGC | FAM | |
| AG Pha 365 | | AC | | 153 | | GAGAACATGGAGCCAAGCAT | | GCGCAACATGTCAGTAGGTC | HEX | |
| AG Pha 231 | | AAC | | 109 | | TGGGTGGTCTAGCCCATTAG | | CCTCAGATTCAGGAGGCAGT | NED | |
| *Trinectes paulistanus* | | | | | | | | | | | | |
| 1 | | AG Tpa 317 | | AC | | 114 | | ACAGTGTGGATCTGCCTCCT | | CCCACCTCATTCACTTGCTT | FAM | |
| AG Tpa 402 | | AG | | 171 | | CACCAAGGACAGGAAGTGCT | | TTTGGGAGCTTGTCACCTCT | HEX | |
| AG Tpa 421 | | AG | | 132 | | TCAAGCACGTAGCACGAGAC | | TTCCTGATGGGATTACTGGG | NED | |
| 2 | | AG Tpa 035 | | AAC | | 121 | | ACCTTCATCACCTGGTCAGC | | GCACGAGTTCAATCAGCAAA | FAM | |
| AG Tpa 458 | | AC | | 92 | | ATGAGCTGCCTCTGTCTCGT | | TGAGAACCACAACTCCATCG | HEX | |
| AG Tpa 231 | | AC | | 152 | | GGCCTACAGTAACGGCAGAG | | GTGTGCCAGGAAAGGAAGAA | NED | |
| 3 | | AG Tpa 168 | | AG | | 169 | | TCACCCTCCTCTGCCACTAC | | ATCCCACAGGAACTGTTTGC | HEX | |
| AG Tpa 251 | | AAC | | 101 | | TTGCCCTTGAAACAACATCA | | CATTAAAGCGTCGCCAAACT | NED | |
| 4 | | AG Tpa 472 | | AC | | 154 | | TTGTGGGTAATTTGGGCTGT | | TACTGAGCAGCAGTGGAGGA | FAM | |
| AG Tpa 331 | | ATC | | 159 | | GTTTGTGTCGTTTGTGCGTC | | TTGTGTTGTCACACCCTGCT | HEX | |
| 5 | | AG Tpa 144 | | AC | | 120 | | TTCGCTCTGCACAGACAGTT | | ACCAGGGAGCGAAATTAGGT | HEX | |
| AG Tpa 395 | | AC | | 172 | | GACGAGGCGTTGTGTAGTGA | | TTGGTCGTGAGGTTTGGAAT | NED | |

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| --- | --- | --- | --- | --- | --- | --- |
| Multiplex | Locus | Repetição (Motif) | Tamanho do fragmento | Forward primer (5’-3’) | Reverse primer (5’-3’) | Fluorescência |
| *Mycteroperca interstitialis* | | | | | | |
| 1 | AG Min 436 | AAC | 96 | CATAGAACAGAAGCCATGCAA | CCCAGTATGTCACAGCATGTC | FAM |
| AG Min 047 | AC | 134 | CCAATCTGCAGCCCATAACT | TTGGTTCGTGGACATTTGTT | HEX |
| AG Min 287 | AC | 98 | GACCACAGAACCACATTCACC | TGTATGGTAACCTCGGCCAC | NED |
| 2 | AG Min 360 | AC | 100 | TCACCTTCCTCTGTGTGTCCT | ACAAGCTCCACCGATCAAAT | FAM |
| AG Min 082 | AC | 148 | GCAGCCTAGGATTCAGTTCC | AGGAAGGCAGACTGAAAGGG | HEX |
| AG Min 289 | AC | 91 | GGGTTACTCTCACCCTTAAATAAA | CTGTAGCGAGCTGGTCATTG | NED |
| AG Min 019 | AATG | 192 | GATAGTCTGGCGACCTGTCC | GAGGTAACATGTGCGCTGAA | NED |
| 3 | AG Min 497 | AC | 161 | TATCAAACTCGTTAGGCCGC | TTGTCGCCACTCTTTCTTGA | FAM |
| AG Min 276 | AC | 90 | TCTTTATAAGGTCACTTGAGTATCAGA | ATCAGCACCTGCATGCCT | NED |
| 4 | AG Min 341 | AC | 91 | TGCTCCTCTGTCAGTGTTGG | GCGCTTGAGACAGTCAGTTCT | FAM |
| AG Min 344 | AC | 191 | TCCTTGGTGGCTGGCTGT | CCCGCTTTGGACTGAAAGT | FAM |
| AG Min 206 | AC | 95 | CCATCTGTTAGTGTGCAGGC | TGTCTCAGTTGTGTGTGTCCG | NED |

Tabela 3. Características dos *loci* para a espécie *Epinephelus morio*, total de amostras obtidas por área (N). Número de amostras genotipadas por *locu* (NL), número de alelos e Ra riqueza alélica (Na).

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Locus*** | **NL** | **Área 1 (N=19)** | | **N** | **Área 2 (N=18)** | | **NL** | **Área 3 (N=3)** | | **Total (N=40)** | |
| **Na** | **Ra** | **Na** | **Ra** | **Na** | **Ra** | **Na** | **Ra** |
| **E6** | 18 | 15 | 0,83 | 14 | 14 | 1,00 | 3 | 5 | 1,03 | 35 | 1,03 |
| **E14** | 16 | 18 | 1,12 | 12 | 19 | 1,58 | 3 | 4 | 0,76 | 31 | 0,76 |
| **E15** | 5 | 5 | 1,00 | 12 | 4 | 0,30 | 3 | 2 | 1,82 | 20 | 1,82 |
| **E17** | 18 | 17 | 0,94 | 12 | 13 | 1,08 | 3 | 6 | 0,92 | 33 | 0,92 |
| **E19** | 17 | 19 | 1,12 | 13 | 20 | 1,53 | 3 | 5 | 0,75 | 33 | 0,75 |
| **E26** | 18 | 12 | 0,67 | 12 | 13 | 1,08 | 3 | 4 | 1,14 | 33 | 1,14 |
| **E33** | 3 | 3 | 1,00 | 4 | 4 | 1,00 | 3 | 3 | 1,00 | 10 | 1,00 |
| **Média** | 13,6 | 12,7 | 1,0 | 11,3 | 12,4 | 1,1 | 3,0 | 4,1 | 1,1 | 27,9 | 1,1 |

Tabela 4. Valores de heterozigosidades observada (*Ho*) e esperada (*He*) para todos os *loci* da espécie *Epinephelus morio*, \* valores com desvio significativo em relação ao equilíbrio de *Hardy-Weinberg*, após correção de *Bonferroni*. Área 1-Norte de Abrolhos e Royal Charlotte, Área 2-Sul do banco de Abrolhos, Área 3-Plataforma estreita entre Linhares e Piúma.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | E06 | | E14 | | E15 | | E17 | | E19 | | E26 | | E33 | |
| *Ho* | *He* | *Ho* | *He* | *Ho* | *He* | *Ho* | *He* | *Ho* | *He* | *Ho* | *He* | *Ho* | *He* |
| **Área 1** | 0,89 | 0,93 | 0,94 | 0,94 | 0,60 | 0,67 | 0,94 | 0,94 | 0,94 | 0,95 | 0,83 | 0,91 | 0,33 | 0,60 |
| **Área 2** | 0.64\* | 0.93\* | 0,92 | 0,98 | 0.33\* | 0.57\* | 0.83\* | 0.93\* | 0,84 | 0,97 | 0.83\* | 0.92\* | 1,00 | 0,75 |
| **Área 3** | 1,000 | 0,3 | 1,00 | 0,80 | 1,00 | 0,60 | 1,00 | 1,00 | 1,00 | 0,93 | 1,00 | 0,86 | 0,67 | 0,73 |