Animal Biology

Genotyping-by-Sequencing (GBS) of large amphibian genomes: a comparative study of two non-model species endemic to Italy

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Submitted: September 10, 2018. Final revision received: November 11, 2018. Accepted: November 12, 2018

Abstract

Next Generation Sequencing (NGS) and related technologies have revolutionized the field of conservation and population genetics, providing novel tools and the capacity to discover thousands of new Single Nucleotide Polymorphisms (SNPs) for the analysis of population parameters. However, gathering NGS data for organisms with very large genomes, such as amphibians, remains challenging because it is still unclear how the current methods perform. Here, we use the Genotyping-by-Sequencing (GBS) approach to generate SNP data for the genotyping of two amphibian species that are of conservation concern, the Sardinian brook salamander (*Euproctus platycephalus*) and the Italian stream frog (*Rana italica*). Both *E.*

platycephalus and *R. italica* have very large genomes (5.53 Gb and >20 Gb, respectively) so genomic data are not available for either of them. We used 95 individual samples and one Illumina lane for each species, with an additional lane for *E. platycephalus*. After filtering, we obtained 961 and 854 high-coverage SNPs for *E. platycephalus* and *R. italica*, respectively. Our results suggest that GBS can serve as a reliable and cost-effective method for genotyping large amphibian genomes, including non-model species.

Keywords

Conservation genomics; frog; newt; Next Generation Sequencing; SNPs; whole genome duplications

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Supplementary material

Text file listing the 96 individual barcodes used during the PCR reaction.

AACGCACATT, AACGTGCCT, AACTGG, AAGACGCT, AATAACCAA, AATGAACGA, AATTAG, ACAACCAACT, ACAACT, ACAGT, ACCAGGA, ACGCGCG, ACGGTACT, ACTGCGAT, ACTGCT, ATAGAT, ATATAA, ATATCGCCA, ATCCG, ATCTGT, ATGAGCAA, ATGGCAA, ATTAT, CAACCACACA, CAAGT, CACCA, CAGAGGT, CAGATA, CAGTGCCATT, CATAT, CATCTGCCG, CCACTCA, CCGAACA, CCTCG, CCTTGCCATT, CGCAACCAGT, CGCACCAATT, CGTCGCCACT, CGTGGACAGT, CGTGTCA, CGTTCA, CTAAGCA, CTCAT, CTCGCGG, CTCGTCG, CTCTA, CTCTCGCAT, CTTAG, CTTGA, GAAGCA, GAAGTG, GAATGCAATA, GAGCGACAT, GCAAGCCAT, GCACGAT, GCCAACAAGA, GCCTACCT, GCGCCG, GCGCTCA, GCGTACAAT, GCGTCCT, GCTCCGA, GGAACGA, GGAAGACAT, GGACAG, GGACAG, GGAGTCAAG, GGATA, GGCTTA, GGTATA, GGTGCACATT, GGTGT, GTCGCCT, GTGACACAT, TAGATGA, TAGCAG, TAGCCAA, TAGCGGAT, TATCA, TATGT, TATTCGCAT, TCACGGAAG, TCACTG, TCAGAGAT, TCCGAG, TCTTGG, TGAAT, TGACGCCA, TGCAGA, TGCCGCAT, TGCTT, TGGCAACAGA, TGGCACAGA, TGGCCAG, TTATTACAT, TTCGTT, TTGCTG