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Genetic Characteristic of Indonesian Local Ducks Based on Single Nucleotide Polymorphism (SNP) Analysis in D-loop Region Mitochondria DNA

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| <b>Title</b>         | Genetic Characteristic of Indonesian Local Ducks Based on Single Nucleotide Polymorphism (SNP) Analysis in D-loop Region Mitochondria DNA |
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| <b>Abstract</b>       | <p>Abstract. The aim of the study was to know the genetic characteristic and polymorphysm of Indonesian local ducks including Magelang, Tegal, Mojosari, Bali and Alabio duck based on Single Nucleotide Polymorphism (SNP) analysis in D-loop region mtDNA. The long term aim was to set the spesific genetic marker based on SNP D-loop region mtDNA which could differentiate local ducks in Indonesia. In the future, it could be used as selection tool for local duck conservation, and refinement strategy as well as the improvement of genetic quality by utilizing the available native duck germplasm. There were 20 ducks for each duck population and were taken 3 ml of its blood as sample. DNA Isolation Kit high pure PCR template preparation (Geneaid) was uded for Genome DNA isolation. Amplification with PCR technique used primer DL-AnasPF (L56) as forward and DL-AnasPR (H773) as reverse. Next, PCR product or amplicon were sequenced. Sequence result were analyzed with SNP technique and observed the similarity and difference of its nucleotide sequence between individual and population. The result of the study showed that genome DNA from local duck in Indonesia was successfully isolated. DNA fragment of 718 bp was amplified with primer pair of DL-AnasPF and DL-AnasPR. Nucleotide sequence was 469 nt and analyzed with SNP technique. It was compared with standard nucleotide sequence of <i>Anas platyrhynchos</i> (HM010684.1) in Gen Bank. The result of nucleotide sequence similarity percentage was 99.68±0.56%. Single Nucleotide Polymorphism D-loop region mtDNA Indonesian local duck was 0.32±0.56%. Some SNP was found in Magelang duck C (Klawu blorok), F (Cemani black), G (Gambiran), H (Jarakan kalung), I (Jowo plain) and K (Plain white) also Tegal duck 8, 1, 2, 5, 2, 8 and 2 SNP respectively. It could be concluded that polymorphic genetic characteristic similarity were existed in Indonesia local duck populations which was shown by its big standard deviation SNP in D-loop region mtDNA. Magelang duck with different feather color relatively more polymorphic to another local duck in Indonesia. Single Nucleotide Polymorphism which was achieved could be used as genetic marker that differentiate genetic characteristic of Indonesian local ducks.</p> <p><b>Key words:</b> genetic characteristic, local duck, Single Nucleotide Polymorphism (SNP), D-loop mtDNA</p> <p><b>Abstrak.</b> Penelitian ini bertujuan untuk mengetahui karakteristik genetik dan polimorfisme itik lokal Indonesia yaitu itik Magelang, Tegal, Mojosari, Bali dan Alabio berdasarkan analisis Single Nucleotide Polymorphism (SNP) daerah D-loop mtDNA. Tujuan jangka panjangnya adalah menetapkan marker atau penanda genetik berdasarkan SNP daerah D-loop mtDNA spesifik yang dapat membedakan itik-itik lokal yang ada di Indonesia. Selanjutnya digunakan sebagai alat bantu seleksi untuk konservasi, pembibitan dan pengembangbiakan itik lokal. Populasi masing-masing jenis itik lokal yang digunakan sebanyak 20 ekor untuk diambil 3 ml sampel darahnya. Isolasi DNA genom menggunakan DNA Isolation Kithigh pure PCR template preparation (Geneaid). Amplifikasi dengan teknik PCR menggunakan pasangan primer DL-AnasPF (L56) sebagai forward dan DL-AnasPR (H773) sebagai reverse. Produk PCR atau amplikon yang diperoleh disekuensing. Hasil sekuensing dianalisis dengan teknik SNP dan diamati kesamaan dan perbedaan urutan nukleotida antar individu itik dan antar populasi. Hasil penelitian menunjukkan bahwa DNA genom dari itik lokal di Indonesia berhasil diisolasi. Amplifikasi dengan teknik PCR berhasil memperoleh fragmen berukuran 718 bp. Urutan nukleotida hasil sekuensing sebesar 469 nt dianalisis dengan teknik SNP dan dibandingkan dengan urutan nukleotida standar dari itik <i>Anas platyrhynchos</i> (HM010684.1) yang ada di Gen Bank, diperoleh persentase kesamaan urutan nukleotid sebesar 99,68±0,56%. Single Nucleotide Polymorphism daerah D-loop mtDNA pada itik lokal di Indonesia sebesar 0,32±0,56%. Sejumlah SNP ditemukan pada itik Magelang C (Klawu blorok), F (Hitam cemani), G (Gambiran), H (Jarakan kalung), I (Jowo polos) dan K (Putih polos) serta itik Tegal masing-masing 8, 1, 2, 5, 2, 8 serta 2 SNP. Kesimpulan dari penelitian ini adalah terdapat karakteristik genetik yang polimorfik pada populasi itik lokal di Indonesia, ditunjukkan dengan adanya simpang baku SNP pada daerah D-loop mtDNA yang relatif besar. Itik Magelang dengan warna bulu yang berbeda relatif lebih polimorfik dibandingkan dengan itik lokal lainnya di Indonesia. Single Nucleotide Polymorphism yang diperoleh dapat digunakan sebagai penanda genetik yang dapat membedakan karakteristik genetik yang dimiliki oleh itik lokal di Indonesia. Kata kunci: karakteristik genetik, itik lokal, Single Nucleotide Polymorphism (SNP), D-loop mtDNA</p> |
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| <b>Author</b>       | Dr. Ir DATTA DEWI PURWANTINI, M.P   |