

## INTISARI

### Studi Hematologi dan *Molecular Fish Sexing* Koi (*Cyprinus carpio*) Jenis Kohaku Dengan Metode Amplifikasi PCR

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Ikan koi (*Cyprinus carpio*) Kohaku adalah salah satu jenis ikan favorit di Indonesia. Salah satu kunci keberhasilan budidaya ikan koi adalah manajemen pemeliharaan yang intensif, dengan penentuan jenis kelamin secara cepat, tepat, akurat, dan dilakukan sedini mungkin dengan berbasis molekuler. Indikator keberhasilan budidaya ikan koi juga tidak lepas dari faktor kesehatan ikan. Pemeriksaan darah rutin merupakan salah satu cara yang mudah dan cepat untuk menganalisis kesehatan ikan. Penelitian ini bertujuan untuk mengetahui jenis kelamin ikan koi kohaku secara cepat, tepat, akurat dan sedini mungkin menggunakan metode PCR serta untuk mengetahui profil hematologi dari ikan koi kohaku spesies lokal. Penelitian dimulai dengan memelihara 10 ekor ikan koi yang diperoleh dari pembudidaya koi di daerah Sleman Yogyakarta. Sampel darah perifer sebanyak 0,5 ml dikoleksi melalui vena caudalis. Pengambilan sampel dilakukan menggunakan preparat anestesi khusus yaitu Koi Anesthesia. Darah ditampung dalam tabung antikoagulan K2 EDTA. Sampel darah digunakan dalam pemeriksaan hematologi yang meliputi pemeriksaan eritrosit, leukosit, hemoglobin, PCV, MCV, MCH, MCHC, total protein plasma, fibrinogen dan ekstraksi DNA. Hasil ekstraksi DNA dipakai sebagai template untuk mengamplifikasikan gen ArS.9-15. Produk PCR divisualisasikan dengan elektroforesis gel agarosa 1,5% kemudian dianalisis secara deskriptif untuk menentukan jenis kelamin koi jantan atau betina. Elektroforesis produk PCR menunjukkan dua pita DNA sebesar 850 bp dan 1.100 bp pada koi kohaku jantan, sedangkan pada koi kohaku betina hanya menunjukkan pita DNA berukuran 850 bp. Hasil *molecular fish sexing* dari 10 ikan koi kohaku menunjukkan 70% betina dan 30% jantan. Hasil pemeriksaan hematologi dari ikan koi kohaku spesies lokal adalah, eritrosit  $1,187 \times 10^6$  sel/ $\mu\text{L}$ ; leukosit 39.750 sel/ $\mu\text{L}$ ; hemoglobin 7,2 g/dL; PCV 11,1 %; MCV 102,02 fL; MCH 72,17 pg; MCHC 129,11 g/dL; TPP 8,11 g/dL; dan kadar fibrinogen 1,69 g/dL. Perbedaan beberapa parameter darah dalam penelitian ini, dengan literatur terutama dipengaruhi oleh kualitas sampel, faktor stress, atau status kesehatan.

Kata kunci: ikan koi kohaku, hematologi, *molecular fish sexing*, gen ArS.9-15.

## ABSTRACT

### Hematology and Molecular Fish Sexing on Koi (*Cyprinus carpio*) Kohaku by PCR Amplification Method

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Kohaku koi fish (*Cyprinus carpio*) is one of the favorite types of koi fish in Indonesia. One of the success key in koi fish farming is intensive maintenance management, which one of the effort is to rapidly sex determine, precisely, accurately, as early as possible and based on a molecular basis. Indicator of the success in koi fish farming is also inseparable from health factors. The easiest and fastest way to analyze fish health is with routine blood tests. This study aims to sex determine of Kohaku Koi fish rapidly, precisely, accurately and as early as possible based on the amplification of the ArS.9-15 gene using the PCR method and also to see the kohaku koi fish blood profile. The research stages began from the maintenance of 10 kohaku koi fish, obtained from koi fish farmers in the Sleman area in Yogyakarta. After that, a collection of 0.5 ml peripheral blood samples per fish from the caudalis vein using special anesthetic preparat, namely Koi Anesthesia. The collected peripheral blood samples were then accommodated in tubes containing the K2 EDTA anticoagulant. Blood samples used for routine hematological examination include the number of erythrocytes, leucocytes, hemoglobin, PCV, MCV, MCH, MCHC, total plasma protein, fibrinogen and also used for DNA extraction. DNA extraction used as a template for PCR amplification to amplify the ArS.9-15 gene. PCR products were visualized with 1.5 % agarose gel electrophoresis then were analyzed descriptively to sex determine between male or female kohaku koi. Electrophoresis results of PCR products showed two DNA bands of 850 bp and 1,100 bp in male Kohaku Koi, while in female Kohaku Koi showed only a band DNA in size of 850 bp. The results of the molecular fish sexing of the 10 Kohaku Koi showed that 70% are female and 30% are male. The whole blood tests result shows that erythrocyte is in  $1.187 \times 10^6$  cells / $\mu$ L; leukocyte 3,975 cells / $\mu$ L; hemoglobin 7.2 g/dL; PCV 11.1 %; MCV 102.02 fL; MCH 72.17 pg; MCHC 129.11 g/dL; TPP 8.11 g/dL; and fibrinogen 1.69 g/dL. The difference of several parameters with the literature in this study, can be influenced by the quality of the sample, stress factor, or health status.

Key words: Kohaku koi fish, hematology, molecular fish sexing, ArS.9-15 gene.