

ABSTRAK

STUDI PROFIL HEMATOLOGI DAN *MOLECULAR SEXING* PADA IKAN KOI (*Cyprinus carpio*) JENIS TAISHO SANSHOKU DENGAN METODE AMPLIFIKASI PCR

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Koi Taisho Sanshoku merupakan ikan hias berwarna dasar putih dengan corak merah dan hitam yang sangat digemari dalam dunia budidaya ikan hias. Berdasarkan morfologinya, koi Taisho Sanshoku yang berumur di bawah satu tahun sulit dibedakan antara jantan dan betina karena memiliki bentuk, ukuran, warna, serta corak yang sama. Kemampuan penentuan jenis kelamin koi yang cepat, tepat, dan akurat akan sangat membantu para pembudidaya dan pemulia koi dalam komersialisasi dan perbanyakan spesies ikan yang efisien. Selain itu, gambaran hematologi pada ikan budidaya juga penting dilakukan untuk memberikan pengetahuan mengenai kondisi maupun kesehatan pada ikan budidaya. Penelitian ini bertujuan untuk mengetahui gambaran hematologi dan menentukan jenis kelamin koi (*Cyprinus carpio*) jenis Taisho Sanshoku secara molekuler dengan mengamplifikasi gen ArS.9-15 menggunakan metode PCR.

DNA diekstraksi dari sampel darah sepuluh ekor koi Taisho Sanshoku yang telah dipelihara selama tiga hari menggunakan Geneaid *gSYNC DNA Extraction Kit*. Hasil ekstraksi diamplifikasi pada bagian gen ArS.9-15 dengan metode PCR menggunakan primer ArS.9-15 dan dielektroforesis dengan gel agarose 1,5% dan pewarnaan SybrSafe. Visualisasi di bawah UV transilluminator dengan panjang gelombang 280 nm menghasilkan amplikon dengan panjang sekitar 800 bp dan 1.100 bp pada ikan jantan sedangkan pada ikan betina menghasilkan pita tunggal 800 bp.

Hasil pemeriksaan darah rutin dari sepuluh koi Taisho Sanshoku yaitu RBC $1,93 \pm 0,5 \times 10^6$ sel/ μ L, hemoglobin $6,8 \pm 2,4$ g/dL, PCV $29,2 \pm 13,0\%$, MCV $139,5 \pm 27,6$ fL, MCV $35,0 \pm 10,5$ pg, MCHC $24,9 \pm 7,81$ g/dL, WBC $44,2 \pm 7,5 \times 10^3$ sel/ μ L, total protein plasma $7,8 \pm 2,7$ g/dL, dan kadar fibrinogen $0,3 \pm 0,2$ g/dL. Kesimpulan hasil pemeriksaan hematologi yang berbeda dengan referensi ikan koi (*Cyprinus carpio*) sehat menegaskan agar kualitas sampel, metode sampling, dan umur ikan perlu diperhatikan. Berdasarkan hasil elektroforesis, sepuluh ekor koi Taisho Sanshoku dalam penelitian telah berhasil ditentukan jenis kelaminnya 100%, terdiri dari enam ekor ikan jantan dan empat ekor ikan betina.

Kata kunci: *Cyprinus carpio*, ArS-9.15 gene, molecular fish sexing, PCR.

ABSTRACT

STUDY OF HEMATOLOGICAL PROFILE AND MOLECULAR SEXING OF TAISHO SANSHOKU KOI FISH (*Cyprinus carpio*) BY PCR AMPLIFICATION METHOD

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Taisho Sanshoku Koi is an ornamental fish with a white base and red-black patterns which is very popular in ornamental fish cultivation. Based on its morphology, at the age of less than a year the Taisho Sanshoku can not be distinguished between male koi and female koi because they have the same physical shape and appearance including size, color, and pattern on their bodies. The ability to determine the sex of Koi fish quickly, rapidly, precisely, accurately, and earlier will greatly assist koi cultivators and breeders for the efficient commercialization and breeding. Moreover, the hematological profile of cultured fish is also important to provide knowledge about the health and condition of cultured fish. This study aims to describe the hematological profile and determine the sex of the Taisho Sanshoku Koi (*Cyprinus carpio*) molecularly by detecting the ArS.9-15 gene using the polymerase chain reaction method.

DNA was extracted from blood samples of ten Taisho Sanshoku Koi which were maintained for three days using the Geneaid gSYNC DNA Extraction Kit. The extraction results were amplified on the ArS.9-15 gene section by PCR method using ArS.9-15 primer electrophoresed with 1.5% agarose gel and SybrSafe staining. Visualization under a UV transilluminator with a wavelength of 280 nm produced amplicon with a length of about 800 bp and 1,100 bp in male fish while the female fish produced a single band of 800 bp.

The results of the hematology of ten Taisho Sanshoku koi were RBC $1.93 \pm 0.5 \times 10^6$ cells/ μ L, hemoglobin 6.8 ± 2.4 g/dL, PCV 29.2 ± 13.0 %, MCV 139.5 ± 27.6 fL, MCV 35.0 ± 10.5 pg, MCHC 24.9 ± 7.81 g/dL, WBC $44.2 \pm 7.5 \times 10^3$ cells/ μ L, total plasma protein 7.8 ± 2.7 g/dL, and fibrinogen 0.3 ± 0.2 g/dL. The conclusion of the hematological profile are different from the healthy koi (*Cyprinus carpio*) reference and emphasizes that the quality of the sample, sampling method, and the age of the fish need to be considered. Based on the results of electrophoresis, the ten Taisho Sanshoku Koi (*Cyprinus carpio*) were 100% successfully determined, consisting of six males and four females.

Keywords: *Cyprinus carpio*, ArS.9-15 gene, molecular fish sexing, PCR.