

Imarotus Shofiyah, 2021. Perbandingan Densitas dan Orientasi Berkas Kolagen terhadap Perubahan Bentuk Tubuh Teripang *Acaudina rosettis* dan *Phyllophorus sp.* Skripsi ini dibawah bimbingan Dr. Dwi Winarni, M.Si. dan Sugiharto, S.Si., M.Si. Departemen Biologi, Fakultas Sains dan Teknologi, Universitas Airlangga, Surabaya.

ABSTRAK

Tujuan dari penelitian ini adalah untuk mengetahui peran kolagen berupa densitas dan orientasi berkas terhadap perubahan bentuk tubuh teripang *Acaudina rosettis* dan *Phyllophorus sp.* Sebanyak 5 individu dari spesies *A. rosettis* (berat dinding 14,7–51,8 gram dan panjang tubuh 18–23 cm) dan *Phyllophorus sp* (rata-rata berat dinding 28,5–58,5 gram dan panjang tubuh 11–15 cm) diambil dari Selat Madura. Setiap individu dipotong pada 6 bagian dinding tubuh (dorsal dan ventral: anterior, median, posterior) dan kemudian didekalsifikasi dalam larutan EDTA 12% hingga jaringan cukup lunak (3–5 minggu). Dengan metode parafin, sampel dipotong secara melintang menjadi sediaan histologi melalui tahap *processing, embedding, sectioning, affixing, dan staining* dengan pewarnaan Van Gieson. Kolagen pada dermis diamati melalui mikrofoto (10x10). Densitas kolagen diukur dengan *ImageJ* dan data diolah dengan uji ANOVA *same subject* pada $\alpha=0,05$. Orientasi berkas kolagen diamati melalui mikrofoto yang telah diedit menjadi efek negatif dengan aplikasi *PicsArt*. Jenis perubahan bentuk tubuh diamati melalui foto teripang ketika *sampling*. Hasil pengamatan densitas dan orientasi kolagen menunjukkan perbedaan interspesies, namun relatif sama pada semua bagian dinding tubuh intraspesies. *A. rosettis* memiliki densitas kolagen lebih rendah daripada *Phyllophorus sp.* Orientasi berkas kolagen dinding tubuh *A. rosettis* tersusun secara acak dengan organisasi antarberkas yang lemah, sedangkan *Phyllophorus sp* memiliki kolagen dengan orientasi seragam (sirkuler terhadap arah potongan jaringan) dan organisasi yang kompak. Densitas dan orientasi kolagen berpengaruh pada kemampuan untuk merubah bentuk tubuh: *Phyllophorus sp* dengan densitas tinggi dan orientasi berkas yang seragam mampu menggembungkan tubuhnya secara maksimal dan memiliki tubuh lebih kaku, sedangkan *A. rosettis* dengan densitas rendah dan orientasi berkas yang tidak seragam menyebabkan tubuhnya bersifat lebih fleksibel dan terbatas dalam merubah bentuk tubuh. Kedua spesies mampu melakukan restriksi lokal dengan kemampuan yang sama.

Kata kunci: *Acaudina rosettis*, *Phyllophorus sp*, densitas, orientasi, kolagen, bentuk tubuh teripang.

Imarotus Shofiyah, 2021. Comparison of Collagen Bundle's Density and Orientation in Relation to *Acaudina rosettis* and *Phyllophorus sp*' Body Shapes Change. This thesis is under guidance of Dr. Dwi Winarni, M.Si. and Sugiharto, S.Si., M.Si. Department of biology, Faculty of Science and Technology, Airlangga University, Surabaya.

ABSTRACT

The aim of this study was to determine the role of collagen, in the form of density and bundle orientation toward the changes of its body shape in sea cucumbers species *Acaudina rosettis* and *Phyllophorus sp*. Five individuals from species *A. rosettis* (the size of body wall weight is 14,7–51,8 grams and body length is 18–23cm) and *Phyllophorus sp* (the size of body wall weight is 28,5–58,5 grams and body length is 11–15 cm) were collected from Madura Strait. Each sample was cut in 6 different body parts (dorsal and ventral: anterior, median, posterior) and decalcified in 12% of EDTA solution until the tissues were soft enough (3–5 weeks). Samples were cut *cross-sectional* into histological preparations using the *paraffin* method through the following steps: processing, embedding, sectioning, affixing, and Van Gieson staining. Collagen in the dermis was observed through microphoto (10x10). *ImageJ* was used to calculate the density of collagen, also the *same subject* ANOVA test was used to analyze the data within $\alpha=0,05$. The orientation of collagen bundles was identified through the microphoto which has been edited to be negative effect using *PicsArt* app. Various types of body shape were observed using photos that were taken during sampling. The results of collagen density and orientation observations showed differences in interspecies, but were relatively consistent in all parts of the intraspecies body wall. *A. Rosettis* has a lower collagen density than *Phyllophorus sp*. The collagen bundles of *A. rosettis*' body wall are not uniformly arranged, and there is a lack of bundle organization. However, *Phyllophorus sp* has collagen with a compact organization and a uniform orientation (circular toward the cut of tissue). The ability to change its body shape is affected by collagen density and orientation: *Phyllophorus sp* with a high density and uniform bundle orientation has a stiffer body wall and it is able to inflate its body maximally. *A. rosettis*, with low density and non-uniform bundle orientation, causes its body wall to be more flexible and limited in changing shape. Both species have the same ability to perform local restrictions.

Keywords: *Acaudina rosettis*, *Phyllophorus sp*, density, orientation, collagen, sea cucumber's body shape.