

## RINGKASAN

SYARIF IRWAN NURDIANSYAH, Program Studi S2 Biologi Fakultas Biologi, Universitas Jenderal Soedirman, Status Reproduksi dan Komposisi Kimia Oosit Cacing Nipah (*Namalycastis rhodochorde*) Betina pada Semua Kuartal Siklus Lunar, Komisi Pembimbing, Ketua Hj.Yulia Sistina, M.Sc. Stud., Ph.D., anggota Dr. Ir. Isdy Sulisty, DEA.

Cacing nipah (*Namalycastis rhodochorde*) merupakan spesies yang baru diketahui dari kelompok Polychaeta dan memiliki pola reproduksi monotelik yang memijah (*spawning*) hanya satu kali dalam satu siklus hidup. Tingkat kematangan seksual cacing nipah (*Namalycastis rhodochorde*) terdiri dari *immature*, *submature* dan *mature*. Cacing Polychaeta betina memiliki tingkat kematangan yang dapat diidentifikasi berdasarkan komposisi dan diameter oosit. Pemijahan pada cacing Polychaeta yang berada pada fase reproduksi (*mature*) dikoordinasi oleh faktor eksternal (siklus lunar) dan faktor internal (system endokrin).

Penelitian pengaruh siklus lunar terhadap status reproduksi cacing nipah (*Namalycastis rhodochorde*) betina telah dilakukan untuk mengkaji tingkat kematangan seksual berkaitan dengan diameter oosit cacing nipah yang keluar dari sarang (tumbuhan nipah) serta komposisi kimia oosit pada semua kuartal siklus lunar, yaitu kuartal *new moon*, kuartal 1, kuartal *full moon* dan kuartal III. Oosit, dari 10 ekor cacing nipah yang disampling dari Delta Sungai Kapuas Kabupaten Kubu Raya Kalimantan Barat selama tiga bulan berturut-turut (Maret, April dan Mei 2014). Oosit diisolasi dari betina dengan cara menyayat tubuh cacing untuk mendapatkan cairan selom yang mengandung oosit. Sebagian kecil cairan selom diambil untuk pengukuran diameter oosit sebagai parameter tingkat kematangan seksual cacing nipah. Sebagian besar cairan selom diinkubasi pada temperatur rendah (5 °C) untuk disimpan sebelum dilakukan analisis komposisi kimia. Analisis komposisi kimia dilakukan pada oosit yang diisolasi dari cairan selom. Komposisi lipid dianalisis dengan metode *Gerber*, protein dianalisis dengan metode *kjeldahl* dan glukosa dianalisis dengan metode *Smogy-Nelson*.

Hasil penelitian membuktikan bahwa siklus lunar menentukan atau setidaknya berpengaruh pada keluarnya cacing betina dari sarangnya, yaitu tumbuhan nipah. Cacing betina *submature* (100%) ditemukan pada kuartal *new*

*moon* (NM), dan kuartal I (K1). Pada kuartal III (K3) ditemukan 93,33% dan di kuartal *full moon* (FM) hanya 40%. Sebanyak 60% cacing nipah betina yang dikoleksi pada kuartal *full moon* (FM) berada pada tahap reproduksi atau *mature*. Data diameter oosit sebagai parameter tingkat kematangan seksual cacing nipah betina sampel terbukti berbeda sangat nyata ( $P < 0,01$ ) antar 12 waktu sampling siklus lunar. Hasil analisis data kandungan lipid pada oosit cacing nipah sampel menunjukkan bahwa kandungan lipid berkisar antara  $13,95 \pm 44,41 - 22,20 \pm 2,99$  ppm, kandungan protein berkisar antara  $75,76 \pm 12,33 - 150,08 \pm 20,34$  ppm dan glukosa berkisar antara  $75,89 \pm 10,53 - 99,18 \pm 7,2$  ppm. Hasil analisis statistik data komposisi kimia oosit ke-12 kuartal sampling terbukti bahwa kandungan protein dan glukosa sangat berbeda nyata ( $P < 0,01$ ), sedangkan kandungan lipid tidak berbeda nyata ( $P > 0,015$ ). Hasil analisis korelasi *Pearson* membuktikan bahwa kandungan lipid, protein dan glukosa pada oosit cacing nipah berkorelasi sangat nyata (\*\*;  $P < 0,01$ ) dengan diameter oosit. Kandungan lipid dan protein berkorelasi positif (secara searah) dengan diameter oosit, artinya peningkatan diameter oosit diikuti peningkatan kandungan lipid dan protein. Kandungan glukosa berkorelasi negatif (secara terbalik) dengan diameter oosit, artinya kandungan glukosa oosit akan menurun seiring dengan peningkatan diameternya. Hasil uji-T komposisi kimia (lipid, protein dan glukosa) serta diameter oosit antara sampel yang *submature* dan *mature* menunjukkan bahwa terdapat perbedaan yang sangat nyata (sig.  $< 0,001$ ) antara keduanya. Hasil ini membuktikan bahwa terjadi perubahan komposisi kimia (lipid, protein dan glukosa) oosit seiring perubahan diameter oosit cacing nipah (*N. rhodocorde*) saat memasuki proses pematangan secara seksual.

Secara keseluruhan penelitian ini membuktikan bahwa siklus lunar menentukan keluarnya cacing nipah betina dari sarang. Simpulan lain adalah tingkat kematangan reproduksi cacing nipah dapat ditentukan berdasarkan parameter diameter dan komposisi kimia oositnya.

**Kata Kunci:** Siklus lunar, Kuartal *Full Moon*, Cacing Nipah, Diameter Oosit, Lipid, Protein, Glukosa.

## SUMMARY

SYARIF IRWAN NURDIANSYAH, Post Graduate Department of Biology, Faculty of Biology, University of Jenderal Soedirman, The Reproduction Status and Chemical Composition of Nypa Worm's Oocytes (*Namalycastis rhodochorde*) from All Quarter of Lunar Cycle, Supervisor Hj.Yulia Sistina, M.Sc. Stud., Ph.D., Co-Supervisor Dr. Ir.H. Isdy Sulisty, DEA.

Nypa worm (*Namalycastis rhodochorde*) has described previously as a new species of Polychaeta with reproductive strategy being monothelic, namely once time spawning in their lifetime. The Maturity stages of Nypa Worm (*Namalycastis rhodochorde*) consist of *immature* (oocytes diameter at  $\leq 40 \mu\text{m}$ ), *submature* (oocyte diameter of  $40 < x < 120 \mu\text{m}$ ), and *mature* (oocyte diameter  $\geq 120 \mu\text{m}$ ). It has been known that females Polychaeta maturity stages can be measured by its oocytes diameter and chemicals composition. Polychaeta spawning is known to be controlled by external factor (i.e lunar cycle) and internal factor (i.e. endocrine system).

Research has been conducted to study lunar cycle effect on females nypa worm maturity as detected from oocytes diameter and their chemical composition sampled worms collected from out of the nest (nypa tree) in all quarters of lunar cycle, i.e new moon quarter, first quarter, full moon quarter and third quarter during three consecutive months (March, April and May 2014) at Kapuas River Delta, Kubu Raya District, West Borneo. Oocytes from 10 nypa worms were sampled, isolated from worm's coelom fluid. A small part of coelom fluid was used to measure oocyte diameter as maturity stats parameter of worms. Most of coelom fluid then were incubated at low temperature ( $5^{\circ}\text{C}$ ) before analysis of chemicals composition were conducted. Analysis for lipid content in oocytes was used Gerber method, for protein applied Kjeldahl method, and for glucose applied the Smogy-Nelson method.

Results proven that lunar cycle determined or have effect on female nypa worm out of the nest (nypa tree). It has been dated that 100% submature females found from new moon quarter (NM) and first quarter sampling. Sampling from third quarter found 93.33% submature. Sampling result during full moon quarter (FM) got 60% mature females. Statistical analysis proven that oocyte's diameter

data from all samples were very significant difference ( $P<0.01$ ) indicated that lunar cycles controlled maturity stage of female nypa worm.

Data from oocytes chemical composition shown that the lipid content was ranges from  $13.95\pm44.41$ – $22.20\pm2.99$  ppm, protein content ranges from  $75.76\pm12.33$ – $150.08\pm20.34$  ppm and glucose content ranges from  $75.89\pm10.53$ – $99.18\pm7.2$  ppm. Results of data analysis proven that oocyte protein or glucose composition were very significant difference ( $P<0.01$ ) among 12 quartes sampling, while the lipid content were not significantly different ( $P>0.05$ ). Analysis using Pearson correlation proven that lipid, protein and glucose content in nypa worm (*Namalycastis rhodocorde*) oocytes were highly significantly correlated (\*\*) with oocytes diameters. Lipid or protein each was positively correlated with oocytes diameter, which means if oocyte diameter increases the lipid or protein content also increases. However, glucose content of oocytes proven a negative correlation with oocytes diameter, which means that if the glucose content increase the oocyte diametr decrease or vice versa. Results from analysis of simple paired test for each data of chemicals composition (lipid, protein and glucose) and oocyte diameter from submature and mature worm samples proven that both were significantly different (sig.<0.01). This result proven that nypa worm oocyte's composition of lipid, protein or glucose were changed as changed also on oocyte's diameter during maturity processes occurs.

The overall research proven that lunar cycle determine the activity of females nypa worm to came out from their nest during reproduction phase or mature stage. Second conclusion was that maturity stages of females nypa worms indicated by oocytes diameter and composition of lipid, protein, and glucose.

**Keywords:** Lunar Cycle, Full Moon Quarter, Nypa Worm, Oocytes diameter, Lipid, Protein, Glucose.