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Thermal condition in nests of varying clutch sizes of the green turtle (Chelonia mydas) in Redang Island, Terengganu Malaysia / Chan Siew Len.

cln 1516



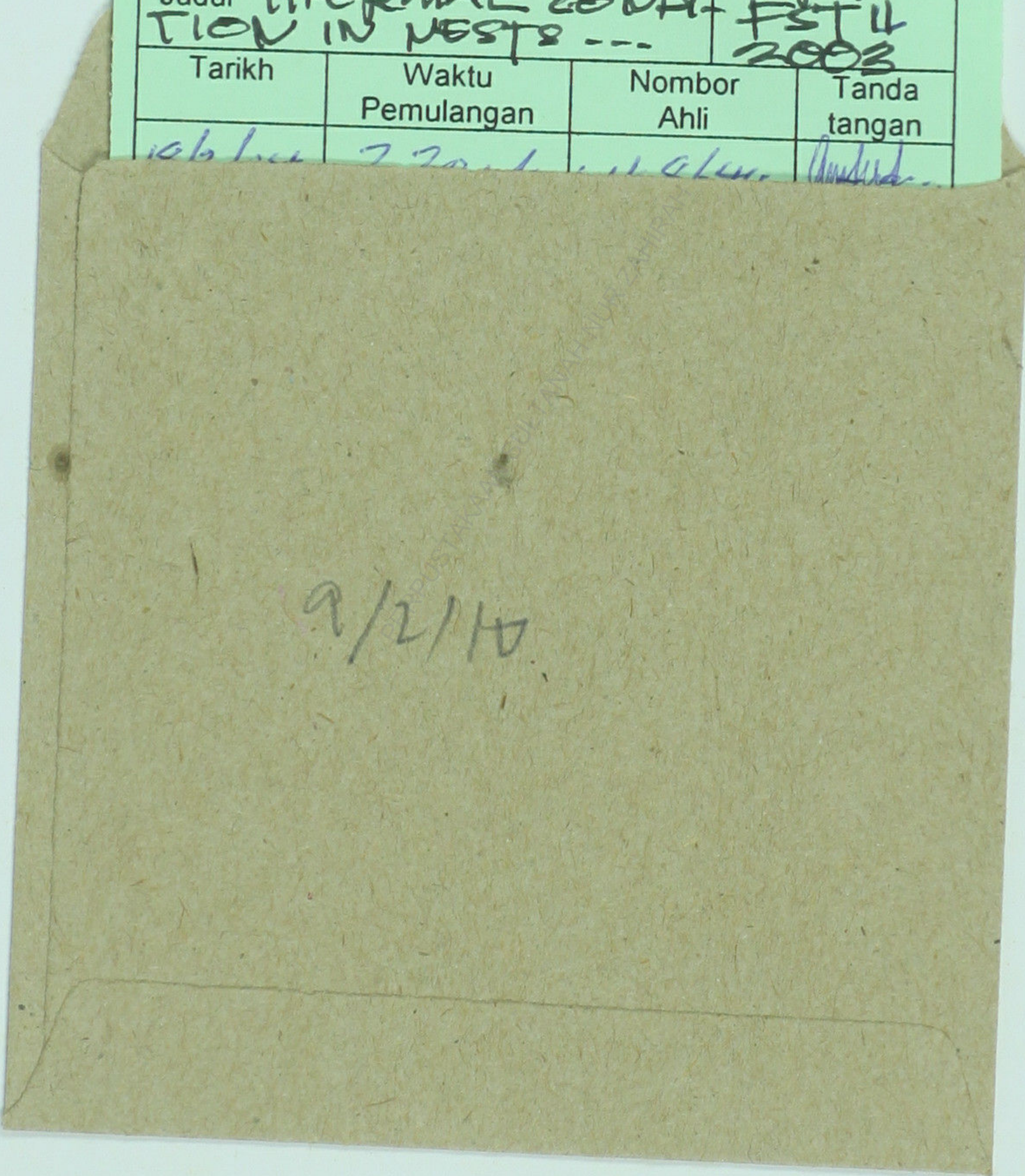
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**THERMAL CONDITION IN NESTS OF VARYING CLUTCH SIZES OF THE  
GREEN TURTLE (*Chelonia mydas*) IN REDANG ISLAND, TERENGGANU,  
MALAYSIA.**

BY  
CHAN SIEW LEN

This project is submitted in partial fulfillment of the requirements for the degree of  
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Faculty of Science and Technology  
Kolej Universiti Sains dan Teknologi Malaysia, KUSTEM  
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*Specially dedicated to:*

Cling & lok chai “ *Ni men si jui hao de.....xie xie ni men de pei pan.....*”

Kahli n nini “Who always take good care of me. You will always on my mind”

Khai sin “Thank you for your help.....*tung siang, xie xie ni loh....*”

Pailang “*Ni si yong yuen de pailang....*”

Kian weng (*C.kianna*)& Pam (*C. marsha*) “I’m so glad that we can do our final  
year project together-gether....All  
the best pal.... =>”

Future mama Chelonian “Come back when you grew up girl.....this is our  
deal.....that never fade.....”

Chagar Hutang “Beautiful girl..... been in love with you since the very first sight.....”

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## ABSTRACT

A study on the influence of clutch size on incubation temperature and hatching success of green turtle (*Chelonia mydas*) nests was conducted at Chagar Hutang and Mak Kepit beach on Redang Island, Malaysia from May to October 2002. Temperatures were measured every two hours using StowAway®TidbiT® self-recording temperature loggers placed in the center of each clutch in relocated nests containing 0, 5, 25, 50, 75, and 100 eggs throughout incubation period. Nest temperatures were lower later in the season in August than in May. Highest temperatures were reached 45-50 days of incubation. Clutch size effects can increase incubation temperature to as high as 2.5°C. These temperature increases were attributed to internal metabolic heat. The effect of metabolic heating on nest temperature became evident after the first-third of incubation and progressed until hatching (one-way ANOVA,  $df = 4, 10$ ,  $F = 3.62$  and  $F = 8.76$ ,  $p = 0.045$  and  $p = 0.0026$  respectively). Influences of metabolic heating during the middle trimester may not skew sex ratio of hatchling. Middle trimester temperature was negatively correlated to incubation duration ( $y = -0.2281x + 42.554$ ,  $R^2 = 0.405$ ). Shorter incubation intervals reflect warmer average incubation temperature. There was no significant relationship between hatching success and clutch size ( $y = 0.0345x + 79.353$ ,  $R^2 = 0.0043$ ). Variation cause by other factors encountered by the eggs may better explain nest hatchability. Clutch size does have an impact on incubation temperature, but that was not the sole factor determining the temperature regime in nests.

## ABSTRAK

Kajian pengaruh saiz kelompok telur terhadap suhu pengeraman dan kadar penetasan bagi penyu agar (*Chelonia mydas*) dijalankan di Chagar Hutang dan Mak Kepit dari bulan Mei hingga Oktober 2002. Suhu harian sarang eksperimen yang mengandungi 0, 5, 25, 50, 75 dan 100 biji telur direkod dengan menggunakan StowAway® TidbiT® logger suhu yang terletak di tengah kelompok telur sepanjang tempoh pengeraman. Suhu sarang didapati lebih rendah pada bulan Ogos berbanding dengan bulan Mei. Suhu pengeraman mencapai takat maksimum antara hari ke-45 dan hari ke-50. Haba metabolik memberi rangsangan terhadap suhu pengeraman selepas 1/3 jumlah tempoh pengeraman sehingga penetasan (one-way ANOVA,  $df=4, 10, F=3.62$  and  $F=8.76, p = 0.045$  and  $p = 0.0026$  masing-masing). Saiz kelompok telur dapat meningkatkan suhu pengeraman sebanyak  $2.5^{\circ}\text{C}$  selepas 45 hari telur dieramkan. Suhu pengeraman semasa 'trimester' pertengahan mempunyai hubungan korelasi negatif dengan jangkamasa pengeraman ( $y = -0.2281x + 42.554, R^2 = 0.405$ ). Pengaruh saiz kelompok telur semasa pertengahan 'trimester' tidak memberi kesan yang ketara terhadap nisbah seks anak penyu. Saiz kelompok telur bagaimanapun tidak menunjukkan kesan terhadap peratusan penetasan dalam sarang yang dikaji ( $y = 0.00345x + 79.353, R^2 = 0.0043$ ). Kadar penetasan dapat dihuraikan dengan lebih jelas melalui kefahaman terhadap variasi lain yang dialami oleh telur sepanjang tempoh pengeraman. Walaupun saiz kelompok telur didapati memberi kesan terhadap suhu pengeraman, ia bukan satu-satunya factor yang menyebabkan perubahan suhu dalam sarang.