EFFECTS OF TEMPERATURE ON SEXUAL DIFFERENTIATION OF THE PAINTED TERRAPIN, *Callagur borneoensis*.

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By

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SPECIALLY DEDICATED TO MY BELOVED FAMILY: BONIFACE LIVINU, ANNA DABBI, MARY JOAN, SHIRLEY DAISY AND STANLEY MAXIMILAN...

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ABSTRACT

A study was conducted on effects of temperature on sexual differentiation of the painted terrapin, *Callagur borneoensis*. Painted terrapin eggs from seven clutches were incubated in seven styrofoam boxes under controlled temperature ranging from 27°C to 33°C. About seven to ten eggs were incubated in each styrofoam box and each box was incubated with eggs from different clutches. The incubation duration for eggs incubated at 27°C was between 109 to 115 days while the incubation period for eggs incubated at 33°C was between 63 to 69 days. Data obtained from this study showed that eggs which were incubated from the same clutch did not hatch at the same day under similar incubation temperatures. The hatching success for eggs from the same clutch was highest in clutch A while the lowest hatching success was from clutch F. For hatching success with respect to temperature in each box, the highest hatching success was at 29°C and lowest at 32°C. After hatching, size of each terrapin hatchling was measured to determine whether the size of each hatchling is correlated with sexual differentiation. Data shows that the size of hatchlings was not correlated to sex. Highest mortality rate occurred in clutch F incubated at 32°C and lowest in clutch A incubated at 29°C. From histological examination, eggs which were incubated at average temperature of 30.98°C and above produced 100% female hatchling while eggs which were incubated at average temperature of 28.88°C and below produce 100% male hatchling. Whereas at average temperature of 29.76°C, only 28.57% female hatchling were obtained. This shows that the pivotal temperature which gives 50% female and 50% male hatchling is estimated between 28.88°C and 30.98°C. All results obtained from this study proved that incubation temperature is the main

factor determining the hatching success, incubation duration and sexual differentiation of the hatchlings. There were more male hatchlings than female hatchlings obtained from this study when the eggs were incubated in styrofoam boxes. Therefore, incubating turtle eggs in styrofoam boxes would help to balance the sex-ratios of hatchlings produced from natural nests.

ABSTRAK

Satu kajian telah dijalankan mengenai kesan suhu terhadap perbezaan jantina dalam tuntong laut, *Callagur borneoensis*. Telur-telur daripada tujuh induk tuntong laut telah dieram dalam tujuh kotak styrofoam pada suhu terkawal di antara 27°C hingga 33°C. Sebanyak tujuh hingga sepuluh biji telur daripada induk yang berlainan telah dieram dalam setiap kotak styrofoam. Jangkamasa pengeraman bagi telur-telur yang dieram pada suhu 27°C adalah di antara 109 hingga 115 hari manakala jangkamasa pengeraman bagi telur-telur yang dieram pada suhu 33°C adalah di antara 63 hingga 69 hari. Data diperolehi daripada kajian menunjukkan telur-telur yang dieram daripada induk yang sama tidak menetas pada hari yang sama di bawah suhu pengeraman yang sama. Kadar kejayaan penetasan bagi telur-telur daripada induk yang sama adalah paling tinggi pada telur-telur daripada induk A manakala kadar kejayaan penetasan yang paling rendah adalah daripada induk F. Bagi kadar kejayaan penetasan mengikut suhu dalam setiap kotak styrofoam, kadar yang tertinggi sekali adalah pada suhu 29°C dan terendah pada suhu 32°C. Selepas penetasan, pengukuran saiz anak tuntong dilakukan untuk mengetahui sama ada saiz adalah berkait dengan perbezaan jantina anak tuntong. Data menunjukkan saiz tidak berkait dengan perbezaan jantina anak tuntong. Kadar kematian anak tuntong yang tertinggi sekali telah berlaku pada telur-telur daripada incuk F yang dieramkan pada 32°C manakala yang terendah pada telur-telur daripada induk A yang dieramkan pada 29°C. Daripada pemerhatian histologi, telur-telur yang telah dieram pada suhu purata 30.98°C ke atas akan menghasilkan 100% anak tuntong betina manakala telur-telur yang dieram pada suhu purata 28.88°C ke bawah menghasilkan 100% anak tuntong jantan. Pada suhu purata 29.76°C pula, hanya

28.57% anak tuntong betina sahaja yang diperolehi. Ini menunjukkan bahawa suhu pivotal iaitu suhu yang akan menghasilkan 50% betina dan 50% jantan adalah dianggarkan di antara suhu 28.88°C dan 30.98°C. Keputusan yang didapati daripada kajian ini membuktikan bahawa suhu pengeraman merupakan faktor utama untuk mengetahui kadar kejayaan penetasan, jangkamasa pengeraman dan perbezaan jantina anak tuntong. Terdapat lebih banyak anak tuntong jantan daripada anak tuntong betina yang telah dihasilkan daripada kajian ini apabila telur-telur dieramkan dalam kotak styrofoam. Oleh yang demikian dengan mengeramkan telur-telur dalam kotak styrofoam akan membantu menseimbangkan nisbah jantina anak penyu yang dihasilkan di kawasan semulajadi.