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Life cycle of *Haemaphysalis bispinosa*, Neumann, 1897 (Acari: Ixodidae) under laboratory conditions

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Haemaphysalis bispinosa is a medically and veterinary important three-host, hard tick that is widely distributed in Sri Lanka infesting a wider range of vertebrates but cattle is the major host. This tick acts as a competent vector of Kaysanur Forest Disease virus, Q fever and babesiosis. This study was conducted to determine the life cycle pattern of Sri Lankan *H. bispinosa* population. Naturally detached female ticks who fed on cattle were collected, brought to the laboratory and maintained under laboratory conditions (28±1°C, 80% RH) in plastic grid plates. Immature stages were reared on albino rabbits. Female ticks had an average weight of 41.5 (±12.9) mg and completed oviposition within an average of 8.8 (±2.8) days with a pre-oviposition period of 10.1 (±0.9) days. A single female laid a total of 541.2 (±218.2) eggs and the Reproductive Efficiency Index (REI) was 13.5 (±4.1). Larger females laid a higher number of eggs (Pearson correlation; r = 0.8, p<0.05). Incubation period at three different temperatures 22 °C, 28 °C, and 30°C were 31.0 (±1.9), 16.9 (±0.9) and 14.4 (±0.6) days and the incubation success were 73.8%, 95.1% and 96.4%, respectively. A majority (93.5%) of the larvae successfully moulted to nymphs with an average pre-moulting period of 7.8 (±1.1) days after a parasitic period of 3.5(±0.9) days. Survival period of unfed larvae at 28±1°C (87.3±16.3 days) was significantly shorter (Two sample t test; p<0.001) than that of at 22±1°C (150.5±7.5 days). Nymphs completed the blood meal after 4.6 (±0.7) days and had a mean weight of 3.4 (±1.6) mg and majority (64.6 %) moulted successfully with an average pre-moulting period of 10.4 (±1.3) days. Unfed nymphs survived 36.4 (±4.4) days. Heavier nymphs moulted to females (4.1±1.6mg) while lighter nymphs moulted to males (2.8±1.4 mg; p<0.001). Body weight of adult females could increase a maximum of 63 times. Adult ticks did not feed on albino rabbits. Unfed adults survived 146 (±15.4) days. Duration of the life cycle ranged from 52-251 days. When the life cycles of Japanese, Chinese and Indian populations of *H. bispinosa* were compared with that of the Sri Lankan population, it shares similarities with the life cycle pattern of Indian and Chinese populations.

Keywords: Life history, cattle tick, *Haemaphysalisbispinosa*

Acknowledgement: National Research Council of Sri Lanka (NRC-11-44)

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