

## ABSTRACT

*Chrysomya megacephala* (Fabricius, 1794), is a necrophagous insect of the Calliphoridae family that plays an important role in forensic entomology in assisting death investigations using Postmortem Interval (PMI) analysis. However, one of the factors that determine the speed of fly growth duration is temperature. By knowing the data on field temperature variations that have implications for the duration of growth, the PMI analysis in determining the time of death of the corpse will be more accurate. So far, data on the growth duration of *C. megacephala* larvae with variations in field temperature in Indonesia have not been reported. The purpose of this study was to determine the effect of temperature changes on the growth duration of *C. megacephala* larvae and to estimate the Postmortem Interval (PMI) and to determine the effect of temperature change duration on the mean performance of weight, length of larvae and pupae of *C. megacephala*. This research design used a quasi-experimental approach with a *one shot posttest only design* with four temperature treatments, namely 27°C, 31°C, 35°C and 38°C. Capture of *C. megacephala* flies was conducted in three waste disposal sites in Banyuwangi Regency, East Java. Flies were reared in the laboratory using two types of artificial media, namely *meat blood mixture* (MBM) for hatching eggs into 1st instar larvae (L1) and *larval rearing media* (LRM) for growth of 2nd instar larvae (L2) to pupae. Flies were reared until a stable second generation was obtained, then used for research. The rearing of eggs to larvae and pupae was conducted in an incubator after a certain temperature of  $\pm 0.5^\circ\text{C}$ . Each temperature change treatment used six replicates. The results showed that the growth duration of *C. megacephala* flies was also different for each temperature change tested, namely at  $27 \pm 0.5^\circ\text{C}$  (224 hours),  $31 \pm 0.5^\circ\text{C}$  (181 hours),  $35 \pm 0.5^\circ\text{C}$  (172 hours), and  $38 \pm 0.5^\circ\text{C}$  (171 hours). There were significant differences between the length of 1st instar larvae, 2nd instar larvae, and 3rd instar larvae with temperature changes ( $p=0.000$ ), ( $p=0.020$ ), and ( $p=0.001$ ). There were significant differences between the weights of 1st instar larvae, 2nd instar larvae, 3rd instar larvae, and pupae with temperature changes ( $p=0.023$ ), ( $p=0.000$ ), ( $p=0.007$ ), and ( $p=0.000$ ). This growth duration data has obvious implications for the field of forensic entomology in determining the death of corpses using PMI analysis, especially in Indonesia.

Keywords: *Chrysomya megacephala*, *Postmortem Interval* (PMI), Forensic entomology.

## INTISARI

*Chrysomya megacephala* (Fabricius, 1794), merupakan salah satu serangga nekrofagus dari keluarga Calliphoridae yang berperan penting pada keilmuan entomologi forensik dalam membantu investigasi kematian menggunakan analisis *Postmortem Interval* (PMI). Namun, salah satu faktor yang menentukan kecepatan durasi pertumbuhan lalat adalah suhu. Dengan mengetahui data variasi suhu lapang yang berimplikasi terhadap durasi pertumbuhannya, maka analisis PMI dalam menentukan waktu kematian mayat akan lebih akurat. Sejauh ini, data durasi pertumbuhan larva *C. megacephala* dengan variasi suhu lapang di Indonesia belum pernah dilaporkan. Tujuan penelitian ini untuk mengetahui pengaruh perubahan suhu terhadap durasi pertumbuhan larva *C. megacephala* serta estimasi (*Postmortem Interval*) dan untuk mengetahui pengaruh durasi perubahan suhu terhadap rerata performa bobot, panjang larva dan pupa *C. megacephala*. Desain penelitian ini menggunakan *quasi-eksperimental* (eksperimental semu) dengan pendekatan *one shot posttest only design* dengan empat perlakuan suhu, yaitu 27°C, 31°C, 35°C dan 38°C. Penangkapan sumber sampel lalat *C. megacephala* dilakukan di tiga Tempat Pembuangan Sampah (TPS) di Kabupaten Banyuwangi, Jawa Timur. Lalat dipelihara di laboratorium menggunakan dua jenis media buatan, yaitu *meat blood mixture* (MBM) untuk penetasan telur menjadi larva instar 1 (L1) dan *larval rearing media* (LRM) untuk pertumbuhan larva instar 2 (L2) sampai menjadi pupa. Lalat dipelihara sampai memperoleh generasi kedua yang stabil, kemudian digunakan untuk penelitian. Pemeliharaan telur hingga menjadi larva dan pupa dilakukan di dalam inkubator dengan setelah suhu tertentu  $\pm 0,5^\circ\text{C}$ . Setiap perlakuan perubahan suhu menggunakan enam ulangan. Hasil penelitian menunjukkan bahwa durasi pertumbuhan lalat *C. megacephala* juga berbeda setiap perubahan suhu yang diuji, yaitu pada suhu  $27 \pm 0,5^\circ\text{C}$  (224 jam  $31 \pm 0,5^\circ\text{C}$  (181 jam),  $35 \pm 0,5^\circ\text{C}$  (172 jam), dan  $38 \pm 0,5^\circ\text{C}$  (171 jam). Terdapat perbedaan signifikan antara panjang larva instar 1, larva instar 2, dan larva instar 3 dengan perubahan suhu ( $p=0,000$ ), ( $p=0,020$ ), dan ( $p=0,001$ ). Terdapat perbedaan signifikan antara bobot larva instar 1, larva instar 2, larva Instar 3, dan Pupa dengan perubahan suhu ( $p=0,023$ ), ( $p=0,000$ ), ( $p=0,007$ ), dan ( $p=0,000$ ). Data durasi pertumbuhan ini memiliki implikasi yang nyata pada bidang entomologi forensik dalam menentukan kematian mayat menggunakan analisis PMI terutama di Indonesia.

Kata kunci: *Chrysomya megacephala*, *Postmortem Interval* (PMI), Entomologi forensik