Available online at http://www.ijcrls.com

International Journal of Current Research in Life Sciences
Vol. 09, No. 05, pp.3276-3278, May, 2020

ISSN: 2319-9490

RESEARCH ARTICLE

DETERMINE THE TIME DURATION IN LIFE CYCLE STAGES OF FAMILY SARCOPHAGIDAE SPECIES OF *SARCOPHAGA BULLATA* & *SARCOPHAGA CARNARIA* DURING WINTER SEASON IN POLADPURTEHSIL

***Dr. Bhosale P.A.**

Department of Zoology, Sundarrao More Arts, Commerce, and Science College, Poladpur, Dist- Raigad: 402303. (M.S.) India

Received 27th March, 2020; Accepted 16th April, 2020; Published 30th May, 2020

ABSTRACT

Larval Growth of flesh fly Sarcophaga bullata andcarnaria (Diptera: Sarcophagidae) was Studied in outdoor ambient temperatures in winter seasons.Thevarious types of physical evidence can be found at almost any crime scene and detailestimation of post mortem interval (PMI) in the investigation of distrustful death, the forensic measurer flesh flies are essential for accuracy in estimation of PMI. The types of evidence and where it is found can assist investigators to develop a sense of how the crime was committed. The family sarcophagidae species of *Sarcophaga Bullata* & *Sarcophaga Carnaria.* Were reared in laboratory condition for studying their time duration of different stages of life cycle under the fluctuating temperature in winter seasons. *Sarcophaga Bullata*took225 hours 35 minutes, whereas the Sarcophaga *Carnaria*took 240 hours 33 minutes, during winter season respectively. This study shows that forensic investigators will have to take each of these variables into consideration from thedevelopment of insects in orderdiptera to give clear or exactestimation of postmortem interval.

Key words: Forensic Insect, PMI in winter, lifecycle duration; Temp change.

Citation: Dr. Bhosale P.A. 2020. "Determine the time duration in life cycle stages of family Sarcophagidae species of *Sarcophaga Bullata* & *Sarcophaga Carnaria* during winter season in Poladpurtehsil." *International Journal of Current Research in Life Sciences*, 09, (05), 3276-3278.

INTRODUCTION

The Poladpurtaluka is a very remote and tremendous rainfall region due to this biotic fauna are available on the severalvarious species are observedin family sarcophaidae but the actual time duration determining studies of the species *Sarcophaga Bullata* & *Sarcophaga Carnaria*are studied. The family sarcophaidae includes flesh-flies the well-known scavenger insects belonging to the order diptera fleshfly is usually the first insects to come in contact with dead body remains Worldwide. There are 1150 species in the biogeographic region of the world. Developmental data for primary flesh flies provide the most accurate means of estimating the PMI using arthropodinsect's information (Greenberg 1991). It is presumed that the first individuals that arrives at, and lay eggs in a corpse do so within hours after death. The provided information the body is outside and there are no obvious barriers preventing egg-laying (such as environmental restrictions and whether the body is covered, buried or indoors). Therefore, time of death is assumed to be close to the time the first eggs are deposited. (Catts and Goff 1992).

Corresponding author: **Dr. Bhosale P.A.,**
Department of Zoology, Sundarrao More Arts, Commerce, and Science College, Poladpur, Dist- Raigad: 402303. (M.S.) India.

DISCUSSIONS

The present study also supports this statement. In order for insect developmental analysis to yield an accurate PMI estimation, data must be available for the earliest colonizing species collected from the corpse at the time of discovery. The rearing was conducted outdoor at the mean ambient fluctuating temperature of 25.10 °C and mean relative humidity 51.1%in winter season.(Gunn2006). Reported that the eggs of this genus fly hatch in the reproductive track of female fly and it lays first instar larvae. All the first instar larvae were collected within duration of one hour after the decayed meat was placed outside for baiting. It has been reported that the viviparous females of Sarcophagids do not deposit all their larvae in the same carrion like fleshflies, rather spreading them among several carcases, Galonte (2008). While comparing the life cycle of flesh fly *Sarcophaga Bullata* & *Sarcophaga Carnaria* the former spend more than 50% of their immature life cycle in the pupation period, Kumara, et al (2013). The Studied lifecycle of *Sarcophaga Bullata* and reported at constant temperature of 28 °C and the duration of total development up to adult 436.8 ± 15.4 hours. Singh et al (2006). The report that the life of cycle of *Sarcophaga Bullata* was observed and completed life cycle within 15 days during winter season with temperature ranged between 20-42 °C and relative humidity between 14-54% with no rain fall. Galloway et al (1989).

The studied life cycle of in *Sarcophaga Carnaria* during winter sesaon in Southern Arizona and concluded that temperature and sunlight greatly influenced the duration of larval growth, whereas cloudy weather prevent larviposition in this species (Sukontasan et al., 2010). Although there may be several early-arriving species, the oldest 12 individuals are the most relevant because they represent the first eggs deposited on the body. Because certain species can oviposit beginning a few hours following death and continuing for at least two weeks (smith, 1986). The larvae of sarcophagidae feeds on remains or other decaying matter. Most species offleshflies studied thus far are anautogenous; female requires a substantial amount of protein to develop mature eggs within her ovaries (about 800 µg per pair of ovaries in Phormiaregina). Both male and female adult sarcophagidae ranges from 6 to 14 mm in length.

The adult size depends on species and food availability to the larval stages. The majority of these species are metallic in appearance with colour ranging from brilliant green or blue to bronze or shiny black (Ambrose 2007). fleshfly eggs are about 1.6 mm × 0.5 mm, white or yellowish, looks like rice balls when laid. While the female fleshfly typically lays 160 to 200 eggs per batch, she is usually iteroparous, laying around 2000 eggs during her course of life. The sex ratio of fleshfly eggs is usually 50:50 Khole (1978). Upon reaching carrion, female deposit eggs onto the body. Since development is highly predictable if the ambient temperature is known, fleshfly are considered a valuable tools in forensic science to determine post mortem interval (PMI).Traditional estimation of time since death are generally unreliable after 72 hours and often entomologist are the only officials capable of generating an actuating approximate time interval. This research work was taken up in order to study the time duration of different stages of *Sarcophaga Bullata* & *Sarcophaga Carnaria* during winter season so as to prepare the baseline data that will help the forensic experts to find correct PMI in Indian conditions.

MATERIALS AND METHODS

The present research work was carried out at research laboratory. The species *Sarcophaga Bullata* & *Sarcophaga Carnaria* flies were used as the biomaterials and different appliances and tools were used.

Collecting and rearing of fleshflies: The species *Sarcophaga Bullata* & *Sarcophaga Carnaria* flies were collected from poladpurtaluka, district of Raigad, Maharashtra, India. For the collection of flies fresh liver sample was purchased from the local slaughterhouse. Partially putrefied liver and meat was exposed in the sampling site and within few minutes the flies were attracted. The flies' were collected by the insect net and after identification they were released in the insect rearing cages. Honey solution (water and honey) soaked in tissue paper was kept in petridish and fresh sliced liver meat of cattle was provided daily in separate petridishes in the rearing cages. After few days the mated adult female started laying eggs on sliced liver meat. The eggs were collected with the help of fine brush directly after laying. The fleshflies laid eggs on the sliced liver meat which was later on reared in in laboratory condition at winter seasons. The plastic jar was taken for rearing the instars of fleshfly larvae. The liver meat was then placed into 7 cm deeper jar covered with fine mesh to prevent the entry of parasitoids.

The two experiments were conducted at the same time. Two groups of 60 larvae separately transferred into three plastic jars and fed them fresh liver meat daily till pupation. Observation was taken on hourly basis. The maggots were observed and collected with the help of forceps and preserved in small bottle throughout their developmental stages at different time duration. As the third instars larva finished feeding and reach wandering phase, they left the food and travel to the soil for pupation. After few days the adult fly emerged out from the pupa. The total time taken by each stages of *Sarcophaga Bullata* & *Sarcophaga Carnaria*life cycle during winter seasons was recorded. The temperature and humidity were recorded daily with the help of Hygrothermometerclock. The experiment was repeated three times.

Statistical Analysis: Statistical analysis was performed using the excel sheet, data were analyzed by using two way analysis of variances (ANOVA) andsignificance level at $P \leq 0.05$.

OBSERVATIONS AND RESULTS

In present research work it is observe that the fleshflies' reaches from Ist instar larvae to IInd and then IIIrd instar larvae after their moultingcompletion. The time duration of different stages of *Sarcophaga Bullata* & *Sarcophaga Carnaria* during win terseasons are as follows.

Table 1. Time duration of different stages of life cycle in *Sarcophaga Bullata* during winter season.

Ife cycle stages		Duration (H:MM)	PMI (H:MM)
Eggs		20:36	
Larva	Ist instar	26:30	47:00
	IInd instar	28:30	75:36
	IIIrd instar	48:00	123:36
Pre-pupa		21:50	145:26
Pupa		118:25	263:51
Total duration		263:51	

Table 2. Time duration of different stages of life cycle in *Sarcophaga Carnaria* during winter season

Ife cycle stages		Duration (H:MM)	PMI (H:MM)
Eggs		19:02	
Larva	Ist instar	46:15	65:17
	IInd instar	28:25	93:45
	IIIrd instar	50:05	143:47
Pre-pupa		24:35	168:22
Pupa		117:40	286:02
Total duration		286:02	

Winter season: The average temperature and humidity during the experiment was22.7°C and 35.8% respectively. Table 1 shows the time duration of different stages of *Sarcophaga Bullata* during winter season. The result showed the eggs persisted 20 hours 36 minutes. After hatching eggs the Ist instar larva took 26 hours 30 minutes to become IInd instarlarva stage. The PMI duration since egg laid was 47 hours 06 minutes. The IInd instar larva took 28 hours 30 minutes to reach third instarlarva and the PMI duration was 75 hours 36 minutes. The IIIrd instarlarva took 48 hours and PMI duration was 123 hours 36 minutes. The pre-pupal stage persisted 21 hours 50 minutes to reach pupal stage while PMI duration was 145 hours 26 minutes.

The pupal stage took118 hours 25 minutes to become adult fly emerged. The total duration of whole life cycle of sarcophaga misera during winter season was 263 hours 51 minutes (Table 1).

Winter season: The average temperature and humidity during the experiment was25°C and 46.8% respectively. Table 2 shows the time duration of different stages of *Sarcophaga Carnaria* during winter season. The result showed that the eggs persisted 19 hours 02 minutes. After hatching eggs the I^{st} instar larva took 46 hours 15 minutes to become II^{nd} instar larva stage. The PMI duration since egg laid was 65 hours 17minutes. The II^{nd} instar larva took 28 hours 25 minutes to reach third instar larva and the PMI duration was 93 hours 45 minutes. The III^{rd} instar larva took 50 hours 05 minutes and PMI duration was 143 hours47 minutes. The pre-pupal stage persisted 24 hours 35 minutes to reachpupal stage while PMI duration was 168 hours 22 minutes. The pupalstage took 117 hours 40 minutes to emerge adult fly. The total durationof whole life cycle of *Sarcophaga Carnaria* during winter season was286 hours 02 minutes (Table 2).

Conclusion

It is concluded from the present study that the life cycle duration of larval and pupal stages of flesh fly s *Sarcophaga Bullata* & *Sarcophaga Carnaria*s pecies is directly related to the ambient temperature and humidity and duration of total life cyclespan in winter seasons. The low ambient temperature and high humidity larval and pupal development, sufficient food is available to this flesh fly. The data of the present study, the life cycle of *Sarcophaga Bullata* & *Sarcophaga Carnaria* in winter is favorable to growth and reproduction of flies are forensically important on the estimation of postmortem interval (PMI) which are involved in criminal and suspicious cases. Insect development is dependent on environmental temperature, where at the higher temperature, the development faster as compare to cooler temperature.

Acknowledgement

Authors are thankful to my research guide, Zambare S.Pex. Prof. & Head, Department of Zoology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (MS), India for providing support my research work.

REFERENCES

Ambrose DP 2007. The insect: Beneficial and harmful aspects (1st Edn) Kalyani publisher, Ludhiana, India, pp: 801.

Catts, E.P,. And Goff, M.L. 1992. Forensic entomology in criminal investigations. Annual Review of Entomology, 37: 253-272. Digital Investigation Volume 10, Issue 4, December 2013, Pages 287-299.

Galante E. 2008. Decomposer insects - Encyclopedia of entomology, 2nd Edition. Boca Raton, Fl: Springer Science + Business Media, 2008; 1162-1165.

Galloway A, Birkby WH, Jones AM, Henry TE, Parks B.O. 1989. Decay rates of Human remains in an Aridenvironment*J. Forensic sci. 1989; 34(3):607-616.*

Greenberg, B. 1991. Flies as forensic indicators.J.of Medical Entomology 28: 565-577.

Gunn A. 2006. Essential Forensic Biology, *1st Edition Chichester: John Wiley & Sons, 2006,200-21.*

Khole V 1978. Studies on the population dynamics in larval fleshflies flies (Diptera: Calliphoridae). Biovigyaram 4: 151-158.

Kumara TK, Hassan AA, CheSalmah, MR Bipender. 2013. Larval growth of Liosarcophagamisera and princeps Thompson (Diptera: Sarcophagidae) under uncontrolled Indoor temperatures in Malaysia. South east Asian J. Trop. Med. Public Health. 2013; 44 (2):182-187.

Singh R, Sharma P, Parul, Chaturvedi P. Mehta RK. 2006. Biology of Sarcophagamisèra (Fabr.) (Diptera: Sarcophagidae) for estimation of post mortem interval(PMI) during summer in Rajasthan. XVIII All IndiaForensic Science conference, Kolkata, India, 2006, 206-212.

Smith, K.G. 1986. A manual of forensic entomology. Cornell University Press, Ithaca.

Sukontason K, Bunchu N, Chaiwong T, MoophayaakK, Sukontason KL 2010. Forensically important flesh flyspecies in Thailand: morphology and developmental rate. *Parasitol Res. 2010; 106:1055-1064.*

****