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IMPORTANCE OF CALLIPHORID FLIES WITH REFERENCE TO THE DETERMINATION OF POST MORTEM INTERVAL

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Abstract: *Abstract:-Present study was conducted to determine the fauna of calliphorid flies of Solapur district during different seasons. Calliphoridae flies (blow flies) are the useful insect for the investigation of victims 'death date. In order to understand the distribution of active species of blow flies in Solapur , we collected forensically important blow fly samples from carrions in different seasons.*

Keywords:Calliphorid Flies , Determination , Post Mortem Interval , death date.

INTRODUCTION :-

Forensic entomology is the broad field where arthropod science and the judicial system interact .It has been subdivided into three principal areas focused on those issues most often litigated (Lord and Sterenson , 1986).Therefore, Urban entomology concentrates mainly on controversies involving termites, and others insect problems accruing to the human environment.

Forensic entomology is an extensive discipline where arthropod science and the judicial system interact (Hall 2001). The field of forensic entomology has been divided into three areas: medico criminal entomology (also referred to as medicolegal entomology), urban entomology and stored product entomology. Information gained from medicolegal entomology typically is used to determine time of death, place of death and other issues of medical or legal importance (Gordh and Headrick 2001). Urban entomology concentrates mainly on controversies involving termites, cockroaches, and other insect problems accruing to the human environment, whereas stored product entomology involves disputes over arthropods and arthropod parts in food and other products (Hall 2001).

When human remains are found, the most important questions usually are how, when, where and why the person died. Historically, determination of the post-mortem interval (PMI) has been estimated through observation and measurement of body conditions such as core body temperature (Nelson 1999), muscular flaccidity, rigor mortis, lividity, pallor of the skin and others (Smith 1986, Bass 2001, Byrd and Castner 2001a). Entomological specimens in medicolegal death investigations can be reliable indicators for estimating the PMI in both early and advanced stages of cadaver decomposition (Nuorteva 1977, Smith 1986, Goff et al. 1988, Kashyap and Pillay 1989, Greenberg 1991, Byrd 1998).

Insects and other invertebrates feeding on carrion form a distinct faunal succession associated with the various stages of decay (Smith 1986). Recognition of the different immature stages of each species involved, together with the knowledge of their rates of development, can give an indication of the PMI (Smith 1986). A forensic (= medicolegal) entomologist can also determine the age of immature insects, based upon knowledge of the variables regarding insect invasion of human remains. Evaluation and interpretation of entomological evidence at a crime scene can address other complicated issues including season of death, geographic location of death, movement or storage of the remains following death, location of specific sites of trauma on the body, sexual molestation and use of drugs (Haskell et al. 1997).

MATERIAL AND METHOD

The methods as given by byrd and Castner(2001) will be used to carry of out the work. When the forensic entomologist arrives at the death scene, a detailed overview of the physical surroundings, location and placement of the remains. Protection of the scene is required to preserve the integrity of all types of evidence. Sampling of entomological evidence is somewhat intrusive and can result in minor unavoidable disturbance to the remains, any disturbance can be documented by written and photographic record.

CONCLUSION :

With the widespread acceptance of forensic entomology in the criminal justice system, it is hoped that the specialised training of crime scene technicians, investigators, medical examiners, and coroners will increase the frequency of recovery of entomological evidence. With the proper techniques and protocols established it is possible for the personnel to conduct entomological evidence recovery without a forensic entomologist present at the scene. The collected evidence can then be shipped to the cooperating forensic entomologists at a distant location with no loss of evidentiary value . If training and cooperative efforts continue , the use of entomological evidence in legal investigations should further increase while valuable crime scene evidence will cease to be lost.

DISCUSSION & HISTORY OF FORENSIC ENTOMOLOGY.

The first documented forensic entomology case is from thirteenth century China in a book entitled “Hsi yüan chi lu” which can be translated as “The Washing Away of Wrongs.” The author, Sung Tz'u, was an educated man. He was a doctor, a sheriff and eventually a Judicial Intendant. The book describes applications of forensic entomology used in criminal cases during that period. A man was murdered by the roadside apparently by an assailant with a sickle. Sung Tz'u made a proclamation that the nearest neighbours were to bring all their sickles to him for examination (McKnight 1981). At inquest time, the weather was hot and blow flies were attracted to one sickle only, even though it had no discernable traces of blood. The owner of the sickle confessed to the murder.

In addition to medical and legal experts, sculptors, painters and poets have closely observed the decomposition of human bodies, noting, in particular, the effects of feeding maggots. Artwork from the Middle Ages accurately depicts the insect-mediated pattern of body mass reduction, particularly the early skeletonization of the skull and the reduction of internal organs, with large parts of the skin left intact (Benecke 2001). In May 2004, a new painting of Prince Philip entitled “Portrait of a Prince” was released by artist Stuart Pearson Wright. The painting shows Prince Philip with a bluebottle fly sitting on his left shoulder, which represents a memento mori; the prince's mortality (The Associated Press 2004).

In 1855, Dr. Bergeret, a French physician, used insect succession as a tool (incorrectly) to solve a case (Benecke 2001). In the mid-1880s, J.P. Mégnin, also in France, published La Faune des Cadavres: Application de Entomologie à la Medicin Legale. The recognition by Mégnin of a sequence and progression of decomposition of a corpse was recorded in this work and in association with this decomposition progression, he observed changes in the insect assemblages as the corpse aged (Haskell et al. 1997,Benecke 1998).

This early interest in insects and decomposition led to a study on insect succession on human corpses in Quebec, Canada, in 1897 by Wyatt Johnston and Geoffrey Villeneuve (Anderson 2001, Benecke 2001). At the same time in the United States, Murray Motter systematically tabulated the insect fauna from 150 exhumed corpses from the Washington, D.C. area (Haskell et al. 1997, Benecke 2001).

Species identification of the most important fly groups, Calliphoridae (blow flies) and Sarcophagidae (flesh flies), used in forensic cases could not have been accomplished had it not been for Aldrich's (1916) monograph on the Sarcophagidae which illustrated the distinctive male genitalia of adult flies. Knipling (1936) initiated taxonomic work on the larvae of sarcophagids and calliphorids. Hall's 1948 book, The Blowflies of North America, made it possible to identify the mature larvae of most species of calliphorids.

In northern Europe, the blow fly Phaenicia sericata (Meigen) is the most economically important ectoparasite of domesticated sheep. Sheep myiasis is a widespread disease and can cause high levels of mortality. The desire to develop control methods against sheep myiasis led to studies of calliphorid attractants (Wardle 1921, Cragg and Thurston 1949, Hammack and Holt 1983, Ashworth and Wall 1994, Wall and Warnes 1994, Morris et al. 1998). The attractant studies prompted additional studies on blow fly distribution and ecology (Parish and Cushing 1938, James 1947, Green 1951, Wolff et al. 2001) and were followed by studies that addressed effects of temperature on developmental time of blow fly life cycles (Davidson 1944, Kamal 1958, Nuorteva 1977,Greenberg 1991, Byrd and Butler 1996, 1997, 1998).

Regional successional studies of Calliphoridae in the United States have been conducted in California (James 1955), Hawaii (Goff et al. 1986, Goff et al. 1988, Goff 1991), Mississippi (Goddard and Lago 1985), Missouri (Hall and Doisy 1993), Virginia (Hall and Townsend 1977), Indiana (Haskell 1989), Illinois (Baumgartner 1988), Arizona (Deonier 1942, Baumgartner 1986, Galloway et al. 1989), Colorado (Adair 1999), Maryland (Introna et al. 1991), West Virginia (Joy et al. 2002), Louisiana (Tessmer et al.1995, Watson and Carlton 2003), and South Carolina (Tomberlin and Adler 1998). Four species--two of which are now found in Florida--of Old World blow flies have been confirmed from South or North America (Baumgartner and Greenberg 1984,Baumgartner 1986, Greenberg 1988, Tantawi and Greenberg 1993, Martin et al. 1996):Chrysomya rufifaces (Maquart), C. albiceps (Wiedemann), C. megacephala (F.) and C.putoria (Wiedmann). Studies by Byrd (1998) and Peters (2003) were conducted in the Gainesville, FL (= north-central Florida) area. This study will add rural north-central Florida to the list.

The study of insects important to forensic entomology has been conducted mainly through the use of non-human animal models. Decomposition studies worldwide have used a variety of different carcass types and sizes, including dogs (Jiron and Cartin 1981, Early and Goff 1986, Richards and Goff 1997), cats (Early and Goff 1986), alligators (Watson and Carlton 2003), voles (Lane 1975), rats (Greenberg 1990, Tomberlin and Adler 1998, Faucherre et al. 1999, Kocarek 2001), squirrels (Johnson 1975), deer (Watson and Carlton 2003), foxes (Easton and Smith 1970, Smith 1975), harbor seals (Lord and Burger 1984b), herring gulls (Lord and Burger 1984a), guinea pigs (Bornemissza 1957), mice (Putnam 1978, Blackith and Blackith 1989), lizards and toads (Cornaby 1974), raccoons (Joy et al. 2002), turtles (Abell et al. 1982), poultry (Hall and Doisy 1993, Tessmer et al. 1995), sheep (Deonier 1940), rabbits (Denno and Cothran 1975, Tantawi et al. 1996, Bourel et al. 1999), elephants (Coe 1978), opossums (Goddard and Lago 1985), black bears (Anderson 1998, Peters 2003, Watson and Carlton 2003), impala (Braack 1981), and pigs (Payne 1965, Tullis and Goff 1987, Haskell 1989, Anderson and VanLaerhoven 1996, Tessmer and Meek 1996, Richards and Goff 1997, Byrd 1998, deCarvalho et al. 1999, Shahid et al. 1999, Davis and Goff 2000, deCarvalho and Linhares 2001, Wolff et al. 2001, Tenorio et al. 2003, Watson and Carlton 2003).

The only faunal succession research on human remains was conducted in Tennessee (Rodriguez and Bass 1983, Catts and Haskell 1990).Human cadavers are not easily obtainable for detailed decomposition studies. Pigs,Sus scrofa, are omnivorous, have similar gut fauna, are relatively hairless and

have skin that is very similar to that of humans (Anderson and Van Laerhoven 1996). The putrefaction of pigs proceeds approximately at the same rate as for human bodies that are of the same weight (Campobasso et al. 2001). Haskell's 1989 study in Tennessee (Schoenly and Haskell 2000) compared the insect community structure and decomposition rates between adult and infant human remains to a pig model and found no significant difference in the composition of the insect communities in human and pig carcasses (Campobasso et al. 2001). Therefore, twenty-two kg pigs have been recommended as suitable human models for adult decomposition (Catts and Goff 1992).

Development of life cycle stages of flies of Calliphoridae depends on environmental factors i. E. At high temperature growth rate of larval stages is fast and low temperature growth rate is slower.

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