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# Spring Season Survey of the Urban Blowflies (Diptera: Calliphoridae) of Chicago, Illinois

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# SPRING SEASON SURVEY OF THE URBAN BLOWFLIES (DIPTERA: CALLIPHORIDAE) OF CHICAGO, ILLINOIS

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## ABSTRACT

During May 1980, 1165 blowflies of 12 species were trapped on chemically enhanced rat carrion baits in a dense urban setting in Chicago. In descending order, *Cynomyopsis cadaverina, Lucilia sericata,* and *Phormia regina* were the most abundant species recovered (92% of total). These results are contrasted with other nearby blowfly surveys.

Blowflies are the major decomposers of carrion (Hall 1948). They are also medically important as disseminators of disease pathogens (Greenberg 1973). The role of these insects as medicological indicators in forensic medicine has only recently been widely recognized and applied (Smith 1986). However, there is a paucity of basic information on the distribution and phenology of these insects regionally (Smith 1986). Forensic inferences about cadaver history, as well as investigations of the medical importance of these insects, are dependent upon an adequate knowledge of the distribution, composition, and bionomics of carrion faunas which are known to vary with geography and synanthropy. Except for fall season collections (Melnick 1949) and carrion successional studies in forests (Johnson 1975), little other information exists on Illinoisan Calliphoridae, particularly in urban habitats during the spring season. I now report on the spring season occurrence of blowflies in a densely urban area of northeastern Illinois based on collections from chemically enhanced rat carrion.

## MATERIALS AND METHODS

From 7 to 25 May 1980, blowflies were collected from modified Bishopp type cone fly traps (Bishopp 1916) propped above (2 cm) baits that were placed in full sun on cement or bare soil in an open area (0.03 $km^2$) within the city of Chicago on the grounds of the University of Illinois campus, Cook County. The habitat is densely urban (eusynanthropic) with no fields or woodlots nearby. Each trap consisted of a 2.4 l white cardboard bucket (15 cm ht) with an inverted fiberglass screen cone inserted into the widest opening (19 cm dia).

Baits were recently sacrificed, abdominally incised, white rat carrion (250 gms) alone, or immersed in water (100 ml) or an aqueous solution (1–2%) of 1 of 10 different chemicals which are known attractants to muscoid flies (Mulla et al. 1977). The attractants were egg albumin, indole, egg aged 4 days, indole—trimethylamine mixture, ethol mercaptan, ammonium carbonate, butyaldehyde, indole—phenol mixture, 3 day aged yeast solution, and citrated blood. Carrion attractiveness may be enhanced by the addition of particular chemicals (Freney 1932).

Six traps, each baited with a different rat solution, were positioned 50–70 m equidistant

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at ca. 0900 hrs and retrieved at 1700 hrs daily for a 3 day period during 5 experimental series run throughout May under generally favorable environmental conditions (low wind & cloudless skies), with a monthly mean diurnal ambient temperature (0.5 m height) of 22 ± 3.5°C (15.4°C av. diel monthly, National Oceanic Atmospheric Admin., O'Hare Airport) and relative humidity of 57 ± 8%. Carrion alone and carrion in water were presented during all five series but each chemical additive was utilized only during two.

Trapped flies were killed by freezing; sexed, enumerated, and identified following Hall (1948). Voucher specimens were deposited at the Field Museum of Natural History, Chicago, with the bulk in the author's collection.

## RESULTS AND DISCUSSION

During May 1,165 total blowflies among 12 species were recovered in 90 trap days in the Chicago area. *Cynomyopsis cadaverina* (R.-D.), *Lucilia sericata* (Mg.), and *Phormia regina* (Mg.) each comprised 46, 29, and 17%, respectively, of all blowflies. *Calliphora vicina* R.-D., *Calliphora livida* Hall, and *Lucilia illustris* (Mg.) were rare (5, 1, & 1%, respectively), whereas *Bufolucilia silvarum* (Mg.), *Calliphora vomitoria* (L.), *Calliphora terraenovae* Macq., *Lucilia coeruleiviridis* (Macq.), *Cyanus elongatus* (Hough), and *Protophormia terraenovae* (R.-D.) were very scarce (each < 1%). May collections in New York City (Williams 1954) and Madison, Wisconsin (Dicke and Eastwood 1952) have yielded very similar species' percentages, although *B. silvarum, C. elongatus,* and *C. livida* were entirely absent at the former site. However, the abundance of *C. cadaverina* (46%) and *P. regina* (17%) herein reported differs greatly from a spring survey in nearby Indiana, where each species represented 9% and 59%, respectively, of the blowflies at a large city dump (Siverly 1970). This list augments Johnson (1970), who reported only 6 species in northeastern Illinois, and confirms the presence of an additional 6 species.

*Cochliomyia macellaria* (Fabr.) and *Pollenia rudis* (Fabr.) are two additional species in the author's collection and reported by Melnick (1949) from northern Illinois which were not obtained, likely because the former species is a summer/fall immigrant from warmer southern states (Greenberg 1985) and the latter is not attracted to carrion (Hall 1948). It is also conceivable that *Calliphora coloradensis* Hough and *Eucalliphora lilaea* (Walker) may be infrequently taken in Illinois because of their presence in nearby Michigan (Williams 1956) and Wisconsin (Dicke and Eastwood 1952), respectively. *Bufolucilia silvarum, C. terraenovae, C. vomitoria,* and *P. terraenovae* were only trapped on baits immersed in rotten egg or indol-phenol solutions. No other chemical additives were detectibly more attractive than carrion alone.

*Calliphora vicina, L. sericata,* and *C. cadaverina* were present in small numbers from the first day's collection on 7 May (19°C max. temp.), *P. regina* and *B. silvarum* did not appear until 20 May (23°C max. temp.), and the remaining species appeared on 25 May (28°C max. temp.). Generally, fly diversity and abundance increased with the advance of warmer weather. At this latitude (42°N) *P. regina* and *C. vicina* first appear yearly in early to mid-March; *C. cadaverina, L. sericata,* and *C. livida* in late March; *P. terraenovae* and *C. terraenovae* in late April; and the remainder in mid- to late May (Bruce and Knipling 1936, Dicke and Eastwood 1952).

The spring season collections herein reported agree in part with Johnson (1970, 1975), at a site 30 km from the present study, confirming the early abundance of *P. regina* followed by *L. sericata,* but differ markedly in the composition and phenology of all other species. Johnson reported *C. livida* to be the dominant spring fly with a complete absence of *C. cadaverina.* However, in this survey the former was rare and the latter common. Yearly climatic variation and differences in the synanthropy of the collection sites (forest vs. urban setting) may account for these discrepancies. *Cynomyopsis cadaverina* may preferentially avoid forest habitats since it is reported to be an abundant fly in urban areas of Wisconsin (Dicke and Eastwood 1952), New York City (Williams 1954), and Ohio (Hall 1948). However, the Chicago collections generally agree with the phenology of

these species in nearby states. *Phormia regina*, *C. cadaverina*, and *L. sericata* are common spring species in the Central States (Bruce and Knipling 1936, Dicke and Eastwood 1952, Williams 1954, Siverly 1970). Populations of *C. livida* and *C. vicina* peak in April (Hall 1948) which accounts for their declining representation in this May survey. The rarity of *B. silvarum*, *L. illustris*, *L. coeruleiviridis*, *C. vomitoria*, *C. terraenovae*, *C. elongatus*, and *P. terraenovae* in metropolitan Chicago is not surprising because the former 3 are typically woodland or meadow species and the latter 4 are generally uncommon throughout their range (Hall 1948).

In summary, this survey confirms the presence of 12 blowfly species in urban areas of northeastern Illinois and presents data on their relative spring abundance. This information contributes to our knowledge of these insects in the state and adds to an informational base for use by forensic entomologists.

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