

CASE REPORT

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Calliphora vicina (Diptera: Calliphoridae) Collected from a Human Corpse Above 3400 m in Elevation

ABSTRACT: In the summer of 2005 an adult hiker was killed in a fall in Rocky Mountain National Park, Colorado (U.S.A.). His body was subsequently colonized by the blowfly *Calliphora vicina* (Diptera: Calliphoridae). The body was discovered 9 days later at an elevation of 3475 m (11,400 feet). This is the first report of *C. vicina* on a human corpse at this elevation in Colorado. This paper provides additional confirmation of this fly colonizing a human corpse at high elevations in Colorado.

KEYWORDS: forensic science, forensic entomology, death investigation, *Calliphora vicina*, high elevation

Several authors have documented the colonization of human and nonhuman remains discovered in high mountainous elevations by various species of saprophagous and necrophagous insects (1–5). In the Rocky Mountains of Colorado, high elevations (above tree line) can exhibit highly variable and often harsh weather conditions which may limit opportunities for insect colonization as compared with lower elevations. These conditions may include sustained lower temperatures, high winds, and sporadic precipitation, all of which may contribute to shorter activity periods for insects (6). Additionally, the availability of naturally occurring food sources such as mammal carcasses is less abundant at high elevations of Colorado. For these reasons, the diversity of insects found on corpses at higher elevations is generally smaller than that found at lower elevations.

Case History

In August of 2005 the body of a hiker was found at an elevation just over 3475 m in Rocky Mountain National Park, Colorado (U.S.A.). The hiker's body was found below Donner Ridge and Spectacle Lake in a large sloped boulder field. The victim was hiking alone. The victim was clothed and was observed to have a severe head laceration. Additionally, the victim had several broken bones and closed injuries consistent with a fall from the ridge above. His T-shirt had been wrapped around the head wound indicating that the victim did not immediately die from the fall. There was no evidence of foul play and the local victim was a frequent hiker of the area. The medical examiner concluded that the victim likely died within a few hours of receiving the head injury.

The victim was exclusively colonized by the blow fly *Calliphora vicina* (Robineau-Desvoidy). Live and preserved specimens of third instar larvae were collected from a large maggot mass in the victim's mouth. Several live adults were also collected from the scene. The larvae were reared to adulthood. Crime scene photographs

showed no adult beetles and no other species were collected on scene or at autopsy. Weather records were obtained from a weather station located in the Rocky Mountain National Park Headquarters building at an elevation of 2383 m. Weather records, photographs, and eyewitness accounts of the search and rescue personnel indicated no precipitation and only partly overcast conditions in the area of the interest during the search efforts. Based on an examination of the weather records it was determined that the victim was likely colonized 8–9 days prior to discovery which was consistent with the time he set out on his hike. A hiking party had also reported briefly talking to the victim in a location very near the position of his body. This was within a few hours of his departure time for the hike.

C. vicina is Holarctic in distribution (7,8) and has been extensively collected by the author from human corpses along the Front Range of Colorado. *C. vicina* has been rarely reported from high elevations and its elevation of distribution remains unknown. Evidence of any migration behavior through various elevations during the lifetime of the adult is also unknown at this time. De Jong and Chadwick (3) report collections of *C. vicina* from rabbit carcasses [*Oryctolagus cuniculus* (L.)] in Colorado from Guanella Pass (3566 m) and Mt. Evans (4191 m) in Clear Creek County during the months of June and July. Tolbert et al. (9) studied arthropod abundance in the alpine tundra of the Niwot Range in the Indian Peaks Section of the Rocky Mountains of Colorado. The elevation of this study area is between 3750 and 3800 m. Tolbert noted that Diptera larvae accounted for 80% of all soil insect larvae. Of the fly larvae, 90% were Cecidomyiidae; however, specimens Calliphoridae were collected. Specimens were not identified to the species level. Frenot et al. (10) reported the collection of *C. vicina* from harsh environments such as the Kerguelen Islands of the Antarctic.

Discussion

This is the first report of *C. vicina* collected from a human corpse at high altitude in Colorado. The literature regarding forensic entomology cases from high elevations is sparse. Typically, bodies recovered from high elevations in Colorado are primarily colonized

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by the blowflies *C. coloradensis* (Hough), *Phormia regina* (Meigen), *Protophormia terraenovae* (Robineau-Desvoidy), and the Silphid beetle *Thanatophilus lapponicus* (Herbst) (1). Rarely are victims of homicide killed or dumped at such high elevations. This is likely the result of having few roads, harsh conditions, time constraints, and the fact that the murder probably occurred at a distant location. Knowledge of insect bionomics at high elevations, however, will likely aid entomologists in their analysis of physical evidence and provide insight into the tolerances of various species in regards to elevation and migration. Additional collections of insect species at high elevations should be reported to broaden our knowledge of their biology and behavior in forensic cases.

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