# Predicting Geographic Distribution of Forensically Significant Blow Flies of Subfamily Chrysomyinae (Diptera: Calliphoridae) in Northern Thailand

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**Abstract:** Blow flies (Diptera: Calliphoridae) are carrion-breeding flies that are commonly used as evidence in forensic investigation. An adequate knowledge of ecological and geographical data of blow fly has a direct application in forensic science, as far as estimating time of colonization or corpse relocation. The aim of this study was to evaluate the occurrence of four species of Chrysomyinae (*Chrysomya pinguis*, *Chrysomya chani*, *Chrysomya villeneuvi*, and *Ceylonomyia nigripes*) across six land use types in central Chiang Mai, northern Thailand. Eighteen study sites were selected for sampling across three districts of Chiang Mai province (Mueang Chiang Mai, Mae Rim, and Hang Dong). Adult flies were collected every two weeks using a funnel trap baited with 1-day tainted beef offal. The predicted geographic distributions of forensically important blow fly species were modeled using the computer program ArcGIS, based on selected climatic variables (temperature, relative humidity, and light intensity) recorded at study sites. During the study period, 1298 adult flies were collected, with peak fly occurrence during summer (April–May). Seasonal fluctuation patterns varied depending on fly species. Climatic factors displayed diverse impact on associated fly populations. Identified species were restricted mainly to mixed deciduous forests (MDF) especially in the mountainous area. None of these flies were trapped in an urban area.

**Keywords:** spatial distribution; predictive distribution; GIS; forensic entomology

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## 1. Introduction

Many blow flies (Diptera: Calliphoridae) species are carrion-breeding and have veterinary, medical, and forensic importance [1,2]. They play a prominent role as vectors of human as well as livestock, pathogens [1,2]. Additionally, they are currently the most commonly used arthropod group in forensic entomology research to determine time of colonization as related to the post-mortem interval (PMI$_{min}$) as they are commonly associated with decomposing human remains [3,4]. The presence and abundance