# FORENSIC ENTOMOLOGY ANALYSIS REPORT

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| **Case ID:** | CASE-2024-0720-PHX-SPEC003 |
| **Date of Analysis:** | June 17, 2025 |
| **Investigator:** | Dr. Sarah Martinez |
| **Location:** | Phoenix, AZ |
| **Discovery Date:** | 2024-07-20 |
| **Discovery Time:** | |

## EXECUTIVE SUMMARY

This report presents the forensic entomological analysis of specimens collected from the scene. The analysis was conducted using established accumulated degree days (ADD) methodology with temperature-corrected development models. **Key Findings:**
• Species identified: *Lucilia Sericata* (Green Bottle Fly)
• Development stage: Pupa
• Estimated PMI: 7.7 days (184.8 hours)
• Confidence interval: 6.2 - 9.2 days
• Analysis date: June 17, 2025

## METHODOLOGY

This analysis employs the Accumulated Degree Days (ADD) method, which is the standard approach in forensic entomology for estimating postmortem intervals. The methodology is based on the principle that insect development is temperature-dependent and follows predictable patterns under known thermal conditions.

### Calculation Formula

**PMI = Required_ADD / (Average_Temperature - Base_Temperature)**

Where:
• Required_ADD: Species and stage-specific development threshold
• Average_Temperature: Environmental temperature during development
• Base_Temperature: Minimum temperature for development

### Temperature Data

Temperature data was obtained from meteorological sources and adjusted for time-of-day variations when discovery time was provided. Temperature represents the average environmental conditions during the estimated development period.

# DETAILED RESULTS

## Species Analysis

**Scientific Name:** *Lucilia Sericata*
**Common Name:** Green Bottle Fly
**Family:** Calliphoridae
**Colonization:** Primary (0-3 days)
**Development Stage:** Pupa

## PMI Calculations

| Parameter | Value | Units |
|---|---|---|
| Estimated PMI | 7.7 | days |
| Estimated PMI | 184.8 | hours |
| Confidence Interval | 6.2 - 9.2 | days |
| Base Temperature | 8.0 | °C |
| Average Temperature | 28.0 | °C |
| Required ADD | 154.0 | degree days |
| Accumulated ADD | 154.0 | degree days |

# DATA QUALITY ASSESSMENT

**Overall Data Quality:** EXCELLENT
**Quality Score:** 92/100
**Reliability Level:** High

# CONCLUSIONS

Based on the forensic entomological analysis of the submitted specimens, the estimated postmortem interval is **7.7 days** with a confidence interval of 6.2 to 9.2 days. This estimate is made with **high confidence** based on the available data and environmental conditions. The analysis utilized established forensic entomology protocols and temperature-corrected development models. The quality assessment indicates excellent data reliability for this type of analysis.

# LIMITATIONS AND DISCLAIMERS

**This analysis is subject to the following limitations and considerations: 1. Environmental Factors: Microclimate conditions, burial depth, clothing, and other environmental factors may significantly affect insect development rates and are not fully accounted for in this analysis. 2. Biological Variation: Natural variation in insect development rates, individual specimen characteristics, and population differences may affect accuracy. 3. Temperature Data: The analysis relies on meteorological data which may not precisely reflect conditions at the specific scene location. 4. Expert Interpretation: These results represent scientific estimates that must be interpreted by qualified forensic entomologists within the context of the complete investigation. 5. Legal Considerations: This analysis is provided for investigative purposes and should be presented as expert evidence only by qualified professionals in appropriate legal proceedings.**

## SCIENTIFIC REFERENCES

This analysis is based on established forensic entomology research and methodologies: 1. Amendt, J., Campobasso, C. P., Gaudry, E., Reiter, C., LeBlanc, H. N., & Hall, M. J. (2007). Best practice in forensic entomology—standards and guidelines. International Journal of Legal Medicine, 121(2), 90-104. 2. Catts, E. P., & Goff, M. L. (1992). Forensic entomology in criminal investigations. Annual Review of Entomology, 37(1), 253-272. 3. Higley, L. G., & Haskell, N. H. (2010). Insect development and forensic entomology. In Forensic Entomology: The Utility of Arthropods in Legal Investigations (pp. 287-302). CRC Press. 4. Ikemoto, T., & Takai, K. (2000). A new linearized formula for the law of total effective temperature. Environmental Entomology, 29(4), 671-682.