OSAC 2024-S-0020
Method for Measuring a Spatter Stain

Bloodstain Pattern Analysis Subcommittee
Physics/Pattern Interpretation Scientific Area Committee (SAC)
Organization of Scientific Area Committees (OSAC) for Forensic Science

OSAC Proposed Standard

DRAFT OSAC 2024-S-0020 Method for Measuring a Spatter Stain

Prepared by
Bloodstain Pattern Analysis Subcommittee
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Table of Contents

Method for Measuring a Spatter Stain

1 Scope

Spatter stains are deposited on a surface after blood drops move through the air. Determining the size of these stains can be used in many aspects of bloodstain pattern analysis, including but not limited to aiding in pattern classification, event reconstruction, interpretation, and establishing an area of origin.

This document provides the steps required for measuring the length and width of spatter stains on non-porous surfaces for the purpose of estimating the angle of impact, area of convergence, area or origin, or establishing characteristics for pattern classification.

2 Necessary Equipment

Devices used to measure stains may include but are not limited to, measuring scales and rulers, caliper devices, magnifying loupes with scales, computer software, and cameras. Measurements shall be documented in metric units.

3 Terms and Definitions

3.1
leading edge
The side of the spatter stain where the blood first impacts the surface and initiates the movement relative to the surface.

3.2
major axis
The longest line segment within an elliptical stain (length).

3.3
minor axis
The longest line segment perpendicular to the major axis within an elliptical stain (width).

4 Methods

Stains can be observed and documented directly, via photographs, or from scene mapping equipment. Analysts shall:

1. Select stain(s) with a well-defined edge to measure. Avoid stains that have the potential to be distorted due to the substrate, mixed with tissue, clots, or foreign materials, or are overlapping with other spatter stains.
2. Establish the major and minor axes of the stain. To do this, analysts can use software to inscribe the largest ellipse within the edges of the stain. If necessary, adjust the size

and orientation of the inscribed ellipse to maximize the overlapped area and minimize the non-overlapped area (see Figure 1).

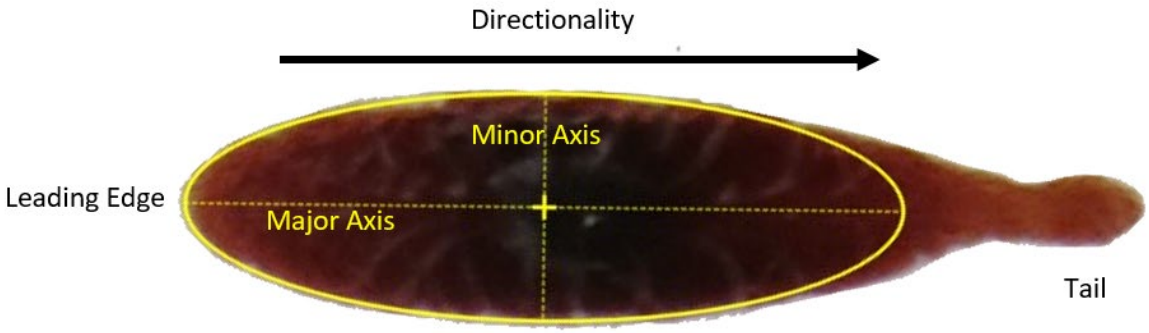

Figure 1: Example of ellipse fitting to establish major and minor axes.

3. Measure the minor axis of the stain.
4. Measure the major axis of the stain. This can be accomplished by either:
    a. Directly measuring the length (see Figure 2a). Or,
    b. Measuring the distance between the minor axis and the leading edge along the major axis. Double that value to determine the length of the major axis (see Figure 2b).

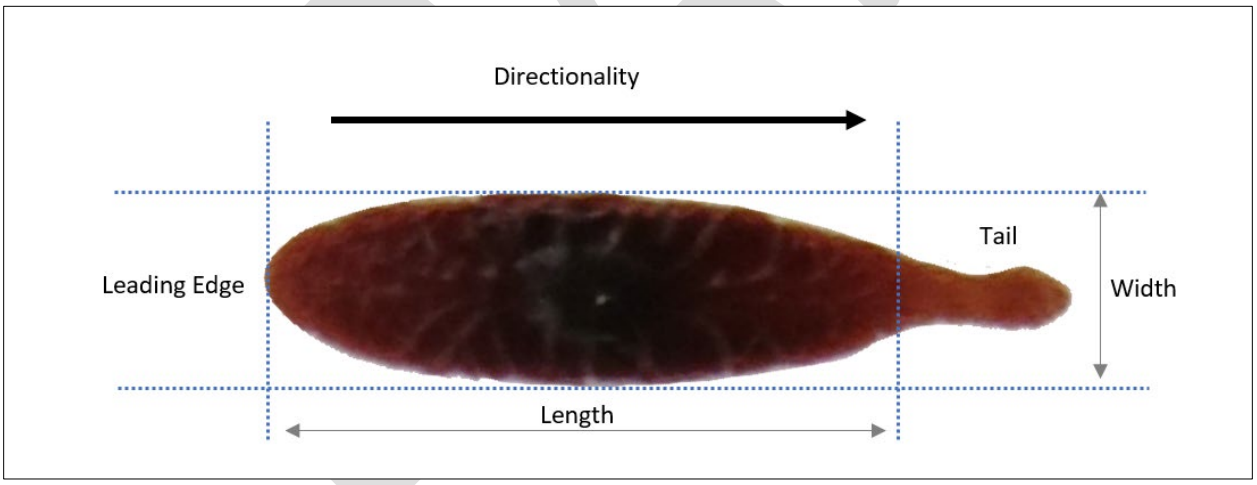

Figure 2a: Example of the length of the major axis.

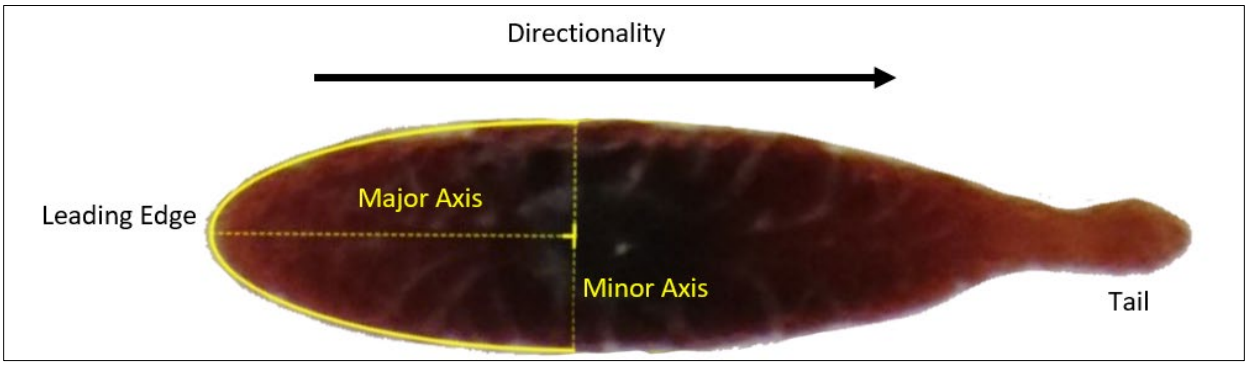

Figure 2b: The length to double from the leading edge to the center of the minor axis

5 Measurement Uncertainty and Limitation Considerations

Several factors need to be considered when measuring bloodstains. The texture and porosity of the surface where the bloodstain is located can affect measurement accuracy. The accuracy of the measuring device used is crucial, and the magnification of smaller stains can improve measurement accuracy. The shape of the bloodstain must also be taken into account, as irregularly shaped or distorted stains caused by the substrate or environmental factors affect the accuracy of the measurements.

Annex A
(informative)

Bibliography

[1] Accuracy of Digital Ellipse Marking for Bloodstain Pattern Analysis, Moore, C., Liscio, E. JBPA, Volume 35, Number 3

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[3] Accuracy of Area of Origin Analysis on Textured, Wallpaper Surfaces, Gareth Griffiths, Eugene Liscio, P.Eng. , Dean Northfield, JBPA, Volume 35, Number 1, March 2020