## B21 The Outdoor Crime Scene: Influence of Weather and Soil Types on the Detection of Diluted Blood With Luminol

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The goal of this presentation is to demonstrate to the forensic community the usefulness of luminol application at outdoor crime scenes, months and even years after blood was spilled.

This presentation will impact the forensic community and/or humanity by showing the usefulness of applying luminol at outdoor crime scenes to detect diluted blood, will discuss the different results on different types of soil and discuss how it may aid the crime scene investigator in his/her homicide investigation.

Traditionally luminol has been used as a presumptive reagent to detect blood, both fresh and old. Luminol is capable of detecting blood in dilution up to 1:5.000.000 and it´s usefulness at indoor crime scenes is well known and well documented.

Due to the effect of rain or snow, visible blood may quickly disappear at an outdoor crime scene. Little has been documented on the use of luminol to detect diluted blood in outdoor conditions although homicides committed outdoors are not uncommon.

This presentation will describe a study performed to investigate the time period that luminol can detect diluted blood outdoors, in exposed areas and to investigate if the type of soil that blood is spilled on, affects the length of time that luminol can detect spilled blood outside. The study was also designed to investigate the possible difference in detection of diluted blood with luminol, between blood spilled in the summer, when the ground is dry, and blood spilled in the winther, when the ground is wet or snow covered. Possible difference in the behavior of human versus pig blood and human blood with and without an added anticoagulant was also investigated for research purposes.

A remote rural area with restricted access was chosen for the site of study. The area contained a green area, with both grass and moss, gravel, mixed with sand, and rocks. On the green area as well as the gravel and rock, selected volumes of human blood (obtained from live volunteers) was spilled. The volume ranged from 5ml-1000ml, to simulate anything from insignificant bleeding to a life threatening blood loss. Blood was spilled according to a protocol in the month of August, under sunny and dry conditions, and in February, on top of snow, while raining. As human blood in large volumes is difficult to obtain, a parallell study was run using pig blood for comparison to see if pig blood might be substituted for human blood in further such outdoor studies. Both the human and pig blood was without anticoagulant. For further comparison, a large volume of human blood mixed with anticoagulant was also spilled. Automatic hourly recordings of temperature, windspeed and precipitation were obtained for the area during the entire study period. The areas of spilled blood were monitored daily while blood was visible with the naked eye. Thereafter selected areas within the areas where the blood was spilled, were sprayed weekly with luminol and the luminesence documented. Planned study period is 18 months. For an extended time frame, a homicide scene where blood was known to have been spilled in a lava field 18 months previously was revisited with luminol at the onset of the study.

Results of this study will show the usefulness of applying luminol at outdoor crime scenes to detect diluted blood, will discuss the different results on different types of soil and discuss how it may aid the crime scene investigator in his/her homicide investigation.

**Luminol, Outdoor Crime Scene, Criminalistics**

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