Western Carolina University Cadaver Dog Training Level 2 overview

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provided the following information

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What is Known

- Cadaver locating dogs are able to detect human graves up to 100 years old
- Cadaver locating dogs can differentiate human from non-human.
- Dogs are within an order of magnitude sensitivity of MS when dealing with explosives (~pptr)
- Odor changes over time, both concentration and composition.
- Other techniques (GPR, etc.) have not been reliable or are difficult to interpret.
- Burials tend to exclude insects and decomposition takes much longer (~8X) than if on the surface.

Canine Ability

- The olefactory acuity of the canine can detect odorant concentration levels of 1-2 parts per trillion.
- Canines, in search mode, also “sniff upwards of 100 times per minute and inhale approximately 24 L/min of air.
- This roughly indicates that the canine is sampling approximately 1 mole of gas with a sensitivity of 10^{-9} grams or 1 ng.

Understanding Decomposition can Help Answer Many of the Five W's

- When did they die?
  - Time since death determination
- Where did they die?
  - Evidence of decompositional products
  - Decomposition events
- What happened?
  - How did they die
- Who is the victim?
  - Identification/reconstruction.

Major GASES historically thought to be produced during Decomposition

- Methane
- Ammonia
- Carbon Dioxide
- Hydrogen Sulfide
- Organic acids

Physical and Chemical Decomposition

- **Temperature** (altitude, latitude, burial depth, presence of water, air movement, environment, etc.)
- Van't Hoff's Law ('law of ten' – Q10)

  Velocity of chemical reactions increases two or more times with each 10oC rise in temperature.

  (enzymes, catalysts, etc.)

Detection of Buried Human Remains

'*Statistically speaking*' the majority of clandestine graves will:

1. Be no deeper than 2.5 ft.
2. Be 'close' to water or 'near' poorly traveled roads
3. Be 10 feet away from the nearest large tree
4. Contain a clothed or wrapped corpse which will be face down

Detection of Buried Human Remains

- **Identify a search area:** witness accounts, confessions, police intelligence, suspicions, evidence, and logic.

- **Method choice depends on:** terrain, environment, vegetation, size of search area, soil type, hydrology, subsurface, age of suspected occurrence, manmade activity in the area, amount of surface moisture – need help from geologist, botanist, anthropologist.

Ideal canine/odor search collection conditions

- Barometric pressure < 30 in.Hg (<1016 hPa) and falling
- Temperature >12 C and rising (ideally with sunlight hitting the site and warming the soil)
- Soil type (clay is the worst, sand is very good, humic is somewhere in the middle)
- Soil moisture (quite moist, but not waterlogged, very dry is not good)
- Air humidity (between 70-85%) Significant amounts of dew impede volatiles (best to collect/search when the dew has nearly finished evaporating) Rainfall during collection/search is not good
- Wind < 15mph