



Ensuring Welfare of Bats in Research in Ghana

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Presentation Outline

- Introduction:
- Bat Capture and Handling Procedures:
 - Mist Netting
 - Handling captured bats
 - Sampling, microchipping etc
- Some Best Practices:
 - Care for captured bats
 - Non-invasion sampling
 - Captive breeding of bats for research

Introduction

- Issues raised by research involving animals have aroused intense debate
- Opinion about its necessity, justification and acceptability varies widely
- Historically, animals have been used in a wide range of scientific research activities that have provided many benefits to society, particularly in relation to the advancement of scientific knowledge, human and veterinary medicine, and the safety of chemical products.

Introduction

- Welfare of many research species as models have laws and protocol guiding due to knowledge on those species – rodents, primates etc
- 40% of bats specie are threaten with extinction globally. There are few or no available data on bats to help protect them (IUCN, 2020)
- We introduce to you, our procedures on bat research
- We highlight procedures that might compromise bat welfare and suggest better procedures available

Introduction: Bats

- Bats are flying mammals that form the taxonomic order *Chiroptera,* from the Greek words *cheir* (hand) and *pteron* (wing).
- Over 1,200 are found everywhere in the world, except Antarctica. On-going research may identify more, with an estimation of up to 2,000.



Bats and Ecosystem Services

- Bats are important seed dispersal pollination and arthropod suppression agents – vital for ecosystem health.
- Insectivorous bats control insect populations (including pest and vectors of human diseases)





Bats

- 20% of mammalian species are bats
- Evolved ~65 mya, with great diversification early in mammalian history (Eocene period, 52 to 50 million years ago)
 - Little evolutionary change compared to other mammal taxa
 - Long history of association or co-speciation with their viruses
- They are thought to be reservoir of pathogens of public health concerns,– Marburg viruses, SAR coronaviruses, Henipa-viruses, Some lyssaviruses
- Thus, the attention of researchers



Bat Capture: Mist Netting

- Bats are trapped using different net sizes
- Best size for bats is 12- by 2-m nets with 36-mm mesh; (2, 3)
- Mist Netting is Good for large fruit bats
- Thinner mist nets are better in catching echolocating bats [4]
- Trapping is at night
- Trapping is away from roost
- Bats are caught early morning when they return from feeding
- Some trappers trap during night departure (Some times incidentally) and bats are kept till morning sampling?



BAT TRAPPING

Pole Net trapping

- Using a long pole with net attached at end of pole
- Within the roost Day
- Stressful bats are nocturnal species
- Inefficient with few bats caught especially in the field
- Good in captive population as limited impact



Harp trapping

- Trapping bats in caves during mostly evening when they are departing
- Bat hit the wire and falls in the collector device
- Good for Insectivorous bats
- Trapping away from roost
- Trapped bats comfortable



When /How to trap bats



- Day, When bats are resting? No
- Night when bats are going to feed? No
- Early, when bats are returning from feeding? Yes
- Nets/Traps should be inspected regularly (every 15-30 minutes)
- Bats should be immediately removed to prevent entangling in net

Captured Bat: Bagging

- Trapped bats are kept in a cotton bags
- Hanged under shady trees
- Bats cannot be stored for long feeding and drinking of bats difficult (bats risk of removing individually





Captured bats: Caging

- Captured bats are kept in mini cages
- Little stress for bats
- Food and water provided in cage
- Can be kept where convenient and for long periods
- Challenges:
 - transportation of cages to site
 - Removal of bats for sampling



Sampling of bats

- Sampling Bats:
 - Throat swabs
 - Faecal swabs
 - Blood
 - Urine
 - Tissues
- Are we sensitive with sampling methods?
- Do we use right size of equipments – needles, swabs etc.
- It could be very invasive and stressful

• Inappropriate swab size



How do we minimise pain from blood sampling . Using anaesthetics?



- Using a more accessible vein cephalic, saphenous, etc?
- 1% of BW of blood syringes/needles, pipettes/tips, tube ematocrits etc



Other Procedures (Pics Curtesy Dr Abedi Lartey) Are bats comfortable wearing these? ICARUS technology may be better



Pics Curtesy Dr Abedi Lartey



10 GPS (E-obs)Tags deployed 4 with good data

20 solar loggers deployed

Could tagging be injurious to bats?





Other Best Practices Hydrating bats during sampling is necessary



Bat Release





- Bat should be release at site of trapping
- Should fly away voluntarily
- Good to monitor bats released by monitoring capture sites

Some Best Practices

- Can we decide on best samples for the study?
- Can we explore non-invasive sampling:
- Urine, Faecal



Best Practices: Non-invassive Urine and Faecal sampling







Best Practices: Bat captive breeding for research

- Purpose:
 - Longitudinal Studies
 - Infection studies
- Require large cages:
 - Obstacles for forced exercise
 - Hanging platforms for feeders and drinkers
- Triple fencing to isolate from environment
- Provision of darkness for some bats

Large bat housing cage natural environment within cage for enrichment



Captive Breeding

- Some bats adapt well to captive rearing *E. helvum, Tadarida, Eptesicus, Nectareous bats etc* [1]
- Other bats do not Mormoops bats [1], epimorphorus bats [3] etc

Captive Breeding: Challenges

- Natural behaviour?
- Faith of bats after study?
- Provision of cage large enough for flied for long flyers e.g *e. helvum,* foraging distance 35-87Km a night for feeding [5]
- Provision of ideal feeding platforms to mimic natural feeding
- Risk to staff?



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Acknowledgement







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THANK YOU

1. www.hinko.org

- 2. Charles N. Francis. Comparison of Mist nets and two Harp traps for capturing bats. J Mamm 70(4), 865-870, 1989.
- 3. Author's Personal Observations
- 4. https//doi.org/10.1093/jmammal/gyab109
- 5. Fahr J., et. al. 2015. doi:10.171/journal.pone.038985
- 6. IUCN, 2020. https://www.mammal.org.uk/2020/08/bats-on-the-red-list/

Bats

- Habitats range from deserts to tropical forests, and from sea level to mountaintops.
- Body sizes from less than 2g to over 1kg,
- Wingspans as small as 10cm to nearly 2m.
- Food include pollen, flowers, fruits, seeds, insects and blood.