

# Differential effects of artificial lighting on flight and foraging behavior of two sympatric bat species in a desert habitat

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- In the past moon and stars were the main light sources at night
- Today many areas are artificially lit
- Artificial light affects animal behavior



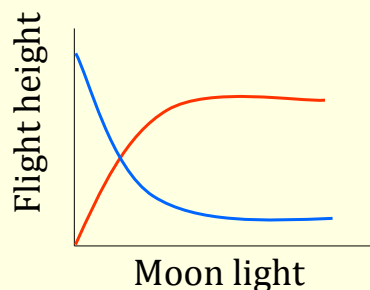
## Effect of light on bats

- Bats are nocturnal and as such are affected by night light
  - Shifts in activity and foraging duration
  - Changes in foraging routes
- One explanation is fear of predation
- On the other hand artificial light creates rich food patches (de Jong and Ahlén 1991)

3

## Effects of light on flight

- Flight behavior attributes are velocity, height, length and shape of the trajectory
- There is conflicting evidence of effects of natural light on flight behavior



\* Hecker and Brigham, 1999

\* Reith, 1982

4

# How does artificial light affect the flight behavior of two sympatric bat species?



*Pipistrellus kuhlii*



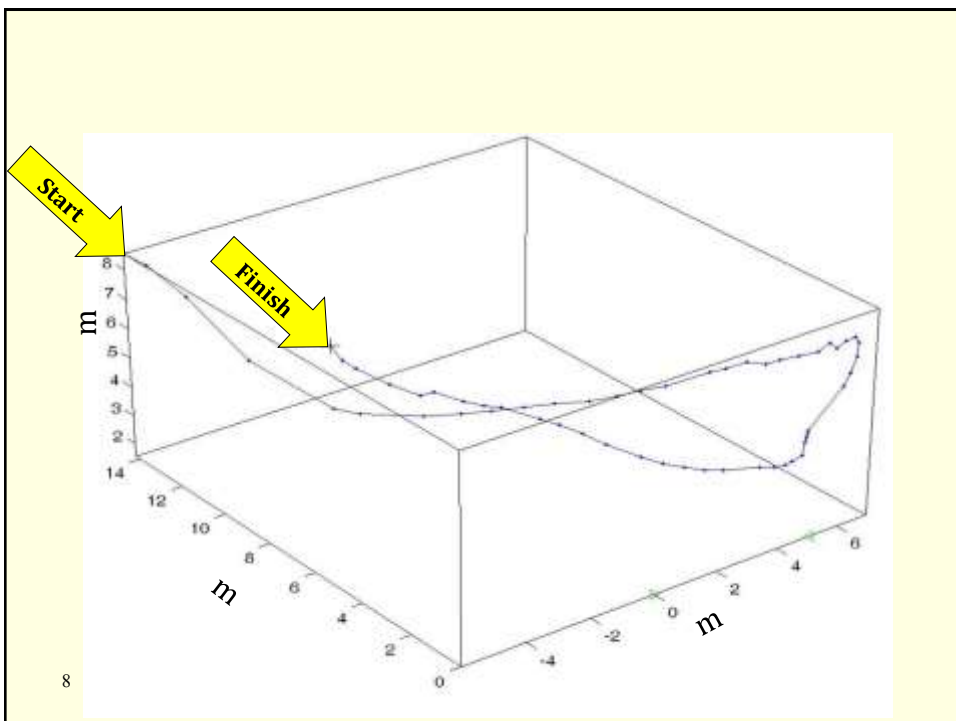
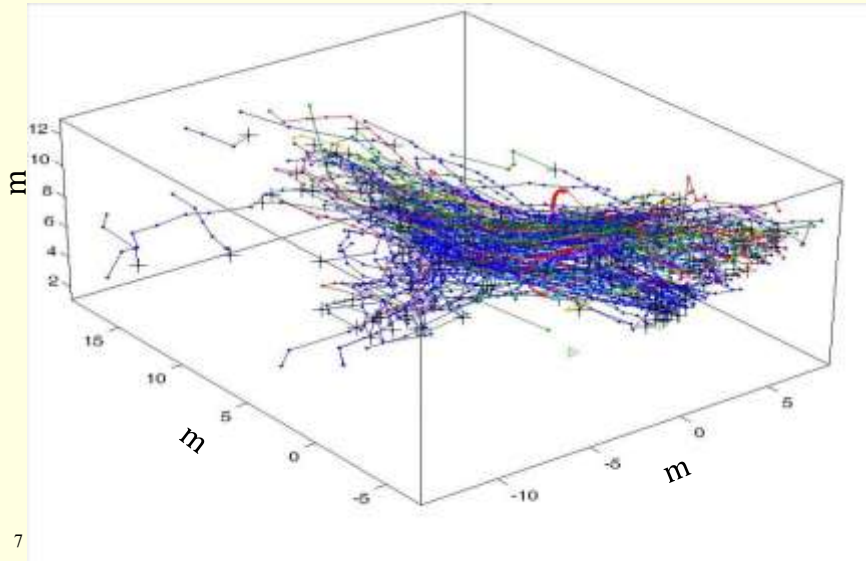
*Eptesicus bottae*



Victoria Holderied-Milia

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## Trajectories recorded in a 5 min period



# Experimental design

Beginning	22:30	22:00	21:30	21:00
End	23:30	22:30	22:00	21:30

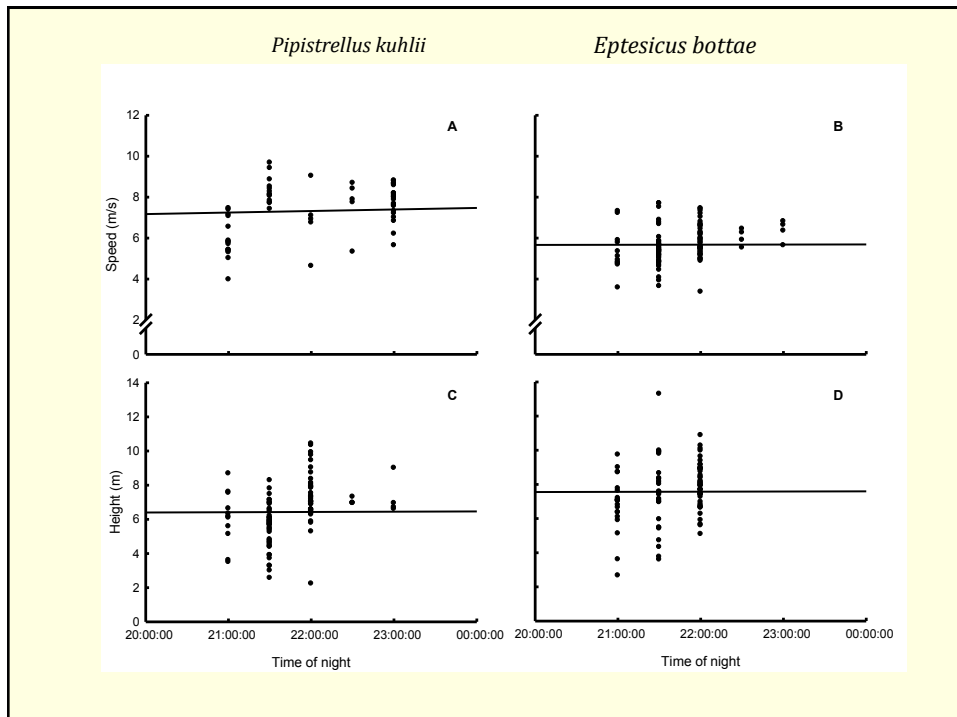
**Table 1** Experimental design and number of trajectories per species per sampling period: rows represent the four sampling nights with different light regimes in four half hour segments (columns).

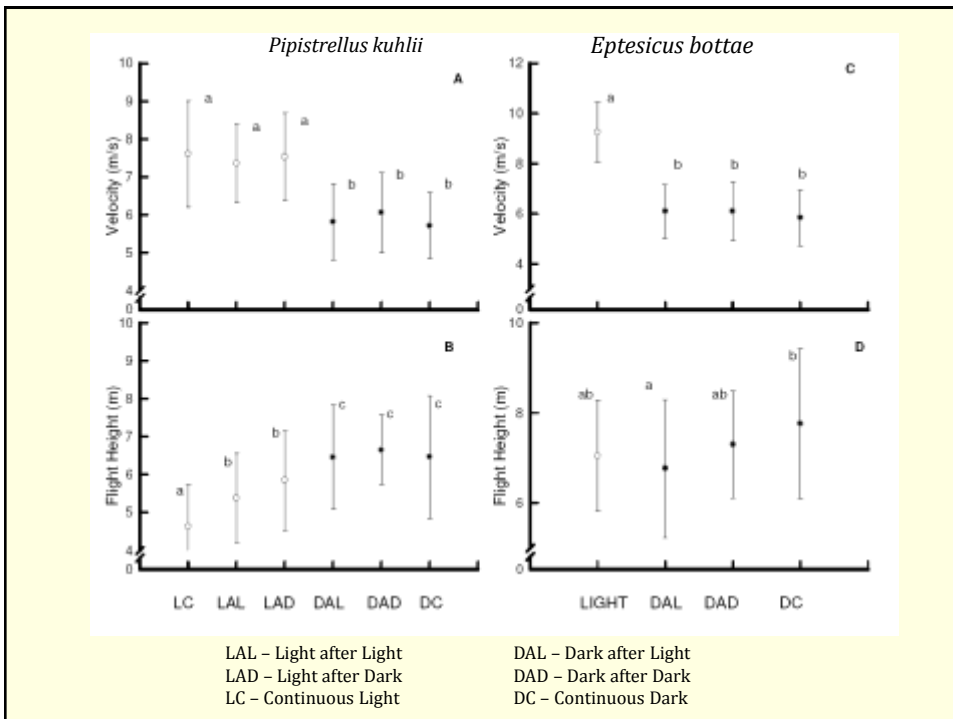
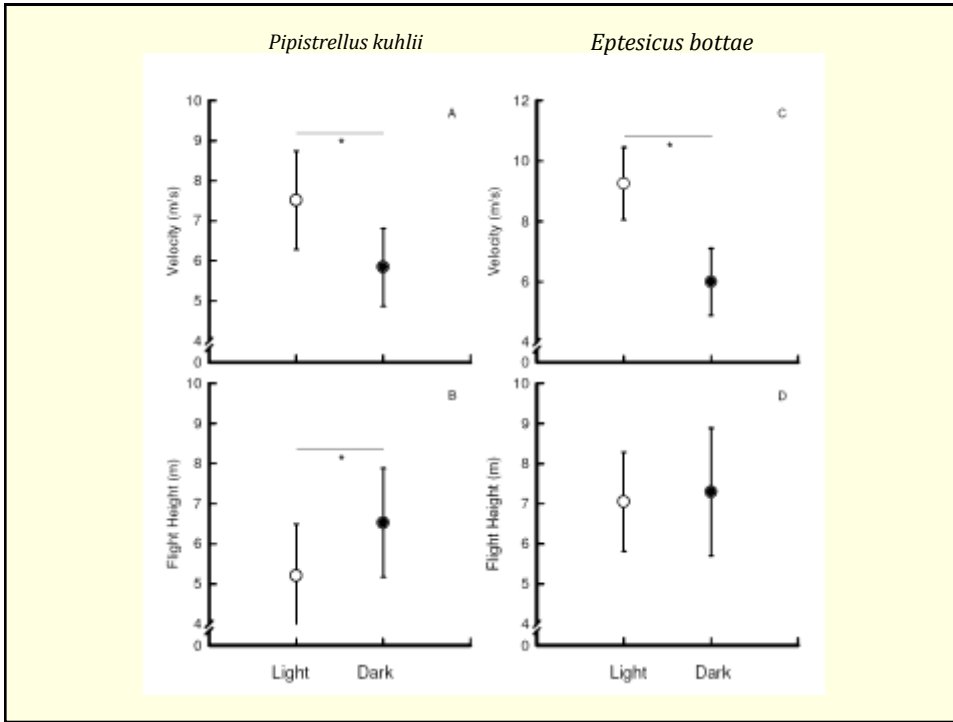
Time night	20:00-20:30 h PK/LE	20:30-21:00 h PK/EB	21:00-21:30 h PK/EB	21:30-22:00 h PK/EB	Per night PK/EB
Night 1	21/0	7/0	5/0	25/0	58/0
Night 2	27/1	89/36	35/2	34/7	145/46
Night 3	17/23	23/2	28/11	47/11	132/57
Night 4	25/28	36/37	32/24	5/0	102/96

Grey backgrounds represent Dark phase periods, white backgrounds represent Light phase periods. Numbers of trajectories for the two species *Pipistrellus kuhlii* (PK) and *Eptesicus bottae* (EB) are given for each half hour segment and for the total of each night.

light				
Cont dark	Dark	Dark	Dark	Dark

9





🦇 Bats fly faster and lower under artificial light

🦇 The changes in flight behavior are related to the light regime

🦇 Flying differently under artificial light:

🦇 Predation avoidance

🦇 Orientation

🦇 Prey availability

13

*P. kuhlii* seems to be more adaptive to conditions of artificial light and may have competitive advantage over *E. hottae*, which

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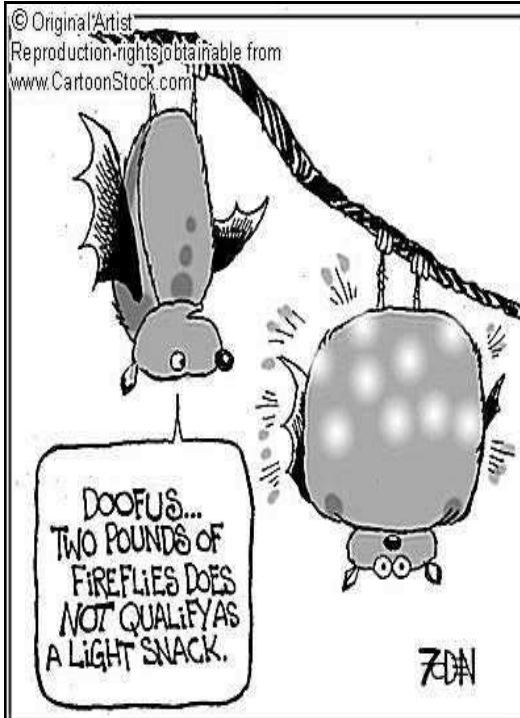
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14



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Thank you