Electric fields can be used to repel mosquitoes:

Laboratory experiments and use cases.

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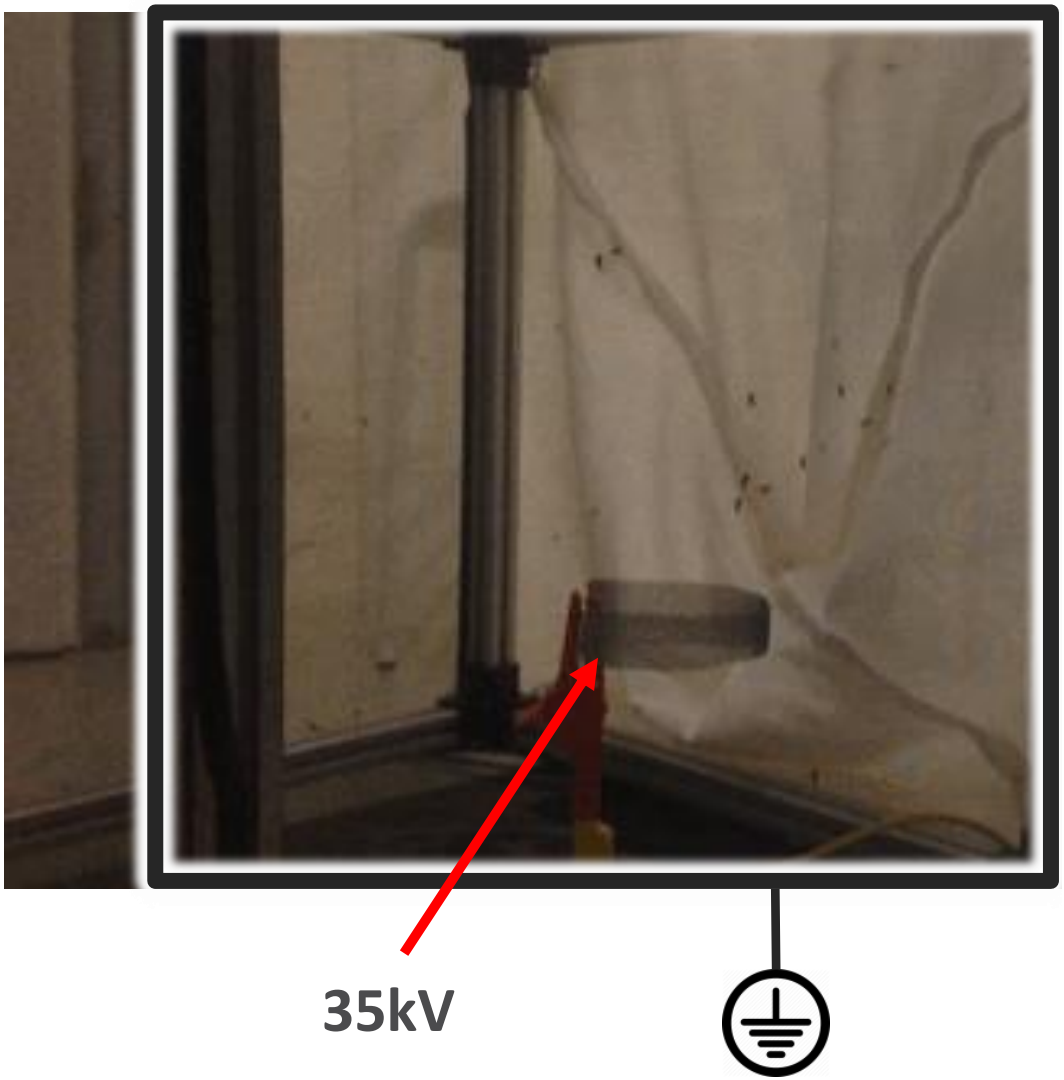
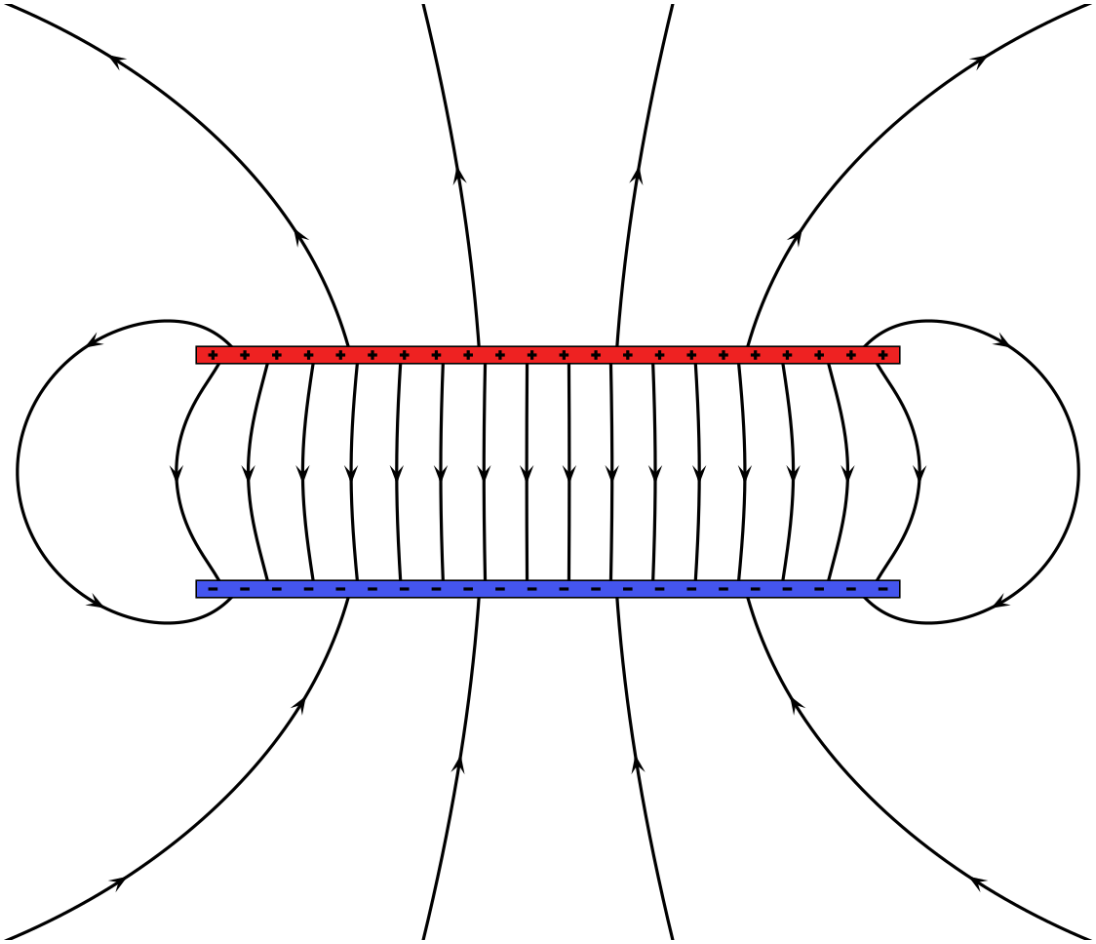
How did the project start?



Berta Domènech Garcia

Electric Field



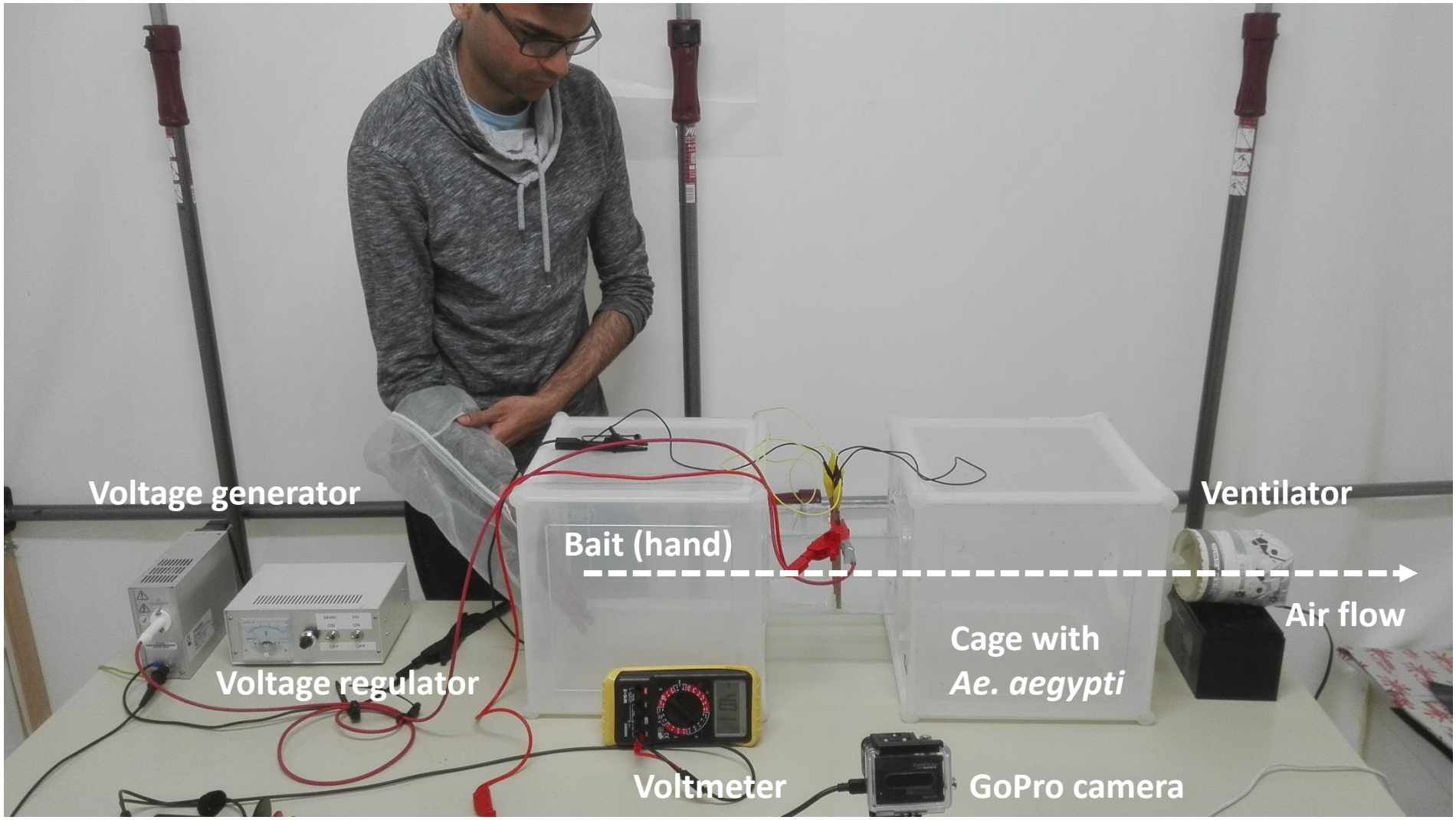
An electric field forms between differently charged objects.

This is an illustration of the electric field between two parallel conductive plates (electrodes).

Between the plates the electric field is essentially uniform.

VFPt capacitor-square-plate - Electric field - Wikipedia

Dose-Response Tests



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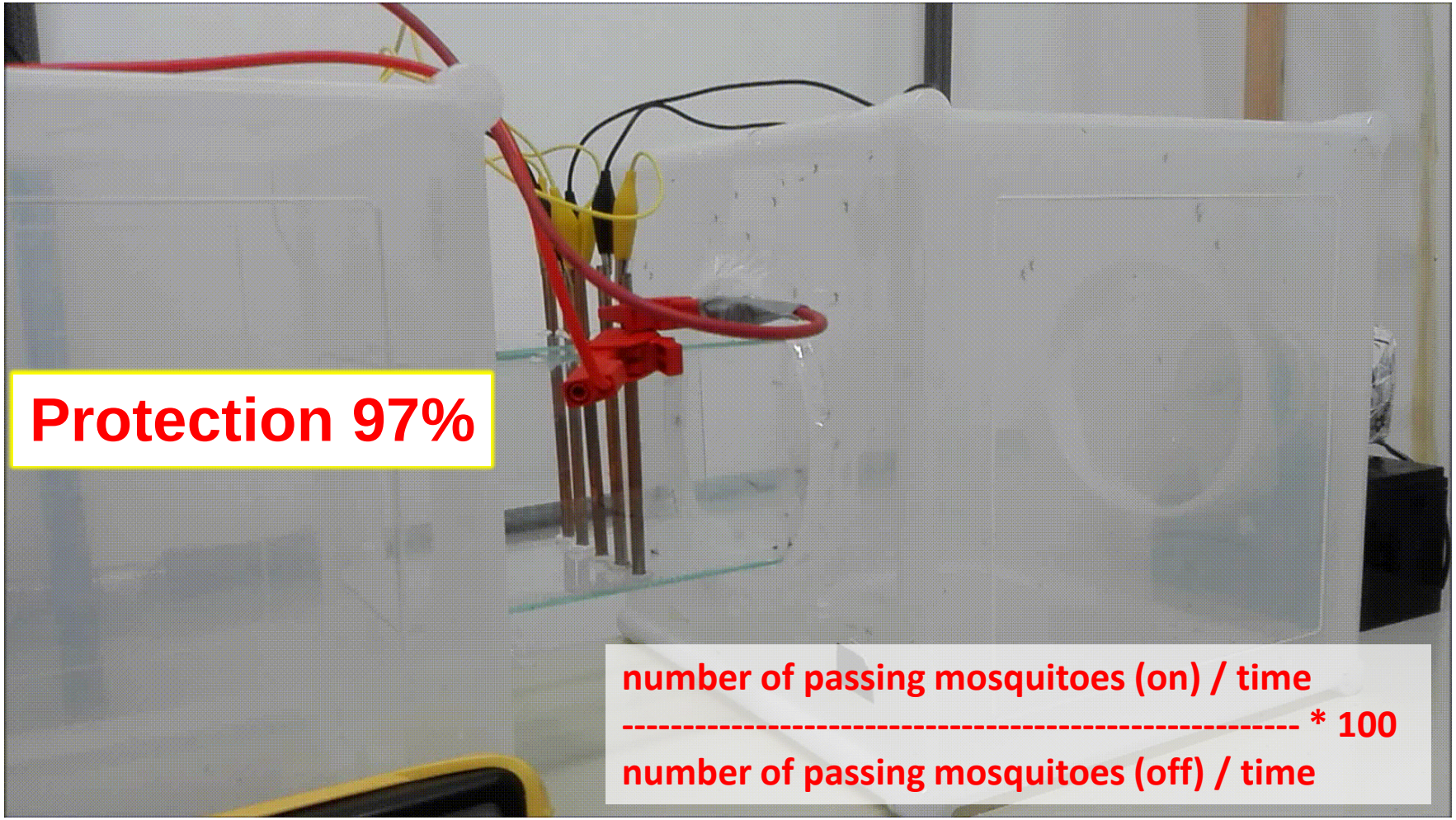
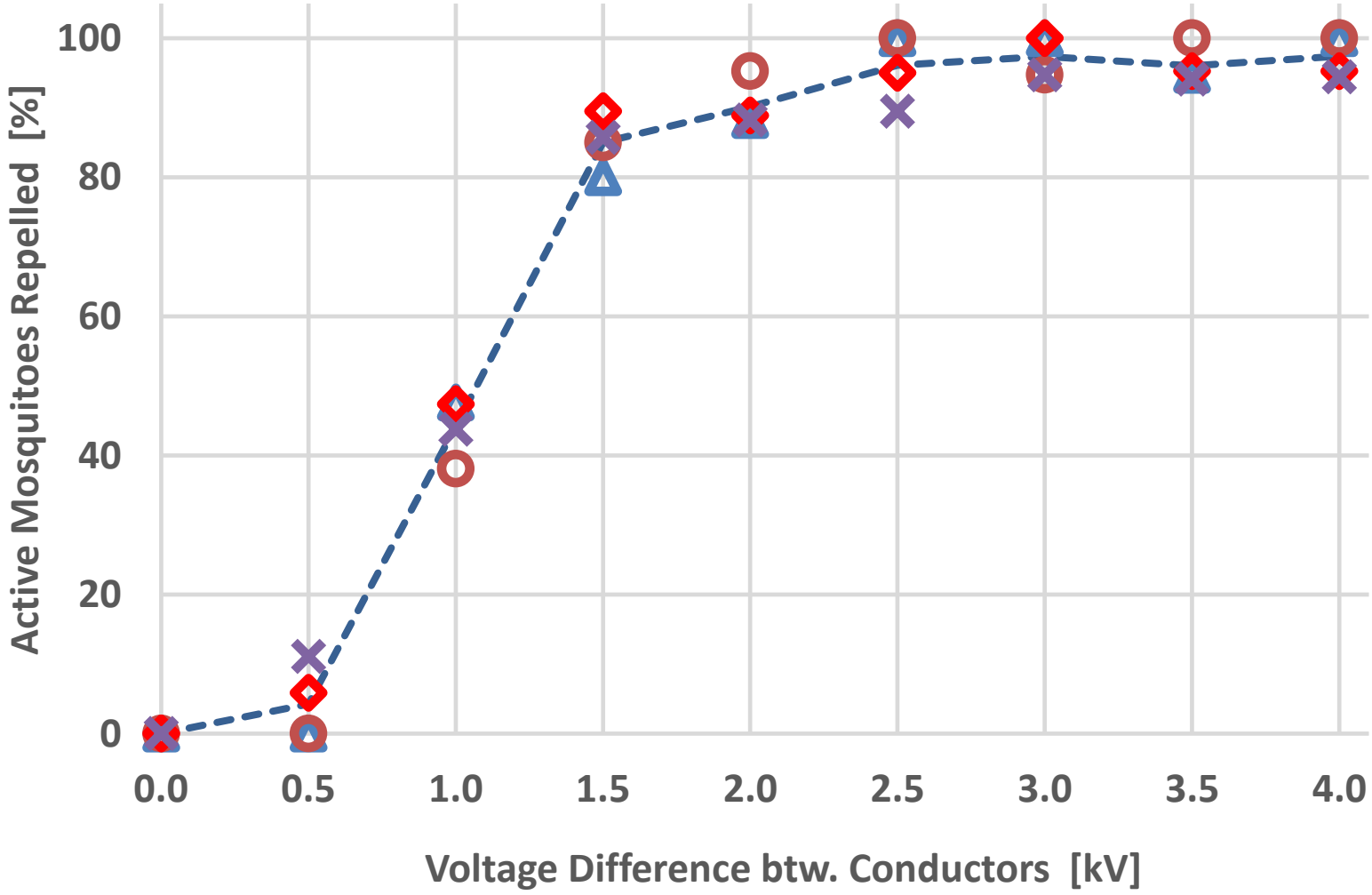
Setup: -4kV ⏚ -4kV ⏚ -4kV; *d*=2cm

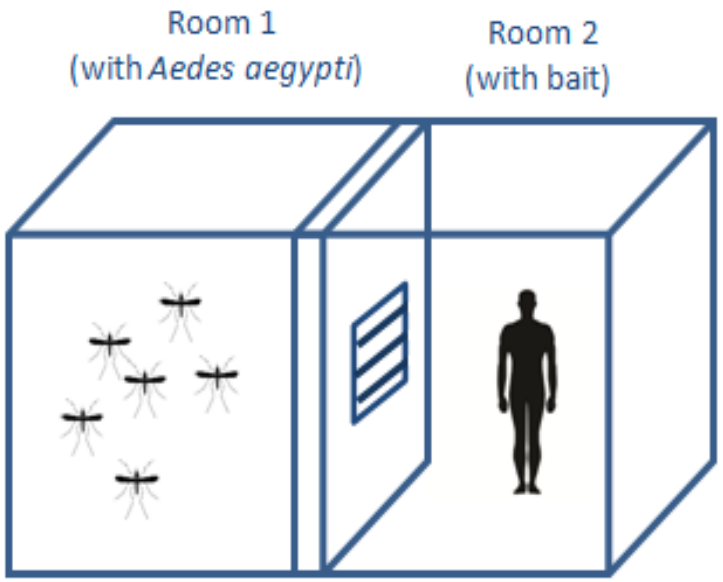


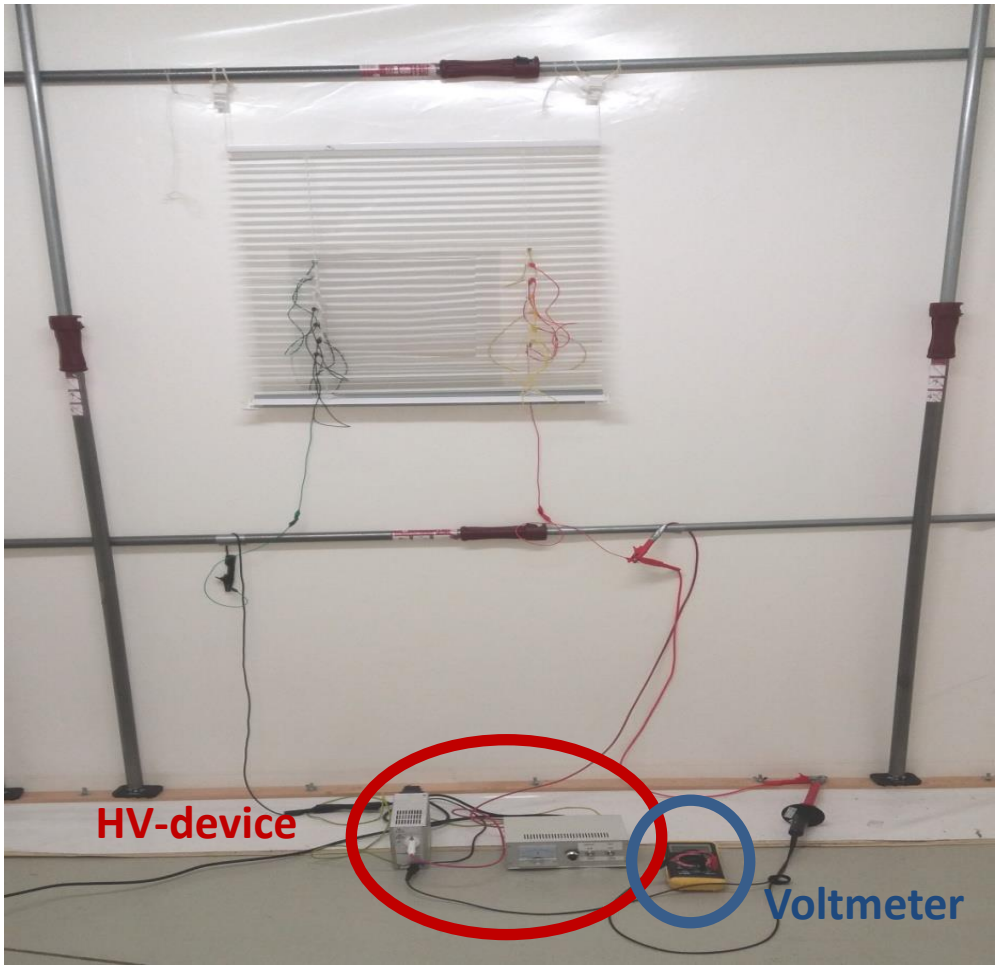
Dose-Response Curve



Venetian Blinds (adjustable slats)

Repellent Venetian Blinds

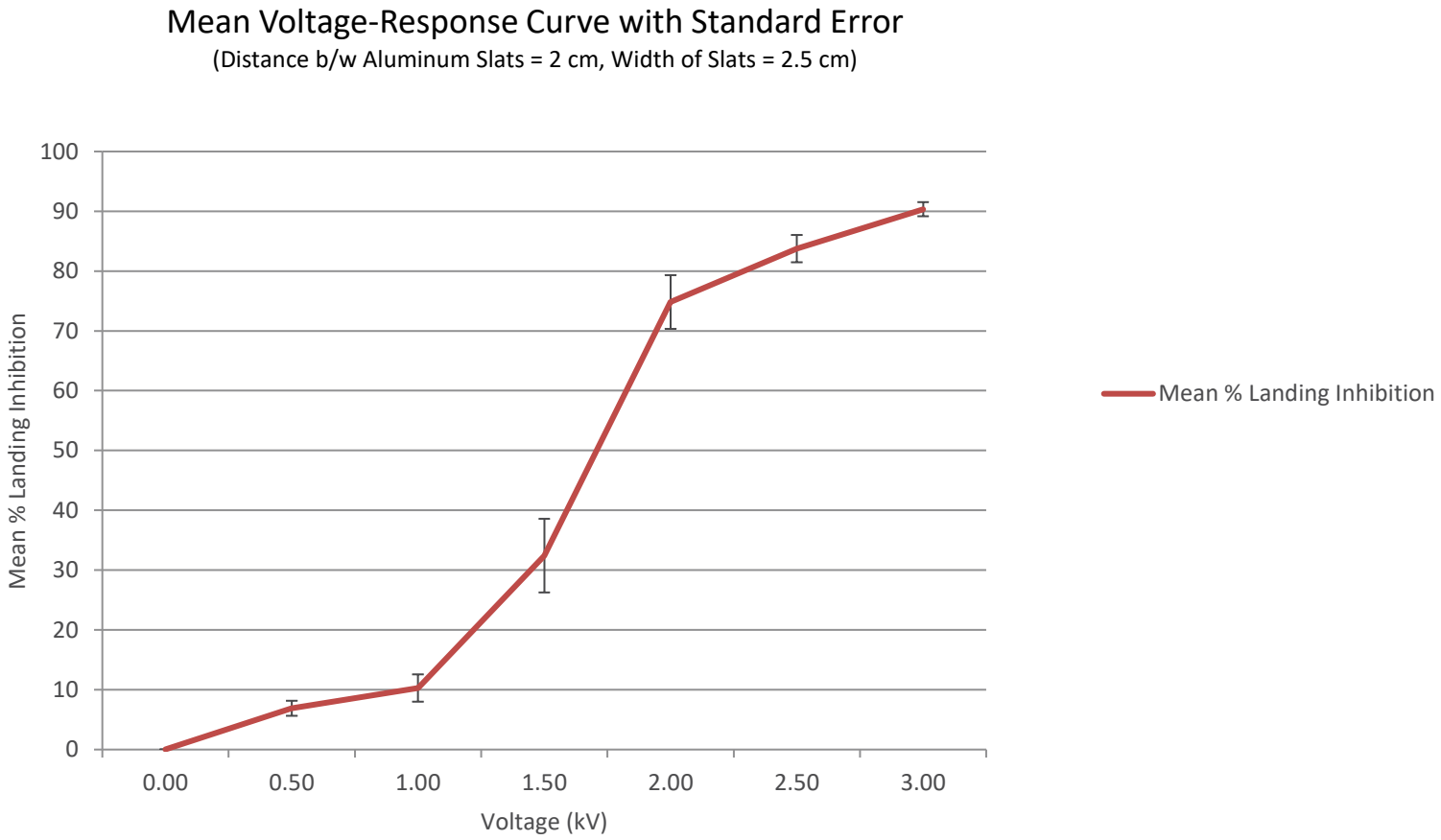




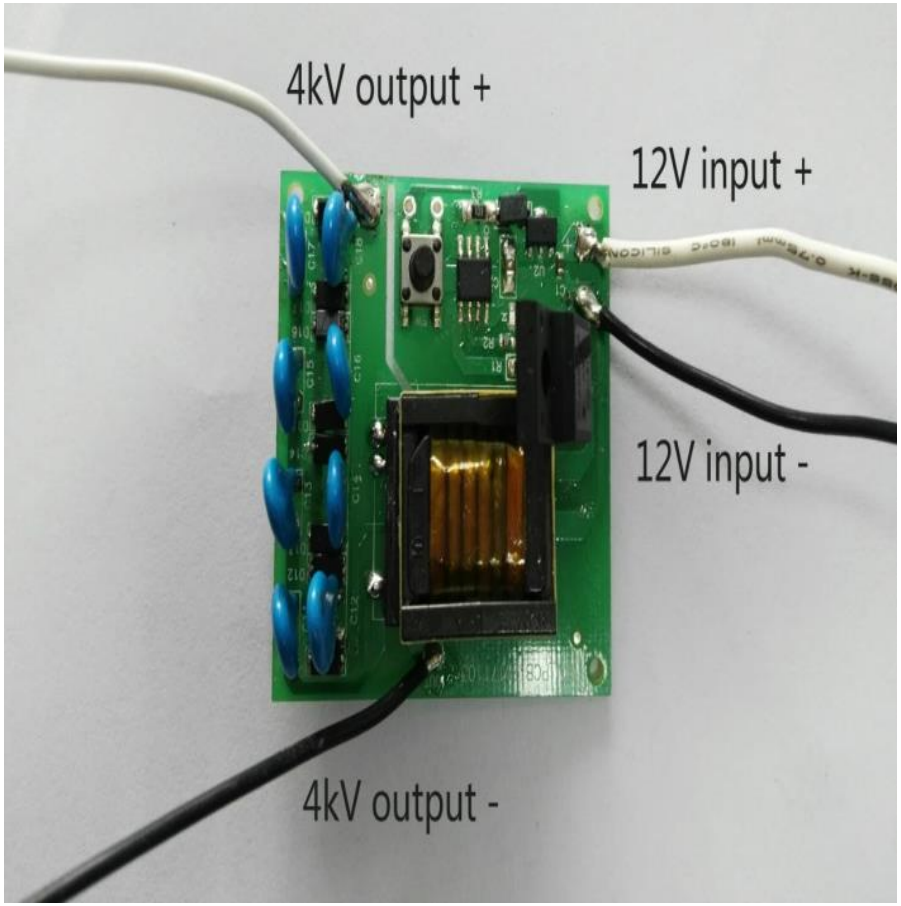
Test Setup

Repellent Venetian Blinds

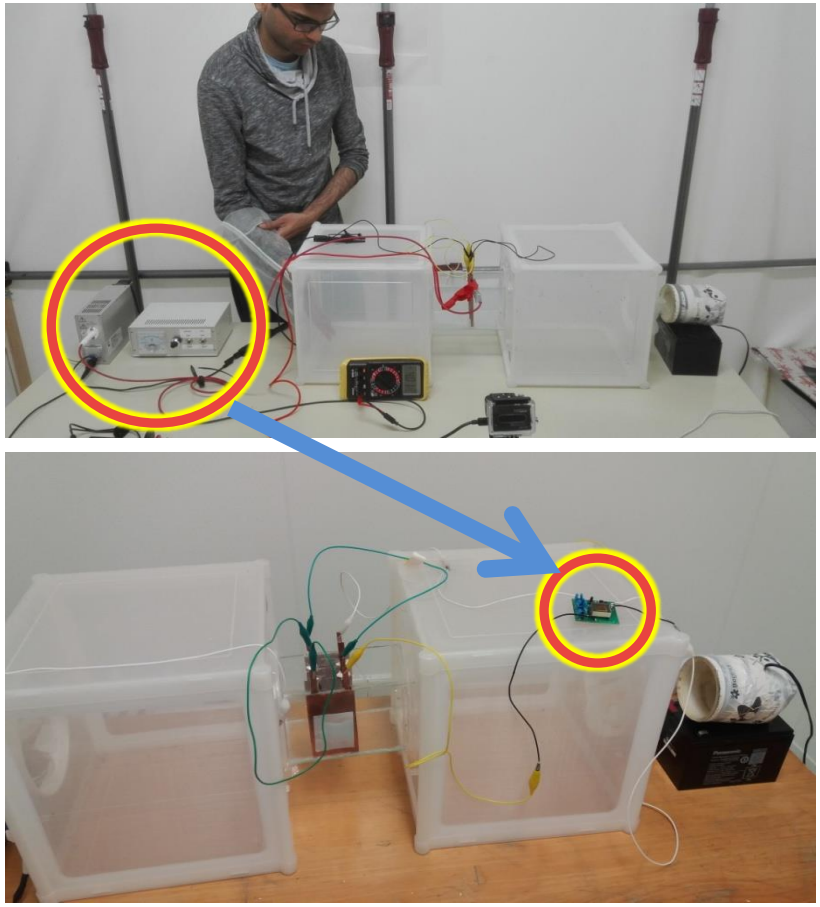
Dose-Response – Venetian Blinds



Simple Prototype Development



Dimensions: 5cm x 4.5 cm



Power Saving through Pulsation

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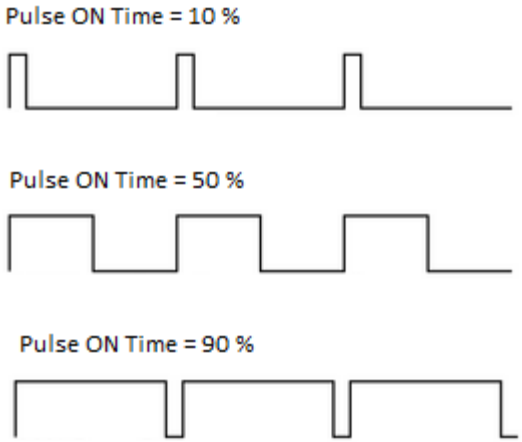
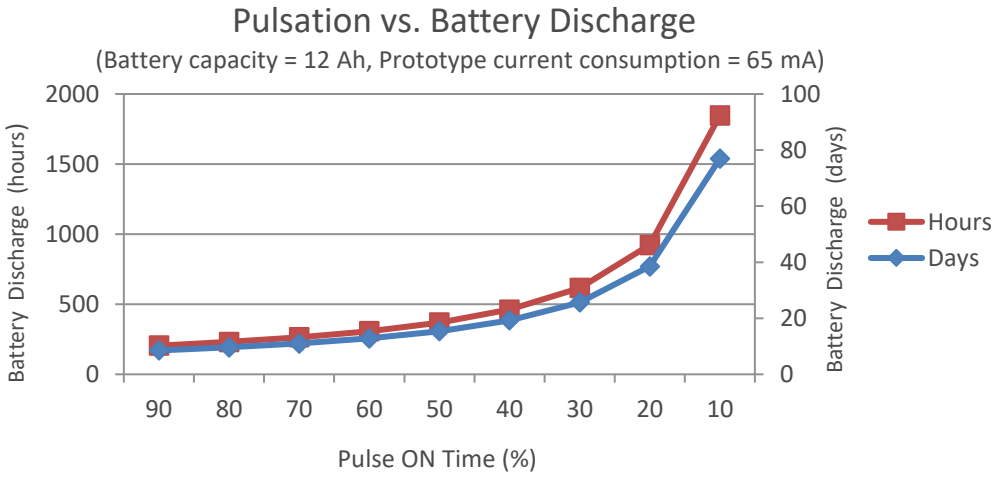
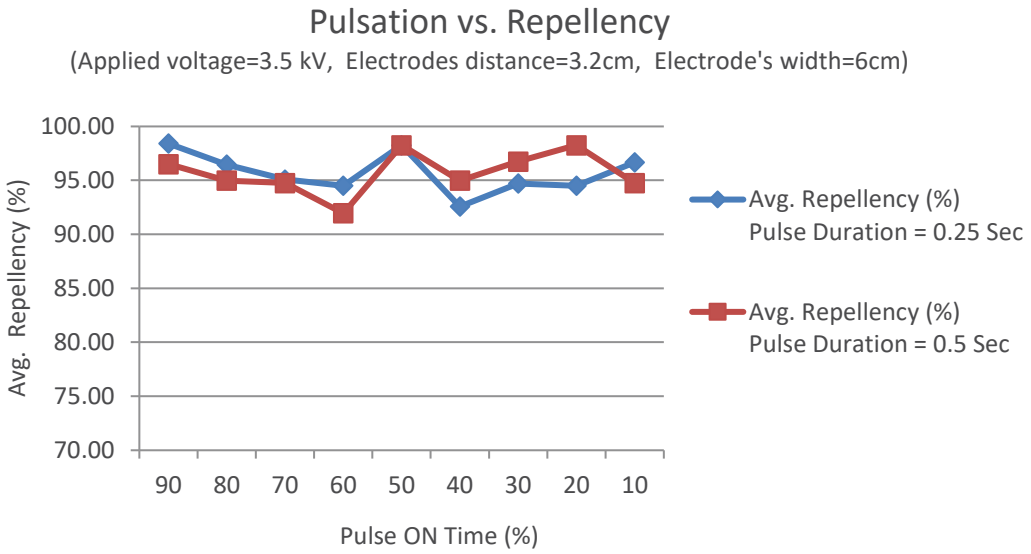
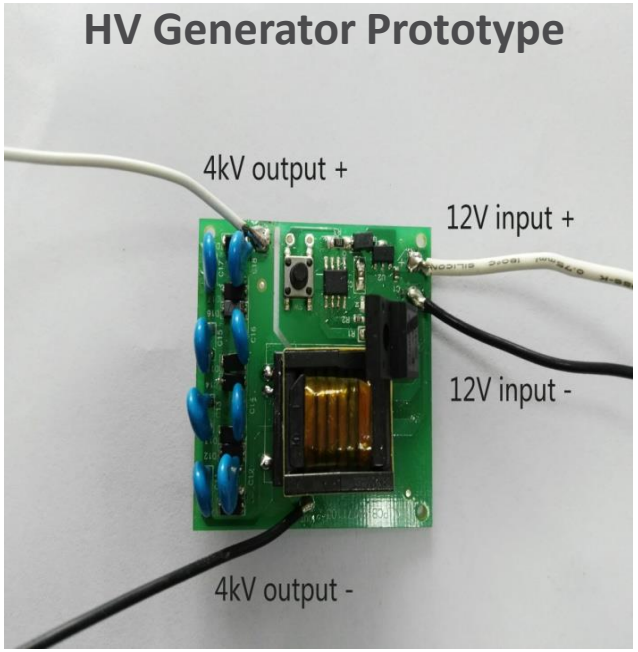
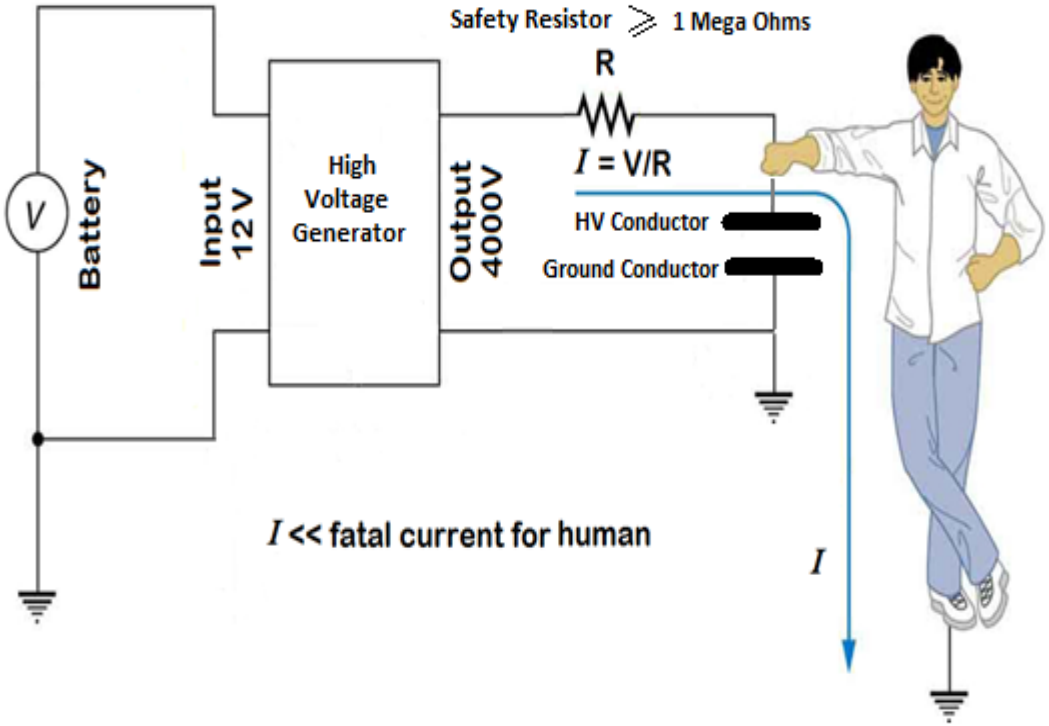


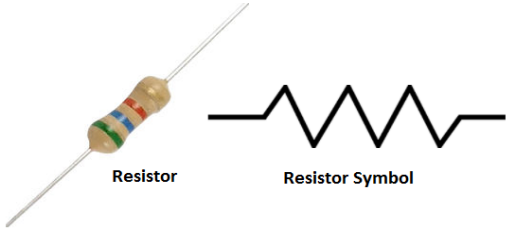




Safety Solution





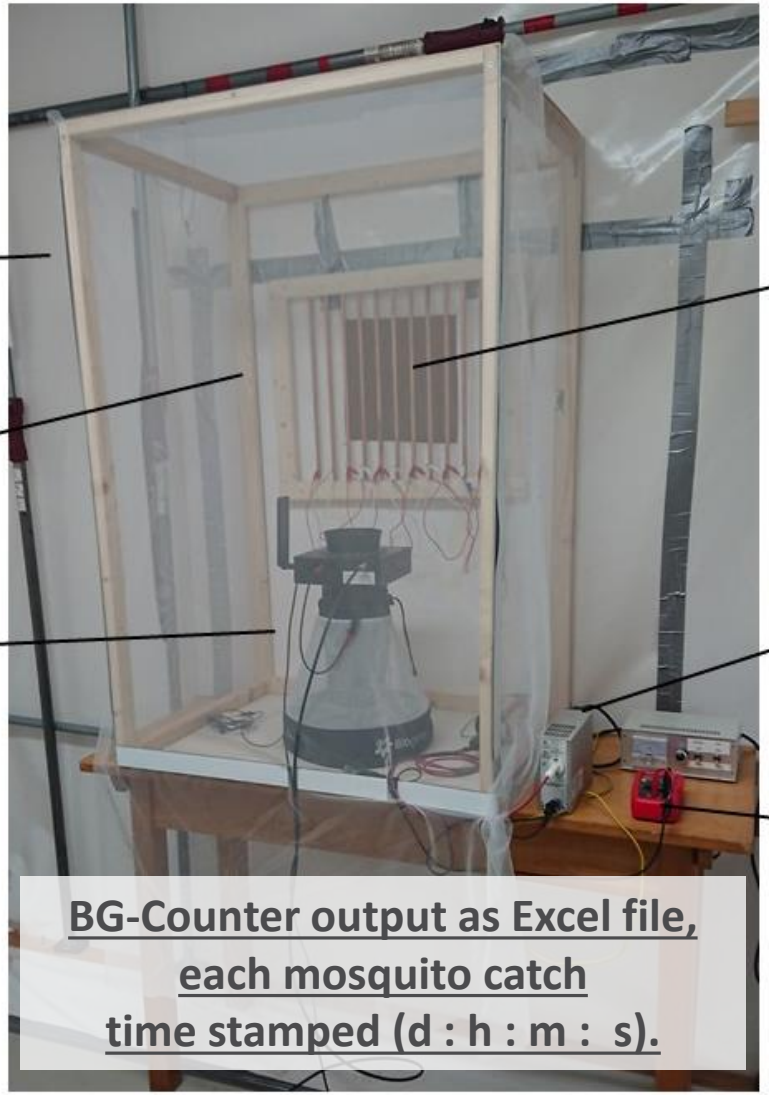


Limiting the circuit current through resistor

(Patent filed….)

Next Step: External Venetian Blinds

Automated counting system



fly-in chamber

frame with electrode grid
(horizontal in experiments)

BG-Counter trap counts captured mosquitoes in real time.

window to release room

HV generator

voltmeter

BG-Counter output as Excel file, each mosquito catch time stamped (d : h : m : s).

www.bg-counter.com

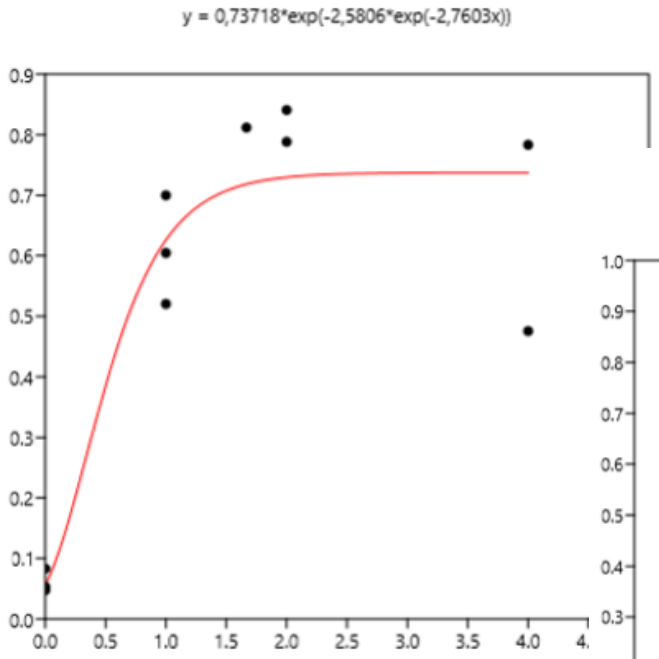
Comparing 3 electrode geometries

round electrodes,
1 cm diameter,
3 cm distance

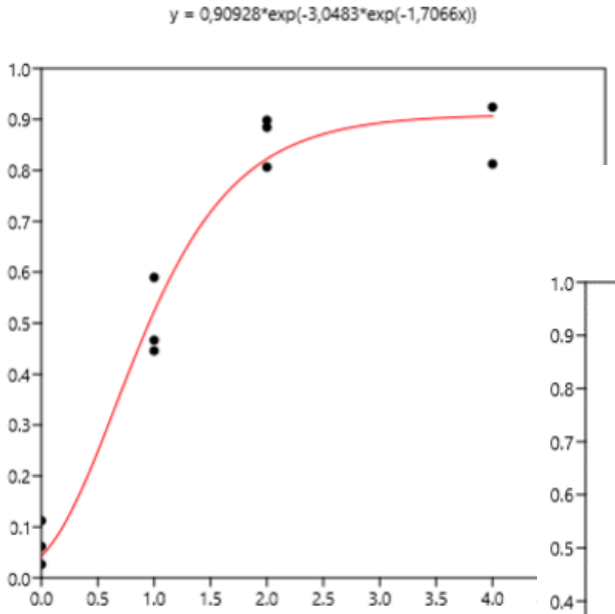
flat electrodes,
1 cm width,
3 cm distance

flat electrodes,
2.5 cm width,
2.5 cm distance

Comparing 3 electrode geometries

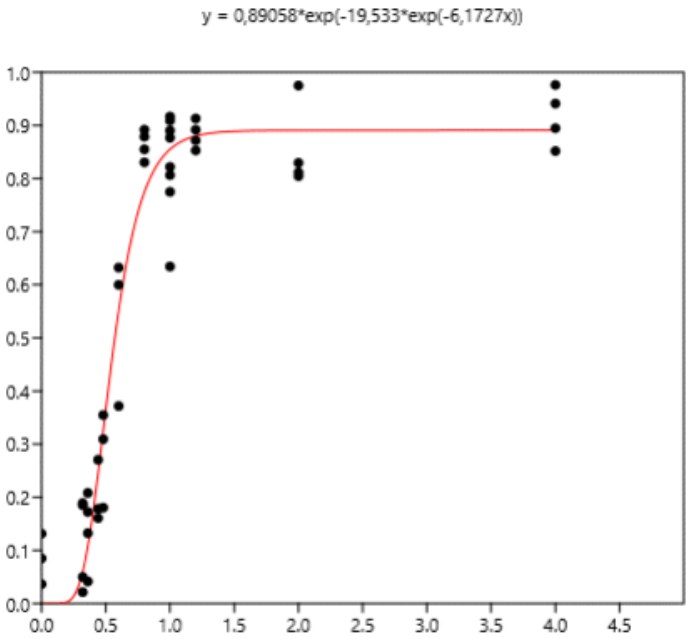


round electrodes,
1 cm diameter,
3 cm distance



flat electrodes,
1 cm width
3 cm distance

flat electrodes,
2.5 cm width,
2,5 cm distance



Summary & Outlook

- ✓ Proof of concept: on-off, non-chemical repellent
- ✓ Simple protype
- ✓ Rechargeable battery use is possible
- ✓ Power saving through pulsed charging
- ✓ Safety evaluation okay
- ✓ Developed lab procedure for an automatic data collection using the commercially available BG-Counter
- ✓ Comparing electrode geometries and positions
  - Slats for external Venetian blinds (BG & Reflexa)
  - Other electrode geometries (BG & ASU & ?)

Other use cases

1. Static, non-adjustable window blinds
2. Other electrode forms to protect windows or doors
3. Protection of ventilation opening (open eaves, etc.)
4. Protection of water storage tanks, cisterns, etc.
5. Protection of water drains, storm drains, waste water tanks, etc.
6. Protective fences?
7. Combination with attractive traps: Push-Pull
8. …

Support

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Federal Ministry
for Economic Affairs
and Energy

on the basis of a decision
by the German Bundestag

USAID
FROM THE AMERICAN PEOPLE

The initial research was
supported by USAID

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Reflexa

Thank you!

Biswarup Ganguly - Van de Graaff Generator - Science City - Calcutta 1997 444.JPG - Wikipedia