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Role of temperature and waste type on the development and survivorship of *Hermetia illucens*

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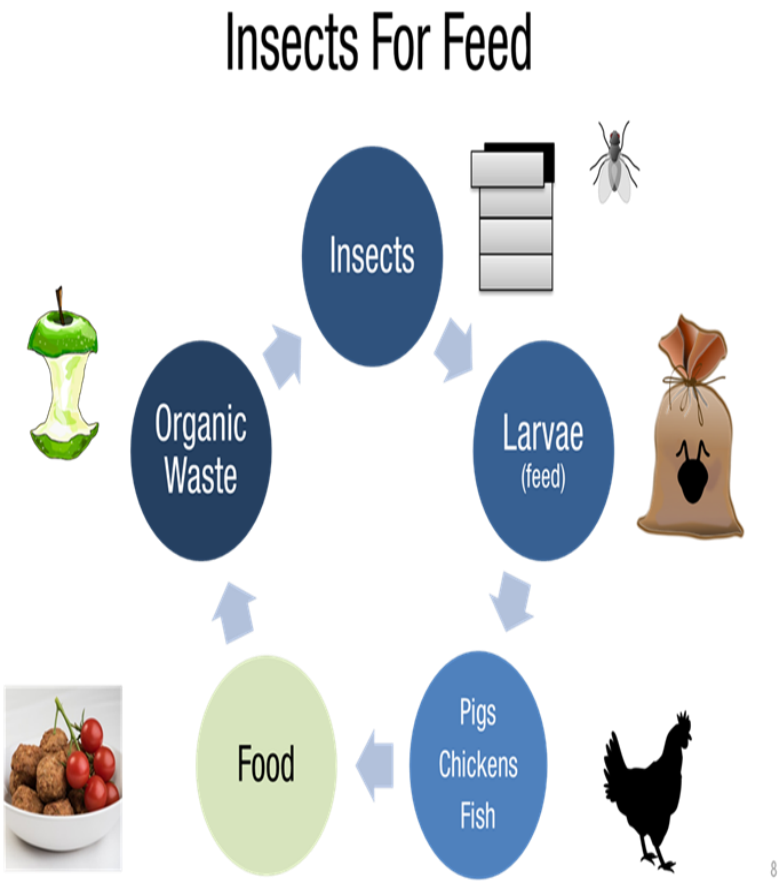
Life cycle of BSF

- Hermetia illucens known as the Black Soldier Fly(BSF).
- Although, originally traced back to the Americas, is currently known to be found in tropical as well as temperate regions across the globe.
- BSF is considered as non-pest and can tolerate extreme temperatures.
- Larvae and adults have contrasting morphological and life habits.

http://bugguide.net/node/view/184752/bgimage

Background

- Many studies demonstrated the use of BSF in waste management and their potential in bio-conversion industries.
- Other studies supported their use for livestock feed and demonstrated their great nutritional quality that is required by livestock for their individual growth.



FAO(2012)

Rearing of BSF on different organic waste streams







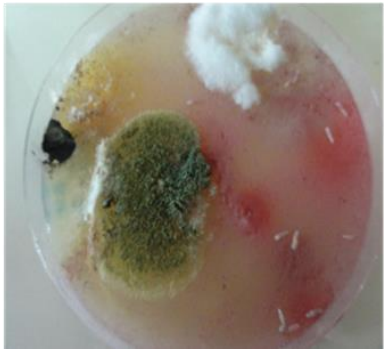
BSF performance on different substrates

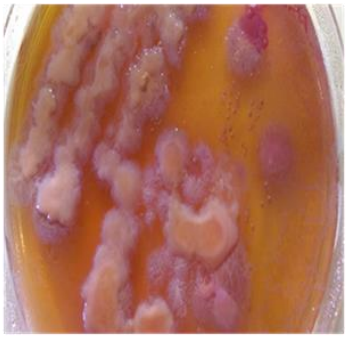
Nutritional quality of BSF reared on different substrates

- Crude Protein
- Fibers
- Minerals
- Amino acids, vitamins and fatty acids.
- Aflatoxins/Mycotoxins
- Pesticide residues

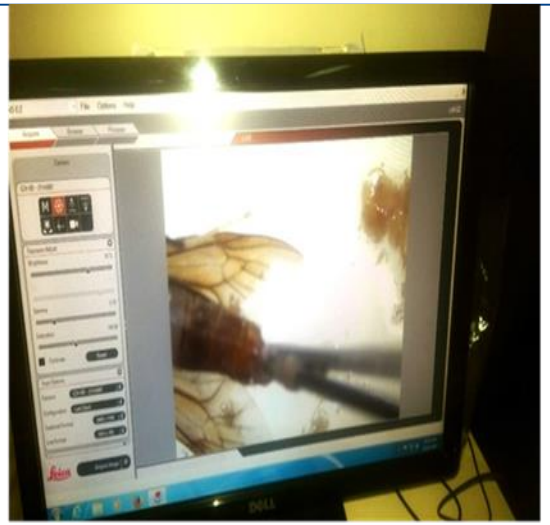


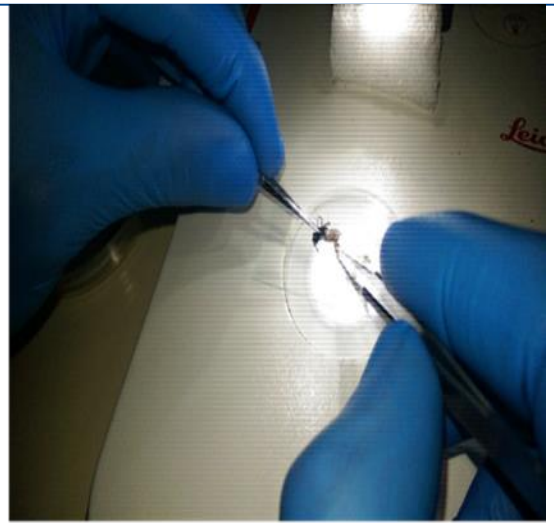

Morpho-identification of BSF performance on elimination of organic waste pathogens

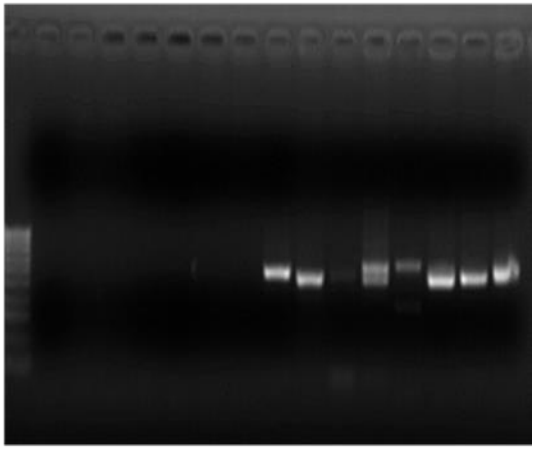




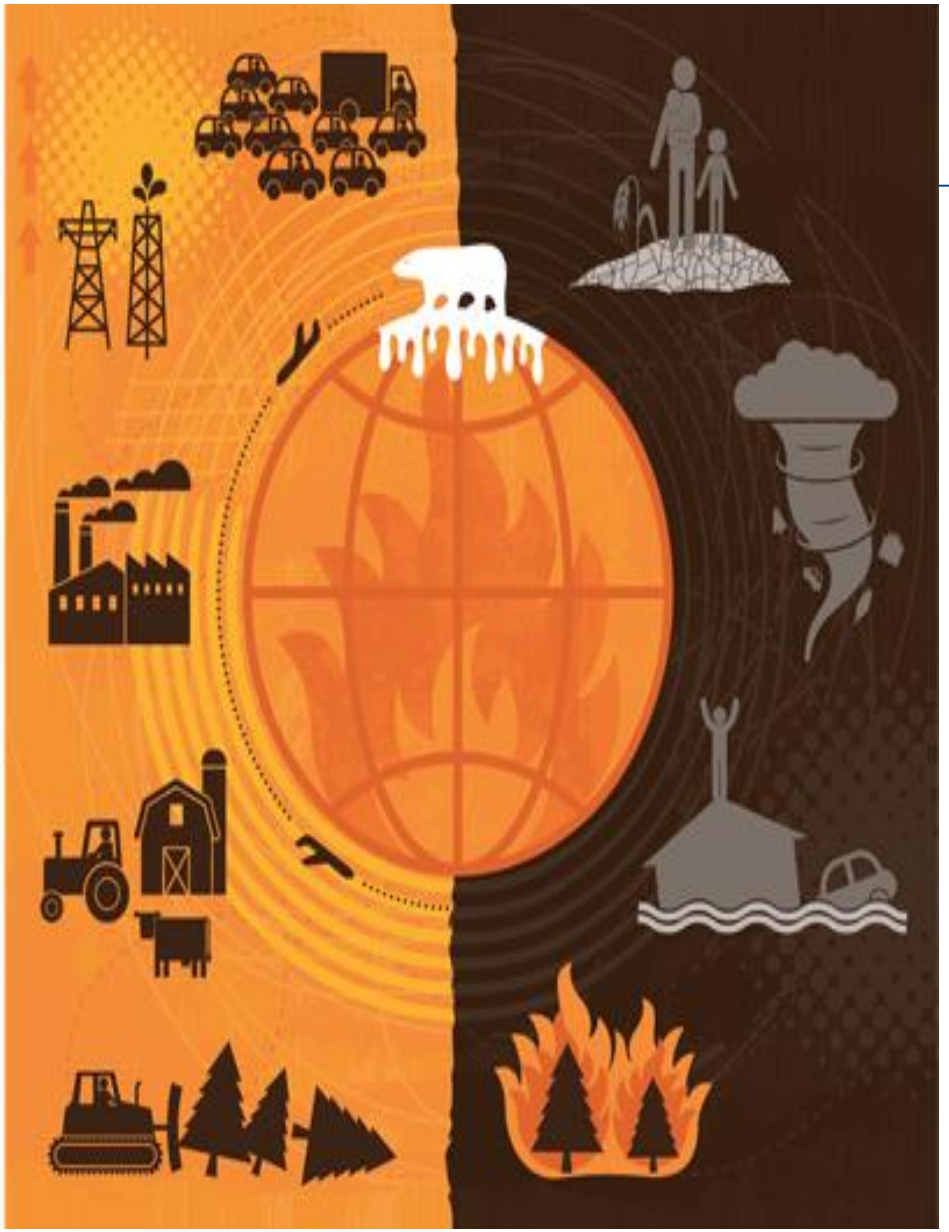
Molecular identification of the microflora of BSF's reared on different organic waste streams







GETTING HOT IN HERE ?



Objective

- Studies looked into the effect of different diets on lab reared BSF and/or the influence of temperature on development and survival of BSF using laboratory prepared diets.
- Or into the influence of organic waste streams as rearing substrates on the development and survival of BSFL.
- Most of these studies were carried on with the aim of understanding and developing BSFL large scale production in the developed world where indoors climate controlled facilities can be established.

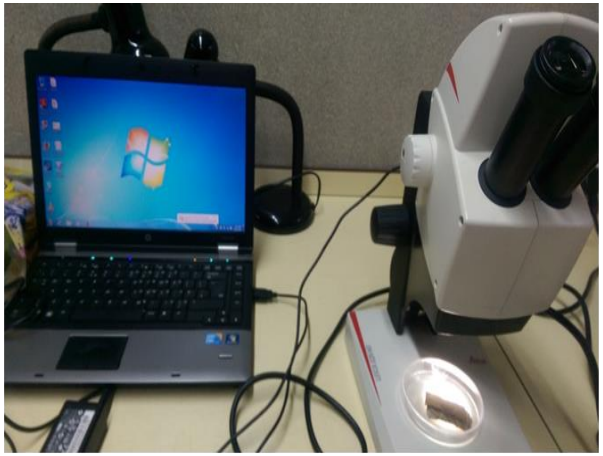
Objective

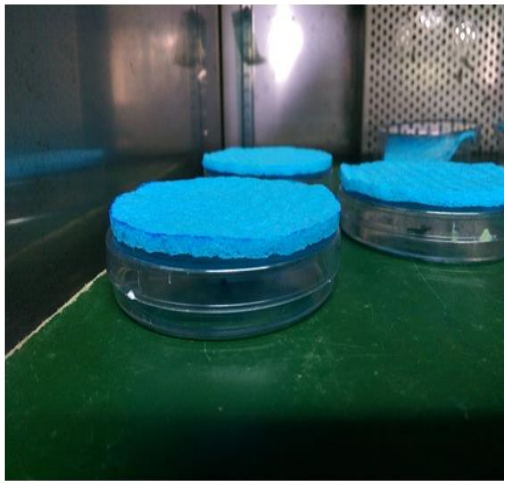
- Therefore this study sought to investigate the influence of increasing temperatures on selected life-history traits of black soldier fly reared on two different and readily available urban organic waste streams.
- This comparison allowed us to determine the most fit out of the two organic waste streams along with the accompanying optimum temperatures.

Preparation of substrate and larvae feeding

- Two different substrates were analyzed: Cow dung (CD) and spent grain (SG).
- Fresh CD collected from a local slaughter house where the bovines were previously fed on wild vegetation diets.
- SG sourced from a local brewery after fermentation of barley in the beer production process.
- The substrates were chosen to on basis that they would be considered for large scale industrial BSFL production in Kenya.

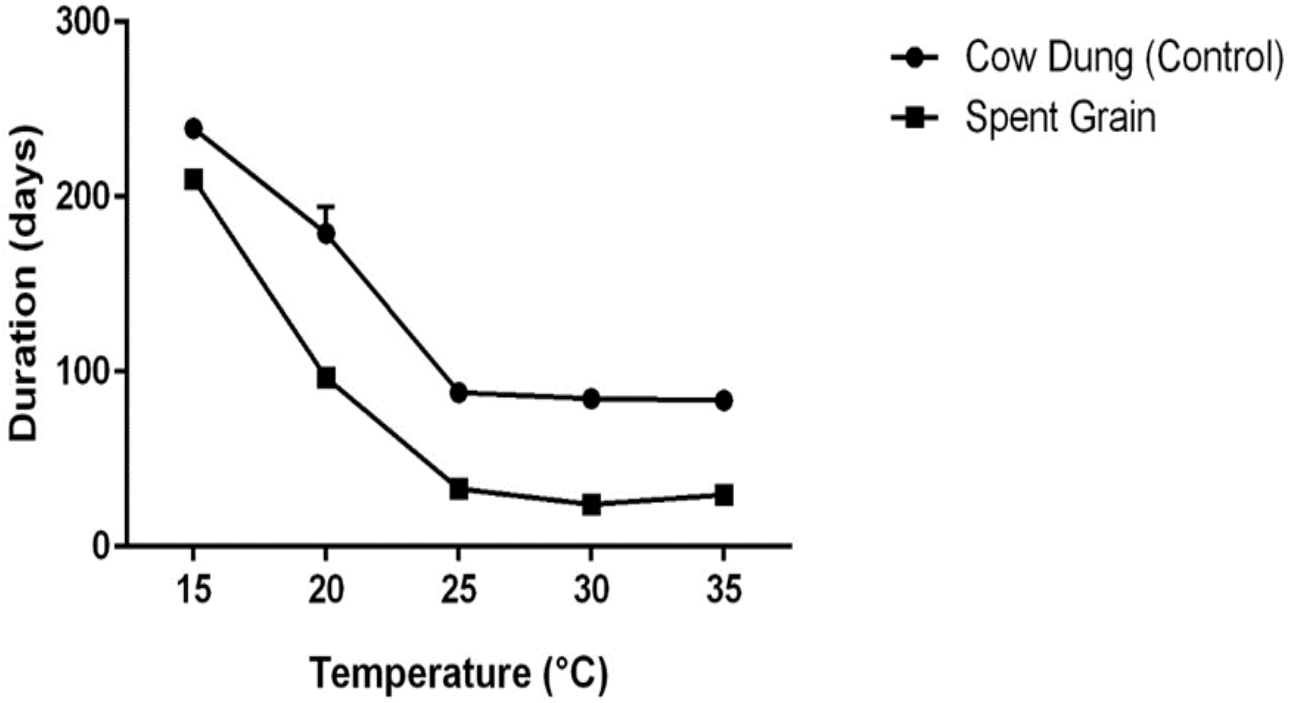
Sourcing of organic waste streams in urban areas of Nairobi: Farmers Choice slaughter house a bovine farm in in Kahawa West in Nairobi where cow dung was collected and Tusker House, Kenya Breweries Ltd. in Nairobi where spent grain was collected.





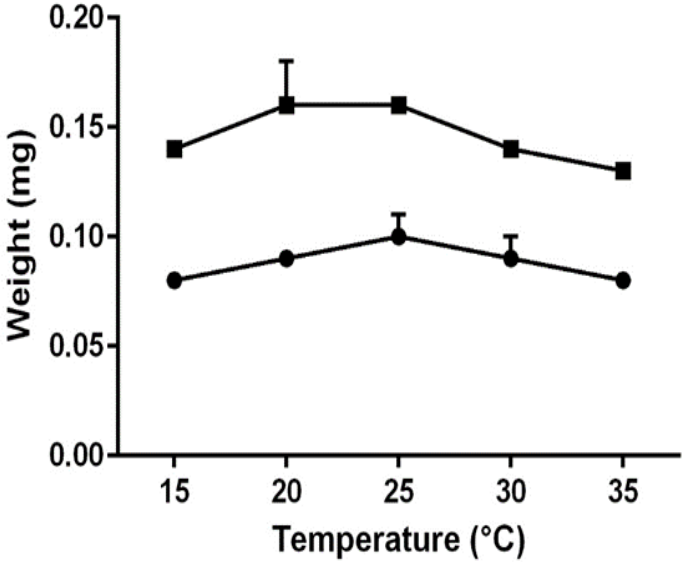
Results

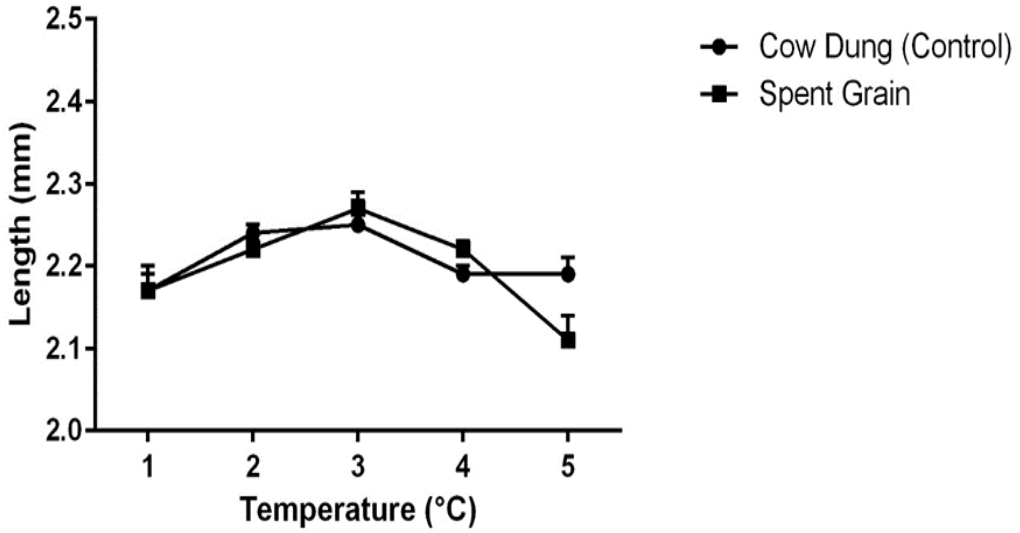
Figure 1. The effect of temperature on the development of BSFL (days) reared on cow dung and spent grain



p value = 0.95

Figure 2. The effect of temperature on the weight and length of BSFL (mg) reared on cow dung and spent grain

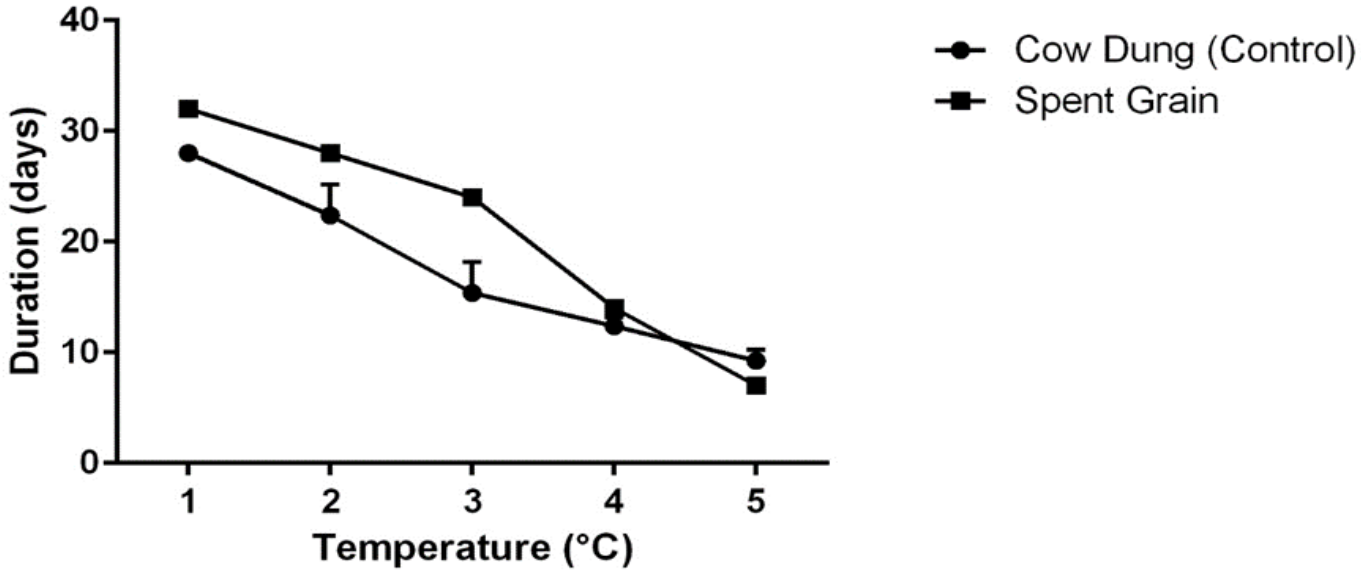




p value = 0.26

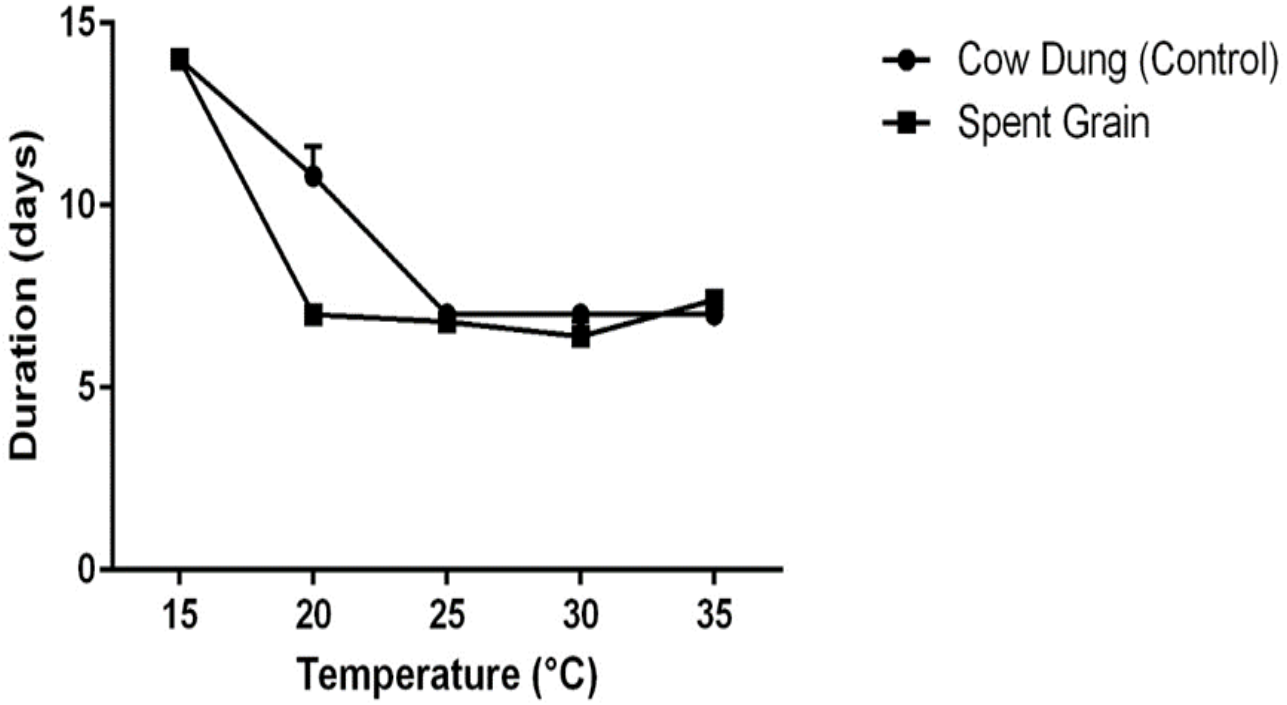
p value = 0.16

Figure 3. The effect of temperature on the emergence of adult BSF (days) reared on cow dung and spent grain



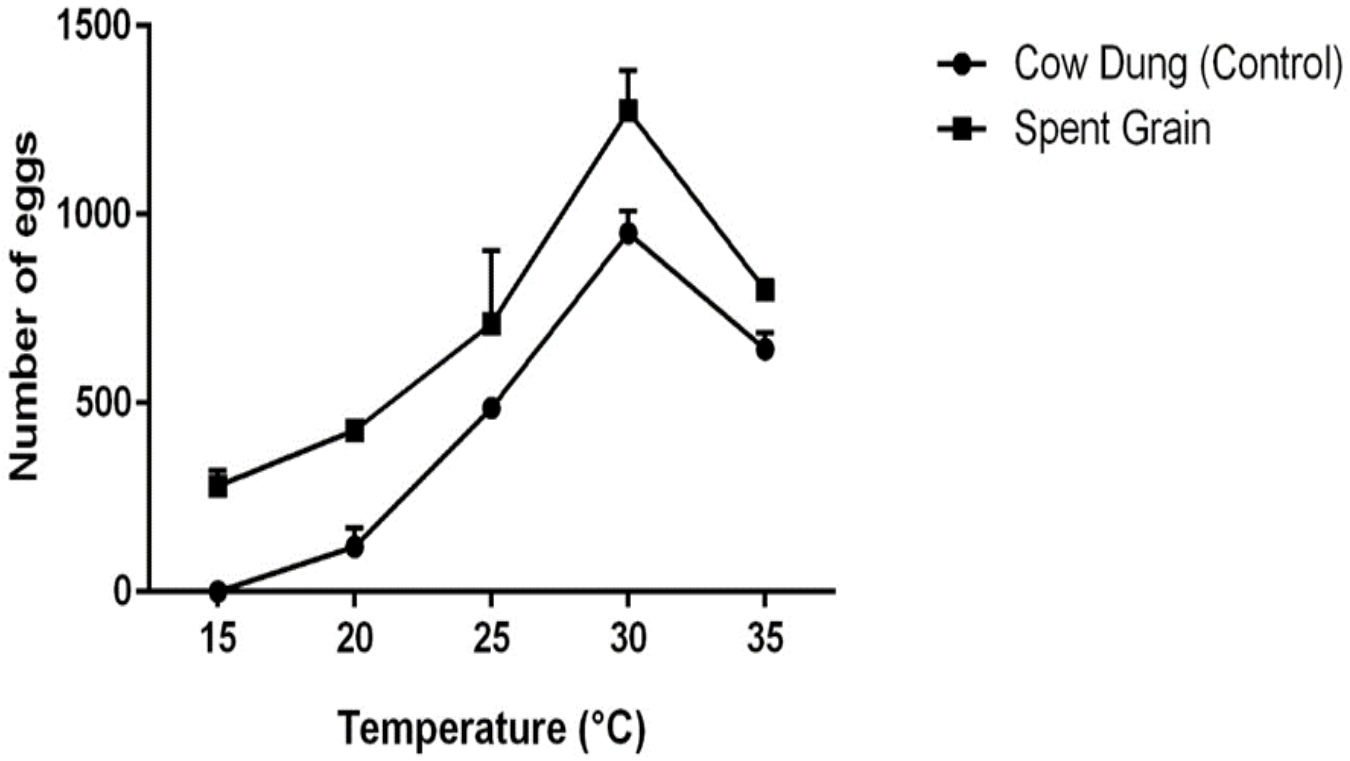
p value = 0.00

Figure 4. The effect of temperature on the longevity of adult BSF (days) reared on cow dung and spent grain



p value = 0.45

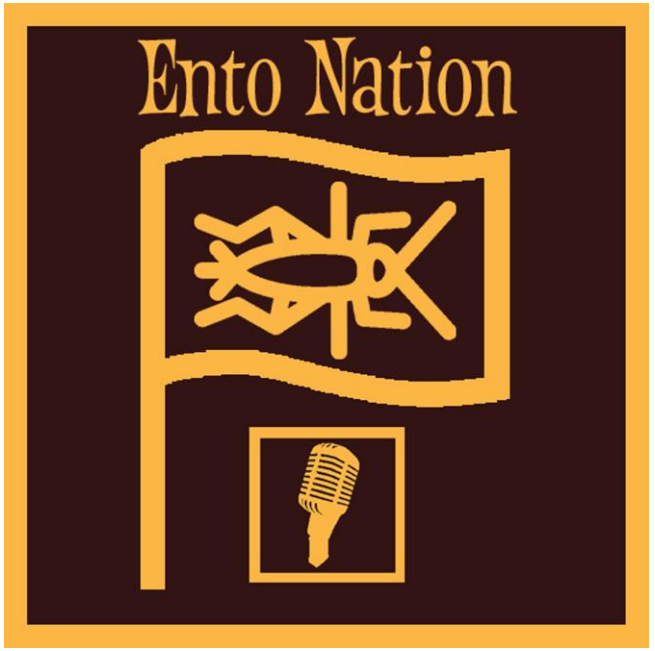
Figure 5. The effect of temperature on the fecundity of adult BSF (no. eggs) reared on cow dung and spent grain



p value = 0.75

Podcast: #28 “Lady of the Flies”

https://entonation.com/podcast-28-lady-of-the-flies-marwa-shumo-black-soldier-fly-expert/

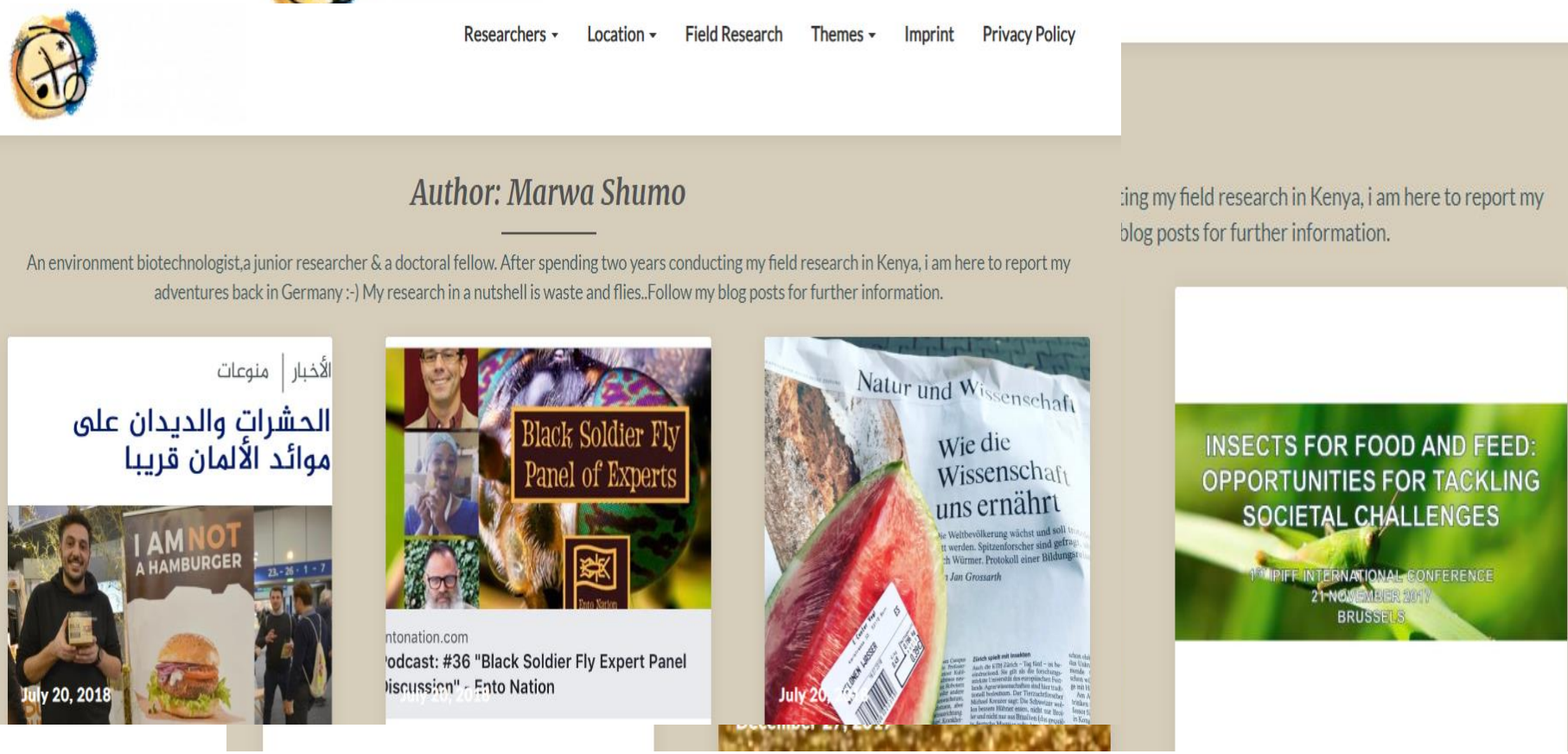


Podcast: #36 “Black Soldier Fly Expert Panel Discussion”

https://entonation.com/podcast-36-black-soldier-fly-expert-panel-discussion/

ZEF's blog

http://blog.zef.de/



Acknowledgments

icipe
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