EXPLORING THE WIND-EVOKED ESCAPE RESPONSE IN COCKROACHES

ABSTRACT

This paper explores the wind-evoked escape response behaviour in cockroaches through the lens of Tinbergen's four questions; adaptation, phylogeny, mechanism and ontogeny. All research for this paper has been compiled through literature reviews into scholarly articles. Research into the adaptation - how the trait increases the fitness of the species - found that the primary reason for the escape response is for the cockroach to escape potential predators. Phylogeny, which looks at how a certain trait evolved, is unclear when considering the wind-evoked escape response. Two potential theories were found, one postulating that the evolution of a thinner cuticle increased the need for the behaviour, and the other attributing it to evolution in wings. The mechanism of the behaviour, which is the underlying biological function, is widely understood through the numerous studies previously conducted. Finally, examining the ontogeny of the behaviour, which is the lifetime development, produced conflicting results. Some studies state that younger cockroaches have a stronger escape response while others state that it is older cockroaches. Further research needs to be conducted into the questions of phylogeny and ontogeny to better understand the behaviour.

ADAPTATION

How a certain behaviour increases the fitness of a species

- Increases the cockroach's chances of survival
- Escape with unpredictable movements
- Insect survives long enough to pass down lineage

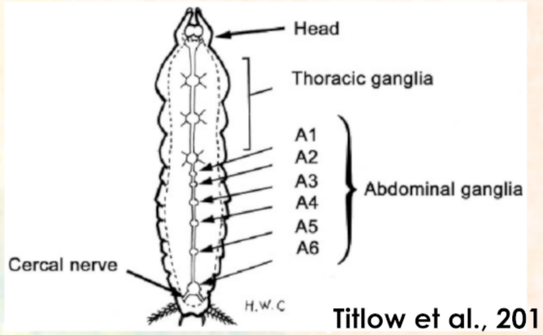
PHYLOGENY

How the evolution in a species gives rise to a certain trait

- Difficult to create accurate phylogenetic tree
- **THEORY 1:** cockroaches with thinner cuticles have stronger escape response
- **THEORY 2:** escape response evolved alongside wings

MECHANISM

Description of underlying biological function



Titlow et al., 2013)

ONTOGENY

Lifetime development of the trait in the species.

- No accurate framework available
- **THEORY 1:** older cockroaches have stronger escape responses
- **THEORY 2:** younger cockroaches have stronger escape responses

CONCLUSION

There is conflcting literature on the ontogeny and phylogeny. Further research would help us to better understand thiis mechanism.

[Gunjan Bhardwaj, HH/PSYC 3280, Animal Behaviour]