

Cannibalism in Insects

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Cannibalism refers to killing and consuming an individual of the same species as food. It is generally known as intraspecific predation, which is best known in predatory species, but it occurs in some detritivores and herbivores as well. Cannibalism is common in carnivorous insects, however, it has also been reported in around 130 noncarnivorous insect species (Richardson *et al.*, 2010). Mainly four types of cannibalism are found in insects *viz.*, i) Infanticide and Ovicide ii) Regulated self-cannibalism (Autophagy) iii) Sexual cannibalism iv) Parental cannibalism. Among these sexual cannibalism is the most common and prevalent wherein a female organism kills and consumes a conspecific male before, during or after copulation (Santana *et al.*, 2012).

Advantages of Cannibalism in insects	Disadvantages of Cannibalism in insects	Factors Affecting Cannibalism
<ul style="list-style-type: none"> Provides a nutritious dinner to the consumer. Able to regulate population density and decrease intraspecific competition in a population. Increase the survival and fecundity of the cannibal and improve their overall body condition. 	<ul style="list-style-type: none"> The transfer of pathogens from the victim to the cannibal is possible and could result in the death of the cannibalistic individual. Cannibals also face the risk of injury or death when attempting to capture their prey, but this risk is usually minimized by the fact that insects tend to prey on individuals smaller than them. There is also the instance of removing potential mates from the population, and reducing the group size which can make the individual more vulnerable to predation. 	<ol style="list-style-type: none"> Density Food Availability of victims Environmental conditions Stress

Alessandra have classified the cannibalism into following types:

A. Based on the survival of the prey:

- i. **Destructive cannibalism:** When the cannibalized individual undergoes injuries or death it is said to be Destructive cannibalism. E.g.: Sexual Cannibalism in Preying mantis where in the females consumes the males completely during copulation.



Preying mantids

- ii. **Non-destructive cannibalism:** When predation does not cause serious damage on the individual that suffered the action it is said to be Non-destructive cannibalism. E.g.: Queens of *Amblyopone silvestrii* ants feed on the larval haemolymph during food shortage.



LHF in *Amblyopone silvestrii* ants

B. Cannibalism can also be classified according to the kinship between cannibal and prey

- Filial Cannibalism: When parents consume the offspring.
- Fraternal Cannibalism: When the individuals consume siblings.
- Heterocannibalism: When no kinship exists between the cannibal and the prey

Polyandry may provide females with benefits that directly affect their condition and fecundity and/or enhance the quality of their offspring. In polyandrous species exhibiting sexual cannibalism, females gain considerable nutritional benefits through consuming a mating partner (Welke and Schneider, 2012). Food, density, physiological stress, behaviour and availability of victim may increase the rate of cannibalism in insects. In general, larger individuals are seeming to be more cannibalistic (Richardson *et al.*, 2010). Barry *et al.* (2008) studied on a moderate size dimorphic species such as praying mantid *Pseudomantis albofimbriata* with relatively larger males benefit the cannibalistic females to gain nutritional benefits to translate into increased fecundity. Here, cannibalistic females substantially improve their body condition and subsequently produce heavier egg cases than their non-cannibalistic counterparts.

Cannibalism can be adaptive by improving growth rate, survivorship, vigour and fecundity. It also plays an important role in regulating population density and suppressing population outbreaks, stabilizing host plant-insect relationships and reducing parasitism rate. Though cannibalism could bring enormous benefits to insects in terms of quality food, reduction of competition and surviving from food shortage, it is still not very common. Cannibalism could be widespread, but not universal.

References

1. Barry, K.L., Holwell, G.I. and Herberstein, M.E. 2008. Female praying mantids use sexual cannibalism as a foraging strategy to increase fecundity. *Behavioral Ecology*, **19**(4): 710-715.
2. Richardson, M.L., Mitchell, R.F., Reagel, P.F. and Hanks, L.M. 2010. Causes and consequences of cannibalism in noncarnivorous insects. *Annual Review of Entomology*, **55**: 39-53.
3. Santana, A.F., Roselino, A.C., Cappelari, A.F. and Zucoloto, F.S. 2012. Cannibalism in insects. *Florida Entomological Society*, **96**(1): 177-194.
4. Welke, K.W. and Schneider, J.M. 2012. Sexual cannibalism benefits offspring survival. *Animal Behaviour*, **83**(1): 201-207