

## It's the thought that counts: valentine's day in the arthropod world

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Everybody wants to make their special someone feel adored come Valentine's day and it's not often you go far wrong with gifting the classic box of chocolates or flowers. Insects and arachnids are also partial to these romantic gestures and appreciate when an ambitious male can bring something else to the table (sometimes literally!). The tokens offered by males to females are called 'nuptial gifts' and serve to increase a male's chance of mating with a female...sound familiar?

One hypothesis for the evolution of the nuptial gift is believed to be linked to mate choice. Nuptial gifts can act as an indicator of male fitness as there is a cost to hunting and not consuming prey and instead giving it away. This indicates to females that those with better gifts are likely to have better genes and produce stronger offspring [1,2]. An alternative hypothesis has been suggested for species prone to cannibalism. It is thought that the nuptial gift reduces the rate of sexual cannibalism as the male distracts the female with the gift as they mate [3].

Nuptial gifts are typically classified as either endogenous (produced by the male) or exogenous (collected by the male) [4]. Exogenous gifts are typically a prey item which the male has hunted or scavenged. Before attempting to mate with the female they will present this token to increase their chances of wooing her. Spiders which adopt this gift giving strategy will take the time to wrap the prey items in silk before they deliver the prey to the female. Whilst this may seem courteous of the males, it means that sneaky (or savvy) males can take advantage and offer much less valuable tokens whilst still satisfying female expectations [5,6,7]. This could include carcasses of the male's last meal. As the gift is wrapped and mating happens relatively quickly, by the time the female realises she has been duped with a worthless gift the male has already begun mating [8,7]. In the species *Pisaura mirabilis* (nursery web spider), males which offer the worthless gifts typically copulate for shorter times if the female unwraps her gift revealing his poor effort [8,9]. The nursery web spider has also been observed 'playing dead' after presenting his gift so as to avoid cannibalism and as the female unwraps the present the male will spring back into action to copulate [10].

Insects tend to offer endogenous gifts which they make themselves rather than picking something off the shelf like the arachnids. The endogenous gift favoured by most species comes in the form of spermatophores which carry the sperm along with nutrients for the females [4]. In species which do not feed as adults the spermatophore can play an important role in reproduction as females receiving more nutritional gifts will produce fitter offspring [11].

Many species of katydids and crickets have evolved a more elaborate two part spermatophore which the female will eat rather than absorb. The part which is consumed is called the spermatophylax and after copulation has occurred the female will be able to gain the nutritional benefits of the gift [12]. In some species the male has specialised glands on their back which the female may dine on and in other species of crickets' males will even allow the female to chow down on a modified leg spur to consume their blood [13,4].

Scorpionflies take a slightly different approach with their gifts. Males will produce a 'spit ball' using their enlarged salivary glands which exudes pheromones which act as an attractant for females. Once the female locates a male they will feed on these nutrient rich spit balls whilst copulation takes place and males with the largest spit balls will mate for longer. If a male does not have the resources to create a salivary mass for his partner then he will offer a prey item as a consolation prize and males can be quite thrifty in re-using the prey for other females although this does impact their success [14,4].

The benefit for females receiving gifts seems fairly obvious, an increase in fitness. For males however, the gifts often use up many of their own resources. Besides increasing their chance of attracting a female there are a few subtle side effects of receiving nuptial gifts which may be of benefit to males. In some species, spermatophores contain compounds which reduce a female's receptivity from other males giving the first male a higher chance of passing on his genes to the next generation. Some gifts may not actually have much benefit to females and in the case of *Drosophila melanogaster* (fruit fly) the gift accelerates reproduction at the expense of shortening the female's lifespan [4].

So, next time you give your loved one a gift, remember it's the thought that counts. Although I would avoid the insect carcasses.

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