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Do Insects Reproduce Asexually?

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INTRODUCTION

In insects, sexual reproduction is widespread, although single-individual reproduction is also frequent. Asexual reproduction happens when a single female or hermaphroditic creature produces offspring without the involvement of a male.

Parthenogenesis: Most insect orders have at least one species that reproduces asexually through **PARTHENOGENESIS**. Unfertilized eggs develop into embryos without the involvement of a male, frequently resulting in genetic clones of the mother. When males aren't present, this happens to numerous stick insects in the Phasmatodea order. Some parthenogenic stick insects' reproductive cells go through meiosis, which results in haploid cells. These subsequently fuse together to return the cells to their original diploid state, however the cells' genomes will be somewhat altered due to the cross-over processes that occur during meiosis. Other stick insects' reproductive cells never go through meiosis, which resulting in offspring who are genetically identical to their parents. Both of these modes of parthenogenesis have been observed in other insects and creatures.

Parthenogenesis combined with oviparous sexual reproduction is a feature of several complicated insect life cycles, such as that of many aphid species. Female aphids make genetic clones by reproducing asexually in ideal environmental conditions. In this instance, aphid populations can quickly expand in order to take advantage of the high-quality plant host. To add to the complication, the newborn aphid daughters already have growing embryos inside of them, making a pregnant mother aphid also an expecting grandma! While conditions are favourable, these offspring are created through viviparous parthenogenesis for numerous generations.

Female aphids begin to generate males by removing one of the X chromosomes from their offspring's genome as temperatures drop and photoperiods shorten, and many aphids revert to oviparous reproduction at this time. Male aphids are absent for the majority of the year and only appear at particular seasons of the year. This shift from asexual to sexual reproduction allows groups to mix genetically. **Holocyclic** reproduction is characterised by periods of asexual reproduction interspersed with times of sexual reproduction.

Parthenogenesis can also be seen in Hymenoptera. Male hymenopterans are born from unfertilized eggs, whilst females are born from fertilised eggs. Male hymenopterans are haploid because they are born from unfertilized eggs with only one set of chromosomes. Like most creatures, the fertilised eggs from which females develop are all diploid and have two sets of chromosomes. **Haplodiploidy** is the name for this type of sex determination mechanism.

Polyembryony: Other odd reproductive techniques are used by a tiny number of insects. POLYEMBRYONY is an unusual mechanism of reproduction found primarily in endoparasitic insects. A single egg separates into numerous embryos in this scenario, the same mechanism that produces identical twins in adults. This occurs in some parasitoid wasp species, when the ovipositing wasp expends minimal energy to create a large number of progeny within the parasitized host. Furthermore, because the parasitic wasp only needs to oviposit once to create a large number of offspring in the host, she is less vulnerable to predation and other hazards.

The number of embryos that can be created from a single egg can range from 10 to over one thousand! The embryos created from the initial egg do not get their nutrition from the egg yolk; instead, they get all of their energy from the parasitic host. When the larvae reach the end of their development, they leave the host and weave a silken pupal case from which a free-living adult emerges.

Paedogenesis: Another unusual reproductive technique involves juveniles who have children of their own because children these days grow up so quickly. Some insects shorten their life cycles by reproducing while still in the larval stage, skipping the pupal and adult stages. Insects with reproductively mature juveniles create progeny through PAEDOGENESIS, and these juveniles rarely grow into adults. Individuals who are paedogenic are frequently parthenogenic and viviparous.

Paedogenesis, like parthenogenesis in aphids, could be part of a complex life cycle in which adult females are only generated under certain conditions and most reproduction takes place in female larvae. In the Cecidomyiidae family of gall midges, this form of reproductive technique has evolved several times (Order Diptera). The reproductive system of paedogenic gall midge larvae matures quicker than the rest of the body, allowing eggs to be laid during the larval stage, or occasionally during the pupal stage. Because a female gall midge may govern the sex ratio of her own offspring, the eggs generated may result in male or female offspring. When female gall midge larvae are exposed to inadequate conditions, they can reproduce through paedogenesis or metamorphosis into adults, which may benefit the individuals. Male gall midge larvae are always able to complete their life cycles and become adults. The paedogenic progeny of some gall midges develop within the mother larva and eat her before emerging into the external world.

Most species of the parasitic order Strepsiptera (twisted-wing parasites), as well as beetles in the genus *Platerodrilus* (trilobite beetles), reproduce exclusively in the larval stage. Females never metamorphosis into adults in these groupings, and only males experience an adult dispersal stage. We can see from these and other situations that paedogenesis is not confined to asexual reproduction, but can also include sexual reproduction.

As previously stated, depending on the time of year, aphids can be parthenogenic and display viviparity. Because newborn aphid daughters already have their own growing embryos, they are paedogenic! They have paedogenic viviparous parthenogenesis, which implies they can produce children. These reproductive techniques aren't mutually exclusive, as you can see from this example.

Hermaphroditism: The fourth unusual kind of insect reproduction we'll explore is HERMAPHRODITISM, which happens when both male and female reproductive structures are present in a single organism. Because each individual possesses both male and female reproductive systems, hermaphroditic insects may fertilise themselves. Sexual reproduction between people happens in this reproductive method as well, analogous to paedogenesis.

Hermaphroditism is a rather uncommon reproductive strategy in insects, despite its widespread appearance in vertebrates. This is not to be confused with gynandromorphism, which occurs when a person possesses both female and male traits but not necessarily both functional reproductive systems. Only a few species of scale insects of the genus *Icera*, a group of hemipteran insects that are frequently horticultural and agricultural pests, are functioning hermaphrodites. True males are exceedingly rare in these insects, with the majority of the population being functioning hermaphrodites that self-fertilize.