SEX DETERMINATION IN HONEYBEE:

In bees, wasps and ants, sex is determined by a haploid-diploid mechanism. In honey bees, the sperms are stored in a special receptacle in the female after mating, and remain available for fertilization when eggs are laid, throughout the remainder of her life. When she lays an egg in a worker cell, sperms are emitted to fertilize the egg. When the queen comes to a drone cell, sperm are not released.

Fertilized eggs produce diploid females, while unfertilized eggs develop parthenogenetically to produce haploid but fertile males. Since all males are haploid, meiosis in the male is anomalous, and does not reduce the chromosome number. In other words, the male bees produce sperm by mitosis rather than meiosis, yielding one functional sperm per spermatocyte.

In honeybee, there are two kinds of females - workers and the queen. The queen is fertile and lays eggs, but the workers are sterile. Genetically, the queen and the workers are same. They differ in their morphology and fertility due to the kind of food received by the larvae. Larvae destined to become queens are fed "royal jelly", a food rich in vitamins. The honeybee thus provides a good example of the difference between sex determination and sex differentiation. Thus, though both the queen and workers are genetically female, the workers differentiate into sterile individuals and the queens become functional females. This modification is due to the influence of environmental factors. Hence, sex is determined at the time of fertilization, but subsequent events may modify or even inhibit normal sex differentiation.