Reproduction  
Main article: Canine reproduction  
  
Female dog nursing newborn puppies  
In domestic dogs, sexual maturity happens around six to twelve months of age for both males and females,[17][68] although this can be delayed until up to two years old for some large breeds. This is the time at which female dogs will have their first estrous cycle. They will experience subsequent estrous cycles semiannually, during which the body prepares for pregnancy. At the peak of the cycle, females will come into estrus, being mentally and physically receptive to copulation.[17] Because the ova survive and are capable of being fertilized for a week after ovulation, it is possible for more than one male to sire the same litter.[17]  
  
Fertilization typically occurs 2–5 days after ovulation; 14–16 days after ovulation, the embryo attaches to the uterus, and after 7-8 more days the heart beat is detectable.[69][70]  
  
Dogs bear their litters roughly 58 to 68 days after fertilization,[17][71] with an average of 63 days, although the length of gestation can vary. An average litter consists of about six puppies,[72] though this number may vary widely based on the breed of dog. In general, toy dogs produce from one to four puppies in each litter, while much larger breeds may average as many as twelve.  
  
Some dog breeds have acquired traits through selective breeding that interfere with reproduction. Male French Bulldogs, for instance, are incapable of mounting the female. For many dogs of this breed, the female must be artificially inseminated in order to reproduce.[73]  
  
Neutering  
  
A feral dog from Sri Lanka nursing very well-developed puppies  
Neutering refers to the sterilization of animals, usually by removal of the male's testicles or the female's ovaries and uterus, in order to eliminate the ability to procreate and reduce sex drive. Because of the overpopulation of dogs in some countries, many animal control agencies, such as the American Society for the Prevention of Cruelty to Animals (ASPCA), advise that dogs not intended for further breeding should be neutered, so that they do not have undesired puppies that may later be euthanized.[74]  
  
According to the Humane Society of the United States, 3–4 million dogs and cats are euthanized each year in the United States and many more are confined to cages in shelters because there are many more animals than there are homes. Spaying or castrating dogs helps keep overpopulation down.[75] Local humane societies, SPCAs, and other animal protection organizations urge people to neuter their pets and to adopt animals from shelters instead of purchasing them.  
  
Neutering reduces problems caused by hypersexuality, especially in male dogs.[76] Spayed female dogs are less likely to develop some forms of cancer, affecting mammary glands, ovaries, and other reproductive organs.[77] However, neutering increases the risk of urinary incontinence in female dogs,[78] and prostate cancer in males,[79] as well as osteosarcoma, hemangiosarcoma, cruciate ligament rupture, obesity, and diabetes mellitus in either sex.[80]  
  
Inbreeding depression  
A common breeding practice for pet dogs is mating between close relatives (e.g. between half- and full siblings).[81] Inbreeding depression is considered to be due largely to the expression of homozygous deleterious recessive mutations.[82] Outcrossing between unrelated individuals, including dogs of different breeds, results in the beneficial masking of deleterious recessive mutations in progeny.[83]  
  
In a study of seven breeds of dogs (Bernese mountain dog, basset hound, Cairn terrier, Epagneul Breton, German Shepherd dog, Leonberger, and West Highland white terrier) it was found that inbreeding decreases litter size and survival.[84] Another analysis of data on 42,855 dachshund litters found that as the inbreeding coefficient increased, litter size decreased and the percentage of stillborn puppies increased, thus indicating inbreeding depression.[85] In a study of boxer litters, 22% of puppies died before reaching 7 weeks of age.[86] Stillbirth was the most frequent cause of death, followed by infection. Mortality due to infection increased significantly with increases in inbreeding.[86]  
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