[Template:About](/wiki/Template:About" \o "Template:About) [Template:Redirect4](/wiki/Template:Redirect4) [Template:Pp-move-indef](/wiki/Template:Pp-move-indef) [Template:Taxobox](/wiki/Template:Taxobox)

**Foxes** are small-to-medium-sized, [omnivorous](/wiki/Omnivorous) [mammals](/wiki/Mammal) belonging to several [genera](/wiki/Genera) of the family [Canidae](/wiki/Canidae). Foxes are slightly smaller than a medium-size domestic [dog](/wiki/Dog), with a flattened skull, upright triangular ears, a pointed, slightly upturned [snout](/wiki/Snout), and a long bushy [tail](/wiki/Tail) (or *brush*).

Twelve [species](/wiki/Species) belong to the [monophyletic](/wiki/Monophyly) group of [*Vulpes*](/wiki/Vulpes) genus of "true foxes". Approximately another 25 current or [extinct](/wiki/Extinction) species are always or sometimes called foxes; these foxes are either part of the [paraphyletic](/wiki/Paraphyly) group of the South American foxes, or of the outlying group, which consists of bat-eared fox, gray fox, and island fox.[[1]](#cite_note-1) Foxes are found on every continent except Antarctica. By far the most common and widespread species of fox is the [red fox](/wiki/Red_fox) (*Vulpes vulpes*) with about 47 recognized [subspecies](/wiki/Subspecies).<ref name=Lloyd1980>[Template:Cite book](/wiki/Template:Cite_book)</ref> The global distribution of foxes, together with their widespread reputation for cunning, has contributed to their prominence in [popular culture](/wiki/Popular_culture) and [folklore](/wiki/Folklore) in many societies around the world. The hunting of foxes with packs of hounds, long an established pursuit in Europe, especially in the [British Isles](/wiki/British_Isles), was exported by European settlers to various parts of the [New World](/wiki/New_World).

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## Etymology[[edit](/index.php?title=(none)&action=edit&section=1)]

The word *fox* comes from [Old English](/wiki/Old_English_language), which derived from [Proto-Germanic](/wiki/Proto-Germanic) \**fuhsaz*.[Template:Refn](/wiki/Template:Refn) This in turn derives from [Proto-Indo-European](/wiki/Proto-Indo-European_language) \**puḱ-* ‘thick-haired; tail’.[Template:Refn](/wiki/Template:Refn) Male foxes are [known as](/wiki/List_of_animal_names) dogs, tods or [reynards](/wiki/Reynard), females as vixens, and young as cubs, pups, or kits. A group of foxes is referred to as a skulk, leash, or earth.[[2]](#cite_note-2)

## Biology[[edit](/index.php?title=(none)&action=edit&section=2)]

[thumb|Fox skeleton](/wiki/Image:FoxSkelLyd1.png)

### General morphology[[edit](/index.php?title=(none)&action=edit&section=3)]

Foxes are generally smaller than other members of the family [Canidae](/wiki/Canidae) such as [wolves](/wiki/Gray_wolf), [jackals](/wiki/Jackal), and domestic [dogs](/wiki/Dog). For example, in the largest species, the [red fox](/wiki/Red_fox), males weigh on average between [Template:Convert](/wiki/Template:Convert),<ref name=Lariviere1996>[Template:Cite journal](/wiki/Template:Cite_journal)</ref> while the smallest species, the [fennec fox](/wiki/Fennec_fox), weighs just [Template:Convert](/wiki/Template:Convert).<ref name=nobleman>[Template:Cite book](/wiki/Template:Cite_book)</ref> Fox-like features typically include a triangular face, pointed ears, an elongated [rostrum](/wiki/Rostrum_(anatomy)), and a bushy tail. Foxes are [digitigrade](/wiki/Digitigrade), and thus, walk on their toes. Unlike their dog relatives, foxes have partially retractable claws.<ref name=Burrows>[Template:Cite book](/wiki/Template:Cite_book)</ref> Fox [vibrissae](/wiki/Vibrissae), or whiskers, are black. The whiskers on the muzzle, mystaciae vibrissae, average 100-110mm long, while the whiskers everywhere else on the head average to be shorter in length. Whiskers (carpal vibrissae) are also found on the forelimbs and average to be 40mm long, pointing downward and backward.[[3]](#cite_note-3) Other physical characteristics vary according to habitat and its adaptive significance.

### Pelage[[edit](/index.php?title=(none)&action=edit&section=4)]

Fox species differ in fur color, length, and density. Coat colors range from pearly white to black and white to black flecked with white or grey on the underside. [Fennec foxes](/wiki/Fennec_fox) (and other species of fox adapted to life in the desert, such as [kit foxes](/wiki/Kit_fox)), for example, have large ears and short fur to aid in keeping the body cool.[[3]](#cite_note-3)[[4]](#cite_note-4) [Arctic foxes](/wiki/Arctic_fox), on the other hand, have tiny ears and short limbs as well as thick, insulating fur, which aid in keeping the body warm.[[5]](#cite_note-5) [Red foxes](/wiki/Red_fox), by contrast, have a typical [auburn](/wiki/Auburn_hair) [pelt](/wiki/Fur), the tail normally ending with white [marking](/wiki/Animal_markings).[[6]](#cite_note-6) A fox's coat color and texture may vary due to the change in seasons; fox pelts are richer and denser in the colder months and lighter in the warmer months. To get rid of the dense winter coat, foxes [moult](/wiki/Moult) once a year around April; the process begins from the feet, up the legs, and then along the back.[[4]](#cite_note-4) Coat color may also change as the individual ages.[[3]](#cite_note-3)

### Dentition[[edit](/index.php?title=(none)&action=edit&section=5)]

A fox's [dentition](/wiki/Dentition), like all other canids, is I 3/3, C 1/1, PM 4/4, M 3/2 = 42. (Bat-eared foxes have six extra molars, totaling in 48 teeth.) Foxes have pronounced [carnassial](/wiki/Carnassial) pairs, which is characteristic of a [carnivore](/wiki/Carnivore). These pairs consist of the upper premolar and the lower first molar, and work together to shear tough material like flesh. Foxes' canines are pronounced, also characteristic of a carnivore, and are excellent in gripping prey.<ref name=Teeth>[Template:Cite web](/wiki/Template:Cite_web)</ref>

### Behavior[[edit](/index.php?title=(none)&action=edit&section=6)]

[right|thumb|](/wiki/File:Alopex_lagopus_coiled_up_in_snow.jpg)[Arctic fox](/wiki/Arctic_fox) curled up in snow In the wild, the typical lifespan of a fox is one to three years, although individuals may live up to ten years. Unlike many canids, foxes are not always pack animals. Typically, they live in small family groups, but some ([Arctic foxes](/wiki/Arctic_fox)) are known to be solitary.[[3]](#cite_note-3)[[4]](#cite_note-4) Foxes are omnivores.[[7]](#cite_note-7)[[8]](#cite_note-8) The diet of foxes is largely made up of [invertebrates](/wiki/Invertebrate) such as insects, and small [vertebrates](/wiki/Vertebrate) such as reptiles and birds, and can include eggs and plants. Many species are generalist predators, but some (such as the [crab-eating fox](/wiki/Crab-eating_fox)) have more specialized diets. Most species of fox consume around [Template:Convert](/wiki/Template:Convert) of food every day. Foxes [cache](/wiki/Cache_(biology)) excess food, burying it for later consumption, usually under leaves, snow, or soil.[[4]](#cite_note-4)[[9]](#cite_note-9) Foxes tend to use a pouncing technique where they crouch down to [camouflage](/wiki/Camouflage) themselves in the terrain, then using their hind legs, leap up with great force to land on top of their targeted prey.[[3]](#cite_note-3) Using their pronounced canine teeth, foxes grip on to their prey's neck and either shake until the prey is dead, or until the animal can be disemboweled.[[3]](#cite_note-3) The [gray fox](/wiki/Gray_fox) is one of only two canine species known to climb trees; the other is the [raccoon dog](/wiki/Raccoon_dog).

### Sexual characteristics[[edit](/index.php?title=(none)&action=edit&section=7)]

The male fox's [scrotum](/wiki/Scrotum) is held close to the body with the [testes](/wiki/Testes) inside even after they descend. Like other canines, the male fox has a [baculum](/wiki/Baculum), or penile bone.[[3]](#cite_note-3) The testes of [red foxes](/wiki/Red_fox) are smaller than those of Arctic foxes.[[10]](#cite_note-10) [Sperm formation](/wiki/Spermatogenesis) in red foxes begins in August–September, with the testicles attaining their greatest weight in December–February.[[11]](#cite_note-11) Vixens are in heat for one to six days, making their reproductive cycle twelve months long. As with other canines, the [ova](/wiki/Egg_cell) are shed during [estrus](/wiki/Estrus) without the need for the stimulation of copulating. Once the egg is fertilized, the vixen enters a period of [gestation](/wiki/Gestation) that can last from 52 to 53 days. Foxes tend to have an average litter size of four to five with an 80 percent success rate in becoming pregnant.[[3]](#cite_note-3)[[12]](#cite_note-12) Litter sizes can vary greatly according to species and environment[Template:Spaced ndashthe](/wiki/Template:Spaced_ndash) [Arctic fox](/wiki/Arctic_fox), for example, can have up to eleven kits.[[13]](#cite_note-13) The vixen has four pairs of teats. Each teat has 8 to 20 [lactiferous ducts](/wiki/Lactiferous_duct), which connect the mammary gland to the nipple, allowing for milk to be carried to the nipple.

### Vocalization[[edit](/index.php?title=(none)&action=edit&section=8)]

The fox's vocal repertoire is vast:

* Whine - Made shortly after birth. Occurs at a high rate when kits are hungry and when their body temperatures are low. Whining stimulates the mother to care for her young; it also has been known to stimulate the male fox into caring for his mate and kits.
* Yelp - Made about 19 days later. The kits' whining turns into infantile barks, yelps, which occur heavily during play.
* Explosive call - At the age of about one month, the kits can emit an explosive call which is intended to be threatening to intruders or other cubs; a high pitch howl.
* Combative call - In adults, the explosive call becomes an open-mouthed combative call during any conflict; a sharper bark.
* Growl - An adult fox's indication to their kits to feed or head to the adult's location.
* Bark - Adult foxes warn against intruders and in defense by barking.[[3]](#cite_note-3)<ref name=Tembrock>[Template:Cite journal](/wiki/Template:Cite_journal)</ref>

In the case of domesticated foxes, the whining seems to remain in adult individuals as a sign of excitement and submission in the presence of their owners.[[3]](#cite_note-3)

## Classification[[edit](/index.php?title=(none)&action=edit&section=9)]

Canids commonly known as foxes include the following genera and species:[[3]](#cite_note-3)

|  |  |  |
| --- | --- | --- |
| **Genus** | **Species** | **Picture** |
| [*Canis*](/wiki/Canis) | [Ethiopian wolf](/wiki/Ethiopian_wolf), sometimes called the Simien fox or Simien jackal | [thumb|](/wiki/File:Canis_simensis_.jpg)[Ethiopian wolf](/wiki/Ethiopian_wolf), native to the Ethiopian highlands |
| [*Cerdocyon*](/wiki/Cerdocyon) | Crab-eating fox | [thumb|](/wiki/File:Cerdocyon_thous_MG_9503.jpg)[Crab-eating fox](/wiki/Crab-eating_fox), a South American species |
| † [*Dusicyon*](/wiki/Dusicyon) | [extinct](/wiki/Extinction) [genus](/wiki/Genus), including the [Falkland Islands wolf](/wiki/Falkland_Islands_wolf), sometimes known as the Falklands Islands fox | [thumb|](/wiki/File:FalklandIslandFox2.jpg) [Falkland Islands wolf](/wiki/Falkland_Islands_wolf) Illustration by [John Gerrard Keulemans](/wiki/John_Gerrard_Keulemans) (1842–1912) |
| [*Lycalopex*](/wiki/Lycalopex) | * [Culpeo](/wiki/Culpeo) or Andean fox * [Darwin's fox](/wiki/Darwin's_fox) * [South American gray fox](/wiki/South_American_gray_fox) * [Pampas fox](/wiki/Pampas_fox) * [Sechuran fox](/wiki/Sechuran_fox) * [Hoary fox](/wiki/Hoary_fox) | [thumb|A](/wiki/File:fox_pan_de_azucar.JPG) [South American gray fox](/wiki/South_American_gray_fox) in [Pan de Azúcar National Park](/wiki/Pan_de_Azúcar_National_Park) in the coast of Atacama Desert |
| [*Otocyon*](/wiki/Otocyon) | Bat-eared fox | [thumb|](/wiki/File:Bat_eared_fox_Kenya_crop.jpg)[Bat-eared fox](/wiki/Bat-eared_fox) in [Kenya](/wiki/Kenya) |
| [*Urocyon*](/wiki/Urocyon) | * [Gray fox](/wiki/Gray_fox) * [Island fox](/wiki/Island_fox) * [Cozumel fox](/wiki/Cozumel_fox) (undescribed) | [thumb|](/wiki/File:Urocyon_littoralis_full_figure.jpg)[Island fox](/wiki/Island_fox) (*Urocyon littoralis*), in the [Channel Islands](/wiki/Channel_Islands_of_California), California, US |
| [*Vulpes*](/wiki/Vulpes) | * [Arctic fox](/wiki/Arctic_fox) * [Bengal fox](/wiki/Bengal_fox) * [Blanford's fox](/wiki/Blanford's_fox) * [Cape fox](/wiki/Cape_fox) * [Corsac fox](/wiki/Corsac_fox) * [Fennec fox](/wiki/Fennec_fox) * [Kit fox](/wiki/Kit_fox) * [Pale fox](/wiki/Pale_fox) * [Rüppell's fox](/wiki/Rüppell's_fox) * [Red fox](/wiki/Red_fox) * [Swift fox](/wiki/Swift_fox) * [Tibetan sand fox](/wiki/Tibetan_sand_fox) | [thumb|The](/wiki/File:Fennec_Fox.jpg) [fennec fox](/wiki/Fennec_fox) is the smallest species of fox |

[thumb|Red fox](/wiki/Image:Räv_vid_Revhusen_i_Ystad_-_Juli_2012..jpg)

## Conservation[[edit](/index.php?title=(none)&action=edit&section=10)]

[right|thumb|The](/wiki/Image:Urocyon_littoralis_pair.jpg) [island fox](/wiki/Island_fox) is a [near-threatened species](/wiki/Near-threatened_species) Several fox species are [endangered](/wiki/Endangered_species) in their native environments. Pressures placed on foxes include habitat loss and being hunted for pelts, other trade, or control.[[14]](#cite_note-14) Due in part to their opportunistic hunting style and industriousness, foxes are commonly resented as nuisance animals.[[15]](#cite_note-15) On the other hand, foxes, while often considered pests themselves, have been successfully employed to control pests on fruit farms while leaving the fruit intact.[[16]](#cite_note-16)

### Island fox (''Urocyon littoralis'')[[edit](/index.php?title=(none)&action=edit&section=11)]

The [island fox](/wiki/Island_fox), though considered a [near-threatened species](/wiki/Near-threatened_species) throughout the world, is becoming increasingly endangered in its [endemic](/wiki/Endemic) environment of the [California Channel Islands](/wiki/California_Channel_Islands).[[17]](#cite_note-17) A population on an island is smaller than those on the mainland because of limited resources like space, food and shelter.[[18]](#cite_note-18) Island populations, therefore, are highly susceptible to external threats ranging from introduced predatory species and humans to extreme weather.[[18]](#cite_note-18) On the California Channel Islands, it was found that the population of the island fox was so low due to an outbreak of [canine distemper virus](/wiki/Canine_distemper_virus) from 1999 to 2000[[19]](#cite_note-19) as well as predation by non-native [golden eagles](/wiki/Golden_eagles).[[20]](#cite_note-20) Since 1993, the eagles have caused the population to decline by as much as 95%.[[19]](#cite_note-19) Because of the low number of foxes, the population went through an [Allee effect](/wiki/Allee_effect); this is where at low enough densities, an individual's [fitness](/wiki/Fitness_(biology)) decreases.[[17]](#cite_note-17) Conservationists, therefore, had to take healthy breeding pairs out of the wild population to breed them in captivity until they had enough foxes to release back into the wild.[[19]](#cite_note-19) Nonnative grazers were also removed so that native plants would be able to grow back to their natural height, thereby providing adequate cover and protection for the foxes against golden eagles.[[20]](#cite_note-20)

### Darwin's fox (''Pseudalopex fulvipes'')[[edit](/index.php?title=(none)&action=edit&section=12)]

[Darwin's fox](/wiki/Darwin's_fox) is considered [critically endangered](/wiki/Critically_endangered) because of their small known population of 250 mature individuals as well as their restricted distribution.<ref name=Jimenez2006>[Template:Cite journal](/wiki/Template:Cite_journal)</ref> On the [Chilean](/wiki/Chile) mainland, the population is limited to [Nahuelbuta National Park](/wiki/Nahuelbuta_National_Park) and the surrounding [Valdivian rainforest](/wiki/Valdivian_temperate_rainforest).<ref name=Jimenez2006/> Similarly on [Chiloé Island](/wiki/Chiloé_Island), their population is limited to the forests that extend from the southernmost to the northwestern most part of the island.<ref name=Jimenez2006/> Though the Nahuelbuta National Park is protected, 90% of the species live on Chiloé Island.<ref name=iucn41586>[Template:IUCN2014.1](/wiki/Template:IUCN2014.1)</ref> A major problem the species faces, therefore, is their dwindling, limited habitat due to the cutting and burning of the unprotected forests.<ref name=Jimenez2006/> Because of deforestation, the Darwin's fox habitat is shrinking, allowing for their competitor's ([chilla fox](/wiki/South_American_gray_fox)) preferred habitat of open space, to increase; the Darwin's fox, subsequently, is being outcompeted.<ref name=Yahnke1996>[Template:Cite journal](/wiki/Template:Cite_journal)</ref> Another problem they face is their inability to fight off diseases transmitted by the increasing number of pet dogs.<ref name=Jimenez2006/> To conserve these animals, researchers suggest the need for the forests that link the Nahuelbuta National Park to the coast of Chile and in turn Chiloé Island and its forests, to be protected.<ref name=Yahnke1996/> They also suggest that other forests around Chile be examined to determine whether Darwin's foxes have previously existed there or can live there in the future, should the need to reintroduce the species to those areas arise.<ref name=Yahnke1996/> And finally, the researchers advise for the creation of a captive breeding program, in Chile, because of the limited number of mature individuals in the wild.<ref name=Yahnke1996/>

## Relationships with humans[[edit](/index.php?title=(none)&action=edit&section=13)]

[thumb|A](/wiki/File:Sunny_Fox.jpg) [red fox](/wiki/Red_fox) on the porch of a house. Foxes are often considered pests or nuisance creatures for their opportunistic attacks on poultry and other small livestock. Fox attacks on humans are not common.[[21]](#cite_note-21)Many foxes adapt well to human environments, with several species classified as "resident urban carnivores" for their ability to sustain populations entirely within urban boundaries.[[22]](#cite_note-22) Foxes in urban areas can live longer and can have smaller litter sizes than foxes in non-urban areas.[[22]](#cite_note-22) Urban foxes are ubiquitous in Europe, where they show altered behaviors compared to non-urban foxes, including increased population density, smaller territory, and pack foraging.[[23]](#cite_note-23) Foxes have been introduced in numerous locations, with varying effects on indigenous flora and fauna.[[24]](#cite_note-24)

### Fox hunting[[edit](/index.php?title=(none)&action=edit&section=14)]

[Template:Main](/wiki/Template:Main) Fox hunting originated in the [United Kingdom](/wiki/United_Kingdom) in the 16th century. Hunting with dogs is now banned in the United Kingdom,[[25]](#cite_note-25)[[26]](#cite_note-26)[[27]](#cite_note-27)[[28]](#cite_note-28) though hunting without dogs is still permitted. Red foxes were [introduced into Australia](/wiki/Red_foxes_in_Australia) in the early 19th century for sport, and have since become widespread through much of the country. They've caused population decline among many native species and prey on livestock, especially new lambs.[[29]](#cite_note-29) Fox hunting is practiced as recreation in several other countries including Canada, France, Ireland, Italy, [Russia](/wiki/Russia) and the United States.

### Domestication[[edit](/index.php?title=(none)&action=edit&section=15)]

[thumb|250px|A tame fox in](/wiki/File:A_tame_fox_cub_at_home_with_Mr_and_Mrs_Gordon_Jones,_Talysarn_(4478261667).jpg) [Talysarn, Wales](/wiki/Talysarn,_Wales)

[Template:See also](/wiki/Template:See_also) There are many records of [domesticated red foxes](/wiki/Red_fox#Taming_and_domestication) and others, but rarely of sustained domestication. A recent and notable case is the Russian silver fox,[[30]](#cite_note-30) which resulted in visible and behavioral changes, and is a case study of an animal population modeling according to human domestication needs. The current group of domesticated silver foxes are the result of nearly fifty years of experiments in the Soviet Union and Russia to domesticate the silver morph of the red fox. This selective breeding resulted in physical and behavioral traits appearing that are frequently seen in domestic cats, dogs, and other animals, such as pigmentation changes, floppy ears, and curly tails.[[31]](#cite_note-31) Notably, the new foxes became more tame, allowing themselves to be petted, whimpering to get attention and sniffing and licking their caretakers.<ref name=mason>Kenneth Mason, Jonathan Losos, Susan Singer, Peter Raven, George Johnson(2011)*Biology Ninth Edition*, p. 423. McGraw-Hill, New York.ISBN 978-0-07-353222-6.</ref>

### Urban foxes[[edit](/index.php?title=(none)&action=edit&section=16)]

[Template:Main](/wiki/Template:Main) Foxes, particularly red foxes, have been inhabiting and breeding in human-populated areas since the twentieth century. They have adapted well to these environments, taking advantage of man-made features such as houses and gardens to create dens. For sustenance, they take advantage of food thrown away by humans. In some cases, human residents will feed foxes that frequent their local area. In this sense, a benign relationship has been established in which foxes have become comfortable and amiable toward the humans who, while becoming their providers, do not much mind the presence of the foxes. However, for some, urban foxes have proven to be a nuisance due to their intrusion and destruction of private property. Urban fox control methods and laws vary regionally.[[32]](#cite_note-32)

### In culture[[edit](/index.php?title=(none)&action=edit&section=17)]

[Template:Main](/wiki/Template:Main)

The fox appears in many cultures, usually in [folklore](/wiki/Folklore). However, there are slight variations in their depictions in folklore. In Western folklore and also in Persian folklore, foxes are depicted as a symbol of cunning and [trickery](/wiki/Trickery) – a reputation derived especially from their reputed ability to evade hunters. This is usually represented as a character possessing these traits. These traits are used on a wide variety of characters, either making them a nuisance to the story, a misunderstood hero, or a devious villain.

In Asian folklore, foxes are depicted as a [familiar spirit](/wiki/Familiar_spirit) possessed of magic powers. Similar to Western folklore, foxes are depicted as mischievous, usually tricking other people, with the ability to [disguise as an attractive female human](/wiki/Human_disguise). However, there are other depictions of foxes as a mystical, sacred creature, that can either bring wonder or ruin.[[33]](#cite_note-33) [Nine-tailed foxes](/wiki/Nine-tailed_fox) appear in Chinese folklore, literature, and mythology, in which, depending on the tale can be a good or a bad omen.[[34]](#cite_note-34) The motif was eventually introduced from Chinese to Japanese and Korean cultures.[[35]](#cite_note-35) The constellation [Vulpecula](/wiki/Vulpecula) represents a fox.[[36]](#cite_note-36) In some countries, foxes are major predators of rabbits and hens. Population oscillations of these two species were the first nonlinear oscillation studied, and led to the now-famous [Lotka-Volterra equation](/wiki/Lotka-Volterra_equation).[[37]](#cite_note-37)[[38]](#cite_note-38)

## Notes[[edit](/index.php?title=(none)&action=edit&section=18)]

[Template:Reflist](/wiki/Template:Reflist)

## References[[edit](/index.php?title=(none)&action=edit&section=19)]

[Template:Reflist](/wiki/Template:Reflist)

## External links[[edit](/index.php?title=(none)&action=edit&section=20)]

[Template:Commons](/wiki/Template:Commons) [Template:Wiktionary](/wiki/Template:Wiktionary) [Template:Wikiquote](/wiki/Template:Wikiquote)

* [BBC Wales Nature: Fox videos](http://www.bbc.co.uk/wales/nature/mediaexplorer/?theme_group=species&theme=mammals&set=fox)
* [The fox website](http://www.thefoxwebsite.org/)
* [Template:Wikisource-inline](/wiki/Template:Wikisource-inline)

[Template:Authority control](/wiki/Template:Authority_control)

[Category:Foxes](/wiki/Category:Foxes)