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**Pangolins** (also referred to as **scaly anteaters** or **trenggiling**) are mammals of the order **Pholidota**. The one extant family, **Manidae**, has three genera: *Manis*, which comprises four species living in [Asia](/wiki/Asia), *Phataginus*, which comprises two species living in [Africa](/wiki/Africa), and *Smutsia*, which comprises two species also living in Africa.[[1]](#cite_note-1) These species range in size from [Template:Convert](/wiki/Template:Convert). A number of extinct pangolin species are also known. The name pangolin comes from the [Malay](/wiki/Malay_language) word "pengguling", meaning "something that rolls up". It is found in tropical regions throughout Africa and Asia.

Pangolins have large, protective [keratin](/wiki/Keratin) scales covering their skin; they are the only known mammals with this adaptation. They live in hollow trees or burrows, depending on the species. Pangolins are [nocturnal](/wiki/Nocturnal), and their diet consists of mainly ants and termites which they capture using their long, specially adapted tongues. They tend to be solitary animals, meeting only to mate and produce a litter of one to three offspring which are raised for about two years. Pangolins are threatened by hunting (for their meat and armor) and heavy [deforestation](/wiki/Deforestation) of their natural habitats, and are the most trafficked mammal in the world.[[2]](#cite_note-2) Of the eight species of pangolin, four species (*Phataginus tetradactyla*, *P. tricuspis*, *Smutsia gigantea*, and *S. temminckii*) are listed as vulnerable, two species (*Manis crassicaudata* and *M. cullonensis*) are listed as endangered, and two species (*M. pentadactyla* and *M. javanica*) are listed as critically endangered on the [IUCN](/wiki/IUCN) [Red List of Threatened Species](/wiki/Red_List_of_Threatened_Species).[[3]](#cite_note-3)

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

The physical appearance of a pangolin is marked by large, hardened, overlapping plate-like scales. The scales, which are soft on newborn pangolins but harden as the animal matures, are made of [keratin](/wiki/Keratin), the same material of which human fingernails and [tetrapod](/wiki/Tetrapod) [claws](/wiki/Claw#Tetrapods) are made. The pangolin's scaled body is comparable to a [pine cone](/wiki/Conifer_cone) or [globe artichoke](/wiki/Globe_artichoke). It can curl up into a ball when threatened, with its overlapping scales acting as [armour](/wiki/Armour_(zoology)) and its face tucked under its tail. The scales are sharp, providing extra defense.[[4]](#cite_note-4) The front claws are so long they are unsuited for walking, so the animal walks with its fore paws curled over to protect them.

Pangolins can also emit a noxious-smelling chemical from [glands](/wiki/Gland) near the anus, similar to the spray of a [skunk](/wiki/Skunk).[[5]](#cite_note-5) They have short legs, with sharp claws which they use for burrowing into termite and ant mounds, as well as climbing.[[6]](#cite_note-6) The size of pangolins varies by species, ranging from [Template:Convert](/wiki/Template:Convert). Females are [generally smaller](/wiki/Sexual_dimorphism) than males.

The tongues of pangolins are extremely elongated and extend into the [abdominal](/wiki/Abdominal) cavity. Like those of the [giant anteater](/wiki/Giant_anteater) and the [tube-lipped nectar bat](/wiki/Tube-lipped_nectar_bat), they are not attached to their [hyoid](/wiki/Hyoid) bone and extend past their [pharynx](/wiki/Pharynx) deep into the [thorax](/wiki/Thorax).[[7]](#cite_note-7) This extension lies between the [sternum](/wiki/Sternum) and the [trachea](/wiki/Vertebrate_trachea). Large pangolins can extend their tongues as much as [Template:Convert](/wiki/Template:Convert), with a diameter of only [Template:Convert](/wiki/Template:Convert).<ref name=Mondadori/>

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

Most pangolins are [nocturnal](/wiki/Nocturnal) animals that use their well-developed sense of smell to find insects. The [long-tailed pangolin](/wiki/Long-tailed_pangolin) is also active by day, while other species of pangolins spend most of the daytime sleeping, curled up into a ball.<ref name=Mondadori>[Template:Cite book](/wiki/Template:Cite_book)</ref>

[Arboreal](/wiki/Arboreal) pangolins live in hollow trees, whereas the ground dwelling species dig tunnels underground, to a depth of [Template:Convert](/wiki/Template:Convert).<ref name=Mondadori/> Pangolins are also good swimmers.<ref name=Mondadori/>

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

[thumb|left|](/wiki/File:Pangolin_defending_itself_from_lions_(Gir_Forest,_Gujarat,_India).jpg)[Indian pangolin](/wiki/Indian_pangolin) defending itself against [Asiatic lions](/wiki/Asiatic_lions) Pangolins are [insectivorous](/wiki/Insectivory). Most of their diet consists of various species of ants and termites and may be supplemented by other insects, especially larvae. They are somewhat particular and tend to consume only one or two species of insects, even when many species are available to them. A pangolin will consume an average of [Template:Convert](/wiki/Template:Convert) of insects per day.[[8]](#cite_note-8) Pangolins have a very poor sense of [vision](/wiki/Visual_perception), and therefore rely heavily on [smell](/wiki/Olfaction) and [hearing](/wiki/Hearing). After locating their prey, they tear open the [anthills](/wiki/Ant_colony) or [termite mounds](/wiki/Termite_mound) with their powerful front claws. Their front claws are so large that their front feet are not useful for walking. The animal uses its long tail to counterbalance its torso as it walks on its two hind legs. After tearing open the ant or termite mound, it uses its long tongue to probe inside the insect tunnels and retrieve its prey. They have glands in their chests to lubricate the tongue with sticky, ant-catching saliva. The tongue extends all the way into a cavity of the abdomen and is longer than the pangolin's entire body length. Pangolins lack teeth and, therefore, the ability to chew, however, they ingest small stones while foraging, which accumulate in the muscular stomach and help to grind up ants.

Some species, such as the [tree pangolin](/wiki/Tree_pangolin), use their strong, [prehensile](/wiki/Prehensile) tails to hang from tree branches and strip away bark from the trunk, exposing insect nests inside.

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

Pangolins are solitary and meet only to mate. Males are larger than females, weighing up to 50% more. While there is no defined mating season, they typically mate once each year, usually during the summer or autumn months. Rather than the males seeking out the females, males mark their location with urine or feces and the females will find them. If there is competition over a female, the males will use their tails as clubs to fight for the opportunity to mate with her.[[9]](#cite_note-9) Gestation lasts for approximately 120–150 days. African pangolin females usually give birth to a single offspring at a time, but the Asiatic species may give birth from one to three.<ref name=Mondadori/> Weight at birth is [Template:Convert](/wiki/Template:Convert) and the average length is [Template:Convert](/wiki/Template:Convert). At the time of birth, the scales are soft and white. After several days, they harden and darken to resemble those of an adult pangolin. During the vulnerable stage, the mother stays with her offspring in the burrow, nursing it, and will wrap her body around it if she senses danger. The young cling to the mother's tail as she moves about, although in burrowing species, they remain in the burrow for the first two to four weeks of life. At one month, they first leave the burrow riding on the mother's back. [Weaning](/wiki/Weaning) takes place at approximately three months of age, at which stage the young begin to eat insects in addition to nursing. At two years of age, the offspring are sexually mature and are abandoned by the mother.<ref name=EoM>[Template:Cite book](/wiki/Template:Cite_book)</ref>

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

[thumb|upright|A coat of](/wiki/File:Coat_of_Pangolin_scales.JPG) [armor](/wiki/Armor) made of pangolin scales, an unusual object, was presented to [George III](/wiki/George_III_of_the_United_Kingdom) in 1820 Pangolins are hunted and eaten in many parts of Africa and are one of the more popular types of [bush meat](/wiki/Bush_meat). They are also in great demand in Southern [China](/wiki/China) and [Vietnam](/wiki/Vietnam) because their meat is considered a delicacy and some believe that pangolin scales have medicinal qualities.[[10]](#cite_note-10)[[11]](#cite_note-11)[[12]](#cite_note-12)[[13]](#cite_note-13) This, coupled with [deforestation](/wiki/Deforestation), has led to a large decrease in the numbers of [giant pangolins](/wiki/Giant_pangolin). In November 2010, pangolins were added to the [Zoological Society of London's](/wiki/Zoological_Society_of_London) list of genetically distinct and endangered mammals.[[14]](#cite_note-14) All eight species of pangolin are classified by the [IUCN](/wiki/IUCN) as threatened to extinction, while two are classified as [critically endangered](/wiki/Critically_endangered).[[11]](#cite_note-11)[[15]](#cite_note-15) Though pangolins are protected by an international ban on their trade, populations have suffered from illegal trafficking due to unfounded beliefs in East Asia that their ground-up scales can stimulate lactation or cure cancer or asthma.[[16]](#cite_note-16) In the past decade there have been numerous seizures of illegally trafficked pangolin and pangolin meat in Asia.[[17]](#cite_note-17)[[18]](#cite_note-18)[[19]](#cite_note-19)[[20]](#cite_note-20) In one such incident in April 2013, [Template:Convert](/wiki/Template:Convert) of pangolin meat was seized from a Chinese vessel that ran aground in the Philippines.[[21]](#cite_note-21)[[22]](#cite_note-22)

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

As a result of increasing threats to pangolins, mainly in the form of illegal, international trade in pangolin skin, scales, and meat, these species have received increasing conservation attention in recent years. For example, in 2014, the [IUCN](/wiki/International_Union_for_Conservation_of_Nature) (International Union for the Conservation of Nature) re-categorised all eight species of pangolin on its [Red List of Threatened Species](/wiki/IUCN_Red_List), and each species is now threatened with extinction.[[23]](#cite_note-23) Also, the [IUCN SSC Pangolin Specialist Group](http://www.pangolinsg.org/) launched a global action plan to conserve pangolins, dubbed 'Scaling up Pangolin Conservation' in July 2014.

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

[thumb|](/wiki/File:Tree_Pangolin.JPG)[Tree pangolin](/wiki/Tree_pangolin) [thumb|](/wiki/File:Zoo_Leipzig_-_Chinesisches_Ohrenschuppentier.jpeg)[Chinese pangolin](/wiki/Chinese_pangolin) Pangolins were formerly classified with various other orders, for example [Xenarthra](/wiki/Xenarthra), which includes the ordinary [anteaters](/wiki/Anteater), [sloths](/wiki/Sloth), and the similar-looking [armadillos](/wiki/Armadillo). Newer genetic evidence, however, indicates their closest living relatives are the [Carnivora](/wiki/Carnivora) with which they form the clade [Ferae](/wiki/Ferae).[[24]](#cite_note-24)[[25]](#cite_note-25) Some palaeontologists placed [Ernanodonta](/wiki/Ernanodon) in a separate suborder of Cimolesta near [Pholidota](/wiki/Pholidota),[[26]](#cite_note-26) have classified the pangolins in the order [Cimolesta](/wiki/Cimolesta), together with several extinct groups indicated (†) below, though this idea has fallen out of favor since cimolestids have been determined to have not been placental mammals.[[27]](#cite_note-27) Until recently, all species of pangolin had been attributed to the genus *Manis*. Recent research has supported the splitting of pangolins into three genera: *Manis*, *Phataginus*, and *Smutsia*.[[1]](#cite_note-1) [Template:Laurasiatheria Cladogram](/wiki/Template:Laurasiatheria_Cladogram)

* **ORDER PHOLIDOTA**[[28]](#cite_note-28)[[29]](#cite_note-29)\*\* Genus †[*Arcticanodon dawsonae*](/wiki/Arcticanodon) Rose, Eberle & McKenna 2004
  + Genus †[*Melaniella timosa*](/wiki/Melaniella) Fox 1984
  + Genus †[*Molaetherium*](/wiki/Molaetherium) Heissig 1982
  + Family †[Escavadodontidae](/wiki/Escavadodontidae) *Rose & Lucas 2000*
    - Genus †[*Escavadodon zygus*](/wiki/Escavadodon) Rose & Lucas 2000
  + Family †[Epoicotheriidae](/wiki/Epoicotheriidae) Simpson 1927
    - Genus †[*Amelotabes simpsoni*](/wiki/Amelotabes) Rose 1978
    - Genus †[*Alocodontulum atopum*](/wiki/Alocodontulum) (Rose, Bown & Simons 1977) Rose, Bown & Simons 1978 [[*Alocodon*](/wiki/Alocodon) Rose, Bown & Simons 1977 non Thulborn 1973; [*Alocodon atopum*](/wiki/Alocodon_atopum) Rose, Bown & Simons 1977; [*Tubulodon atopum*](/wiki/Tubulodon_atopum) (Rose, Bown & Simons 1977) Rose et al. 1991] Genus †[*Auroratherium sinense*](/wiki/Auroratherium) Tong & Wamg 1997
    - Genus †[*Pentapassalus*](/wiki/Pentapassalus) Gazin 1952
      * Species †[*P. pearcei*](/wiki/Pentapassalus_pearcei) Gazin 1952 [[*Tubulodon pearcei*](/wiki/Tubulodon_pearcei) (Gazin 1952) Rose et al. 1991]
      * Species †[*P. woodi*](/wiki/Pentapassalus_woodi) (Guthrie 1967) Rose 1978 [[*Palaeanodon woodi*](/wiki/Palaeanodon_woodi) Guthrie 1967; [*Tubulodon woodi*](/wiki/Tubulodon_woodi) (Guthrie 1967) Rose et al. 1991]
    - Genus †[*Dipassalus oryctes*](/wiki/Dipassalus) Rose, Krishtalka & Stucky 1991
    - Genus †[*Tetrapassalus*](/wiki/Tetrapassalus) Simpson 1959a
      * Species †[*T. mckennai*](/wiki/Tetrapassalus_mckennai) Simpson 1959a
      * Species †[*T. proius*](/wiki/Tetrapassalus_proius) West 1973c
    - Genus †[*Epoicotherium unicum*](/wiki/Epoicotherium) (Douglass 1904) Simpson 1927 [[*Xenotherium*](/wiki/Xenotherium) Douglass 1906 non Ameghino 1904; [*Pseudochrysochloris*](/wiki/Pseudochrysochloris) Turnbull & Reed 1967; [*Xenotherium unicum*](/wiki/Xenotherium_unicum) Douglass 1905; [*Pseudochrysochloris yoderensis*](/wiki/Pseudochrysochloris_yoderensis) Turnbull & Reed 1967] Genus †[*Tubulodon taylori*](/wiki/Tubulodon) Jepsen 1932
    - Genus †[*Xenocranium pileorivale*](/wiki/Xenocranium) Colbert 1942
  + Family †[Metacheiromyidae](/wiki/Metacheiromyidae) Wortman 1903
    - Genus †[*Propalaeanodon schaffi*](/wiki/Propalaeanodon) Rose 1979
    - Genus †[*Palaeanodon*](/wiki/Palaeanodon) Matthew 1918
      * Species †[*P. parvulus*](/wiki/Palaeanodon_parvulus) Matthew 1918
      * Species †[*P. ignavus*](/wiki/Palaeanodon_ignavus) Matthew 1918
      * Species †[*P. nievelti*](/wiki/Palaeanodon_nievelti) Gingerich 1989
    - Genus †[*Brachianodon westorum*](/wiki/Brachianodon) Gunnell & Gingerich 1993
    - Genus †[*Mylanodon rosei*](/wiki/Mylanodon) Secord et al. 2002
    - Genus †[*Metacheiromys*](/wiki/Metacheiromys) Wortman 1903
      * Species †[*M. marshi*](/wiki/Metacheiromys_marshi) Wortman 1903 [[*Metacheiromys tatusia*](/wiki/Metacheiromys_tatusia) Osborn 1904]
      * Species †[*M. dasypus*](/wiki/Metacheiromys_dasypus) Osborn 1904 [[*Metacheiromys osborni*](/wiki/Metacheiromys_osborni) Simpson 1931]
  + Genus †[*Argyromanis patagonica*](/wiki/Argyromanis) Ameghino 1904
  + Genus †[*Orthoarthrus mixtus*](/wiki/Orthoarthrus) Ameghino 1904
  + Genus †[*Euromanis krebsi*](/wiki/Euromanis) (Storch & Martin 1994) Gaudin, Emry & Wible 2009 [[*Eomanis krebsi*](/wiki/Eomanis_krebsi) Storch and Martin 1994]
  + Suborder [Eupholidota](/wiki/Eupholidota) Gaudin, Emry & Wible 2009
    - Family †[Eomanidae](/wiki/Eomanidae) Storch 2003
      * Genus †[*Eomanis waldi*](/wiki/Eomanis) Storch 1978
    - Family [Patriomanidae](/wiki/Patriomanidae) Szalay & Schrenk 1998 sensu Gaudin, Emry & Pogue 2006
      * Genus †[*Cryptomanis gobiensis*](/wiki/Cryptomanis) Gaudin, Emry & Pogue 2006
      * Genus †[*Patriomanis americana*](/wiki/Patriomanis) Emry 1970
    - Family **Manidae** Gray 1821
      * Genus †[*Necromanis*](/wiki/Necromanis) Filhol 1893 [[*Leptomanis*](/wiki/Leptomanis) Filhol 1893; [*Necrodasypus*](/wiki/Necrodasypus) Filhol 1893; [*Teutomanis*](/wiki/Teutomanis) Ameghino 1905; [*Galliaetatus*](/wiki/Galliaetatus) Ameghino 1905]
        + Species †[*N. franconica*](/wiki/Necromanis_franconica) (Quenstedt 1886) [[*Lutra franconica*](/wiki/Lutra_franconica) Quenstedt 1886]
        + Species †[*N. parva*](/wiki/Necromanis_parva) Koenigswald 1969
        + Species †[*N. quercyi*](/wiki/Necromanis_quercyi) Filhol 1893
        + Species †[*N. galliae*](/wiki/Necromanis_galliae)
      * Subfamily [Smutsiinae](/wiki/Smutsiinae) Gray 1873 (African pangolins)
        + Genus [*Phataginus*](/wiki/Phataginus) Rafinesque 1821 [[1]](#cite_note-1) [[*Phataginus*](/wiki/Phataginus) Rafinesque 1815 (nomen nudum); [*Triglochinopholis*](/wiki/Triglochinopholis) Fitzinger 1872; [*Uromanis*](/wiki/Uromanis) Pocock 1924]

[Tree pangolin](/wiki/Tree_pangolin) (*P. tricuspis* (Rafinesque 1821) Rafinesque 1821)

[Long-tailed pangolin](/wiki/Long-tailed_pangolin) (*P. tetradactyla* (Linnaeus 1766))

* + - * + Genus [*Smutsia*](/wiki/Smutsia) Gray 1865 [[1]](#cite_note-1) (African ground pangolins)

[Giant pangolin](/wiki/Giant_pangolin) (*S. gigantea* (Illiger 1815))

[Ground pangolin](/wiki/Ground_pangolin) (*S. temmincki* (Smuts 1832))

* + - * Subfamily [Maninae](/wiki/Maninae) Gray 1821
        + Genus [*Manis*](/wiki/Manis_(genus)) Linnaeus 1758 [[*Pholidotus*](/wiki/Pholidotus) Storr 1780; [*Quaggelo*](/wiki/Quaggelo) Frisch 1775; [*Pangolinus*](/wiki/Pangolinus) Rafinesque 1821; [*Pangolinus*](/wiki/Pangolinus) Rafinesque 1815 nomen nudum; *Pangolin* Gray 1873; [*Phatages*](/wiki/Phatages) Sundevall 1843] (Asiatic pangolins)

†[*M. hungarica*](/wiki/Manis_hungarica) Kormos 1934

†[*M. lydekkeri*](/wiki/Manis_lydekkeri) Trouessart

[Asian giant pangolin](/wiki/Asian_giant_pangolin) (*M. paleojavanica* Dubois) †

Subgenus ([*Manis*](/wiki/Manis_(genus))) Linnaeus 1758

[Indian pangolin](/wiki/Indian_pangolin) (*M. crassicaudata* Gray 1827)

[Chinese pangolin](/wiki/Chinese_pangolin) (*M. pentadactyla* Linnaeus 1758)

Subgenus ([*Paramanis*](/wiki/Paramanis)) Pocock 1924

[Sunda pangolin](/wiki/Sunda_pangolin) (*M. javanica* Desmarest 1822)

[Philippine pangolin](/wiki/Philippine_pangolin) (*M. culionensis* Elera 1915)

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* [Pangolin: Wildlife summary from the African Wildlife Foundation](http://web.archive.org/web/20090417080037/http://www.awf.org/content/wildlife/detail/pangolin)
* [Tree of Life of Pholidota](http://tolweb.org/Pholidota/15954)
* [*National Geographic* video of a pangolin](http://video.nationalgeographic.com/video/weirdest-pangolin)
* [Proceedings of the Workshop on Trade and Conservation of Pangolins Native to South and Southeast Asia](http://cmsdata.iucn.org/downloads/pangolin_proceedings_final_print__2_.pdf) (PDF)
* [Template:Cite EB1911](/wiki/Template:Cite_EB1911)
* [The Phylogeny of Living and Extinct Pangolins (Mammalia, Pholidota) and Associated Taxa: A Morphology Based Analysis](http://web2.utc.edu/~gvv824/Gaudin%20et%20al%202009.pdf) (PDF)

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