= Noronha skink =

The Noronha skink (Trachylepis atlantica) is a species of skink from the island of Fernando de Noronha off northeastern Brazil . It is covered with dark and light spots on the upperparts and is usually about 7 to 10 cm (3 to 4 in) in length . The tail is long and muscular , but breaks off easily . Very common throughout Fernando de Noronha , it is an opportunistic feeder , eating both insects and plant material , including nectar from the Erythrina velutina tree , as well as other material ranging from cookie crumbs to eggs of its own species . Introduced predators such as feral cats prey on it and several parasitic worms infect it .

Perhaps seen by Amerigo Vespucci in 1503 , it was first formally described in 1839 . Its subsequent taxonomic history has been complex , riddled with confusion with Trachylepis maculata and other species , homonyms , and other problems . The species is classified in the otherwise mostly African genus Trachylepis and is thought to have reached its island from Africa by rafting . The enigmatic Trachylepis tschudii , supposedly from Peru , may well be the same species .

= = Discovery and taxonomy = =

In an early account of what may be Fernando de Noronha , purportedly based on a voyage by Amerigo Vespucci in 1503 , the island was said to be inhabited by " lizards with two tails " , which is thought be a reference to the Noronha skink . The tail is long and fragile , and it breaks easily , like that of many skinks and other lizards , following which it may regenerate . However , when it does not completely break off , a new tail may nevertheless grow out of the broken part , so that the tail appears forked .

= = = 19th century = = =

The species was first formally described by John Edward Gray in 1839 , based on two specimens collected by HMS Chanticleer before 1838 . He introduced the names Tiliqua punctata , for the Noronha skink , and Tiliqua maculata , for a species from Guyana , among many others . Six years later , he transferred both to the genus Euprepis . In 1887 , George Boulenger placed both in the genus Mabuya (misspelled " Mabuia ") and considered them identical , using the name " Mabuia punctata " for the species , which was said to occur both on Fernando de Noronha and in Guyana . He also included Mabouya punctatissima O 'Shaughnessy , 1874 , purportedly from South Africa , as a synonym .

= = = 20th century = = =

In 1900 , L.G. Andersson claimed that Gray 's name punctata was preoccupied by Lacerta punctata Linnaeus , 1758 , which he identified as Mabuya homalocephala . He therefore replaced the name punctata with its junior synonym maculata , using the name Mabuya maculata for the skink of Fernando de Noronha . Linnaeus 's Lacerta punctata in fact refers to the Asian species Lygosoma punctatum , not to Mabuya homalocephala , but Gray 's name punctata remains invalid regardless . In 1931 , C.E. and M.D. Burt resurrected the name Mabuya punctata (now spelled correctly) for the Noronha skink , noting that it was " apparently a very distinct species " , but did not mention maculata , and in 1935 , E.R. Dunn disputed Boulenger 's conclusion as to the synonymy of punctata and maculata and , in apparent ignorance of Andersson 's work , restored the name Mabuya punctata for the Noronha skink . He wrote that the Noronha skink was very distinct from other American Mabuya and more similar in some respects to African species .

K.P. Schmidt , in 1945 , agreed with Dunn 's conclusion that maculata and punctata of Gray were not the same , but he noted Andersson 's point that punctata was preoccupied and therefore introduced the new name Mabuya atlantica to replace punctata . The next year , H. Travassos , disagreeing with Dunn and unaware of Andersson 's and Schmidt 's contributions , considered both of Gray 's names to be synonymous and restored the name Mabuya punctata for the Noronha skink

. He also considered Mabouya punctatissima and Trachylepis (Xystrolepis) punctata Tschudi , 1845 , described from Peru , as synonyms of this species . In 1948 , he acknowledged the preoccupation of punctata noted by Andersson and accordingly retired Mabuya punctata in favor of Mabuya maculata , as Andersson had done . The name Mabuya maculata remained in general usage for the Noronha skink in subsequent decades , though some have used Mabuya punctata , " not ... aware of the last nomenclatural changes . "

= = = 21st century = = =

In 2002 , P. Mausfeld and D. Vrcibradic published a note on the nomenclature of the Noronha skink informed by a re @-@ examination of Gray 's original type specimens ; despite extensive attempts to correctly name the species , they were apparently the first to do so since Boulenger in 1887 . Based on differences in the number of scales , subdigital lamellae (lamellae on the lower sides of the digits) , and keels (longitudinal ridges) on the dorsal scales (located on the upperparts) , as well as the separation of the parietal scales (on the head behind the eyes) in maculata , they concluded that the two were not , after all , identical , and that Schmidt 's name Mabuya atlantica should therefore be used . Mausfeld and Vrcibradic considered Mabouya punctatissima to represent a different species on the basis of morphological differences , but were unable to resolve the status of Trachylepis (Xystrolepis) punctata .

In the same year , Mausfeld and others conducted a molecular phylogenetic study on the Noronha skink , using the mitochondrial 12S and 16S rRNA genes , and showed that the species is more closely related to African than to South American Mabuya species , as previously suggested on the basis of morphological similarities . They split the old genus Mabuya into four genera for geographically discrete clades , including Euprepis for the African ? Noronha clade , thus renaming the Noronha species to Euprepis atlanticus . In 2003 , A.M. Bauer found that the name Euprepis had been incorrectly applied to this clade and that Trachylepis was correct instead , so that the Noronha skink is currently referred to as Trachylepis atlantica . Additional molecular phylogenetic studies published in 2003 and 2006 confirmed the relationship between the Noronha skink and African Trachylepis .

In 2009 , Miralles and others reviewed the taxon maculata and concluded that the animal now known as Trachylepis maculata also belongs in the African clade , but they were unable to determine whether or not it is indigenous to Guyana . They also reviewed Trachylepis (Xystrolepis) punctata and replaced it with Trachylepis tschudii because the older name was preoccupied by Linnaeus 's and Gray 's punctata . Although they were unable to resolve the identity of T. tschudii , which is still known from a single specimen , they believed that it is most likely the same species as the Noronha skink ; it may be either a representative of an undiscovered Amazonian population of the latter or simply a mislabeled animal from Fernando de Noronha .

= = Description = =

The Noronha skink is covered with light and dark spots above , but there is substantial variation in the precise colors . There are no longitudinal stripes . The scales on the underparts are yellowish or grayish . The eyelids are white to yellow . It has a small head with small nostrils , which are placed far to the front at the sides of the head . The mouth contains small and conical teeth and a thin but well @-@ developed tongue . The eyes are small and placed laterally and contain dark , rounded irises . There are three to five well @-@ developed auricular lobules (small projections) in front of the ears ; these lobules are absent in true Mabuya . The hindlimbs are longer and stronger than the forelimbs , which are small . The tail is longer than the body and is muscular but very brittle . It is nearly cylindrical in form and tapers towards the end .

In reptiles , features of the scales are important in distinguishing among species and groups of species . In the Noronha skink , the supranasal scales (located above the nose) are in contact , as are the prefrontal scales (behind the nose) in most individuals . The two frontoparietal scales (above and slightly behind the eyes) are not fused . Unlike in T. maculata , the parietal scales (

behind the frontoparietals) are in contact with each other . There are four supraocular scales (above the eyes) in almost all specimens and five supraciliary scales (immediately above the eyes , below the supraoculars) . The dorsal scales (on the upperparts) have three keels , two fewer than in T. maculata . There are 34 to 40 (mode 38) midbody scales (counted around the body midway between the fore- and hindlimbs) , 58 to 69 (mode 63 ? 64) dorsal , and 66 to 78 (mode 70) ventral scales (on the underparts) . Mabuya species and T. maculata generally have fewer midbody scales (up to 34) . There are 21 to 29 subdigital lamellae under the fourth toe , more than in T. maculata , which has 18 . The Noronha skink has 26 presacral vertebrae (located before the sacrum) , similar to most Trachylepis , but unlike American Mabuya , which have at least 28 .

Although there is substantial variation in measurements within the species , no discrete groups can be detected and it is not possible to separate the sexes unambiguously using measurements alone . Among 15 male and 21 female T. atlantica collected in 2006 , snout to vent length was 80 @.@ 6 to 103 @.@ 1 mm (3 @.@ 17 to 4 @.@ 06 in) , averaging 95 @.@ 3 mm (3 @.@ 75 in) , in males and 65 @.@ 3 to 88 @.@ 1 mm (2 @.@ 57 to 3 @.@ 47 in) , averaging 78 @.@ 3 mm (3 @.@ 08 in) , in females and body mass was 10 @.@ 2 to 26 @.@ 0 g (0 @.@ 36 to 0 @.@ 92 oz) , averaging 19 @.@ 0 g (0 @.@ 67 oz) , in males and 6 @.@ 0 to 15 @.@ 0 g (0 @.@ 21 to 0 @.@ 53 oz) , averaging 10 @.@ 0 g (0 @.@ 35 oz) , in females . Males are significantly larger than females . In 100 specimens collected in 1876 , head length was 12 @.@ 0 to 18 @.@ 9 mm (0 @.@ 47 to 0 @.@ 74 in) , averaging 14 @.@ 8 mm (0 @.@ 58 in) ; head width was 7 to 14 @.@ 4 mm (0 @.@ 28 to 0 @.@ 57 in) , averaging 9 mm (0 @.@ 35 in) , and tail length was 93 to 170 mm (3 @.@ 7 to 6 @.@ 7 in) , averaging 117 mm .

= = Ecology and behavior = =

The Noronha skink is very abundant throughout Fernando de Noronha , even occurring commonly in houses , and also occurs on the smaller islands that surround the main island of the archipelago . Its abundance may be a result of the absence of ecologically similar competitors . Apart from T. atlantica , the reptile fauna of Fernando de Noronha consists of the indigenous amphisbaenian Amphisbaena ridleyi and two introduced lizards , the gecko Hemidactylus mabouia and the tegu Tupinambis merianae .

The species is found in several microhabitats , but most often on rocks . Although predominantly ground @-@ dwelling , it is a good climber . Nothing is known about its reproduction except that skinks studied in late October and early November , during the dry season , showed little evidence of reproductive activity . The Noronha skink is oviparous (egg @-@ laying) , like many Trachylepis , but unlike Mabuya , which are all viviparous (giving live birth) .

Trachylepis atlantica is active during the day . Its body temperature averages 32 ° C (90 ° F) , a few degrees higher than the environment temperature . During the day , body temperature peaks at up to 38 ° C (100 ° F) around midday and is lower earlier and later . In the early morning , the lizard may bask in the sun . During foraging , it spends about 28 @.@ 4 % of its time moving on average , a relatively high value for Trachylepis .

A geologist who visited the island in 1876 noted that the skink is curious and bold :

While seated upon the bare rocks I have often observed these little animals watching me , apparently with as much curiosity as I watched them , turning their heads from side to side as if in an effort to be wise . If I kept quiet for a few minutes they would creep up to me and finally upon me ; if I moved , they ran down the faces of the rocks , and turning , stuck their heads above the edges to watch me .

= = = Diet = = =

The Noronha skink is an opportunistic omnivore and " thrives on anything edible " . Analysis of stomach contents indicates that it mainly eats plant material , at least during the dry period , but it also feeds on insects , including larvae , termites (Isoptera) , ants (Formicidae) , and beetles (Coleoptera) . Its prey is mostly mobile , rather than sedentary , which is consistent with the

relatively high proportion of time it spends moving . Related skink species eat mostly insects , but island populations may often be more herbivorous . Animal prey averages 6 @.@ 9 mm3 in volume , less than in most other Trachylepis .

When the mulungu tree Erythrina velutina blooms during the dry season , Noronha skinks climb up to 12 m (39 ft) to reach the inflorescences of the tree and to eat the nectar by inserting their heads into the flowers . They probably use the nectar both for its sugar and water content . In this way , the skinks aid in pollinating the tree , as they acquire pollen on their scales and leave pollen on stigmas when visiting a flower . Pollination is rare behavior among lizards , but occurs most frequently in island species . Humans have introduced additional food sources to the island , including Acacia seeds , feces of the rock cavy (Kerodon rupestris) , carrion flies , juvenile Hemidactylus mabouya , and even cookie crumbs given by tourists . The availability of these additional food sources may increase the abundance of the skink . In 1887 , H. N. Ridley observed Noronha skinks eating banana skins and yolk from doves ' eggs . Several cases of cannibalism have been reported , involving skinks eating eggs , juveniles , and the tail of an adult .

= = = Relationships with other species = = =

The Noronha skink probably lacked predators before Fernando de Noronha was discovered by humans , but several species that arrived since do prey on it , most commonly the cat (Felis catus) and cattle egret (Bubulcus ibis) . These may negatively affect skink abundance at some localities on the island . The Argentine black and white tegu lizard , Tupinambis merianae , and three introduced rodents , the house mouse (Mus musculus) , brown rat (Rattus norvegicus) and black rat (Rattus rattus) , have also been observed to eat Noronha skinks , but the rodents , particularly the house mouse , may have been scavenging on already dead skinks .

According to a 2006 study , the Noronha skink is infected by several parasitic worms , most frequently by the nematode Spinicauda spinicauda . Another nematode , Moaciria alvarengai , is much rarer . Other rare parasites include two trematodes ? Mesocoelium monas and an undetermined species of Platynossomum ? and an undetermined species of Oochoristica , a cestode . S. spinicauda is usually only found in teiid lizards ; it may have entered the archipelago when Tupinambis merianae , a teiid , was introduced to the island in 1960 . Among nematodes , previous studies in 1956 and 1957 had only reported M. alvarengai and Thelandros alvarengai from the skink ; the presence of S. spinicauda could explain the rarity of M. alvarengai and absence of T. alvarengai in Noronha skinks observed in 2006 .

= = Origin = =

Phylogenetic analyses using a variety of mitochondrial and nuclear genes places the Noronha skink among the tropical African species of Trachylepis , a position also supported by morphological similarities . It may have arrived on its island on rafting vegetation from southwestern Africa via the Benguela Current and the South Equatorial Current , which passes Fernando de Noronha . This possibility was first suggested by Alfred Russel Wallace before 1888 . Mausfeld and coworkers calculated that the journey from Africa to Fernando de Noronha would take 139 days . Because this period seemed too long for the skink to survive , they proposed that the Noronha skink instead arrived via Ascension Island , where a skink may have persisted into historical times .

The South American and Caribbean Mabuya skinks form a clade that appears to be derived from a separate colonization from Africa . Both transatlantic colonization events are believed to have occurred within the last 9 million years .