

= Katipo =

The katipo (*Latrodectus katipo*) is an endangered species of spider native to New Zealand . It is one of many species in the genus *Latrodectus* , such as the Australian redback (*L. hasseltii*) , and the North American black widows . The species is venomous to humans , capable of delivering a comparatively dangerous bite . The name katipo (plural : katipo) is from the Māori *katipō* , meaning " night @-@ stinger " . It is a small to medium @-@ sized spider , with the female having a round black or brown pea @-@ sized body . Red katipo females , found in the South Island and the lower half of the North Island , are always black , and their abdomen has a distinctive red stripe bordered in white . In black katipo females , found in the upper half of the North Island , this stripe is absent , pale , yellow , or replaced with cream @-@ coloured blotches . These two forms were previously thought to be separate species . The male is much smaller than the female and quite different in appearance : white with black stripes and red diamond @-@ shaped markings . Katipo are only found living in sand dunes close to the seashore . They are found throughout most of coastal New Zealand except the far south and west . Katipo feed mainly on ground dwelling insects , caught in an irregular tangled web spun amongst dune plants or other debris ,

After mating in August or September , the female katipo produces five or six egg sacs in November or December . The spiderlings hatch during January and February and disperse into surrounding plants . Due to habitat loss and colonisation of their natural habitat by other exotic spiders , the katipo is threatened with extinction .

A katipo bite produces the toxic syndrome latrodectism ; symptoms include extreme pain and , potentially , hypertension , seizure , or coma . Bites are rare , an antivenom is available , and no deaths have been reported since 1901 . The katipo is particularly notable in New Zealand as the nation is almost entirely devoid of dangerous native wildlife ; this unique status means the spider is well known , despite being rarely seen .

= = Taxonomy = =

Although the ' *kātipō* ' was reported to the Linnean Society as early as 1855 , the spider was formally described as *Latrodectus katipo* by L. Powell in 1870 . Spiders of the genus *Latrodectus* have a worldwide distribution and include all of the commonly known widow spiders : the North American black widow spider (*Latrodectus mactans*) , the brown widow (*Latrodectus geometricus*) , and the European black widow (*Latrodectus tredecimguttatus*) . The katipo 's closest relative is the Australian redback spider (*Latrodectus hasseltii*) *Latrodectus katipo* and *L. atritus* (black katipo) were previously thought to be two separate species , but research has shown that they are a single species , *L. katipo* , with colour variation that is clinal over latitude and correlated with mean annual temperature . The katipo is so closely related to the redback that it was at one stage thought to be a subspecies , with the proposed name *Latrodectus hasseltii katipo* . Further research has shown that the katipo is distinct from the redback , having slight structural differences and striking differences in habitat preference , and it remains its own species . The katipo 's family Theridiidae has a large number of species both in New Zealand and worldwide and are commonly known as tangle @-@ web spiders , cobweb spiders or comb @-@ footed spiders .

The common name , katipo , is Māori for " night stinger " , derived from the words *kakati* (to sting) and *pō* (the night) . This name was apparently given to the spider due to the Māori belief that the spiders bite at night . Other common names include red katipo , black katipo and New Zealand 's redback .

= = Description = =

The katipo is a small to medium @-@ sized spider . The mature female has a body size of about 8 millimetres (0 @.@ 31 in) with a leg span of up to 32 millimetres (1 @.@ 3 in) . The red katipo female , found in the South Island and the lower North Island , has a large black globular abdomen , about the size of a garden pea , with slender legs and a white @-@ bordered orange or red stripe

on its back that runs from the uppermost surface of the abdomen back to the spinnerets . The dark velvet @-@ black abdomen is described as satin or silky in appearance , rather than being shiny . The underside of the abdomen is black and has a red patch or partial red hourglass @-@ shaped marking . It has mainly black legs with the extremities changing to brown . The black katipo female , found in the upper North Island , does not have a red stripe on the top of her body , and the abdominal colouration is usually lighter , but is otherwise very similar in appearance to the red katipo . The hourglass pattern on the underside of the abdomen may also be less distinct , losing the middle section , and may even be absent . Variations also exist whose abdomen , cephalothorax , or entire body is brown , sometimes with a dull red or yellow stripe , or cream @-@ coloured spots on its upper side . These different forms were at one point thought to be different species , but a 2008 study demonstrated they were different morphs of the same species .

Adult males and juveniles are quite different in appearance to the female . They are smaller in size , being about one sixth the size of an adult female . Juveniles have a brown carapace , with a predominantly white abdomen which has a series of red @-@ orange diamonds running along the dorsal region bordered on either side by irregular black lines . Males retain this coloration into adulthood . Due to its much smaller size , Urquhart (1886) believed the male to be a separate species and named it *Theridion melanozantha* . This was not rectified until 1933 when it was correctly identified as the male *Latrodectus katipo* .

= = Habitat = =

The katipo is restricted to a highly specialised habitat and is only found near the seashore living among sand dunes . They generally reside on the landward side of dunes closest to the coast where they are most sheltered from storms and sand movement . They can sometimes be associated with dunes several kilometres from the sea when these dunes extend inland for long distances .

Webs are typically established in low @-@ growing dune plants and other vegetation such as the native Pingao (*Desmoschoenus spiralis*) or the introduced marram grass (*Ammophila arenaria*) . They may also build their webs under driftwood , stones , or other debris such as empty tin cans or bottles . Webs are almost always constructed over open sand and near the ground so as to catch crawling insects for food . Spiders inhabiting dune grasses construct their webs in open spaces between the grass tufts , while spiders inhabiting areas of shrubbery do so on the underside of a plant overhanging open sand . It has been found that these patches of open sand are necessary for katipo to build their webs as plants that envelop sand dunes in dense cover , such as exotic plants like kikuyu or buffalo grass , create an environment unsuitable for web construction . The katipo therefore prefers to spin its web amongst pingao plants as this plants growth pattern leaves patches of sand between each plant . The wind can then blow insects and other prey through these gaps and into the web . Marram grass has been extensively planted in New Zealand to help stabilise sand dunes and has largely replaced pingao in many areas . Because marram grass grows in a very tight formation only leaving small gaps between tufts , this makes it difficult for the katipo to construct a suitable web for capturing prey .

Like other theridiid spiders , the web is a disorganised , irregular tangle of fine textured silk . It is hammock @-@ shaped and is made up of opaque yellowish @-@ white silk . The web consists of a broad base with many supporting threads above and below , including a number of sticky guy lines anchored to debris in the sand . A cone @-@ shaped retreat is built in the lower part of the web , although the katipo can normally be found near the main body of the web . The plants it builds its web in provide support and shelter for the nest .

= = Range = =

The katipo is endemic to New Zealand . In the North Island it is found along the West Coast from Wellington to North Cape . On the east coast of the North Island it occurs irregularly , however , it is abundant on Great Barrier Island . In the South Island it is found in coastal regions south to Dunedin on the east coast and south to Greymouth on the west coast . This southern limit is due to the katipo

needing temperatures higher than about 17 ° C (63 ° F) to be maintained during the development of their eggs ? in the southern areas of New Zealand it is typically colder than this .

The red katipo is found south of approximately 39 ° 15 ' S (the western tip of Taranaki on the west coast , and just north of Waipatiki Beach in Hawke 's Bay on the east coast) . The black katipo is found north of approximately 38 ° S (Aotea Harbour , just north of Kaitiaki on the west coast , and Waipiro Bay and just south of the Bay of Plenty on the east coast) . Both forms are found in the area in between these latitudes .

= = Behavior = =

= = = Diet = = =

The katipo typically catches wandering ground invertebrates such as beetles (e.g. *Cecyropa modesta*) or amphipods (e.g. *Bellorchestia quoyana*) , but it may occasionally catch moths , flies , and other spiders . Katipo can catch insects much larger than themselves . These larger insects often become entangled in the web and in the ensuing struggle , the web 's ground anchor line breaks . Due to the silk 's elasticity , this causes the prey to become suspended a few centimetres off the ground . The katipo then moves to the prey , turns so that the spinnerets are facing the insect and spins silk over it . Like most theridiids , the tarsi of the hind legs have a row of strong curved bristles which are arranged as a comb . The katipo uses these to scoop sticky silk from her spinnerets and throws it over the insect with a series of rapid movements . After the insect is firmly immobilised , she bites it several times , usually at the joints , before spinning more silk to strengthen the web , and then administering a last long bite which ultimately kills the insect . The spider then moves the prey up into the web until it is ready to eat . If food is readily available then it is common to see five or six insects hanging in the web waiting to be ingested . The male 's hunting behaviour is similar to the female 's , although may not be as vigorous due to its smaller size .

= = = Reproduction = = =

The male wanders as an adult and in August or September goes looking for the females ' webs to mate . The male will enter the female 's web and vibrate the silk as he approaches her . The female is usually aggressive at first and will chase the male from the web . The Courtship process consists of the male bobbing , plucking and tweaking the web along with periods of cautious approach and being chased by the female . Eventually , when she becomes docile and allows him to approach , the male will then approach the female as she hangs quietly upside down in the web . The male moves onto her ventral abdomen , tapping her rapidly until she moves to align his abdomen above hers . He then inserts his palps one at a time , leaving the female between each insertion . Copulation occurs over 10 to 30 minutes . After mating , the male retreats to groom , which is performed by running his palps and legs through his fangs and wiping them over his body . The male is not eaten by the female unlike some other widow spiders .

The females lay their eggs in November or December . The eggs are round , about the size of a mustard seed , and are a transparent , purply red . They are held together in a cream @-@ coloured , round , ball shaped egg sac which is about 12 millimetres (0 .47 in) in diameter . The female constructs five or six egg sacs over the next three to four weeks . Each egg sac contains about 70 to 90 fertilised eggs . The egg sacs are hung in the centre of the spiders web and the female spins more silk over them . Over time the exterior of the egg sac may become covered with sand . After six weeks of incubation , during January and February , the spiderlings hatch . The young spiders then disperse from the web . At present , little is known about the dispersal mechanism that the spiderlings use to move away from the nest . In one study , observing spiders over 24 hours , 28 % used a ballooning method , which is where the young spiders use heat currents to carry themselves away from the nest suspended by a single web strand . While the majority , 61 % , used a bridging method where the spiderling uses its silk to move to nearby plants , and 11 % still remained in the

nest . The young spiderlings reach full maturity the following spring .

The close relationship between the katipo and redback is shown when mating , The male redback is able to successfully mate with a female katipo producing hybrid offspring . However , the male katipo can not mate with the female redback as the male katipo is heavier than the male redback and when it approaches the web it triggers a predatory response in the female leading to the katipo being eaten before mating occurs . There is evidence of interbreeding between katipo and redbacks in the wild .

= = Predators = =

The katipo has only one known direct predator : a small , undescribed native wasp from the family Ichneumonidae has been observed feeding on katipo eggs .

= = Population decline = =

The katipo is an endangered species and has recently become threatened with extinction . It is estimated that there are only a few thousand katipo left in about 50 areas in the North Island and eight in the South Island , making it rarer than some species of kiwi . A number of reasons have contributed to its decline ; the major factors appear to be loss of habitat and declining quality of the remaining habitat . Human interference with their natural habitat has been occurring for over a century following European settlement . Coastal dune modification resulting from agriculture , forestry , or urban development along with recreational activities like the use of beach buggies , off road vehicles , beach horse riding and driftwood collection have destroyed or changed areas where katipo lives . The introduction of many invasive exotic plants has also contributed to the decline of suitable habitat .

Foreign spiders have colonised areas where suitable habitat remains . The major coloniser is the South African spider *Steatoda capensis* . It was first reported in the 1990s and may have displaced the katipo along the west coast of the North Island from Wellington to Wanganui . Although both the katipo and *S. capensis* have been found sharing the same dune systems or even co existing under the same piece of driftwood suggesting that the two species can co exist in similar habitats . It is possible that the displacement of the katipo by *S. capensis* is due to its ability to recolonise areas from which the katipo had been displaced after storms or other dune modifications . Furthermore , *S. capensis* breeds year round , produces more offspring and lives in a greater range of habitats which leads to greater pressure on the katipo . *S. capensis* also belongs to the family Theridiidae and shares many of the katipo 's features . It is of similar size , shape , general coloration , it lacks the red stripe on its back , but may have some red , orange or yellow on its abdomen , as well as the general location where katipos are found . Due to these similarities it is commonly known in New Zealand as the ? false katipo ? .

In 2010 the katipo was one of a dozen species of previously unprotected invertebrate given full protection under the 1953 Wildlife Act , noted as " iconic , vulnerable to harm , and in serious decline " . Under the Act , killing an absolutely protected species such as a katipo is punishable by a fine or even imprisonment .

= = Toxicology = =

The katipo has medically significant venom in humans , although bites are rare . The incidence of bites is low as it is a shy , non aggressive spider . Their narrow range , diminishing population , and human awareness of where they live means interaction between humans and the spider is minimal . The katipo will only bite as a last resort ; if molested , the spider will usually fold up into a ball and drop to the ground or retreat to the nearest cover . If the threat continues , the spider may throw out silk against the interference . When restrained in any way or held against skin , such as if tangled up in clothing , the spider will then bite defensively . However , if the female is with an egg sac it will remain close by it and sometimes move offensively to bite any threat .

Bites from Katipo spiders produce a syndrome known as latrodectism . The venoms of all Latrodectus spiders are thought to contain similar components with the neurotoxin α -latrotoxin the main agent responsible . Most bites are caused by female spiders ; the male katipo was considered too small to cause systemic envenoming in humans . However , bites from male redback spiders have been reported suggesting male Latrodectus spiders can cause envenoming in humans . Although bites by male spiders are much rarer than those by females , perhaps due to their smaller jaws rather than lacking venom of similar potency to females or being unable to administer an effective bite . Māori legends recall many deaths , the last of which appears to have been a Māori girl who according to the missionary Thomas Chapman died in approximately 1849 . While there were reports of severe katipo bites in 19th or early 20th century records , no other fatalities from spider bites have since been reported in New Zealand . The most recent fatality seems to have been in 1901 , as reported in the Evening Post on 25 September of that year : " AUCKLAND , This Day . Mr. George Twidle , aged 47 , son of Mr. George Twidle of Pukekohe , was bitten by a katipo spider on . September 16 . His arm swelled , and he suffered great pain till Saturday last , when he died . He leaves a widow and several children . " The most recent reported katipo bites (as of 2016) were to a Canadian tourist in 2010 and a kayaker in 2012 .

== Symptoms ==

The clinical features of latrodectism are similar for all species of Latrodectus spiders and is generally characterised by extreme pain . Initially , the bite may be painful , but sometimes only feels like a pin prick or mild burning sensation . Within an hour victims generally develop more severe local pain with local sweating and sometimes piloerection (goosebumps) . Pain , swelling and redness spread proximally from the site . Less commonly , systemic envenoming is heralded by swollen or tender regional lymph nodes ; associated features include malaise , nausea , vomiting , abdominal or chest pain , generalised sweating , headache , fever , hypertension and tremor . Rare complications include seizure , coma , pulmonary edema , respiratory failure or localised skin infection . The duration of effects can range from a few hours to days , with severe pain persisting for over 24 hours after being bitten in some cases .

== Treatment ==

Treatment is based on the severity of the bite ; the majority of cases do not require medical care and patients with localised pain , swelling and redness usually only require local application of ice and routine analgesics . Hospital assessment is recommended if simple analgesia does not resolve local pain or clinical features of systemic envenoming occur . In more severe bites , Redback antivenom can be given . Redback antivenom can also cross α -neutralise katipo venom , and it is used to treat envenoming from Latrodectus katipo in New Zealand . It is available from most major New Zealand hospitals . Antivenom will usually relieve symptoms of systemic envenoming and is indicated in anyone suffering symptoms consistent with Latrodectus envenoming . Unlike some other antivenoms , it is not limited to patients with signs of severe , systemic envenoming . Particular indications for using antivenom are local then generalised pain , sweating or hypertension . However , good evidence to support the effectiveness of widow spider antivenoms is lacking and studies have cast some doubt on antivenoms efficacy in latrodectism . Pain relief agents , such as parenteral opiates , or benzodiazepines may be required as adjunct agents .