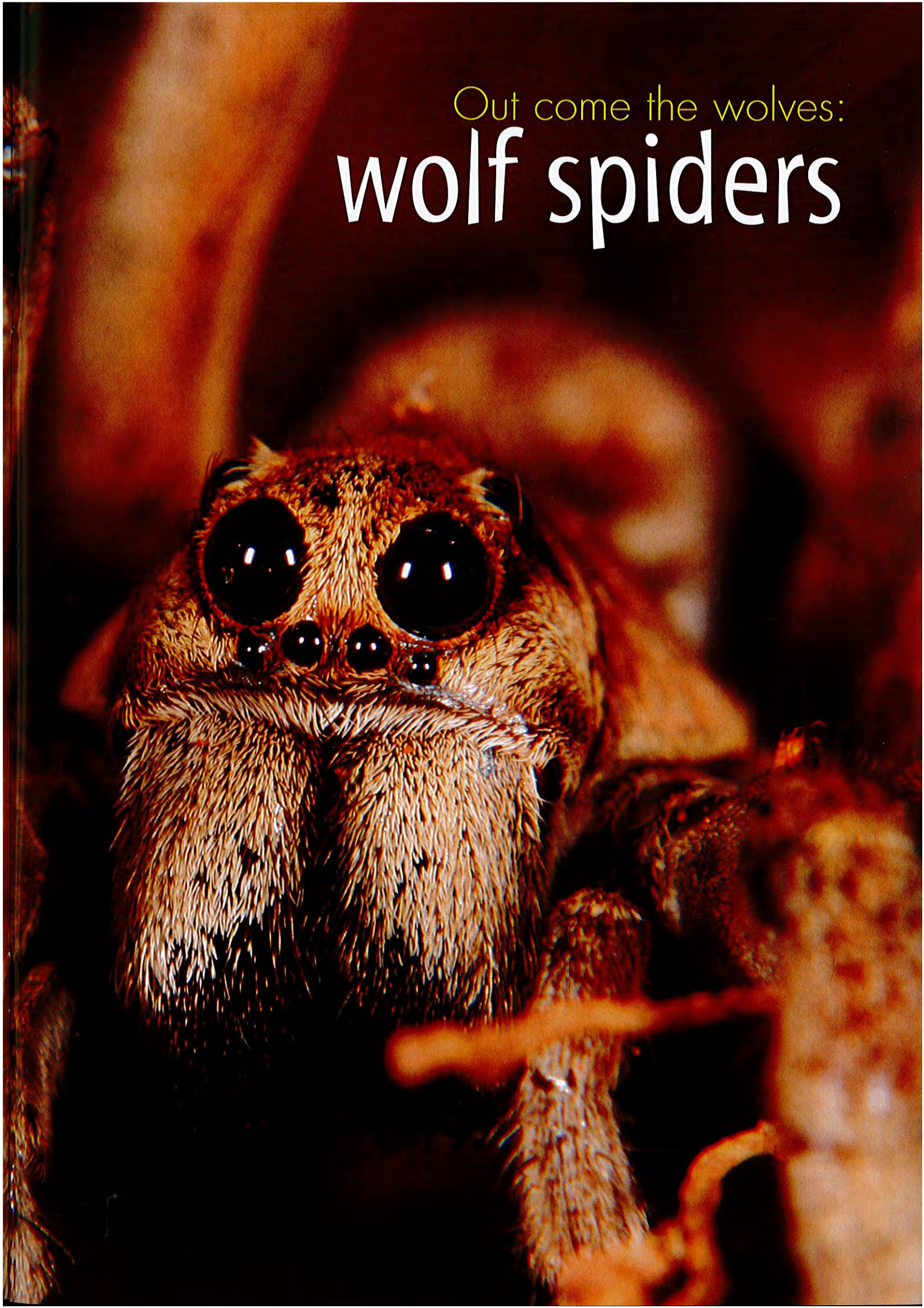
Whether they fascinate or repulse you, there's no doubt that wolf spiders are intriguing creatures.

by Ryan Ellis


Out come the wolves:
wolf spiders

As the sun sets and darkness prevails, the wolves emerge from their daytime retreats to hunt, eyes glistening in the moonlight. But, each with eight hairy legs, eight beady eyes and a pair of fearsome fangs, these are not your usual four-legged wolves. Wolf spiders are loathed and feared by some but loved and admired by others. Whether you love them or hate them, these spiders are undoubtedly celebrities of the arachnid world.

The common name wolf spider is applied to a family of ground-dwelling spiders scientifically known as Lycosìdae (from *lycos*, Greek for wolf). This large group of spiders is found around the world and is particularly abundant across Western Australia in a variety of habitats. Known for their diverse adaptations to different environments and their effective hunting ability, the wolf spiders are an impressive group of harmless spiders that defy their bad reputation once you get to know them.

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Wolf spiders have eight eyes arranged in a distinctive pattern.

Left An undescribed species photographed near Fitzgerald Inlet.
Photos – Ryan Ellis/DEC

Below Forrest's wolf spider (*Hoggicosa forresti*) consuming another spider.
Photo – Jiri Lochman

What makes a wolf?

The name wolf spider was originally given to the family based on the belief these spiders hunted in packs much like wolves; they are often seen in high abundance in areas where they are present. However, like most other spiders, wolf spiders are solitary. They generally come into contact with other wolf spiders only for reproduction, to fight for a mate (in the case of males) or, on occasion, to eat each other. A different explanation for their name is based on the way they hunt, chasing down their prey much like a wolf or wild dog. Only a few groups of wolf spiders use prey-capture webs.

Wolf spiders are distinguishable from other spider families by the arrangement of their eight eyes. Four eyes are evenly spaced in a square on top of their carapace (the upper section of their exoskeleton) and a row of four small frontal eyes is situated above the base of the fangs. At night it is easy to locate wolf spiders by looking for their shining eyes, which reflect incoming light. This green or bluish shine is caused by a highly reflective structure called a 'tapetum' in the spider's secondary eyes. Even the smallest of individuals and hatchlings can be located using a spotlight at night.

Each foot, or 'tarsus' (the terminal segment of the leg), carries three small claws. The absence of claw tufts renders the spider incapable of movement on smooth surfaces such as glass, metals and plastics, and for this reason wolf spiders are almost always found running on the ground. Rarely do wolf spiders venture into even low vegetation.

Wolf spider species vary greatly in size with different species ranging in adult size (body length, without legs) from a tiny 1.5 millimetres in the genus *Zoica* to about 35 millimetres in the larger species, for example in the genus *Hoggicosa*. Wolf spiders also vary

greatly in colour, and their markings include shades of brown and grey with scattered and sometimes intricate markings of contrasting colours making up radiating bands or blotches. Species in the web-building genus *Venonia* are uniformly black with a white spot on the tip of the abdomen almost like white-tailed spiders (*Lampona* spp.), which belong to a very different spider family, Lamponidae.

While some species of wolf spider can be identified easily, for example the abovementioned *Venonia*, identification of most species requires a detailed examination of the reproductive organs, because within genera, colour patterns are generally very similar.

Part of the pack

Across the globe more than 2,300 species of wolf spider are currently described, of which about 160 species in 28 genera occur in Australia. However, this represents less than half of the known species of this continent. Within the Lycosidae, there are four subfamilies known from Australia—the Zoicinae, Venoniinae, Artoriinae and Lycosinae. Zoicinae and Venoniinae are small families by number of species and genera, and they are also the smallest by size. With a body size of less than two millimetres, the Western Australian *Zoica minuta*, originally described from the Kimberley, belongs to one of the smallest wolf spider species worldwide. The Artoriinae is made up of almost 50 species in at least five genera. This subfamily contains species in the genus *Tetralycosa* which have adapted to one

Above The eight eyes of a wolf spider include four large and four small eyes.
Photo – Ryan Ellis/DEC

Left Salt Lake wolf spider (*Tetralycosa alteripa*).
Photo – Volker Framenau

Above Desert wolf spider.
Photo – Ryan Ellis/DEC

Left Polished wolf spider.
Photo – Volker Framenau

of the harshest environments in the country, saltlakes. The fourth subfamily and the largest in both species number and size of the spiders is the Lycosinae. This group includes almost all of the arid-adapted wolf spiders that spend their days in burrows to escape the heat and venture out at night.

Wolf spiders occur in almost all habitats, an ecological success that is probably due to their unique combination of a variety of hunting, breeding and dispersal strategies. From coastlines to mountain tops, rainforests to deserts, these spiders occur in habitats ranging from dense leaf litter to barren sandy plains. Some species have adapted to extremely harsh conditions and environments including hot, dry deserts, saltlakes, desolate sand dunes and monsoonal rainforests. Wolf spiders have also adapted to disturbed habitats, including suburban backyards and parks and other man-made environments in great numbers.

One of the most common species likely to be encountered in the Perth region is the western rough wolf spider (*Hogna immansueta*) (subfamily Lycosinae), which is often found in backyards and local areas of remnant bushland in autumn. Where reticulation provides regular moist conditions, the beautiful polished wolf spider (*Artoriopsis expolita*) (subfamily Artoriinae) is abundant. It is a vagrant hunter so does not excavate a burrow. The impressive two-coloured or desert wolf spider (*Hoggicosa bicolor*) (subfamily Lycosinae) occurs in arid areas across the state, although this spider will only be found at night when it leaves its burrow to hunt.

On the hunt

Wolf spiders primarily feed on small ground-dwelling invertebrates such as small insects, but are known to also hunt prey larger than themselves, such as other spiders and small lizards. Three basic hunting strategies are known in wolf spiders. Species in the genus *Venonia* (subfamily Venoniinae) build small sheet-webs close to the ground. Spiders sit in a silken funnel at the end of the web and wait for prey to get entangled in the sheet. Spiders in the Zoicinae and most species in the subfamily Artoriinae are vagrant hunters. These wolf spiders roam through leaf litter to find prey, a strategy most closely resembling that of their mammalian namesakes. The larger species, mainly those in the subfamily Lycosinae, excavate burrows in which they spend most of their time. Often spiders can be seen sitting in the entrance of their burrow waiting for prey to pass by. They may also

Right *Dingosa* sp. in a burrow entrance. *Photo – Dennis Sarson/Lochman Transparencies*

Centre right An undescriped species photographed at Lake Corin.

Below right Predator and burrow thief Main's ground gecko (*Lucasium maini*) using an old wolf spider burrow. *Photos – Ryan Ellis/DEC*

leave the burrow for short distances to hunt. Once prey has been spotted or its vibrations felt, the spider is on the move. The spider's relatively long legs enable it to outrun and capture prey easily. Prey is generally consumed on the spot immediately after capture, before the spider continues to forage or retreats to its burrow.

Breeding

Once a male wolf spider has reached maturity, all of its energy is directed to locating females to mate with. In burrowing species, males will abandon the retreat for good and venture out to look for a mate. The search for a mate is often based on chemical communication. Roaming females leave a 'dragline' of silk behind them that carries male-attracting pheromones. Reproduction being the one thing on its mind, the male generally ignores prey in the search for a female.

As a male spider's primary genital organs and sperm-transmitting structures, its 'pedipalps', are not connected, it builds a sheet of web onto which it deposits its sperm before trying to find a mate. He then inserts the bulb of its pedipalps into the seminal fluid which is sucked into the bulb. Once the male has found a suitable mate it must take extreme caution to not be mistaken for food and to avoid the female becoming agitated and trying to kill the male. To achieve this, the male wolf spiders engage in a complex mating 'dance' that includes pedipalp scratching, drumming on the ground with the pedipalsps or a percussive performance conducted by hammering the abdomen on the ground. The male will also caress the female, aiming

to keep it in a trance-like state and preventing it from becoming aggressive.

Reproduction occurs in summer in most species, although some are winter mature, such as the yellow-handed artoria (*Artoria flavimana*). After mating, the female will construct a large spherical egg sac in which it lays eggs. From three to more than 1,000 eggs may be laid in the egg sac, depending on the species. The egg sac is then attached to the female's spinnerets and is carried everywhere the female goes, even when it is hunting for food. Some burrowing species have been observed exposing the egg sac to the sun at the burrow entrance, possibly to help speed up development.

After the young spiderlings have hatched from their eggs, they leave the egg sac with the help of their mother. The young do not immediately disperse. They climb onto the mother's abdomen where they hold onto special hairs. Attached to the mother's back, the young spiderlings continue to accompany the female and thereby avoid hazardous situations. Often there will be so many spiderlings on the female's back it is difficult to see it, apart from its eyes and legs.

Eventually, after a few days or weeks, the spiderlings will disperse from the mother's back. Some disperse on the ground while others climb onto vegetation or rocks where they release a strand of silk, known as gossamer, which the wind catches, thereby carrying the little spider to a new, hopefully hospitable, home.

Left A female western lawn runner (*Venatrix pullastra*) spider with its spiderlings emerging from its egg sac. *Photo – Volker Framenau*

Below Leuckart's wolf spider (*Lycosa leuckartii*) with its spiderlings. *Photo – Wade Hughes/Lochman Transparencies*

The female's mobile technique of caring for its brood is unique to wolf spiders and contributes to the ecological success of the spiders. For example, wolf spiders are particularly abundant in environments prone to inundation, such as river banks, lake shores or even sandy beaches. In times of floods or tidal movements, females simply carry their brood to safe ground. Other common ground-living spiders, such as jumping spiders (family Salticidae) or ground spiders (family Gnaphosidae) fix their egg sacs to substrate and the brood may not survive rising water levels.

Daytime retreats

Being largely nocturnal, wolf spiders need a daytime retreat. Some species roam freely and hide among leaf litter and vegetation or underneath fallen logs, bark or human building materials, while others construct burrows. Spiders use their strong chelicerae, or fangs, to excavate burrows up to 30 centimetres deep, depending on the soil type. Sometimes they will use the abandoned burrows of other spiders or insects.

Burrows may be constructed in areas consisting of sandy, clay or rocky substrates which can cause the spider to vary the length or direction of its burrow. Burrows are silk-lined, albeit often very thinly, and many have a large open cavity at the base. Wolf spiders seem to take pride in their burrows and are quick to repair any damaged silk linings or lids. They will renovate the burrow as they grow by widening it and excavating a larger cavity at the base.

While burrow entrances are generally uncovered, they can be decorated with small leaves, twigs and bark. Trapdoor-like lids from silk and soil, stones and leaves and even pebbles or rabbit or sheep scats are constructed by some wolf spiders, for example in the genus *Hoggicosa*. Burrows with lids are often indistinguishable from the surrounding substrate, making it difficult for predators to locate burrows and prey on the spiders. The shuttlecock wolf spider (*Mainosa longipes*) (subfamily Lycosinae) and species in the genus *Dingosa* (Lycosinae) build remarkable turret-like structures around the entrance of their burrow from leaves, fine twigs or pebbles. Wolf spider burrows are sealed and lids closed when the spider is moulting or during adverse conditions outside the burrow.

A bite from the beast

Wolf spider bites, even those of the larger species, are not known to cause serious injuries or necrotic lesions in people. Bites are known to be mildly painful causing only local pain and swelling, and systemic reactions are rare and mild. There have been no reports of allergic reactions to a wolf spider bite. Wolf spiders are generally not very aggressive and bites are rare. In contrast, and curiously, bites of larger species, for example the common garden wolf spider (*Lycosa godeffroyi*) (subfamily Lycosinae), have been reported to be fatal to dogs.

With a large number of undescribed and even undiscovered species roaming WA, there is still much to learn about our Australian wolves.

Above The turret entrance of a shuttlecock wolf spider.
Photo – Ryan Ellis/DEC

Above right Turret-building wolf spider (*Dingosa humphreysi*) at the nest entrance.

Right Garden wolf spider.
Photos – Jiri Lochman

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