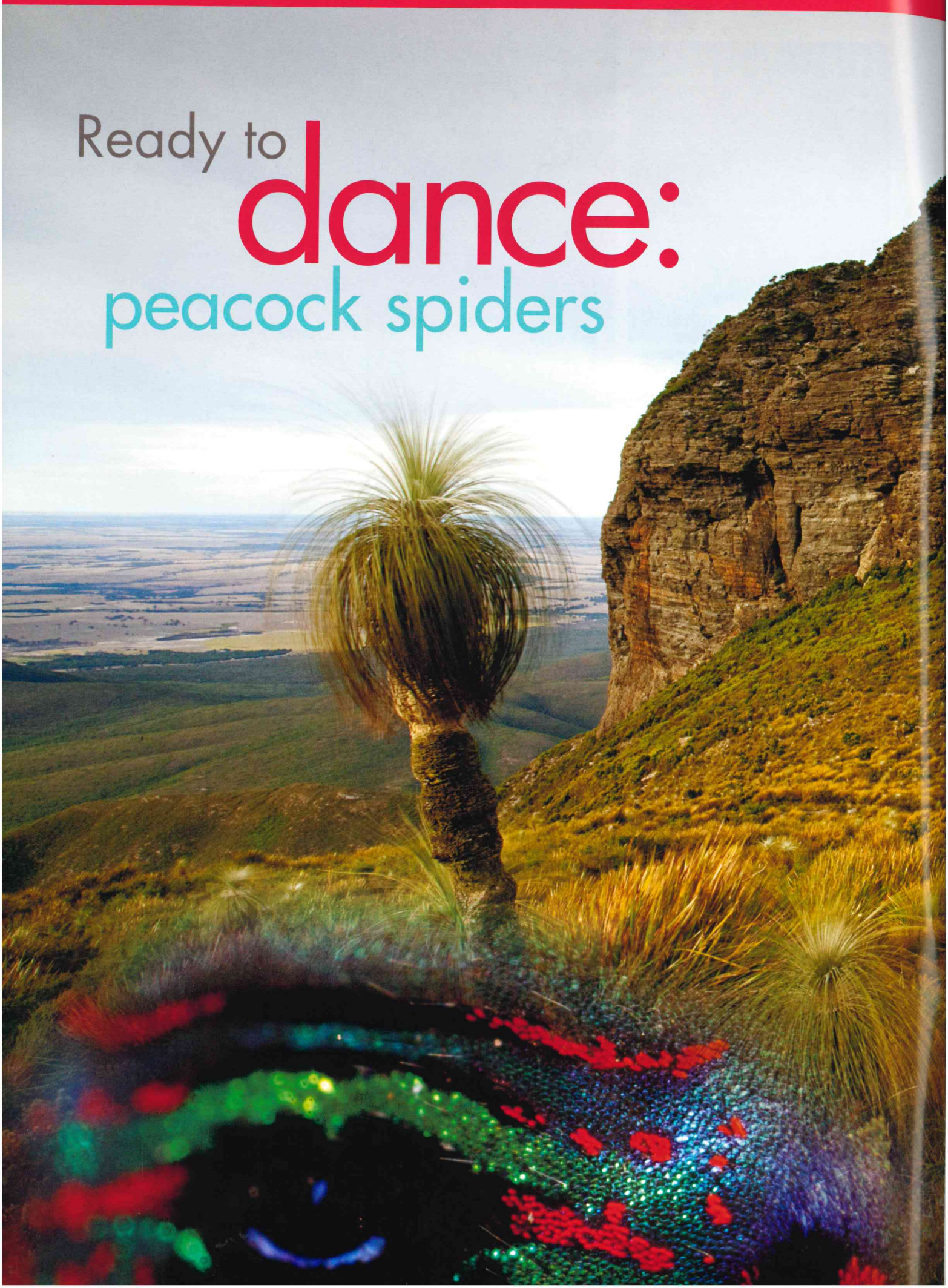
Ready to dance: peacock spiders



Found throughout the southern Australian bush, peacock spiders are tiny but magnificent. The brilliant colours of the males and the species' fascinating antics delight those who observe them. But they can be easily missed unless you know what to look for.

by Jürgen Otto

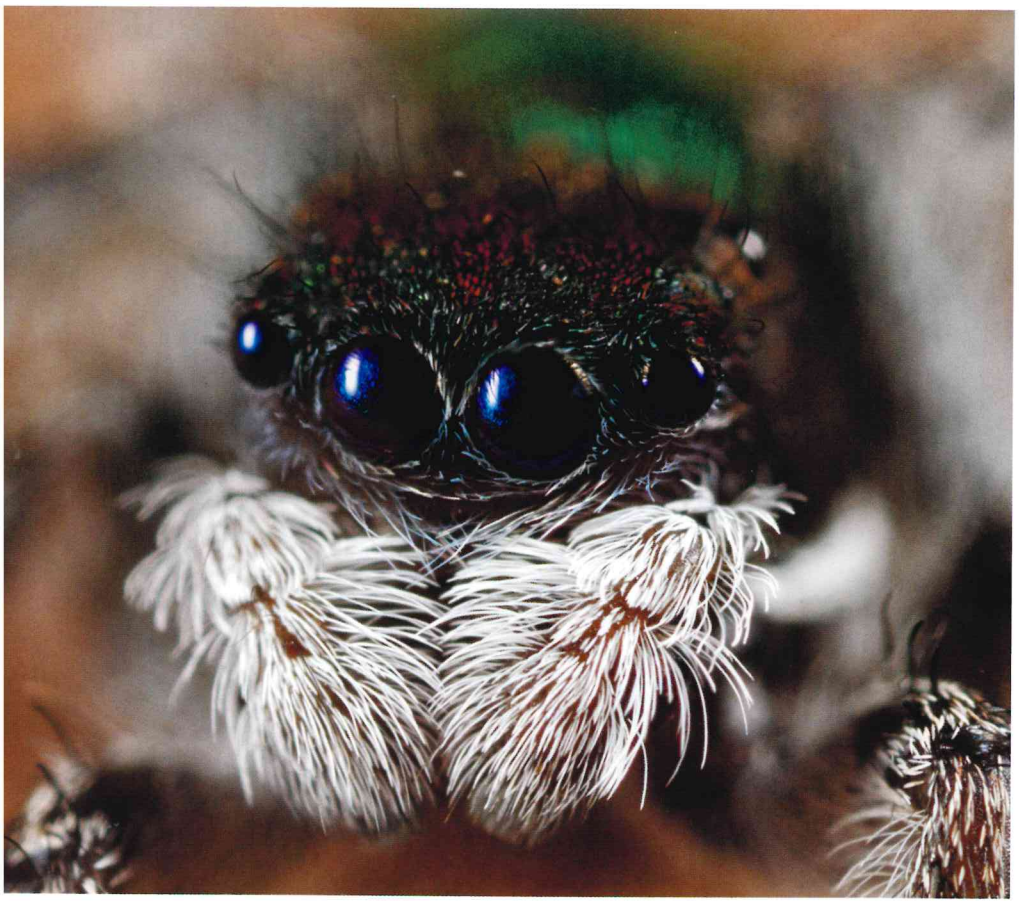
If you take a walk anywhere in the southern Australian bush between September and December, carefully watching the ground or low vegetation, you could come across one of the most intriguing spectacles nature has to offer: peacock spider courtship. With nine described species found in Australia, this ritual probably happens thousands of times each day. But, as peacock spiders are small (four to six millimetres long), it happens on a scale that most of us aren't attuned to. And this has ensured that the peacock spiders' fantastic show has largely remained their secret, until recently at least.

While female peacock spiders are primarily brown, blending perfectly into the environment, the males are the exact opposite. Brightly coloured, they stand out. Their array of colours is dazzling, including blue, yellow, red, green, purple or orange hues. And if that wasn't enough, most species sport fields of iridescent hairs on the abdomen. A closer look reveals that these hairs are not uniform, and the various colours, it seems, are associated with differently shaped hairs; some colours are produced by pigments, while others are the result of refracted light.

In most invertebrate groups, such as beetles and butterflies, it is the tropical regions that have the most colourful representatives. But not so in peacock spiders. As brilliantly coloured as they may be, peacock spiders are at home in the southern parts of Australia: Tasmania, southern Western Australia, Victoria, New South Wales, and south-eastern Queensland. Only a single species is known from the tropics and it occurs predominantly in the southern range of this climate. But their colourful appearance is not the only thing that makes peacock spiders special; there is a lot more to them than first meets the eye.

Male seeking female

Like all jumping spiders, 'peacocks' have two large front eyes and well-developed vision. Males spend much of their day looking for a partner and nothing in their immediate surroundings escapes their attention. Chemical signals also seem to play a role, and males can often be seen getting visibly excited without a female in sight. When that happens the male raises one or two legs and begins to move them up and down, as if to advertise its presence. One species even has an area of iridescent scales on the legs that reflects the sunlight, like a mirror, and produces a flash of blue light every time the legs



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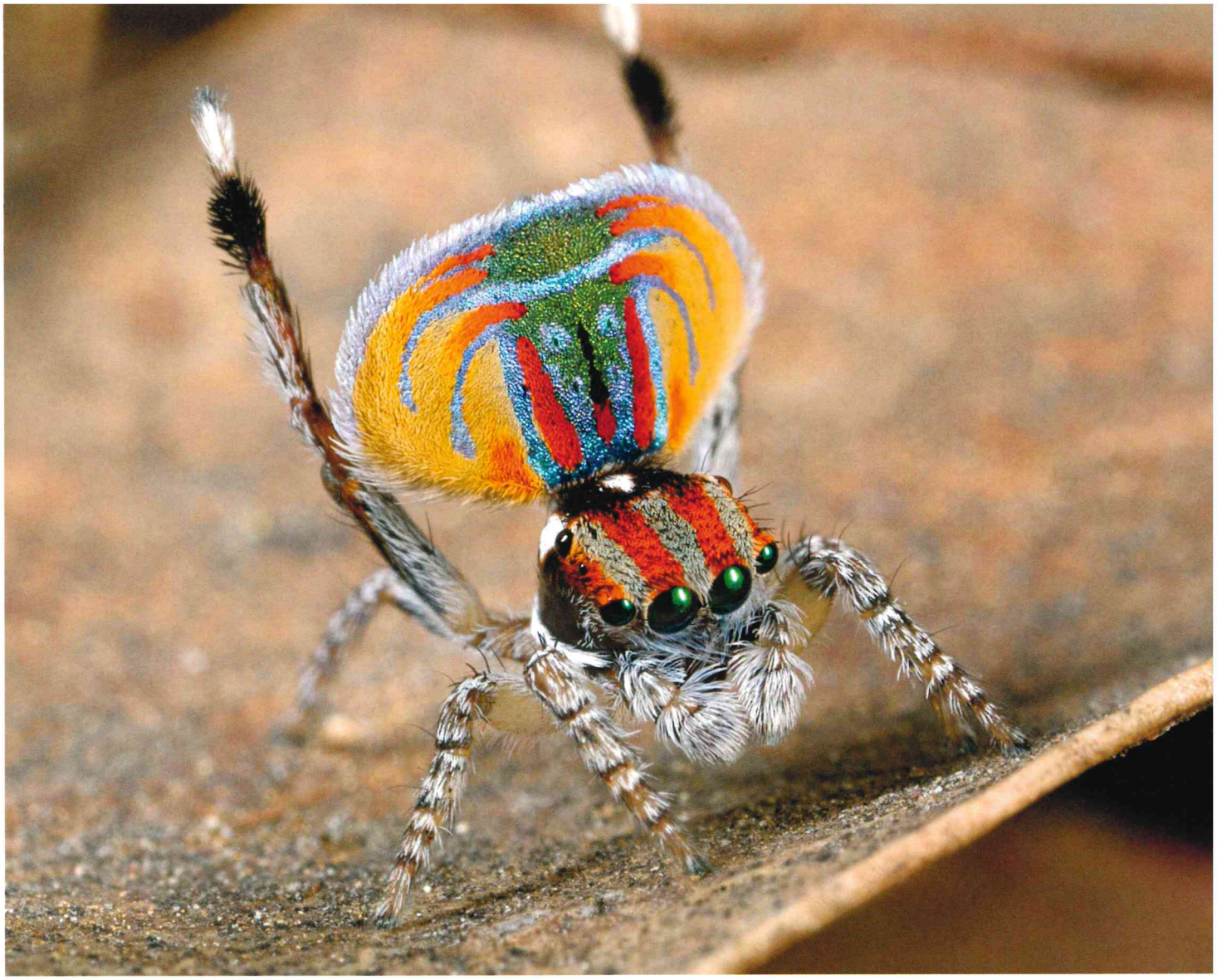
Main Ellen Peak in Stirling Range National Park is home to 'Darlington's peacock spider.'
Photo – Damon Annison
Inset 'Darlington's peacock spider' is thought to be the largest in the *Maratus* genus.

Above 'Linnaeus" peacock spider starting its courtship dance.

Left Peacock spiders have two large front eyes and well-developed vision.
Photos – Jürgen Otto



Above Male peacock spiders such as this *Maratus volans* from eastern Australia extend a colourful fan and third pair of legs during courtship.
Photo – Jürgen Otto

move. In addition, most species are able to produce sounds by vibrating their abdomen, and presumably the females are able to feel these from some distance. But all this is only a prelude to something much more impressive.

Courtship dance

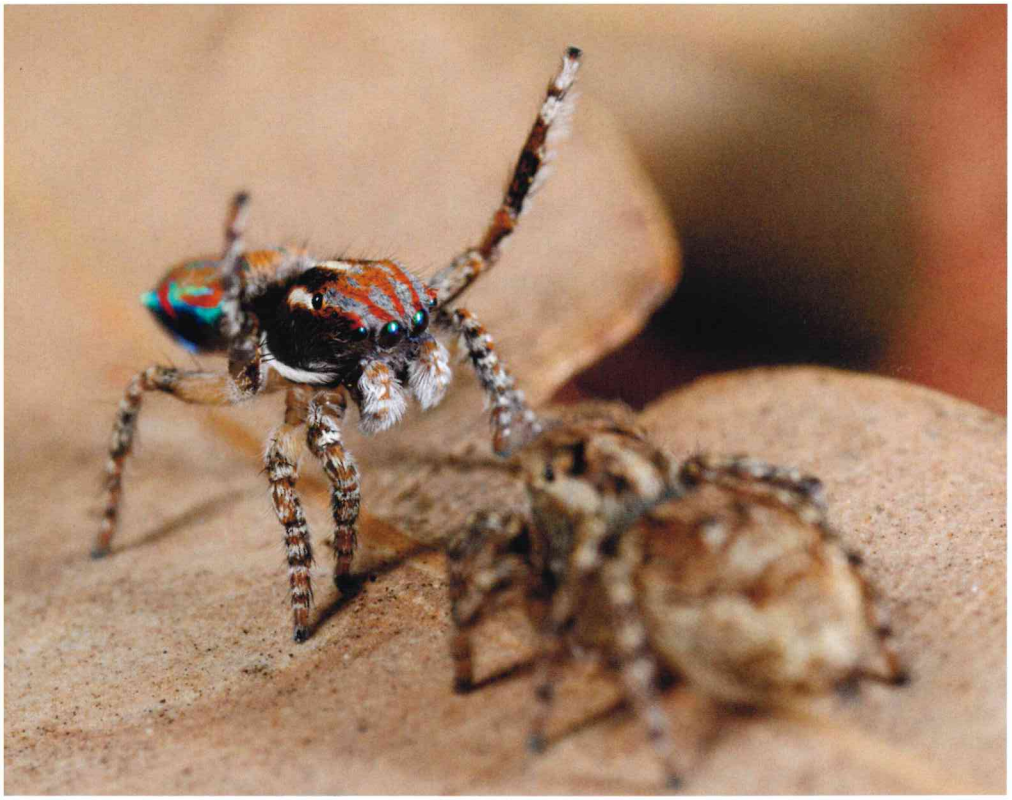
Male peacock spiders have a pair of wing-like extensions or 'flaps' on their abdomen, that most times are folded away and out of sight. When a female is in close range, the male raises its abdomen and expands these flaps in a spectacular display of colour and movement. Only then does the true beauty of these spiders become apparent, as patterns resembling grotesque faces complete with eyes and lips, bright circles, or a caricature of an entire spider, are revealed.

After the flaps are unfolded, the spiders move from side to side, raising and waving a pair of legs to further enhance their display. Some species have white tips on these legs, adding to the impressive spectacle. It is hard to say whether this show is more impressive to the female peacock spider or the human observer. But seeing one of these tiny males performing its energetic and colourful act seems to defy human logic and experience, as spiders are not an animal we associate with beauty and complex behaviour.

Romance

Once the male has performed its dance, the female's reaction will determine what happens next. In some species, already-pregnant females clearly dislike advances by males. They signal their displeasure by raising and waving their abdomens, and, on occasion, simply attack and make a meal of the male, welcome nourishment for the female's developing eggs. In other species, the females are more tolerant and let the males try until they finally give up.

If the male has found a female willing to mate, it approaches slowly from the front. Then gently, almost hesitantly, the male lowers its front legs onto the area behind the female's eyes, known as the cephalothorax. Usually, the female reacts with a little twitch. While this is a scene that humans may interpret as brimming with affection, it may just be a ritual leading to the next stage. To gain access to the female's genital opening the male climbs on top. Then, in what appears more like a painful contortionist's act, the male twists the female's abdomen by 180 degrees, before it is able to discharge the sperm contents of its pedipalps into the female's genital opening. The female is surprisingly accepting of all this. Sometimes it will move underneath a twig or leaf, which seems to make it easier for the male to rotate its abdomen. Once insemination is complete the male jumps away quickly, clearly wanting to avoid paying with its life for its amorous adventure.



Left Before mating, male peacock spiders retract their colourful fan to get close to the female.

Centre left A mating pair of peacock spiders.

Below left The common peacock spider can be found in Perth.
Photos – Jürgen Otto

Aftermath

By mid-summer most males die, having tried for months to impress females with their display. The ones that survive look a little worn—many of the colourful scales have fallen off and, in the latest stages of life, not even the sight of a female gets them excited. The females seem to hang in there a bit longer and a few weeks after insemination (the exact times aren't known) they produce a small clutch of eggs.

In autumn, when all adults have completely disappeared, some juveniles can already be seen hopping around and feasting on small insects. However, the immature males look nothing like the colourful adults. In fact, in some species they resemble adult females. Only when they go through their final moult, around September, do they assume the colourful costume.

Species of the west

Of the nine named species that are commonly considered 'peacock spiders', five can be found in WA. The common peacock spider (*Maratus pavonis*) is widespread and may even be encountered in Perth gardens. The male has a bright red 'ring' on the abdomen, resembling a target sign, and when it is close to a female its whole body vigorously shakes, as two of its legs hit the substrate. Its name *pavonis* is derived from *pavo*, which is Latin for peacock, a name that is now applied to all similar species that raise their abdomen during courtship.

The banksia peacock spider (*M. mungaich*) inhabits banksia, marri and jarrah mixed forests of south-western Australia. It is a beautiful little spider, predominantly iridescent blue with a dark central patch and some red

Above The summit of Bluff Knoll in Stirling Range National Park is just one place in the south-west where peacock spiders can be found.
Photo – Damon Annison

Right 'Darlington's peacock spider' has yet to be formally named. It can be found on some peaks in the Stirling Range.
Photo – Jürgen Otto

transverse bands on the abdomen. It has one of the largest pairs of flaps in relation to body size.

In drier areas you may encounter a more drab-looking species, the bat-like peacock spider (*M. vespertilio*). While its colouration can't match that of the others, it is unique in the males' ritual fighting. With their flaps expanded and legs stretched out, they take turns in gently hitting each other until one gives up or a little brawl resolves the matter.

Linnaeus' peacock spider (*M. linnaei*) is known only from Two Peoples Bay near Albany. Despite its very small flaps that do not extend, its courtship is fascinating to watch. As the male steps sideways, it moves backwards with each step and wiggles its abdomen between two hind legs held up like goal posts. The female follows the male's moves as if in a trance or being pulled along by invisible strings.

The coastal peacock spider (*Saitis speciosus*) can be found among sea spinach (*Tetragonia decumbens*) plants on beaches around Perth. In this species, the flaps have been replaced by a beautiful downy fringe, but the courtship dance is similar to that of other peacock spiders. It too is brightly coloured: iridescent blue with black and red markings.

A Western Australian species that has been photographed but not yet named may be the largest species in the genus *Maratus*. It is known as 'Darlington's peacock spider' in honour of American naturalist Dr Philip Jackson Darlington Jr who was the first to collect it. This species has been found near the summits of Bluff Knoll and Ellen Peak in the eastern part of the Stirling Range. Two large eye spot markings and a bright-red transverse band make the expanded abdomen of the male appear like a clown's face. During courtship this 'face' is flicked from side to side while the extended third pair of legs remains static until rearranged in quick, erratic and unpredictable bursts of activity.

Peacock spider identification

Many spiders can only be recognised by the shape of their reproductive organs. In contrast, the peacock spiders' colourations are so specific that nothing more is required to identify them than good eyes or photographs. Better still, there are many new species to discover, even close to Australia's big cities. The most recently described species, Harris' peacock spider (*Maratus harrisi*), was found as a result of an amateur photographer posting a picture of the spider on the internet, hoping that someone could identify it. It now bears his name, and several other species also known from amateur photographs are now waiting to be scientifically described.

Australia is a large country and, with very few spider experts looking for peacock spiders, it seems photography enthusiasts can play an important role in the discovery and documentation of new species. So, if you are a keen photographer, keep an eye open this spring—you may be the next to discover a new species. But respect their environment and consider that the animals you are looking for may be under your boot.

A 'flying spider' that can't fly

The first peacock spider was collected by lawyer and spider enthusiast HHB Bradley in Sydney during the late 19th century. Bradley gave three specimens to British arachnologist Octavius Pickard-Cambridge and told him that "he has observed the spiders elevating and depressing these flaps and to use them as wings or supporters to sustain the length of their leaps". Pickard-Cambridge never saw this spider alive but he did not doubt the story. So he gave it the species name *volans*, which is the Latin word for flying.

The story of the 'flying spider' was so convincing that it became accepted by arachnologists around the world. This continued even after RA Dunn reported in the April 1957 edition of *Walkabout* magazine that males of the related species *M. pavonis* use their flaps in courtship display, not for flying. It seems nobody took note of Dunn's fabulously entertaining description of the beautiful spider he discovered accidentally while clipping the grass, which his family named 'Hector'. The first claims that *Maratus* species can't fly were published only recently, in 2007. But it was not until the following year that the courtship display of *M. volans* was eventually observed and photographed for the first time.

Rising to fame

The first photographs of *M. volans'* courtship display, published in 2008, were something of a sensation. At the time virtually nobody had seen or even heard of such colourful spiders or their amazing courtship display. Owing to their brilliant colours, they quickly earned a reputation as excellent photographic subjects. Some even consider them the 'holy grail' of macro photography. Peacock spiders now feature on book and magazine covers and photography sharing sites, and videos showing them in action not only attract a considerable audience on YouTube but have also been broadcast on national and overseas television shows.

People who admit to an intense fear of spiders comment on peacock spiders being surprisingly 'cute', and there are also those who paint them, make glass models or produce quilts around peacock spider motives. There are even some who have them tattooed on their bodies. Recently the spiders inspired United States artists to perform a dance based on their moves. Will peacock spiders eventually rival the koala or kangaroo as symbol of the Australian fauna, and will visitors travel to Australia to see them? Time will tell.

Above Peacock spiders are a tiny four to six millimetres long but their prominent markings easily identify species.

Below The Tasmanian common peacock spider has a smaller abdominal fan and more blue on its legs than the Western Australian species.
Photos – Jürgen Otto

Scan this QR code to see a video of peacock spiders on YouTube.

www.youtube.com/user/Peacockspiderman/videos

Jürgen Otto lives in Sydney and spends much of his spare time photographing and studying peacock spiders.

He can be contacted by email (jurgenotto@optusnet.com.au) and encourages those who see peacock spiders to get in touch.

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