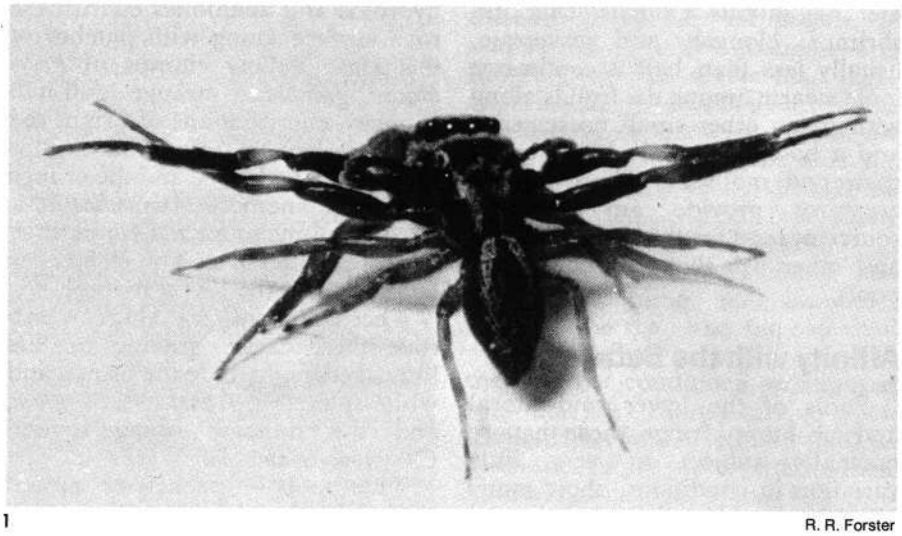
Jumping Spiders



1 R. R. Forster

Many people are surprised to find that not all spiders build webs to catch prey. Of all the hunting groups, the jumping spiders have become the most adept at catching insects without the use of snares. These fascinating little animals use their eyes to detect, stalk and jump at their insect food.

Like most spiders, they have eight eyes, but their prowess results from the special development of the front two eyes, which have acquired a remarkable ability to recognise certain features of their prey. To begin with, any of the other six eyes may detect movement, at which stage the spider swings round to face the direction from which this movement has come. With the aid of its front eyes, the spider is able to distinguish between an enemy, a possible mate, another spider or prey, and, having decided into which of these categories the object falls, can then approach with the appropriate series of behaviour patterns. If the object is prey, the spider creeps or runs steadily forward, following its victim until it is within a certain distance. At this point it pauses, crouches, and then jumps upon its prey.

When young jumping spiders first emerge from their egg sacs, however, they are not immediately able to catch prey. In fact, it takes an average of three to four jumps before the spiderling can succeed in making a capture.

It is not only while hunting that jumping spiders have set patterns of movement, but also when they come in contact with other members of their species. Although young spiders inevitably turn tail and run whenever they meet each other, when they become adult, well-recognised patterns of behaviour develop. Two males may respond with a series of leg-waving, zig-zagging, leg-bending and approach movements that signal their intentions to each other. Such encounters do not end in death for either of the spiders, but in all probability serve to warn one away from an area of intending courtship.

When a male confronts a female his behaviour may initially be similar, but lack of an identical response from the female suggests that she may be a suitable partner, and gradually the pattern of his movements changes. As he gets near, his first pair of legs are stretched out in front, parallel to each other, and with his body held close to the ground he finally touches her. With palps tapping her carapace and legs

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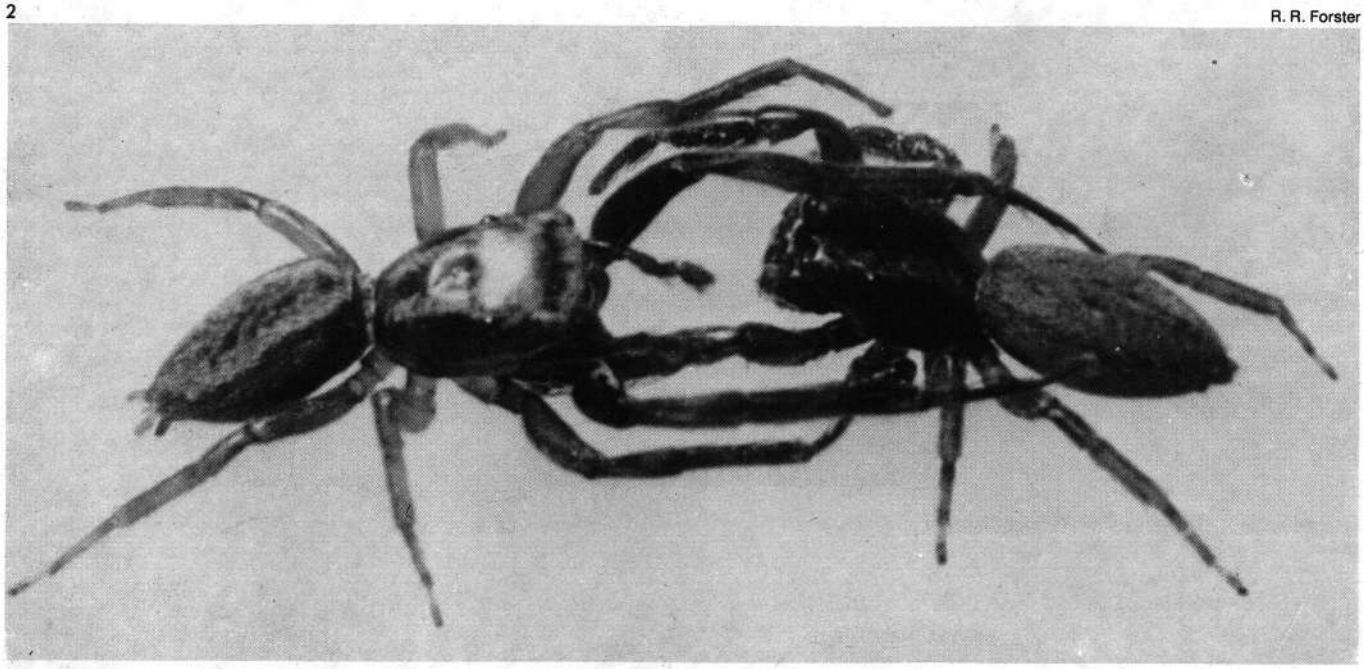


feeling for her abdomen, he creeps on top of her and mating takes place. The approach movements are described as courtship, and so spectacular are they in some species that they have been likened to the courtship displays of some birds and mammals.

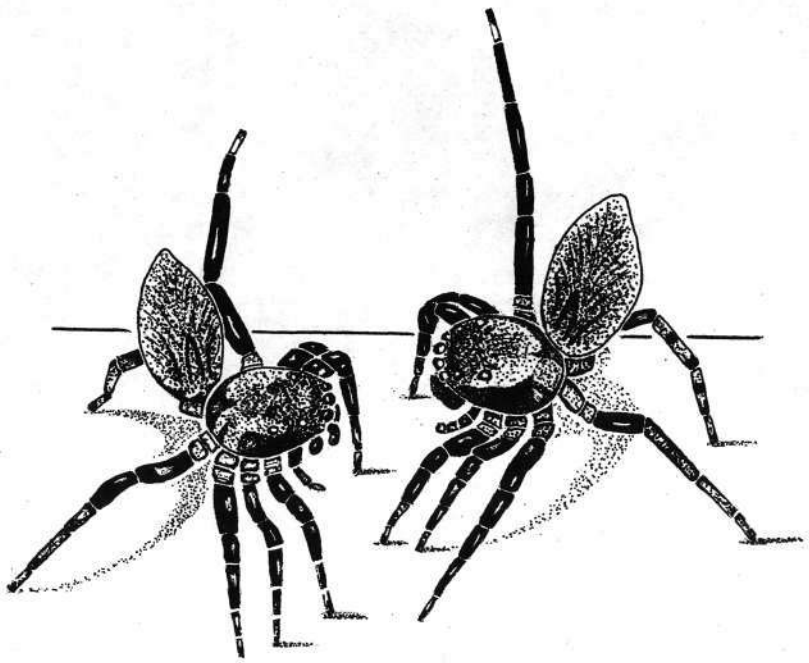
Widely Distributed

There are few land habitats which jumping spiders have not colonised. They are found on the seashore, riverbeds, under barks of trees, foliage and high mountain tops. In fact, jumping spiders are among the highest living creatures in the world, having been found hunting on the snow-covered slopes of Mount Everest up to a height of about 6,400 m. There they feed upon the springtails and mites which also abound in the area. The only habitat which they might live in but have not been found is the Antarctic, where suitable insect food exists. This is surprising, and it may be that they will yet be discovered living there.

New Zealand has its own distinctive species of jumping spiders, although they are generally less colourful than those found elsewhere. Nevertheless, they are just as fascinating and all have their own special behaviour patterns. Perhaps one spider familiar to most people will be the little jumper commonly called the house hopper. This is a colourful little spider which may be seen actively hunting for its prey and performing its courtship dances on the walls of houses in the North Island, and as far as is known, only on the West Coast of the South Island.

When the male is mature, he sports a red band of hairs above and below his eyes, and his rapidly tapping palps are plentifully clothed with white hairs so that this presence is immediately noticed by the female. The female by comparison is a "plain Jane" with a dull brown body, highlighted only by a white band stretching halo-like around the head.

The courtship dance of the male house hopper is unusual among jumping spiders in New Zealand. Instead of raising his front legs to signal, he uses his third pair of legs. As well, he raises his abdomen at right angles to the body and sways it rhythmically from side to side. Once having recognised the female, the legs are lowered, the abdomen continues to wave from side to side, and with a series of zig-zagging movements the spider carefully approaches the female. He does so slowly, circling warily round her, never taking his eyes off her ever-watchful posture.



3 L. M. Forster

1 Two male jumping spiders come into contact after an elaborate series of movements.

2 A male brown jumper manipulates the abdomen of a subdued female prior to mating.

3 A drawing of two male house hoppers displaying vigorously to each other.

Even if the female is quite willing to mate, she may well run away a few times, but each time the male will get closer to her, using the same series of movements. When he gets within a few centimetres the abdomen is lowered to the ground and the front legs are stretched out in front. He taps her and climbs on to her in the same way as other spiders. If, however, the female has already mated, she performs her own special dance — one that is quite unique among New Zealand jumping spiders. As soon as she sees him she raises her legs and abdomen in exactly the same way as the approaching male. Swaying from side to side, she keeps in rhythm with the male and when he sees her behaving in this way he comes no closer. If the female gets quite near to him while performing these movements, he will turn tail and run, for this behaviour apparently signals to him that he would be well-advised to turn his attentions elsewhere.

When two males of this species come face to face their behaviour differs from the courtship performance. Initially both males raise their third pair of legs and abdomen high in the air. Almost immediately however, their abdomens are bent to one side and they proceed to creep

1 towards each other using the third pair of legs and abdomen as signalling devices. Zig-zagging from side to side, they continue to edge closer and closer until finally, cheek to cheek as it were, they spread their fangs, their palps and their third legs sideways so that each pair comes in contact at the tips. Having made this contact, one of the males will drop his legs and turn and run away.

When two males are kept in each other's company for some time, they show very little interest in each other. However, if the same two males are placed together after

2 separation, they will go through the same procedure again. Significantly, it is always the same spider which withdraws from the action.

The reason for such behaviour in male jumping spiders is not well known, for it is generally accepted that spiders are not territorial. Among many birds and mammals, for instance, where males have quite ritualised performances, they generally do so to protect the territory in which they live, mate, and often rear their young.

Green Jumper

Another handsome jumping spider, the green jumper, is often found in the curled up leaves of flax and cabbage trees. With its long black legs, black head region and

3 green and yellow-striped abdomen, this spider is a striking creature. With great agility, it leaps about the flax bush in search of prey. It probably holds the New Zealand record for a long-distance jump, and as it does so with great accuracy it is reasonable to assume that this spider has even better eyesight than some of the other jumping spiders.

The male green jumper has its own special behaviour in approaching a female, using, like most jumping spiders, the long, black and heavily built front legs to signal his intentions. Not only has this spider a highly ritualised performance in response to other males, but it also displays a fascinating reaction to its own reflection in a mirror. Upon first glimpsing itself, it raises its front legs high and wide. Moving rapidly from side to side and alternately tapping vigorously on the ground with its two front legs, the spider approaches its image. As it gets closer, the front legs tap the ground even more sharply and there is less raising of the front legs in the air, until the spider finally makes

contact with the mirror. At this stage the spider struggles to touch the legs of the "other spider". When he fails to do so, however, he usually turns and runs away and refuses to respond to his mirror image again for quite some time. It seems that he realises there is something odd about his "opposite number".

There is another similar but unrelated spider which also lives in the flax. This is a squat, brown spider, far less active than the green jumper. It prefers the dead, brown rolled-up leaves of the flax plant and is seldom seen hunting its prey out on the leaves. It is considerably less aggressive than the green jumper and if two males of these different species come in contact with each other, it is always the brown jumper which runs away. Although its colour and pattern are less conspicuous than in the green jumper, the courtship dance is more elaborate and more spectacular. Perhaps this compensates for its lack of colour. The male of this species is frequently found inside the house during February, March or April, particularly after wet weather. It would appear that when the male matures, it goes around in search of a mate.

Some of the largest and most interesting jumping spiders are those which live high on the South Island mountains above the snowline. These are large black-bodied spiders which live among and beneath the stones. There are a number of species scattered along the whole of the Southern Alps, but the two most familiar are the white-bearded mountain spider and the orange-bearded mountain spider. The white-bearded one is predominantly marked with white hairs, while both the immature spiders and the adult females have a white band of hairs below the eyes. The orange-bearded spiders, by contrast, are covered with a number of orange-yellow hairs, while the young and females have a thick orange beard or band of hairs below the eyes. The males of both species, however, are jet black, having lost their distinctive hairs and coloration during the final moult. It might be wondered how it is possible at a glance to tell the males of the different species apart: admittedly it is difficult, but a practised eye can determine the various faint markings on the abdomen which are characteristic of the different species.

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Common Origin?

The behaviour of these two species is extraordinarily similar and suggests that these spiders have come from the same original stock. It is highly likely that during the Pleistocene ice ages groups of these spiders were isolated on mountain peaks right along the Southern Alps. During the long period of isolation, these separate populations continue to evolve and change, thus leading to the number of different species today. However, during the course of evolution they retained very similar behavioural patterns because environmentally they were exposed to very similar conditions with few pressures upon them to change their behaviour.

Since that time, conditions have permitted the boundaries of the white-bearded and the yellow-bearded spider to overlap in some areas and it is a matter of speculation as to how the females of these two species can tell the two males apart. It is possible that there are subtle differences in the male's behaviour which observers have not yet detected. It is also probable that these animals use scent as an added attraction during courtship procedure and that this is a further aid to recognition. That scent plays a part in the mating of spiders, there is little doubt, but experiments have yet to be made to prove this conclusively.

The complexities and peculiarities of the life and behaviour of this fascinating yet common group of spiders are only now beginning to be unravelled. Of the hundred or more species found in this country, no more than a dozen have as yet been observed and recorded.

R. R. F./L. M. F.

1 The black front legs and carapace are distinctive features of the green jumper.

2 Female jumping spider with striking orange-yellow "beard". Spiders such as this may be found at high altitudes on some South Island mountains.

3 A male jumping spider responding to his own image in a mirror.

4 The mature male house hopper has a reddish "forehead" and white hairy palps as distinguishing features.

5 This female mountain spider has a white "beard" and distinctive markings.

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All photos by R. R. Forster