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The Australian Museum

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Article

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Australian Fringed Jumping Spiders, or Australian *Portia* (hereby referred to as *Portia*) are specialist spider-eating spiders which have attracted a great deal of interest in recent years due to their extremely varied and adaptable prey capture techniques, their ability to learn from previous experience, and to solve mazes from observation. As a result they have been sought out for studies by zoologists, ethologists, and even psychologists.

These arachnids are often quite difficult to locate in the field as they are highly cryptic in both appearance and behaviour – but, fortunately, given the right conditions they are relatively easy to breed and raise.

The species is apparently found from Nepal, Sri Lanka, Taiwan and Australia but future studies may reveal several cryptic species listed under this name as behaviour - if not appearance - varies greatly over the range. The species in Australia is represented by two distinct populations with differing behaviour - and even here more than one species may be involved. The northern Queensland variety is slightly smaller, has the most varied prey capture techniques of any animal in the world barring ourselves and other simians, prefers forested habitats, always uses a dead leaf as an egg receptacle, and is far easier to raise. The Northern Territory version is far less sophisticated in its hunting methods, prefers rocky overhangs and caves, never uses a leaf as an egg receptacle, and is quite troublesome in comparison to maintain, raise, and breed. Queensland *Portia* readily and carefully stalk and relish other species of Salticid spiders – Northern Territory *Portia* cannot work out how to catch them initially and treat them as they would web – building spiders before abandoning normal methods and just trying to chase them or jump on them whenever they come close – or else give up and ignore them.

The methods used to raise them are the same in each case. Once hatchlings have undergone their first moult and are able to feed they are placed separately in individual glass jars (with the labels removed to give clear visibility) with ventilation SLITS in the lid (made with a sharp knife or razor blade). Do not use holes as in their early stages both the spiderlings and their prey can escape through small openings. Into each jar a number of dead leaves and twigs are wedged or curled (so the tension prevents the material moving loosely about if the jar is tilted or turned right way up) to give the spiders something to cling to as they establish their rudimentary webs – *Portia* is unusual amongst the majority of Salticid spiders in building and maintaining a web as a homesite. These jars are placed on shelves lid side down. This has a number of advantages (a) if the jars are right way up the spiders invariably take up residence and attach their webs to the lids making escape or webbing damage a likelihood every time you open the jar, (b) visibility is enhanced as there is more light in the jar due to the lid not providing shade plus the spiderlings are readily visible where-ever they are inside so accidentally trapping them in the lid is eliminated (c) carbon dioxide is heavier than oxygenated air and sinks to the bottom to dissipate out of the ventilation holes reducing a stale air build up as occurs in upright jars, (d) the liquid spider excreta drops onto the lid where it can be regularly rinsed off as opposed to a full jar clean-out which may be necessary if the jar was right way up.

The spiderlings are hydrated by adding either a short spray of water from an atomiser or a quick couple of water drops from a pipette/eye-dropper once or twice a week depending on external humidity and temperature. Lighting is either artificial 12/12 or using natural daylight – both have been used successfully but anecdotally (i.e. not tested) survival rate seems better under natural lighting. The spiders are not exposed to direct sunlight - as they seem to prefer shaded places in nature – but the ambient light is good enough to readily see them and their behaviour. Diet is other spiders from the moment of their first moult. They have been recorded feeding on insects but laboratory tests show that survival rate on insects alone is very poor, insects and spiders is better, and best survival to maturity of all is *Portia* raised on a spider-only diet (Li & Jackson 1997). Fortunately they will also eat spider eggs and hatchlings. The easiest way

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Photo Stuart Humphreys (c) Australian Museum



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Northern Territory male

to raise them is to collect a suitable-sized prolifically breeding species of spider and cultivate that as well and simply feed the young *Portia* with the young of the other species. In Australia this is easily taken care of with a small colony of Red-back Spiders (*Latrodectus hasselti*) – both the egg and young of which are eaten by all ages of *Portia*.

As the *Portia* grow any other suitable-sized spider may be used but it is important if your *Portia* numbers are small to watch what happens. If the *Portia* is preparing to moult, or isn't hungry for some other reason, the other spider is just as much a predator and just as dangerous to a *Portia* as it is to any other prey. Many unintended *Portia* may get killed and eaten by their intended prey this way. Daddy-long-legs (family Pholcidae) are particularly dangerous to non-hunting *Portia* as their long legs allow them to immobilise a resting *Portia* with silk from a safe distance to themselves. Nevertheless *Portia* love Pholcids when hungry! If the *Portia* has not started to hunt the prey spider within 30 minutes then it is best to remove it and try again in a day or two. I find a straw bristle from a broom is excellent for herding both *Portia* and their prey out of jars and over to where-ever you want them. Watching the *Portia* hunt is good for at least 2 reasons – (1) to determine that all is well, and (2) that is the most interesting aspect of *Portia* and the reason for all the interest – watching the *Portia* presented with a spider species it has never seen before go through 5 or more different methods until it discovers what works for this species and then the next time it is offered this species 'remembering' what worked last time without all the need for trial and error, or the alternate stalk and freeze approach when hunting another jumping spider (which has just as good vision as *Portia*) can take up quite a bit of time but is well worth the observation. Under normal conditions leaving the remains of prey in the jar causes no problems and I have raised 1st moult hatchlings to maturity with the remains of every meal and every moult still in the jar with them with no ill effects. It is fascinating to watch a *Portia* scan a jar with many lifelike bodies in it yet still pinpoint the live spider every time. However if the bodies start growing mould this indicates that the container is too humid and everything should be removed and the jar cleaned out. If you wish to remove the prey remains for aesthetic reason either the broom straw or some fine forceps may be used but try to minimise damage to the *Portia*'s web as they frequently moult soon after a meal.

Once mature *Portia* are easy to sex. The males are obviously darker with a white cephalothoracic stripe and a spindly body. Palpal differences are a little masked as the females have a fringe of hair on the palps which makes them a similar width to the male palps.

Once the spiders are mature place a female in as large a jar (or a small escape-proof terrarium) as you can, and add in several thin twigs wedged in (you can use blu-tac if you wish) so there is plenty of space but an immobile structure of twigs to suspend a web between. NOW add in sequentially as much food as she can eat at a sitting (check as before that she is eating them rather than being eaten herself) and keep this up for at least a week. Then add in 2-3 small dry leaves with a slight curve to them – the size of, and a bit like, the bowl on a teaspoon). After a day or two you may notice that the female has hoisted one of these up into her web and may be resting on it. NOW add in the male by placing his open jar adjacent to the open jar of the female and watch the proceedings. The courtship involves much leg waving and can go on for hours, but if the female actively starts running at the male allow him to leave the jar – or remove him - and wait a further few days before trying again. You can sometimes improve things by siting his jar next to hers so they can court through the glass. At any rate add him again and she should accept him – if not repeat the process or try another male – continued rejection could mean one or both spiders still have a moult to go. Once mating has occurred, or you suspect it may have after 2-3 days, remove the male – females rarely eat males unless they get continually pestered by them after they are already impregnated. The female *Portia* will spend a lot of time on the leaf and, when she lays, she will camouflage the eggs against its surface. Egg laying has occurred when the female appears to have dramatically reduced in abdominal bulk. Once they have hatched the young will initially stay close to the leaf and not move much - however once they have moulted and you see all the tiny moults in the web this is the time to remove them and raise them separately. The NT *Portia* are a little different as they do not use the leaf as an egg receptacle but suspend the eggs in a flimsy transparent envelope of silk within the web. Raise the young *Portia* as outlined before.

Some variations on this are to leave the young in together or place several small groups into several large jars. Here they will cannibalise each other even with the presence of other spider species. Growth will of

course be quick and this method may be necessary if you have no other source of food for them but you will reduce your population rapidly. However you will invariably then end up with a juvenile pair per jar which will co-habit quite amicably and mature together. This is particularly the case with the NT *Portia* which are regularly found in the field as immature pairs sharing the same web.



Photography Stuart Humphreys (c) Australian Museum

Northern Territory female

Problems/areas of further study?

Occasionally in tackling another spider a *Portia* will get bitten on a leg and will jettison this limb. In at least one case a female which lost a limb and moulted to maturity shortly afterwards with 7 legs produced an eighth leg about 7 days later which was smoother and thinner but just as long as the original. The specimen is in the Australian Museum collection.

NT *Portia* seem to have fertility problems and although mating is observed the female may produce a number of infertile egg or else lay eggs and then eat them. The reasons for this are not known. Sometimes *Portia* will experience moulting difficulties and die in moult.

Portia will readily eat insects which a prey spider has caught and begun feeding on. It is suspected that this may be due to the presence of spider venom in the insect but more work needs to be done. Genetic work on *Portia fimbriata* is needed to determine how many species there actually are.

References

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