

Lessons from the Legless Lizard

Captive husbandry of the scaly-foot
sub-species (*Pygopus* spp.)

*Many readers will look twice at the headline for this story and question the sanity of the author. Is there such thing as a legless lizard or a legless gecko? Strictly speaking the answer is yes, but **Rob Porter** proves a simple affirmative is not nearly enough when it comes to identifying the genealogy of this fascinating species.*





Opposite page: Common Scaly-foot (*P. lepidopodus*) owned by author. Photo by Shannon Plummer.
This page: Head shot of a Western Hooded Scaly-foot (*P. nigriceps*).

In his groundbreaking examination of the scaly-foot species in 1974, well-respected taxonomist Arnold Kluge made some pretty spectacular claims. His extensive research proved the ancestor of these legless reptiles known as flap-footed lizards or pygopods was indeed a lizard that looked very much like today's geckos.

In more recent times, researchers have gone a step further by including them in an infraorder of lizards known as the Gekkota along with the true geckos (Han et al, 2004). Many would question why these two groups should be combined when they don't look alike. But, there are several internal morphological features as well as ecological and behavioural characteristics that support the family ties. The most evident similarities are that geckos and pygopods are the only lizards able to vocalise and use their tongues to clean the eye; and both groups almost invariably produce only two eggs in each clutch. However, the two groups often have very different needs in captivity. The legless lizards are mostly active during the day (diurnal) as opposed to the predominantly nocturnal geckos. The pygopods also enjoy higher temperatures than the geckos and many will actively bask under a heat source. They are also chiefly ground-dwelling or terrestrial reptiles unlike the geckos, many of which are superbly adapted for climbing and enjoy vertically

orientated enclosures. Yet, legless lizards are surprisingly hardy and undemanding captives. One of the most straightforward to maintain are the Scaly-foot species (*Pygopus* spp.).

Natural history

There are currently four recognised species in the genus *Pygopus*; the Common Scaly-foot (*P. lepidopodus*), the Western Hooded Scaly-foot (*P. nigriceps*), the Eastern Hooded Scaly-foot (*P. schraden*) and the Northern Hooded Scaly-foot (*P. steefescotti*) (Wilson and Swan, 2008). The first species is primarily an inhabitant of the southern third of the Australian mainland while the other three cover the majority of the northern two-thirds of the country between them.

All of the species prefer dry habitats – the Eastern and Western Hoodeds are found in sandy or stony deserts – while the Common and Northern Hooded opt for open woodland and heathlands. All of the species are quite secretive and spend much of their active time partially concealed in grass clumps and leaf litter. When inactive a variety of objects including rocks, logs, animal burrows and even soil cracks are used for shelter. Although most legless lizards are diurnally active, the Hooded Scaly-foot group is one of the exceptions to this rule and is primarily nocturnal. The Common Scaly-foot on the other hand is usually diurnal,

but in very hot weather they can often be found moving about after dark and are a common sight on bitumen roads at night.

All species are variable in their colouration, especially the Common Scaly-foot. Most specimens of this species from the east coast of Australia are plainly coloured in various hues of brown or grey-brown. By contrast, some Common Scaly-foot from southern and south-western Australia are spectacularly marked with rows of dark spots and blotches along the body often interspersed with pale stripes. Intermediate forms with markings around the head, neck and tail also occur. As their name suggests, the three Hooded species are characterised by a large dark blotch on the back of the head and/or neck, although the intensity of these marks varies considerably. The rest of their body may also be distinctively coloured to a greater or lesser extent, often with a fine checkerboard pattern. The Common species is by far the largest of the group, with some specimens reaching a metre in length, about three-quarters of which is tail. The Hooded species are much smaller in length, rarely exceeding 40cm in length, about two-thirds of this comprising the tail.

Husbandry

All scaly-foot species are principally terrestrial, rarely climbing higher than 20-30cm off



the ground among vegetation. They do however, enjoy coiling among grass tussocks and other low, dense vegetation where they can bask or watch for prey in relative safety. Consequently, an enclosure that is horizontally orientated but with a little vertical height is ideal. Due to its larger size, the Common Scaly-foot should be given a larger enclosure than the Hooded species. A cage of around 90x40x40cm high would suffice for one-to-three Common Scaly-foot; enclosure dimensions for a similar number of the Hooded group should be about 60x30x30cm. Timber, glass or plastic are all suitable cage construction materials as the captive environment will be kept fairly dry. Ensure there is good ventilation throughout by installing vents at both the top and bottom of the cage. This ensures the passive warm air flows out the top of the cage while the lower vent holes draw in fresh cooler air. These lizards don't appear to be prone to rostral abrasions caused by rubbing against mesh vents, so it is not necessary to restrict access by installing vents high up on the cage walls. A word of caution, these lizards are master escape artists, so make sure the cage is completely secure and has a tight-fitting lid.

The lizards do not appear to be particularly fussy about the enclosure substrate. The depth of the substrate only

needs to be around 2-3cm as none of the species excavate their own burrows, although they will use a burrow, such as a buried piece of pipe, if it is provided. Fine sand works well as it is readily available, cheap and easy to keep clean. The Hooded species looks great on red desert sand, which brings out their true colours. However, this is not essential and pale sands such as commercially available plasterer's sand will do equally as well. Alternatively, a coco peat or similar material can be used as long as it doesn't contain a high proportion of fine dust. At the other extreme, paper towel or plain newspaper can also be used quite successfully with all members of the group.

Furnishings need to be robust to cope with the activity of these relatively large lizards and kept simple so it is easy to maintain the cage environment. And remember to include at least one hiding spot for each inhabitant. These can take the form of natural refuges such as pieces of bark or flat rocks, or artificial hides like up-turned plant pot saucers with access notches cut in one side. Ideally these hiding spots should be big enough to comfortably fit a coiled legless lizard, but should also be only 2-3cm high off the substrate as the reptiles will feel more secure if they are in contact with both the substrate below and the 'ceiling' of the refuge above. In addition to these home sites

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Opposite page from top: Custom scaly-foot enclosure, male Common Scaly-foot (*P. lepidopodus*) feeding on mashed fruit.
 This page: Common Scaly-foot (*P. lepidopodus*) in a natural setting. Photo by Shannon Plummer.

another hiding area should be supplied that is always kept moist. A small plastic container of moist cage substrate or Sphagnum moss will serve this purpose well. Cut a small entrance hole either in the top or side of the container and water the contents regularly so they stay moist but not wet. The Hooded Scaly-foot in particular seems to appreciate this feature and usually spends much of the day coiled among the moist substrate, possibly as a reflection of their use of cool, humid burrows in their natural desert habitat.

Other optional furnishings include a grass tussock or other pieces of vegetation, either natural or artificial. All species seem to enjoy curling among the stalks and leaves either to bask or await passing prey. Other low-climbing features such as logs or robust branches can also be installed and may be used by the inhabitants from time to time providing a better use of the three-dimensional aspects of the enclosure. A water bowl needs to be available at all times.

At this stage it is unsure if any type of Ultraviolet light is important to these lizards. Based on their normal activity patterns, it is fair to assume that the diurnal Common Scaly-foot may have developed a need for exposure to Uv light, thus it may be beneficial to provide a full-spectrum light source for this species. On the other hand, the nocturnal Hoodeds will probably do well without these light wavelengths.

Similarly, Common Scaly-foot will happily bask under a heat source up to 36-38°C during the day, while *P. nigriceps* and other Hooded species appear to do well with a hot spot of low-to-mid-30°C possibly in the form of an under floor heat pad rather than a light source. Both species are very tolerant of cold temperatures with winter cooling periods down to low teens or even single figures at night. This is probably important for synchronising the reproductive cycle in all species.

All species are relatively unselective regarding food, with most invertebrate types taken readily. One tip though, scaly-foot are not the most agile of hunters and they often find fast moving prey items such as cockroaches and crickets difficult to catch. Sometimes they appear so inept at catching and holding prey that you have to wonder how they find food in the wild. For the Common Scaly-foot at least this might be explained by their natural diet, which consists of a high proportion of burrowing spiders such as Trapdoors and even Funnel Webs. The spiders are probably cornered inside their burrows where there is no escape and dispatched quickly before they are able to inflict a bite on their reptilian predator. Consequently, to ensure food items are eaten fresh and at their most nutritious it is wise to either offer food from forceps or blunt tweezers. Alternatively, insects could be cooled in a refrigerator for 10-15 minutes before feeding to slow down their

movement and make them easier to catch. All scaly-foot have quite prodigious appetites and will readily consume six-to-eight fairly large insects at a feed and probably a few more if given the opportunity, although the above quantity twice a week during the active season should be adequate as additional items may lead to obesity. Insects should be dusted with calcium powder at most feeds and with a multivitamin supplement once every seven-to-10 days.

All of the species, but especially the Common Scaly-foot, appear to relish soft, sweet fruit. This can be provided as either chopped or mashed fresh fruit or tinned fruit pieces or pulp such as a sauce or baby food. Banana, mango, paw paw, strawberry, apple and pear are all eagerly accepted and will be licked vigorously initially and then eaten by the mouthful once animals become accustomed to the food item. Offer these items in moderation; a small dish once a week is ample. These fruit diets are also a good way of providing calcium or multivitamin supplementation as, once added to the mix, the powder will stay in place until the fruit is eaten, unlike powder dusted on to an insect, which will quickly try and groom the powder off itself.

Breeding

Although scaly-foot have never been extremely popular as captive subjects, they have been maintained from time to time as illustrated by



This page from top: *Pygopus lepidopodus* photographed at Numinbah State Forest, *Pygopus schraderi* photographed in north Queensland. Photos by Scott Eipper.

Below: Dorsal view of the vent area of female limb flaps, dorsal view of the vent area of male limb flaps. Photos by Rob Porter. Opposite page: Common Scaly-foot tasting the air. Photo by Shannon Plummer.



the occasional paper or article in Australian magazines, newsletters and journals over the years. However, despite this, there are no records of true captive breeding of any *Pygopus* species, only anecdotal reports of egg laying, incubation and hatching of eggs from wild-caught gravid females. In recent times, the growth of the reptile hobby has led to a subsequent increase in the maintenance of these legless lizards and a few reports of captive breeding in both Common and Hooded species. The emphasis here though is on 'few' because the number of true breedings of any member of the group can be counted on the fingers of one hand. In addition to this, most of those who have achieved the breeding of these reptiles often fail to repeat the success on a regular basis.

Sexing scaly-foot is relatively easy with adult specimens. The Common species in particular can be sexed visually without even handling the reptiles provided they are mature animals. The easiest method is to view the lizards from above over the vent area so the limb flaps can be seen. The male's flaps are much larger than the female's and protrude laterally distinctly further. Beneath the flaps are small cloacal spurs similar to those found in pythons. Examination of these spurs in the Hooded Scaly-foot species will show that those of the male are larger and more distinct than the female's spurs. The difference is also observable in the Common Scaly-foot if an additional sex confirmation is needed. This can be a somewhat tricky exercise especially if the animals are not used to being handled and begin to struggle. The easiest method is to use a toothpick or small paint brush to gently lift the flaps away from the body so the spurs can be examined.

Female Common Scaly-foot appear to be the dominant sex and, if unreceptive, some males can be viciously attacked leaving permanent scars and the loss of the tail in some instances. Hooded Scaly-foot appear to be much more tolerant of other specimens of either sex in the same enclosure, but aggression can still occur, so initially new introductions need to be monitored closely. If pairs are compatible they can be maintained together all year round. If the female is particularly aggressive towards the male and breeding is desired, it may be advisable to keep the sexes apart for most of the year and introduce the female into the male's cage for brief periods in spring for mating, watching them very closely for any signs of excessive aggression.

Data from wild-caught females and the little captive breeding that has taken place indicate that mating usually occurs in spring and early summer, with eggs being laid between October and January. The Common Scaly-foot will quite readily lay its clutches of two eggs in a small container of moist substrate (as described above). As long as the laying area is enclosed under a lid, the eggs are not usually buried. They are simply laid in a shallow depression on the surface of the substrate. The two eggs are bullet shaped and measure around 38x20mm. Multiple clutches can be produced in a single season, with up to three clutches one month apart recorded in the Common Scaly-foot. Eggs should be incubated in moist perlite or vermiculite at 27-30°C and will hatch after 60-80 days within this temperature range. The hatchlings are miniature versions of the adults and are very active from the start. They appear to be somewhat reluctant to feed for the first week or so, possibly relying on the stored yolk from the egg. However, once they begin to feed they, like their parents, appear to be happy with most types of appropriately sized invertebrate prey items as well as weekly offerings of fruit pulp, which is eagerly lapped up with the fleshy tongue. Little is known about the length of time juveniles take to reach sexual maturity or the overall longevity of any of the species, though at a guess breeding would probably not



take place until the lizards were at least two-to-three years old and, given the correct captive conditions, it wouldn't be unreasonable to expect an individual scaly-foot to live for at least 15-20 years.

The scaly-foot species is a fascinating group of lizards that are very easy to maintain successfully in captivity. Because of their size and unusual appearance their popularity is growing, yet there is still a great deal that we don't understand about their biology particularly with regards to their reproduction. Hopefully, as their appeal increases, more people will

attempt to keep and breed these reptiles and with time we may unlock the keys to consistent and reliable reproduction. One last thought, what really is the correct term for more than one scaly-foot? Is it scaly-feet, scaly-foots or just scaly foot? A question for another time.

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