

# Aquatic activity in *Podarcis muralis* (Laurenti, 1768) on Evvia, Greece

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## INTRODUCTION

During a herpetological excursion to Greece, a locality on the western slopes of Mt. Dirfis on the Greek island of Evvia (Euboea) was surveyed on 18-19 April 2005. Evvia is the second largest island of Greece (3,658 km<sup>2</sup>) and is situated in the westernmost part of the Aegean Sea, very close to the Greek mainland. The highest mountain of Evvia is Mt. Dirfis in the central part of the island; the highest peak is named Delfi and reaches an altitude of 1,743 m. The locality in question was situated 3 km east of the village of Steni. The habitat consisted of low montane, mixed deciduous and coniferous forest in an altitudinal range of approx. 675-700 m. In this note, my observation of voluntary, possibly even deliberate aquatic behaviour by *Podarcis muralis* is reported. This species was recorded for the first time on Mt. Dirfis by RICHTER & MAYER (1990), however, it is obviously common throughout this mountain (Bringsøe, in prep.). So far, it is not known from other parts of Evvia, which are in general considerably warmer and drier.

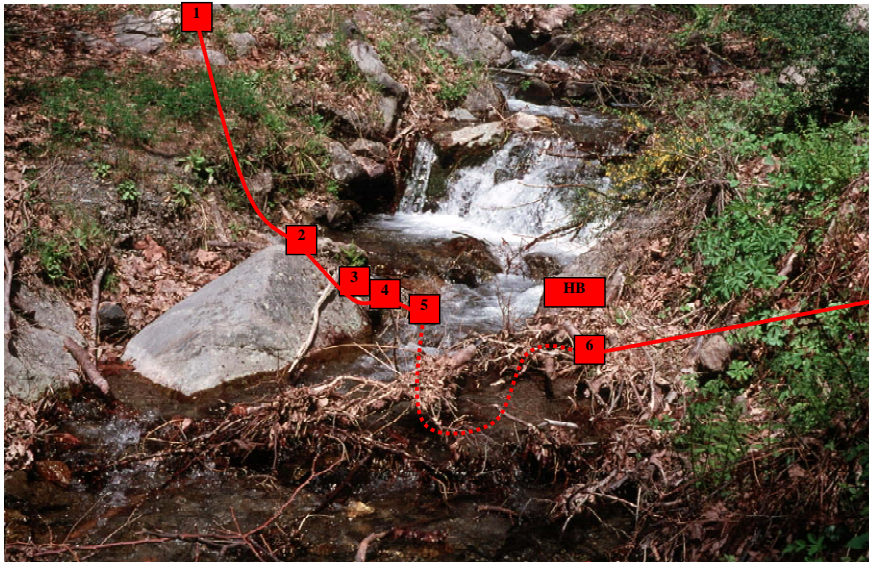
My Danish herp friend Jan Lehmann accompanied me on the trip and he too observed the aquatic habits of *P. muralis*.

## OBSERVATIONS

As we had watched adults of *Salamandra salamandra* along the stream during the entire morning of 19 April 2005, we also saw some specimens of *Podarcis muralis* that were mainly basking on rocks. Around noontime, while standing on the opposite side of the stream, I photographed an adult male basking on a big rock approx. 3-4 m above the stream (fig. 1). I watched it bask for about 15-20

seconds. A few seconds after I had taken another photo, the lizard ran down the rocks towards the stream. Approximately half a metre from the stream it climbed a small dead branch (figs. 2-3), which had small twigs hanging halfway over the stream. Initially, the lizard jumped on the thickest branch – Ø=10-12 mm (fig. 3), but this branch only reached about 20 cm over the stream, which forced the lizard to switch to one of the thinnest twigs – Ø=2-3 mm (fig. 4). As the lizard approached the end of the thin twig part way over the stream, it was forced to move back 10-20 cm and change to another twig, which reached further (about halfway) over the stream. As it neared the end of this twig, its grip became less secure (fig. 5) and eventually the lizard dropped down into the fast-running stream. The photo series (figs. 1-5) shows the lizard before it entered the water and was taken within a 1-2 minute period. I was unable to follow the lizard after it had fallen into the water. However, about 30 seconds after I saw the lizard hit the water surface, I noticed that it had reached the opposite bank, roughly one metre further downstream (fig. 6). After 10-20 seconds it left the bank and moved further up the slope through dead vegetation of grass and fern leaves and live vegetation of thicket and scrub. At this point I found it impossible to monitor the lizard any further. Fig. 7 shows the habitat with the individual places where the photos of figs. 1-6 were taken, the photographer's position and the approximate route that the lizard followed.

The air temperature was 16-17°C as the observations were made, and the weather was quiet and sunny. The area in which the lizard was observed before it entered the stream, was fully sun-exposed (figs. 1-5), whereas the opposite side of the stream was only exposed to the sun close to the water (fig.



7

1. The adult male *Podarcis muralis* is basking on a big rock, approx. 3-4 m above the stream, actually more to the top left than can be indication in the overview in photo 7. A few seconds after this photo was taken, it moved down towards the stream.

2. The specimen has moved down the slope and rocks and is now close to the stream as it is ready to crawl on the twigs reaching about halfway over the stream.

3. The lizard has now climbed on a twig and moves above the water. The stream is visible under the lizard in the left side of the photo.

4. As the lizard has proceeded over the relatively thick twig hanging above the water, it will now have to move to thinner twigs in order to advance further over the water.

5. At this point, the *P. muralis* is close to dropping into the water. The strong torrent underneath the lizard is visible (picture taken nearly perpendicular from above). One or two seconds later, the lizard dropped into the water.

6. After having crossed the fast-running and cold stream, the lizard has reached the opposite bank of the stream. Notice the two drops of water on its head.

7. Habitat photo. The numbers 1-6 show where the male *P. muralis* was situated in figs. 1-6 respectively. The photographer was standing at the place marked "HB". The basking site where the lizard was initially observed (1), is a bit outside this photo. The line illustrates the approximate route (from left to right) which it followed. The route between 5 and 6 is crossing the fast-running stream; however, we did not observe it here. Additionally, it proved impossible to follow it any further as it left place no. 6 and continued to the right.



1



2



3



4



5  
<6



6) and was bordered by a shaded area in which I lost track of the lizard. It is regrettable that the water temperature was not measured, but considering that the stream consisted of melting water from higher altitudes and that we measured water temperatures at other localities in the vicinity, it was estimated to be 9-12°C.

The following species of reptiles and amphibians were observed at that locality on 18-19 April 2005: *Podarcis muralis*, *Salamandra salamandra*, *Rana graeca* and *Bufo bufo*.

## DISCUSSION

When I observed the adult male *P. muralis* moving from its basking site to the stream and entering the water, I was sure that it had not been disturbed neither by me nor by Jan Lehmann, who was standing further downstream and at a greater distance from the lizard than I was. The lizard moved towards me and seemed to ignore both Jan and me. Initially I thought that it was unaware of the fast-running stream, which it approached and eventually entered. I believed the lizard mistakenly climbed the twigs hanging over the water. As it dropped into the cold water, I thought that it would have been carried away by the strong torrent and would possibly be killed. I was surprised to see the wet lizard on the opposite bank, only a short distance downstream. Since I was unable to follow the lizard while it was actually crossing the stream, it might have had a high degree of control of the situation. This could indicate that *P. muralis* is relatively well adapted to this aquatic element within its habitat for short periods of time, although this species is rarely observed using this element.

Apparently, despite extensive field studies on this common species, aquatic habits have not been recorded before in *P. muralis*. Two possible explanations may be that most studies have been performed away from aquatic environments, and that the specimens rarely 'need' to cross streams or ponds.

An open question remains as to why the lizard would have wanted to move to the opposite side of the stream, which was less sun-exposed. In the cool weather of that day, all of the specimens of *P. muralis* that we observed, were situated in areas of full sun. I did not notice any other lizards in the vicinity, which might have affected its activities. Still, the area



*Podarcis muralis* eating an earthworm in the Distos habitat.

utilised by the lizard during my observations might have been a part of its home range, and it is possible that the more shaded area had better feeding opportunities. This is perhaps supported by the following example: in studies of *Zootoca vivipara* in England it turned out that invertebrates tended to be more abundant in areas with dense vegetation (COWLISHAW & AVERY, 1991). In southern Greece *P. muralis* often inhabits forest floors (cf. BRINGSØE, 1986), to some extent resembling habitats and habits of *Z. vivipara*. Such was also the case around the stream at the locality on Evvia.

It is comparatively rare that aquatic behaviour is observed in Lacertidae. Usually it involves escape behaviour as lizards try to elude potential predators, but I am aware of the following two exceptions. BISCHOFF, IN DEN BOSCH & SCHMIDTLER (1998) observed on a day in late spring (15 May) three different specimens of *Lacerta cf. kulzeri* in southern Syria voluntarily entering small puddles (1-2 m<sup>2</sup>, maximum depth 20 cm) created by a small stream. The lizards swam across the puddles, which was considered quite superfluous as the animals could well have reached the other side of the stream without entering water at all. Obviously it was not a matter of escape behaviour since none of the three individuals was disturbed. The authors were unable to explain this behaviour. This case seems to have the greatest similarity to my observations on *P. muralis* as the lizards in both cases might have been rather careless and impulsive as they intended to reach an area on the other side of the body of water in a direct way. One major difference is the condition of the aquatic environment: puddle versus a strong torrent as is the case with *P. muralis* on Evvia. The other observation recorded in the literature concerned a member of the genus *Po-*



View of Mt. Dirfis.

*darcis* entering water in the wild: it has been reported of *P. hispanica* in northern Morocco that "specimens ... living along a small brook fled through the water when approached" (SCHLEICH, KÄSTLE & KABISCH, 1996).

Further, it is well established that *Z. vivipara* may jump into the water as flight behaviour (e.g. GLANDT, 2001). Several species of 'Green Lizards', i.e. *Lacerta agilis*, *L. schreiberi*, *L. strigata*, *L. trilineata* and *Timon lepidus* have been seen entering water in order to escape potential predators (see BRINGSØE, 1986).

WEBB (1980) reported on a special case of aquatic behaviour that was not escape conduct. In north-eastern Greece three gravid females of *L. viridis* were observed lying submerged in a river with only the head protruding from the water surface. That event took place in the morning of 3 June. WEBB's (1980) interpretation was that it might well have been due to thermoregulation.

In the current report on *P. muralis*, the aquatic behaviour can certainly not be ascribed to either escape behaviour or thermoregulation, but rather as a matter of

moving from one point to the other within a probable home range. Apparently *P. muralis* is well adapted to be and move in aquatic environments for short periods of time. Still, all explanations as to the habits of this specimen remain hypothetical.

## SUMMARY

Lacertid species are rarely seen entering water in the wild, but a male *Podarcis muralis* was observed entering the water of a cold, fast-running stream voluntarily or deliberately on Mt. Dirfis on the Aegean island of Evvia, Greece on 19 April 2005. The lizard was not disturbed by the two observers. Figures show the lizard in the various positions during that action in its habitat. The exact reason why the lizard made this move remains unknown. It is speculated that its home range might have extended to both sides of the stream and that the shaded area that it eventually reached had better feeding opportunities.

## RESUMÉ

Det er sjældent, at egentlige firben (Lacertidae) ses søge ned i vand i naturen, men en han af *Podarcis muralis* (murfirben) blev observeret, da den frivilligt eller bevidst søgte direkte ned i vandet af et koldt og hurtigtstrømmende vandløb på Mt. Dirfis på den Ægæiske ø Evvia i Grækenland den 19. april 2005. En serie figurer viser firbenet i forskellige positioner under aktionen på sin habitat. Den nøjagtige årsag til, at firbenet foretog denne handling og bevægede sig gennem vandløbet, er ukendt. Det spekuleres, at dets home range eller aktivitetsområde måske har ligget på begge sider af vandløbet, og at det skyggefulde område, som det nåede til sidst, kunne have haft bedre fødemuligheder.

## SAMENVATTING

Van hagedissen, behorend tot de Lacertidae, wordt zelden gemeld dat ze zich in hun habitat in het water wagen, maar op de berg Dirfis op het Griekse eiland Evboea in

de Egeïsche Zee is op 19 april 2005 waargenomen dat een mannetje *Podarcis muralis* vrijwillig dan wel doelbewust — niet gestoord door de twee waarnemers — het koude water van een snelstromende bergbeek overzwom. Een serie foto's laat verschillende momenten zien van deze actie in zijn leefgebied. Waarom de hagedis deze oversteek maakte werd niet duidelijk. De auteur veronderstelt dat het leefgebied aan beide oevers lag en dat de meer beschaduwde overzijde betere foerageermogelijkheden had te bieden.



Mt. Dirfis, habitat of *P. muralis*.

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