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POD@RCIS

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SCHNEIDER, B., 1981. *Algyroides fitzingeri* (Wiegmann, 1834) — Tyrrhenische Kieleidechse. In: BÖHME, W. (ed.). Handbuch der Reptilien und Amphibien Europas. Band 1. Echsen I: 392-401. Akademische Verlagsgesellschaft, Wiesbaden.

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Frontispiece: Larva of *Salamandra infraimmaculata.*

Photo: Herman A.J. in den Bosch

Natural history notes on the Lebanese Fire salamander, *Salamandra infraimmaculata* (Salamandridae)

Herman A.J. in den Bosch
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Photos by the author.

INTRODUCTION

Over the years I have visited Lebanon at least a dozen times. Initially, it was in search of '*Lacerta' fraasii* for my research on courtship and lacertid reproductive strategies (e.g. IN DEN BOSCH & BOUT, 1998), but over time this developed into a wider interest in the Lebanese herpetofauna (e.g. IN DEN BOSCH, 1998).

Figure 1. The small stream near Haret Jandal.

Figure 2. The rivulet was fairly fast-flowing.

MATERIAL AND FIELD NOTES

Quite circumstantially on June 6, 1996, I happened to be in a wooded area in Lebanon that reminded me of the habitat where I saw my first Fire salamander as a young boy on holiday with my parents and younger sister in the Luxembourg Ardennes in the sixties. And indeed, at my first stop on the side of a small road where a rivulet came down the hills, I saw the unmistakeably *Salamandra*-like larvae in the very shallow, 10-20 cm deep puddles that the relatively fast flowing stream formed along its path downhill (fig. 1). This location was north of Jeblay, at Haret Jandal, and just about two km north of Bater (N33°37.574', E035°36.710', alt. 900 m).
The stream was at most 50 cm wide, but commonly 20-30 cm (fig. 2). The surrounding trees were at first sight not very special; I

Figure 3. A larva of *Salamandra infraimmaculata* in its habitat.

noticed *Platanus* (possibly *orientalis*), *Juglans regia*, even a *Punica granatum* which is usually planted for its fruits, but here probably germinated from disposed seeds. Many of the trees had *Hedera helix* climbing on them. The larger ferns reminded me of *Pteridium aquilinum* and *Dryopteris.* All these later checked out correctly when I consulted POST (1896). In short: the whole area had a fairly temperate European feel to it.

There were over a hundred *Salamandra* larvae in the small part of the stream that I sampled from 12-15 o'clock (fig. 3). The water felt cool, possibly around 10-15°C. The larvae were seen to feed on small invertebrates; among others I seemed to recognise the amphipod genus *Gammarus*. I caught five *Salamandra* larvae by hand and used a large plastic soft drink bottle to transport them for the remaining week (fig. 4).

Nearby some Green Frogs were active, and on the side of the road in sunny spots I saw adult *Phoenicolacerta laevis*. Occasionally some *Hyla* croaking were heard further off.

While currently almost impossible to imagine, I took the larvae home in the same two litre PVC cola bottle in my hand-luggage. (Three years ago it turned out to be a grave cause of concern when the airport security people scanned my hand luggage and noticed a minute amount of liquid in a 30 ml bottle: this contained at most 5 ml of tap water which I had simply forgotten to empty...). In the early nineties this overactive nervousness had not yet taken hold and I could open the bottle to allow fresh air several times in-flight (some

Figure 4. A young larva of *Salamandra infraimmaculata*.

larvae were already fairly well developed and snapped air regularly). Even a planned stop-over in southern Europe with another security check went smoothly.

LEBANON

The internet in the late eighties and early nineties was still in its infancy and getting a proper idea of the temperatures in the mountains was impossible. Important, as I did not want to wait weeks for literally metres of snow to disappear high up in the mountains with the lizards still in hibernation. As I knew no one in the country, my only option was to call the Dutch meteorological offices. This question greatly surprised them. Why did I ask for such information? Oh, a biologist? After some hours all they could tell me about the weather was for the coastal capital of the previous day. At that time, our newspapers sketched the country as a dreadful place (don't go there!) and the television reports enforced such a view. These days any CNN-like station gives you infinitely more substance.

Although in my first years as a visitor the country indeed still had a bad reputation concerning kidnapping and violence, on a personal level I encountered only minor inconveniences. One gets used to the numerous road blocks and diversions. The few times when I was considered a safety problem and detained for a short while, it was always in a relatively amiable atmosphere and I was provided with meals and bedding. Actually, already while in the plane to Beirut I was invited to meet the family and friends of a Lebanese business-man, I got the use of a private apartment and was taken care of in such a generous way beyond anything a reticent Dutchman could dream of. Next, as it was impossible to hire a car as all such rental offices had disappeared due to the war, it was "no problem" to supply a car with driver at no costs! Lebanon thus turned out to be quite different from the abhorrent rat hole the Dutch and other media sketched.

This is not to imply that no terrible atrocities were committed in the country (remember for instance the Sabra and Shatilla massacre in 1982). Certainly, car bombs, kidnappings, etc. were a regular feature of life. Also, another herpetologist, the Slovakian David Jandzík, was badly beaten and robbed in some of the exact same areas I had visited before.

For me it was more of a problem to be able to stay out in the field overnight with the intention to start observations in early morning than to avoid offers to stay with locals. Later I quickly learned to appreciate curious Middle Eastern road habits behind the wheel (not to be adopted at home!), the amazing diversity of cultures, and of course the wonderful variety of food when I did accept invitations.

DISTRIBUTION IN LEBANON

EISELT (1958) restricted the type locality "Syrien" by neotype designation to "Bscherreh (Becharreh) in nördlichen Libanon", currently more commonly written Bcharrè. As the nation Lebanon is a fairly recent creation from 1943, and the type locality of *S. infraimmaculata* is Bcharrè, the form is presently more properly denoted as the 'Lebanese' Fire salamander, although at the time of the original description the area was denoted as Syrian and the form is consequently sometimes still referred to as the 'Syrian' Fire salamander. And indeed VON MARTENS (1885) just stated 'Syrien', and furthermore in my opinion provided a just as pitiable description copied from Ehrenberg (no citation given) "... bezeichnet als var. *infraimmaculata* … bei welchem die Rückenflecken eine unregelmässige Reihe auf der Mitte des Rückens bilden und alle Seitenflecken fehlen..." [described as var. *infraimmaculata* …. in which the dorsal spots form an irregular row on the middle of the back and all lateral spots are absent]. Remarkably enough, the doubtless originally nominate character of an immaculate black belly, is completely absent in the oldest descriptions (since 1885). I found no earlier citations.

Added below is an excerpt of a Lebanese herpetological checklist I started to compile years ago (e.g. IN DEN BOSCH, 1998), but do note that this has not been updated since 2003 and is just meant to give a general impression of the local finds. Furthermore, a synonymy listing seems befitting here.

SYNONYMY

To avoid confusion by the various names encountered in literature over the years, the following synonymy is given, listed by date of publication, plus localities from literature as

well as from museum records. The original citations can be found under the heading Literature.
Salamandra maculosa var. *infraimmaculata* VON MARTENS, 1885: 195.
["Loc.: Syrien. ...bei welchem die Rückenflecken eine unregelmässige Reihe auf der Mitte des Rückens bilden und alle Seitenflecken fehlen..."] The name *infraimmaculata* was proposed by Ehrenberg (his source unmentioned) but only published by VON MARTENS (1885) with the above mentioned – rather meagrely defined – line.
Salamandra maculosa Laur. - PERACCA, 1894: 18.
Salamandra maculosa - WOLTERSTORFF, 1905, 283.
Salamandra maculosa f. *orientalis* Wolt. - WOLTERSTORFF, 1932: 41.
Salamandra salamandra orientalis Wolterstorff, 1932 - MÜLLER & WETTSTEIN, 1933: 135.
Salamandra maculosa orientalis - WERNER, 1935: 227.
Salamandra salamandra orientalis Wolterstorff, 1932 - WERNER, 1939: 213.
Salamandra salamandra infraimmaculata - MERTENS, 1948: 187.
Salamandra salamandra infra-immaculata - FREYTAG, 1955: 72.
Salamandra salamandra infraimmaculata Martens - EISELT, 1958: 131.
Salamandra infraimmaculata - GASSER, 1978: 636.
Salamandra salamandra - WERNER & AVITAL, 1980: 192.
Salamandra salamandra infraimmaculata - DEGANI, 1986: 105.
Salamandra infraimmaculata infraimmaculata - JOGER & STEINFARTZ, 1995: 35.
Salamandra salamandra L. - HRAOUI-BLOQUET, 1997: 212.
Salamandra salamandra infraimmaculata Martens, 1885 - SABEH, 1997: 181.

LOCALITIES AND MATERIAL

Localities - Bcharré (1400 m) (WOLTERSTORFF, 1932); Bcharré (1400 m) (WERNER, 1935); surroundings of Bcharré, 1400-1600 m, 8 and 16vi1931 (two adults, one subadult) (MÜLLER & WETTSTEIN, 1933); Cheba'a (in the most southern Lebanon) (MÜLLER & WETTSTEIN, 1933); Mechmech (Heinrich pers. comm. to Bischoff); larvae, Haret Jandal, approx. 2 km N Bater, N33°37.574', E035°36.710', 900 m, (obs. In den Bosch, 6vi1996); Faraïya, (approx. 1325 m, pers. comm. locals to In den Bosch, 18v1998); Mt. Hermon (near Cheba'a?) (PERACCA, 1894); Mt. Hermon (WERNER & AVITAL, 1980).
Material - Aaqbé (3 km west of Rashaya) BM(NH) 1920.1.20.2373; Aammiq Swamp, J.R. Childress, 11v1969: CAS 159048 [not seen]; Broummana, M. Thompson: BM(NH) 1957.1.1.4; Machmouché (Jezzine), 900 m, Phares: BM(NH) 1937.6.1.1; Mt. Lebanon, from Zoological Museum Giza: BM(NH) 1927.8.12.11. EISELT (1958) used material mentioned above under localities Bcharré (3 specimens NMW); Mt. Hermon (1 ZMT), plus Beirut (1 NMP) and Lebanon (1 NMW, 2 NMP, 2 HUJ). NMW 15501 he designated as neotype because of the loss of the holotype, and at the same restricted the terra typica to the surroundings of Bcharré.
Range - The range of nominate species is Israel, Lebanon, Syria, Hatay region, Turkey (DEGANI, 1986; BARAN & ÖZ, 1994; JOGER & STEINFARTZ, 1995; BARAN & ATATÜR, 1998). The species reaches its southern distribution limit in the mountainous part of northern Israel, with the southernmost population living on Mt. Carmel near Haifa.

ECOLOGY

In e.g. DEGANI (1986) and WARBURG (1994) we find a lot of natural history data concerning northern Israel, DEGANI (1994) wrote on physiological adaptation to xeric habitats, and in SHARON et al. (1997) oogenesis and effect of xeric environments is described for Israeli populations close to Lebanon's southern border (Tel-Dan and Mt. Meron). In ecological respect publications on Israeli animals distinguish, probably correctly, between the populations since the most northern one is connected with a stream in which the larvae are deposited, the other two rely on pools and thus are much more dependent on rainfall. Ovulation probably takes place during spring and parturition occurs mainly between November and March when water is available and thus gestation takes less than a year. I found larvae of 1.5-3.0 cm in June in fairly slow flowing streams and adjacent small puddles, where they seemed to prefer depths of 20-30 cm, to a maximum of 50 cm, with a concentration of larvae found close to rocks and/or roots of plants growing on the banks. They live on all kinds of small invertebrates; I noticed many *Gammarus*. Water temperature

was between 10-15°C. In general the species is active at night, with rain sometimes during the day. The animals copulate on land; the female deposits well-developed larvae in brooks.
SABEH (1997) collected the species in Lebanon between 560-1500 m (no localities mentioned). HRAOUI-BLOQUET (1997) gives 650-2000 m (again without localities). She also considers the animals to be viviparous; an obvious overstatement since larvae are of course deposited in the water (e.g. WARBURG et al., 1979), and not fully developed young salamanders appear. Nevertheless, births of fully developed juveniles are known for *Salamandra salamandra* populations in Spain and Portugal (FREYTAG, 1955; FACHBACH, 1969; WOLTERSTORFF, 1928; LOURENÇO et al., 2019) and from *Salamandra algira* in Morocco (see DINIS & VELO-ANTÓN, 2017), but evidence of such a phenomenon in *S. infraimmaculata* is completely lacking. WERNER (1935) found a recently metamorphosed specimen near Bcharré in May.
ESTERBAUER (1992) reported for the Golan only larvae. Metamorphosed animals live in moist areas near streams. During the daytime these live concealed in holes, under stones, roots or stone heaps. They prey on rain worms and various insects.

REMARKS

MERTENS (1948) determined that *Salamandra salamandra infraimmaculata* Martens from Syria and *Salamandra salamandra orientalis* Wolterstorff from the Taurus mts. near Adana were identical and that *infraimmaculata* – a name used by Ehrenberg but only published with an extremely succinct description by von Martens – enjoyed priority. Based on serum protein patterns GASSER (1978) tentatively regarded the formerly as a subspecies of *S. salamandra* considered form a full species: *Salamandra infraimmaculata*.
The taxonomically interested are referred to a recent internet listing:
https://amphibiansoftheworld.amnh.org/Amphibia/Caudata/Salamandridae/Salamandrinae/Salamandra/Salamandra-infraimmaculata
DEGANI (1986) grouped the Israeli salamanders with the Lebanese based on morphological evidence and plasma electrophoresis and regarded these as con-subspecific with *S. s. infraimmaculata*. VEITH (1994), however, confirmed the specific status of *S. infraimmaculata*. JOGER & STEINFARTZ (1995) stated that all Asian *Salamandra* should be included in the species *S. infraimmaculata*. For Lebanon, based on Israeli animals, they arrived at *S. i. infraimmaculata*. This seems somewhat crude, but they did sample two (of the three) populations in Israel of both the xeric and moist habitat represented in that country, and found no differences. In a more recent morphological paper concerning Israeli animals SHARON et al. (1997) do not seem to recognise the species status of the form and also attribute the taxon to the wrong author: *Salamandra salamandra infraimmaculata* Mertens. VEITH et al. (1998) hypothesised that the Iberian, Central and Eastern Mediterranean populations separated more or less simultaneously about 10 Mio. yrs BP.
The locality of PERACCA (1894) is deduced from the journey of Dr. Festa where Shuba is mentioned as base. WERNER (1939) reported "Nahr el Kebir bei Antiochia" as based on Wettstein (1928) where, however, the find is not described. It is referred to in MÜLLER & WETTSTEIN (1933) as "Nashr el Khebir bei Antiochia, Nordsyrien (coll. 1891, don. Steindachner)" and in Wolterstorff (1932) as "Nahr el Khebir bei Antiochia". This could lead to the assumption that the species is also present in the extreme northern part of Lebanon, since the Nahr el Kebir (or Nahr el Kabir) is the border river with Syria. EISELT (1966: 430) also noticed this and as a second alternative suggested the Nahr el Kebir which flows into the sea 10 km south of Hamidié (near Latakia). The latter seems most likely, since it is close to the present-day Hatay (Turkey), formerly also known as Antiochia.
As maximum size in my vivaria I have measured a male of 115+90 mm and a female of 121+132 mm (head-body + tail), a total size of 205 mm and 55 g for a male, and a 253 mm and 115 g for a (possibly pregnant?) female. A pair from the initial batch, later donated to Sergé Bogaerts, measured 26 and 20.5 cm in March 2021. The sizes mentioned in the literature, 31.6 cm given by ESTERBAUER (1992) as reported to him, and by EISELT (1958) who deposited a 28 cm specimen (NHW 16148) in 1959 from Tarshiha, Israel, as well as a specimen from Mt. Carmel (Israel), seem quite large compared to my captive specimens. WOLTERSTORFF (1905) already mentioned 30-32 cm for the Near-East and Syria.

It is remarkable that larvae said to have been obtained near Alexandria in the last century may actually have been caught in Lebanon by vacationing European residents of that Egyptian town who released these (FLOWER, 1933).
One of the first reports containing ethological-reproductive data on the Near Eastern form is DEGANI & WARBURG (1978), further WARBURG et al. (1979), and a summary of many findings at the southern limits of its distribution in DEGANI (1994). Larvae are said to be mostly produced in Nov-Dec, also Sept. rarely Aug., and in March-April, with 30-200 per female, dimensions 0.13-0.40 g, 25-40 mm, delivered over 1-4 days per batch. The maximum amount of 200 seems quite a lot.

HOUSING AND FOOD

The wild-caught larvae were at first housed in a relatively small 40x25x25 cm glass aquarium with some water plants (mainly *Elodea*), cork bark and stones to avoid drowning. They were fed small invertebrates like *Daphnia*, *Cyclops* and whatever else was collected in my local Dutch ditches, small earthworms and even tiny mealworms, although the latter soon drowned and when non-moving were no longer of interest. A similar diet, but with larger prey, was fed to the (sub-) adults. With increasing size the animals were accommodated in a larger glass cage: 40x40x100 cm fitted with a small plastic pond of 20x35x6 cm. Water circulation was provided by an air stone connected to a small aquarium airpump.
In 1997-8 the animals were kept during the winter months in an unheated room with temperatures around 10°C. The salamanders stopped being active. With rising temperatures their normal night-active pattern resumed. In later years the terrarium was moved to another room with temperatures typically around 15°C in the colder season. In the warmer months, approximately May-August, temperatures outside rarely reach 30°C (usually 20-25°C in daytime). Indoors the low 20s are common in that period.

DEVELOPMENT

Shortly after returning to The Netherlands the larvae were measured: head-body lengths 24-27 mm, tails 18-20 mm. Already in the brook they showed only a slight yellowish coloration at the base of the legs (sometimes even absent). For older larvae see figure 5. Four specimens metamorphosed on July 17,

Figure 5. An older larva of *Salamandra infraimmaculata.*

Figure 6. A larva of *Salamandra infraimmaculata* close to metamorphosis.

19, 26 and 28, 1996 and were then head-body 27-30 mm long with tails 23-27 mm, weights 0.93-1.08 g. Typically a few days before transforming into land-living salamanders they stopped feeding. The last larva did so November 9 and came on land November 14. That one measured 35+30 mm (head-body+tail) and weighed significantly more than the others at 2.24 g.

Their bellies were at first a dirty grey like in the older larvae (see fig. 7) but soon turned into dark grey. Before long it blackened as did the rest of the body. The dorsal and lateral yellow spots were at first tinged with a slightly orangey yellow (fig. 6). Dorsally the spots were irregular, laterally much more rounded. Over the years the figuration of the spots barely changed. In contrast to the older *S. s. salamandra* larvae I know from localities in the southeastern part of the Netherlands, the Lebanese ones in this initial batch hardly showed the yellow spots near the base of the legs. Ventrally in just one metamorphosed specimen two tiny yellow specks were found posteriorly (fig. 8), thus suggesting the scientific nomenclature is not unfounded. Commonly food was accepted after only a few days.

Figure 7. The belly of an older *Salamandra infraimmaculata* turns greyish.

Table 1. Sizes, lengths in mm, weights in gram, October 1996.

Head-body + tail	Weight	Ventral colour	Remarks
35+30	2.36	dark grey-black	
46+38	4.95	black*	* two tiny yellow specks, right posteriorly
42+32	3.62	black	
45+38	5.40	black	
40+36	3.30	black	

Table 2. Sizes, lengths in mm, weights in gram, October 1997.

Head-body + tail	Weight	Ventral colour	
95+80	34.92	dark grey-black	
75+64	19.27	black*	* two tiny yellow specks, right posteriorly
80+75	23.65	black	
76+62	20.75	black	
78+65	21.04	black	

Table 3. Sizes, lengths in mm, weights in gram, August 1998.

Head-body + tail	Weight	Ventral colour	
95+90	61.28	dark grey-black	
85+75	19.27	black*	* two tiny yellow specks, right posteriorly less clear
92+84	41.40	black	
85+60	32.01	black	
90+78	39.50	black	

Table 4. Sizes, lengths in mm, weights in gram, October 1999.

Head-body + tail	Weight	Ventral colour	
125+113	82.03	dark grey-black	
115+102	56.09	black	
95+85	51.00	black*	* two tiny yellow specks, right posteriorly less clear
100+95	45.00	black **	** two tiny yellow specks under throat

Sizes of initial metamorphosed *S. infraimmaculata* are given in table 1. For further development see tables 2-4.
In September 2001 one animal died and was donated to the ZFMK in Bonn (ZFMK 75922).

BEHAVIOUR

It was noteworthy to find that their initial walking was kind of leap-wise; a quick lateral swaying with a forward component, resulting in a at times very fast propulsion, at first even resembling hopping. This was no longer

Figure 8. The belly of a subadult *Salamandra infraimmaculata.*

observed as they grew older. Also, somewhat unexpectedly, recently metamorphosed animals would lacertid-like run from a stone just above the waterline into the water when disturbed. I noticed shedded skins in the water a few (2-5) days after metamorphosis. This skin-shedding is commonly seen in the adults several times per year. It looks like that water is essential to the moulting process; these sheds were not seen on land, although the very thin and transparent cast-offs could be easily missed there.

In the warmer months the animals are mainly active at night, although during periods of very hot days, reaching almost 30°C, they seemed to enter brumation, which may last to October when feeding starts again.

ANNUAL RHYTHM

Apart from the daily rhythm, mainly from dusk to dawn, an annual cycle is present and, in vivarium keeping, traceable because of droppings in the pool water and mealworms anew disappearing from a feeding bowl. Eating in captivity decreases around the middle of April and resumes around October. From the beginning of September-October renewed nightly activity can be deduced from finding some peat-soil in the water basin and the afresh disappearance of mealworms from the bowl. A drop of food-interest may occur in November. Commonly, mealworms in the feeding nap do not vanish anymore.

In May, under Dutch circumstances, the animals no longer appear to be active. When searching their terrarium in e.g. July, I found them under stones, fairly often several, up to four, together. In our wintertime, roughly from November to February when freezing temperatures are possible outside, the *S. infraimmaculata* become more active in January; the salamanders seem to sense the change in season even when indoors. For the Middle East, the above indicated periodicity is logical as reproduction seems to start around the beginning of the year (e.g. data of WARBURG, 2009 for Israel).

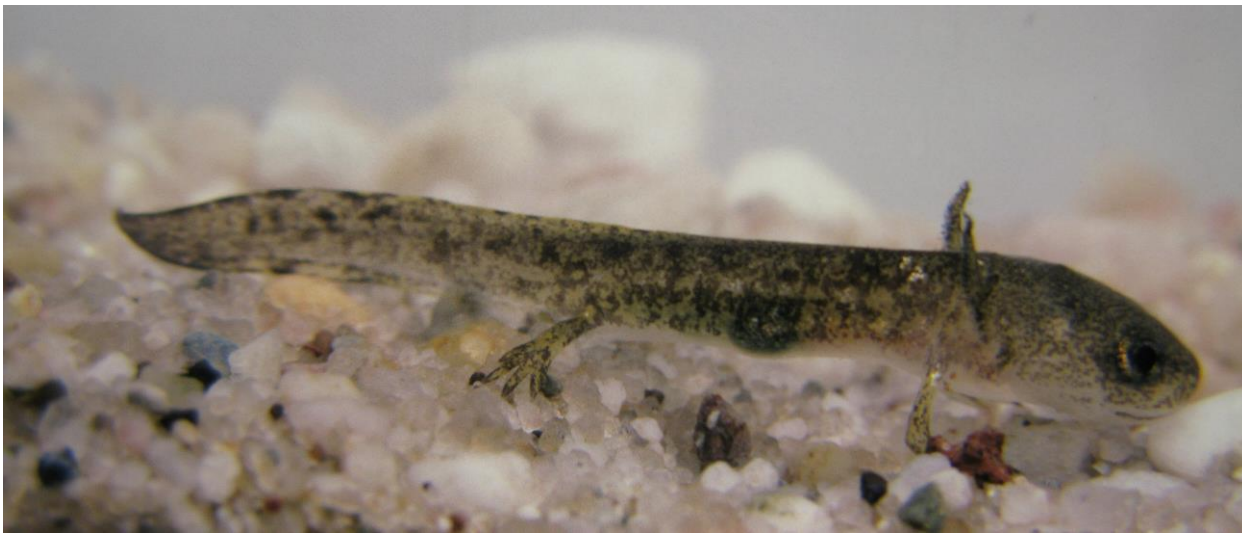

Figure 9. A poorly developed *Salamandra infraimmaculata.*

REPRODUCTION

The wild-caught larvae had apparently reached adulthood in 2003 as on March 9 in 2003 around 10 o'clock I found the first twenty larvae and one unfertilised whitish egg (diameter ±8 mm) in the water. It had been a very cold and long winter; only now the ice on the ditches and pools started melting. None of the larvae (total lengths 22-29 mm) appeared viable, being rather skinny. Eight of the larvae were already dead or dying and showed a crooked tail (fig. 9). One very transparent egg seemed on the face of it to contain a well-developed larva that soon wriggled free. According to the literature, a batch of 20-40 eggs is common and is sometimes laid over a longer period, so I kept hoping for more. It turned out to be in vain. The few invertebrates collected in the still freezing waters outside could not tempt the larvae to feed. One after the other died, the last one on March 15. I did find another two eggs somewhat later, with non-moving embryos. After having been away for ten days, I found another five dead larvae in the water, and this pattern continued at intervals until the end of April. Uncertain if this was from one animal or two possible females.

Hoping that reproduction would be more successful elsewhere, I gave Sergé Bogaerts, who had ample vivarium experience with the genus, a couple in October 2005. He was surprised how much they had grown. Sergé later handed offspring to Max Sparreboom who also reported reproductive success. This aspect will be dealt with soon by BOGAERTS et al. (in prep.).

DISCUSSION

Oddly only one larva metamorphosed over four months later than the rest. It was over twice as heavy as the others when reaching the land phase; this is not so strange as it had more time to feed on aquatic prey. Colour development was similar. Not all freshly metamorphosed animals showed immediate interest in food (e.g. small earthworms); it sometimes took a week. It was curious to find a large range of sizes and lengths within the five animals (table 1), ranging from 35-46 mm head-body and 30-38 mm tail. Having little experience with *Salamandra*, I found it challenging to differentiate the sexes in the juveniles.

Considering that the first larvae of the wild-caught animals were found in March 2003, it can be deducted that, at least in my vivarium, these salamanders reach adulthood in seven years. For Mt. Carmel (Israel) WARBURG (2007) suggested sexual maturity at the age of 3-4 years and a longevity of 20-23 years under natural conditions. The oldest salamander in my vivaria at the time of writing reached 25 years, as did those that were handed to others.

As it is not unusual that *Salamandra* lays egg in consecutive batches and that a first reproduction contains underdeveloped larvae (Bogaerts, pers. comm.), it thus remains uncertain if one or two animals produced young. Two seems more likely as 19 whitish-yellowish unfertilised eggs were found in the last two weeks of April, with the earlier clutches appearing over a period in the beginning of March.

It was encouraging to learn that over the years my five Lebanese larvae were the founders of a larger population with enthusiasts in The Netherlands and beyond; probably all specimens of *S. infraimmaculata* presently circulating in Europe stem from my sample (recently e.g. BURGON et al., 2020). Because no reproductive problems are reported as yet, 25 years later, it appears that inbreeding is not a problem. Furthermore, I suggest that the local impact on the population has been minimal, with larvae in general being much more numerous than adults.

SUMMARY

Data on five larvae of *Salamandra infraimmaculata* caught in Lebanon in June 1996, and their development as indicated by sizes and weights are presented. The colour patterns, once formed, appear stable throughout life. Metamorphosis was in July for four specimens and for one in November. Sizes and weights ranged from 35-46 mm head-body and 30-38 mm tail, and 2.36-5.40 g after reaching the land-phase. Maximum sizes of 115+90 mm (male) and 121+132 mm (female) (HB+T) were reached in my collection; thus, a total size of 205 mm and 55 g (male), and a 253 mm 115 g (female). Maximum ages reached at the moment are 25 years. The first signs of reproduction, in

the form of poorly developed larvae, were found in March 2003, suggesting it takes around seven years to reach adulthood in my vivaria.

SAMENVATTING

Gegevens over vijf larven van *Salamandra infraimmaculata*, verzameld in Libanon in juni 1996, en hun groei en ontwikkeling worden gepresenteerd. Als het kleurenpatroon eenmaal is ontwikkeld, verandert dat nauwelijks meer gedurende het leven. Metamorfose geschiedde in juli bij vier larven, en bij eentje pas in november. De afmetingen en gewichten varieerden op dat moment van 35-46 mm kop-romp met een staart van 30-38 mm, en 2,36-5,40 g. Afmetingen van 115+90 mm (mannetje) en 121+132 mm (vrouwtje) (KR+S) werden behaald in mijn terraria (205 mm, 55 g (mannetje), en 253 mm, 115 g (vrouwtje)). De eerste indicatie van voortplanting van de volwassen geworden dieren was in maart 2003: er werden, weliswaar slecht ontwikkelde, larven gevonden. Hieruit valt af te leiden dat in mijn terraria het ongeveer zeven jaar duurt alvorens de dieren geslachtsrijp zijn. Op dit moment zijn de dieren 25 jaar oud.

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Addendum to the proposal for a new generic name, *Virgotyphlops*, for the species *Eryx braminus* Daudin, 1803 (Serpentes: Typhlopidae)

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INTRODUCTION

The generic name *Virgotyphlops* was proposed by WALLACH (2020a) for the obligative parthenogenetic species *Eryx braminus* Daudin, 1803, currently placed in the genus *Indotyphlops* Hedges et al., 2014. The original publication establishing the name *Virgotyphlops* was registered with ZooBank subsequent to its publication (urn:lsid: zoobank.org:pub:60EB1C4F-F4C5-4449-BC6F-4733DE538C30). FRÉTEY & DUBOIS (2021) challenged the availability of the name *Virgotyphlops* based on two points, the first being a questionable fulfillment of Art. 13.1.1 of the *Code* (ICZN, 1999) and the second being lack of preregistration with ZooBank as per Art. 8.5.3 (ICZN, 2012a-b). The author was unaware of the 2012 amendments to the *Code*, explicitly discussed in detail by DUBOIS et al. (2013), regarding electronic publication of new names at the time he proposed *Virgotyphlops* (WALLACH, 2020a). This publication will assure that the name *Virgotyphlops* is available under the *Code*; however, it is still up to the herpetological community to decide on its taxonomic justification.

NOMENCLATURE

In order to validate the name *Virgotyphlops* and make it available under the *Code*, we must discuss the two issues pointed out by FRÉTEY & DUBOIS (2021). The first is that, although FRÉTEY & DUBOIS (2021) correctly state that Art. 13.1.1 requires "a description or definition that states in words characters that are purported to differentiate the taxon," they maintain that WALLACH (2020a) failed to do so for the genus *Virgotyphlops*. However, the paragraph preceding the new name states "the parthenogenetic nature alone of *I. braminus* warrants recognition of this species as a new genus that is separate from its most closely related snakes of the *Indotyphlops pammeces* species group." This statement, while not explicitly stated as a "diagnosis," clearly defines the diagnostic character of the species and new genus. *Virgotyphlops braminus* is unique among all snakes in being an obligate parthenogenetic species. The fact that parthenogenesis applies equally to both the species and the new genus should not be a reason to disqualify the character as being diagnostic and therefore not fulfilling the requirement of Art. 13.1.1.

Secondly, the failure to preregister the name with ZooBank is now being corrected with this online publication, which has been registered in ZooBank as urn:lsid:zoobank.org: pub:E129FB52-BBB2-40A4-87D0-8F32BA116021. The name is being proposed once again, this time with a 2021 publication date. All previous references to *Virgotyphlops* are unavailable and technically anoplonyms or, more precisely, atelonyms *fide* DUBOIS & FRÉTEY (2020).

SYNONYMY

Serpentes Linnaeus, 1758
  Scolecophidia Duméril & Bibron, 1844
    Typhlopidae Merrem, 1820
      Asiatyphlopinae Hedges et al., 2014

Virgotyphlops gen. nov.

Virgotyphlops (atelonym) WALLACH, 2020a: 10; WALLACH, 2020b: 326–329; MIDGAARD, 2021: RepFocus website; NAHUAT-CERVERA, 2021: 85, 89, 91; UETZ & HALLERMANN, 2021: Reptile Database website.
Type species: *Eryx braminus* Daudin, 1803: 279.
Content: *Virgotyphlops braminus* (Daudin, 1803) by monotypy.
Diagnosis: *Virgotyphlops* can be distinguished from all other genera of the squamate suborder Serpentes by its triploid karyotype (3n = 42), obligative parthenogenetic method of reproduction, and confluence of the supranasal gland line with the caudal portion of rostral gland line on dorsum of head, interrupting the anterior and posterior rostral lines (WALLACH, 2020a). *Virgotyphlops* can best be described as a genus of miniature, unisexual, all-female, highly successful invasive snakes.
Etymology: derived from the Greek *virgo*, meaning virgin birth, and *typhlops*, meaning blind [snake].
Vernacular names: Flowerpot snake or Brahminy blindsnake.
Distribution: Due to the ease with which it can be transported in the soil of plants, the natural range of *Virgotyphlops braminus* has greatly expanded as a result of human commerce to include humid to arid climates in tropical, subtropical, and occasionally temperate regions of the world, except for South America (which it has not yet invaded). Outside of Asia, it is primarily found in domestic and urban habitations.

Virgotyphlops braminus, head.

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