

New records of *Salamandra salamandra* (Linnaeus, 1758) in Latium (Central Italy)

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SALAMANDRA salamandra (Linnaeus, 1758) is present in Italy with two subspecies: *S. s. salamandra* is distributed in the Alps, pre-Alps and (probably) the Northern Apennines, while *S. s. gigliolii* is found in peninsular Italy. At present it is possible to ascribe with certainty only the southernmost populations to *gigliolii*, i.e. in Calabria (Steinfartz et al., 2000). The subspecific identity and distribution of the remaining populations are uncertain. The presence of *Salamandra salamandra* in Latium (Central Italy) deserves particular mention in that so far only two population nuclei have been recorded within the region (Bologna, 2000).

In August 2001 we were informed of the presence of *S. salamandra* larvae in some ponds along the Rio Chiaro brook (Vallerotonda, Frosinone province) in Latium. Shortly afterwards, we conducted some field surveys to verify these observations, and to explore additional sites in the area expected to be suitable for the species: we confirmed the occurrence of salamanders at the Rio Chiaro, and also at the Melfa River, in the area of Val Canneto (Frosinone province) (Fig. 1). We carried out further visits to both sites until July 2002.

The section of the Melfa River that we investigated ranges in altitude between 1330 and 1025 m: this is the upper section of the river, which flows in a N-S orientated valley close to mount La Meta (2242 m). The vegetation is dominated by *Fagus silvatica*, with growths of *Acer* sp. and *Salix* sp. in the valley bottom. The river is permanent, although in summer it can dry up in places. *Bombina variegata pachypus*, *Bufo bufo* and *Rana italica* also breed in the river, and except in the highest reaches, fish are also present.

Larvae of *Salamandra salamandra* were found at three different sites along the river ranging in elevation between approximately 1100 and 1315 m, the first site being 1400 m in distance from the second, and the latter being 850 m from the third. Although the larvae could have been carried downstream by the natural flow of water, it seems appropriate to consider the areas as three different breeding sites, because (1) reproduction was verified at the lowest site, indicated by the observation of a gravid female (see below), and (2) at the intermediate sites larvae were also found in rock pools away from the main stream channel. The first observation record of larvae in 2002 occurred on May 7th (larvae of the former year disappeared in September 2001); their total body lengths (TL) correspond to the sizes measured at birth (see below), or a little larger. However, on the same day, we found two larvae of 57 and 58 mm long, substantially nearer to metamorphosis. On July 17th 2002 we also measured several larvae that had recently been born. Consequently, we suggest that larvae of *Salamandra salamandra* in this region are produced mostly between the middle of April and May, but earlier and later births are possible. This appears to be valid at each of the three different breeding sites along the Melfa River; reproduction therefore does not appear to vary with altitudinal phenologic variation. We recorded adults on only three occasions; these were identified by their dorsal patterns (Table 1).

After seven hours the female found on May 7th produced 33 larvae (mean TL \pm S.E. 32.4 ± 0.2 mm, range 29-34 mm), 5 dead larvae, which did not emerge from gelatinous envelopes, and 5 unfertilised eggs. This individual was found in the middle of a stream pond at 1100 m together with

four males, about 70 m apart. On the vents of all specimens were flesh-red spots and never yellow ones; even on the back there may have been flesh-red variegations, but less concentrated and, therefore, less visible. On the basis of their colour patterns it was not

possible to ascribe the five adult specimens to either of the Italian subspecies, because of their apparent intermediacy between *S. s. salamandra* (characterised by a prevalence of black rather than yellow on the back) and *S. s. gigliolii* (which has a prevalence of yellow on the back, and the vent may also be predominantly yellow with flesh-red spots). In accordance with Andreone et al. (1999), this suggests the existence of clinal hybridisation between the two subspecies in this region. Populations in Campania (just a little south of Latium) have been similarly difficult to identify, even using bio-molecular data (Steinfartz et al., 2000; Odierna et al., 2001). In reaching this conclusion, however, we appreciate that the number of adults examined was relatively small, and further research is clearly needed before populations in the region can be ascribed to a particular subspecies.

The Rio Chiaro brook arises at 1550 m, flowing in a valley N-S oriented close to Catenella delle Mainarde mountains (maximum height 1652 m). We investigated the stretch between 1375 and 1200 m. Vegetation in the area is dominated by *Fagus silvatica*, with scattered *Salix* sp. and riparian vegetation in the valley bottom. The brook is permanent, although may occasionally dry out during the summer. *Salamandrina terdigitata* and *Rana italica* also breed in the brook, but fish are absent.

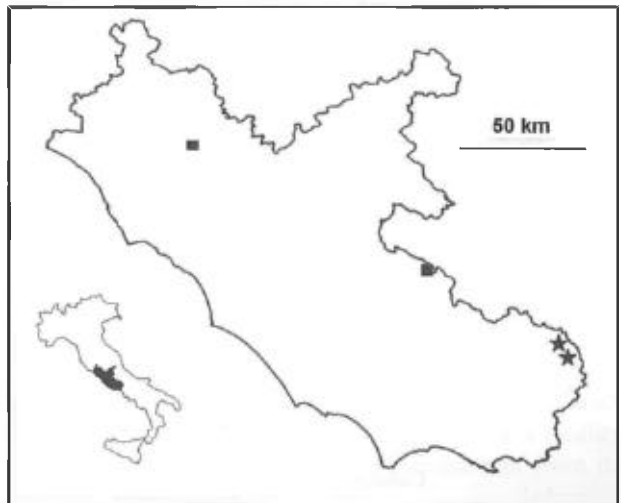
Salamandra salamandra larvae were located in a small tributary arising at 1330 m (approximately 200 m long), and in some

day	hour	air t	water t	sex	TL (mm)	SVL (mm)	W (g)	B/Y	b/y
21/10/2001	6.15 PM	13.5°C		m	167	96	23	1.27	1.20
	6.45 PM	13.5°C		m	179	98	28	1.17	0.99
08/11/2001	7.20 AM	8°C		m	174	101	29	1.30	1.18
	7.35 AM	8°C		m	160	90	17	1.12	1.02
07/05/2002	5.30 PM	12.5°C	7.5°C	f	175	95		1.87	

Table 1. Discovery dates, environmental parameters, and morphology characteristic of specimens found. TL = total length; SVL = snout-vent length; W = weight; B/Y = black/yellow area ratio of head, trunk and tail; b/y = black/yellow area ratio of head and trunk (limbs excepted in these last two categories).

ponds of the main stream downstream from its confluence (1300 m) to at least 1200 m (distance from the confluence is about 960 m). At this site, the larvae metamorphosed before October (2001) also, and new larvae were found on May 7th 2002: on this occasion the smallest individual measured 28 mm and the longest 32 mm. On July 7th 2002, we found some larvae (the longest measuring 55 mm) near metamorphosis. Consequently, there seems to be only one period for parturition in the Rio Chiaro, between the middle of April until May. We did not find any metamorphosed specimens.

Figure 1. Distribution of *Salamandra salamandra* in Latium, Italy. Stars indicate new records; squares denote population nuclei already known (Bologna, 2000).



Salamandra salamandra is considered at 'critical risk' in Latium (Scalera et al., 2000), and it is our view that the two populations described herein should thus be protected. From a practical viewpoint, protection of the Val Canneto population would be easier, this site being located within Abruzzo, Latium and Molise National Park.

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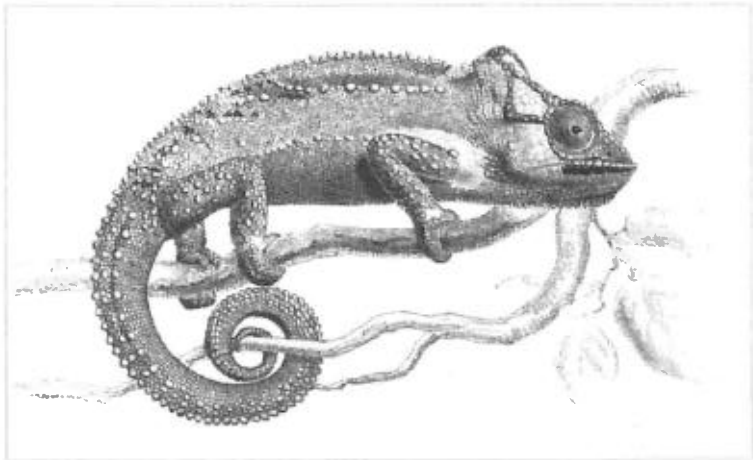
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