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Delayed or anticipated reproduction in the asp viper (*Vipera aspis*)? New field records

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Life history traits of the asp viper, *Vipera aspis* (Linnaeus, 1758), have been found to be extremely variable among populations and years (Saint Girons,1952; Bonnet and Naulleau, 1996; Naulleau and Bonnet, 1996; Luiselli and Zuffi, 2002). Variation has been mainly observed to be related to food availability (Luiselli and Agrimi, 1991), and more recently to climate correlates (Bonnet et al., 2000). Recently, it has been shown that variability patterns of the asp viper's reproductive biology may be significant also at a small geographic scale as well as at the opposite of the species distribution range (Zuffi et al., 2009): differences have basically found in the frequency of reproduction (i.e. biennial versus annual reproduction), and in the differential trade-off between litter body mass and litter size. In the recent past (Zuffi et al., 1999) it was found that under particularly favourable climatic conditions, ovulation may be likely anticipated to May and parturition could occur starting already from mid July, differently from what normally known, that is from early to mid August up to the end of September.

We recently observed three cases of particularly out-of-date reproduction, all referring to central Mediterranean Italy and reported in the following.

i) on June the 3rd 2004, at 14:00 solar hour, on Montecristo Island (Tuscan Archipelago, National Park), a young adult female *Vipera aspis hugyi* measuring 45 cm svl, 51 cm total length was found basking close to a little stream 200 m apart from Villa Reale, in the Cala Maestra harbor at approximately 70m a.s.l.. It appeared markedly emaciated, as post reproductive females, and weighed less than 75 g, as happens in the females monitored in this population (MALZ, unpublished observation).

ii) on May the 29th 2006, at 12:15 solar hour, on Montecristo Island, three newborns of *Vipera aspis hugyi*, ranging 18.1-21.0 cm total length were found in the field very close together, approximately within 150 cm radius, on the top of the Colle dei Lecci (Hill of Oaks) at 450 m a.s.l..

iii) on May the 26th 2010, at 09:50 solar hour, at Belforte, in the municipality of Radicondoli, province of Siena, Tuscany (43°13' 53.36" N, 11°3'50.45" E): along a track that surrounds the middle-age walls of the small village of Belforte, an emaciated female *Vipera aspis francisciredi* was on the track margin, on the grass, close to an olive yard; six newborns were on and along her body, as usually happens just after birth. At the moment of this observation, two of us (PB, MDD) avoided any risk to be bitten by the female and did not capture the newborns nor the female.

A late summer-early autumn mating (September to October) has rarely been found in the asp viper (see discussion in Naulleau et al., 1999), nor winter sperm storage has been still proved in this species (see Saint Girons, 1996). Despite our observations may be in line with autumnal matings (L. Luiselli, personal communication: at Macchia della Manziana, Rota, and Marcigliana all in Latium, central Italy, approximately from 20 September to 20 October) and early gravid condition, we can not actually demonstrate that sperm storage could has occurred in these females. Alternatively, a particularly high predation rate and high fat storage during late summer and autumn could have led the individual females to benefit of a particularly high body condition early in spring (see Zuffi et al., 1999), making early ovulation and parturition possible. An opposite hypothesis could be that the emaciated

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female observed on Montecristo may have reproduced at regular time the previous year, but since then have not eaten, hence surviving wintertime in a very bad body condition. So, the emaciated aspect of the viper can be just depending on the exceptional survival of this individual under bad physical condition, and not on recent parturition.

As far as we are aware, the patterns we recorded are likely the first in the asp viper, perhaps also in the genus *Vipera*, and we underline that more effort in field research as well as in museum collections are needed to help in understanding the actual biological relevance of the above discussed results.

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References

Bonnet, X., Naulleau, G. (1996): Catchability in snakes: consequences for estimates of breeding frequency. Can. J. Zool. **74**: 233–239.

Bonnet, X., Naulleau, G., Shine, R., Lourdais, O. (2000): What is the appropriate timescale for measuring costs of reproduction in a `capital breeder' such as the aspic viper? Evolution. Ecol. **13**: 485–497.

Luiselli, L., Agrimi, U. (1991): Composition and variation of diet of *Vipera aspis francisciredi* in relation to age and reproductive stage. Amphibia-Reptilia **12**: 137–144.

Luiselli, L., Zuffi, M.A.L. (2002): Female life-history traits of the aspic viper (*Vipera aspis*) and sand viper (*V. ammodytes*) from the Mediterranean region. In: Biology of vipers, p. 279–284. Schuett, G.W., Höggren, M., Douglas, M.E., Greene, H.W., Eds. Carmel, CPG/Biological Sciences Press.

Naulleau, G., Bonnet, X. (1996): Body condition threshold for breeding in a viviparous snake. Oecologia **107**: 301–306.

Naulleau, G., Bonnet, X., Vacher-Vallas, M., Shine, R., Lourdais, O. (1999): Does less-than-annual production of offspring by female vipers (*Vipera aspis*) mean less-than-annual mating? J. Herpetol. **33**: 688–691.

Saint Girons, H. (1952): Ecologie et éthologie des Vipères de France. Ann. Sci. Nat., Zool., Paris **14**: 263–343.

Saint Girons, H. (1996): Structure and evolution of a small population of *Vipera aspis* (L) in a farmland area of western France. Rev. Ecol. Terre Vie **51**: 223–241.

Zuffi, M.A.L., Gentilli, A., Cecchinelli, E., Bonnet, X., Filippi, E., Luiselli, L., Pupin, F., Barbanera, F., Dini, F., Fasola, M. (2009): Geographic variation of life-history traits and reproductive patterns in Continental and Mediterranean asp vipers, *Vipera aspis*. Biol. J. Linn. Soc. **96**: 383–391.

Zuffi, M.A.L., Giudici, F., Ioalè, P. (1999): Frequency and effort of reproduction in female *Vipera aspis* from a southern population. Acta Œcol. **20**: 633–638.

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