

The role of exogenous and endogenous factors in the reproductive cycles of the Amphibia [POSTER]

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All amphibians living in temperate areas go through regular cycles of reproductive activity that, as a rule, occur between early spring and late summer. The autumn, usually characterized by equally fit climate (at least in the Mediterranean regions) is less used by the amphibians for reproduction. Possibly, this depends on the short duration of appropriate conditions, followed by a rapid decrease of temperatures and considerable difficulties, for the larvae, to complete their development before the winter.

In this paper we wish to recall the decisive researches of Mario Galgano in clarifying the role of exogenous and endogenous factors in the amphibian reproductive cycles. In a period of about twenty years (1930-1950), he studied the gametogenesis in several anurans and urodeles, both in natural and experimental conditions. The results indicated that the reproductive activity is chiefly depending on physiological responses to seasonal and local temperatures, but with very different patterns according to sex and species.

In some cases (e.g. *Rana temporaria*) we can observe a really discontinuous gametogenesis, where only endogenous rhythms regulate the sexual activity, on the basis of climatic-temporal correlations now strictly codified inside the genome. In these species the dynamics of the reproductive cycle cannot be changed by modifications of natural or experimental conditions.

In other species (e.g. *Rana esculenta*), the reproductive processes depend directly on the temperature. They get blocked by unfit environmental conditions, but can start again when the climatic factors become propitious. In these cases we have a potentially continuous gametogenesis.

In general, all the amphibians exhibit reproductive cycles consistent with their environment, as the result of adaptive processes. In this connection, cases of obvious discordance between reproductive patterns and climatic conditions could be related to the peculiar evolutive history of the species. For example, species living in temperate regions but exhibiting a sexual cycle typical of cold climate can be regarded as relicts of glacial periods or areas.

Morphology and genetics of the Aeolian Islands *Podarcis* [ORAL PRESENTATION]

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Two *Podarcis* species occur on the Aeolian Archipelago (NE Sicily): *P. sicula*, is widespread while the endemic *P. raffonei* just occurs on Scoglio Faraglione, Strombolicchio and La Canna Islets as well as in a small relict isolated population on Vulcano Island.

Morphological analyses based on scalation and biometric traits shows that *P. raffonei* is well differentiated from *P. sicula* particularly in females. Within *P. sicula*, females from the Aeolian Islands are more similar to those of Northern Sicily than to those of peninsular Italy (Salerno area) whereas males differ from both the Sicilian and the peninsular populations. Finally, the three *P. raffonei* populations analysed seem to be quite differentiated between them for both

sexes. Genetic analysis based on mitochondrial DNA sequences indicates that *P. raffonei* is more closely related to *P. wagleriana* from Sicily than to *P. sicula*. Genetic distances between the last two species are significant but lower than typically seen between lacertid species whereas sequences of Aeolian *P. sicula* and those from southern continental Italy are nearly identical.

These results seem to confirm that *P. raffonei* was probably the first *Podarcis* to colonise this volcanic Archipelago which arose ca 500.000 years B.P. The successive colonisation by *P. sicula* led to competitive exclusion and extinction of *P. raffonei*, which mainly survived in small, isolated populations. *Podarcis* lizards appear to be a group subject to relatively rapid morphological evolution as shown by the divergence between the three *P. raffonei* populations and, between the Aeolian and the Sicilian *P. sicula* ones. Morphological traits in males appear to evolve faster in this insular environment relative to females.

**Spatial structure of amphibian populations under strong anthropogenic pressure
in the industrial Dnieper region
[POSTER]**

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The spatial structure of population among the first reacts to change of the natural environment. It is especially appreciable in industrial regions with significant pressure of anthropogenic loads on natural ecosystems. In industrial Dnieper region (Dnipropetrovsk province, Ukraine) the pressure of technogenic, agricultural and recreational factors have reached the maximal level and have caused intensive transformational processes. Only 0.3 % of not disturbed, intact ecosystems, the others have been modified (83.7 %), or differently transformed (16 %). Along these lines, the modified ecosystems were exposed to significant transformation as well.

The ecosystems transformation caused significant changes in amphibians' number. In aquatic ecosystems the number index depends on a transformation degree. If the number in non-transformed ecosystems is recognized as 1, the amphibians number in low-transformed, medium-transformed and strongly transformed ones makes up 0.91, 0.67, 0.41-0.28 in lakes; in meadow ecosystems: 0.82, 0.58, 0.34-0.19 and in the woods: 0.86, 0.62, 0.42-0.24, respectively. The first reaction of amphibian populations to pollution is to change the number and rearrange the spatial structure. In non-transformed small lakes (flood land, steppe) there is continuous diffusive type of spatial structure. It changes into continuous lacy type in the low-transformed ecosystems, wide-striped continuous type – in medium-transformed ones. In meadow and steppe the same continuous diffusive type is replaced with continuous lacy type and large-islet mosaic type, respectively, with the small-islet mosaic type in strongly transformed ecosystems. In flooded woods the continuous lacy type is replaced with the wide-striped type in low-transformed ecosystems and with the large-islet mosaic type in medium-transformed ones, but in riverside medium-transformed sites – in narrow-striped faltering type.

Thus, the rearrange of amphibians' spatial structure under anthropogenic influence is possible to use in bioindication of the population and ecosystem state.