

**PRESS RELEASE**

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## **IS IT POSSIBLE TO LIVE IN A SINGLE-SEX POPULATION? YES, BUT IT REQUIRES POSSESSING SLIGHTLY THIEVISH ABILITIES AND CERTAIN CLONING SKILLS**

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**It usually takes both males and females in order to reproduce successfully. However, a team of scientists from the Institute of Animal Physiology and Genetics CAS and the University of Ostrava found out that the entire population of edible frogs in the Oder River basin is made up of males only. Such populations of other four-legged vertebrates are not yet known of anywhere else in the world. They “steal” the eggs from the marsh frogs. At the turn of April and May, the still areas of water come alive with frog choruses and thus, this intriguing reproduction process can be observed again after a year.**

*“After twenty years of monitoring the populations in the Oder River basin, we can now confirm that all edible frogs living in this area are exclusively male; there are no females whatsoever,”* says Lukáš Choleva, describing the quite exceptional findings. *“In relation to this finding, we were naturally interested in how such male-only population originated and how these males are actually able to reproduce without their females,”* he adds.

The secret lies in an extraordinary form of reproduction called hybridogenesis. It is found in certain organisms of interspecific origin, including the edible frog, which is actually a hybrid itself. *“There is no exchange of genetic information between paternal and maternal chromosomes during the formation of sex cells, as is the case with us humans, but instead, the sex cells form as clones, i.e. genetic copies of only one parent,”* says the co-author of the publication Marie Kaštánková, explaining this remarkable form of reproduction.

### **Two types of sperm and a stolen egg**

The male edible frogs from the Oder River basin are also unique in that they do not produce just one, but rather two types of clonal sperms – one type carries the DNA of one parent species and the other

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type the DNA of the other parent species. And where exactly do the males get the missing egg necessary for the creation of a new edible frog generation from? *“By not having their own females, they co-exist with one of the parent species”*, notes Marie Kaštánková.

### **Male edible frogs also breed females of different species**

In the Poodří region, it is the marsh frog. Here, the hybrid male edible frogs have to compete with other males of their own species for the female marsh frog. Interestingly enough, the list of the edible frogs' remarkable abilities does not end here. The study of these amphibians' chromosomes and genomes has shown that the hybridization between a male edible frog and a female marsh frog produces not only actual male edible frog offspring, but also female ones. However, genetically speaking, these females are not edible frogs, but marsh frogs.

*“We assume that from an evolutionary point of view, it may be a reproductive strategy of edible frogs to increase the number of females in a mixed population, and thus the chance of hybrid males to find a mate and reproduce,”* adds Lukáš Choleva. In this research, the biologists are not simply pointing to amphibian diversity, but also portraying the ways in which animals can reproduce at the vertebrate level, a group to which we humans belong as well.

### **Natural cloning**

Scientists at the Liběchov workplace have a long history of studying alternative reproductive strategies in vertebrates, particularly the biological processes by which the animal body is able to produce a clonal cell. In the future, this knowledge about natural animal cloning in vertebrates can become useful in other disciplines as well, including human medicine.

**Green frogs** are greenish to greenish-brown coloured amphibians that can be found in various types of still water areas from ponds to dead-end river channels, virtually throughout the entire spring and summer period. Throughout this entire time, they put on display their characteristic loud choruses. It is their attachment to the water that distinguishes them from the group of so-called common frogs. These green frogs encompass three different species: marsh frog, pool frog and edible frog. Strictly speaking, the edible frog is not a species per se, but a hybrid of two parent species: the marsh frog and the pool frog, and in the wild it is usually found in the company of one of the parent species. It is their hybrid origin that makes the edible frogs absolutely unique for studying and understanding the processes that lead to the emergence of new species and alternative reproductive strategies.

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Link to the publication: <https://www.nature.com/articles/s41598-021-81240-5.pdf>

Download **photos** [HERE](#).

Download **video sequence** [HERE](#).

For those interested, we offer filming options within the premises or in the exterior; ideally, at the turn of April-May, since it is the frog reproduction period.

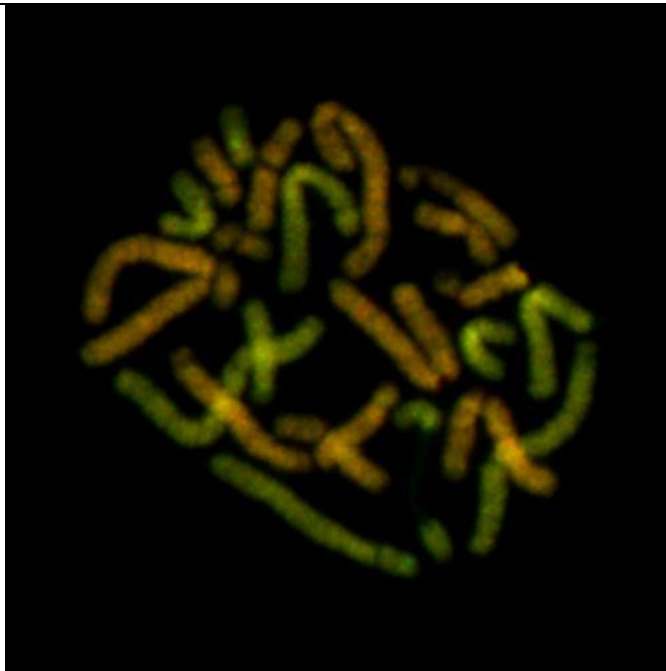
Photo gallery:



*Male green frog from the Poodří Protected Landscape Area*  
*PHOTO: L. Choleva*



*Pond Oderská Kukla in the Poodří Protected Landscape Area, where the male edible frogs are able to live thanks to the presence of littoral with aquatic vegetation*  
*PHOTO: L. Choleva*



*Chromosomes of male edible frog specially stained to prove its hybrid origin*  
*FOTO: M. Kaštánková*