

The barred grass snake is described as a separate species

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The Barred Grass Snake (*Natrix helvetica*), newly recognized as a separate species, occurs in England, France, the Benelux countries, Switzerland, Italy and Western Germany. Credit: Wolfgang Böhme

Together with an international team, Senckenberg scientists identified a

new species of snake in Europe. Based on more than 1,600 snakes, the researchers were able to show that the barred grass snake, whose range includes Western Germany, France, Great Britain, Switzerland and Italy constitutes a distinct species. In their study, published today in the journal *Scientific Reports*, the team examined two contact zones – in the Rhine region and in eastern Germany – where different genetic lineages of grass snakes meet.

The [grass](#) snake is among the most common and widespread snakes in Europe – yet relatively little is known to date about the genetic identity of these non-toxic reptiles, which can reach a length of up to one meter.

"We studied two areas where different genetic lineages of the grass snake come into contact. We discovered that the barred grass snake, previously considered a subspecies, is in fact a [distinct species](#) (*Natrix helvetica*). The barred grass snake is widely distributed throughout Great Britain, Switzerland, Italy and France, and also occurs in the western part of Germany. Thus, the number of European snake species has increased by one," according to Professor Uwe Fritz, Director of the Senckenberg Natural History Collections in Dresden.

In the course of an international study led by Fritz, the professor's doctoral student, Carolin Kindler, examined the [genetic identity](#) of more than 1,600 grass snakes – many of them scientific museum specimens. "This showed once again how valuable these – in part very old – collections can be," explains Fritz, and he continues, "Modern methods such as genetics make it possible to gain entirely new insights from the collection specimens."



The range of the Eastern Grass Snake (*Natrix natrix*) extends from Germany across the Balkans, Eastern Europe and Turkey to Central Asia. Credit: Melita Vamberger

Two "contact zones" of grass snakes were examined more closely by the scientists from Dresden: One of the zones is located in the Rhine region, the other extends from Central Germany down to the southern Balkans. In these zones, different genetic lineages of the grass snake meet, which in part had previously been thought to represent different subspecies. Such contact zones are viewed as natural laboratories for evolution, since they allow the study of hybridization and speciation.

The two contact zones examined in this study represent different stages in the speciation process: The eastern contact zone reveals a complete mixing of the involved genetic lineages over hundreds of kilometers. In the Rhine region, on the other hand, the hybrid zone is less than 50 km wide, and the admixture is very limited and unidirectional, primarily with barred grass snakes cross-breeding with Eastern Grass Snakes, but rarely the other way around. "This indicates the presence of reproductive barriers," explains Fritz. They arise during the speciation process to prevent mismatched pairings among different species. These reproductive barriers and the narrow hybrid zone show that the barred grass snake constitutes a distinct species.

This conclusion is not without consequences. Grass snakes are under special protection in Europe and are considered threatened or highly threatened in some countries. "We now have to pay close attention to which species of grass [snake](#) is involved in each case, in order to be able to assess whether one of them may be more threatened than previously thought," Fritz points out.

More information: Carolin Kindler et al. Hybridization patterns in two contact zones of grass snakes reveal a new Central European snake species, *Scientific Reports* (2017). [DOI: 10.1038/s41598-017-07847-9](https://doi.org/10.1038/s41598-017-07847-9)

Provided by Senckenberg Research Institute and Natural History Museum

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