

# On the vertical distribution of the reptile species in Austria

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Received 2 May 2000; accepted 10 September 2000

Reptiles (17441 records) were recorded from all altitudes up to 2500 m (Table 1; for methods applied see reference). Most records (74%) refer to sites below 700 m, where reptiles are overrepresented when the size of the area covered by these altitudinal classes is considered. Only 0.4 % of the records come from altitudes above 2000 m. Most reptile forms are found in largely continuous series of altitudinal classes. A conspicuous discontinuity is observed towards the upper altitudinal limits in Horvath's Rock Lizard *Lacerta horvathi* and Aesculapian Snake *Elaphe longissima* which is certainly due to lack of information.

Four out of 15 forms (Slow Worm *Anguis fragilis*, Common Lizard *Zootoca v. vivipara*, Grass Snake *Natrix natrix*, Adder *Vipera berus*) turn out to have an extended vertical range exceeding 2000 m altitude. *Zootoca v. vivipara* and Adder are not present below 200 m. Nine forms

(European Pond Terrapin *Emys orbicularis*, Sand Lizard *Lacerta agilis*, Green Lizard *L. viridis*, *Z. v. pannonica*, Wall Lizard *Podarcis muralis*, Smooth Snake *Coronella austriaca*, Aesculapian Snake, Dice Snake *Natrix tessellata* [and Orsini's Viper *Vipera ursinii*]) occur from the lowest areas up to various altitudes not, however, exceeding 1800 m. Horvath's Rock Lizard is found between 600 m and 1700 m, Sand Viper *Vipera ammodytes* between 300 m and 1800 m. European Pond Terrapin, *Z. v. pannonica*, Dice Snake, [and Orsini's Viper] are restricted to low altitudes.

No form is equally distributed over all altitudinal classes in which it dwells. Only Horvath's Rock Lizard, *Z. v. vivipara* and Adder are significantly overrepresented above 700-800 m, while they become insignificant below 500 m (*Z. v. vivipara*, Adder) or are completely missing below 600 m (Horvath's Rock Lizard). Thus,

these three species represent the typical middle and high altitude reptiles of Austria. On the other hand, there is a considerable number of forms the distribution of which concentrates at lower altitudes. Out of 8 forms (European Pond Terrapin, Sand Lizard, Green Lizard, *Z. v. panonica*, Aesculapian Snake, Grass Snake, Dice Snake, [and Orsini's Viper]) significantly overrepresented in the two lowermost altitudinal classes (< 300

m) only Aesculapian Snake, Grass Snake, and Dice Snake are overrepresented in one to three of the following altitudinal classes as well. Apart from this group of lowland reptiles, there are forms which are preferentially present in lower and middle altitudes (Slow Worm, Wall Lizard, Smooth Snake, Sand Viper). In various kinds, these forms are exclusively overrepresented at altitudes between 300 and 1100 m.

## REFERENCES

- CABELA, A., GRILLITSCH, H. & TIEDEMANN, F. 2001: Atlas zur Verbreitung und Ökologie der Amphibien und Reptilien in Österreich. Auswertung der Herpetofaunistischen Datenbank am Naturhistorischen Museum in Wien. Wien (Umweltbundesamt). 880 pp.

**Table 1:** Vertical distribution of the reptile species in Austria. Shaded cells - presence confirmed; white cells - presence not confirmed. When compared with all reptiles present in the altitudinal class, the taxon is: (▲) - significantly ( $\alpha = 0.1$ ) overrepresented, ▼ - significantly ( $\alpha = 0.1$ ) underrepresented, n. s. - not represented significantly ( $\alpha = 0.1$ ) different from all reptiles taken collectively.

Altitude	<i>E. orbicularis</i>	<i>A. fragilis</i>	<i>L. agilis</i>	<i>L. horvathi</i>	<i>L. viridis</i>	<i>Z. v. vivipara</i>	<i>Z. v. pannonica</i>	<i>P. muralis</i>	<i>C. austriaca</i>	<i>E. longissima</i>	<i>N. natix</i>	<i>N. tessellata</i>	<i>V. ammodytes</i>	<i>V. berus</i>	<i>V. ursinii</i>
<= 200 m	▲	▽	▲	n.s.	n.s.	▽	▲	▽	▽	▽	▲	▲	▽	▽	▲
<= 300 m	n.s.	n.s.	▲	n.s.	▲	▽	n.s.	▽	n.s.	▲	▲	▲	▽	▽	▽
<= 400 m	n.s.	▲	n.s.	n.s.	n.s.	▽	▽	n.s.	▲	▲	▲	n.s.	▽	▽	▽
<= 500 m	n.s.	n.s.	n.s.	n.s.	n.s.	▽	n.s.	▲	▲	n.s.	▲	▲	n.s.	▽	▽
<= 600 m	n.s.	n.s.	▽	n.s.	n.s.	n.s.	▽	▲	▲	▲	n.s.	▽	▲	n.s.	n.s.
<= 700 m	n.s.	n.s.	▽	n.s.	▽	n.s.	n.s.	▲	▲	n.s.	n.s.	▽	▲	n.s.	n.s.
<= 800 m	n.s.	n.s.	n.s.	n.s.	▽	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	▽	▲	▲	n.s.
<= 900 m	n.s.	n.s.	n.s.	▲	▽	▲	n.s.	▲	n.s.	▽	▽	▽	n.s.	▲	n.s.
<= 1000 m	n.s.	n.s.	n.s.	▲	▽	▲	n.s.	n.s.	n.s.	▽	▽	▽	n.s.	▲	n.s.
<= 1100 m	n.s.	▲	▽	n.s.	▽	▲	n.s.	n.s.	n.s.	▽	▽	n.s.	n.s.	▲	n.s.
<= 1200 m	n.s.	n.s.	▽	▲	n.s.	▲	n.s.	n.s.	n.s.	▽	▽	n.s.	n.s.	▲	n.s.
<= 1300 m	n.s.	n.s.	▽	n.s.	n.s.	▲	n.s.	n.s.	n.s.	▽	▽	n.s.	n.s.	▲	n.s.
<= 1400 m	n.s.	n.s.	▽	n.s.	n.s.	▲	n.s.	n.s.	n.s.	▽	▽	n.s.	n.s.	▲	n.s.
<= 1500 m	n.s.	n.s.	▽	n.s.	n.s.	▲	n.s.	n.s.	n.s.	▽	▽	n.s.	n.s.	▲	n.s.
<= 1600 m	n.s.	n.s.	▽	n.s.	n.s.	▲	n.s.	n.s.	n.s.	▽	▽	n.s.	n.s.	▲	n.s.
<= 1700 m	n.s.	n.s.	▽	n.s.	n.s.	▲	n.s.	n.s.	n.s.	▽	▽	n.s.	n.s.	▲	n.s.
<= 1800 m	n.s.	n.s.	▽	n.s.	n.s.	▲	n.s.	n.s.	▽	n.s.	▽	n.s.	n.s.	▲	n.s.
<= 1900 m	n.s.	n.s.	▽	n.s.	n.s.	▲	n.s.	n.s.	n.s.	n.s.	▽	n.s.	n.s.	▲	n.s.
<= 2000 m	n.s.	n.s.	n.s.	n.s.	n.s.	▲	n.s.	n.s.	n.s.	n.s.	▽	n.s.	n.s.	▲	n.s.
> 2000 m	n.s.	n.s.	n.s.	n.s.	n.s.	▲	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	▲	n.s.