

Console, G., Iannella, M., Cerasoli, F., D'Alessandro, P. and Biondi, M. 2020. A European perspective of the conservation status of the threatened meadow viper (Reptilia, Viperidae: *Vipera ursinii* (BONAPARTE, 1835)). – Wildlife Biology 2020: wlb.00604

Appendix 1

Model variables, parametrization and results

a) The set of variables considered as candidate predictors downloaded from Worldclim.org. Variables used for models calibration (Pearson's $|r| > 0.85$) are highlighted in yellow.

BIO1 = Annual mean temperature

BIO2 = Mean diurnal range (mean of monthly (max temp – min temp))

BIO3 = Isothermality (BIO2/BIO7) × 100

BIO4 = Temperature seasonality (standard deviation × 100)

BIO5 = Max temperature of warmest month

BIO6 = Min temperature of coldest month

BIO7 = Temperature annual range (BIO5-BIO6)

BIO8 = Mean temperature of wettest quarter

BIO9 = Mean temperature of driest quarter

BIO10 = Mean temperature of warmest quarter

BIO11 = Mean temperature of coldest quarter

BIO12 = Annual precipitation

BIO13 = Precipitation of wettest month

BIO14 = Precipitation of driest month

BIO15 = Precipitation seasonality (coefficient of variation)

BIO16 = Precipitation of wettest quarter

BIO17 = Precipitation of driest quarter

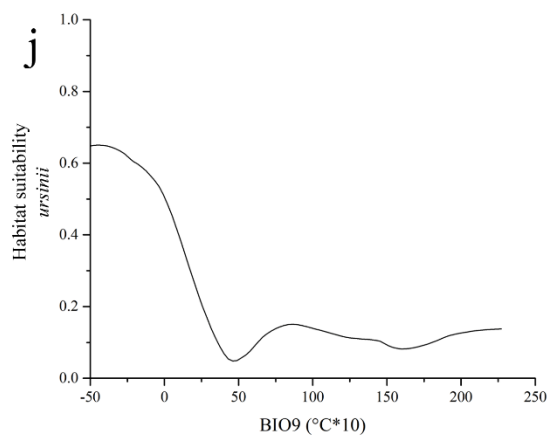
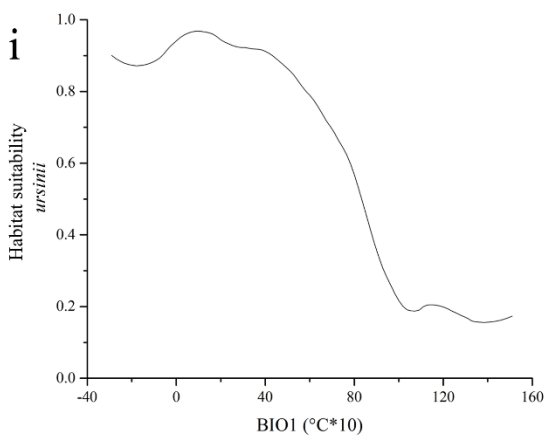
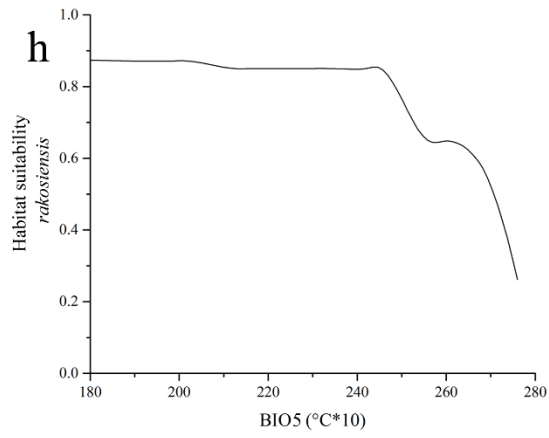
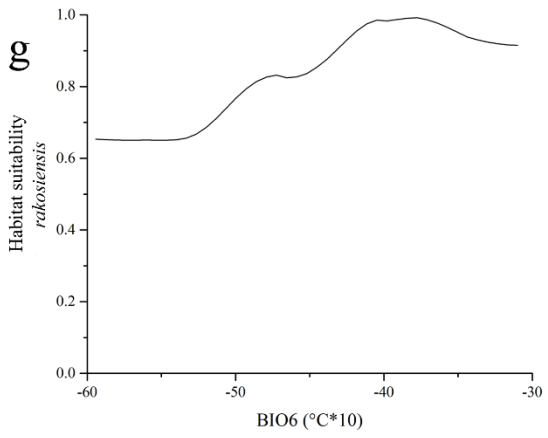
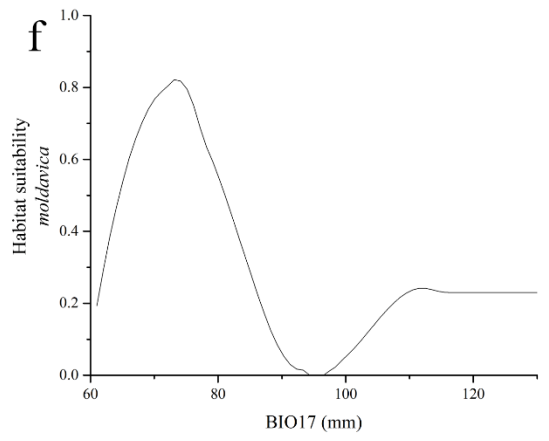
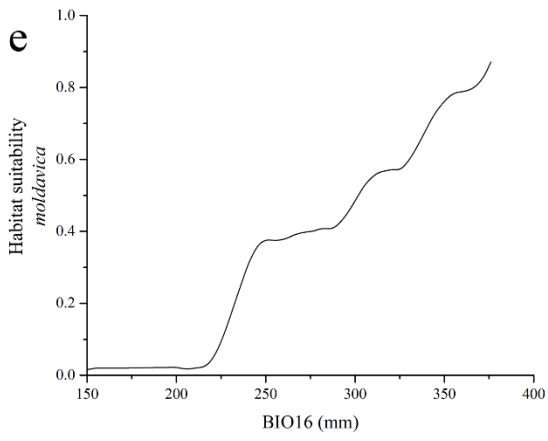
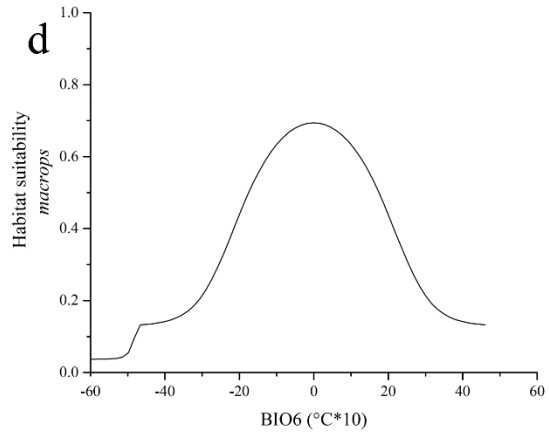
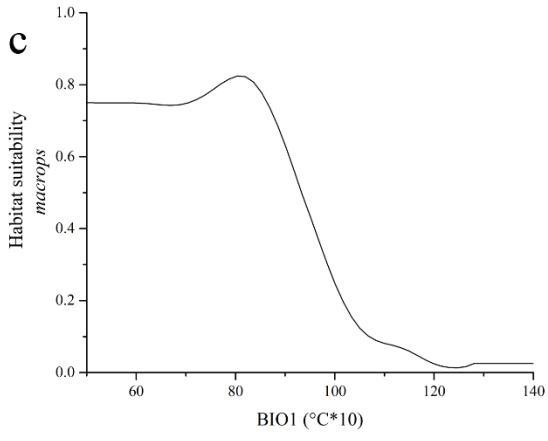
BIO18 = Precipitation of warmest quarter

BIO19 = Precipitation of coldest quarter

b) Models built for each subspecies of *Vipera ursinii* were parametrized as follows: general linear models (GLM): type = 'quadratic', interaction level=3; multiple adaptive regression splines (MARS) = type = 'quadratic', interaction level = 3; generalized boosting model (GBM) = number of trees = 10000, interaction depth = 3, cross-validation folds = 10; maxent (MAXENT.Phillips) = maximum iterations = 5000.

The discrimination accuracy of the ensemble models built for each subspecies were: TSS = 0.930 and AUC = 0.989 for *V. u. macrops*; TSS = 0.968 and AUC = 0.996 for *V. u. moldavica*; TSS = 0.942 and AUC = 0.988 for *V. u. rakosiensis* and TSS = 0.923 and AUC = 0.992 for *V. u. ursinii*.

c) – j) Marginal response curves of the first two highly contributing predictors from the ensemble models obtained for: *Vipera ursinii macrops* (c and d), *V. u. moldavica* (e and f), *V. u. rakosiensis* (g and h) and *V. u. ursinii* (i and j).



k) Percent contribution of the first two highly contributing variables for the four *Vipera ursinii* subspecies

Subspecies	Variable code	Contribution (percent)
<i>Vipera ursinii macrops</i>	BIO1	57.1
	BIO6	15.9
<i>Vipera ursinii moldavica</i>	BIO16	20.2
	BIO17	20.0
<i>Vipera ursinii rakosiensis</i>	BIO6	18.5
	BIO5	14.8
<i>Vipera ursinii ursinii</i>	BIO1	21.6
	BIO9	16.1