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Distribution and habitat suitability maps of revised EUNIS grassland types

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1 Habitat suitability modelling

For the habitat suitability modelling, the widely used software Maxent for maximum entropy modelling of species' geographic distributions was used. Maxent is a general purpose machine-learning method with a simple and precise mathematical formulation, and has a number of aspects that make it well-suited for species distribution modelling when only presence (occurrence) data but not absence data are available (Philips et al. 2006). Because EUNIS habitats have a particular species composition, they are assumed to respond to specific ecological requirements, allowing us to generate correlative estimates of geographic distributions. Modelling habitats that have been floristically defined is a well-known procedure for ecological modelling at local scales, and a promising technique to be applied also at the continental level.

The Maxent method considers presence data (known observations of a given entity) and the so-called background data. Background data comprise a set of points used to describe the environmental variation of the study area according to the available environmental layers. It is assumed that these layers represent well the most important ecological gradients on a European scale. These layers were selected from meaningful environmental predictors commonly used for modelling non-tropical plant and vegetation diversity, and are not mutually strongly correlated.

As environmental predictors (and their sources) the following climate and soil layers have been used:

- Potential Evapotranspiration
<http://www.cgiar-csi.org/data/global-aridity-and-pet-database>
- Solar radiation
<http://www.worldgrids.org/doku.php?id=wiki:inmsre3>
- Temperature Seasonality (standard deviation *100)
<http://www.worldclim.org/bioclim>
- Mean Temperature of Wettest Quarter
<http://www.worldclim.org/bioclim>
- Annual Precipitation
<http://www.worldclim.org/bioclim>
- Precipitation Seasonality (Coefficient of Variation)
<http://www.worldclim.org/bioclim>
- Precipitation of Warmest Quarter
<http://www.worldclim.org/bioclim>
- Distance to water (rivers, lakes, sea)
derived from the shapefile 'Inland_Waters.shp'
- Bulk density of the soil (kg/m³)
Hengl et al. 2014
- Cation Exchange Capacity of the soil
Hengl et al. 2014

- Weight in % of clay particles (<0.0002 mm)
Hengl et al. 2014
- Volume % of coarse fragments (> 2 mm)
Hengl et al. 2014
- Soil organic carbon content (‰)
Hengl et al. 2014
- Soil pH (water)
Hengl et al. 2014
- Weight in % of silt particles (0.0002-0.05 mm)
Hengl et al. 2014
- Weight in % of sand particles (0.05-2 mm)
Hengl et al. 2014

Compared with the habitat suitability models set up for the EUNIS forest types (Schaminée et al. 2014) we now applied 8 recently published soil parameters (Hengl et al. 2014), instead of only one (soil pH). The same set has also been applied for the heath, scrub and tundra habitat types.

Maxent is expected to perform well for estimating the geographic distribution of EUNIS habitats in Europe. However, as with any other modelling techniques this method is sensitive to sampling bias, i.e. when the spatial distribution of presence data is reflecting an unequal sampling effort in different geographic regions. In Maxent, it has been proposed that the best way to account for sampling bias (when bias is known or expected to occur) is to generate background data reflecting the same bias of the presence data. When a complete set of presence data is available, a general recommendation is to generate background points from the occurrences of other species/communities that were sampled in a similar way (Elith et al. 2011).

Two different approaches have therefore been followed for the selection of a maximum of 10,000 locations for the background data, assuming biased and non-biased presence data. For the first approach, 10,000 locations were randomly selected by Maxent from the study area, whereas the second approach concerns a random stratified (one sample per 1x1 km grid) selection of 10,000 background locations of plots present in the EVA database. Concerning the observed occurrences of the EUNIS types also a random stratified selection has been applied with a maximum of 5000 observations.

In Appendix A the results of the analysis are presented. The two modelling approaches (assuming biased and non-biased data) were evaluated for each of the EUNIS habitat types in order to estimate which assumption is more likely. This evaluation was based on the expert knowledge of the team members of the distribution of grassland types by assessing (i) the distribution of the available presence data as an estimate of geographic bias, (ii) the realism of the habitat suitability maps to reflect known distribution of grasslands, and (iii) the environmental predictors that contribute most substantially to the models. The best performing model was then selected by consensus of the expert team for each habitat type. In the overview of EUNIS types on the first page of the Appendix, the preference for one of the two outputs is indicated in the column 'Background data pool'.

For 3 EUNIS types (E1.5e, E.1F, E5.2) insufficient data was available to create a model. For each EUNIS grassland type the following data are presented:

- A distribution map showing the location of the relevés that have been assigned to the EUNIS type concerned and therefore used as presence data.
- A habitat suitability map with colours varying from grey, through green to red, indicating increasingly favourable ecological conditions for the type (expressing the logistic output of the model between 0 and 1).

- AUC, or the Area Under the Curve, as a general estimate of model performance. This is the probability that the classifier correctly orders two points (a random positive example and a random negative example). In general, AUC values in the range 0.5-0.7 were considered low, 0.7-0.9 were moderate and >0.9 were high, suggesting poor, good and very good model performances, respectively. We provide two estimates of the AUC as calculated by Maxent. 'AUC training' reflects the internal fit between observed and predicted occurrences in the computed model. 'AUC test' provides the mean AUC obtained from a 10-fold cross-validation procedure in which ten different models were computed with a random selection of 90% of data (calibration data set) and 10% for testing the model (validation dataset).
- Contribution variables to the Maxent model (%). Indicates to what extent the environmental variables contribute to the model.
- Remarks of a few experts on the suitability map. These remarks should be taken into account when further processing the suitability maps.
- The distribution map as is prepared for the Red List project (Janssen et al. 2016). This map is included to tighten the discussion to where a habitat type is expected to occur

2 Discussion

It is clear that a **suitability** map is not a **distribution** map, but ideally it should cover well the distribution range of a habitat type. From the expert comments it can be concluded that this is not always the case. In some cases a map shows that a habitat is underrepresented or not represented at all in some parts of Europe. In other cases it is just the opposite; in some parts the Europe the habitat type is overrepresented.

The suitability maps are the result of a modelling process with all the potential shortcoming associated with it. On the basis of a limited set of predictors (climate and soil parameters), and a selection of in situ observations a probability is calculated for each grid cell. This process contains a number of uncertainties:

- The assignment of a plot observation to a EUNIS habitat type is based on expert rules. These rules may need further refinement, which could lead to different results.
- The number of plot observations may be too small to deliver an accountable model, although in most cases this doesn't seem to be a problem in the present study.
- The degree of detail in the predictor maps could be too limited, in other words the maps with a grid size of 1x1km could be too coarse. Plants, that form the basis of a habitat type operate on a much smaller scale than 1x1km. And in the field micro climate and soil parameter may differ significantly over short distances.
- Climate and soil parameters may be well represented in the set of predictors, but there are more factors that determine the suitability of a habitat type. For example chemical soil parameters are very important, but are simply not captured in a map on the European scale.

The habitat suitability maps will probably be further reviewed and processed in a next year's ETC/BD task, in which the maps will be downscaled to the actual land cover situation, resulting in probability maps.

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Appendix A: Distribution and suitability maps of the revised EUNIS grassland types

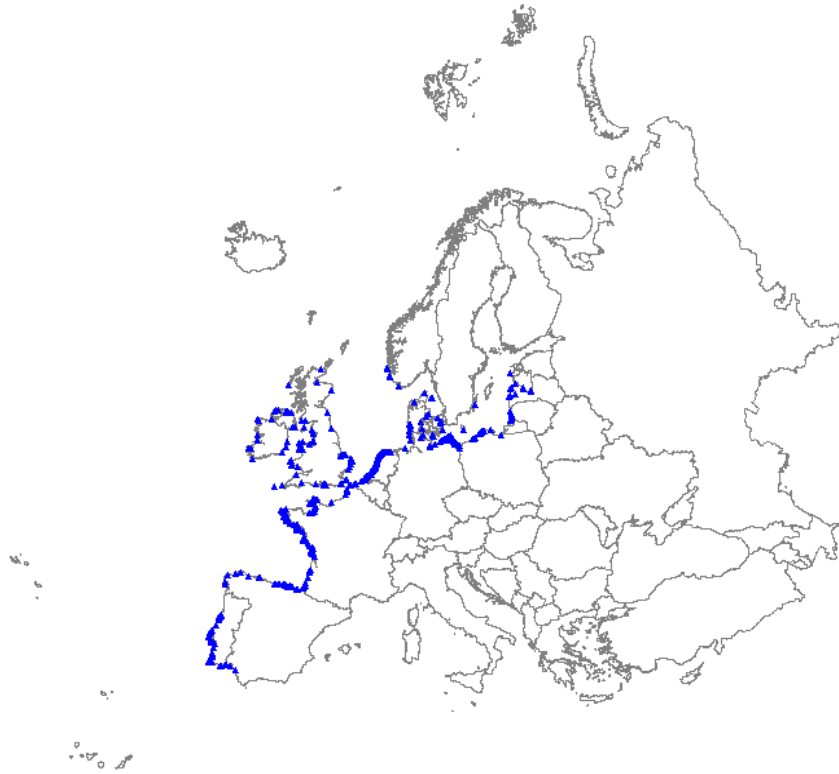
Appendix A: Distribution and suitability maps of the revised EUNIS grassland types

EUNIS-L3 code	Total # of plots	Description	Background data pool
B1.4a	3550	Atlantic and Baltic coastal dune grassland (grey dune)	Study area
B1.4b	5241	Mediterranean and Macaronesian coastal dune grassland (grey dune)	EVA database
B1.4c	547	Black Sea coastal dune grassland (grey dune)	EVA database
E1.1a	790	Pannonian and Pontic sandy steppe	EVA database
E1.1b	1180	Cryptogam- and annual-dominated vegetation on siliceous rock outcrops	Study area
E1.1d	1922	Cryptogam- and annual-dominated vegetation on calcareous and ultramafic rock outcrops	EVA database
E1.1e	422	Perennial rocky grassland of the Italian Peninsula	EVA database
E1.1f	169	Continental dry rocky steppic grassland and dwarf scrub on chalk outcrops	EVA database
E1.1g	1623	Perennial rocky grassland of Central Europe and the Carpathians	EVA database
E1.1h	86	Heavy-metal dry grassland of the Balkans	Study area
E1.1i	2179	Perennial rocky calcareous grassland of subatlantic-submediterranean Europe	EVA database
E1.1j	337	Dry steppic, submediterranean pasture of South-Eastern Europe	EVA database
E1.2a	41008	Semi-dry perennial calcareous grassland	EVA database
E1.2b	5107	Continental dry steppe	EVA database
E1.3a	522	Mediterranean closely grazed dry grassland	Study area
E1.3b	1000	Mediterranean tall perennial dry grassland	EVA database
E1.3c	930	Mediterranean annual-rich dry grassland	EVA database
E1.5a	676	Iberian oromediterranean siliceous dry grassland	Study area
E1.5b	902	Iberian oromediterranean basiphilous dry grassland	Study area
E1.5c	22	Cyrno-Sardean-oromediterranean siliceous dry grassland	Study area

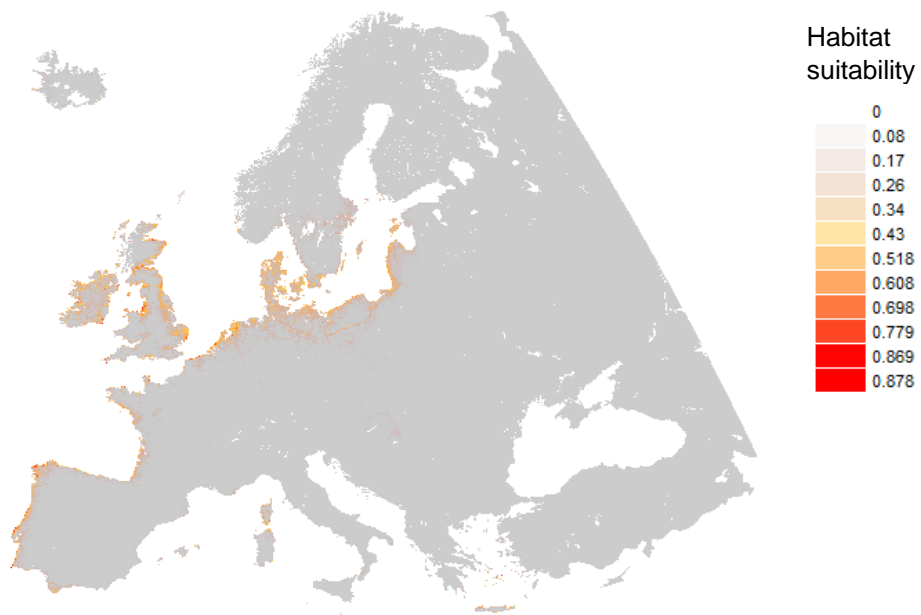
E1.5d	106	Greek and Anatolian oromediterranean siliceous dry grassland	Study area
E1.5e	10	Madeiran oromediterranean siliceous dry grassland	Insufficient data
E1.7	2014	Lowland to submontane, dry to mesic Nardus grassland	EVA database
E1.8	245	Open Iberian supra-mediterranean dry acid and neutral grassland	Study area
E1.9a	4346	Oceanic to subcontinental inland sand grassland on dry acid and neutral soils	Study area
E1.9b	2286	Inland sanddrift and dune with siliceous grassland	EVA database
E1.A	2066	Mediterranean to Atlantic open, dry, acid and neutral grassland	Study area
E1.B	133	Heavy-metal grassland in Western and Central Europe	EVA database
E1.F	4	Azorean open dry, acid to neutral grassland	Insufficient data
E2.1	30390	Mesic permanent pasture of lowlands and mountains	EVA database
E2.2	60857	Low and medium altitude hay meadow	Study area
E2.3	2146	Mountain hay meadow	Study area
E2.4	46	Iberian summer pasture (vallicar)	Study area
E3.1a	713	Mediterranean tall humid inland grassland	Study area
E3.2a	144	Mediterranean short moist grassland of lowlands	Study area
E3.2b	1152	Mediterranean short moist grassland of mountains	Study area
E3.3	1096	Submediterranean moist meadow	Study area
E3.4a	22215	Moist or wet mesotrophic to eutrophic hay meadow	EVA database
E3.4b	11179	Moist or wet mesotrophic to eutrophic pasture	EVA database
E3.5	7401	Temperate and boreal moist or wet oligotrophic grassland	EVA database
E4.1	1339	Vegetated snow-patch	EVA database
E4.3a	18	Boreal and arctic acidophilous alpine grassland	EVA database
E4.3b	8422	Temperate acidophilous alpine grassland	EVA database
E4.4a	3329	Arctic-alpine calcareous grassland	EVA database
E4.4b	531	Alpine and subalpine calcareous grassland of the Balkan and Apennines	Study area
E5.2a	845	Thermophilous woodland fringe of base-rich soils	Study area

E5.2b	134	Thermophilous woodland fringe of acidic soils	Study area
E5.2c	10	Macaronesian thermophilous woodland fringe	Insufficient data
E5.4	11159	Lowland moist or wet tall-herb and fern fringe	EVA database
E5.5	788	Subalpine moist or wet tall-herb and fern fringe	EVA database
E6.1	640	Mediterranean inland salt steppe	EVA database
E6.2	1242	Continental inland salt steppe	EVA database
E6.3	982	Temperate inland salt marsh	EVA database

B1.4a - Atlantic and Baltic coastal dune grassland (grey dune)



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

Geographic restriction distribution data

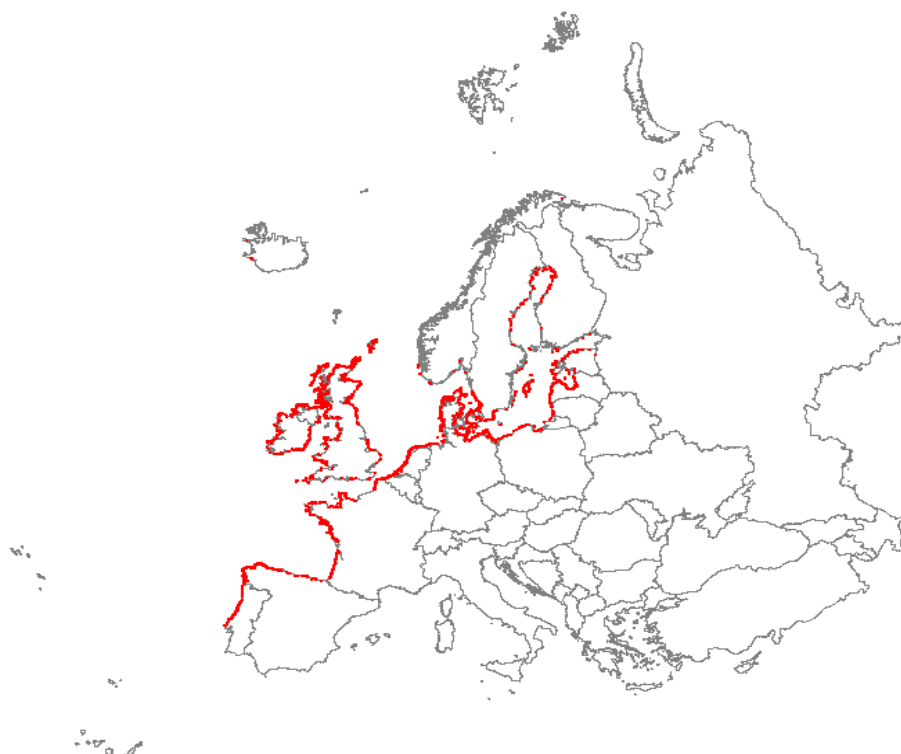
Restricted to coastal areas

Maxent modelling statistics

AUC training (0-1)	0.986
AUC test (0-1)	0.9752
Contribution variables to the Maxent model (%)	
Weight in % of sand particles (0.05-2 mm)	38.0277
Temperature seasonality (stdev * 100)	28.5855
pH (water)	8.9767
Weight in % of silt particles (0.0002-0.05 mm)	7.5388
Bulk density (kg/m ³)	3.9191
Soil organic carbon content (‰)	3.3623
Mean temperature of wettest quarter	2.4307
Distance to water	1.9423
Volume % of coarse fragments (> 2 mm)	1.9395
Weight in % of clay particles (<0.0002 mm)	1.3438
Solar radiation	0.4298
Cation Exchange Capacity	0.4215
Precipitation seasonality (coef. of var.)	0.4032
Precipitation of warmest quarter	0.2881
Annual precipitation	0.26
Potential evapotranspiration	0.2438

Remarks

Chytrý: All the inland predictions must be set to zero.



Distribution map from Red List project (Janssen et al., 2016)

B1.4b - Mediterranean and Macaronesian coastal dune grassland (grey dune)



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

Restricted to coastal areas

Maxent modelling statistics

AUC training (0-1)	0.9928
AUC test (0-1)	0.9891
Contribution variables to the Maxent model (%)	
Precipitation of warmest quarter	36.5503
Weight in % of sand particles (0.05-2 mm)	28.4271
Potential evapotranspiration	11.1158
Soil organic carbon content (‰)	6.825
Weight in % of clay particles (<0.0002 mm)	6.7828
Temperature seasonality (stdev * 100)	1.7337
Precipitation seasonality (coef. of var.)	1.6873
Volume % of coarse fragments (> 2 mm)	1.6238
Bulk density (kg/m ³)	1.3599
Mean temperature of wettest quarter	1.2938
Solar radiation	0.7039
Weight in % of silt particles (0.0002-0.05 mm)	0.6597
pH (water)	0.6493
Distance to water	0.3804
Annual precipitation	0.3302
Cation Exchange Capacity	0.282

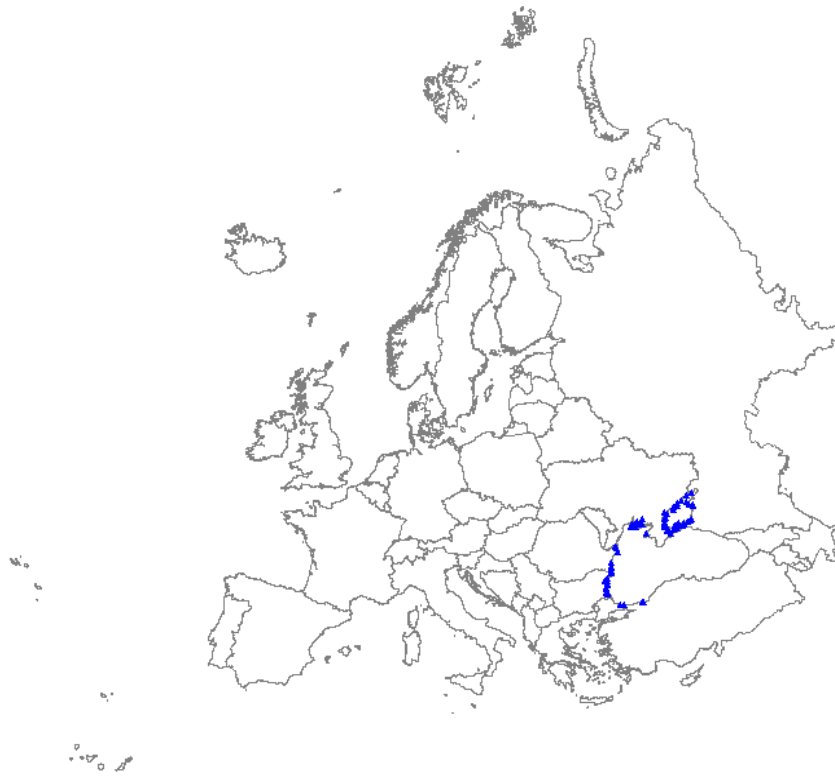
Remarks

Chytrý: All the inland predictions must be set to zero.

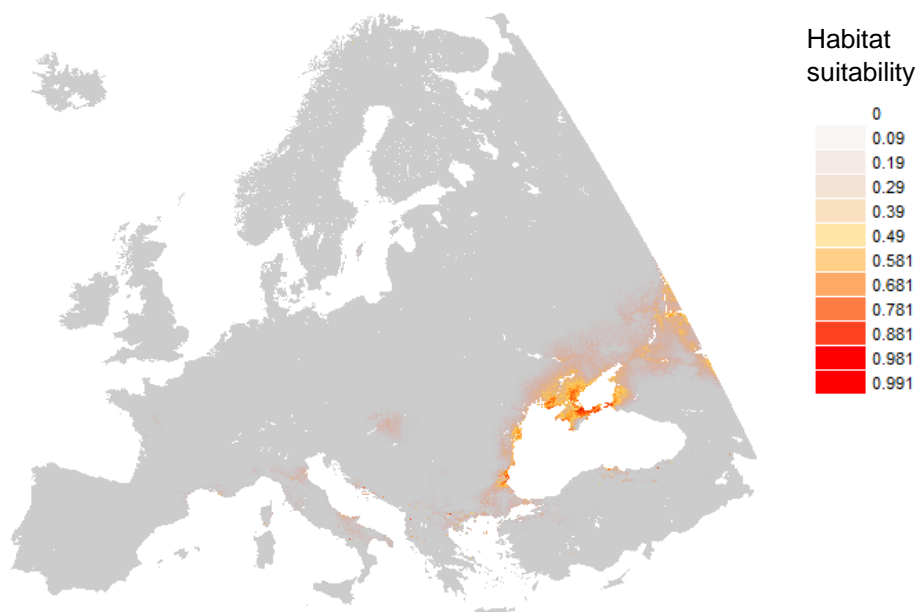


Distribution map from Red List project (Janssen et al., 2016)

B1.4c - Black Sea coastal dune grassland (grey dune)



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

Restricted to coastal areas

Maxent modelling statistics

AUC training (0-1)	0.9956
AUC test (0-1)	0.9967
Contribution variables to the Maxent model (%)	
Annual precipitation	23.6455
Potential evapotranspiration	23.1895
Temperature seasonality (stdev * 100)	12.9169
Precipitation of warmest quarter	12.5852
Precipitation seasonality (coef. of var.)	9.612
Soil organic carbon content (‰)	6.2813
Mean temperature of wettest quarter	4.0225
Weight in % of sand particles (0.05-2 mm)	3.3569
Weight in % of clay particles (<0.0002 mm)	2.1111
pH (water)	1.165
Volume % of coarse fragments (> 2 mm)	0.9045
Distance to water	0.0754
Solar radiation	0.0225
Cation Exchange Capacity	0.0215
Bulk density (kg/m ³)	0.0089
Weight in % of silt particles (0.0002-0.05 mm)	0.0072

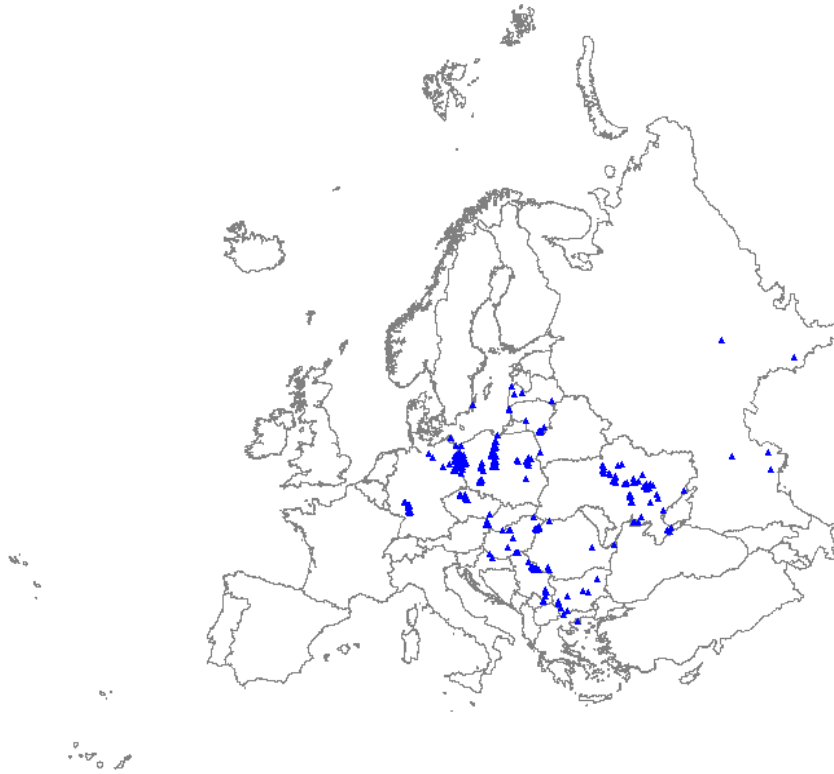
Remarks

Chytrý: All the inland predictions must be set to zero.

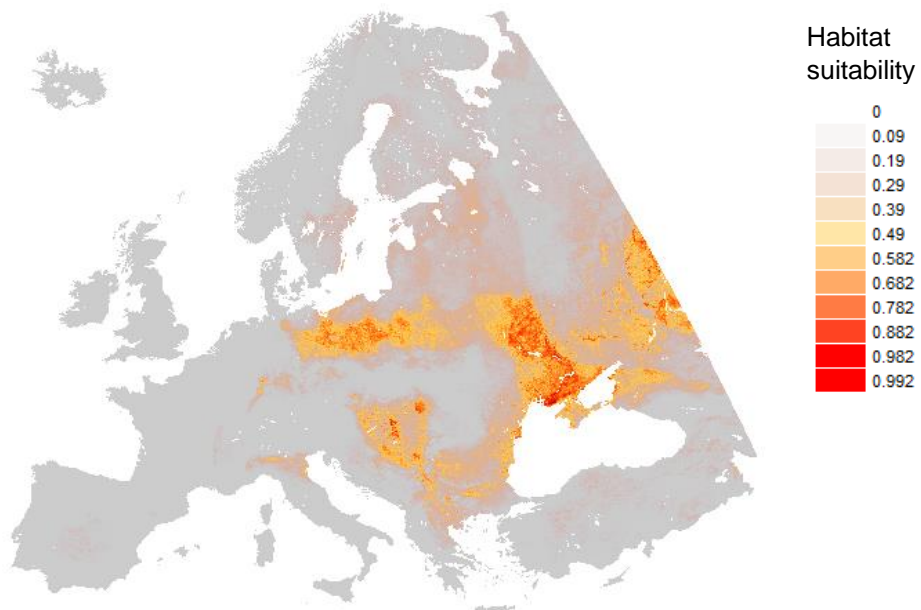


Distribution map from Red List project (Janssen et al., 2016)

E1.1a - Pannonian and Pontic sandy steppe



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

-

Maxent modelling statistics

AUC training (0-1)	0.9651
AUC test (0-1)	0.9647
Contribution variables to the Maxent model (%)	
Temperature seasonality (stdev * 100)	28.3647
Mean temperature of wettest quarter	24.9701
Annual precipitation	15.4847
Precipitation of warmest quarter	12.1144
Volume % of coarse fragments (> 2 mm)	5.3955
Weight in % of sand particles (0.05-2 mm)	5.3777
Solar radiation	3.0565
Soil organic carbon content (‰)	1.7732
Precipitation seasonality (coef. of var.)	1.4943
pH (water)	1.49
Weight in % of clay particles (<0.0002 mm)	1.2226
Distance to water	0.797
Potential evapotranspiration	0.6335
Weight in % of silt particles (0.0002-0.05 mm)	0.4864
Bulk density (kg/m ³)	0.2123
Cation Exchange Capacity	0.0782

Remarks

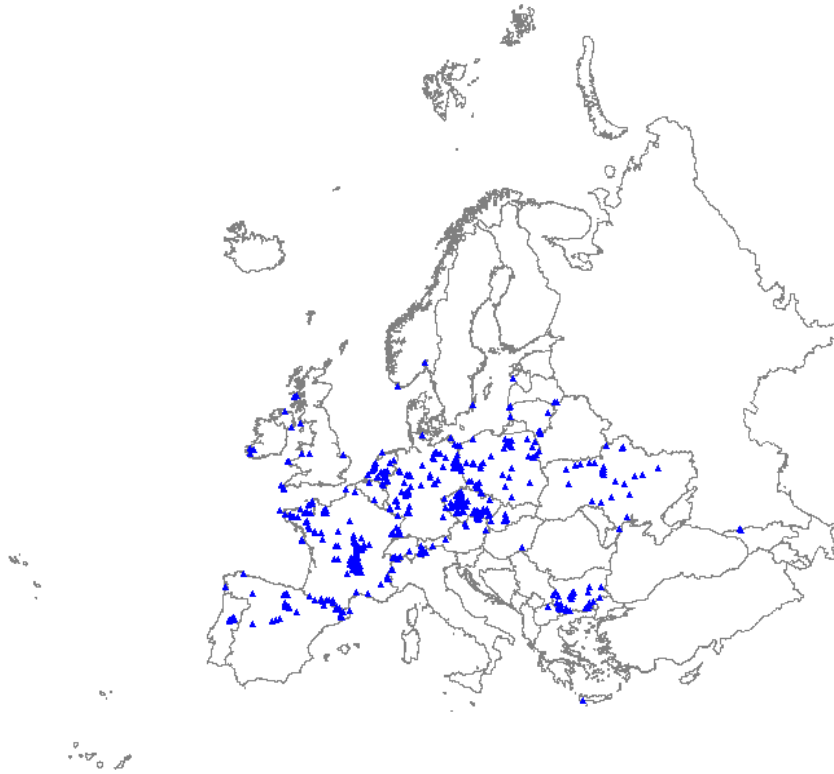
Chytrý: Underestimation in the Baltics.

Evans: Really existing in Latvia? Red List map seems more realistic.

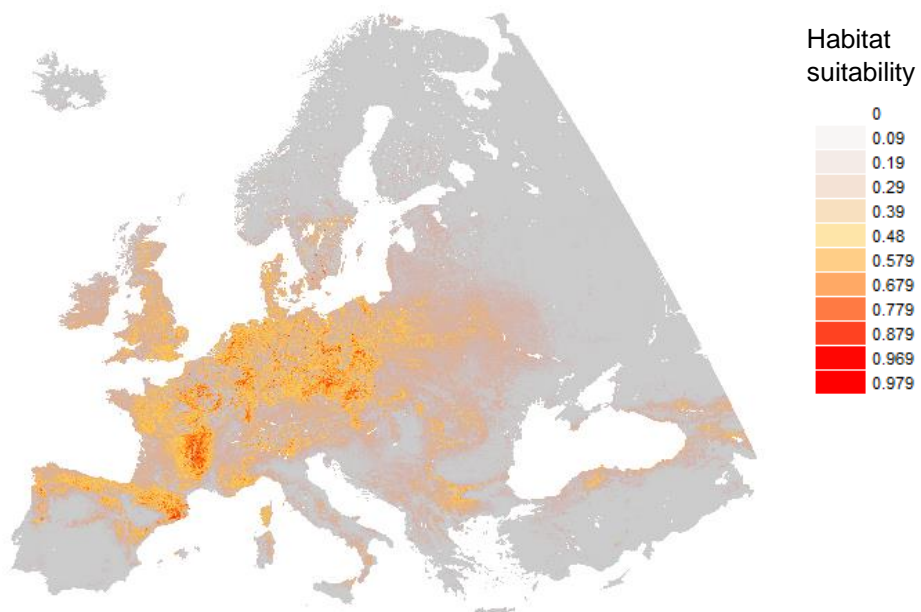


Distribution map from Red List project (Janssen et al., 2016)

E1.1b - Cryptogam- and annual-dominated vegetation on siliceous rock outcrops



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

Geographic restriction distribution data

acidic

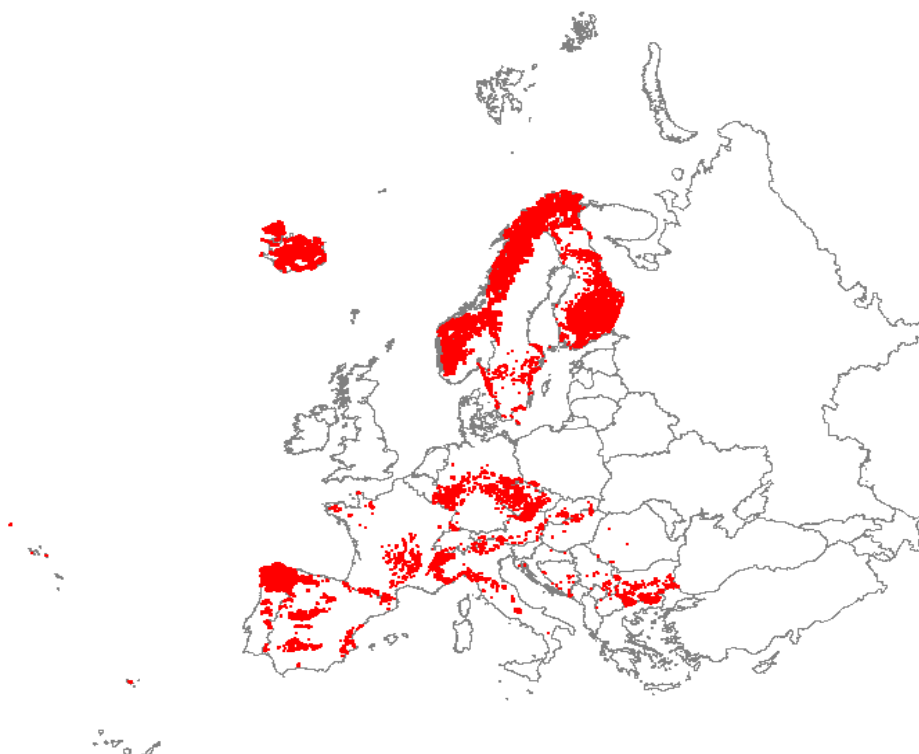
Maxent modelling statistics

AUC training (0-1)	0.9168
AUC test (0-1)	0.8946
Contribution variables to the Maxent model (%)	
Temperature seasonality (stdev * 100)	25.4029
Cation Exchange Capacity	19.7934
Soil organic carbon content (‰)	12.3843
Precipitation of warmest quarter	9.2374
Bulk density (kg/m ³)	8.2839
Distance to water	5.1226
Solar radiation	4.6906
Annual precipitation	4.5057
Weight in % of clay particles (<0.0002 mm)	4.3628
Volume % of coarse fragments (> 2 mm)	3.4231
Weight in % of silt particles (0.0002-0.05 mm)	3.0464
Potential evapotranspiration	1.9764
Mean temperature of wettest quarter	1.1271
pH (water)	0.6226
Precipitation seasonality (coef. of var.)	0.3564
Weight in % of sand particles (0.05-2 mm)	0.1156

Remarks

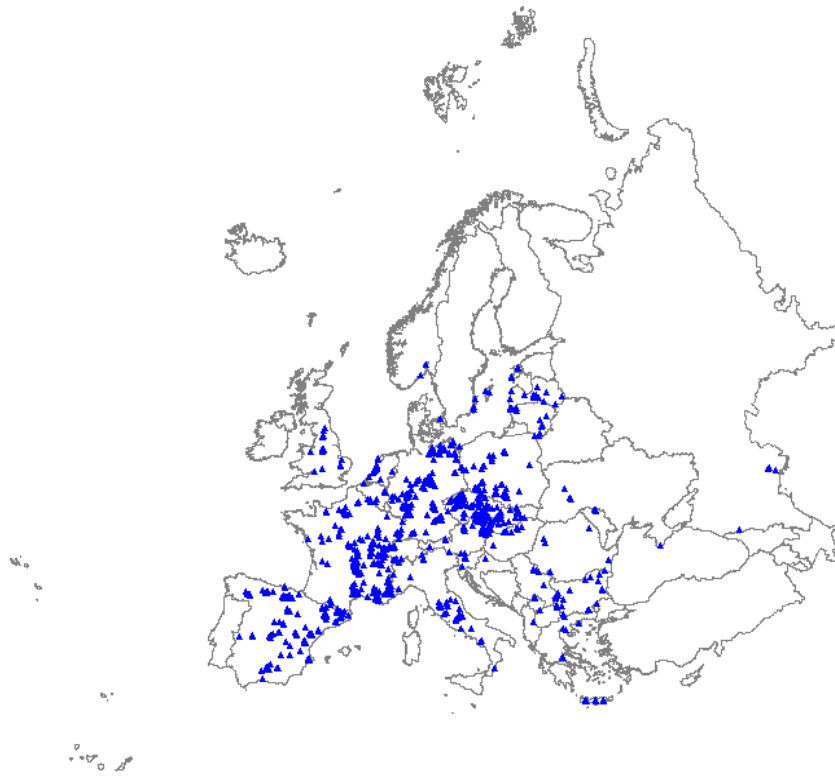
Chytrý: Underestimation in Central-Alps and Fennoscandia.

Evans: Distribution in UK odd, suggest more common on south (basic) and rarer in north (acidic). Predicted large areas in Ukrain which seems unlikely.

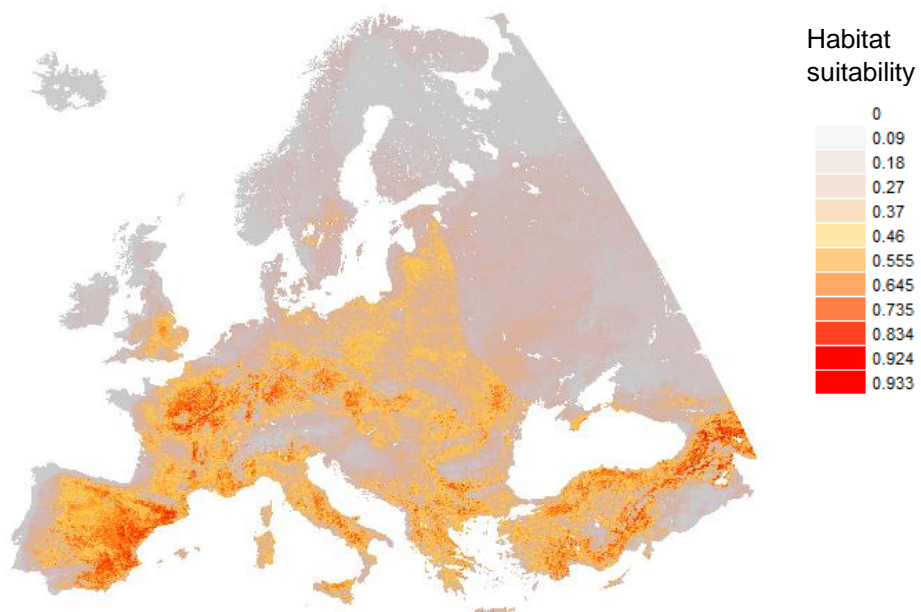


Distribution map from Red List project (Janssen et al., 2016)

E1.1d - Cryptogam- and annual-dominated vegetation on calcareous and ultramafic rock outc



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

-

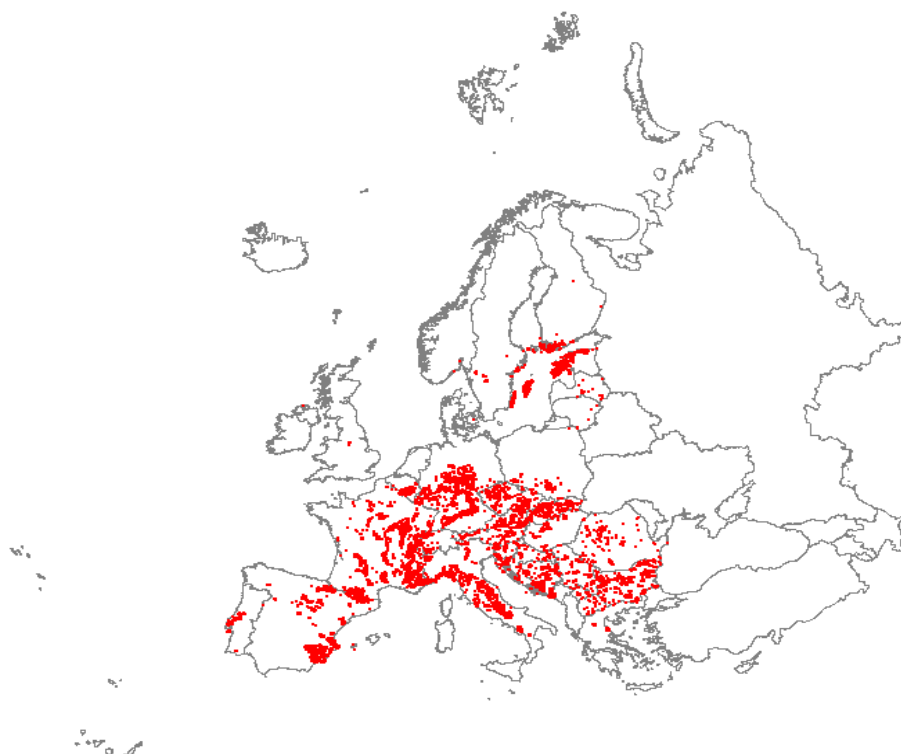
Maxent modelling statistics

AUC training (0-1)	0.8078
AUC test (0-1)	0.7689
Contribution variables to the Maxent model (%)	
Soil organic carbon content (‰)	30.4325
Potential evapotranspiration	24.473
Volume % of coarse fragments (> 2 mm)	12.7108
Precipitation of warmest quarter	10.1542
Annual precipitation	7.7092
Solar radiation	6.9156
Temperature seasonality (stdev * 100)	6.8156
Weight in % of sand particles (0.05-2 mm)	1.454
Precipitation seasonality (coef. of var.)	1.355
Weight in % of clay particles (<0.0002 mm)	1.3095
Bulk density (kg/m ³)	0.9473
Mean temperature of wettest quarter	0.9335
Weight in % of silt particles (0.0002-0.05 mm)	0.599
Distance to water	0.341
pH (water)	0.25
Cation Exchange Capacity	0.1886

Remarks

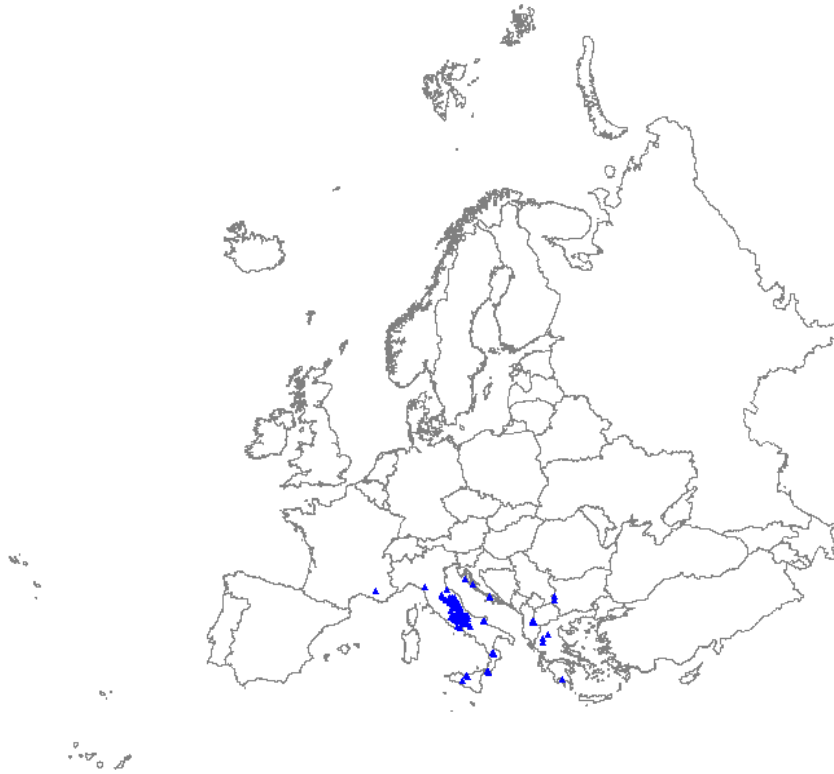
Chytrý: Not predicted for Baltic islands where the unit occurs.

Evans: Major differences in Turkey and Caucasus.



Distribution map from Red List project (Janssen et al., 2016)

E1.1e - Perennial rocky grassland of the Italian Peninsula



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

Not only restricted to Italy according to Flavia Landucci

Maxent modelling statistics

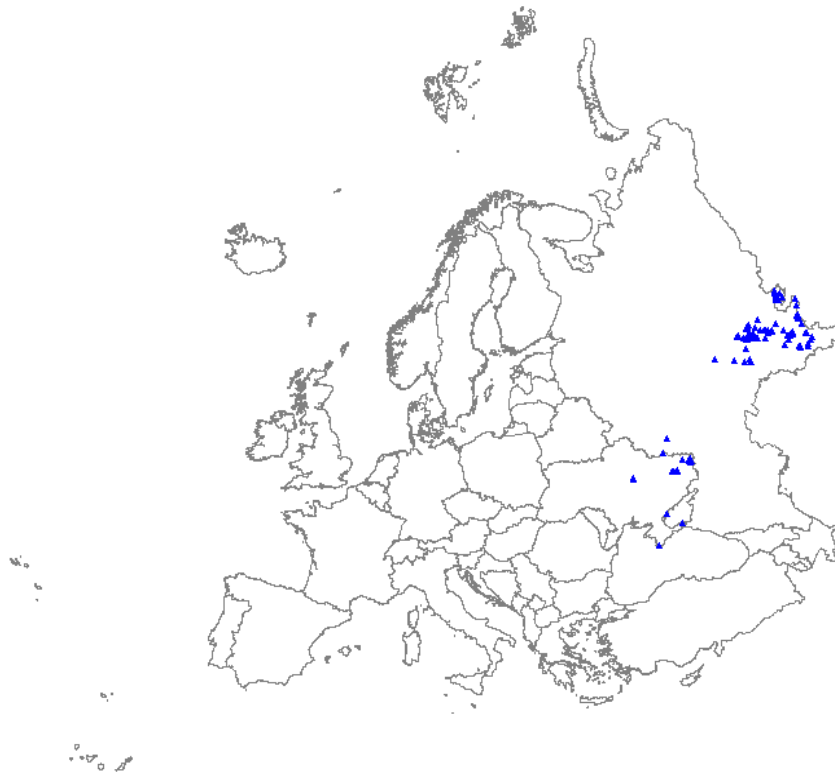
AUC training (0-1)	0.986
AUC test (0-1)	0.9828
Contribution variables to the Maxent model (%)	
Precipitation of warmest quarter	21.6722
Temperature seasonality (stdev * 100)	15.8283
Cation Exchange Capacity	15.6006
Weight in % of clay particles (<0.0002 mm)	11.5413
Annual precipitation	10.267
Volume % of coarse fragments (> 2 mm)	7.612
Potential evapotranspiration	7.0217
Weight in % of sand particles (0.05-2 mm)	6.7761
Solar radiation	3.418
Mean temperature of wettest quarter	1.7552
Precipitation seasonality (coef. of var.)	0.6297
Soil organic carbon content (‰)	0.6235
Distance to water	0.4283
Bulk density (kg/m ³)	0.1666
Weight in % of silt particles (0.0002-0.05 mm)	0.0481
pH (water)	0.0049

Remarks

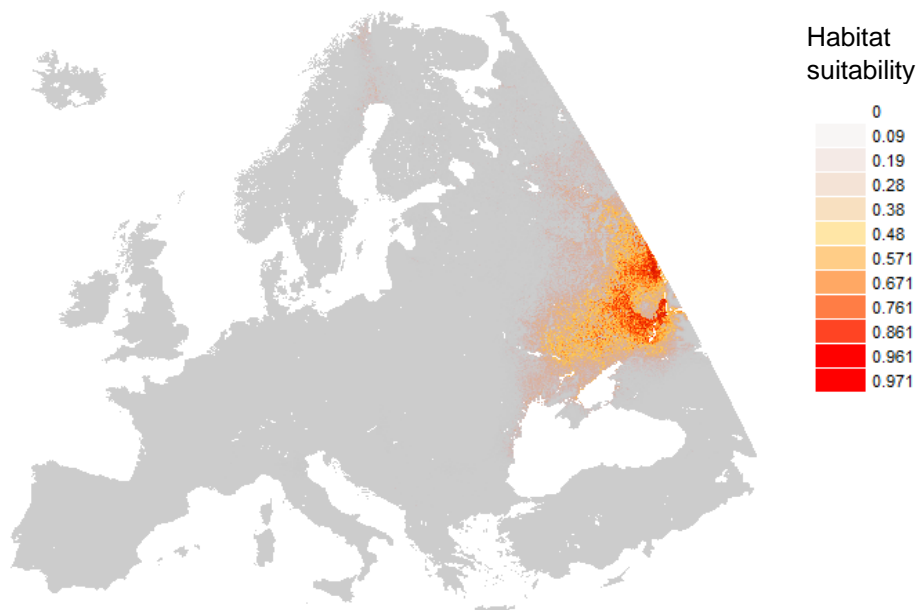


Distribution map from Red List project (Janssen et al., 2016)

E1.1f - Continental dry rocky steppic grassland and dwarf scrub on chalk outcrops



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

-

Maxent modelling statistics

AUC training (0-1)	0.9982
AUC test (0-1)	0.9967
Contribution variables to the Maxent model (%)	
Temperature seasonality (stdev * 100)	86.8037
Potential evapotranspiration	6.9343
Precipitation seasonality (coef. of var.)	2.0328
Mean temperature of wettest quarter	1.4564
Weight in % of silt particles (0.0002-0.05 mm)	0.9023
Annual precipitation	0.4449
Precipitation of warmest quarter	0.333
Distance to water	0.2641
pH (water)	0.1887
Soil organic carbon content (‰)	0.148
Weight in % of sand particles (0.05-2 mm)	0.1392
Weight in % of clay particles (<0.0002 mm)	0.0431
Cation Exchange Capacity	0.0369
Solar radiation	0.019
Bulk density (kg/m ³)	0
Volume % of coarse fragments (> 2 mm)	0

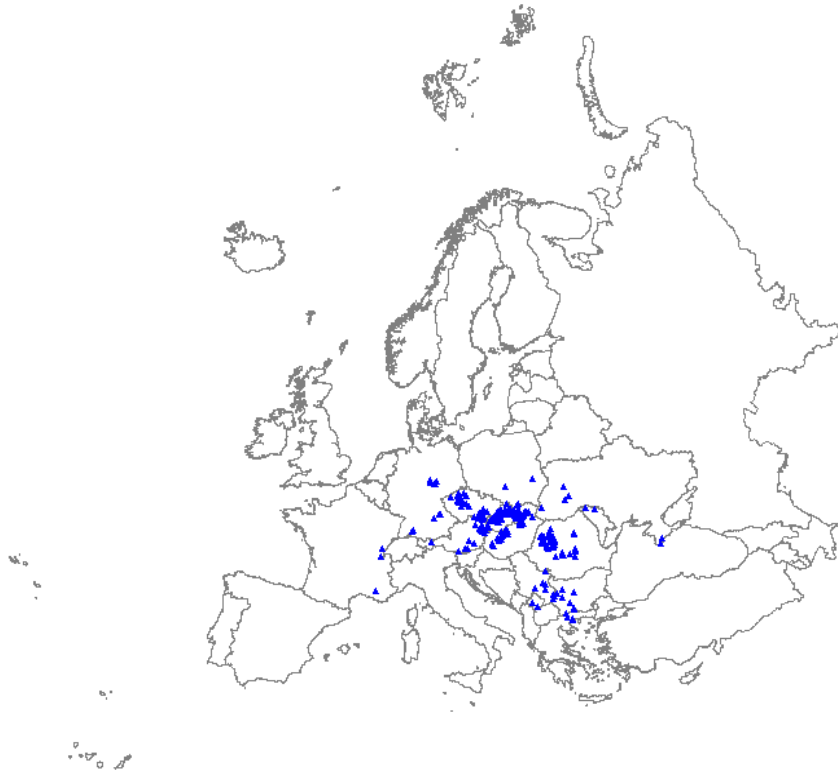
Remarks

Evans: Geological layer probably needed here .

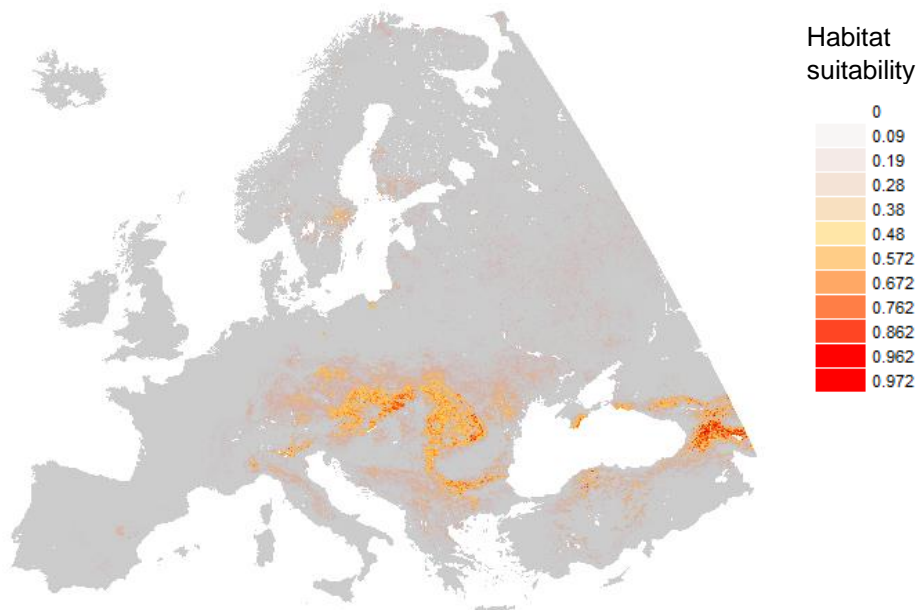


Distribution map from Red List project (Janssen et al., 2016)

E1.1g - Perennial rocky grassland of Central Europe and the Carpathians



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

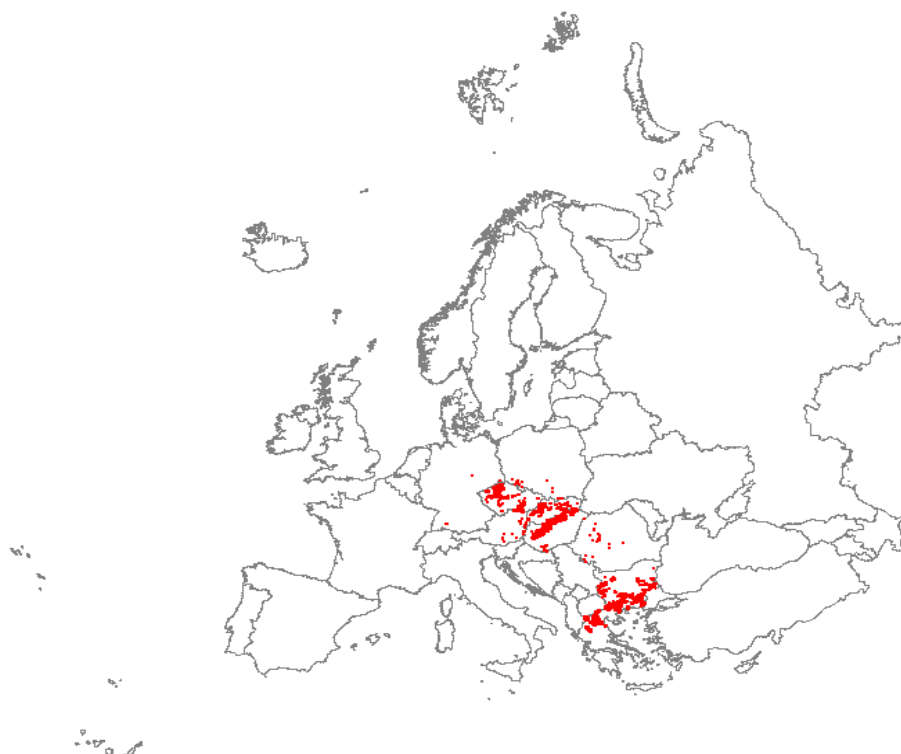
-

Maxent modelling statistics

AUC training (0-1)	0.9468
AUC test (0-1)	0.9218
Contribution variables to the Maxent model (%)	
Temperature seasonality (stdev * 100)	55.4236
Weight in % of clay particles (<0.0002 mm)	12.5637
Weight in % of silt particles (0.0002-0.05 mm)	8.4827
Solar radiation	7.1783
Volume % of coarse fragments (> 2 mm)	5.0944
Soil organic carbon content (‰)	4.9805
Precipitation seasonality (coef. of var.)	4.607
Annual precipitation	2.8143
pH (water)	1.4157
Precipitation of warmest quarter	1.1813
Bulk density (kg/m ³)	1.1408
Weight in % of sand particles (0.05-2 mm)	0.6562
Cation Exchange Capacity	0.3935
Potential evapotranspiration	0.373
Mean temperature of wettest quarter	0.2064
Distance to water	0.1068

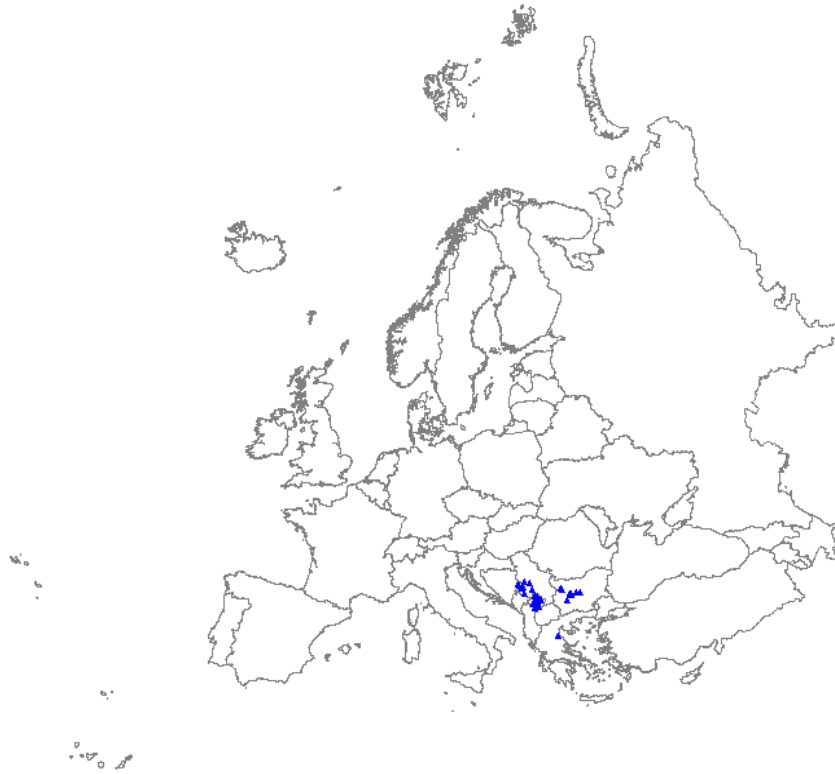
Remarks

Evans: Distribution to the east seems doubtful.

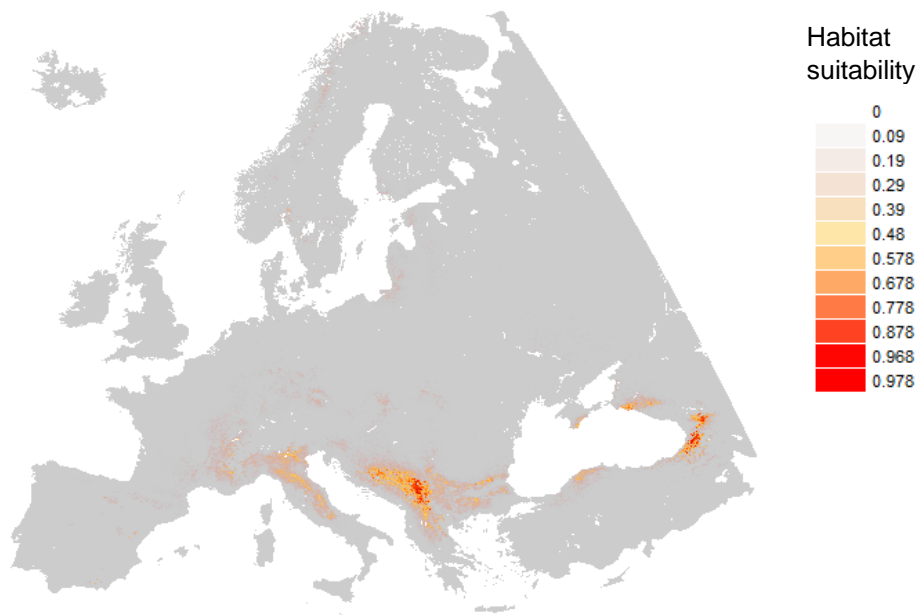


Distribution map from Red List project (Janssen et al., 2016)

E1.1h - Heavy-metal dry grassland of the Balkans



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

Geographic restriction distribution data

-

Maxent modelling statistics

AUC training (0-1)	0.9926
AUC test (0-1)	0.9891
Contribution variables to the Maxent model (%)	
Temperature seasonality (stdev * 100)	26.1041
Precipitation seasonality (coef. of var.)	21.0444
Annual precipitation	14.9855
Solar radiation	12.7279
Weight in % of clay particles (<0.0002 mm)	9.2661
Precipitation of warmest quarter	8.8266
Volume % of coarse fragments (> 2 mm)	7.5506
Potential evapotranspiration	6.0858
Cation Exchange Capacity	2.9506
Weight in % of sand particles (0.05-2 mm)	1.9993
Distance to water	0.5355
pH (water)	0.473
Soil organic carbon content (‰)	0.0871
Weight in % of silt particles (0.0002-0.05 mm)	0.0054
Mean temperature of wettest quarter	0.0017
Bulk density (kg/m ³)	0.0021

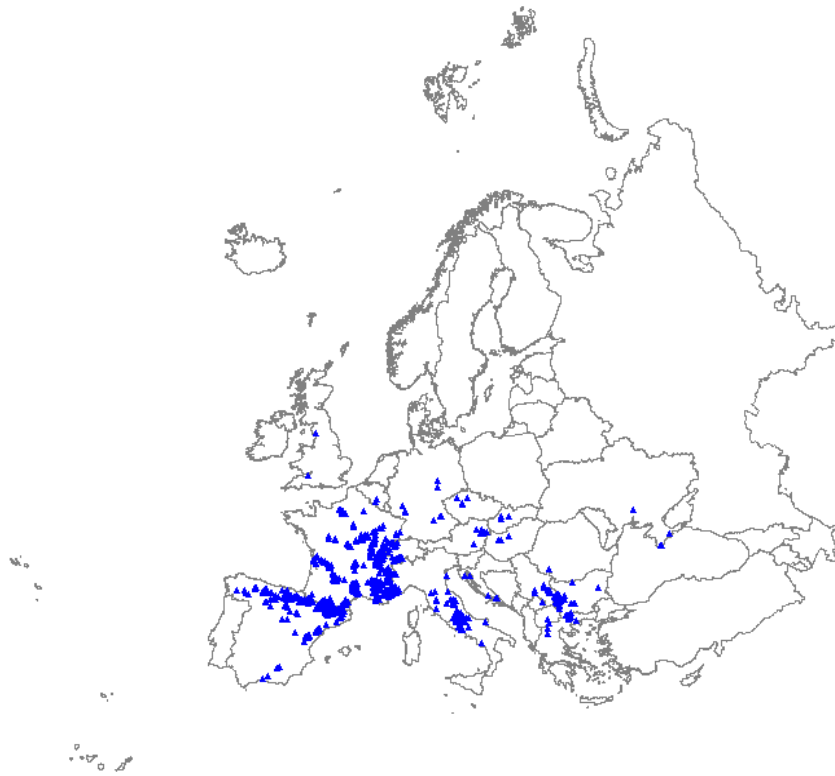
Remarks

Evans: Much of the predicted area does not have suitable soil types (also not Balkan). Defined as endemic for the Balkans & Cyprus.

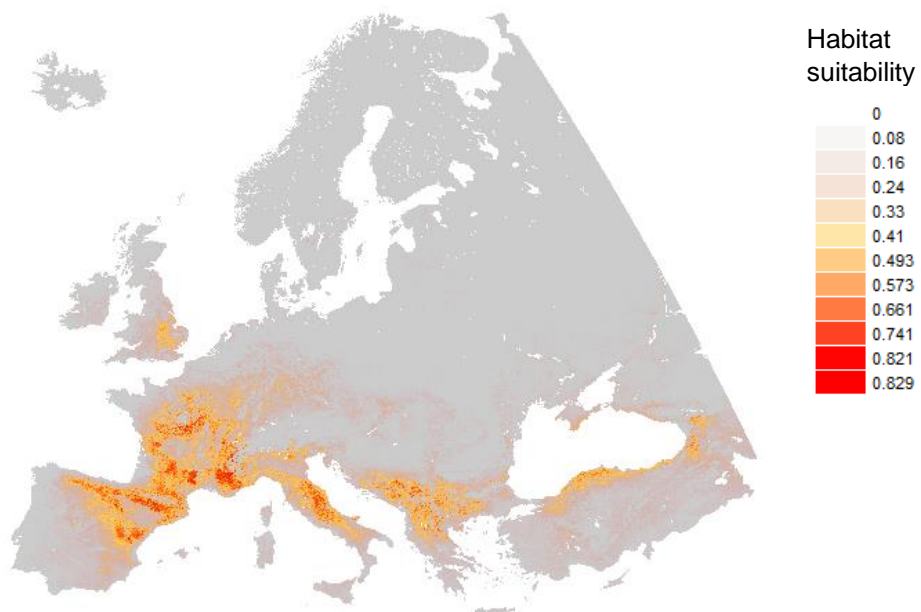


Distribution map from Red List project (Janssen et al., 2016)

E1.1i - Perennial rocky calcareous grassland of subatlantic-submediterranean Europe



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

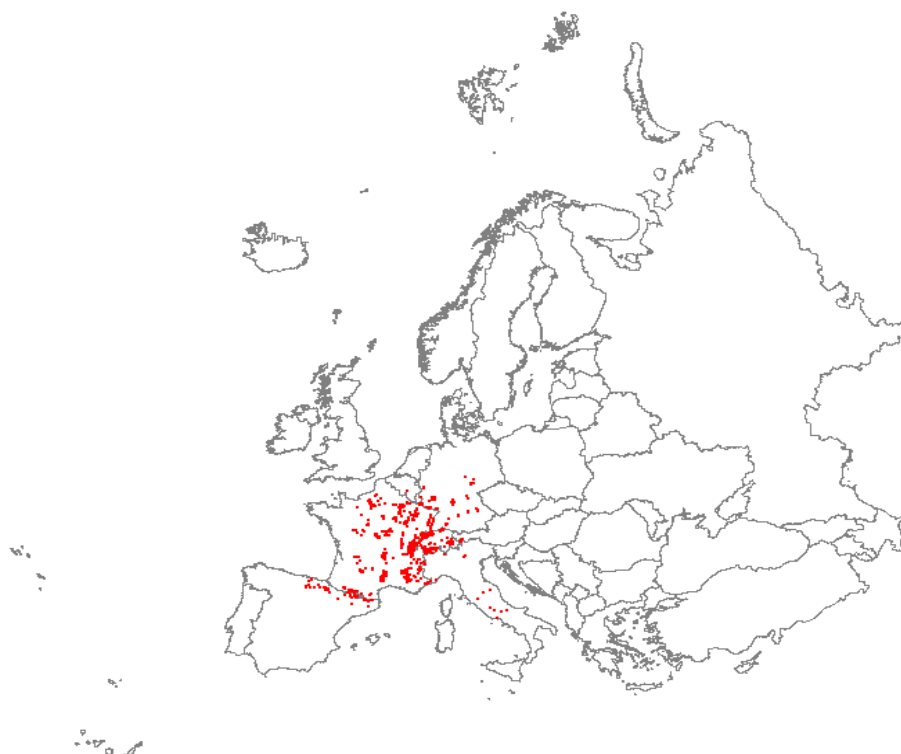
-

Maxent modelling statistics

AUC training (0-1)	0.9094
AUC test (0-1)	0.8896
Contribution variables to the Maxent model (%)	
Volume % of coarse fragments (> 2 mm)	29.4351
Potential evapotranspiration	23.5624
Precipitation seasonality (coef. of var.)	16.7096
Soil organic carbon content (‰)	7.4953
pH (water)	6.746
Weight in % of clay particles (<0.0002 mm)	5.4064
Precipitation of warmest quarter	3.9895
Weight in % of sand particles (0.05-2 mm)	2.4885
Temperature seasonality (stdev * 100)	2.07
Bulk density (kg/m ³)	0.9143
Weight in % of silt particles (0.0002-0.05 mm)	0.6345
Cation Exchange Capacity	0.2298
Mean temperature of wettest quarter	0.0826
Solar radiation	0.0593
Distance to water	0.0295
Annual precipitation	0.0163

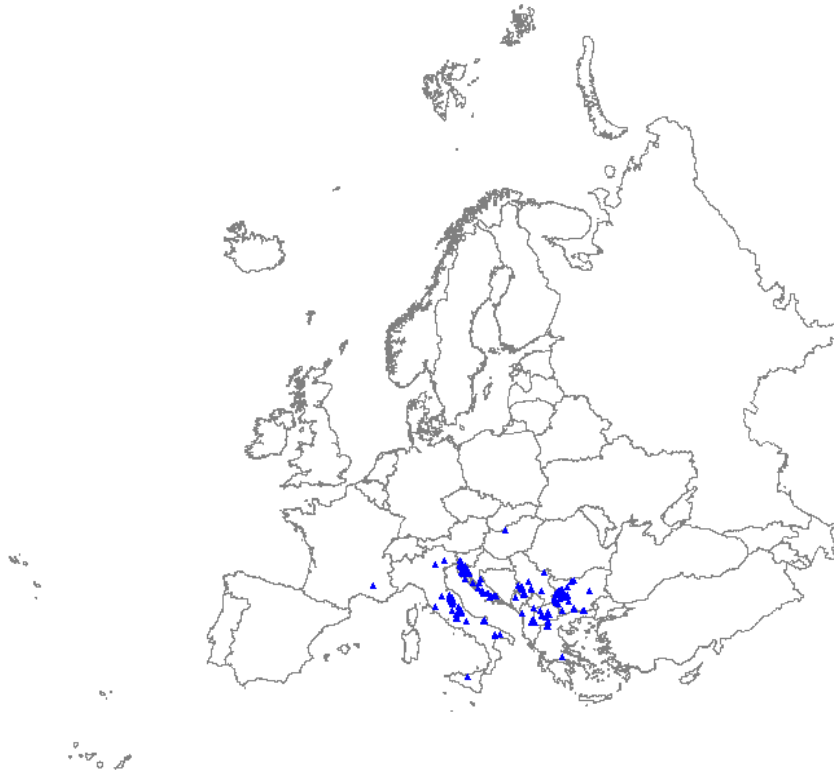
Remarks

Evans: Plots show a distribution different to the Red List map.

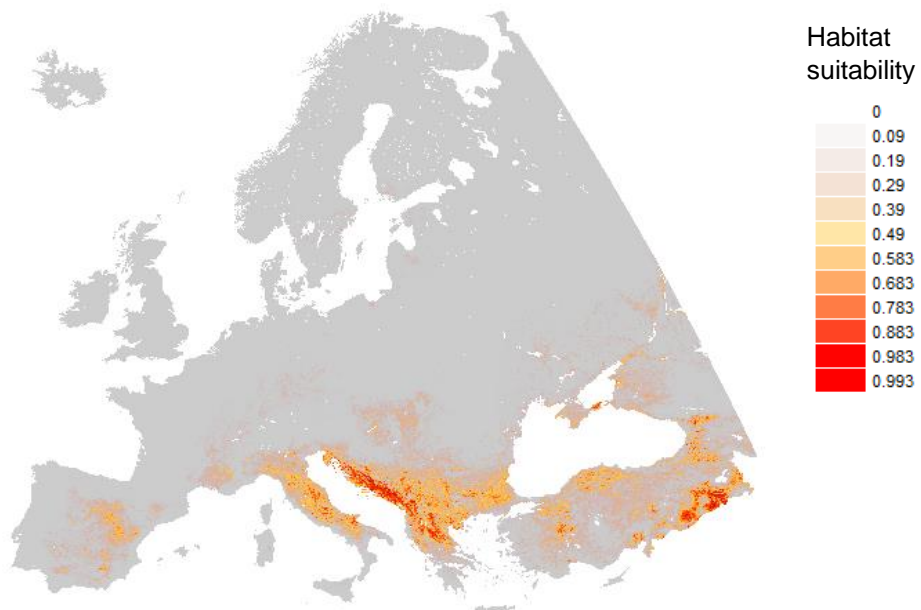


Distribution map from Red List project (Janssen et al., 2016)

E1.1j - Dry steppic, submediterranean pasture of South-Eastern Europe



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

Maxent modelling statistics

AUC training (0-1)	0.9792
AUC test (0-1)	0.9701
Contribution variables to the Maxent model (%)	
Temperature seasonality (stdev * 100)	19.9845
Weight in % of clay particles (<0.0002 mm)	18.4968
Potential evapotranspiration	16.4946
Weight in % of sand particles (0.05-2 mm)	8.7663
Solar radiation	8.6328
Precipitation seasonality (coef. of var.)	7.7252
pH (water)	6.3639
Mean temperature of wettest quarter	5.7499
Cation Exchange Capacity	4.2047
Precipitation of warmest quarter	3.7274
Annual precipitation	2.7237
Weight in % of silt particles (0.0002-0.05 mm)	2.5178
Bulk density (kg/m ³)	1.4773
Volume % of coarse fragments (> 2 mm)	1.3044
Soil organic carbon content (‰)	0.1142
Distance to water	0.0688

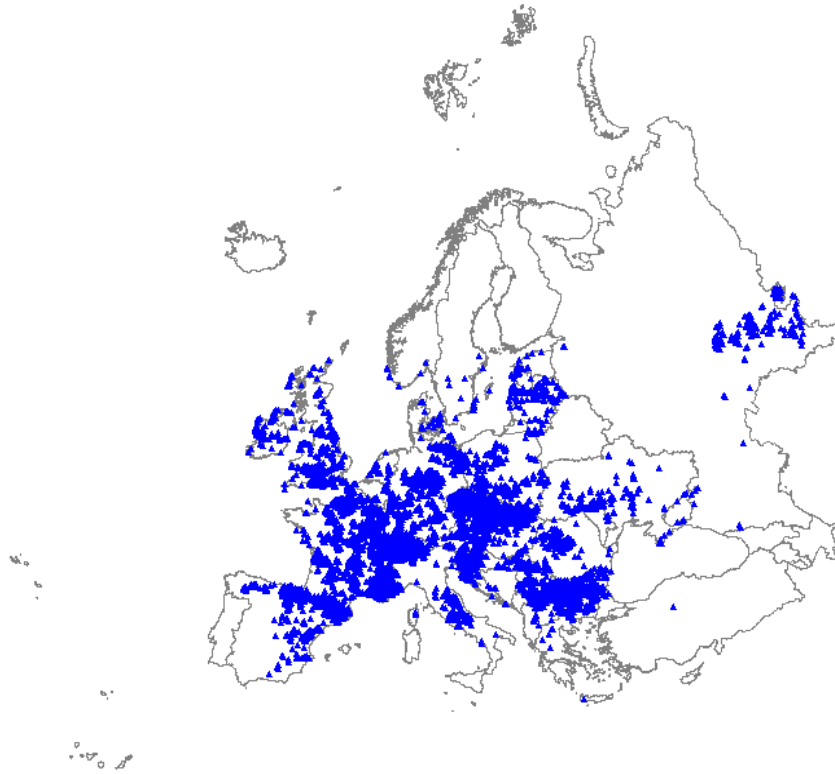
Remarks

Evans: Described as only occurring around the Adriatic sea.

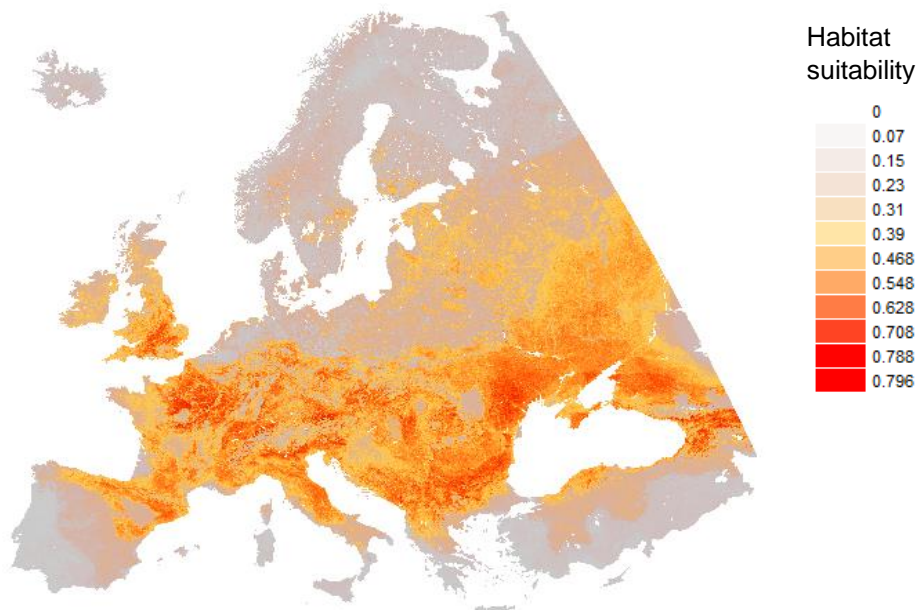


Distribution map from Red List project (Janssen et al., 2016)

E1.2a - Semi-dry perennial calcareous grassland



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

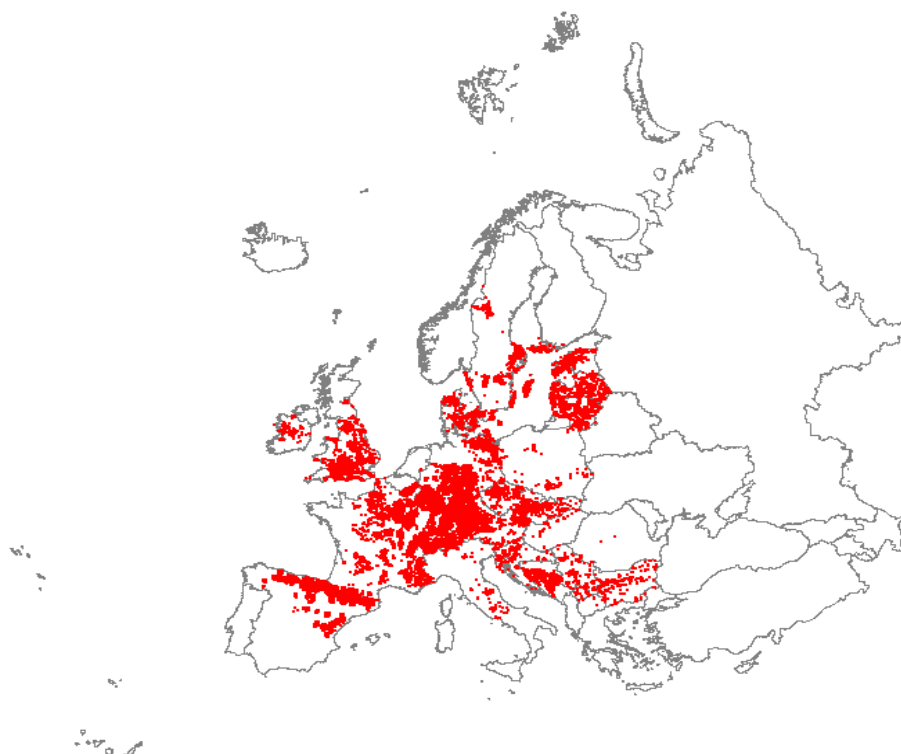
-

Maxent modelling statistics

AUC training (0-1)	0.7112
AUC test (0-1)	0.7091
Contribution variables to the Maxent model (%)	
pH (water)	36.0198
Weight in % of clay particles (<0.0002 mm)	15.3935
Potential evapotranspiration	12.0768
Weight in % of silt particles (0.0002-0.05 mm)	9.6737
Precipitation of warmest quarter	8.632
Solar radiation	5.4526
Annual precipitation	3.415
Volume % of coarse fragments (> 2 mm)	3.3487
Precipitation seasonality (coef. of var.)	2.8482
Temperature seasonality (stdev * 100)	2.5833
Cation Exchange Capacity	2.4834
Weight in % of sand particles (0.05-2 mm)	1.8246
Soil organic carbon content (‰)	1.2424
Mean temperature of wettest quarter	0.3317
Bulk density (kg/m ³)	0.0549
Distance to water	0

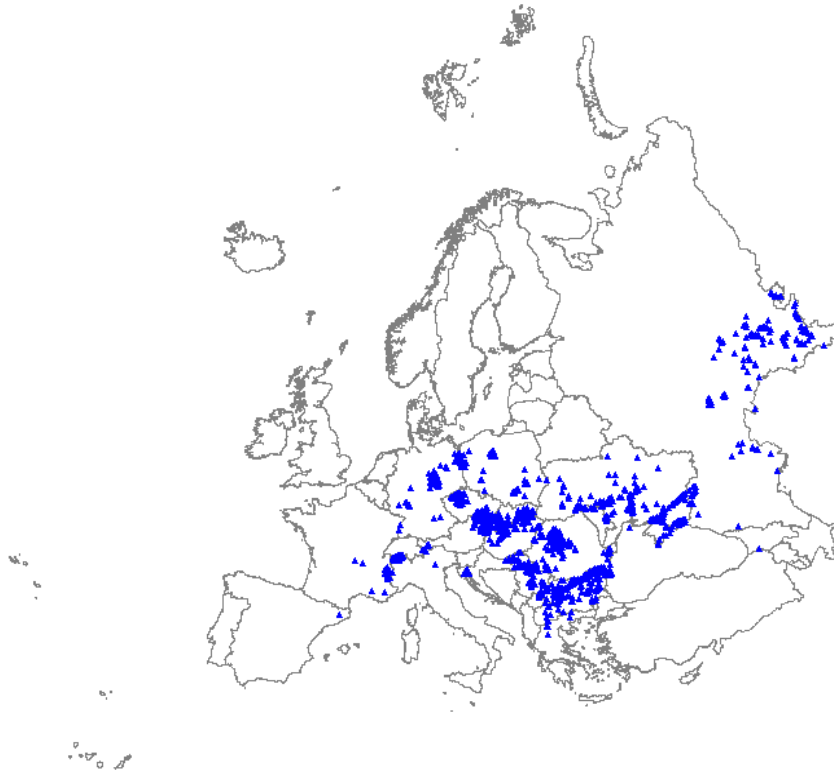
Remarks

Evans: Suitability map seems overestimating compared to the Red List map.

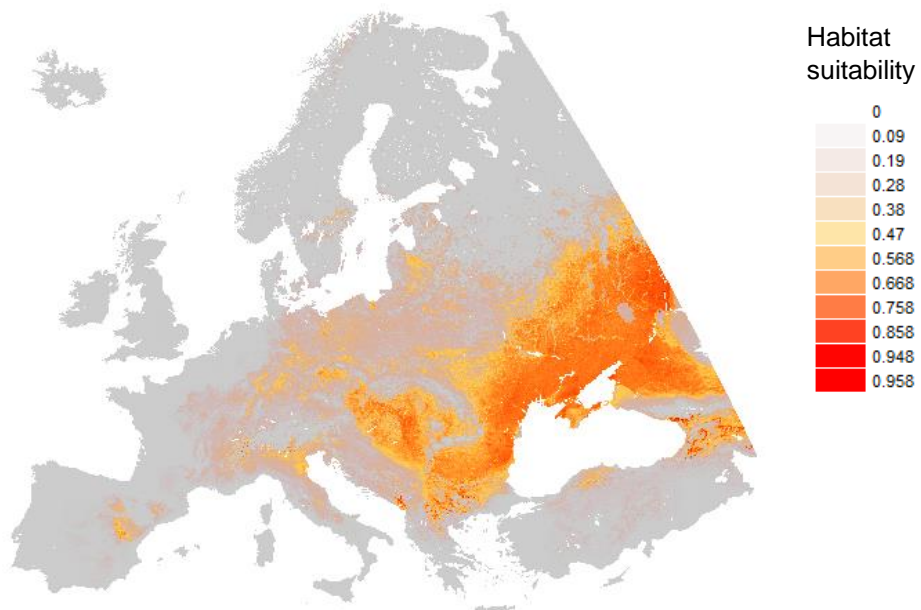


Distribution map from Red List project (Janssen et al., 2016)

E1.2b - Continental dry steppe



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

-

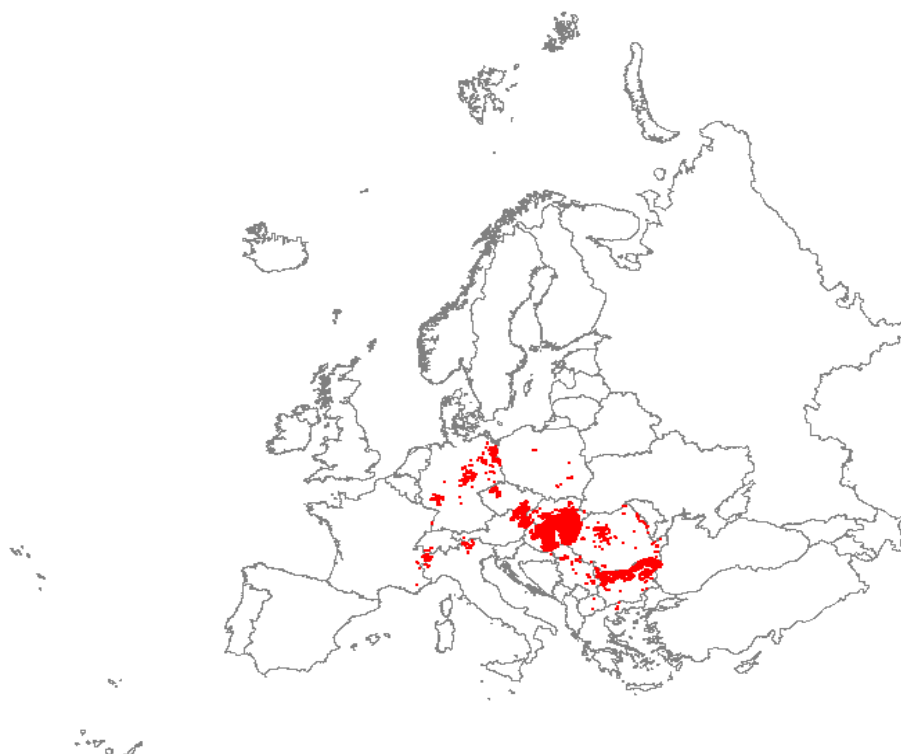
Maxent modelling statistics

AUC training (0-1)	0.8827
AUC test (0-1)	0.8885
Contribution variables to the Maxent model (%)	
Temperature seasonality (stdev * 100)	46.4386
Potential evapotranspiration	22.3175
Solar radiation	13.5901
Annual precipitation	8.2352
Weight in % of clay particles (<0.0002 mm)	7.8519
Precipitation of warmest quarter	2.9676
Volume % of coarse fragments (> 2 mm)	2.8011
Bulk density (kg/m ³)	2.6915
Mean temperature of wettest quarter	2.1935
Precipitation seasonality (coef. of var.)	1.7112
Soil organic carbon content (‰)	0.988
Cation Exchange Capacity	0.6845
Weight in % of silt particles (0.0002-0.05 mm)	0.6477
Weight in % of sand particles (0.05-2 mm)	0.292
pH (water)	0.0817
Distance to water	0.0303

Remarks

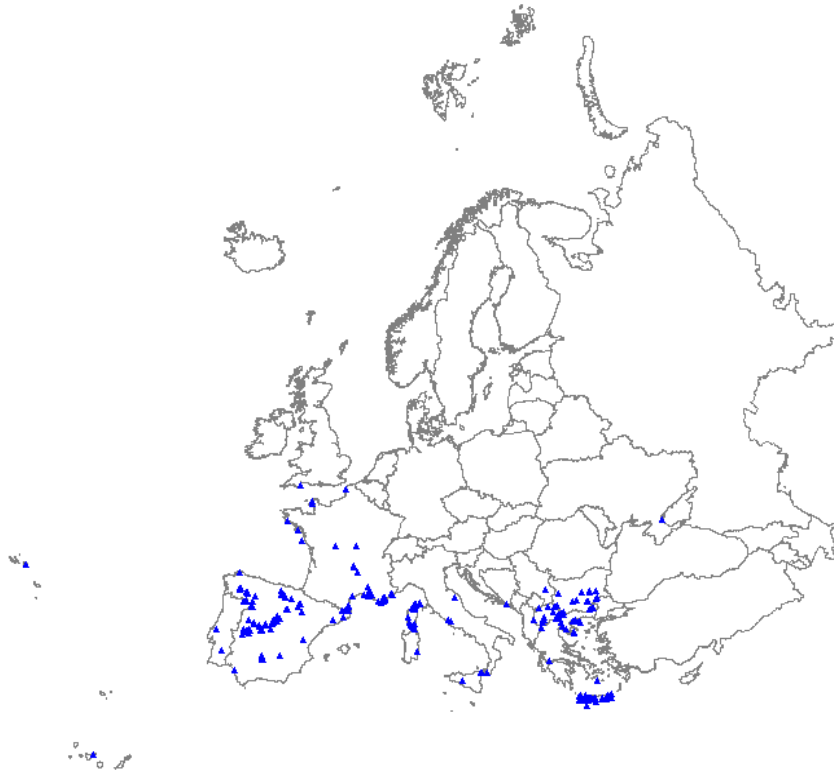
Chytrý: The unit does not occur in Spain, the Po valley of Italy, Sweden and the Baltic states.

Evans: Assuming the habitat is present and widespread in Steppic zone of eastern Europe.

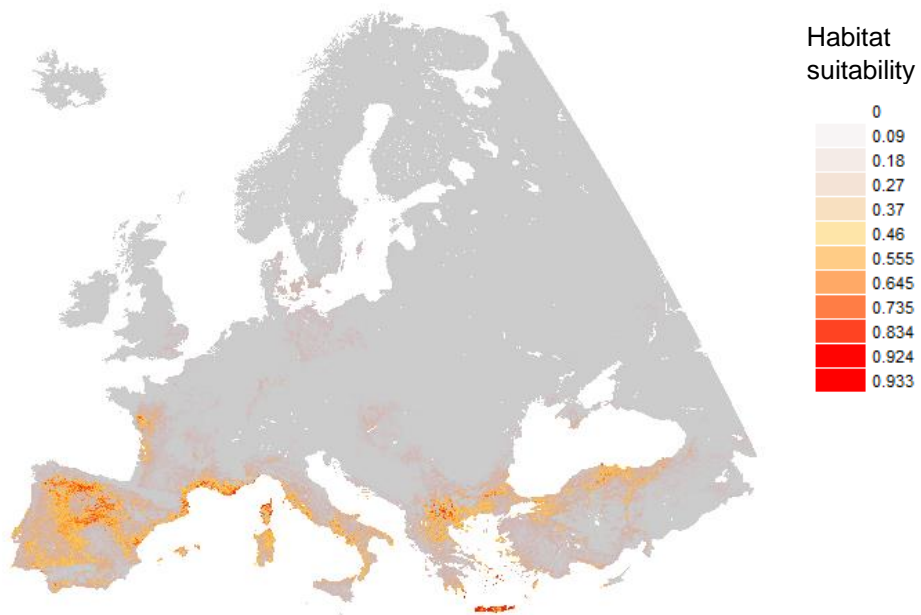


Distribution map from Red List project (Janssen et al., 2016)

E1.3a - Mediterranean closely grazed dry grassland



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

Geographic restriction distribution data

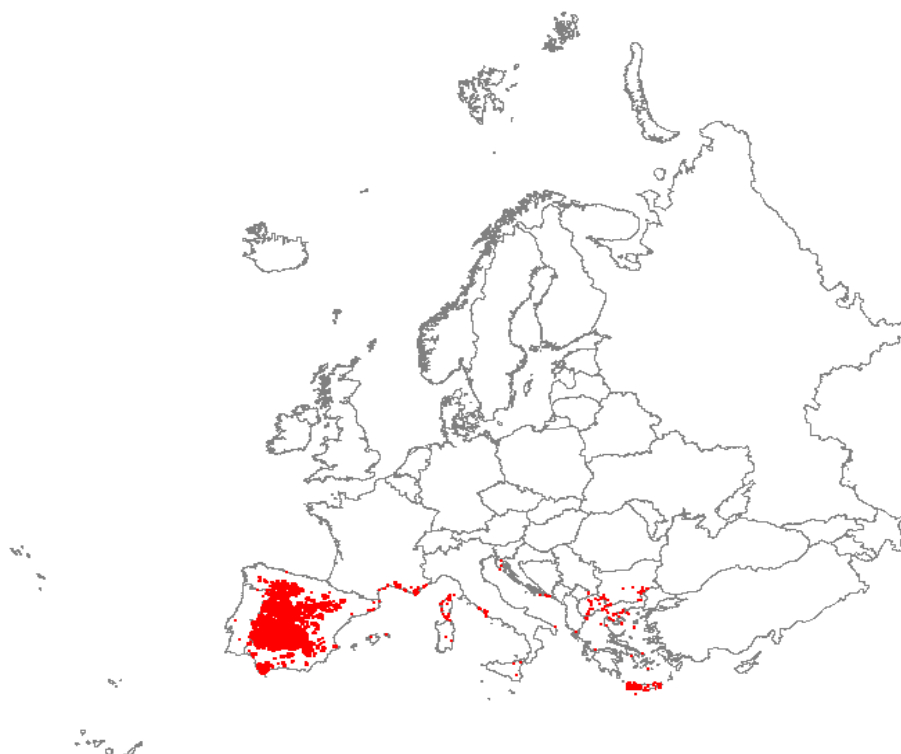
-

Maxent modelling statistics

AUC training (0-1)	0.9708
AUC test (0-1)	0.9537
Contribution variables to the Maxent model (%)	
Precipitation of warmest quarter	36.3878
Temperature seasonality (stdev * 100)	23.224
Soil organic carbon content (‰)	12.485
Precipitation seasonality (coef. of var.)	6.9798
Bulk density (kg/m ³)	5.1733
Weight in % of silt particles (0.0002-0.05 mm)	5.1113
Potential evapotranspiration	3.6452
Mean temperature of wettest quarter	1.5582
Solar radiation	1.5095
pH (water)	1.1205
Annual precipitation	0.9529
Volume % of coarse fragments (> 2 mm)	0.4269
Cation Exchange Capacity	0.1973
Weight in % of clay particles (<0.0002 mm)	0.0865
Weight in % of sand particles (0.05-2 mm)	0.0846
Distance to water	0

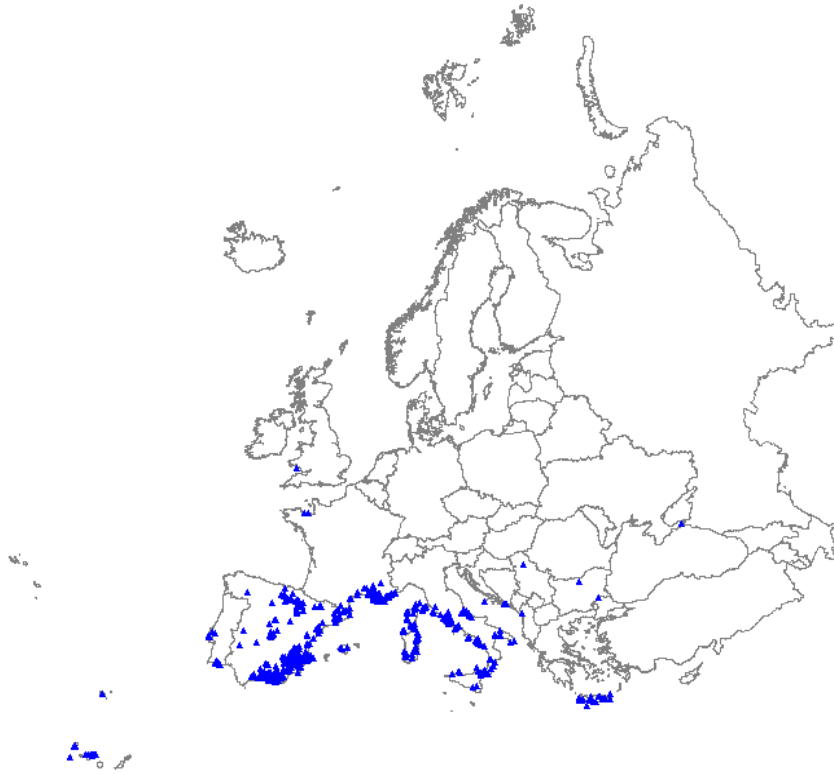
Remarks

Evans: Really in northern FR and outhern UK? The map overestimates the occurrence in Turkey where (according to the Red List) the habitat does not occur.



Distribution map from Red List project (Janssen et al., 2016)

E1.3b - Mediterranean tall perennial dry grassland



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

-

Maxent modelling statistics

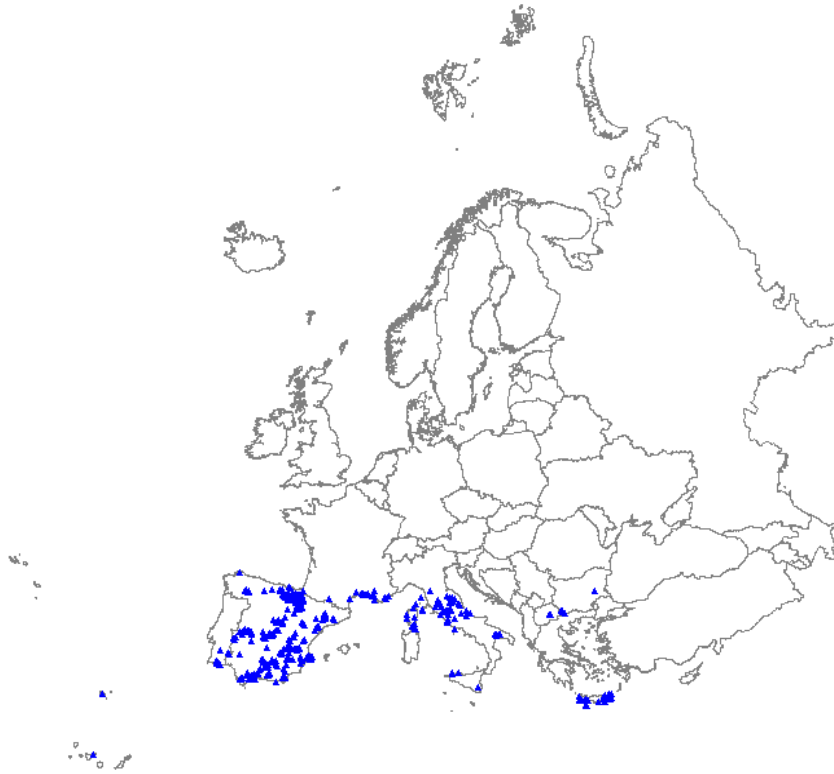
AUC training (0-1)	0.9674
AUC test (0-1)	0.9346
Contribution variables to the Maxent model (%)	
Precipitation of warmest quarter	65.2332
Soil organic carbon content (‰)	16.3498
Potential evapotranspiration	5.7444
Temperature seasonality (stdev * 100)	4.8155
Bulk density (kg/m ³)	2.7384
Volume % of coarse fragments (> 2 mm)	1.9953
Precipitation seasonality (coef. of var.)	0.9465
Distance to water	0.6344
pH (water)	0.5459
Weight in % of silt particles (0.0002-0.05 mm)	0.3104
Weight in % of clay particles (<0.0002 mm)	0.2398
Solar radiation	0.169
Weight in % of sand particles (0.05-2 mm)	0.1592
Annual precipitation	0.0589
Cation Exchange Capacity	0.0497
Mean temperature of wettest quarter	0.0225

Remarks

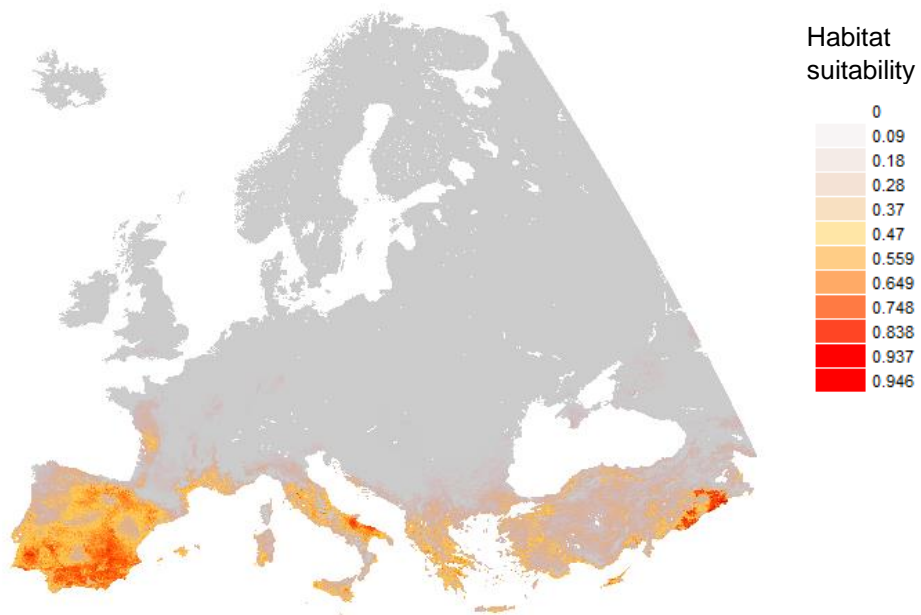


Distribution map from Red List project (Janssen et al., 2016)

E1.3c - Mediterranean annual-rich dry grassland



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

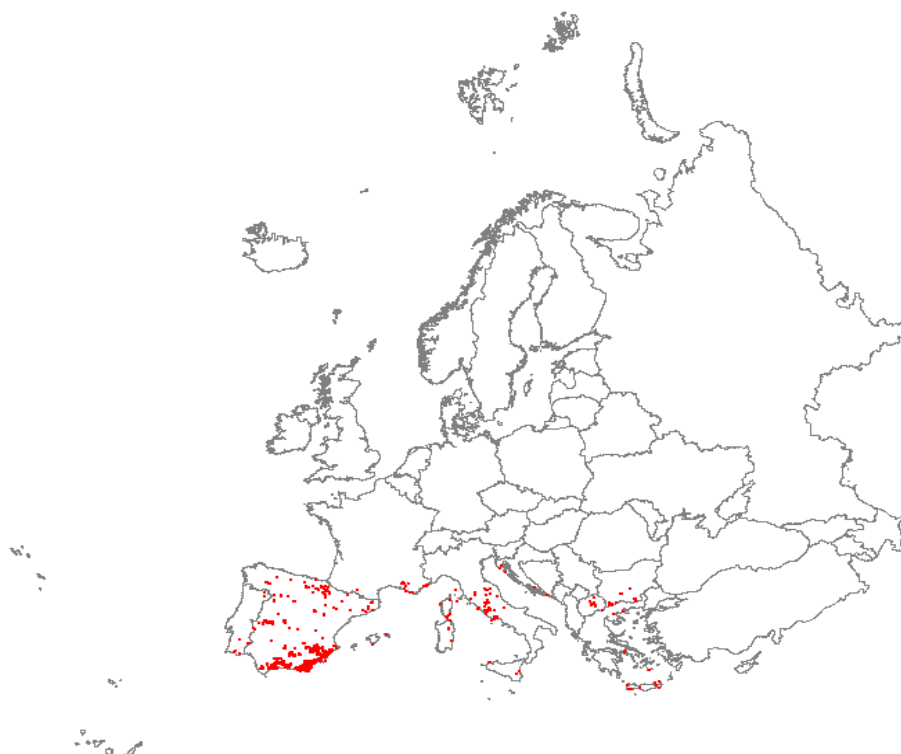
-

Maxent modelling statistics

AUC training (0-1)	0.9632
AUC test (0-1)	0.9639
Contribution variables to the Maxent model (%)	
Soil organic carbon content (‰)	50.489
Precipitation of warmest quarter	29.4739
Temperature seasonality (stdev * 100)	4.9851
Volume % of coarse fragments (> 2 mm)	3.3452
Precipitation seasonality (coef. of var.)	3.2291
Weight in % of sand particles (0.05-2 mm)	2.7049
Bulk density (kg/m ³)	1.875
Potential evapotranspiration	1.2382
pH (water)	0.8863
Weight in % of silt particles (0.0002-0.05 mm)	0.6081
Solar radiation	0.5644
Weight in % of clay particles (<0.0002 mm)	0.4372
Mean temperature of wettest quarter	0.3727
Distance to water	0.1366
Annual precipitation	0.1286
Cation Exchange Capacity	0.0615

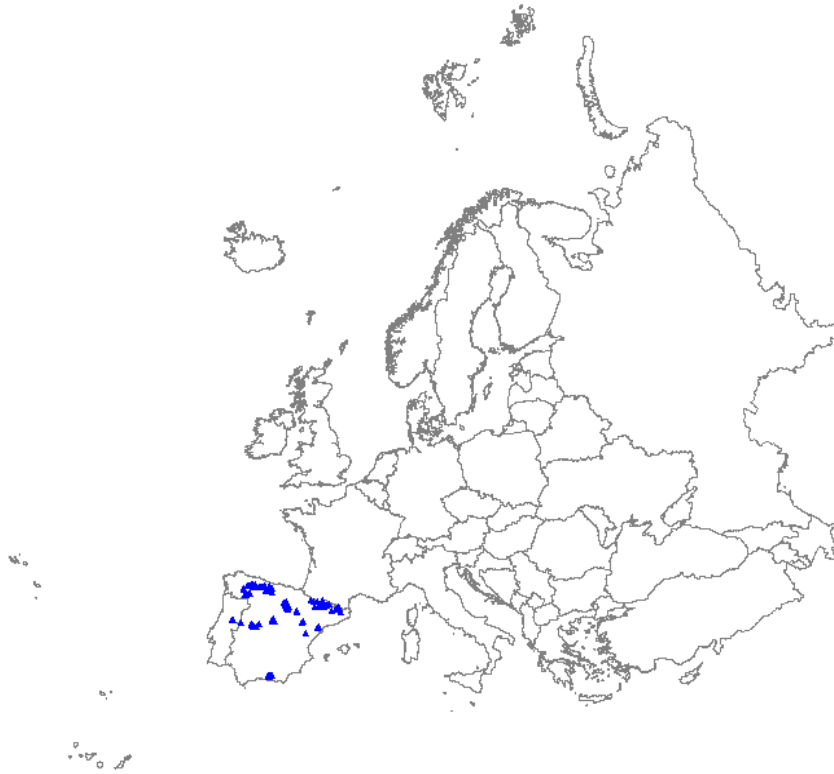
Remarks

Evans: Unlikely to occur in eastern Turkey.



Distribution map from Red List project (Janssen et al., 2016)

E1.5a - Iberian oromediterranean siliceous dry grassland



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

Geographic restriction distribution data

-

Maxent modelling statistics

AUC training (0-1)	0.9891
AUC test (0-1)	0.9895
Contribution variables to the Maxent model (%)	
Weight in % of sand particles (0.05-2 mm)	36.0772
Volume % of coarse fragments (> 2 mm)	24.1609
Temperature seasonality (stdev * 100)	21.9434
Precipitation of warmest quarter	6.0866
Bulk density (kg/m ³)	5.4977
Soil organic carbon content (‰)	2.6886
Solar radiation	1.1558
Weight in % of silt particles (0.0002-0.05 mm)	1.0985
Precipitation seasonality (coef. of var.)	0.5951
Potential evapotranspiration	0.5923
Annual precipitation	0.2819
Mean temperature of wettest quarter	0.1484
Weight in % of clay particles (<0.0002 mm)	0.1427
Cation Exchange Capacity	0.0911
Distance to water	0.0778
pH (water)	0.0494

Remarks

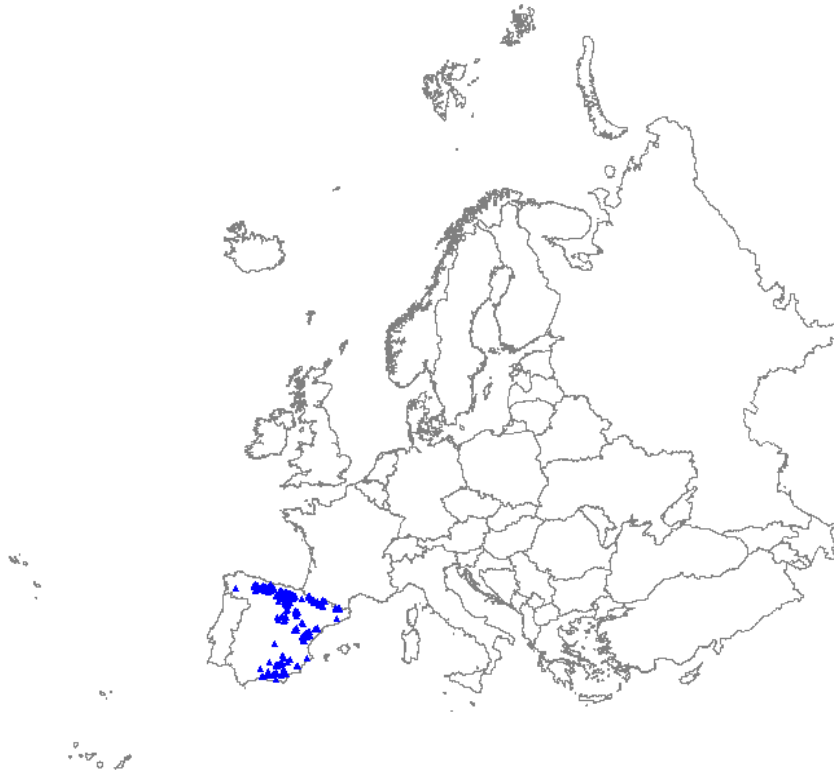
Chytrý: Predictions outside the Iberian Peninsula should be set to zero probability.

Evans: Can only occur on mountains in Spain and Portugal.



Distribution map from Red List project (Janssen et al., 2016)

E1.5b - Iberian oromediterranean basiphilous dry grassland



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

Geographic restriction distribution data

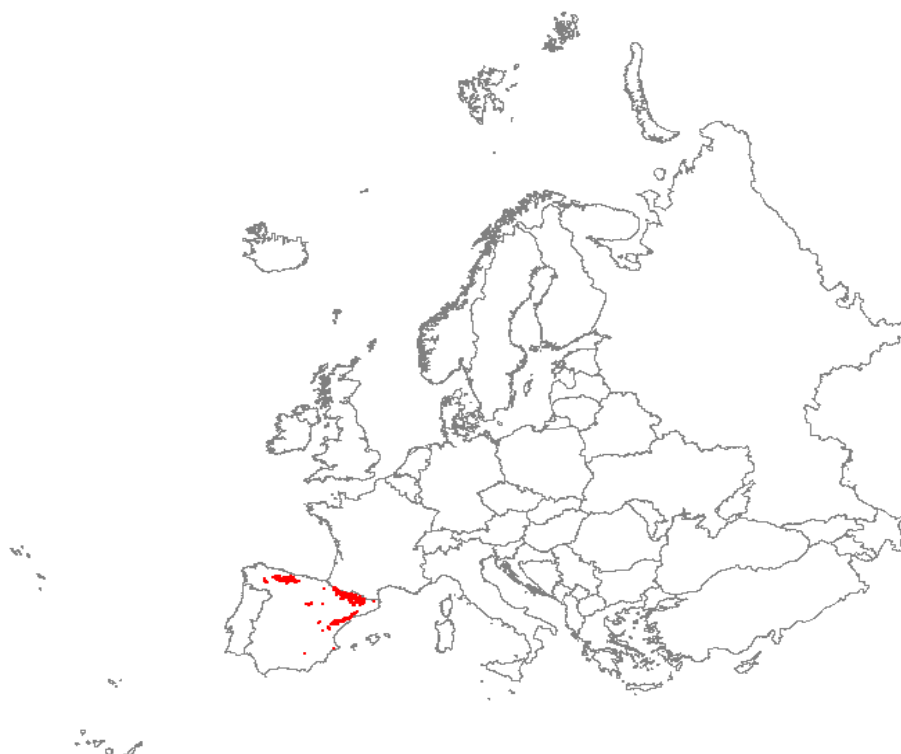
Maxent modelling statistics

AUC training (0-1)	0.9807
AUC test (0-1)	0.9809
Contribution variables to the Maxent model (%)	
Temperature seasonality (stdev * 100)	38.0238
Weight in % of sand particles (0.05-2 mm)	26.936
Volume % of coarse fragments (> 2 mm)	11.9886
Weight in % of clay particles (<0.0002 mm)	6.8908
Precipitation seasonality (coef. of var.)	3.5557
Precipitation of warmest quarter	2.6496
Potential evapotranspiration	2.2674
Mean temperature of wettest quarter	2.1071
Cation Exchange Capacity	1.7205
Bulk density (kg/m ³)	1.4412
Soil organic carbon content (‰)	1.2099
pH (water)	0.5763
Solar radiation	0.3988
Annual precipitation	0.3378
Distance to water	0.1775
Weight in % of silt particles (0.0002-0.05 mm)	0.0461

Remarks

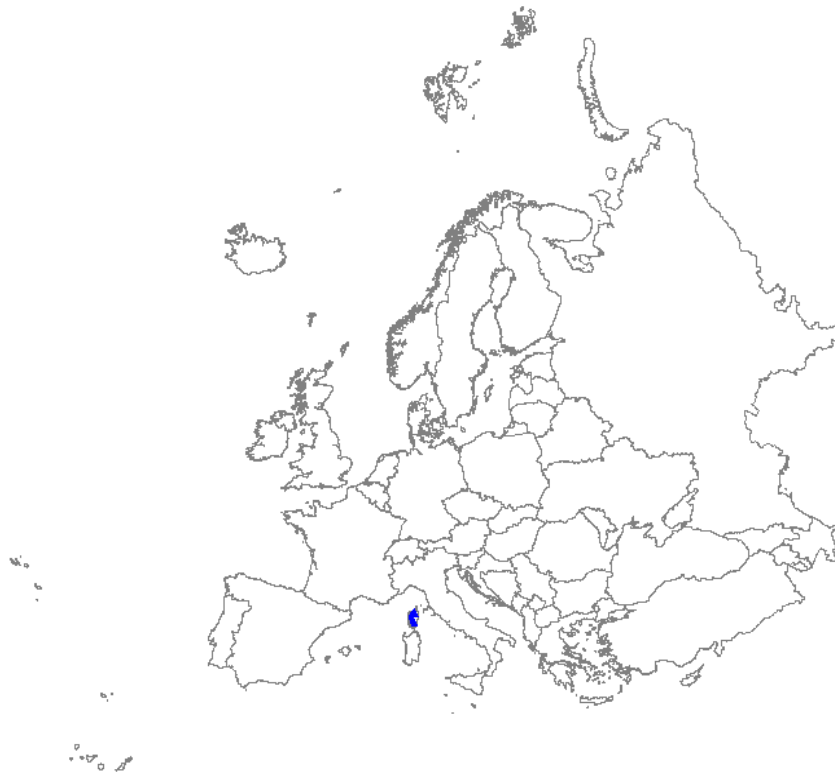
Chytrý: Predictions outside the Iberian Peninsula should be set to zero probability.

Evans: Despite name also occurs in France and Italy.



Distribution map from Red List project (Janssen et al., 2016)

E1.5c - Cyrno-Sardean-oromediterranean siliceous dry grassland



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

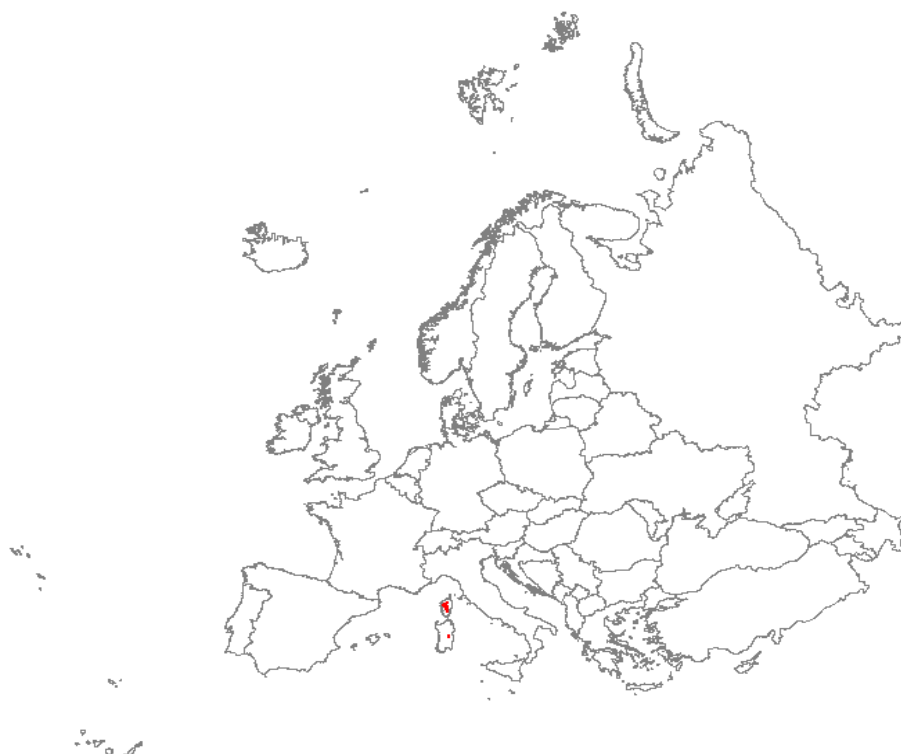
Geographic restriction distribution data

-

Maxent modelling statistics

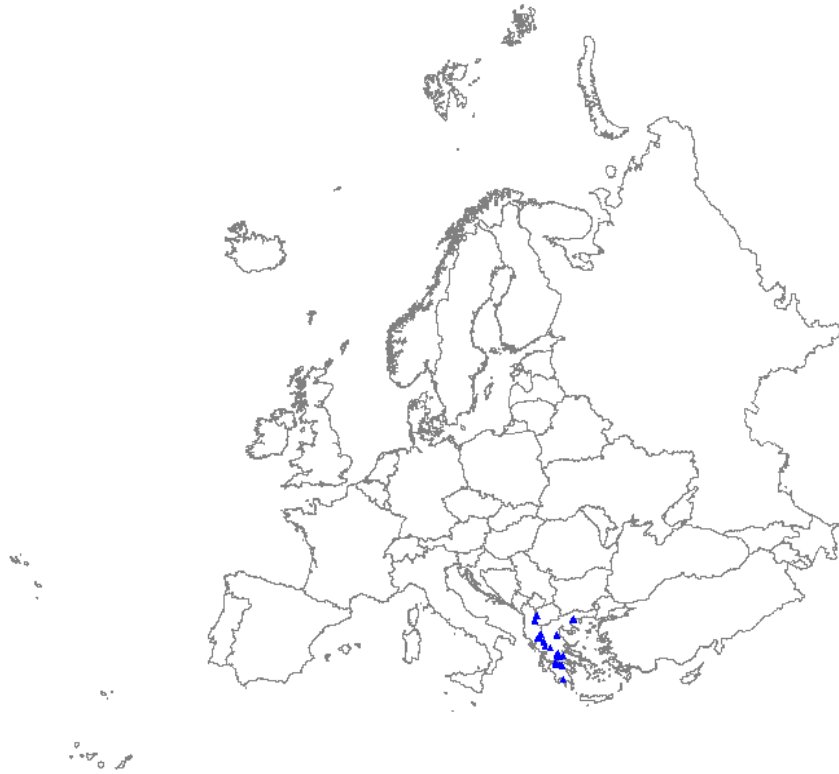
AUC training (0-1)	0.9991
AUC test (0-1)	0.997
Contribution variables to the Maxent model (%)	
Weight in % of sand particles (0.05-2 mm)	21.9638
Soil organic carbon content (‰)	17.3859
Temperature seasonality (stdev * 100)	15.2144
Precipitation of warmest quarter	13.1249
Volume % of coarse fragments (> 2 mm)	12.0942
Precipitation seasonality (coef. of var.)	8.477
Annual precipitation	7.3064
Mean temperature of wettest quarter	3.8978
Cation Exchange Capacity	0.3635
Potential evapotranspiration	0.1406
Bulk density (kg/m ³)	0.0228
Weight in % of clay particles (<0.0002 mm)	0.0065
Distance to water	0
Solar radiation	0
pH (water)	0
Weight in % of silt particles (0.0002-0.05 mm)	0

Remarks



Distribution map from Red List project (Janssen et al., 2016)

E1.5d - Greek and Anatolian oromediterranean siliceous dry grassland



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

Geographic restriction distribution data

-

Maxent modelling statistics

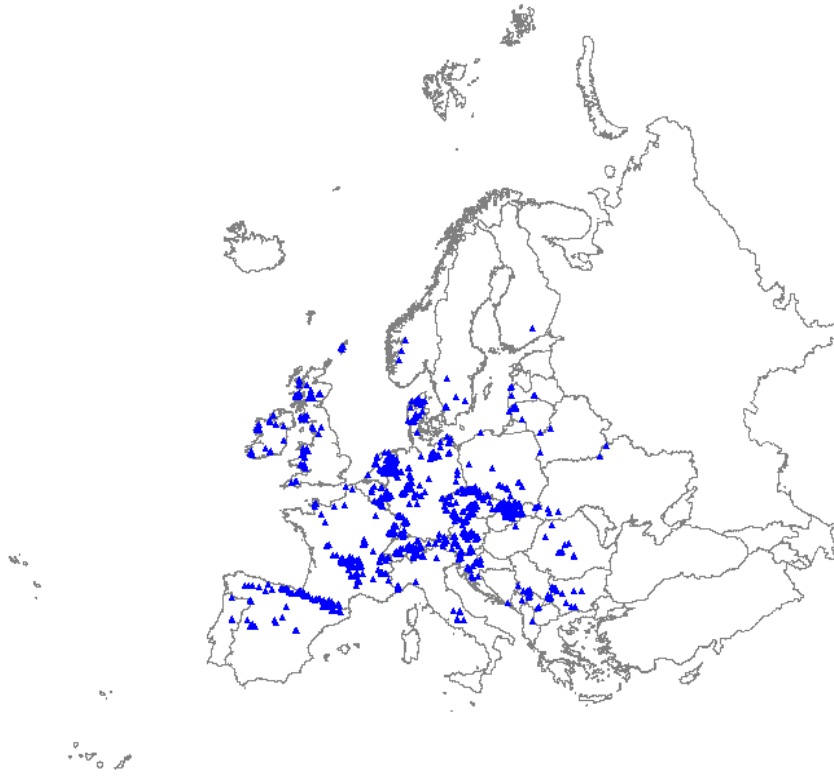
AUC training (0-1)	0.9957
AUC test (0-1)	0.9956
Contribution variables to the Maxent model (%)	
Mean temperature of wettest quarter	40.3685
Volume % of coarse fragments (> 2 mm)	10.0098
Precipitation seasonality (coef. of var.)	8.7248
Annual precipitation	7.5332
Weight in % of sand particles (0.05-2 mm)	7.2631
Soil organic carbon content (‰)	7.1284
Precipitation of warmest quarter	6.804
Temperature seasonality (stdev * 100)	5.8362
Bulk density (kg/m ³)	1.7697
Weight in % of clay particles (<0.0002 mm)	0.8119
Potential evapotranspiration	0.105
Solar radiation	0.0666
Cation Exchange Capacity	0.0544
Weight in % of silt particles (0.0002-0.05 mm)	0.0313
Distance to water	0
pH (water)	0

Remarks

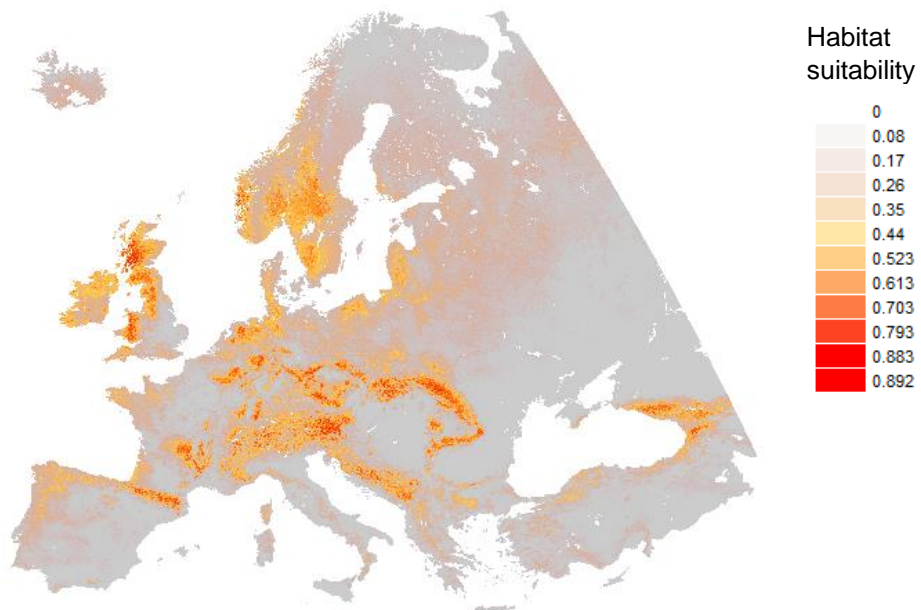


Distribution map from Red List project (Janssen et al., 2016)

E1.7 - Lowland to submontane, dry to mesic *Nardus* grassland



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

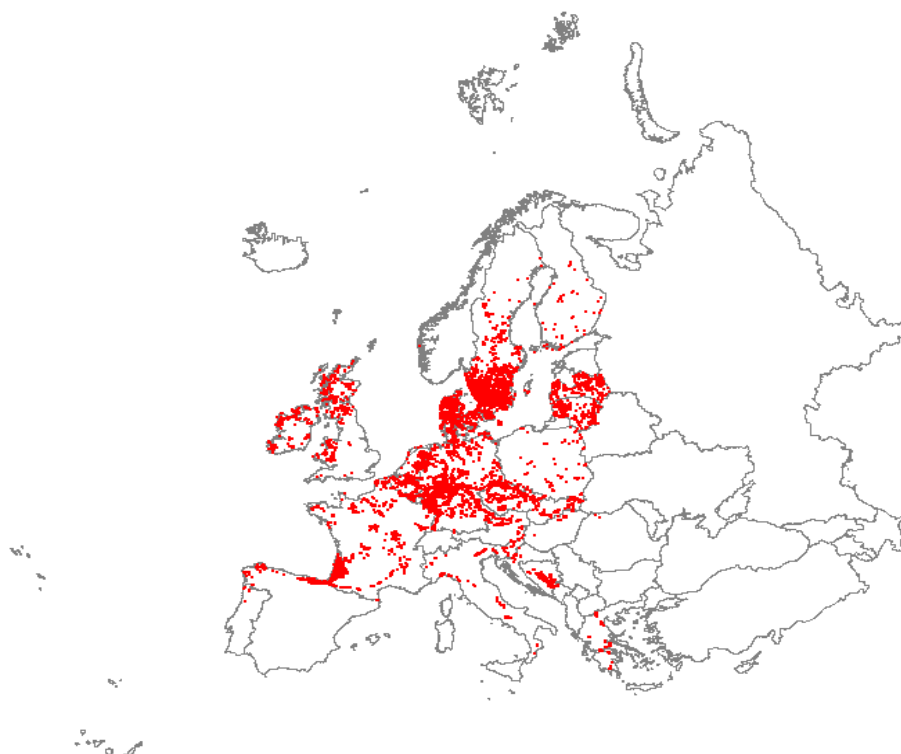
-

Maxent modelling statistics

AUC training (0-1)	0.8179
AUC test (0-1)	0.8087
Contribution variables to the Maxent model (%)	
Potential evapotranspiration	29.486
Precipitation of warmest quarter	16.9105
Weight in % of sand particles (0.05-2 mm)	16.2914
Bulk density (kg/m ³)	12.3766
Solar radiation	6.714
Annual precipitation	5.5269
Mean temperature of wettest quarter	4.1752
Soil organic carbon content (‰)	3.9597
Temperature seasonality (stdev * 100)	2.7783
Weight in % of silt particles (0.0002-0.05 mm)	1.8905
Weight in % of clay particles (<0.0002 mm)	1.7845
Precipitation seasonality (coef. of var.)	1.1122
Volume % of coarse fragments (> 2 mm)	0.791
Distance to water	0.2625
pH (water)	0.2044
Cation Exchange Capacity	0.1438

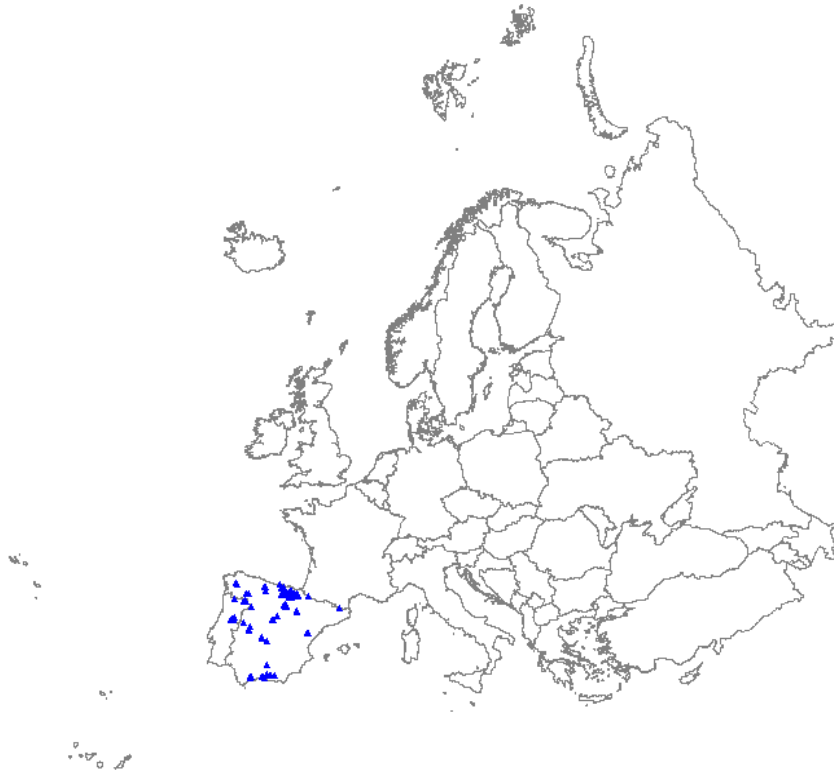
Remarks

Evans: Probably underestimated in Finland and sweden.



Distribution map from Red List project (Janssen et al., 2016)

E1.8 - Open Iberian supra-mediterranean dry acid and neutral grassland



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

Geographic restriction distribution data

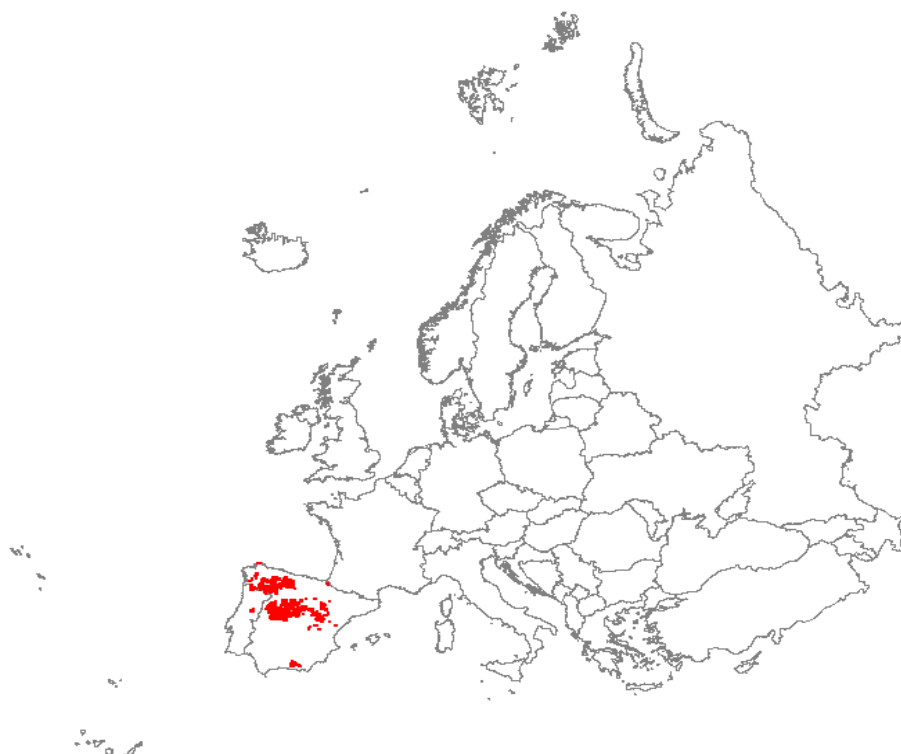
-

Maxent modelling statistics

AUC training (0-1)	0.9882
AUC test (0-1)	0.9936
Contribution variables to the Maxent model (%)	
Temperature seasonality (stdev * 100)	29.8423
Volume % of coarse fragments (> 2 mm)	18.137
Mean temperature of wettest quarter	14.2018
Weight in % of sand particles (0.05-2 mm)	12.9304
Solar radiation	11.739
Soil organic carbon content (‰)	10.8555
Precipitation seasonality (coef. of var.)	4.6359
Annual precipitation	2.6726
Bulk density (kg/m ³)	2.3549
Cation Exchange Capacity	1.23
Precipitation of warmest quarter	0.5137
Potential evapotranspiration	0.511
pH (water)	0.4929
Weight in % of silt particles (0.0002-0.05 mm)	0.3065
Distance to water	0.3036
Weight in % of clay particles (<0.0002 mm)	0.1006

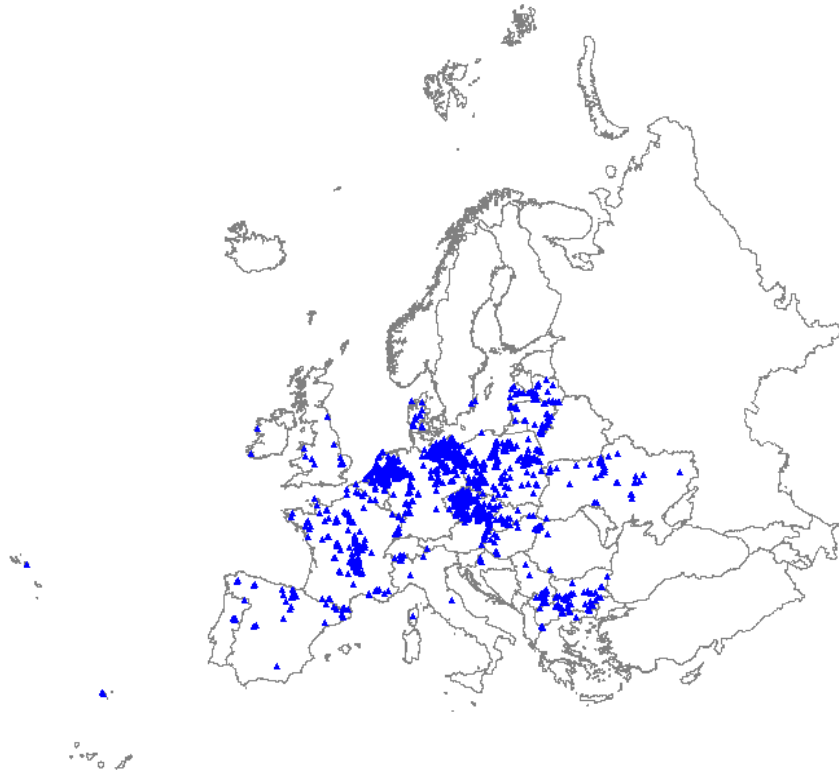
Remarks

Evans: Unlikely to occur outside Iberia.

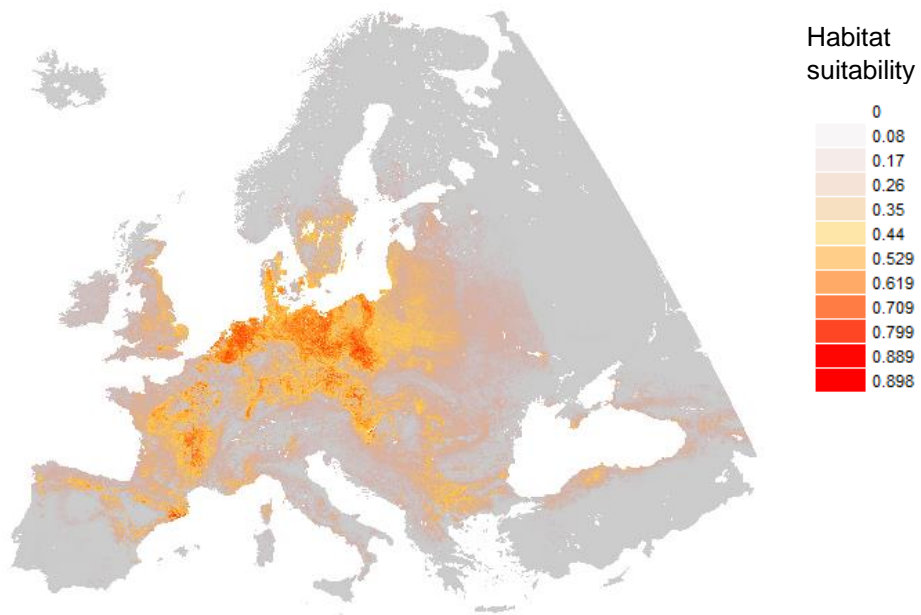


Distribution map from Red List project (Janssen et al., 2016)

E1.9a - Oceanic to subcontinental inland sand grassland on dry acid and neutral soils



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

Geographic restriction distribution data

-

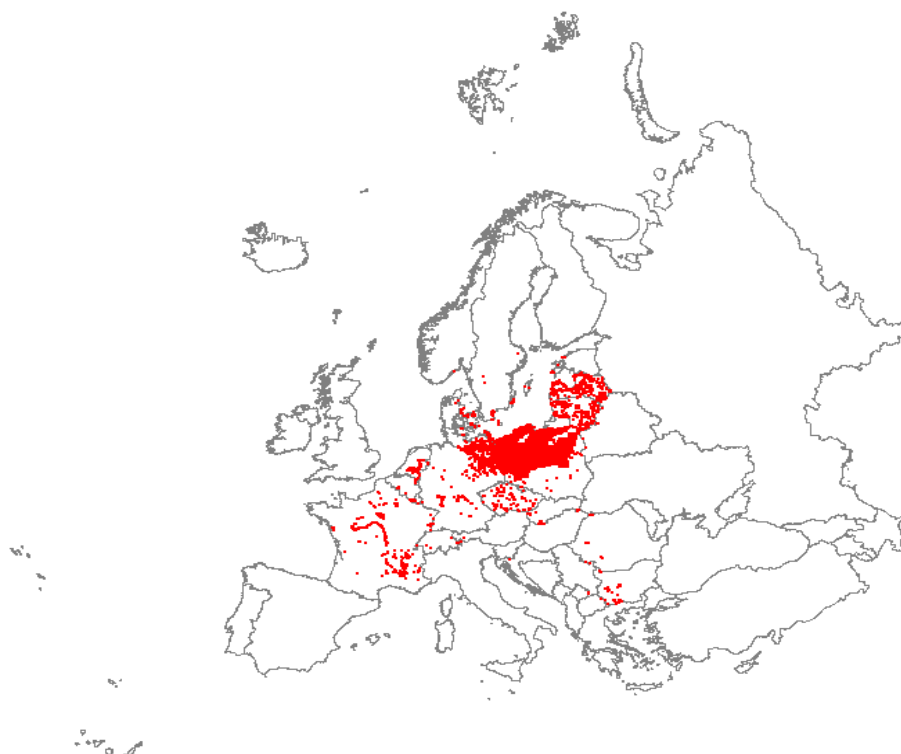
Maxent modelling statistics

AUC training (0-1)	0.8831
AUC test (0-1)	0.8703
Contribution variables to the Maxent model (%)	
Cation Exchange Capacity	40.4447
Temperature seasonality (stdev * 100)	14.6727
Weight in % of silt particles (0.0002-0.05 mm)	14.1592
Precipitation of warmest quarter	13.5749
Solar radiation	6.8064
Annual precipitation	5.6045
Soil organic carbon content (‰)	4.1521
Bulk density (kg/m ³)	2.0676
Potential evapotranspiration	2.0466
Distance to water	1.0201
Mean temperature of wettest quarter	0.8982
Weight in % of clay particles (<0.0002 mm)	0.468
Precipitation seasonality (coef. of var.)	0.2437
Weight in % of sand particles (0.05-2 mm)	0.1977
pH (water)	0.1319
Volume % of coarse fragments (> 2 mm)	0.1113

Remarks

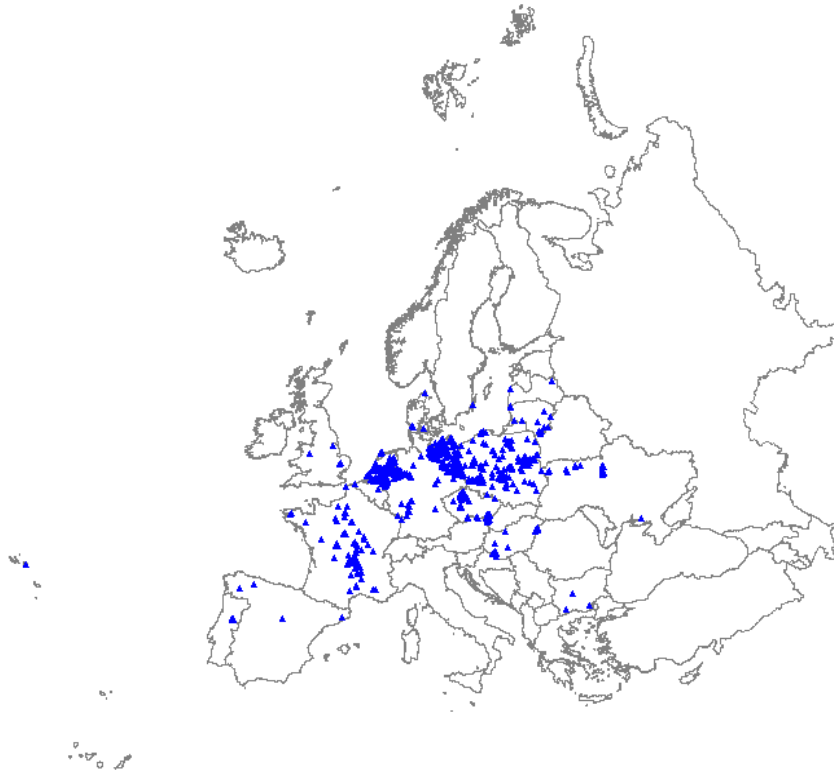
Chytrý: The unit also occurs in the big river valleys of Ukraine and Belarus.

Evans: Seems overestimated in the United Kingdom and northern France.

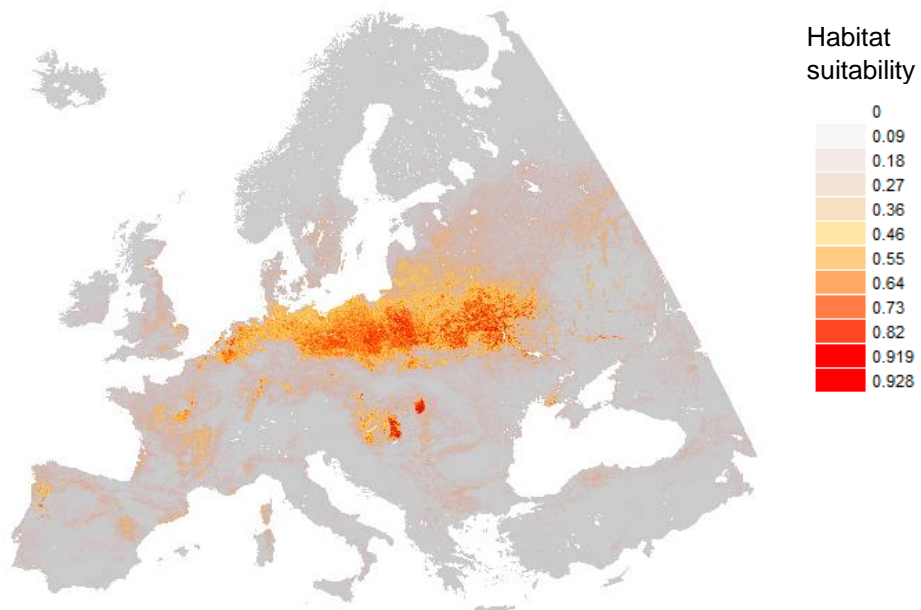


Distribution map from Red List project (Janssen et al., 2016)

E1.9b - Inland sanddrift and dune with siliceous grassland



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

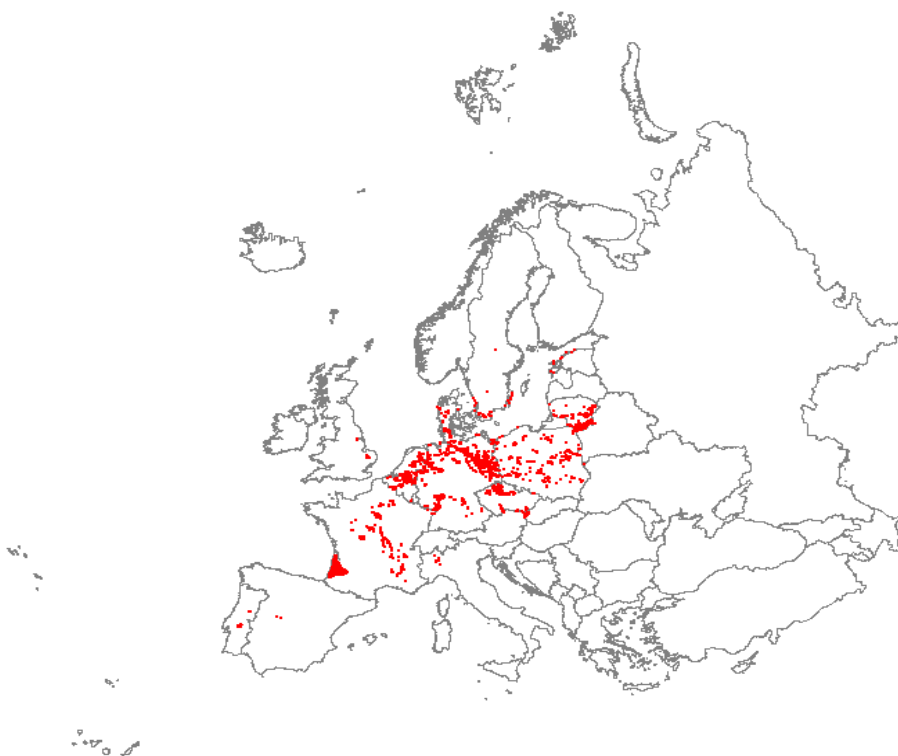
Geographic restriction distribution data

-

Maxent modelling statistics

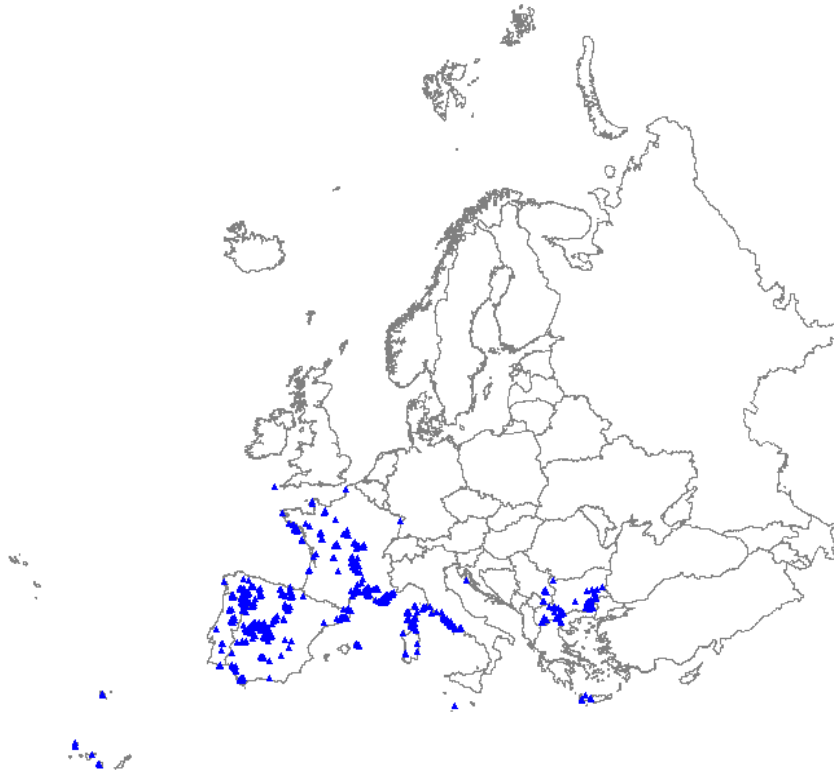
AUC training (0-1)	0.8948
AUC test (0-1)	0.8965
Contribution variables to the Maxent model (%)	
Weight in % of silt particles (0.0002-0.05 mm)	56.1884
Soil organic carbon content (‰)	14.9233
Annual precipitation	8.4433
Solar radiation	7.2006
Cation Exchange Capacity	3.9437
Mean temperature of wettest quarter	3.0313
Precipitation of warmest quarter	2.9629
Weight in % of sand particles (0.05-2 mm)	2.1151
Bulk density (kg/m ³)	2.0988
Temperature seasonality (stdev * 100)	1.3745
Weight in % of clay particles (<0.0002 mm)	1.2957
Distance to water	1.1901
Volume % of coarse fragments (> 2 mm)	0.7634
pH (water)	0.5687
Precipitation seasonality (coef. of var.)	0.4879
Potential evapotranspiration	0.4356

Remarks

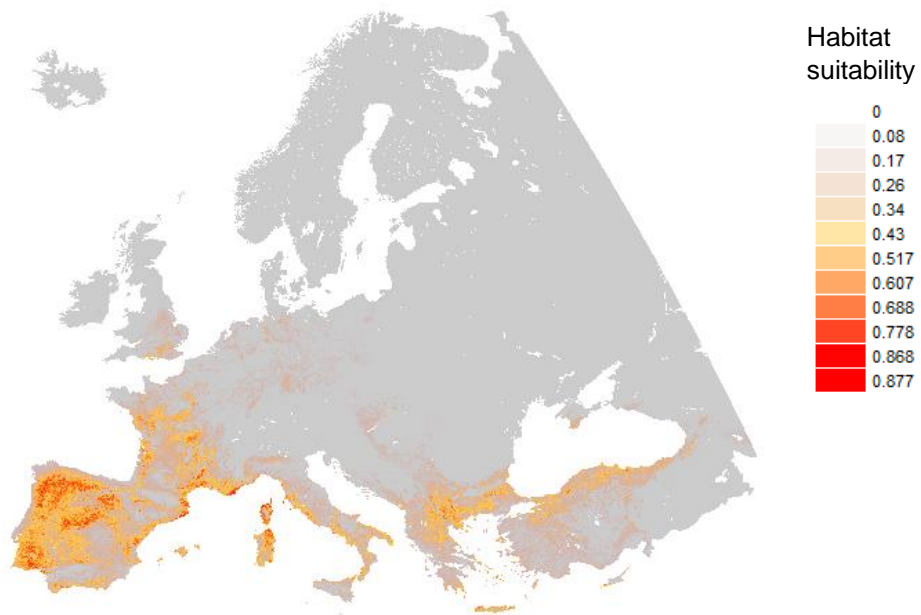


Distribution map from Red List project (Janssen et al., 2016)

E1.A - Mediterranean to Atlantic open, dry, acid and neutral grassland



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

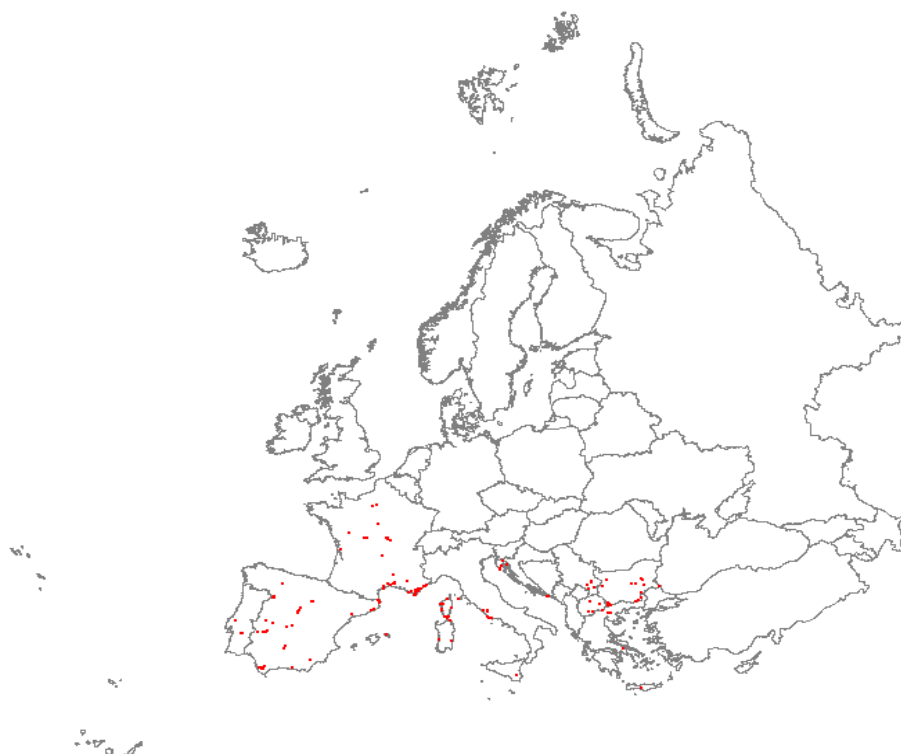
Geographic restriction distribution data

-

Maxent modelling statistics

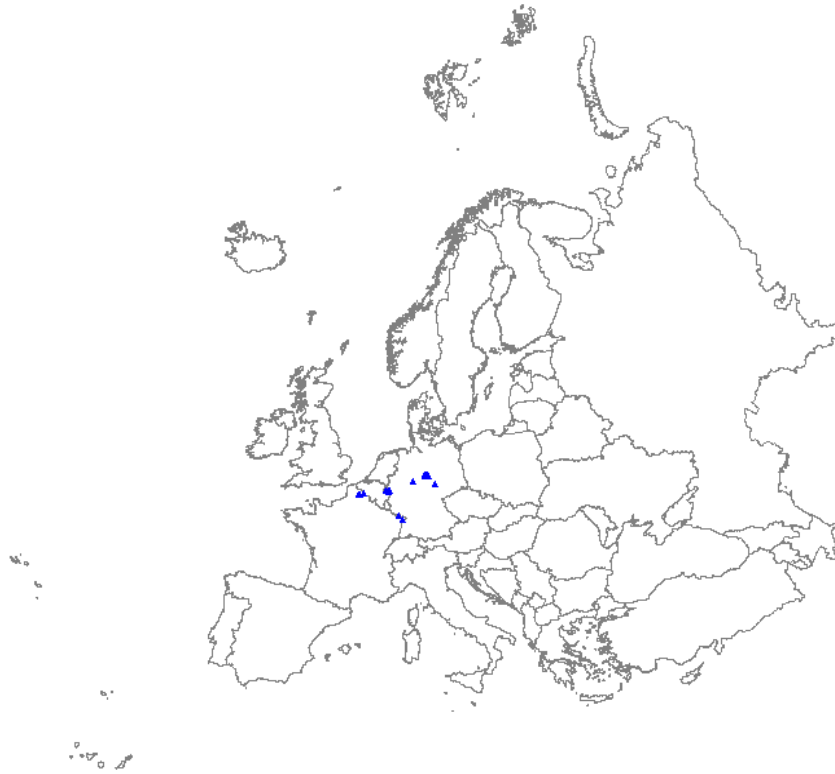
AUC training (0-1)	0.945
AUC test (0-1)	0.9429
Contribution variables to the Maxent model (%)	
Temperature seasonality (stdev * 100)	38.007
Precipitation of warmest quarter	22.313
Soil organic carbon content (‰)	17.0229
Weight in % of silt particles (0.0002-0.05 mm)	9.1852
Precipitation seasonality (coef. of var.)	2.9246
Potential evapotranspiration	2.0933
pH (water)	1.9836
Solar radiation	1.7906
Mean temperature of wettest quarter	1.0239
Weight in % of clay particles (<0.0002 mm)	0.9997
Volume % of coarse fragments (> 2 mm)	0.9366
Annual precipitation	0.8025
Bulk density (kg/m ³)	0.7373
Cation Exchange Capacity	0.6487
Weight in % of sand particles (0.05-2 mm)	0.2219
Distance to water	0.0436

Remarks



Distribution map from Red List project (Janssen et al., 2016)

E1.B - Heavy-metal grassland in Western and Central Europe



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

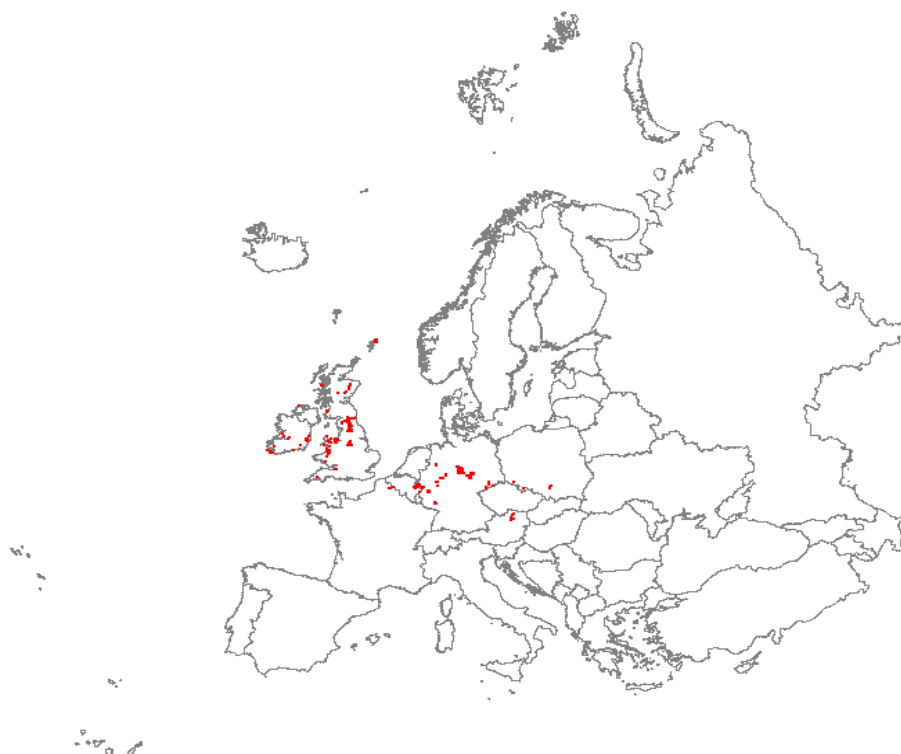
Geographic restriction distribution data

-

Maxent modelling statistics

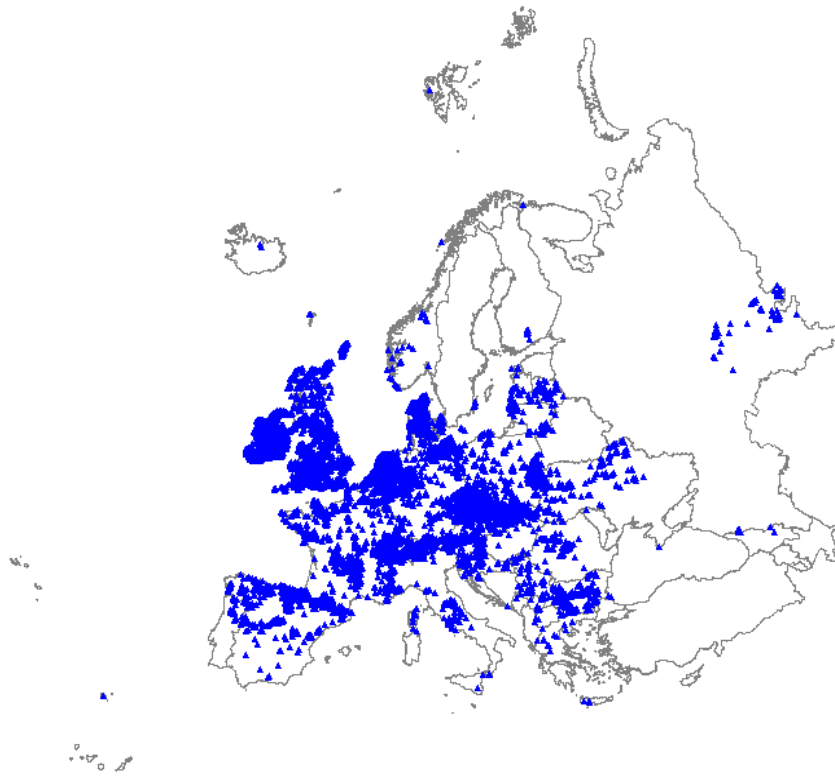
AUC training (0-1)	0.9773
AUC test (0-1)	0.9343
Contribution variables to the Maxent model (%)	
pH (water)	45.2944
Precipitation seasonality (coef. of var.)	22.6051
Mean temperature of wettest quarter	6.5266
Soil organic carbon content (‰)	6.3377
Cation Exchange Capacity	6.0345
Solar radiation	5.5523
Precipitation of warmest quarter	3.3641
Distance to water	2.7563
Potential evapotranspiration	1.8468
Weight in % of clay particles (<0.0002 mm)	1.324
Weight in % of sand particles (0.05-2 mm)	1.0736
Weight in % of silt particles (0.0002-0.05 mm)	0.8576
Volume % of coarse fragments (> 2 mm)	0.5368
Annual precipitation	0.391
Bulk density (kg/m ³)	0.1456
Temperature seasonality (stdev * 100)	0

Remarks

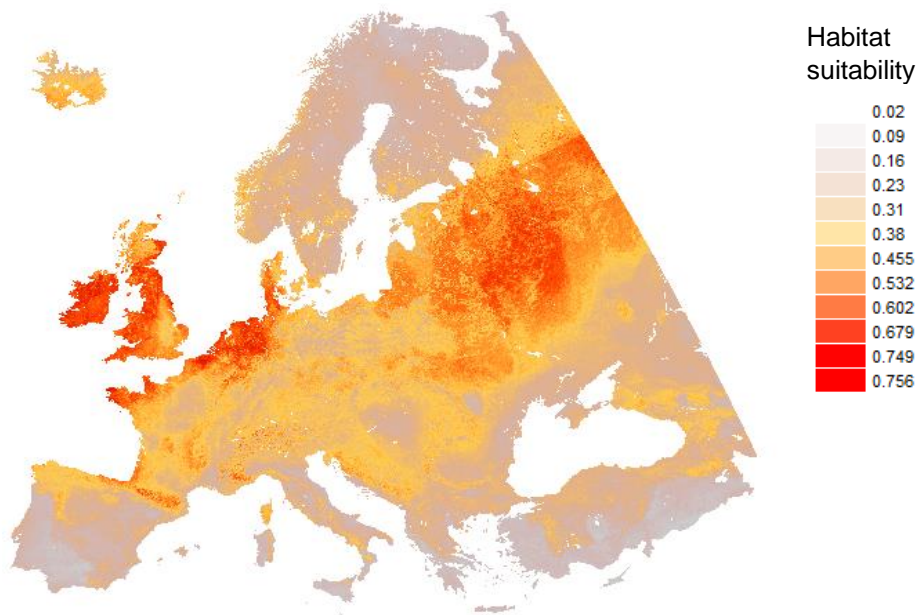


Distribution map from Red List project (Janssen et al., 2016)

E2.1 - Mesic permanent pasture of lowlands and mountains



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

-

Maxent modelling statistics

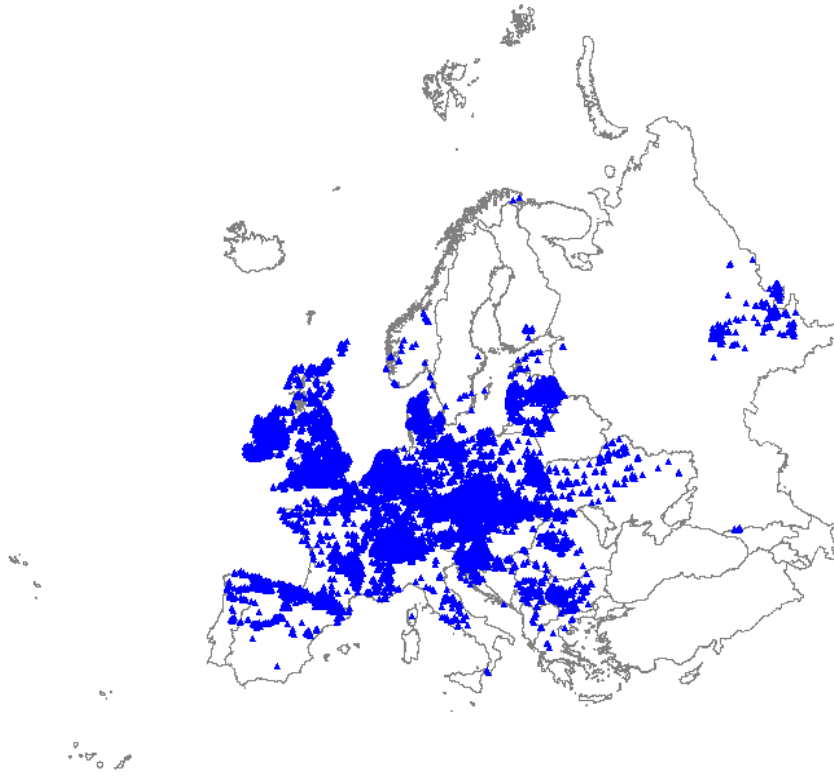
AUC training (0-1)	0.6746
AUC test (0-1)	0.6557
Contribution variables to the Maxent model (%)	
Temperature seasonality (stdev * 100)	41.6154
Soil organic carbon content (‰)	21.8113
Precipitation of warmest quarter	10.8749
Potential evapotranspiration	8.5896
Volume % of coarse fragments (> 2 mm)	5.8015
Precipitation seasonality (coef. of var.)	4.3407
Solar radiation	2.3516
Annual precipitation	2.3192
Bulk density (kg/m ³)	1.5719
Weight in % of sand particles (0.05-2 mm)	0.6822
Cation Exchange Capacity	0.5408
pH (water)	0.4719
Mean temperature of wettest quarter	0.3511
Weight in % of clay particles (<0.0002 mm)	0.3173
Distance to water	0.2154
Weight in % of silt particles (0.0002-0.05 mm)	0.1651

Remarks

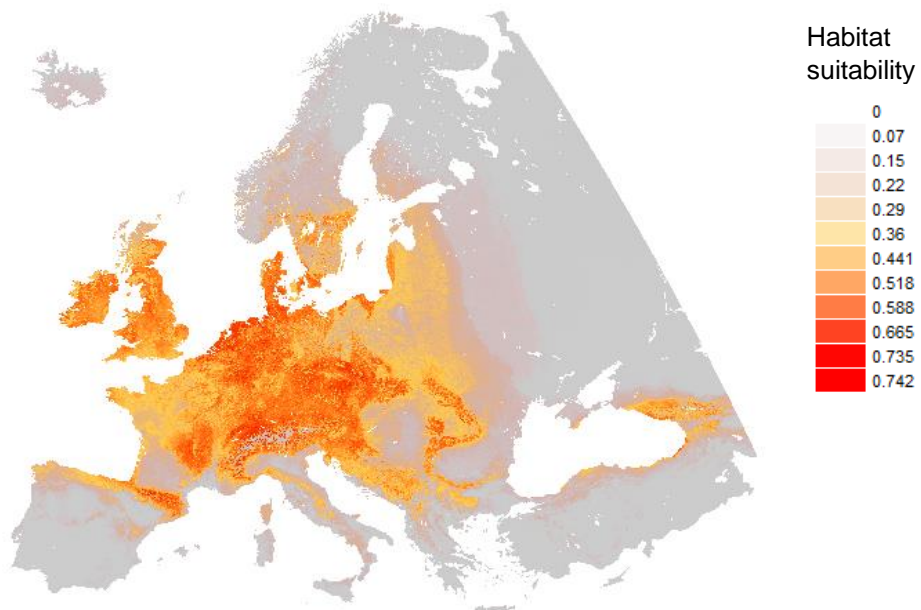


Distribution map from Red List project (Janssen et al., 2016)

E2.2 - Low and medium altitude hay meadow



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

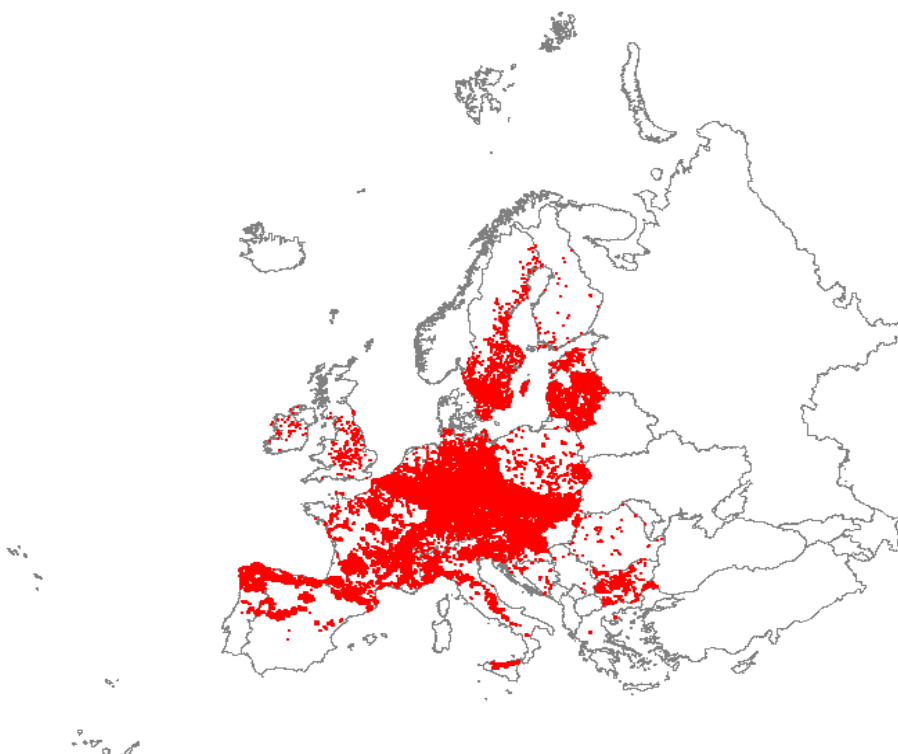
Geographic restriction distribution data

-

Maxent modelling statistics

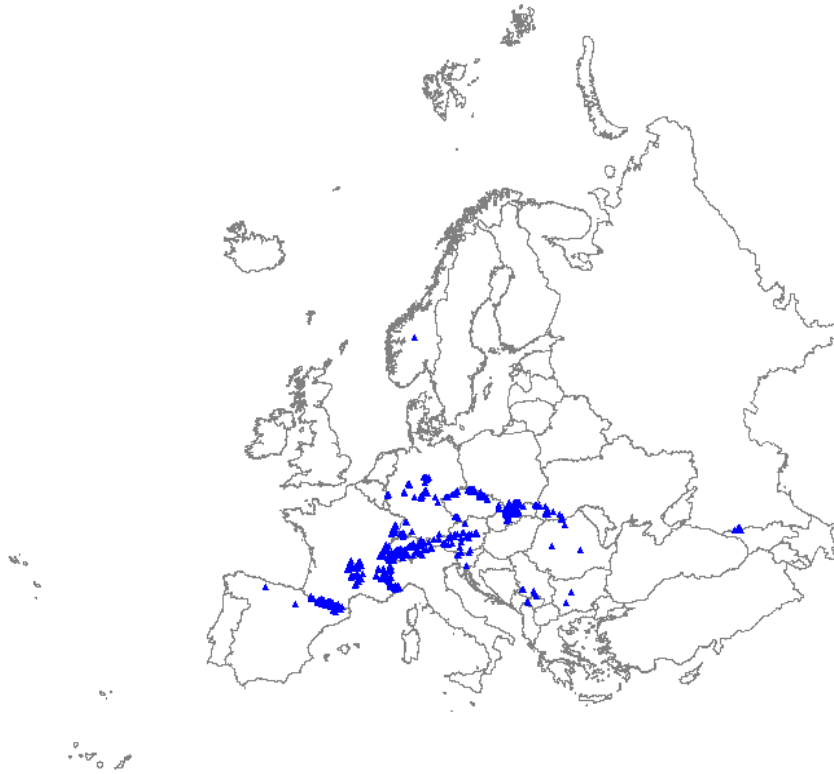
AUC training (0-1)	0.794
AUC test (0-1)	0.7935
Contribution variables to the Maxent model (%)	
Temperature seasonality (stdev * 100)	50.0253
Soil organic carbon content (‰)	22.473
Precipitation of warmest quarter	19.4339
Solar radiation	3.2257
Bulk density (kg/m ³)	1.9914
Potential evapotranspiration	1.1445
pH (water)	0.5317
Weight in % of silt particles (0.0002-0.05 mm)	0.5195
Annual precipitation	0.5188
Precipitation seasonality (coef. of var.)	0.516
Distance to water	0.4587
Weight in % of clay particles (<0.0002 mm)	0.4476
Mean temperature of wettest quarter	0.3523
Weight in % of sand particles (0.05-2 mm)	0.3478
Volume % of coarse fragments (> 2 mm)	0.1765
Cation Exchange Capacity	0.0279

Remarks



Distribution map from Red List project (Janssen et al., 2016)

E2.3 - Mountain hay meadow



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

Geographic restriction distribution data

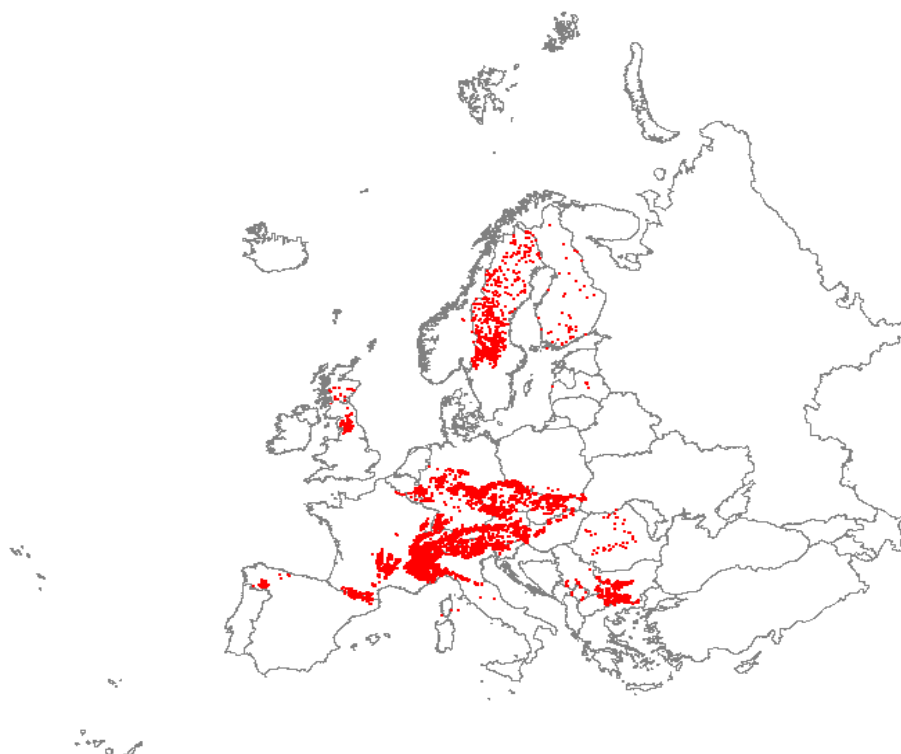
-

Maxent modelling statistics

AUC training (0-1)	0.9449
AUC test (0-1)	0.9474
Contribution variables to the Maxent model (%)	
Precipitation of warmest quarter	44.8523
Volume % of coarse fragments (> 2 mm)	18.4588
Annual precipitation	12.216
Temperature seasonality (stdev * 100)	8.1701
Solar radiation	5.539
Soil organic carbon content (‰)	5.4466
Bulk density (kg/m ³)	4.2435
Weight in % of clay particles (<0.0002 mm)	1.6752
Precipitation seasonality (coef. of var.)	1.2969
pH (water)	0.5795
Potential evapotranspiration	0.4647
Weight in % of sand particles (0.05-2 mm)	0.3934
Mean temperature of wettest quarter	0.3428
Cation Exchange Capacity	0.2176
Weight in % of silt particles (0.0002-0.05 mm)	0.1821
Distance to water	0.0402

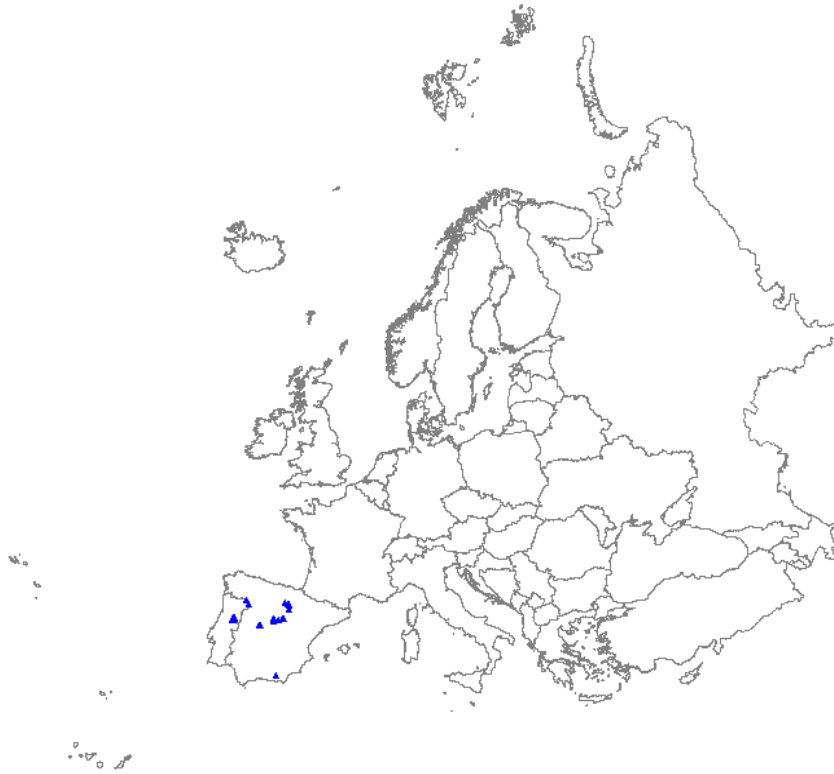
Remarks

Evans: Not predicted in the United Kingdom and Sweden.



Distribution map from Red List project (Janssen et al., 2016)

E2.4 - Iberian summer pasture (vallicar)



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

Geographic restriction distribution data

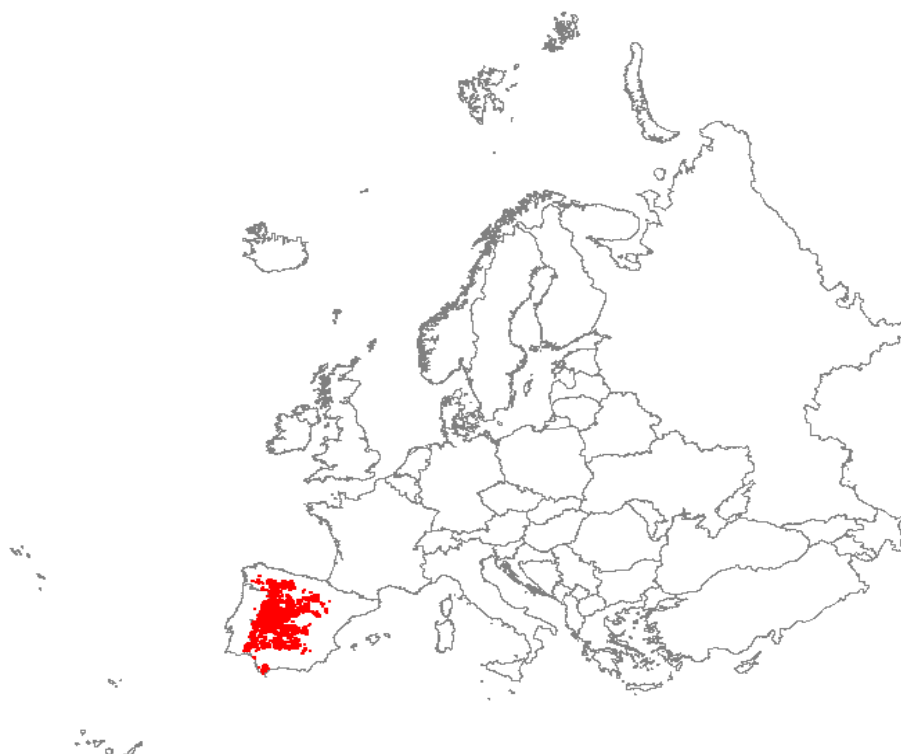
-

Maxent modelling statistics

AUC training (0-1)	0.9975
AUC test (0-1)	0.9928
Contribution variables to the Maxent model (%)	
Volume % of coarse fragments (> 2 mm)	33.1329
Precipitation of warmest quarter	21.4373
Weight in % of silt particles (0.0002-0.05 mm)	15.4899
Annual precipitation	11.2214
Soil organic carbon content (‰)	8.1669
Temperature seasonality (stdev * 100)	5.8117
Solar radiation	3.2185
Precipitation seasonality (coef. of var.)	1.4448
Bulk density (kg/m ³)	1.0037
Weight in % of clay particles (<0.0002 mm)	0.9184
Potential evapotranspiration	0.8716
Weight in % of sand particles (0.05-2 mm)	0.2533
Cation Exchange Capacity	0.2119
Distance to water	0.0273
Mean temperature of wettest quarter	0.0084
pH (water)	0

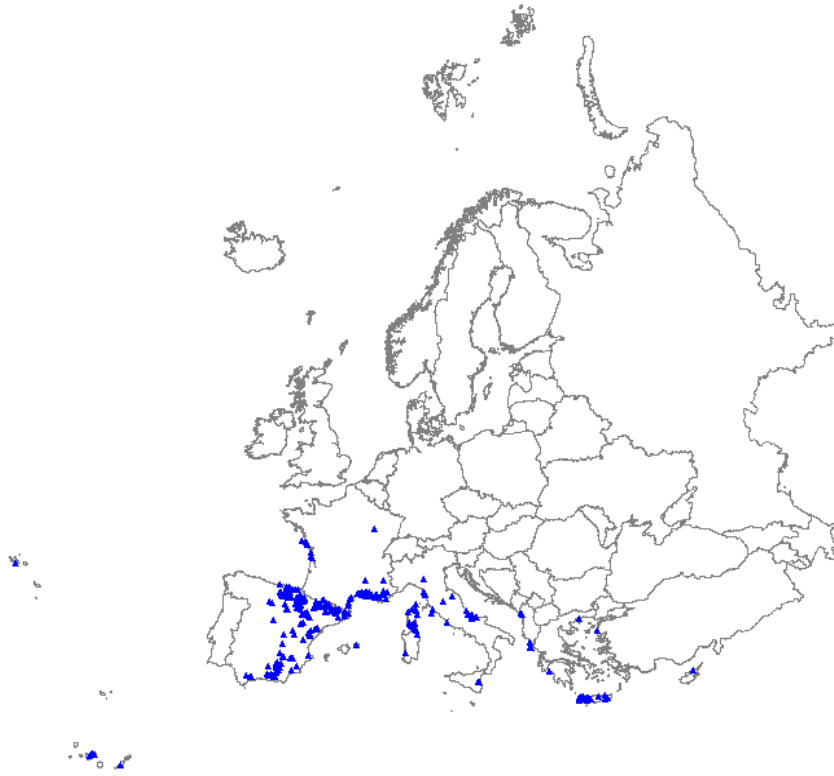
Remarks

Chytrý: Any predictions outside the Iberian Peninsula should be set to zero probability.

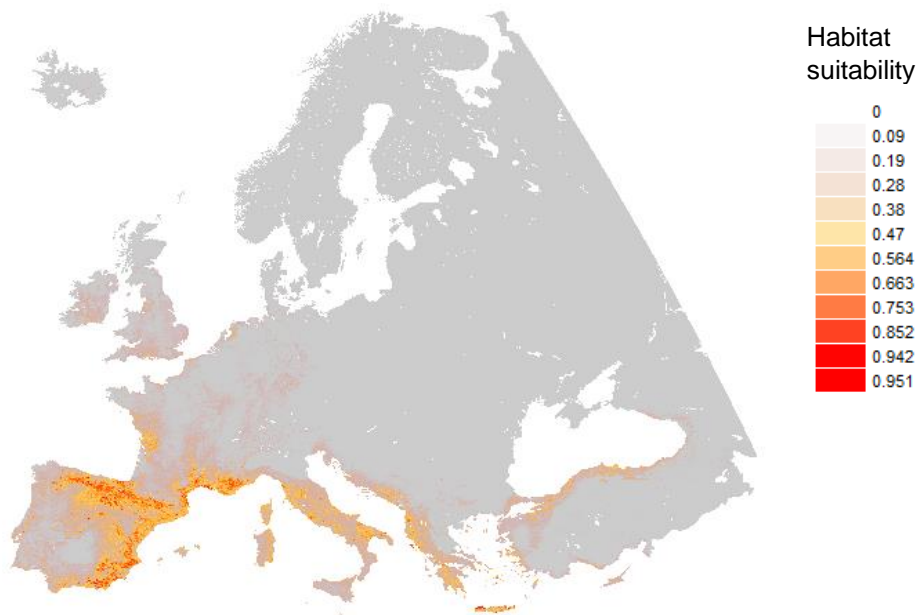


Distribution map from Red List project (Janssen et al., 2016)

E3.1a - Mediterranean tall humid inland grassland



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

Geographic restriction distribution data

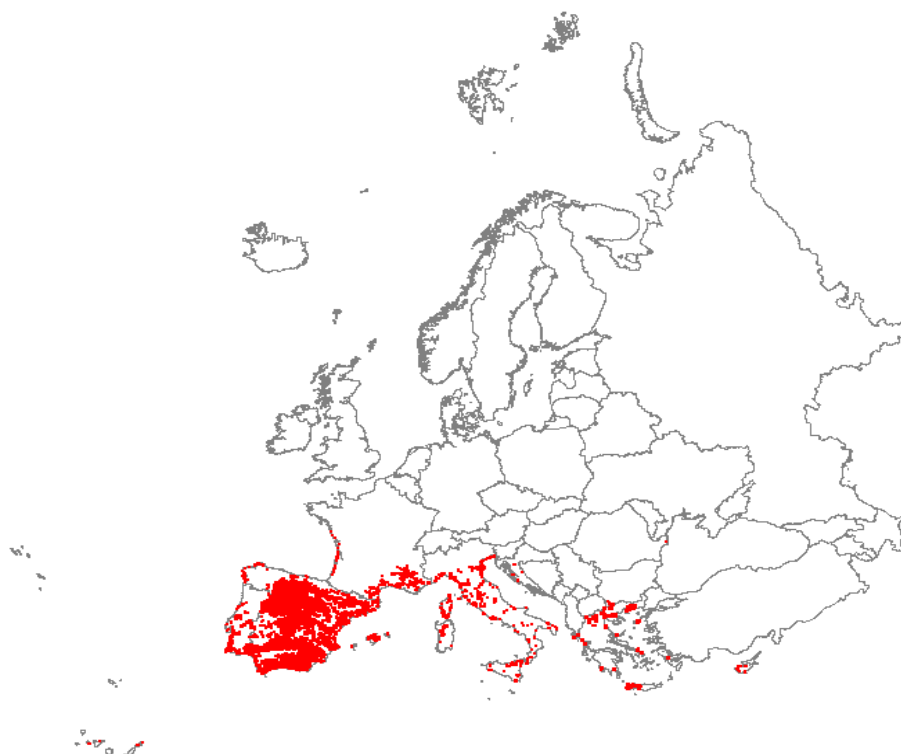
-

Maxent modelling statistics

AUC training (0-1)	0.9708
AUC test (0-1)	0.9637
Contribution variables to the Maxent model (%)	
Temperature seasonality (stdev * 100)	52.6136
Soil organic carbon content (‰)	19.2328
Potential evapotranspiration	7.2496
Precipitation seasonality (coef. of var.)	6.0633
Solar radiation	2.906
Weight in % of clay particles (<0.0002 mm)	2.2076
Volume % of coarse fragments (> 2 mm)	1.9274
Cation Exchange Capacity	1.6047
pH (water)	1.4898
Bulk density (kg/m ³)	1.4408
Weight in % of sand particles (0.05-2 mm)	1.3808
Precipitation of warmest quarter	1.3682
Distance to water	0.8006
Annual precipitation	0.6886
Mean temperature of wettest quarter	0.6622
Weight in % of silt particles (0.0002-0.05 mm)	0.4333

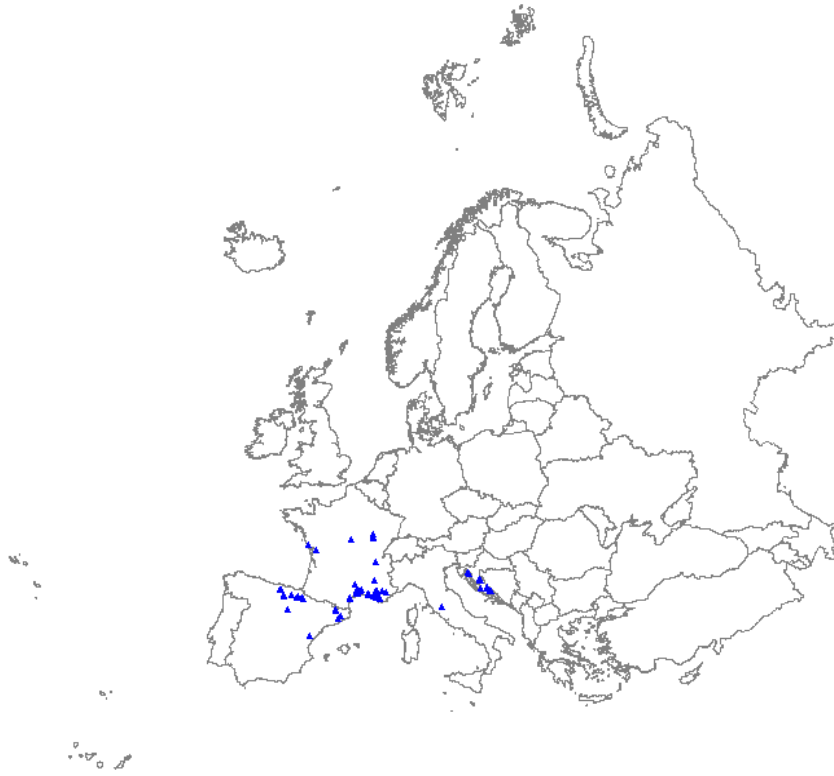
Remarks

Evans: Some releves seem coastal, really existing in northern France?.

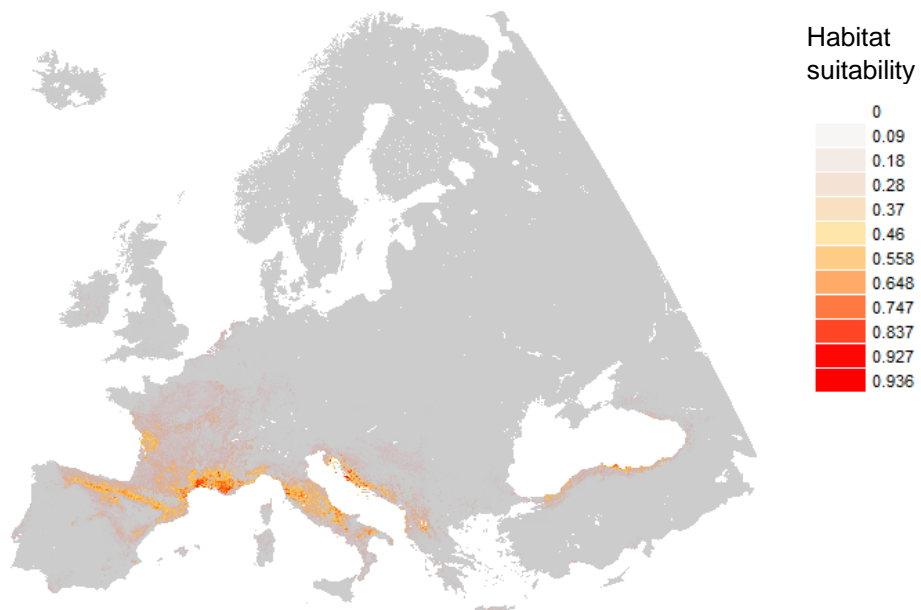


Distribution map from Red List project (Janssen et al., 2016)

E3.2a - Mediterranean short moist grassland of lowlands



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

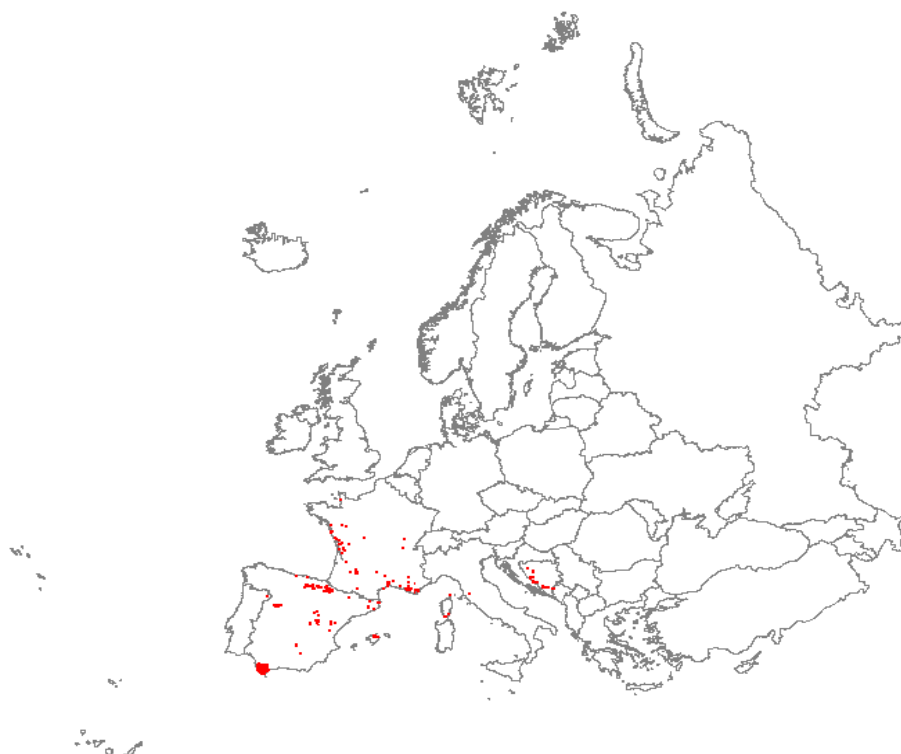
Geographic restriction distribution data

-

Maxent modelling statistics

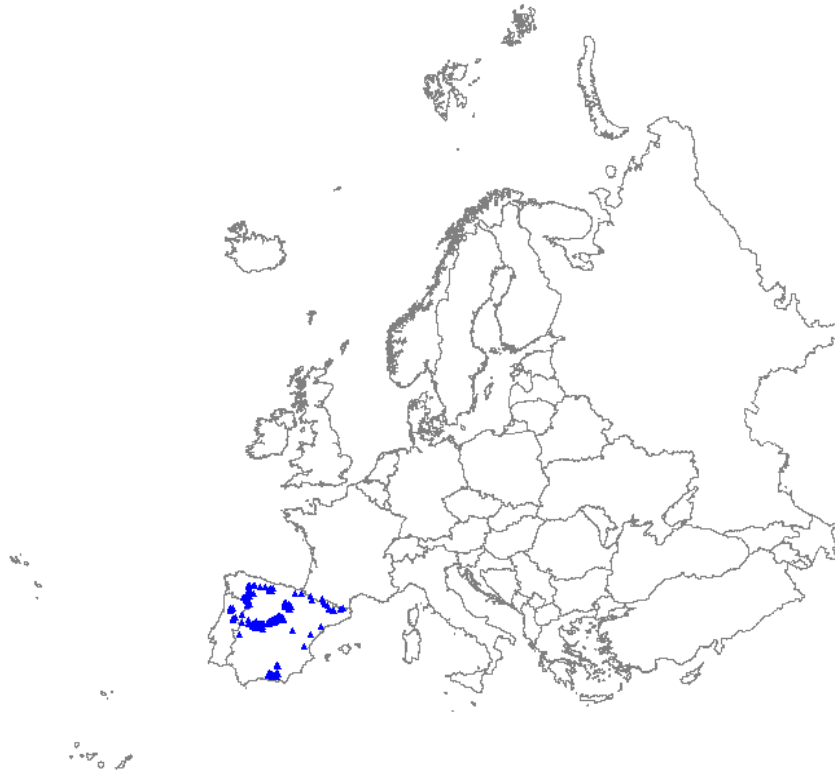
AUC training (0-1)	0.9885
AUC test (0-1)	0.9878
Contribution variables to the Maxent model (%)	
Temperature seasonality (stdev * 100)	28.6551
Soil organic carbon content (‰)	20.6956
Solar radiation	18.0647
Precipitation seasonality (coef. of var.)	14.2506
Annual precipitation	10.9316
Potential evapotranspiration	9.7653
Mean temperature of wettest quarter	5.7789
Volume % of coarse fragments (> 2 mm)	2.5715
Weight in % of clay particles (<0.0002 mm)	1.7214
pH (water)	1.6667
Precipitation of warmest quarter	1.5513
Bulk density (kg/m ³)	1.08
Cation Exchange Capacity	0.7187
Weight in % of silt particles (0.0002-0.05 mm)	0.1761
Distance to water	0.0219
Weight in % of sand particles (0.05-2 mm)	0.0002

Remarks



Distribution map from Red List project (Janssen et al., 2016)

E3.2b - Mediterranean short moist grassland of mountains



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

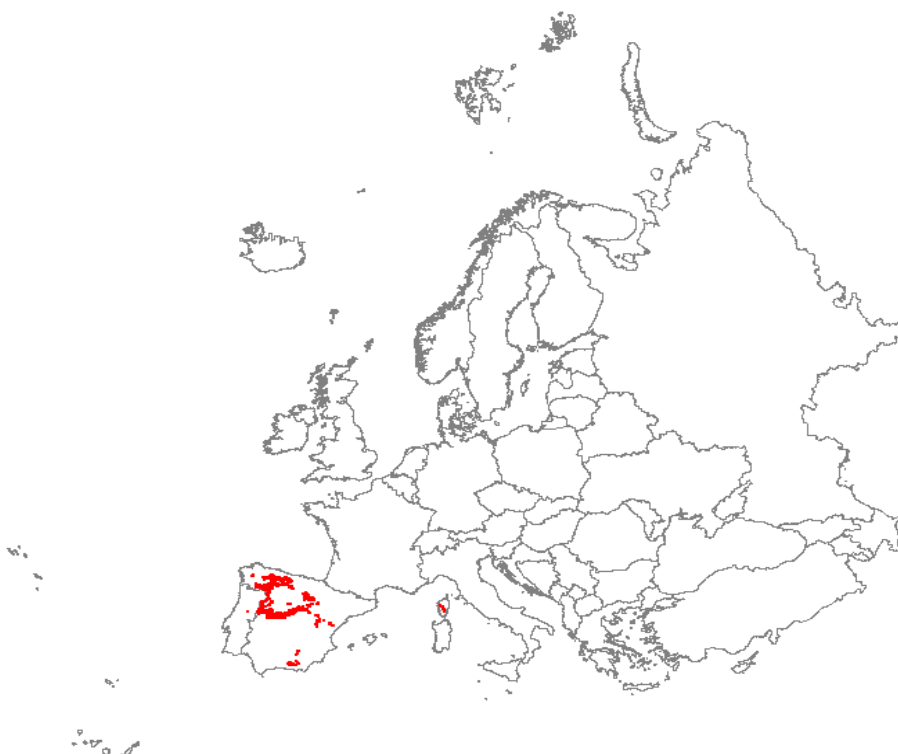
Geographic restriction distribution data

-

Maxent modelling statistics

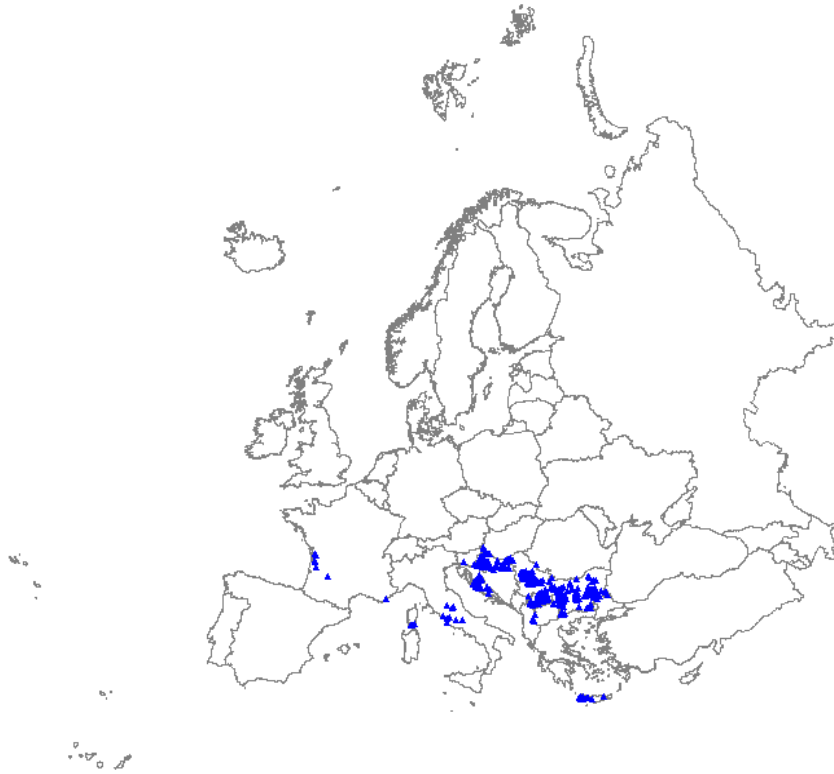
AUC training (0-1)	0.9817
AUC test (0-1)	0.9806
Contribution variables to the Maxent model (%)	
Weight in % of sand particles (0.05-2 mm)	27.3891
Temperature seasonality (stdev * 100)	25.7913
Volume % of coarse fragments (> 2 mm)	13.1899
Weight in % of silt particles (0.0002-0.05 mm)	11.7419
Precipitation of warmest quarter	11.3227
Solar radiation	4.2143
Mean temperature of wettest quarter	3.0999
Soil organic carbon content (‰)	2.8538
Bulk density (kg/m ³)	2.1587
Potential evapotranspiration	0.7105
Cation Exchange Capacity	0.5347
Distance to water	0.4112
Precipitation seasonality (coef. of var.)	0.4005
Annual precipitation	0.2202
Weight in % of clay particles (<0.0002 mm)	0.0119
pH (water)	0.0019

Remarks

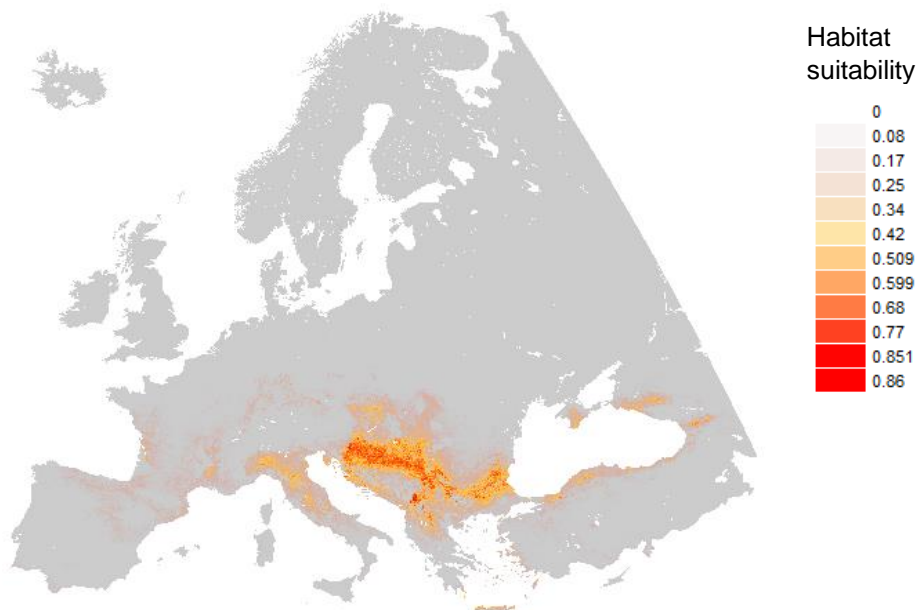


Distribution map from Red List project (Janssen et al., 2016)

E3.3 - Submediterranean moist meadow



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

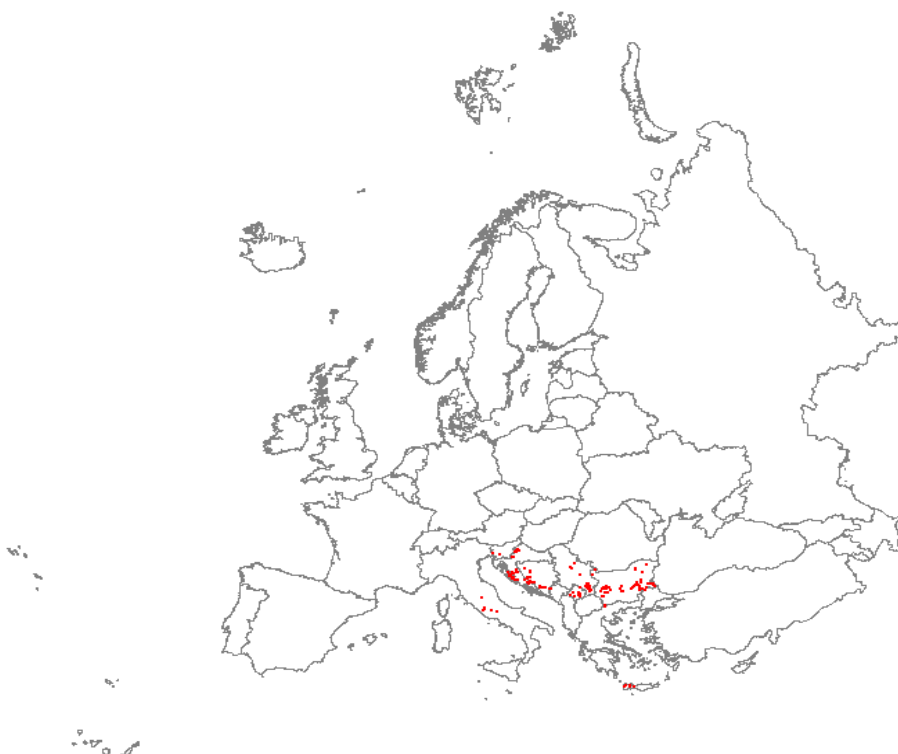
Geographic restriction distribution data

-

Maxent modelling statistics

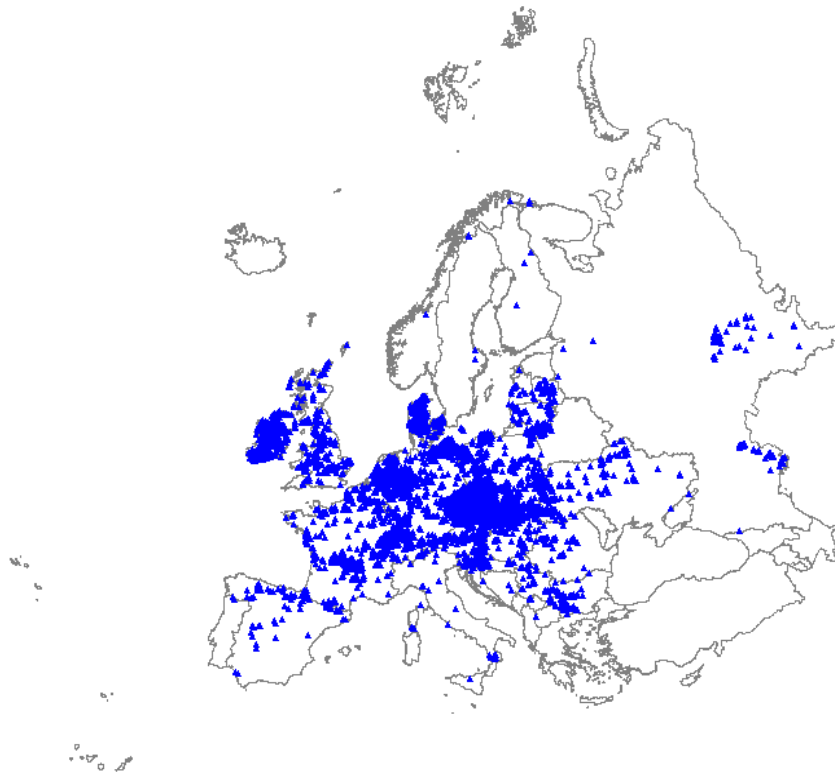
AUC training (0-1)	0.9647
AUC test (0-1)	0.9527
Contribution variables to the Maxent model (%)	
Soil organic carbon content (‰)	32.1708
Temperature seasonality (stdev * 100)	20.9872
Precipitation seasonality (coef. of var.)	15.0961
Volume % of coarse fragments (> 2 mm)	14.5251
Weight in % of clay particles (<0.0002 mm)	4.807
Annual precipitation	4.0373
Solar radiation	2.5139
pH (water)	2.4316
Precipitation of warmest quarter	2.2504
Weight in % of silt particles (0.0002-0.05 mm)	0.9791
Distance to water	0.9239
Bulk density (kg/m ³)	0.8138
Potential evapotranspiration	0.4261
Cation Exchange Capacity	0.2489
Weight in % of sand particles (0.05-2 mm)	0.1272
Mean temperature of wettest quarter	0.0639

Remarks

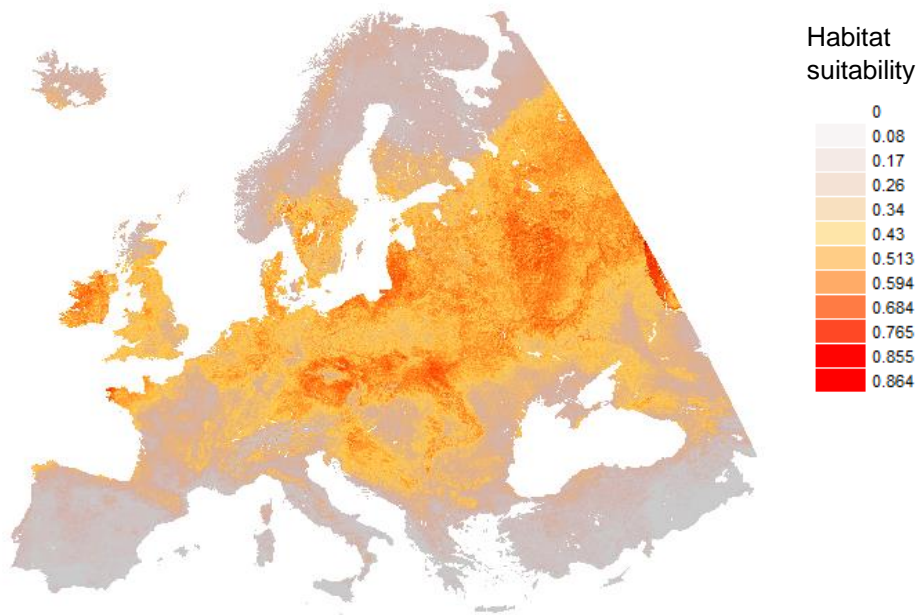


Distribution map from Red List project (Janssen et al., 2016)

E3.4a - Moist or wet mesotrophic to eutrophic hay meadow



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

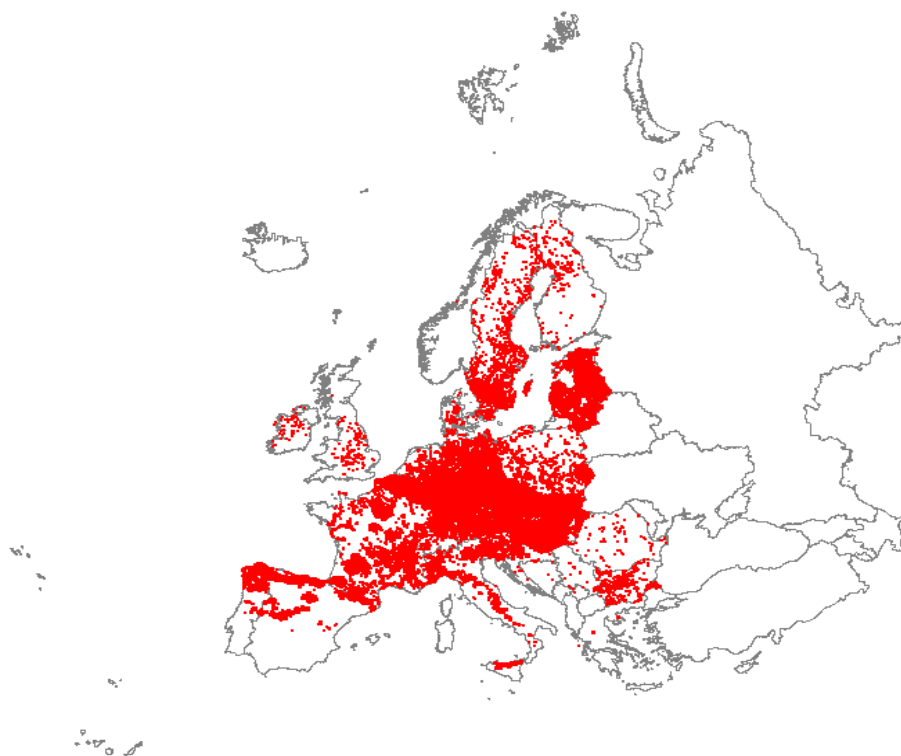
Geographic restriction distribution data

-

Maxent modelling statistics

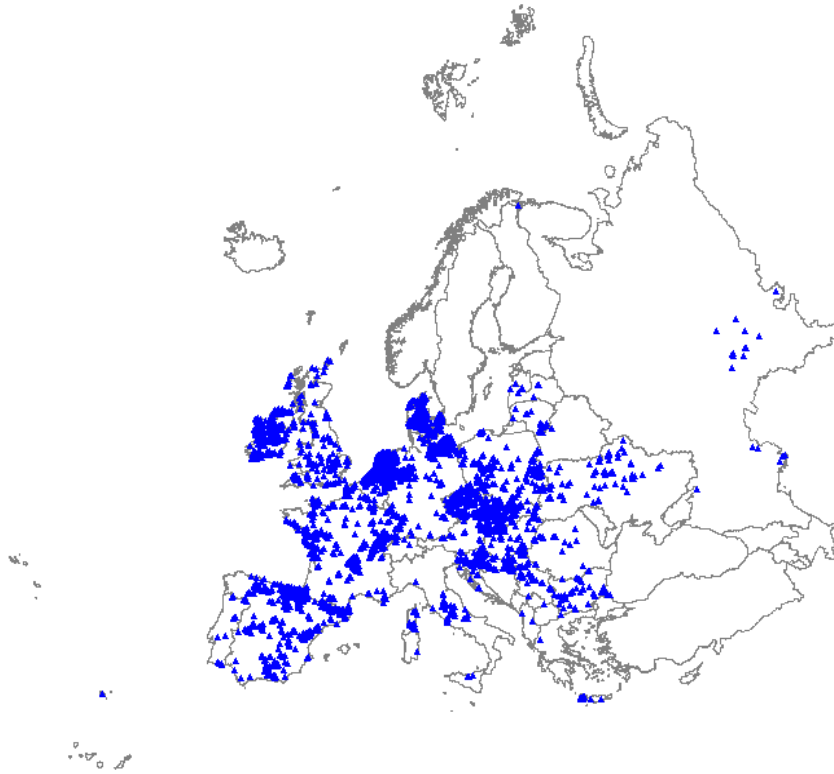
AUC training (0-1)	0.6877
AUC test (0-1)	0.67
Contribution variables to the Maxent model (%)	
Soil organic carbon content (‰)	26.8859
Temperature seasonality (stdev * 100)	16.7979
Precipitation of warmest quarter	16.1536
Volume % of coarse fragments (> 2 mm)	9.8416
Potential evapotranspiration	9.0846
Weight in % of clay particles (<0.0002 mm)	5.5056
Solar radiation	4.3696
Weight in % of sand particles (0.05-2 mm)	4.1039
Annual precipitation	2.4557
Mean temperature of wettest quarter	2.2003
Bulk density (kg/m ³)	2.1403
Distance to water	2.0029
Precipitation seasonality (coef. of var.)	0.5912
pH (water)	0.4495
Weight in % of silt particles (0.0002-0.05 mm)	0.1452
Cation Exchange Capacity	0.1445

Remarks

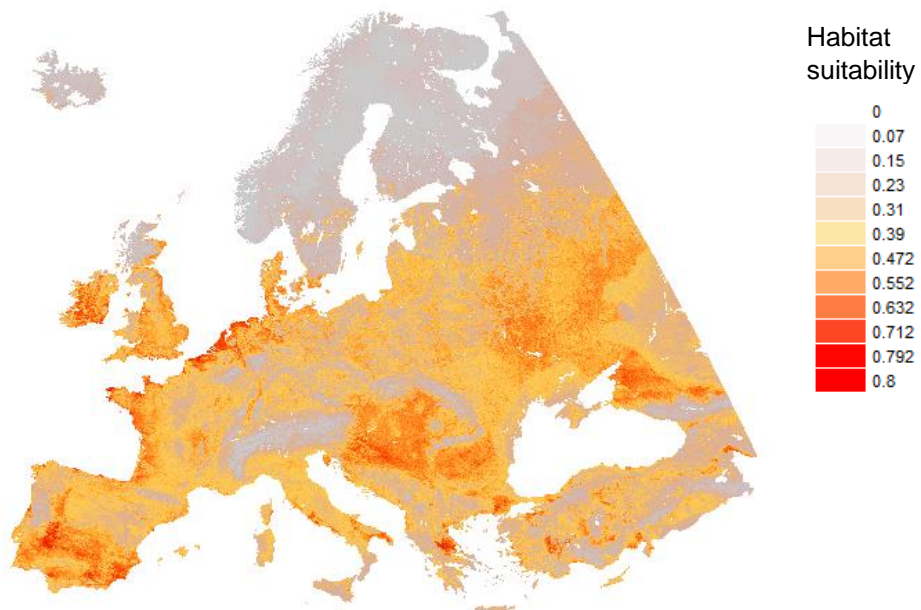


Distribution map from Red List project (Janssen et al., 2016)

E3.4b - Moist or wet mesotrophic to eutrophic pasture



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

-

Maxent modelling statistics

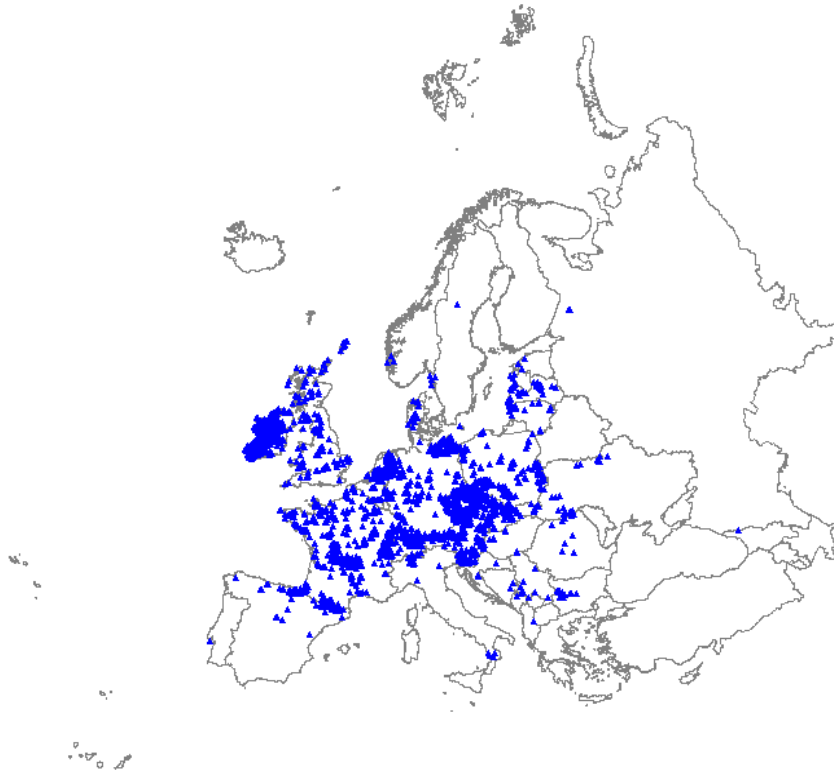
AUC training (0-1)	0.7085
AUC test (0-1)	0.7053
Contribution variables to the Maxent model (%)	
Potential evapotranspiration	30.3743
Volume % of coarse fragments (> 2 mm)	22.9422
Temperature seasonality (stdev * 100)	13.6791
Precipitation of warmest quarter	7.7519
Weight in % of sand particles (0.05-2 mm)	6.9318
Soil organic carbon content (‰)	5.3326
Mean temperature of wettest quarter	2.2857
Precipitation seasonality (coef. of var.)	2.2365
Distance to water	1.7452
Solar radiation	1.6997
pH (water)	1.3881
Bulk density (kg/m ³)	0.9459
Annual precipitation	0.9363
Cation Exchange Capacity	0.1415
Weight in % of clay particles (<0.0002 mm)	0.0562
Weight in % of silt particles (0.0002-0.05 mm)	0

Remarks

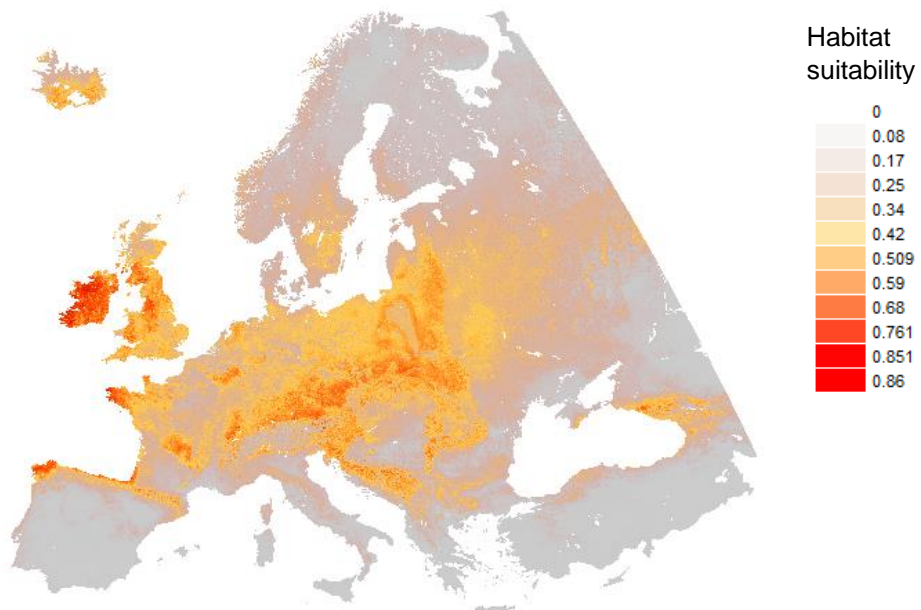


Distribution map from Red List project (Janssen et al., 2016)

E3.5 - Temperate and boreal moist or wet oligotrophic grassland



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

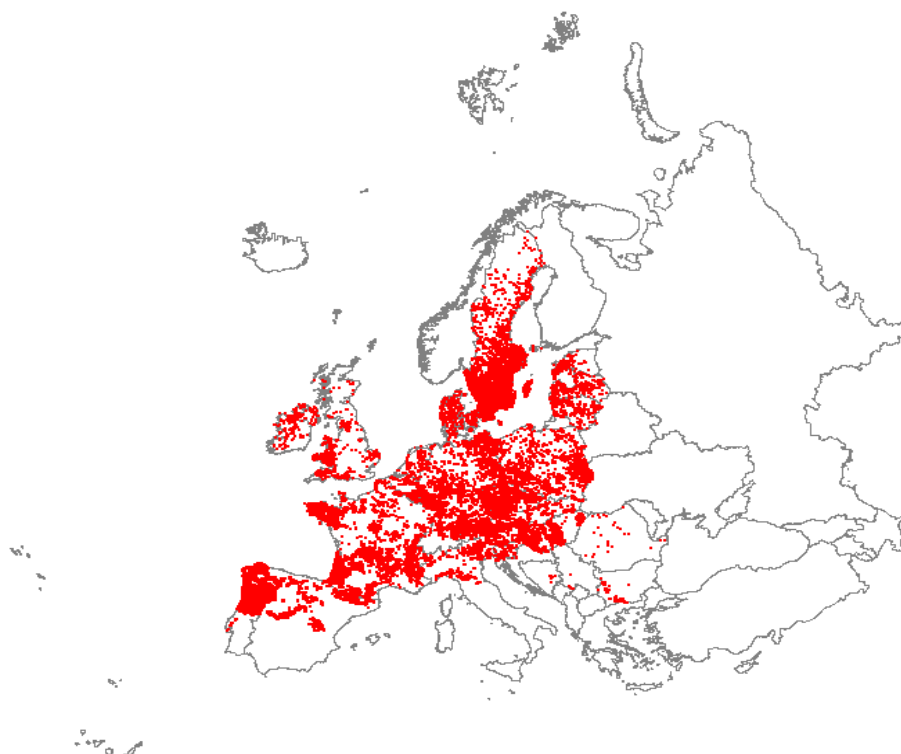
-

Maxent modelling statistics

AUC training (0-1)	0.7371
AUC test (0-1)	0.7075
Contribution variables to the Maxent model (%)	
Precipitation of warmest quarter	24.5629
Temperature seasonality (stdev * 100)	24.5343
Soil organic carbon content (‰)	23.978
Volume % of coarse fragments (> 2 mm)	9.8181
Potential evapotranspiration	7.6192
Solar radiation	2.4294
Weight in % of sand particles (0.05-2 mm)	2.2702
Weight in % of silt particles (0.0002-0.05 mm)	1.9697
Mean temperature of wettest quarter	1.3122
Annual precipitation	1.2117
Precipitation seasonality (coef. of var.)	1.1055
Bulk density (kg/m ³)	0.5017
Distance to water	0.4476
pH (water)	0.4113
Weight in % of clay particles (<0.0002 mm)	0.1534
Cation Exchange Capacity	0.0427

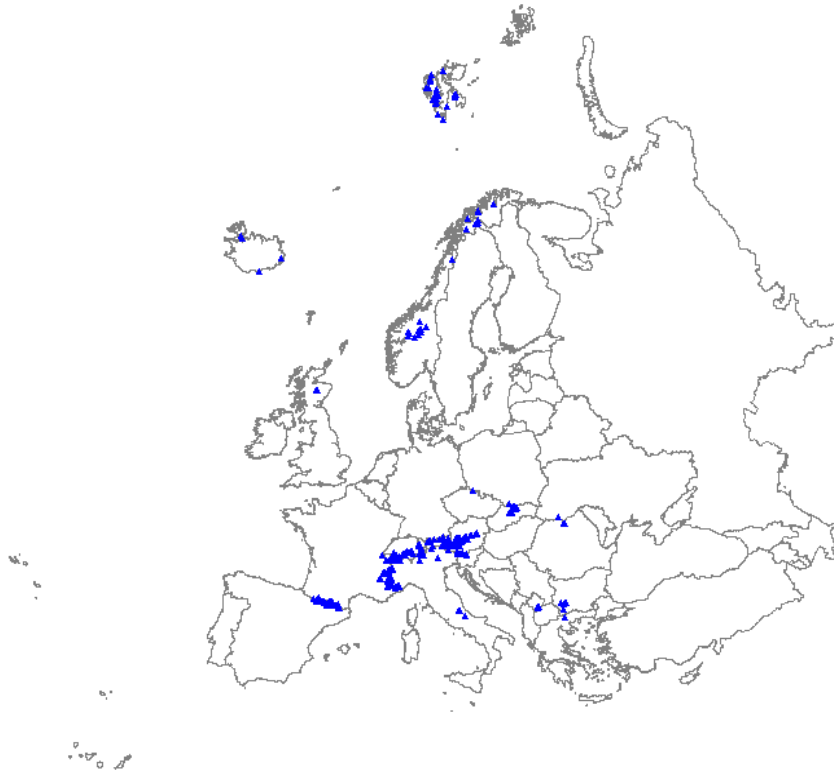
Remarks

Evans: Underestimated in boreal zone?.



Distribution map from Red List project (Janssen et al., 2016)

E4.1 - Vegetated snow-patch



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

-

Maxent modelling statistics

AUC training (0-1)	0.9647
AUC test (0-1)	0.9532
Contribution variables to the Maxent model (%)	
Soil organic carbon content (‰)	43.9819
Weight in % of sand particles (0.05-2 mm)	32.7563
Cation Exchange Capacity	6.549
Annual precipitation	4.7292
Volume % of coarse fragments (> 2 mm)	3.4604
Weight in % of silt particles (0.0002-0.05 mm)	2.8524
Mean temperature of wettest quarter	2.4339
Solar radiation	2.309
pH (water)	1.0057
Temperature seasonality (stdev * 100)	0.8192
Bulk density (kg/m ³)	0.4006
Potential evapotranspiration	0.3384
Precipitation of warmest quarter	0.2795
Precipitation seasonality (coef. of var.)	0.252
Weight in % of clay particles (<0.0002 mm)	0.1262
Distance to water	0

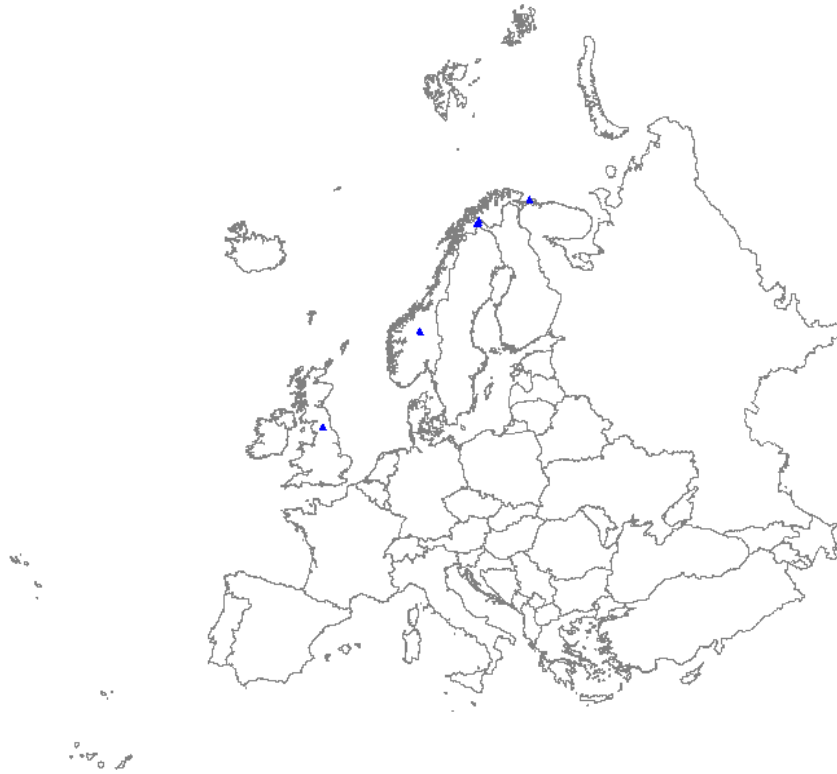
Remarks

Evans: Massif Central, Carpathians, Apeninnes?.

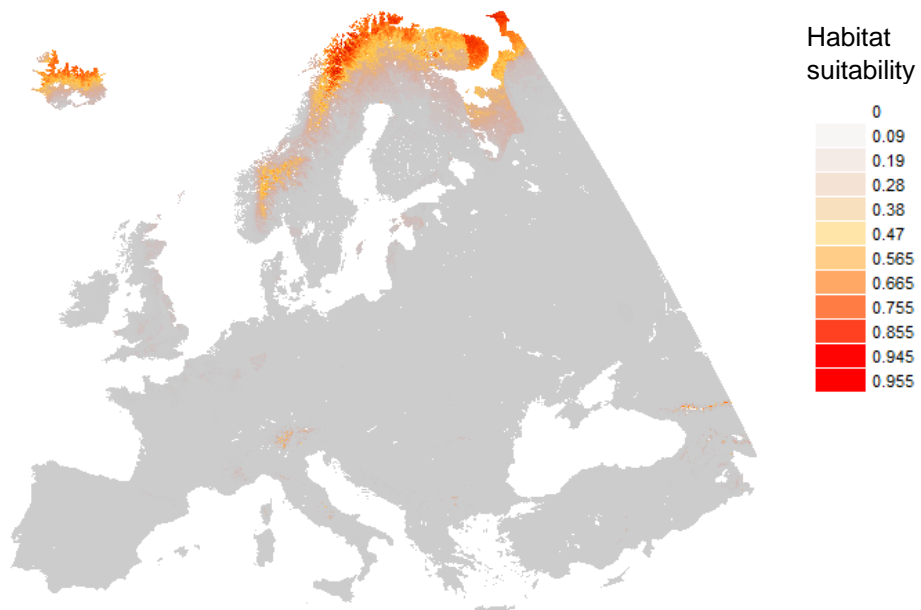


Distribution map from Red List project (Janssen et al., 2016)

E4.3a - Boreal and arctic acidophilous alpine grassland



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

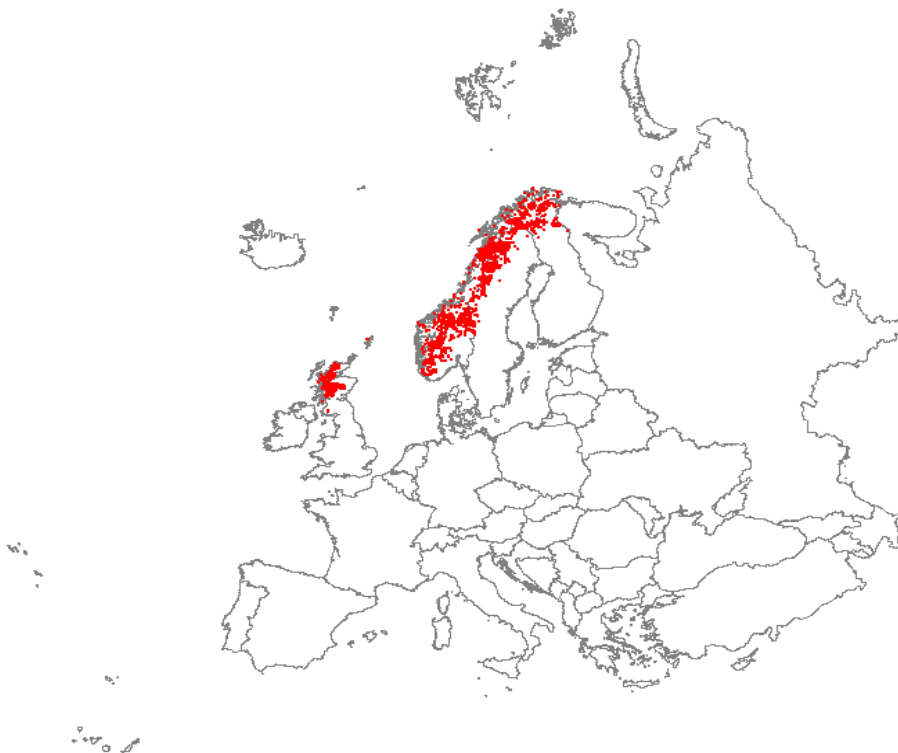
-

Maxent modelling statistics

AUC training (0-1)	0.9913
AUC test (0-1)	0.993
Contribution variables to the Maxent model (%)	
Soil organic carbon content (‰)	81.7964
Solar radiation	11.5211
Mean temperature of wettest quarter	6.366
Annual precipitation	5.4934
Temperature seasonality (stdev * 100)	3.275
pH (water)	1.4376
Precipitation of warmest quarter	0.842
Weight in % of sand particles (0.05-2 mm)	0.4648
Potential evapotranspiration	0.3161
Volume % of coarse fragments (> 2 mm)	0.0088
Weight in % of silt particles (0.0002-0.05 mm)	0
Precipitation seasonality (coef. of var.)	0
Bulk density (kg/m ³)	0
Cation Exchange Capacity	0
Distance to water	0
Weight in % of clay particles (<0.0002 mm)	0

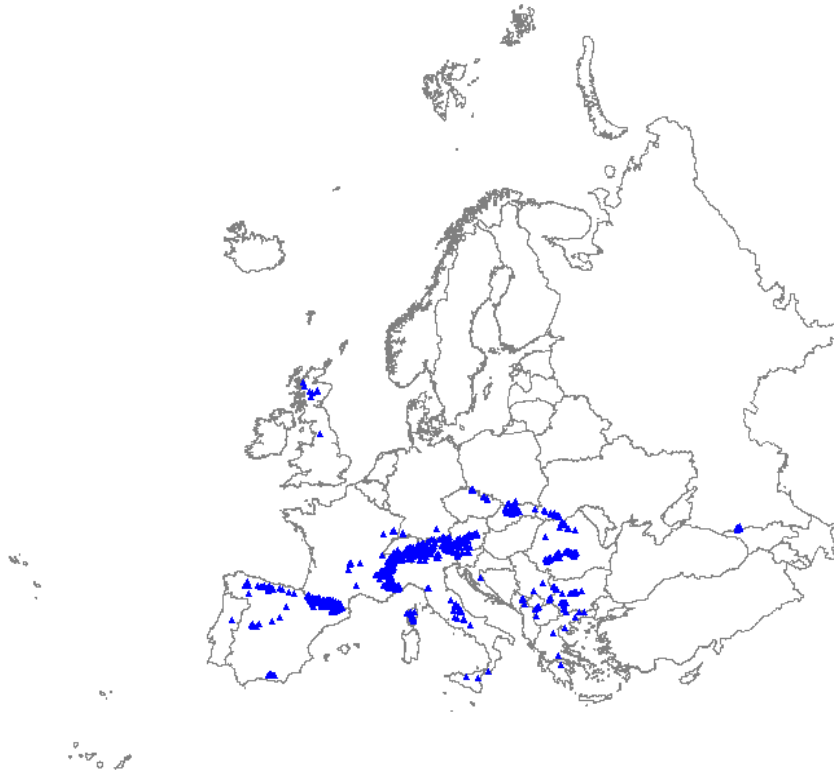
Remarks

Evans: Scotland?.

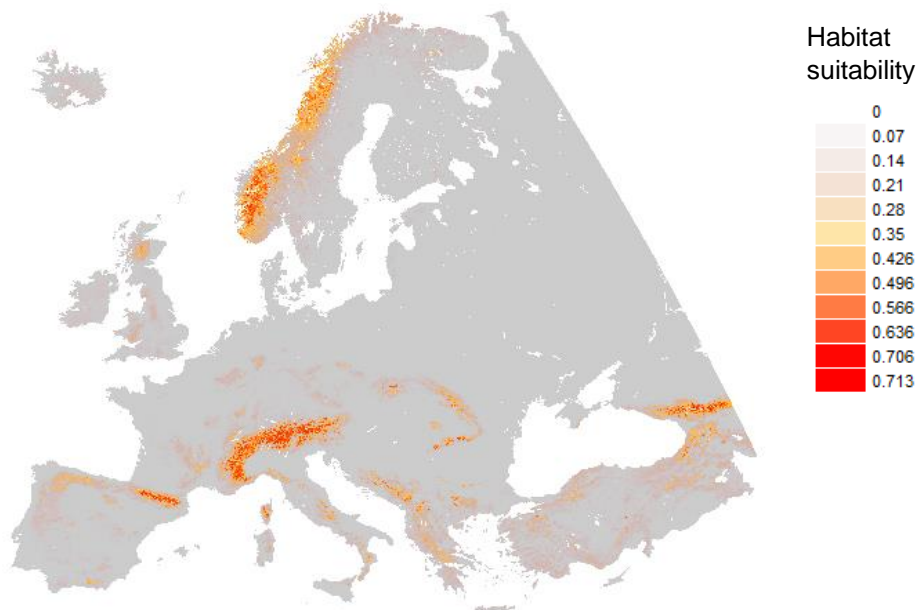


Distribution map from Red List project (Janssen et al., 2016)

E4.3b - Temperate acidophilous alpine grassland



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

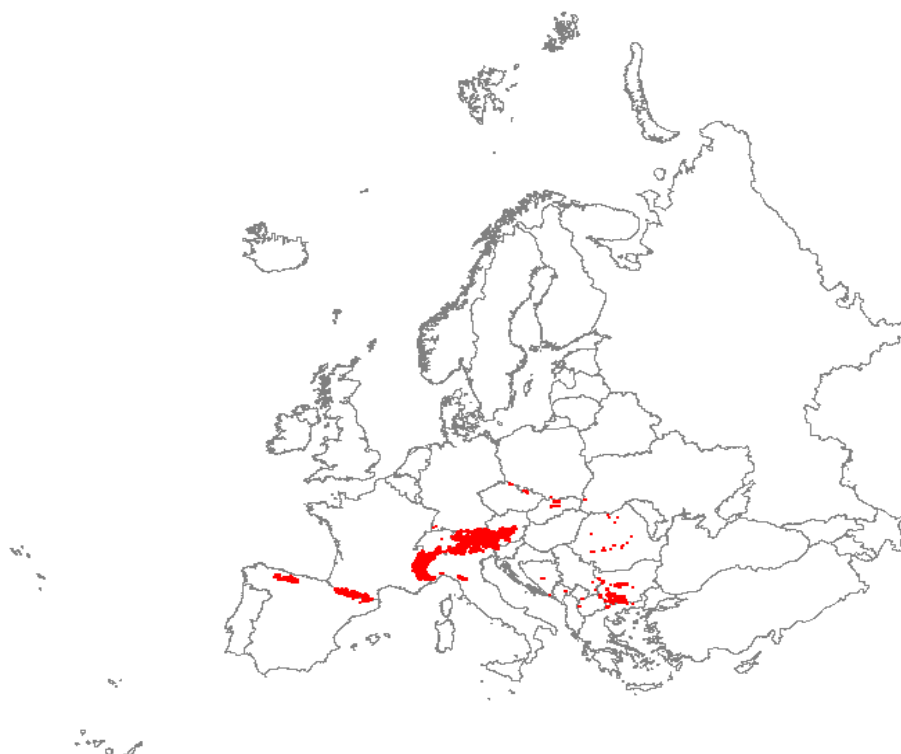
-

Maxent modelling statistics

AUC training (0-1)	0.8916
AUC test (0-1)	0.9003
Contribution variables to the Maxent model (%)	
Weight in % of sand particles (0.05-2 mm)	42.1476
Volume % of coarse fragments (> 2 mm)	24.6527
Soil organic carbon content (‰)	9.0568
Annual precipitation	7.0488
Solar radiation	6.7601
Mean temperature of wettest quarter	6.676
Temperature seasonality (stdev * 100)	1.9529
Cation Exchange Capacity	1.6554
Weight in % of silt particles (0.0002-0.05 mm)	0.8913
pH (water)	0.4894
Bulk density (kg/m ³)	0.4293
Potential evapotranspiration	0.2841
Precipitation seasonality (coef. of var.)	0.2843
Precipitation of warmest quarter	0.2108
Weight in % of clay particles (<0.0002 mm)	0.0505
Distance to water	0.0394

Remarks

Evans: Occurs locally in UK, especially Scotland, also in Norway and Sweden.

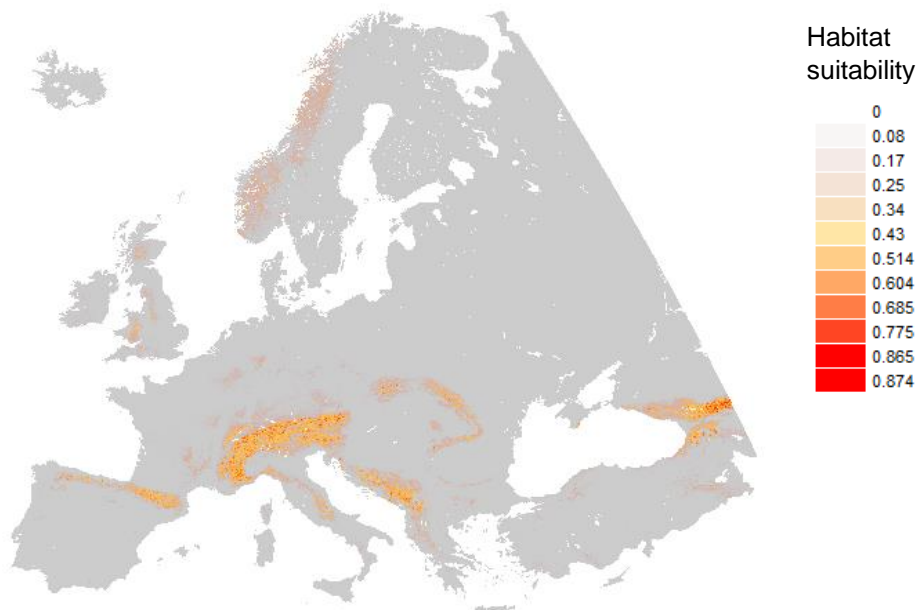


Distribution map from Red List project (Janssen et al., 2016)

E4.4a - Arctic-alpine calcareous grassland



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

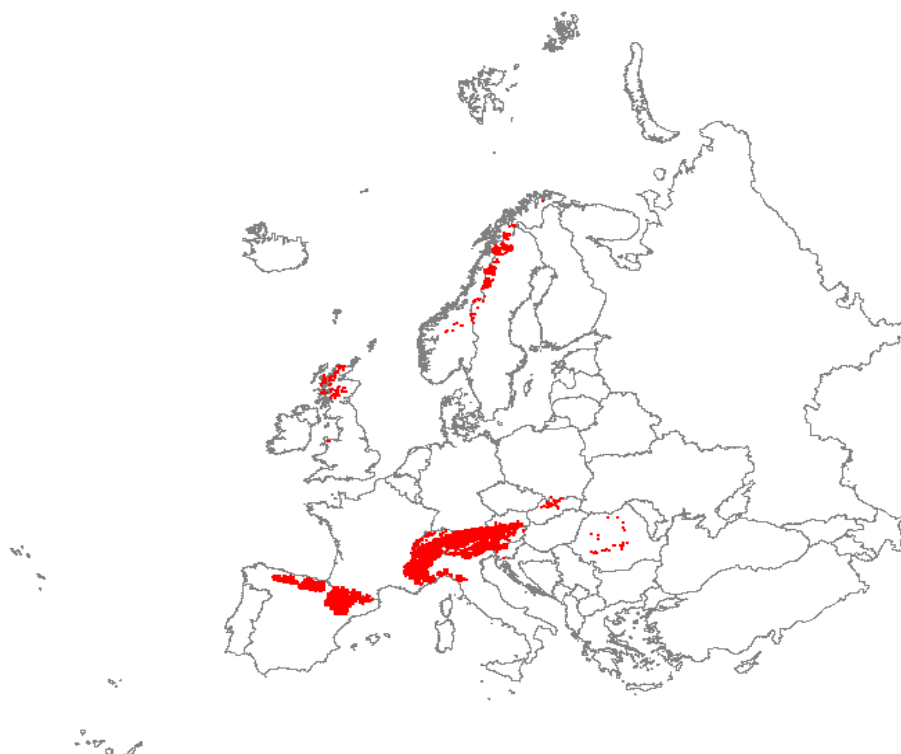
Geographic restriction distribution data

-

Maxent modelling statistics

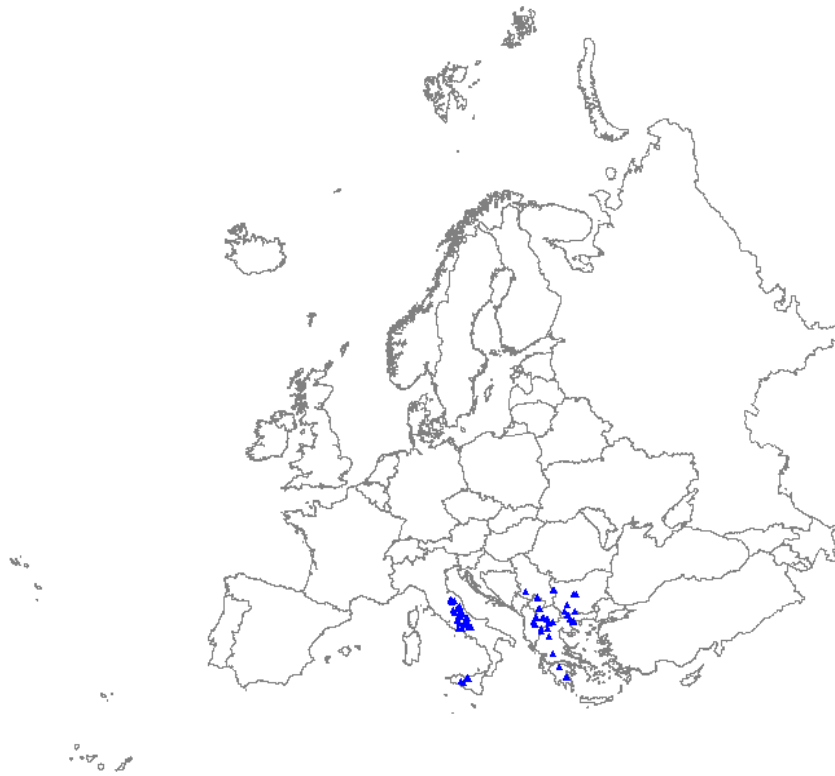
AUC training (0-1)	0.9178
AUC test (0-1)	0.9152
Contribution variables to the Maxent model (%)	
Annual precipitation	35.7854
Volume % of coarse fragments (> 2 mm)	29.8612
Solar radiation	29.8184
Weight in % of sand particles (0.05-2 mm)	12.7099
Cation Exchange Capacity	5.4759
Precipitation of warmest quarter	3.5568
Potential evapotranspiration	2.9631
pH (water)	2.6677
Temperature seasonality (stdev * 100)	2.1662
Weight in % of clay particles (<0.0002 mm)	2.0438
Soil organic carbon content (‰)	0.7156
Mean temperature of wettest quarter	0.5263
Distance to water	0.4602
Weight in % of silt particles (0.0002-0.05 mm)	0.3194
Precipitation seasonality (coef. of var.)	0.0454
Bulk density (kg/m ³)	0.0415

Remarks



Distribution map from Red List project (Janssen et al., 2016)

E4.4b - Alpine and subalpine calcareous grassland of the Balkan and Apennines



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

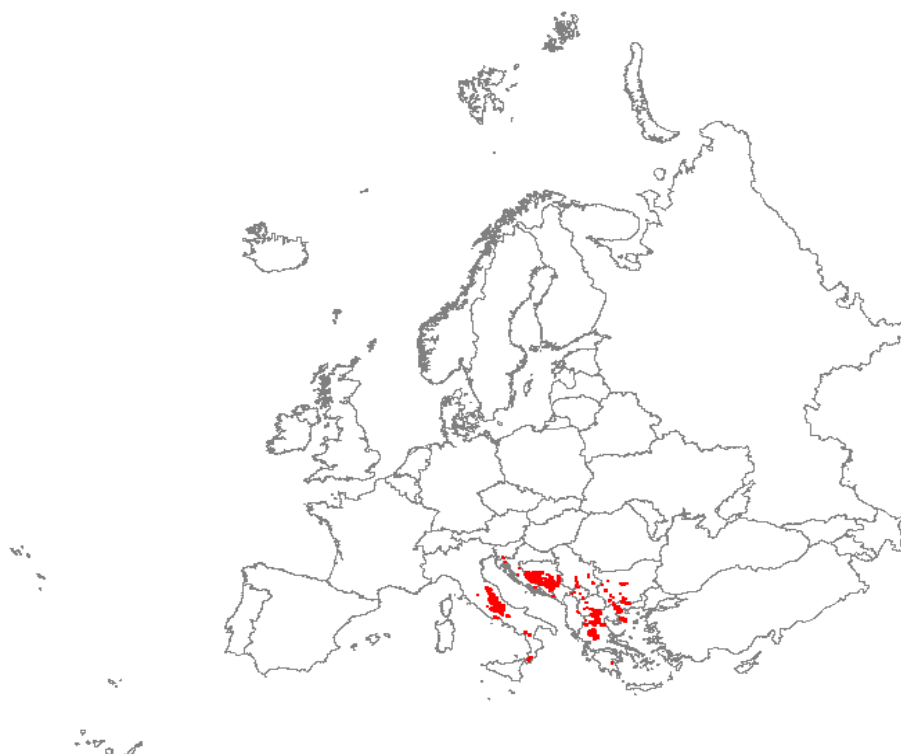
Geographic restriction distribution data

-

Maxent modelling statistics

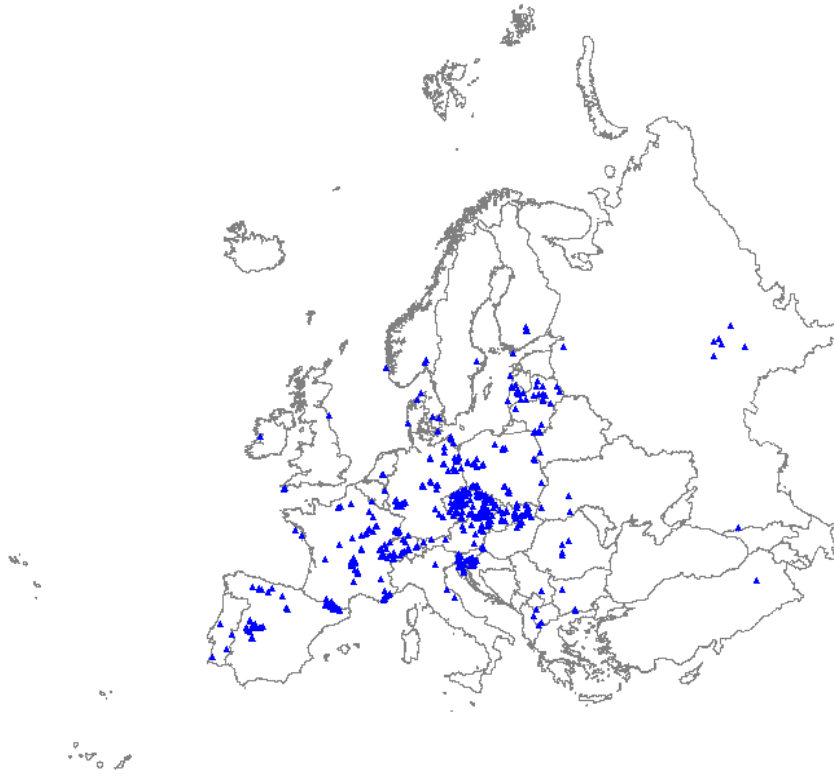
AUC training (0-1)	0.9875
AUC test (0-1)	0.9777
Contribution variables to the Maxent model (%)	
Weight in % of sand particles (0.05-2 mm)	41.7658
Temperature seasonality (stdev * 100)	24.3501
Annual precipitation	6.8205
Precipitation seasonality (coef. of var.)	6.4027
Precipitation of warmest quarter	6.177
Mean temperature of wettest quarter	4.1608
Soil organic carbon content (‰)	2.7005
Weight in % of clay particles (<0.0002 mm)	2.6955
Cation Exchange Capacity	1.9837
Potential evapotranspiration	1.445
Solar radiation	1.0485
Volume % of coarse fragments (> 2 mm)	0.6552
Distance to water	0.1592
Bulk density (kg/m ³)	0.1
pH (water)	0.0271
Weight in % of silt particles (0.0002-0.05 mm)	0.0268

Remarks

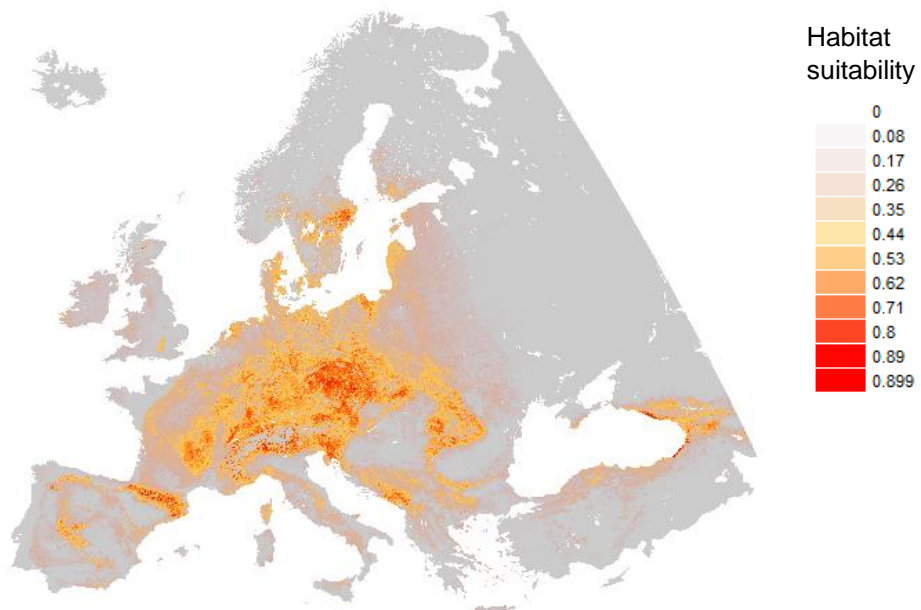


Distribution map from Red List project (Janssen et al., 2016)

E5.2a - Thermophilous woodland fringe of base-rich soils



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

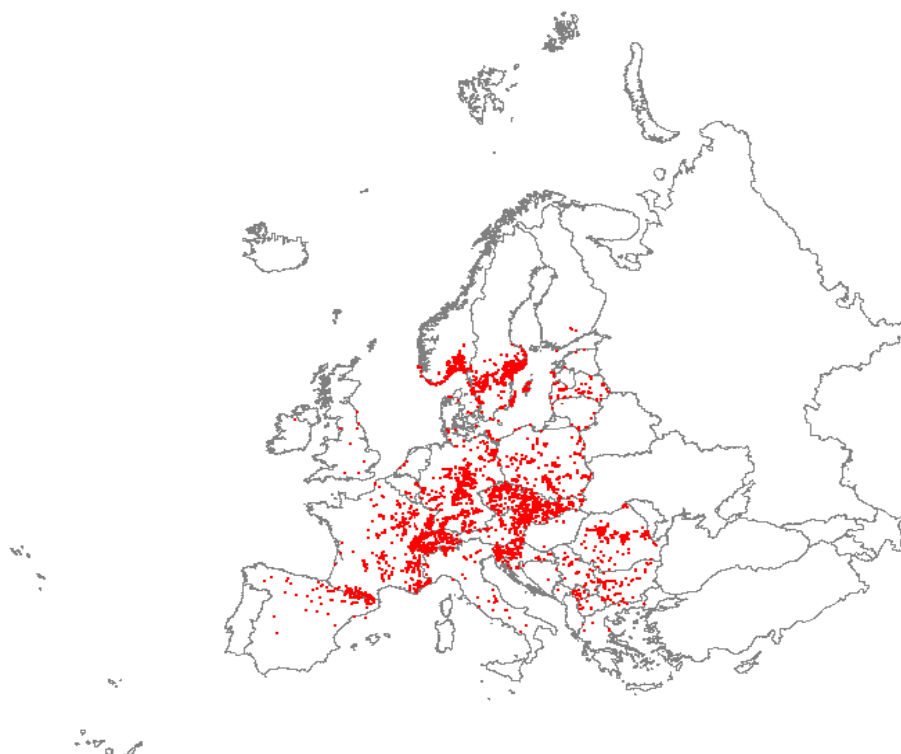
Geographic restriction distribution data

-

Maxent modelling statistics

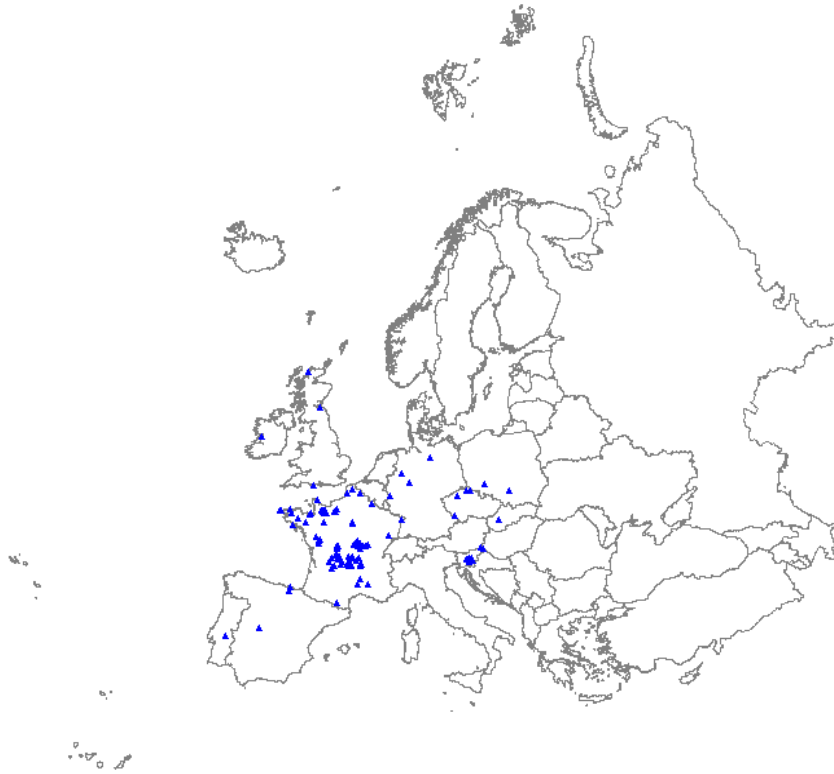
AUC training (0-1)	0.9219
AUC test (0-1)	0.8986
Contribution variables to the Maxent model (%)	
Temperature seasonality (stdev * 100)	41.2579
Soil organic carbon content (‰)	17.826
Precipitation of warmest quarter	11.9411
Volume % of coarse fragments (> 2 mm)	7.4051
Solar radiation	5.4131
Potential evapotranspiration	4.9534
Precipitation seasonality (coef. of var.)	4.0683
Annual precipitation	3.7261
Distance to water	1.6008
Weight in % of clay particles (<0.0002 mm)	1.259
Mean temperature of wettest quarter	0.9223
Weight in % of sand particles (0.05-2 mm)	0.8767
pH (water)	0.633
Cation Exchange Capacity	0.6286
Weight in % of silt particles (0.0002-0.05 mm)	0.1477
Bulk density (kg/m ³)	0.0974

Remarks

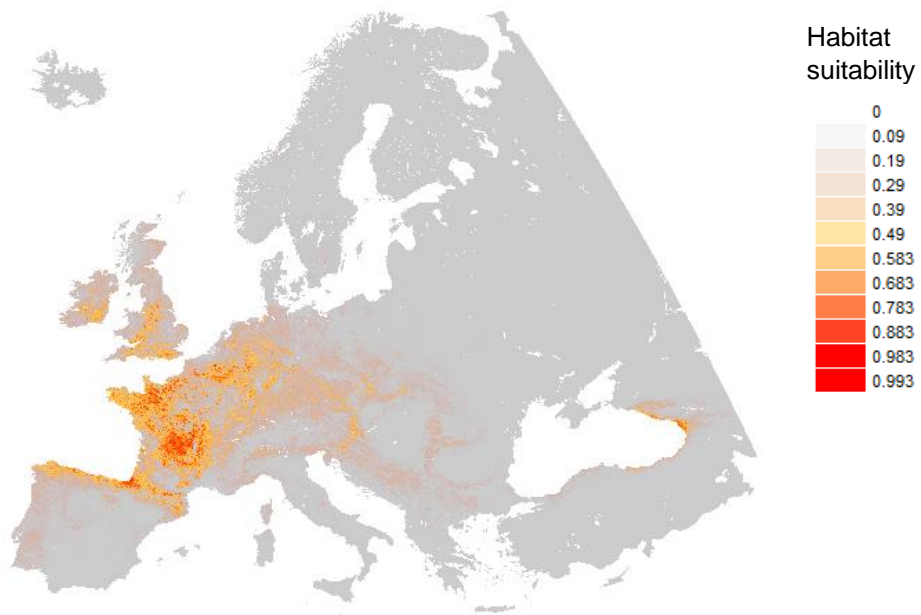


Distribution map from Red List project (Janssen et al., 2016)

E5.2b - Thermophilous woodland fringe of acidic soils



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from study area

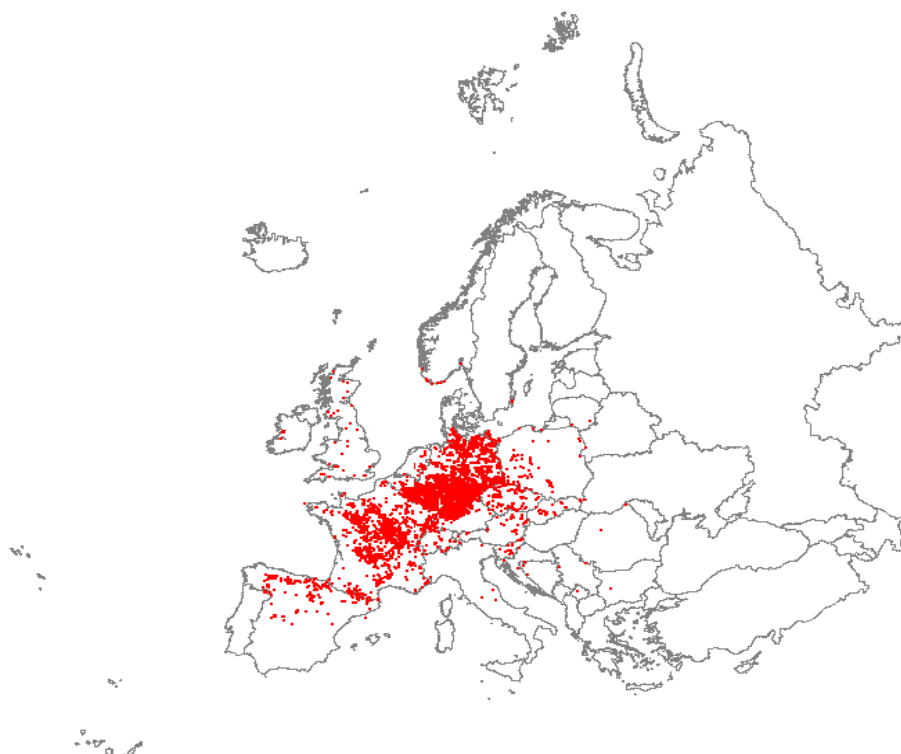
Geographic restriction distribution data

-

Maxent modelling statistics

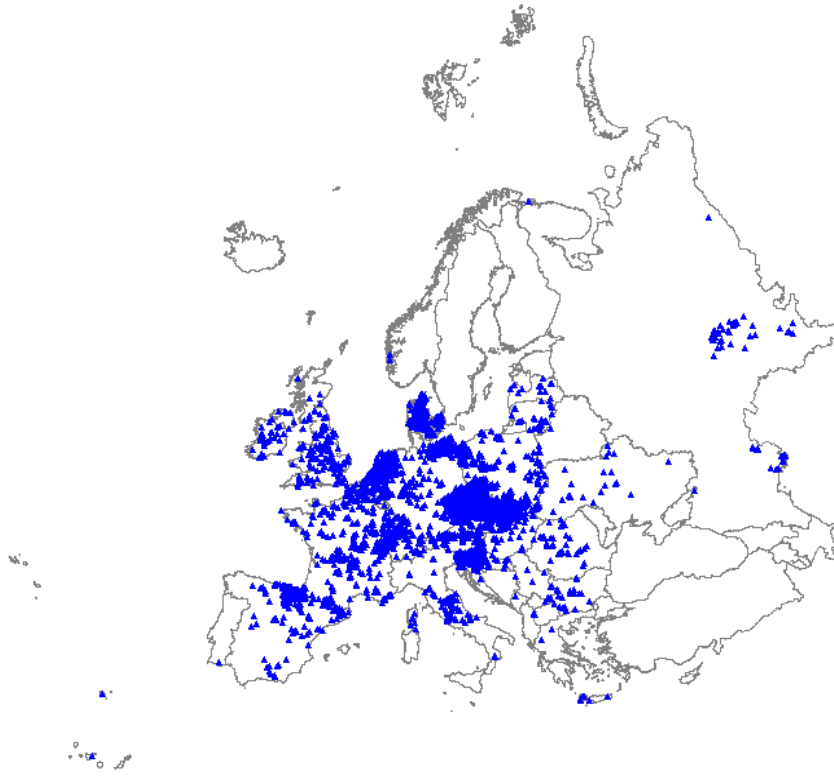
AUC training (0-1)	0.9687
AUC test (0-1)	0.9402
Contribution variables to the Maxent model (%)	
Temperature seasonality (stdev * 100)	33.763
Precipitation seasonality (coef. of var.)	12.5963
Cation Exchange Capacity	11.2902
Potential evapotranspiration	10.539
Soil organic carbon content (‰)	10.4926
Annual precipitation	7.0181
Volume % of coarse fragments (> 2 mm)	3.0836
Bulk density (kg/m ³)	2.4558
Precipitation of warmest quarter	2.0742
Solar radiation	1.9251
pH (water)	1.4747
Distance to water	1.4008
Mean temperature of wettest quarter	1.2011
Weight in % of clay particles (<0.0002 mm)	0.9678
Weight in % of sand particles (0.05-2 mm)	0.4906
Weight in % of silt particles (0.0002-0.05 mm)	0.3401

Remarks

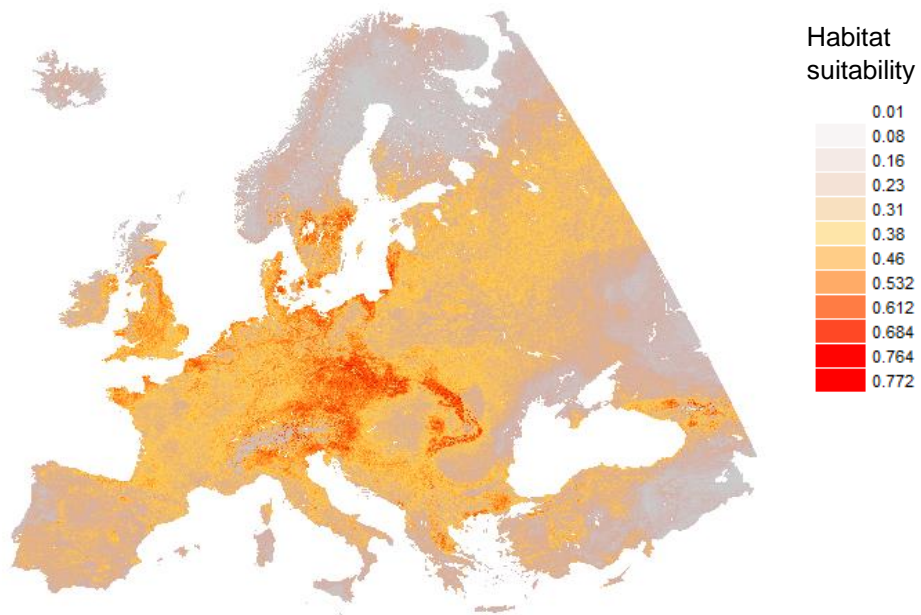


Distribution map from Red List project (Janssen et al., 2016)

E5.4 - Lowland moist or wet tall-herb and fern fringe



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

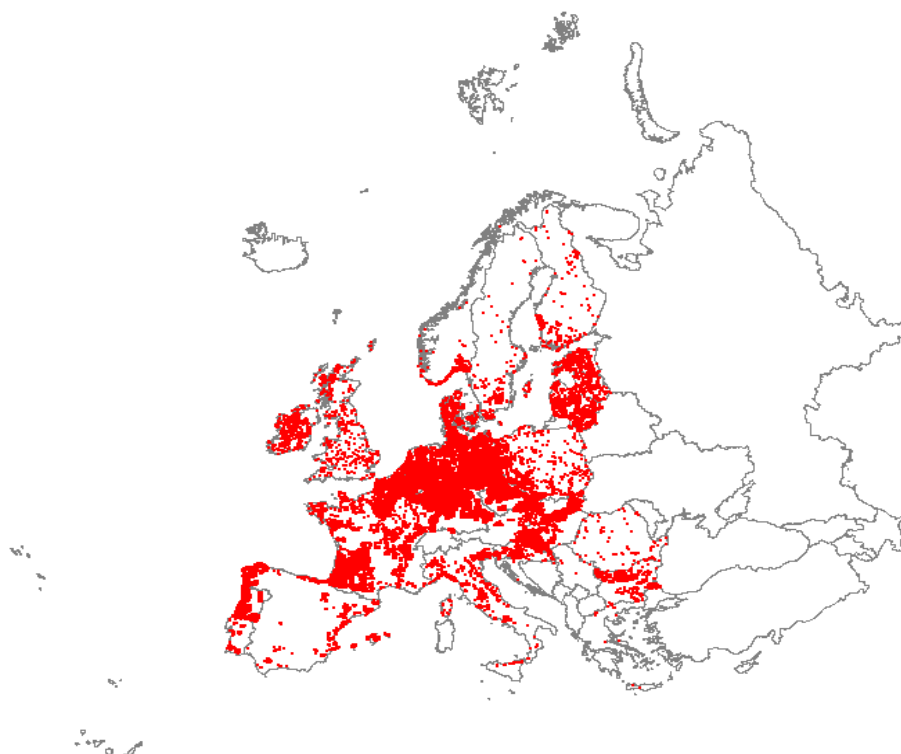
Geographic restriction distribution data

-

Maxent modelling statistics

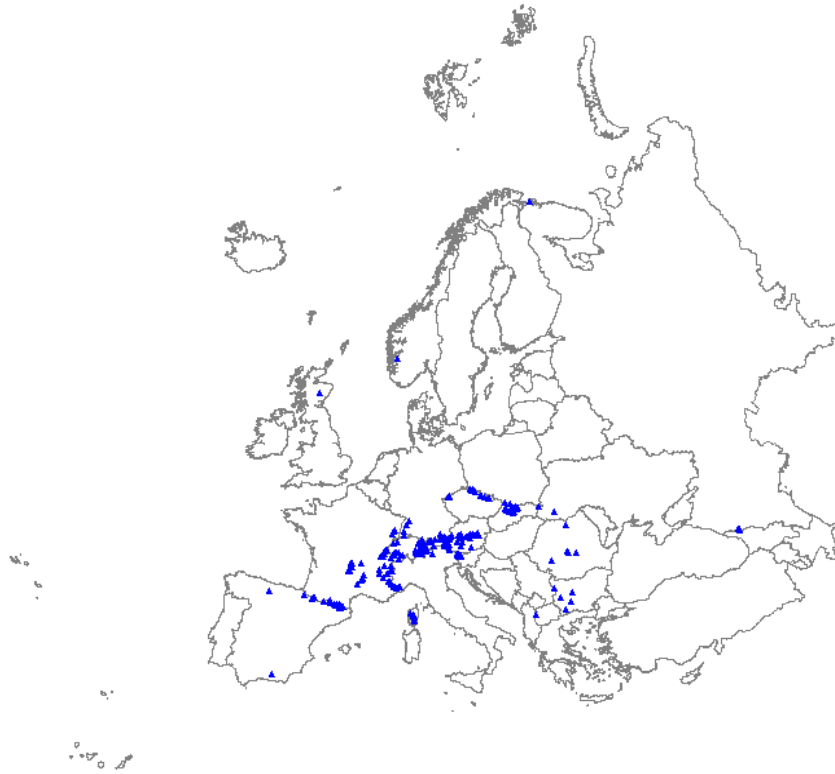
AUC training (0-1)	0.6753
AUC test (0-1)	0.6711
Contribution variables to the Maxent model (%)	
Temperature seasonality (stdev * 100)	27.5335
Soil organic carbon content (‰)	16.5976
Precipitation of warmest quarter	10.9385
Distance to water	9.9648
Mean temperature of wettest quarter	5.8267
Weight in % of clay particles (<0.0002 mm)	5.7685
Precipitation seasonality (coef. of var.)	5.0201
Weight in % of sand particles (0.05-2 mm)	4.416
Solar radiation	3.5445
Annual precipitation	2.3146
pH (water)	1.7895
Weight in % of silt particles (0.0002-0.05 mm)	0.5182
Volume % of coarse fragments (> 2 mm)	0.3017
Potential evapotranspiration	0.2537
Cation Exchange Capacity	0.1542
Bulk density (kg/m ³)	0.0561

Remarks



Distribution map from Red List project (Janssen et al., 2016)

E5.5 - Subalpine moist or wet tall-herb and fern fringe



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

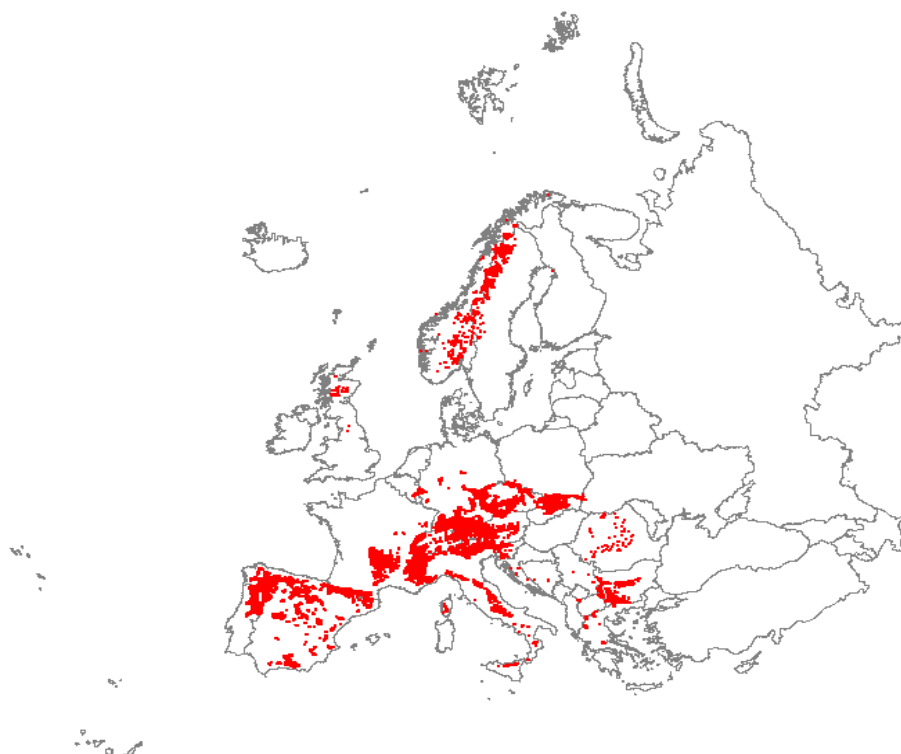
Geographic restriction distribution data

-

Maxent modelling statistics

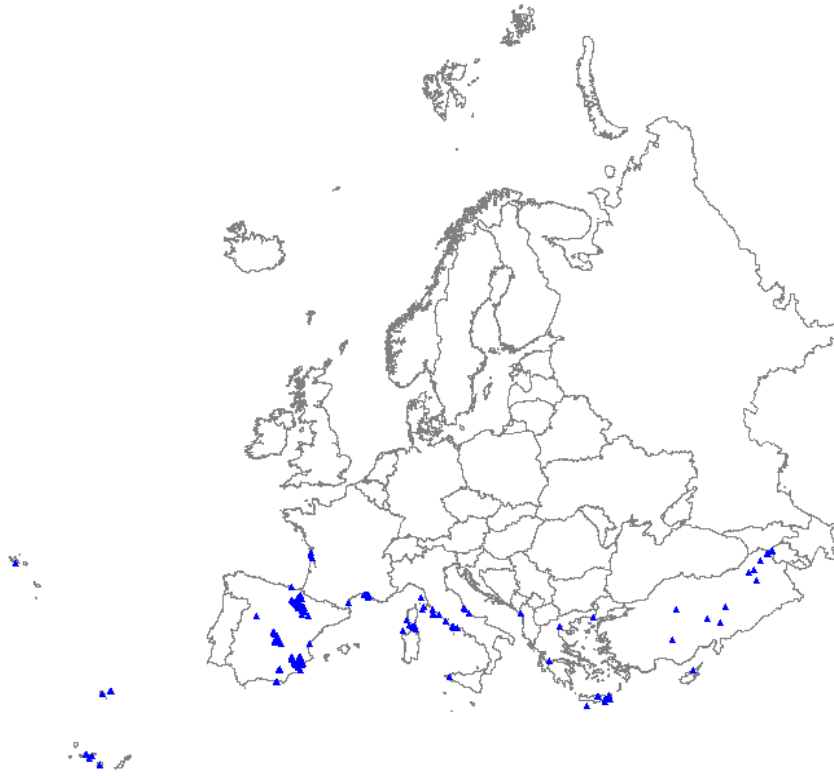
AUC training (0-1)	0.9503
AUC test (0-1)	0.9372
Contribution variables to the Maxent model (%)	
Weight in % of sand particles (0.05-2 mm)	29.0212
Volume % of coarse fragments (> 2 mm)	18.5313
Annual precipitation	13.4782
Solar radiation	11.3717
Cation Exchange Capacity	9.6654
Soil organic carbon content (‰)	5.9674
Temperature seasonality (stdev * 100)	3.8304
Weight in % of silt particles (0.0002-0.05 mm)	2.656
Precipitation seasonality (coef. of var.)	0.6654
Weight in % of clay particles (<0.0002 mm)	0.5895
Precipitation of warmest quarter	0.407
Potential evapotranspiration	0.3925
Bulk density (kg/m ³)	0.3808
Mean temperature of wettest quarter	0.3017
pH (water)	0.1676
Distance to water	0.1189

Remarks

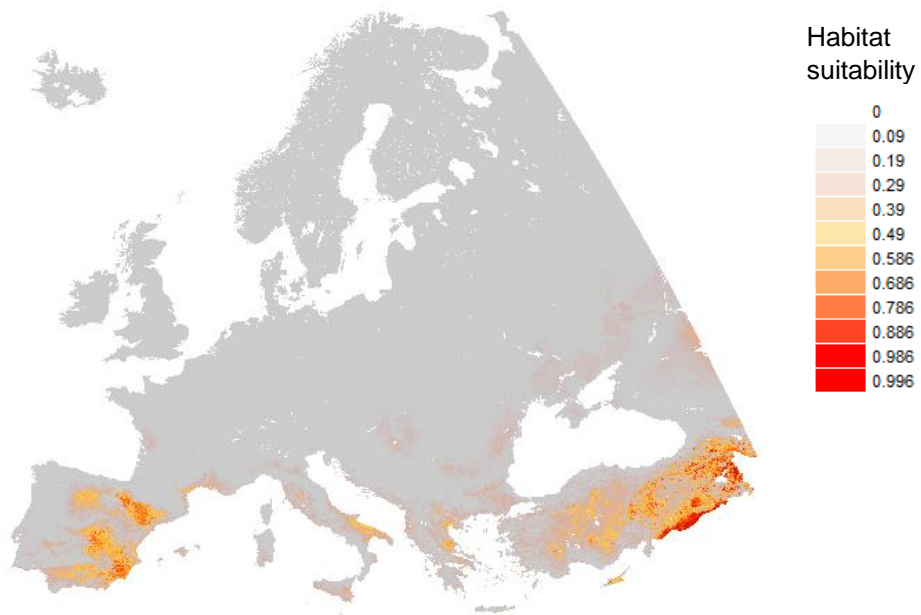


Distribution map from Red List project (Janssen et al., 2016)

E6.1 - Mediterranean inland salt steppe



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

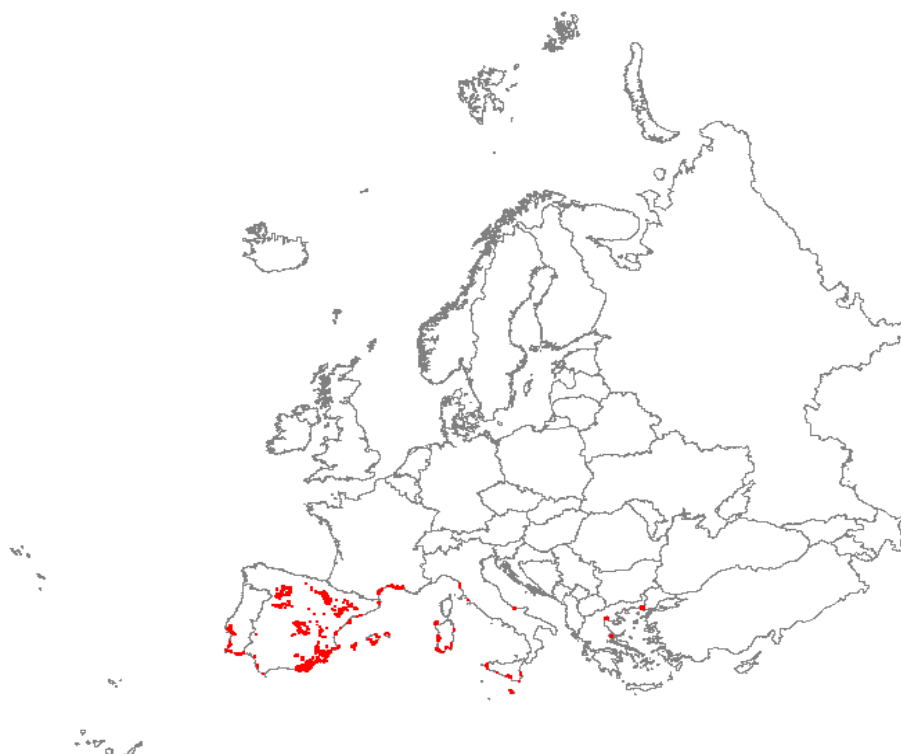
Geographic restriction distribution data

-

Maxent modelling statistics

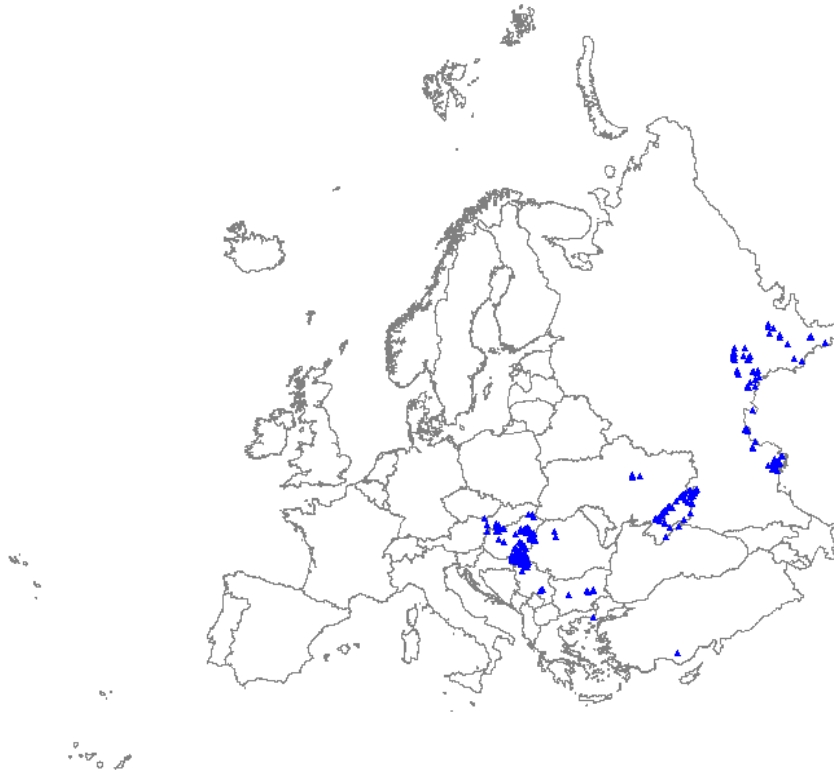
AUC training (0-1)	0.9883
AUC test (0-1)	0.9877
Contribution variables to the Maxent model (%)	
Potential evapotranspiration	41.8064
Soil organic carbon content (‰)	26.9091
Precipitation of warmest quarter	20.3345
Solar radiation	2.8033
Bulk density (kg/m ³)	2.116
pH (water)	1.9746
Weight in % of sand particles (0.05-2 mm)	1.3214
Weight in % of clay particles (<0.0002 mm)	1.0688
Temperature seasonality (stdev * 100)	1.0299
Precipitation seasonality (coef. of var.)	0.8254
Volume % of coarse fragments (> 2 mm)	0.7899
Annual precipitation	0.5257
Cation Exchange Capacity	0.3933
Distance to water	0.2633
Mean temperature of wettest quarter	0.0974
Weight in % of silt particles (0.0002-0.05 mm)	0.0393

Remarks

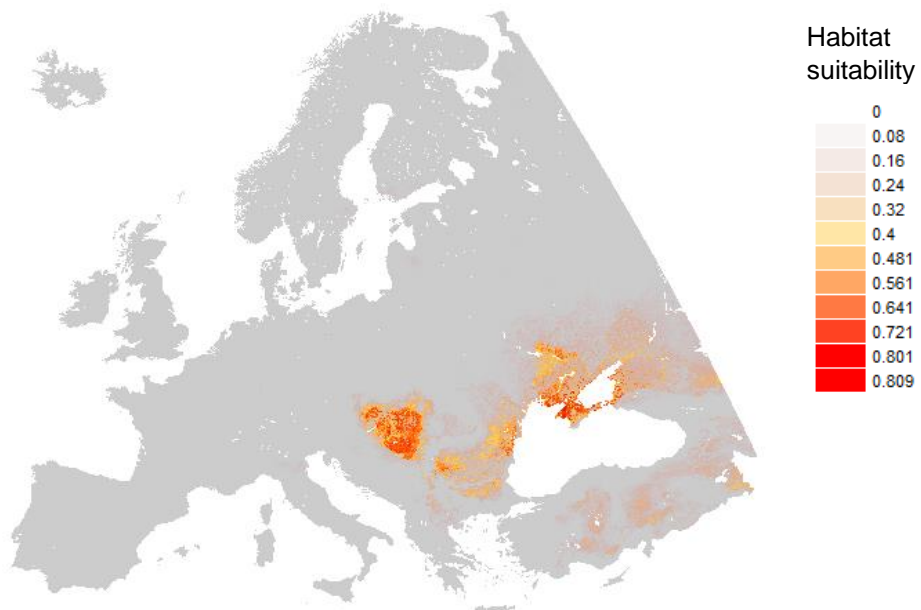


Distribution map from Red List project (Janssen et al., 2016)

E6.2 - Continental inland salt steppe



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

Geographic restriction distribution data

-

Maxent modelling statistics

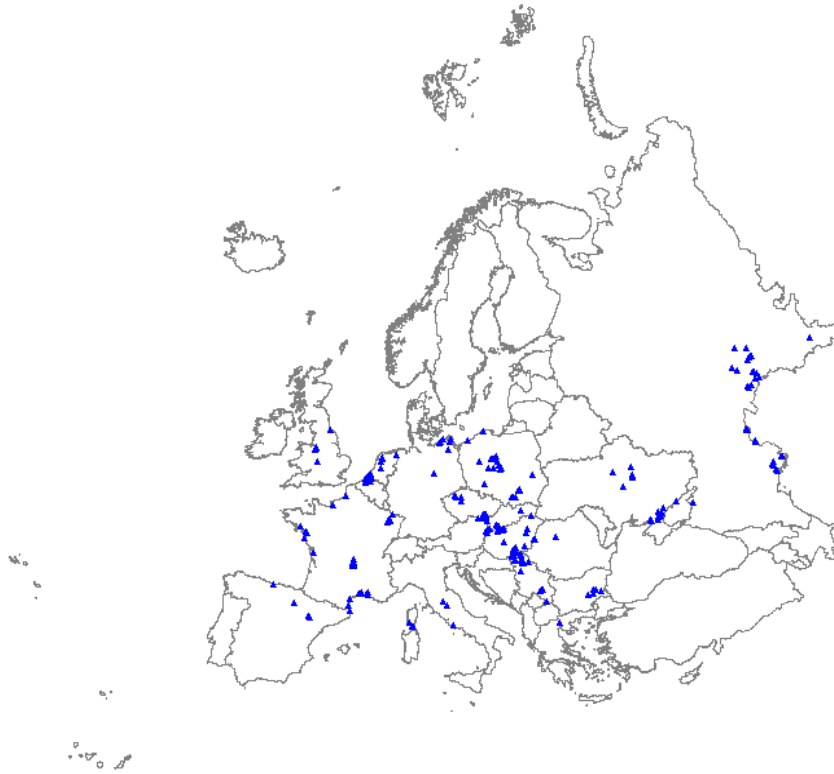
AUC training (0-1)	0.9856
AUC test (0-1)	0.982
Contribution variables to the Maxent model (%)	
Mean temperature of wettest quarter	38.6072
Temperature seasonality (stdev * 100)	29.1025
Solar radiation	15.0708
Potential evapotranspiration	11.2108
Soil organic carbon content (‰)	6.3459
Annual precipitation	5.4406
Precipitation of warmest quarter	3.7118
Weight in % of silt particles (0.0002-0.05 mm)	1.6985
Volume % of coarse fragments (> 2 mm)	1.1285
pH (water)	0.8965
Weight in % of sand particles (0.05-2 mm)	0.8132
Weight in % of clay particles (<0.0002 mm)	0.4755
Cation Exchange Capacity	0.2685
Precipitation seasonality (coef. of var.)	0.1684
Bulk density (kg/m ³)	0.1056
Distance to water	0.017

Remarks

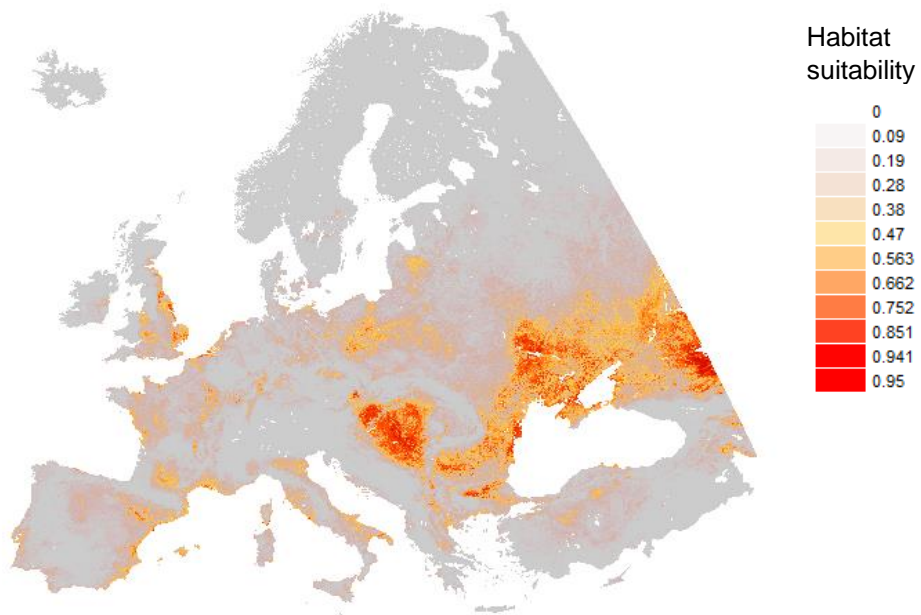


Distribution map from Red List project (Janssen et al., 2016)

E6.3 - Temperate inland salt marsh



Distribution map based on vegetation relevés



Suitability map. Background data for model randomly selected from EVA database

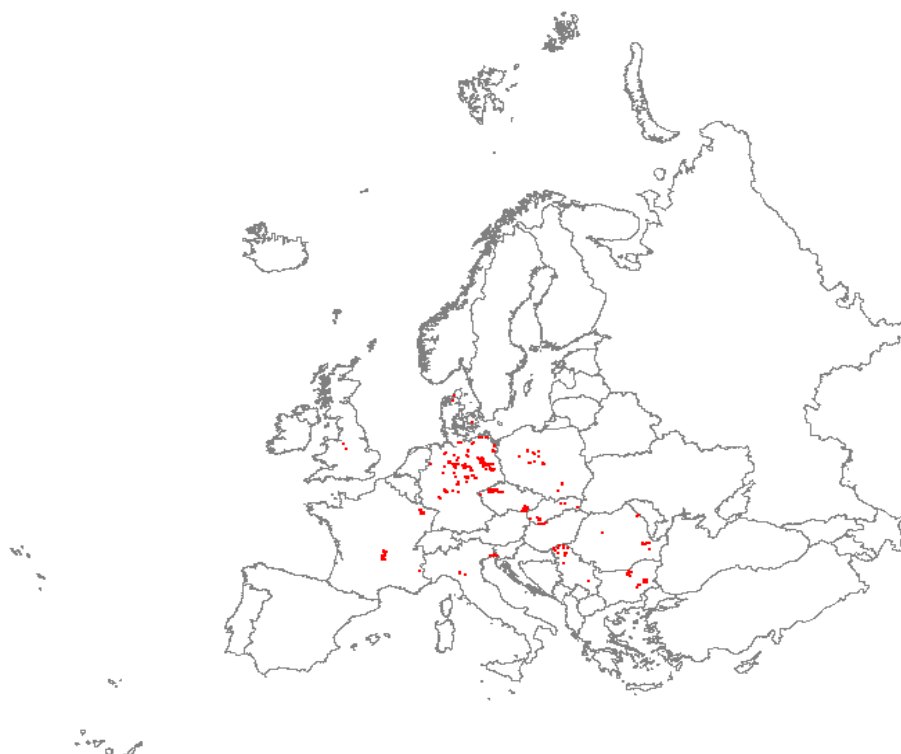
Geographic restriction distribution data

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Maxent modelling statistics

AUC training (0-1)	0.9446
AUC test (0-1)	0.9229
Contribution variables to the Maxent model (%)	
Potential evapotranspiration	41.5817
Solar radiation	15.7341
Mean temperature of wettest quarter	11.7343
Temperature seasonality (stdev * 100)	8.507
Weight in % of sand particles (0.05-2 mm)	7.9667
Annual precipitation	6.9583
Precipitation of warmest quarter	6.3342
Volume % of coarse fragments (> 2 mm)	6.1287
Soil organic carbon content (‰)	5.31
Weight in % of silt particles (0.0002-0.05 mm)	2.0329
Precipitation seasonality (coef. of var.)	1.1504
Cation Exchange Capacity	0.6519
Bulk density (kg/m ³)	0.5249
pH (water)	0.363
Weight in % of clay particles (<0.0002 mm)	0.3416
Distance to water	0.2394

Remarks



Distribution map from Red List project (Janssen et al., 2016)