

Table S1. Bioclimatic variables (35) from the WorldClim v.2 (<https://www.worldclim.org/>; accessed on 21 November 2022; [42]) the CliMond <https://www.climond.org/> at a resolution of 10' (accessed on 28 November 2022; [44,45]).

Number	Variable
bio01	Annual mean temperature (°C)
bio02	Mean diurnal temperature range (mean(period max-min)) (°C)
bio03	Isothermality (Bio02 ÷ Bio07)
bio04	Temperature seasonality (C of V)
bio05	Max temperature of warmest week (°C)
bio06	Min temperature of coldest week (°C)
bio07	Temperature annual range (Bio05-Bio06) (°C)
bio08	Mean temperature of wettest quarter (°C)
bio09	Mean temperature of driest quarter (°C)
bio10	Mean temperature of warmest quarter (°C)
bio11	Mean temperature of coldest quarter (°C)
bio12	Annual precipitation (mm)
bio13	Precipitation of wettest week (mm)
bio14	Precipitation of driest week (mm)
bio15	Precipitation seasonality (C of V)
bio16	Precipitation of wettest quarter (mm)
bio17	Precipitation of driest quarter (mm)
bio18	Precipitation of warmest quarter (mm)
bio19	Precipitation of coldest quarter (mm)
bio20	Annual mean radiation (W m ⁻²)
bio21	Highest weekly radiation (W m ⁻²)
bio22	Lowest weekly radiation (W m ⁻²)
bio23	Radiation seasonality (C of V)
bio24	Radiation of wettest quarter (W m ⁻²)
bio25	Radiation of driest quarter (W m ⁻²)
bio26	Radiation of warmest quarter (W m ⁻²)
bio27	Radiation of coldest quarter (W m ⁻²)
bio28	Annual mean moisture index
bio29	Highest weekly moisture index
bio30	Lowest weekly moisture index
bio31	Moisture index seasonality (C of V)
bio32	Mean moisture index of wettest quarter
bio33	Mean moisture index of driest quarter
bio34	Mean moisture index of warmest quarter
bio35	Mean moisture index of coldest quarter

Table S2. Environmental variables (18) from ENVIREM (<https://envirem.github.io/>; accessed on 26 November 2022; [43]).

Nº	Variable Abbreviation	Brief Description	Units
1	annualPET	Annual potential evapotranspiration: a measure of the ability of the atmosphere to remove water through evapotranspiration processes, given unlimited moisture	mm / year
2	aridityIndexThornthwaite	Thornthwaite aridity index: Index of the degree of water deficit below water need	-
3	climaticMoistureIndex	A metric of relative wetness and aridity	-
4	continentality	Average temperature of warmest month - average temperature of coldest month	°C
5	embergerQ	Emberger's pluviothermic quotient: a metric that was designed to differentiate among Mediterranean type climates	-
6	growingDegDays0	Sum of mean monthly temperature for months with mean temperature greater than 0°C multiplied by number of days	-
7	growingDegDays5	Sum of mean monthly temperature for months with mean temperature greater than 5°C multiplied by number of days	-
8	maxTempColdestMonth	Max. temperature of the coldest month	°C * 10
9	minTempWarmestMonth	Min. temperature of the warmest month	°C * 10
10	monthCountByTemp10	Count of the number of months with mean temperature greater than 10°C	months
11	PETColdestQuarter	Mean monthly PET of coldest quarter	mm / month
12	PETDriestQuarter	Mean monthly PET of driest quarter	mm / month
13	PETseasonality	Monthly variability in potential evapotranspiration	mm / month
14	PETWarmestQuarter	Mean monthly PET of warmest quarter	mm / month
15	PETWettestQuarter	Mean monthly PET of wettest quarter	mm / month
16	thermind	Compensated thermicity index: sum of mean annual temperature, min. temperature of coldest month, max. temperature of the coldest month, x 10, with compensations for better comparability across the globe	°C
17	tri	Terrain roughness index	-
18	topoWet	SAGA-GIS topographic wetness index	-

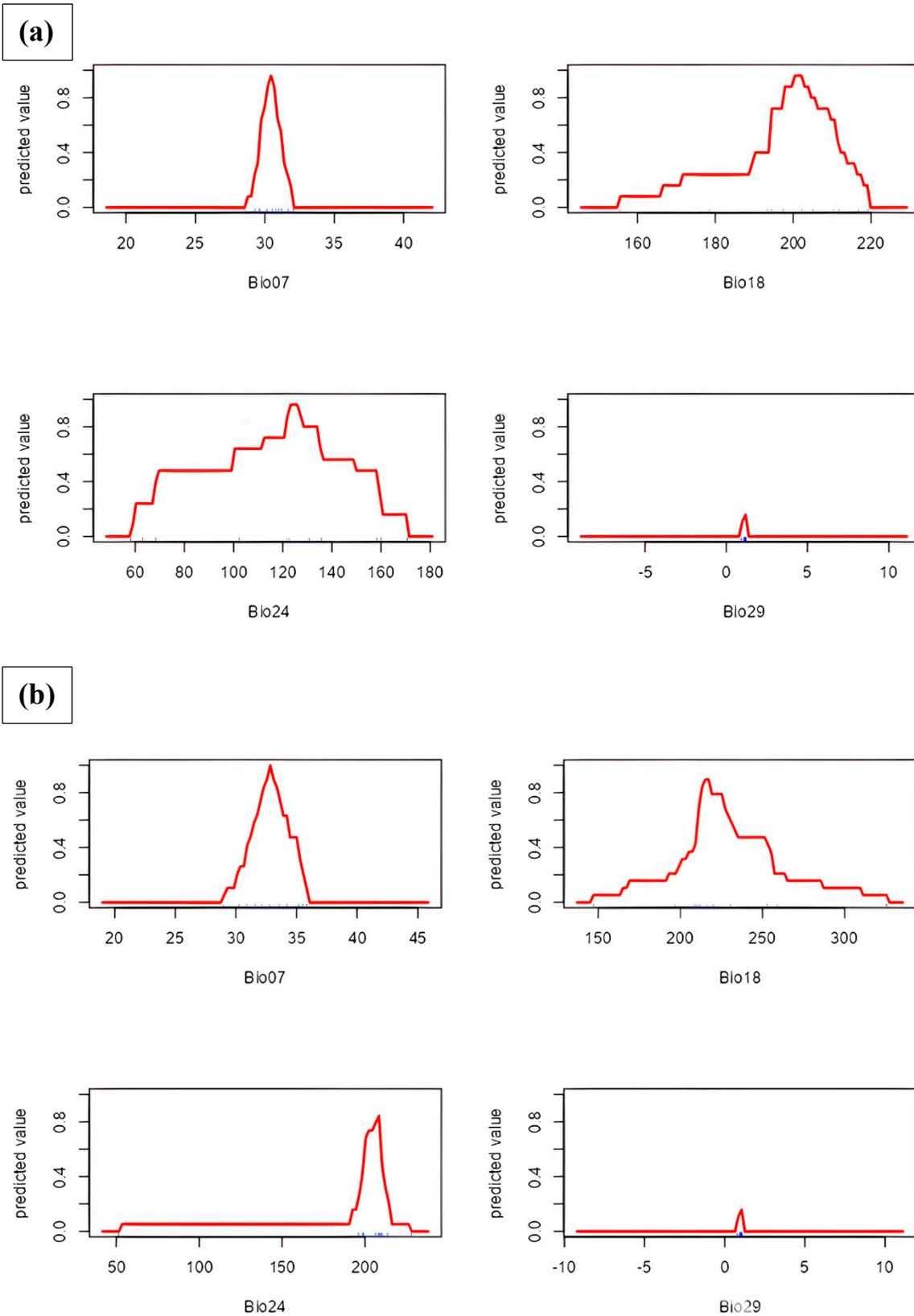
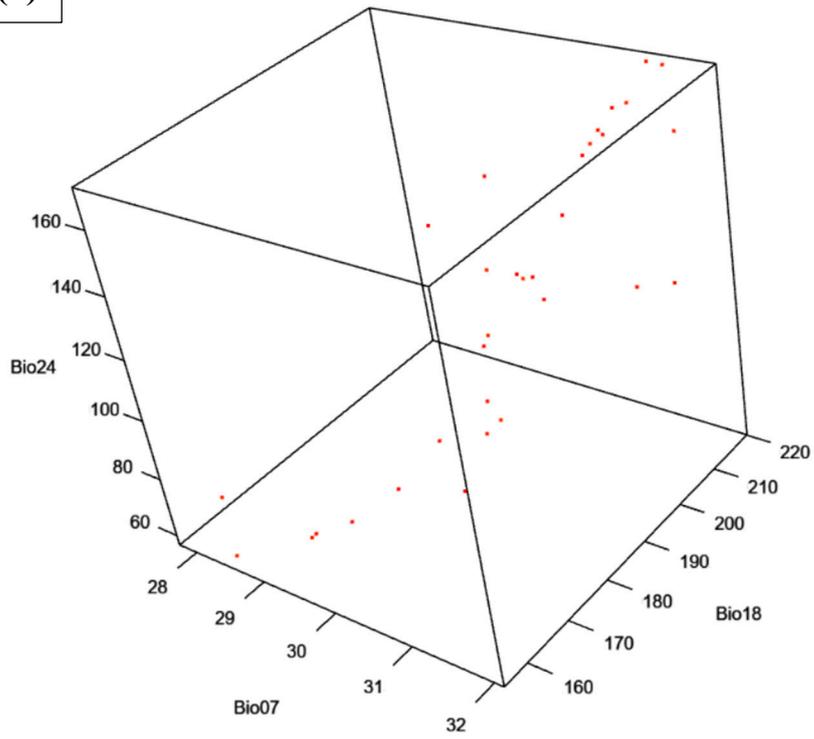


Figure S1. Graphs of the most significant bioclimatic variables (CliMond) from different parts of the tick range: a - Latvia, b – Ukraine.

(a)



(b)

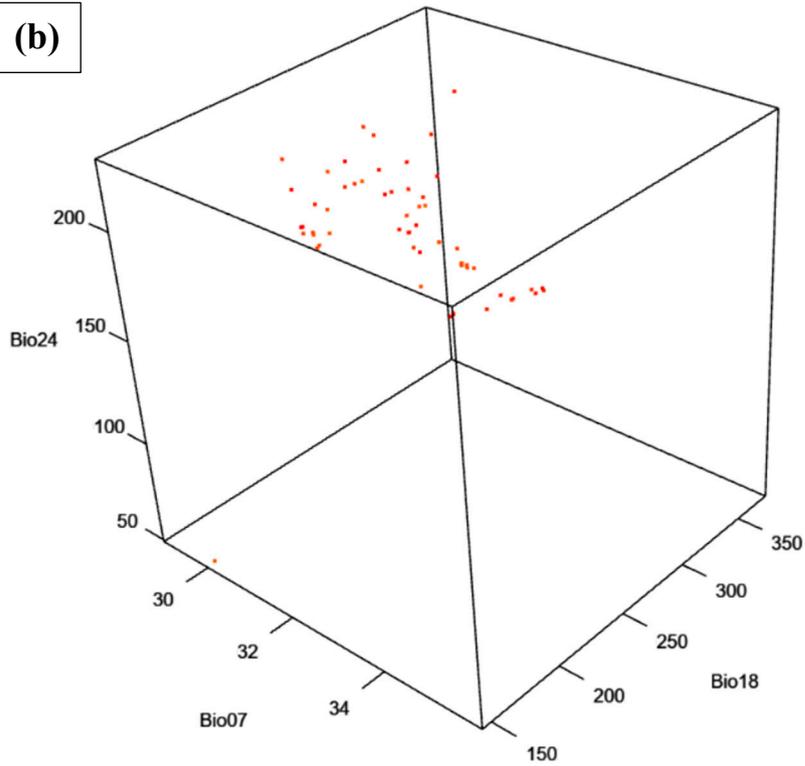


Figure S2. Results of niche space exploration (CliMond): 3D ecological envelope: a - Latvia, b – Ukraine.

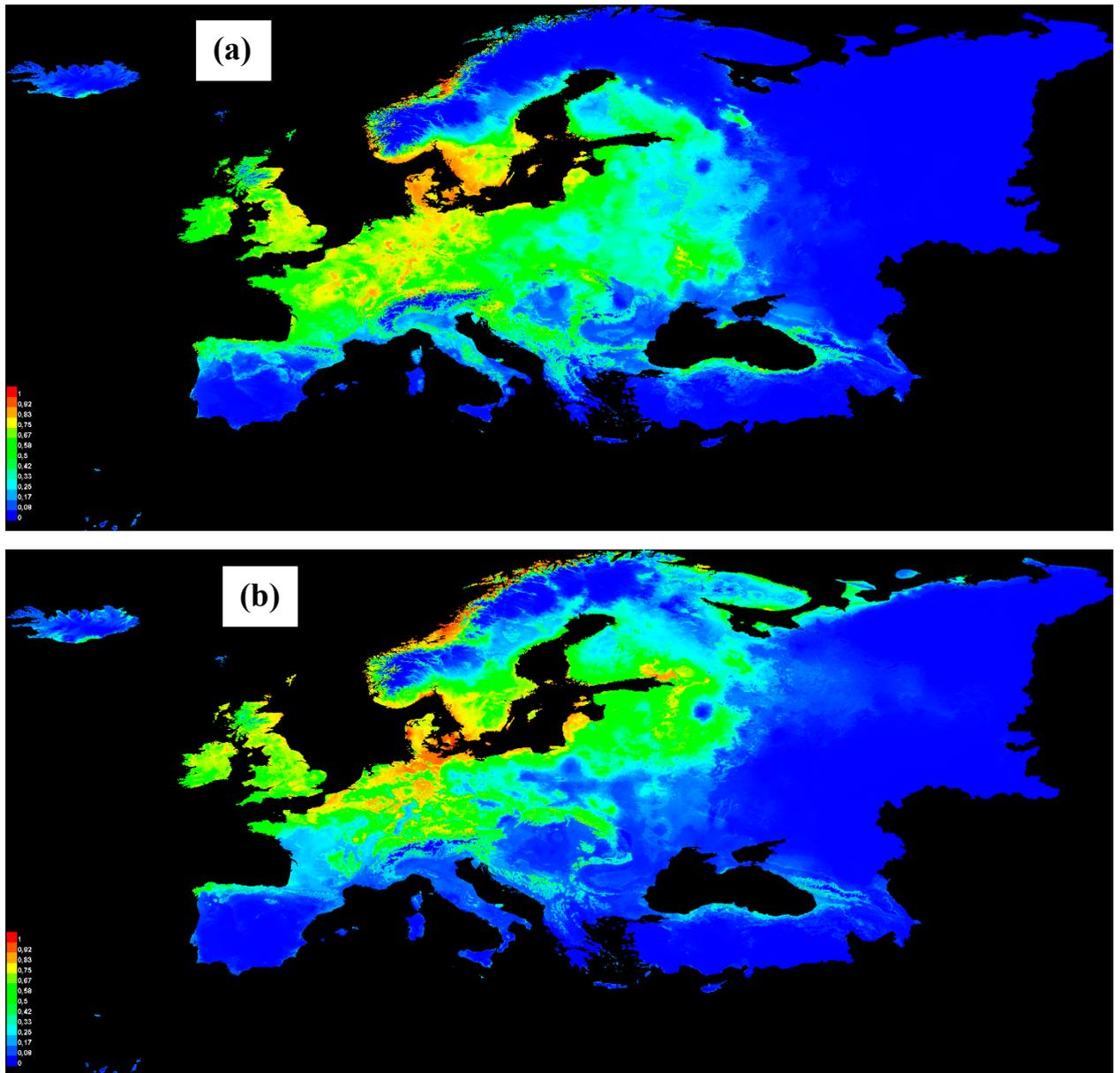


Figure S3. Results of the analysis of SDM Maxent for *I. ricinus* in Europe: (A) current; (B) 2050 (2041–2060) (green-yellow color > 0.5, WorldClim dataset). The average training AUC for the replicate runs is 0.824, and the standard deviation is 0.001.

Figure S4. Changes in key bioclimatic variables important for the spread of ticks in Ukraine and Latvia (CliMond, Figure 5, S1)

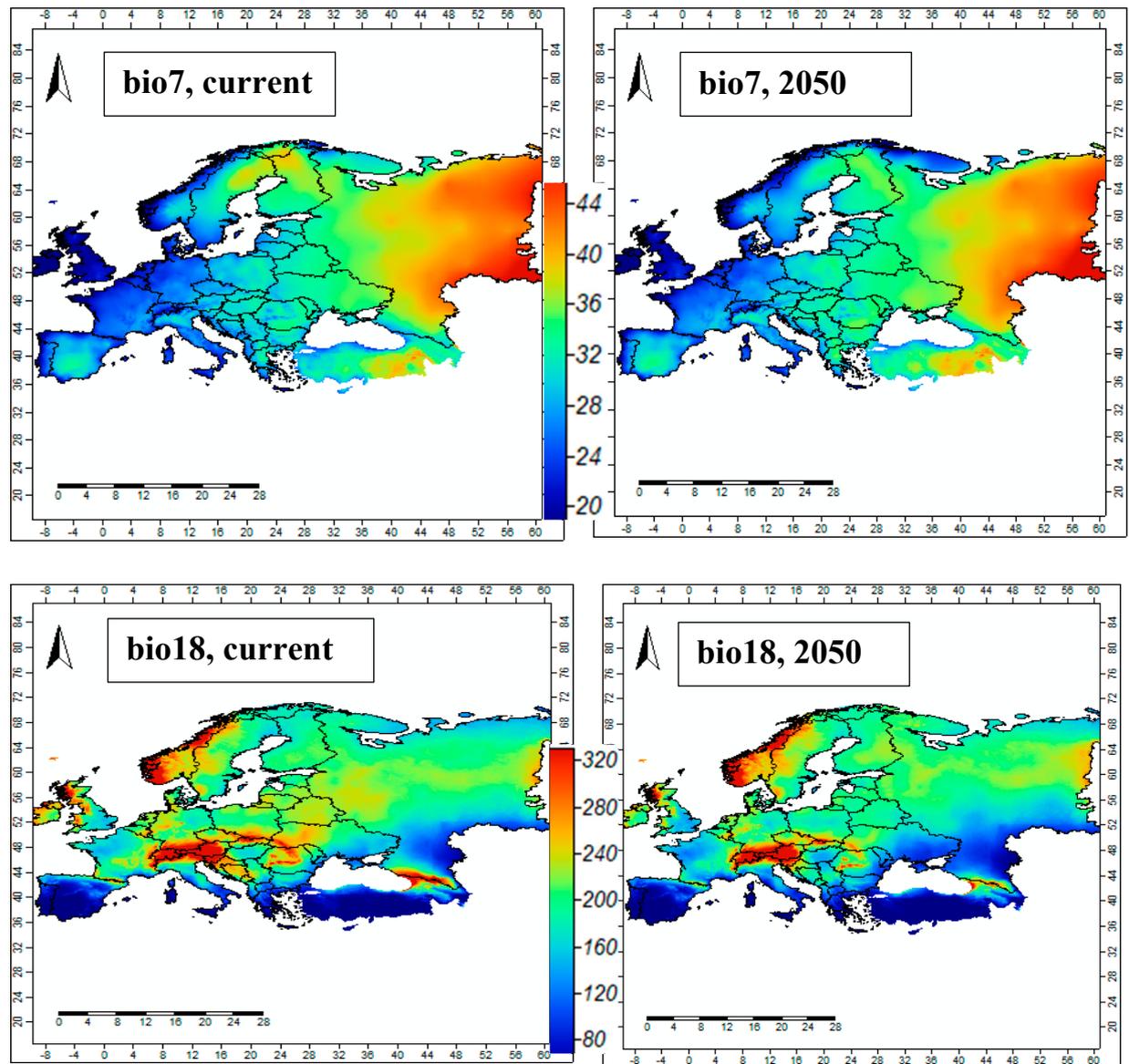


Figure S4. Changes in key bioclimatic variables important for the spread of ticks in Ukraine and Latvia (CliMond, Figure 5, S1)

