

Bryophytes are predicted to lag behind future climate change despite their high dispersal capacities

Flavien Collart

The extent to which species can balance out the loss of suitable habitats due to climate warming by shifting their ranges is an area of controversy. Here, we assess whether highly efficient wind-dispersed organisms like bryophytes can keep-up with projected shifts in their areas of suitable climate. Using a hybrid statistical-mechanistic approach accounting for spatial and temporal variations in both climatic and wind conditions, we simulate future migrations across Europe for 40 bryophyte species until 2050. The median ratios between predicted range loss vs expansion by 2050 across species and climate change scenarios range from 1.6 to 3.3 when only shifts in climatic suitability were considered, but increase to 34.7–96.8 when species dispersal abilities are added to our models. This highlights the importance of accounting for dispersal restrictions when projecting future distribution ranges and suggests that even highly dispersive organisms like bryophytes are not equipped to fully track the rates of ongoing climate change in the course of the next decades.