

Diffusion of ragweed under climate change. Cost benefit-analysis for reducing allergies.

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Ragweed (Fig.1) is rapidly spreading in Europe [1, 2, 3]. Its pollen is highly allergenic, c.5 % of Europeans being sensitized. There is an urgent need to curtail the further spread to minimize allergy costs.

In the present work we simulate the diffusion of ragweed in Austria and southern Germany (Bavaria) until 2050 with particular emphasis on the expected climate change. We analyse the potential of reducing human allergy costs, i.e. the expenses caused by allergies from ragweed pollen, by curtailing the accelerating spread of ragweed. We do so by accounting for three contrasting climate scenarios: no change, moderate and more extreme climate change, i.e. 1.5 and 2.4 degrees from 1990 to 2050.

We find that by a carefully designed management consisting of survey and eradication the spread of ragweed can be drastically reduced. Without management, mean allergy costs for the management period (2011 to 2050) amount to c. 290, 335 and 365 million euros annually under the three climate scenarios. Following an optimally allocated management strategy [4] with an annual budget of 7.5 and 30 million euros, resp. (Fig. 2) yields substantial savings, for the latter case reducing mean allergy costs down to about 10 % of the value with no management. Our analyses thus show that management of ragweed in Central Europe is profitable, therefore highly indicated from an economic point of view.



Figure 1: Ragweed in bloom (*Ambrosia artemisiifolia* L.).

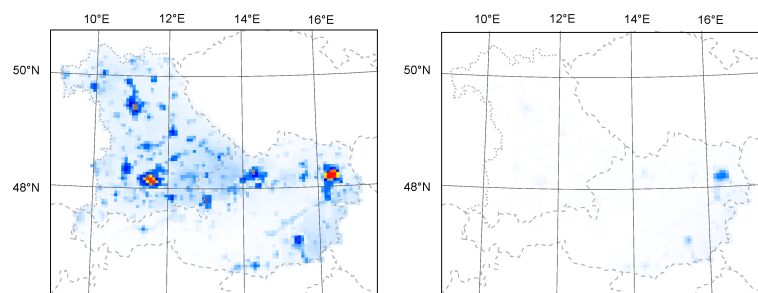


Figure 2: Density of allergy costs for Austria and Bavaria with 7.5 million euros (left) and 30 million euros (right) annual management budget. Colours indicate regions and height of allergy costs in 2050 (red highest, white lowest).

References

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