

## Appendix A: supplementary data

Table 1. Correspondence between allergenic risk categories defined by RNSA and daily airborne pollen concentration (Thibaudon *et al.*, 2008). RAEP = risque allergique d'exposition aux pollens.

Allergenic risk	Pollen concentration (grains/m <sup>3</sup> *day)
RAEP=0	0
RAEP=1	1-2
RAEP=2	3-5
RAEP=3	6-12
RAEP=4	13-30
RAEP=5	>30

Table 2. Health costs (in M€) from *Ambrosia* allergy in the Rhône-Alpes region (data from ORS Rhône-Alpes, 2011, 2012, 2013, 2015). Given are a low cost estimate which accounts for the population that is most likely affected by ragweed allergy (number before slash) as well as a high cost estimate accounting for the whole regional population (number after slash). Data are based on the consumption of medical care and medical goods by persons affiliated to the general health insurance scheme. The costs were calculated as follows: (A) Costs of anti-allergic medication reimbursed during the *Ambrosia* flowering period (data from pharmacies; including costs not reimbursed by the insurance); (B) Costs of anti-asthmatic medication (treatments of asthma crisis) reimbursed during the *Ambrosia* flowering period; (C) Consultations by generalist doctors or specialist doctors linked to either the prescription of anti-allergic medication during the *Ambrosia* flowering period, or to research on specific Immunoglobulin E (IgE) throughout the year; (D) Annual costs for biological IgE tests, research on specific IgE, and for skin prick tests; (E) Annual costs for injectable desensitisation actions and allergological tests; (F) Annual costs for oral or sublingual desensitisation products; and (G) Per diems for sick leave of less than 20 days when linked to the prescription of anti-allergic drugs.

	2008	2009	2010	2011	2012	2013	2014	2015
Anti-allergic medications	1,95/3,17	2,12/3,33	2,37/3,78	3,54/5,57/	2,44/3,56	2,34/3,52	2,01/3,13	1,84/3,01
Anti-asthma medication	-	-	0,15/0,28	0,24/0,44	0,21/0,34	0,20/0,33	0,19/0,32	0,20/0,34
Medical consultations	2,08/3,09	2,67/3,84	2,53/3,65	4,36/6,21	3,55/4,81	3,10/4,43	2,72/3,98	3,48/5,13

32	Biological IgE <sup>1</sup> and	0,09/0,15	0,11/0,18	0,11/0,17	0,14/0,22	0,12/0,17	0,13/0,19	0,12/0,18	0,23/0,32	skin prick
33	skin prick tests									
34	Injectable desensitisation	0,25/0,40	0,22/0,32	0,20/0,31	0,29/0,43	0,25/0,34	0,25/0,36	0,22/0,32	0,13/0,19	
35	Oral or sublingual	-	1,88/1,90	2,16/3,53	3,28/3,97	2,99/4,21	3,16/4,63	2,05/3,12	1,57/2,41	
36	desensitisation									
37	Work absenteeism	1,26/1,74	1,64/2,25	1,56/2,16	2,36/3,20	1,76/2,29	1,67/2,25	1,61/2,15	1,51/2,01	
38	Total	5,63/8,56	8,63/11,82	9,07/13,88	14,21/20,03	11,33/15,73	10,85/15,70	8,92/13,19	8,95/13,41	

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40 <sup>1</sup> In vitro diagnostic to measure the level of specific IgE in the sera of the patient.

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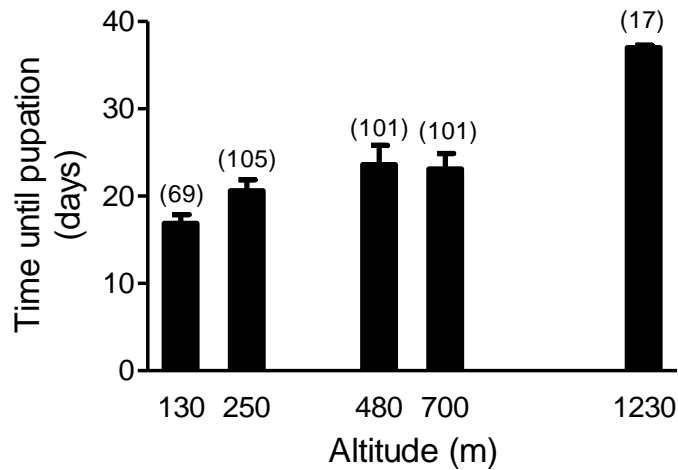
42 Table 3. Regression of the annual allergic risk (expressed as the cumulated number of days with RAEP  $\geq 3$  over the 13 stations) on estimated  
 43 annual health costs from *Ambrosia* allergy in the Rhône-Alpes region. Regressions were calculated with the log-transformed low and high  
 44 estimates of annual health costs (for further information see also Appendix A: Table 2).

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46 Regression equation	Adjusted r-squared	p-value
47 $\log_{10}(\text{high\_cost\_estimate}) = 0.5883 + 0.0017 * (\text{number of days with RAEP} \geq 3)$	0.417	0.0498
48 $\log_{10}(\text{low\_cost\_estimate}) = 0.3348 + 0.0020 * (\text{number of days with RAEP} \geq 3)$	0.504	0.0292

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Fig. 1. Developmental time of *Ophraella communa* (from egg stage to pupation) along an altitudinal gradient in the Southern Alps. Numbers in brackets indicate the number of pupae from which developmental time was recorded at each site.



The temperature-dependent developmental time of *Ophraella communa* was experimentally assessed along an altitudinal gradient in the southern Alps, approximately 50 km North of the Milan area. The five field sites were set up on sun-exposed grassland or in private gardens at 130 m (in the Po plain), 250 m, 480 m, 700 m and 1230 m. Greenhouse-reared, potted *A. artemisiifolia* plants were exposed to female *O. communa* in a field cage set up at the lowest elevation. Plants with freshly laid egg batches were individually covered with a gauze bag, firmly attached to the pot with an elastic ribbon, and transferred within 48 hours after oviposition to one of the five field sites in a randomized order. At the field site, plants were placed within a 1 x 1 x 2 m gauze cage, dug together with the pots into the soil and regularly watered. Two cohorts of 5-8 plants each were transferred to the five field sites, with the exception of the highest site which only received plants from the second cohort. The first cohort was set up between 29 June and 2 July and the second cohort between 8 and 10 August. Each field site was visited at least once a week to record the presence of life stages on each *A. artemisiifolia* plant.