

*Supplementary data to*

**The urban imprint on plant phenology**

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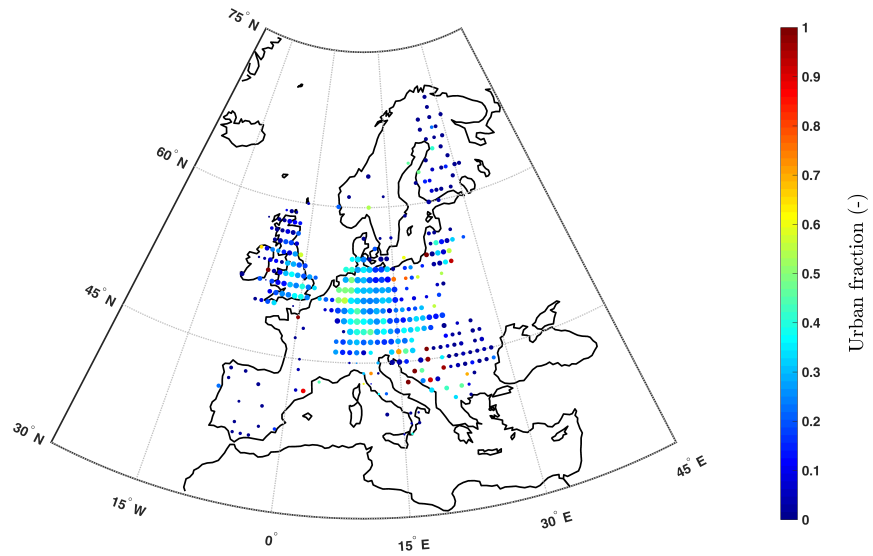
University of Innsbruck, Department of Ecology

Sternwartestr. 15

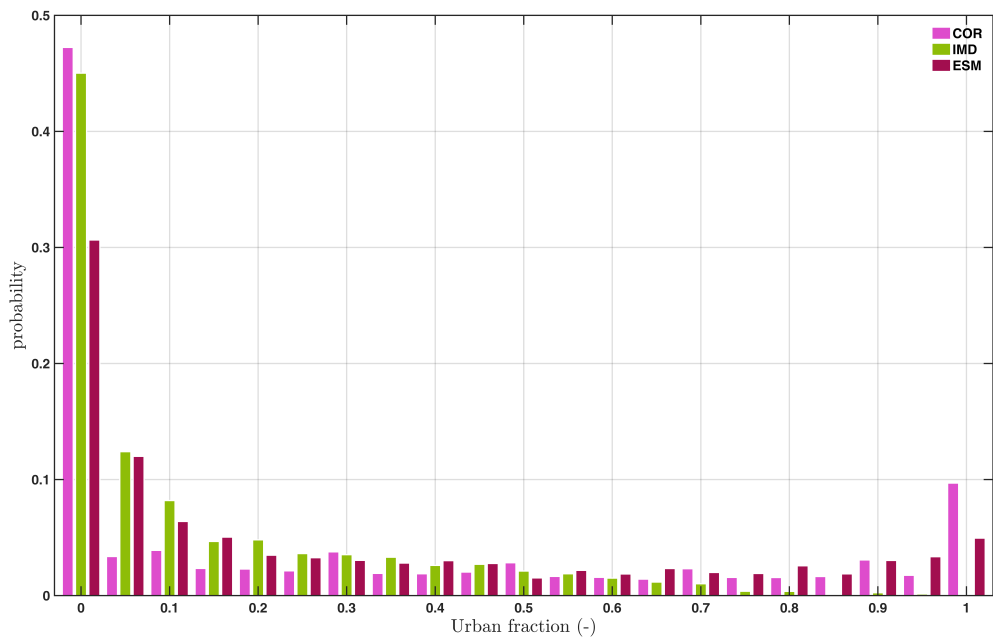
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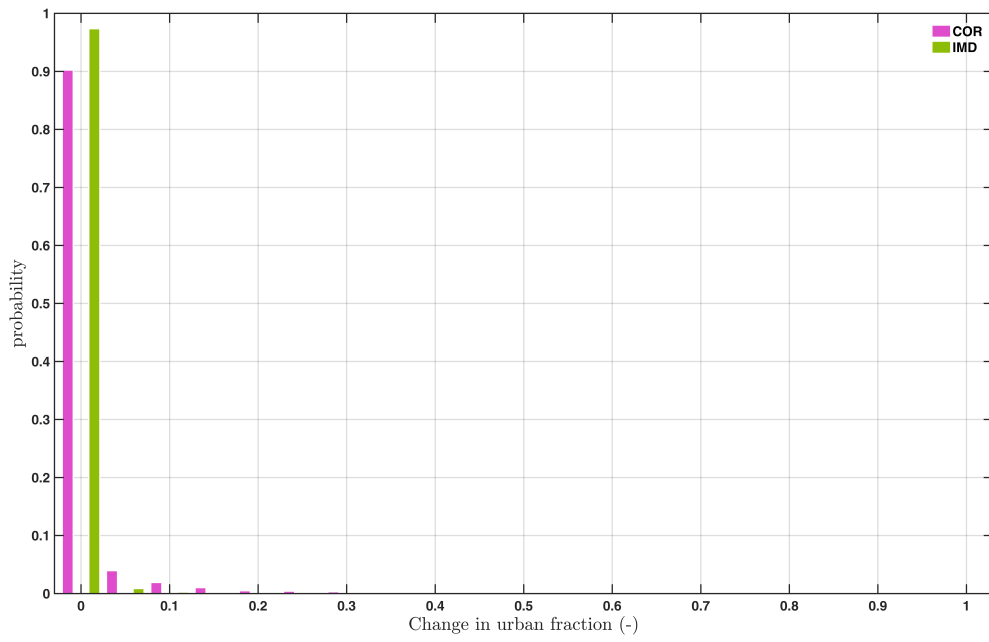
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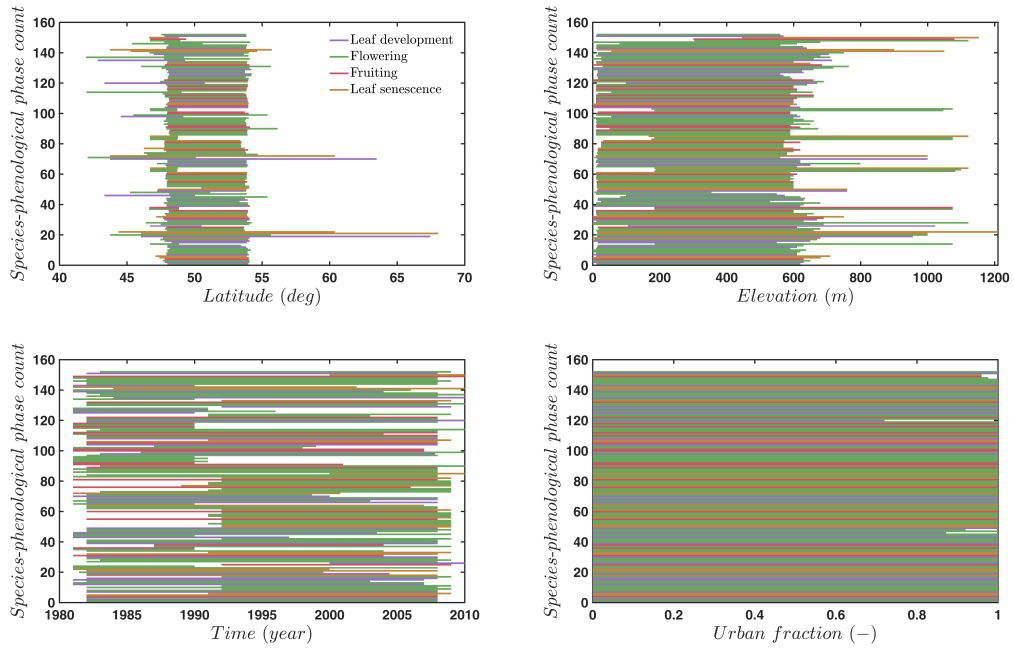
**Supplementary Figure 1 Gridded distribution of pan European phenological sites.** The size of the symbols represents the number of observations, the color coding refers to the urban fraction (based on European settlement map). Time frame is 1981-2010.



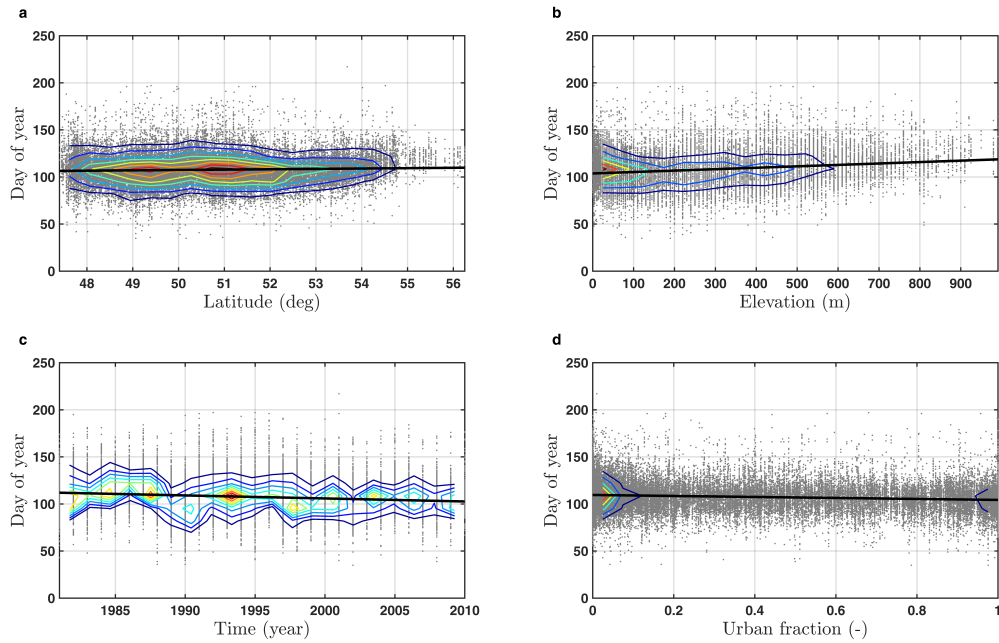
**Supplementary Figure 2 Comparison of three urban fraction metrics.** Reference year is 2010 (COR ...  
CORINE land cover, IMD ... imperviousness degree, ESM ... European settlement map).



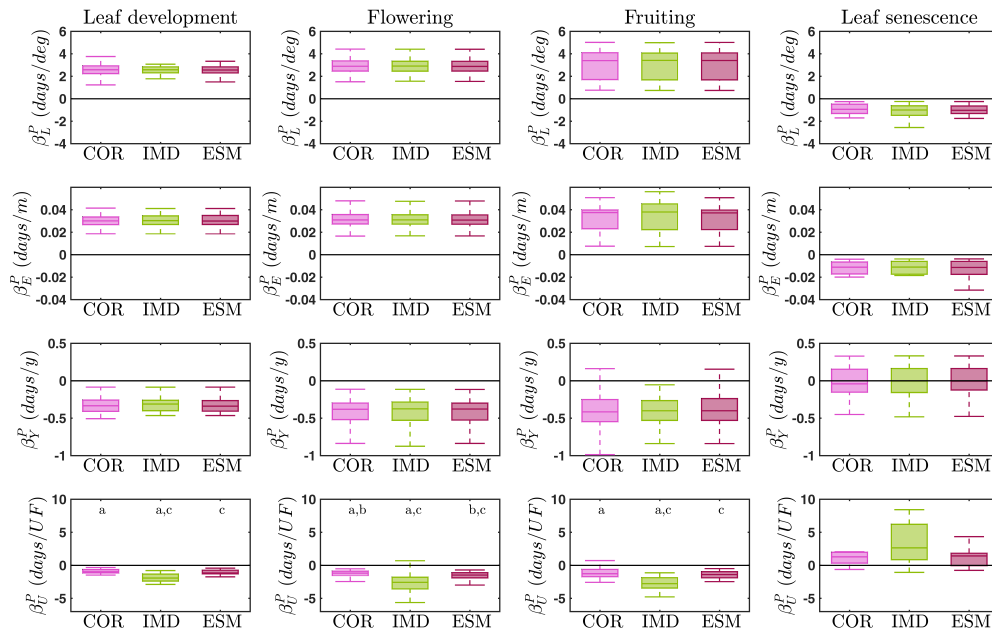
**Supplementary Figure 3 Frequency of the maximum change in urban fraction (COR ... CORINE land cover, IMD ... imperviousness degree) at all phenological observation sites during the 1981-2010 observation period.**



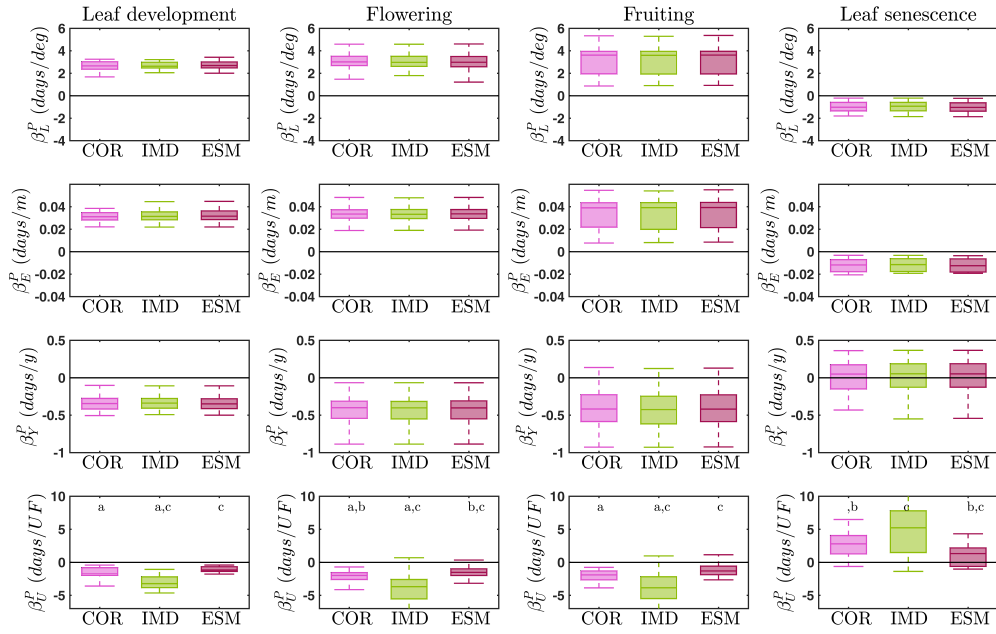
**Supplementary Figure 4** Range of the four independent variables in which 90 % of data are contained for each species-phenological phase combination. The urban fraction metric is the Corine land cover (COR).



**Supplementary Figure 5 Example illustrating the data underlying the multiple linear regression (MLR) analysis of phenological entry dates.** Data are for *Acer platanoides* and the BBCH phenological phase 60 (beginning of flowering). Urban fraction refers to the European settlement map. Grey symbols show data points ( $n = 44\,509$ ), colored lines indicate the density of data and solid black lines represent simple linear regressions, which have been added for illustrating the sign of the relationships.

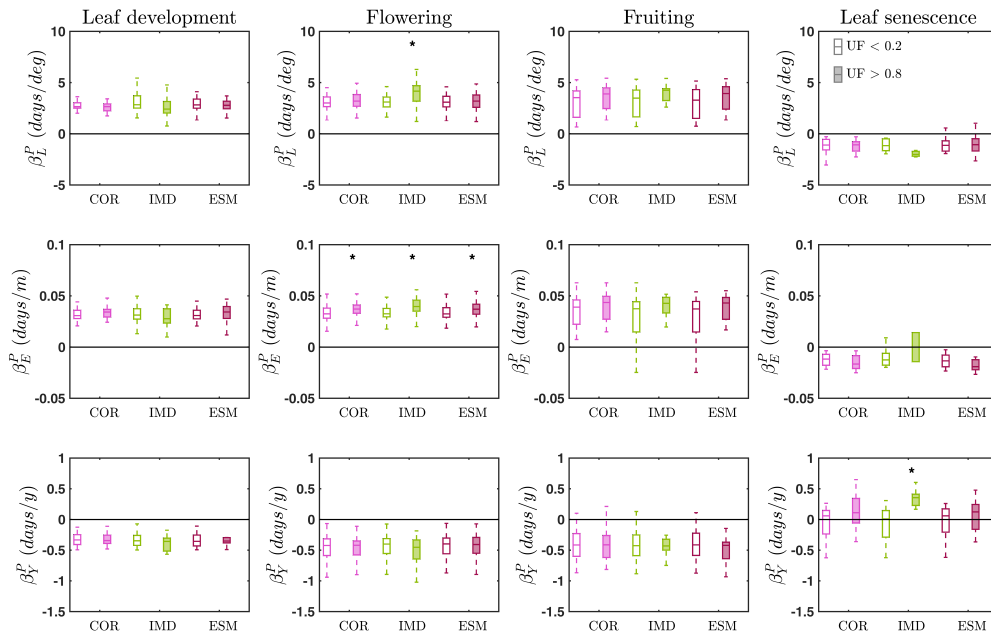


**Supplementary Figure 6 Coefficients of phenological multiple linear regression analysis.** Significant MLR coefficients (Eq. 1) for four aggregated phenological phases and three urban fraction (UF) metrics (COR ... CORINE land cover, IMD ... imperviousness degree, ESM ... European settlement map). Significant ( $p < 0.05$ ) differences between urban fraction metrics are indicated by the same letters. Boxplots show the interquartile range (IQR, box), the median (horizontal line in box) and 1.5 x IQR (whiskers), while outliers are omitted for clarity. The lowermost panels are identical to Fig. 1 in the main text.

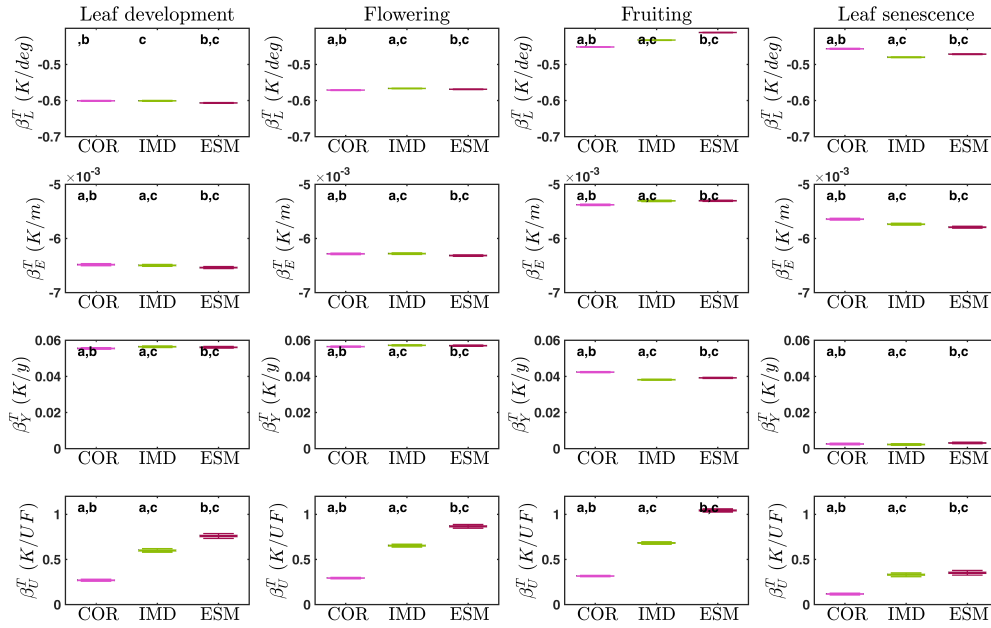


**Supplementary Figure 7** Same as **Supplementary Figure 6**, but analysis based on 1100 m instead of the standard 500 m urban fraction pixel size.

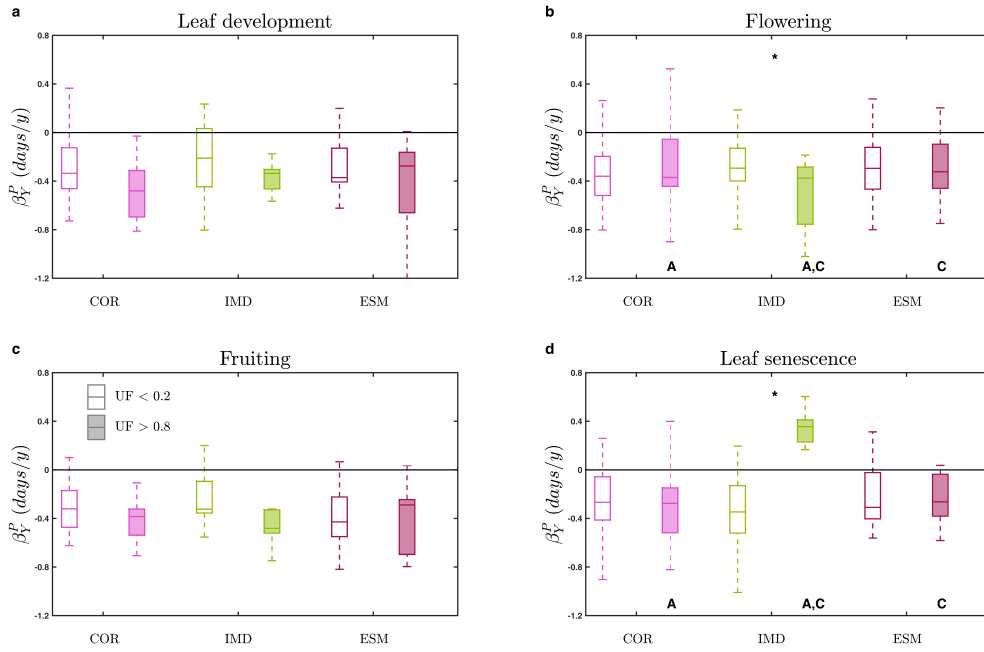




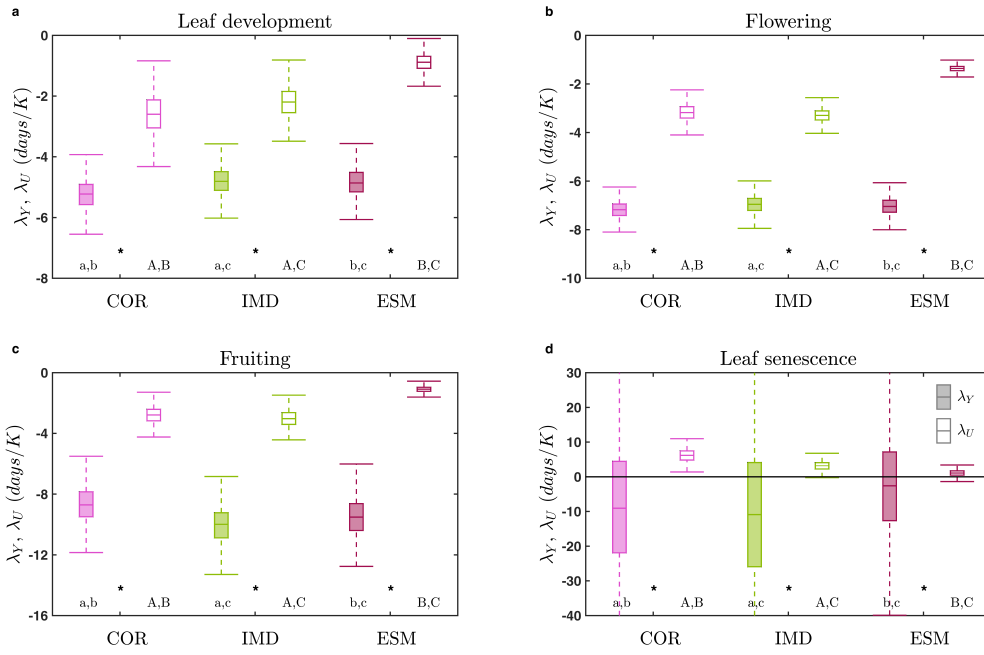
**Supplementary Figure 8 Phenology coefficients of multiple linear regression analysis stratified by urban fraction.** Significant MLR coefficients (Eq. 1) for four aggregated phenological phases and three urban fraction (UF) metrics (COR ... CORINE land cover, IMD ... imperviousness degree, ESM ... European settlement map). Significant ( $p < 0.05$ , Wilcoxon rank sum test) differences between urban fraction metrics are indicated by the same letters, between low and high UF metrics by an asterisk. Boxplots show the interquartile range (IQR, box), the median (horizontal line in box) and  $1.5 \times$  IQR (whiskers), while outliers are omitted for clarity. The lowermost panels are identical to Fig. 4 in the main text.



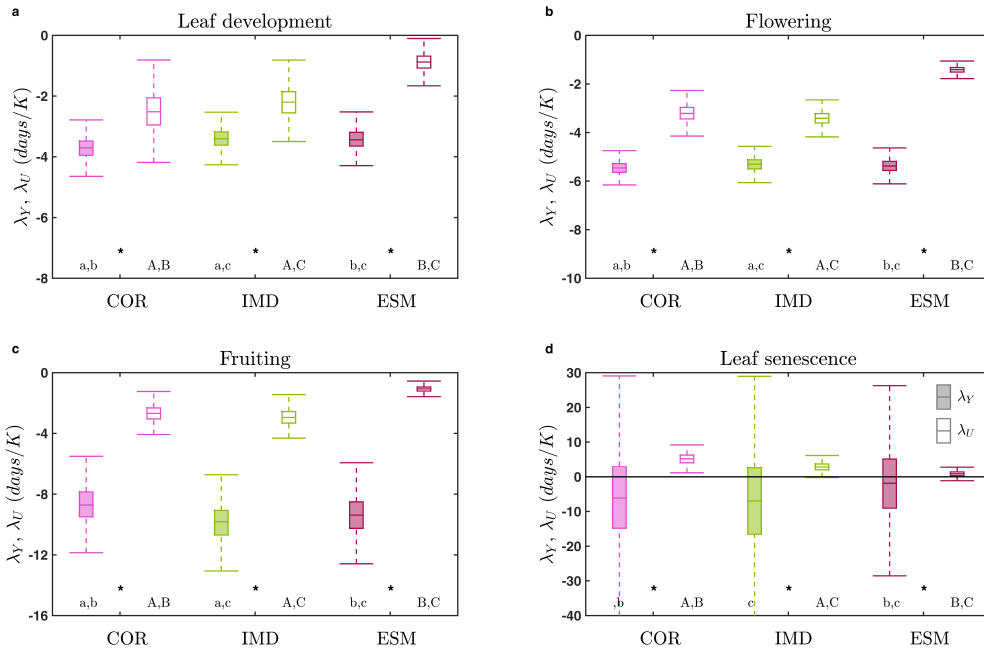
**Supplementary Figure 9 Coefficients of temperature multiple linear regression analysis.** Significant MLR coefficients (Eq. 2) for four aggregated phenological phases and three urban fraction (UF) metrics (COR ... CORINE land cover, IMD ... imperviousness degree, ESM ... European settlement map). Significant ( $p < 0.05$ ) differences between urban fraction metrics are indicated by the same letters. Boxplots show the interquartile range (IQR, box), the median (horizontal line in box) and  $1.5 \times$  IQR (whiskers), while outliers are omitted for clarity. The lowermost panels are identical to Fig. 2 in the main text.



**Supplementary Figure 10** Same as Figure 4, but data restricted to the same species-phenophase combinations in the low and high urban fraction classes.



**Supplementary Figure 11** Same as Figure 3, but temperature averaged over the preceding 10 days instead of 30 days.



**Supplementary Figure 12** Same as Figure 3, but temperature averaged over the preceding 60 days instead of 30 days.