Dataset documenting prevalence and counts of pine processionary moth tents on local host trees in 3 regions of France with different climatic environments

Carole Kerdelhué, Jean-Pierre Rossi, Alexis Bernard, Thierry Fanjas-Mercere, Louis Gross, Benoit Nusillard, Patrick Pineau, Julien Pradel, Alain Talbi, Jérôme Rousselet

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Data Article

Dataset documenting prevalence and counts of pine processionary moth tents on local host trees in 3 regions of France with different climatic environments

Carole Kerdelhué[a,2,*], Jean-Pierre Rossi[a,2], Alexis Bernard[b], Thierry Fanjas-Mercere[b], Louis Gross[b,1], Benoit Nusillard[b], Patrick Pineau[b], Julien Pradel[a,2], Alain Talbi[a,2], Jérôme Rousselet[b]

[a] CBGP, INRAE, CIRAD, IRD, Institut Agro, Université Montpellier, 755 avenue du Campus Agropolis, CS30016, F-34988 Montferrier-sur-Lez Cedex, France
[b] URZF, INRAE, 2163 avenue de la pomme de pin, CS40001 Ardon 45075 Orléans Cedex 2, France

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ABSTRACT

The pine processionary moth *Thaumetopoea pityocampa* is a defoliating lepidopter that develops during winter. The larvae are gregarious and bear urticating setae that are harmful to humans and vertebrates. They shelter in conspicuous silk tents that are easy to detect. We here present a dataset comprising tree characterization and tent counts from 3 agglomerations in France located in regions with different climatic environments. The studied trees belong to various conifer species that are potential hosts for the caterpillars. In each site, we defined clusters as one target tree and its 10–62 nearest neighbors, and surveyed each tree within the clusters by informing: tree species, coordinates, size, number of tents. We characterized a total of 3690 trees, including 2009 trees in Orléans (grouped in 68 clusters), 359 trees in La Baule (18 clusters) and 1322 trees in Montpellier (52 clusters). We provide the raw data characterizing each individual tree, graphs showing the prevalence and mean number of tents for the

* Corresponding author.
E-mail address: Carole.Kerdelhue@inrae.fr (C. Kerdelhué).
[1] Present address INRAE, Bordeaux Sciences Agro, ISVV, SAVE, Villenave d'Ornon, France.
[2] *Social media:* @CBGPMontpellier

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tree species included in the survey, and maps allowing to locate each tree. This dataset brings information about host preference of the pine processionary moth and will be useful as a baseline to study spatio-temporal variability of host-insect relationships. It can also be informative for decision-makers and managers of urban greenings to avoid trees that are likely to be heavily infested for plantation in proximity to vulnerable people.

Specifications Table

Subject	Entomology and insect science.
Specific subject area	Characterizing plant-insect interactions by counting the number of processionary moth winter tents per potential host tree in three urban environments in France
Data format	Raw data: csv Tables: csv Maps: html, pdf Figures: png
Type of data	Table, Map, Graph, Figure
Data collection	In each urban area, plots containing at least 10 trees of the genera *Pinus, Cedrus* or *Pseudotsuga* (potential hosts of the pine processionary moth) were localized. In each plot, a focal tree was chosen (target) and its 10–62 nearest neighbors were surveyed. The target tree and its characterized neighbors were referred to as a *cluster*. Half of the clusters were centered on a target tree bearing at least one tent, and the other half was centered on a non-infested target. Each tree was characterized by its species, size class, geographic coordinates, cluster code and number of observed winter pine processionary tents. All observations were conducted between January 18th and May 6th 2022.
Data source location	La Baule, Loire-Atlantique, France and surrounding region Montpellier, Hérault, France and surrounding region Orléans, Loiret, France, and surrounding region For each agglomeration the geographic coordinates of all the surveyed trees are given in the raw data table.
Data accessibility	Repository name: Institutional INRAE repository at data.gouv.fr Data identification number: doi:10.57745/ZJI3P0 Direct URL to data: https://doi.org/10.57745/ZJI3P0

1. Value of the Data

- These data present counts of pine processionary moth tents on 359 trees in La Baule (grouped in 18 clusters), 1322 trees in Montpellier (52 clusters) and 2009 trees in Orléans (68 clusters) urban districts. The surveyed trees corresponded to 27 conifer species that are potential hosts of *Thaumetopoea pityocampa*, from the genera *Pinus*, *Cedrus* and *Pseudotsuga*. Twenty-six tree species were studied in Orléans, 8 in Montpellier and 8 in La Baule.
- They allow to estimate prevalence and tent densities in various tree species for the 3 studied regions.
- The data can be used as a baseline to compare future observations obtained using a similar protocol in the same or other regions. They document the variability of the insect-tree association patterns in space and time.
- The data can be used by policy makers and managers of urban parks and facilities to choose the tree species to be planted and reduce the risk of pine processionary moth infestations that cause human and animal health concerns

2. Background

The pine processionary moth *Thaumetopoea pityocampa* (Denis & Schiffermüller; Lepidoptera: Notodontidae) is one of the main defoliators of conifer species in the Mediterranean Basin [1]. Its caterpillars develop gregariously during winter and shelter in conspicuous silk tents. The larvae bear urticating setae, and the species causes human and animal health concerns [2]. A previous work developed in the agglomeration of Orléans and based on an exhaustive survey of conifers showed marked differences in prevalence and number of tents between tree species [3,4]. The objective of the present study was to gather data on different conifer species, potential host trees for *T. pityocampa*, in different climatic regions in France [5], namely in Loire-Atlantique (La Baule, oceanic climate), Hérault (Montpellier, Mediterranean climate) and Loiret (Orléans, degraded oceanic climate). The dataset is meant to bring information about plant-insect interactions in different environments.

3. Data Description

The dataset [6] corresponds to the description of each individual tree surveyed in the agglomerations of La Baule, Montpellier and Orléans. Fig. 1 shows the 3 localities in France and a map of each area with the localization of the studied tree clusters.

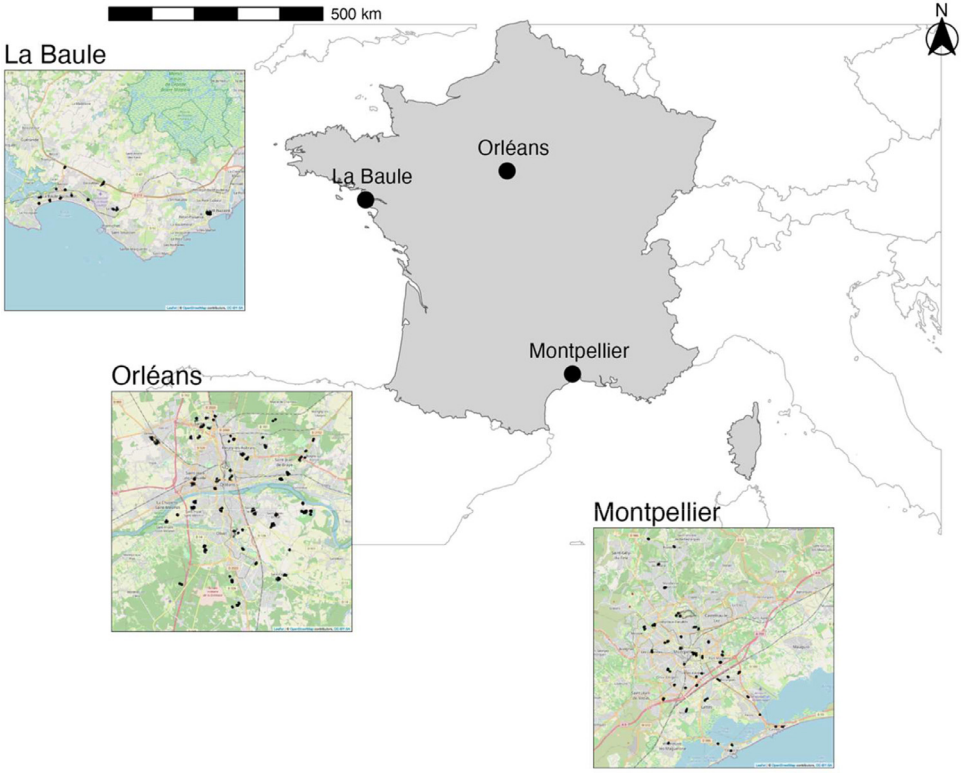

Fig. 1. Map showing the localization in France of the 3 agglomerations included in the study. The inserts show the position of the surveyed tree clusters for each agglomeration.

In the repository, the data corresponding to each tree are given in the table raw_data.csv, that provides the following information for each individual tree: agglomeration, unique tree ID, cluster ID, longitude and latitude in decimal degrees (EPSG:4326), longitude and latitude in the Lambert93 system (EPSG:2154, which is the national coordinate reference system recommended for Metropolitan France), tree species, tree size, number of tents, date of observation, name of field operator. The following column states if the tree is the cluster target tree or a neighbor. The three last columns give the administrative region, department and municipality where the tree is located. We also provide 3 zoomable maps in html format based on OpenStreetMap (https://www.openstreetmap.org) (one per agglomeration), in which the reader can explore the position and characteristics (species, cluster ID and number of tents) of each tree included in the study. Information appear when the operator points to the tree with the mouse. Finally, we provide similar maps in pdf format.

Tables 1–3 correspond to the summary data tables of the three agglomerations (respectively La Baule, Montpellier and Orléans) and give the following information for each tree species found locally: total number of surveyed trees, number of trees hosting at least one tent, prevalence (i.e., proportion of infested tree expressed in %), mean number of tents per infested trees,

Table 1
Summary data for the tree species surveyed in the agglomeration of La Baule (*C. = Cedrus; P. = Pinus*): total number of surveyed trees; number of infested trees (i.e., hosting at least one tent); prevalence (proportion of infested trees expressed in %); mean number of tents per infested tree; mean number of tents per tree (taking into account non-infested trees); minimal and maximal number of tents observed during the survey.

Species	No. surveyed trees	No. infested trees	Prevalence (%)	Mean number of tents per infested tree	Mean number of tents per tree	Minimum number of tents per tree	Maximum number of tents per tree
C. deodara	3	0	0	-	0	0	0
C. libani	18	1	5.56	1	0.06	0	1
P. halepensis	10	1	10	1	0.1	0	1
P. nigra	107	65	60.75	2.85	1.73	0	10
P. pinaster	95	45	47.37	2.09	0.99	0	6
P. pinea	28	14	50	1.57	0.79	0	5
P. radiata	39	25	64.1	2.24	1.44	0	8
P. sylvestris	59	12	20.34	1.42	0.29	0	3

Table 2
Summary data for the tree species surveyed in the agglomeration of Montpellier (*C. = Cedrus; P. = Pinus*): total number of surveyed trees; number of infested trees (i.e., hosting at least one tent); prevalence (proportion of infested trees expressed in %); mean number of tents per infested tree; mean number of tents per tree (taking into account non-infested trees); minimal and maximal number of tents observed during the survey. *C. sp* and *P. sp* correspond to *Cedrus* and *Pinus* individuals, respectively, that could not be identified at species level.

Species	No. surveyed trees	No. infested trees	Prevalence (%)	Mean number of tents per infested tree	Mean number of tents per tree	Minimum number of tents per tree	Maximum number of tents per tree
C. deodara	11	5	45.45	7.6	3.45	0	16
C. libani	102	3	2.94	2	0.06	0	3
C. sp	2	1	50	2	1	0	2
P. bungeana	5	3	60	3.33	2	0	7
P. gerardiana	1	1	100	11	11	11	11
P. halepensis	581	162	27.88	3.6	1	0	26
P. nigra	36	16	44.44	5.75	2.56	0	25
P. pinea	574	195	33.97	3.31	1.13	0	18
P. ponderosa	5	3	60	8.67	5.2	0	12
P. sp	5	4	80	7.5	6	0	13

Table 3
Summary data for the tree species surveyed in the agglomeration of Orléans (*C. = Cedrus; P. = Pinus; Ps = Pseudotsuga*): total number of surveyed trees; number of infested trees (i.e., hosting at least one tent); prevalence (proportion of infested trees expressed in %); mean number of tents per infested tree; mean number of tents per tree (taking into account non-infested trees); minimal and maximal number of tents observed during the survey. *P. sp* corresponds to *Pinus* individuals that could not be identified at species level.

Species	No. surveyed trees	No. infested trees	Prevalence (%)	Mean number of tents per infested tree	Mean number of tents per tree	Minimum number of tents per tree	Maximum number of tents per tree
C. deodara	159	18	11.32	2	0.23	0	6
C. libani	168	2	1.19	1	0.01	0	1
P. armandii	3	0	0	-	0	0	0
P. attenuata	4	0	0	-	0	0	0
P. bungeana	1	0	0	-	0	0	0
P. cembra	1	0	0	-	0	0	0
P. contorta	2	0	0	-	0	0	0
P. halepensis	1	0	0	-	0	0	0
P. leucodermis	6	0	0	-	0	0	0
P. monticola	4	0	0	-	0	0	0
P. mugo	21	0	0	-	0	0	0
P. nigra	780	319	40.9	4.24	1.74	0	64
P. parviflora	1	0	0	-	0	0	0
P. peuce	1	0	0	-	0	0	0
P. pinaster	82	31	37.8	3.71	1.4	0	20
P. pinea	68	4	5.88	1	0.06	0	1
P. ponderosa	9	0	0	-	0	0	0
P. pumila	6	0	0	-	0	0	0
P. radiata	3	1	33.33	1	0.33	0	1
P. sp	2	0	0	-	0	0	0
P. strobiformis	6	0	0	-	0	0	0
P. strobus	8	0	0	-	0	0	0
P. sylvestris	380	64	16.84	2.14	0.36	0	8
P. taeda	5	0	0	-	0	0	0
P. virgiana	1	0	0	-	0	0	0
P. wallichiana	34	0	0	-	0	0	0
Ps. menziesii	253	2	0.79	1	0.01	0	1

mean number of tents per tree (i.e., taking in consideration trees without nests), minimal observed number of tents, maximal observed number of tents.

For each of the 3 agglomerations (La Baule, Montpellier and Orléans), we focused on the tree species for which at least 10 individuals were surveyed. Fig. 2 shows barplots representing the prevalence (percentage of individual trees hosting at least one tent) and the mean number of tents per infested tree (i.e., per tree hosting at least one tent) for these species. Similar graphs computed for all observed tree species per agglomeration can be found in the data repository (i.e., even for species including fewer than 10 surveyed trees).

4. Experimental Design, Materials and Methods

We focused on 3 agglomerations in France, namely La Baule (oceanic climate), Montpellier (Mediterranean climate) and Orléans (degraded oceanic climate). In each urban area, plots containing at least 10 trees of the genera *Pinus, Cedrus* or *Pseudotsuga* (potential hosts of the pine processionary moth) were localized. In each plot, a focal tree was chosen (target tree) and its 10 to 62 nearest neighbors were surveyed. The target and its characterized neighbors were referred to as a cluster. Half of the clusters were centered on a target tree hosting at least one tent, and the other half was centered on a non-infested target. Each tree was characterized by its species,

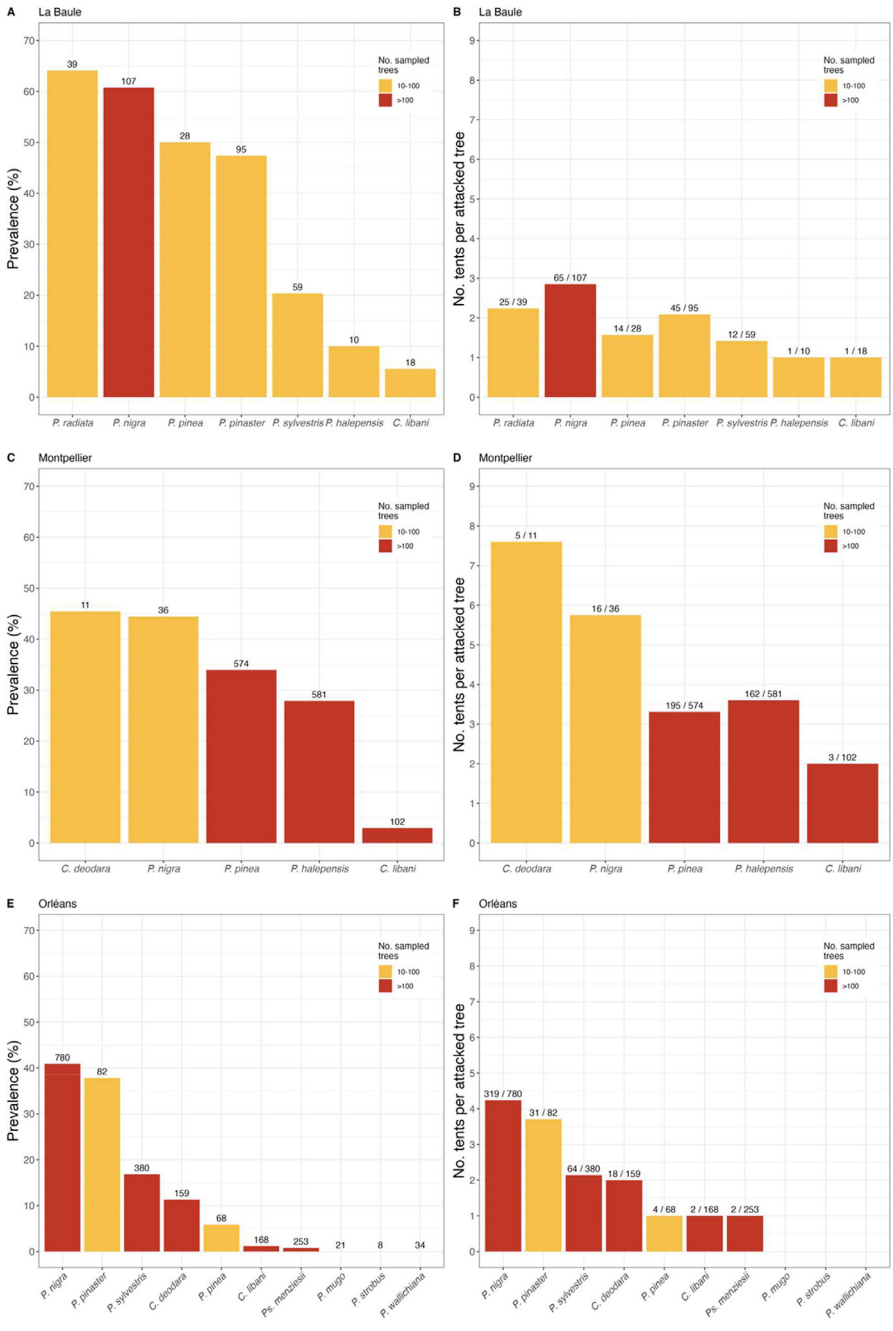

Fig. 2. Prevalence (infested trees/surveyed trees expressed as %) (left panel) and mean number of tents per infested tree (right panel) for each agglomeration. The barplots are restricted to the tree species for which at least 10 individuals were surveyed. Species for which between 10 and 100 individuals were surveyed are represented in yellow, species for which more than 100 individuals were surveyed are represented in red. Numbers shown above each bar correspond to the total number of surveyed trees in the left panel, and to the number of infested trees/number of surveyed trees in the right panel.

size, geographic coordinates, cluster code and number of observed winter pine processionary tents. All observations were conducted between January and May 2022. In total, we surveyed 3690 trees, including 359 trees in La Baule (18 clusters), 1322 trees in Montpellier (52 clusters) and 2009 trees in Orléans (68 clusters).

The maps, graphs and figures provided here and in the repository were produced using the R language [7] and R-studio [8], with the packages ggplot2 [9], cowplot [10], ggpubr [11] and leaflet [12].

Limitations

None.

Ethics Statement

The authors have read and followed the ethical requirements for publication in Data in Brief. The current work does not involve human subjects, animal experiments, or any data collected from social media platforms.

Data Availability

[Dataset] Counts of pine processionary moth tents on host trees in the agglomerations of Orléans, Montpellier and La Baule, France (Original data) (Dataverse).

CRediT Author Statement

Carole Kerdelhué: Supervision, Methodology, Writing – original draft, Writing – review & editing; **Jean-Pierre Rossi:** Methodology, Data curation, Software, Visualization, Writing – review & editing; **Alexis Bernard:** Funding acquisition, Data curation; **Thierry Fanjas-Mercere:** Funding acquisition, Data curation; **Louis Gross:** Funding acquisition, Data curation; **Benoit Nusillard:** Funding acquisition, Data curation; **Patrick Pineau:** Funding acquisition, Data curation; **Julien Pradel:** Funding acquisition, Data curation; **Alain Talbi:** Funding acquisition, Data curation; **Jérôme Rousselet:** Funding acquisition, Conceptualization, Supervision, Data curation, Writing – review & editing.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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