

Supplementary Material

Article:

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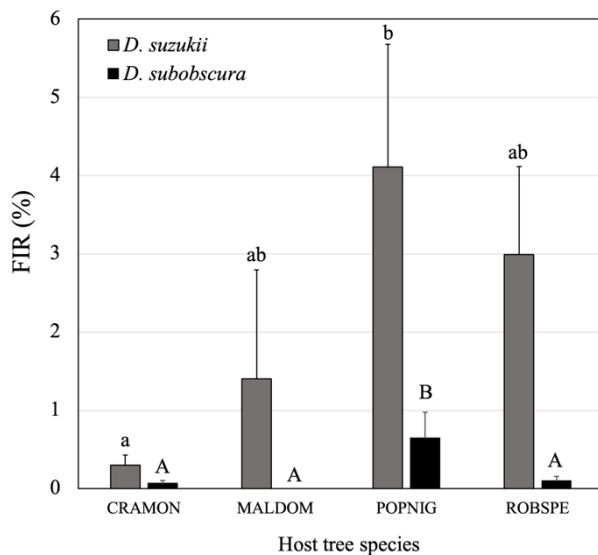


Figure S1 Mean fruit infestation rate (FIR) \pm SE (%) by *D. suzukii* and *D. subobscura* in *Viscum album* individuals according to the major host tree species of *Viscum album*. CRAMON: *Crataegus monogyna* ($n = 66$ samples), MALDOM: *Malus domestica* ($n = 36$), POPNIG: *Populus nigra* ($n = 60$), ROBSPE: *Robinia pseudoacacia* ($n = 43$). Significance of differences between months are represented by different lowercase and capital letters for *D. suzukii* (GLMM: $F = 3.00$, $p = 0.04$) and *D. subobscura* (GLMM: $F = 2.63$, $p = 0.05$) respectively.

Table S1 Host trees of *Viscum album* individuals sampled in the study and mean FIR \pm SE (%) by *D. suzukii* (*Dsuz*) and *D. subobscura* (*Dsub*).

| Species | Code | Number | % | <i>Dsuz</i> mean FIR \pm SE (%) | <i>Dsub</i> mean FIR \pm SE (%) |
|---|--------|--------|-------|--------------------------------------|--------------------------------------|
| <i>Acer campestre</i> | ACECAM | 13 | 4.9% | 0.00 \pm 0.00 | 0.00 \pm 0.00 |
| <i>Acer opalus</i> | ACEOPA | 3 | 1.1% | 0.00 \pm 0.00 | 0.00 \pm 0.00 |
| <i>Acer saccharinum</i> | ACESAC | 4 | 1.5% | 9.64 \pm 4.14 | 0.00 \pm 0.00 |
| <i>Acer</i> sp. | ACESP | 7 | 2.7% | 4.41 \pm 4.10 | 0.28 \pm 0.28 |
| <i>Carpinus betulus</i> | CARBET | 5 | 1.9% | 12.28 \pm 10.31 | 0.20 \pm 0.20 |
| <i>Corylus avellana</i> | CORAVE | 1 | 0.4% | 0.00 \pm 0.00 | 0.00 \pm 0.00 |
| <i>Crataegus monogyna</i> | CRAMON | 66 | 25.0% | 0.30 \pm 0.13 | 0.07 \pm 0.03 |
| <i>Fraxinus</i> sp. | FRASP | 4 | 1.5% | 0.97 \pm 0.97 | 0.33 \pm 0.33 |
| <i>Malus domestica</i> | MALDOM | 36 | 13.6% | 1.40 \pm 1.39 | 0.00 \pm 0.00 |
| <i>Populus alba</i> | POPALB | 3 | 1.1% | 0.00 \pm 0.00 | 0.29 \pm 0.29 |
| <i>Populus nigra</i> | POPNEG | 60 | 22.7% | 4.11 \pm 1.57 | 0.65 \pm 0.32 |
| <i>Populus</i> \times <i>canadensis</i> | POPCAN | 1 | 0.4% | 0.00 \pm 0.00 | 0.00 \pm 0.00 |
| <i>Prunus avium</i> | PRUAVI | 1 | 0.4% | 0.00 \pm 0.00 | 0.00 \pm 0.00 |
| <i>Prunus</i> sp. | PRUNUS | 3 | 1.1% | 0.00 \pm 0.00 | 0.00 \pm 0.00 |
| <i>Pyrus communis</i> | PYRCOM | 1 | 0.4% | 0.00 \pm 0.00 | 0.00 \pm 0.00 |
| <i>Quercus ilex</i> | QUEILE | 3 | 1.1% | 14.67 \pm 14.67 | 0.00 \pm 0.00 |
| <i>Quercus pubescens</i> | QUEPUB | 2 | 0.8% | 0.00 \pm 0.00 | 0.00 \pm 0.00 |
| <i>Quercus rubra</i> | QUERUB | 1 | 0.4% | 0.00 \pm 0.00 | 0.00 \pm 0.00 |
| <i>Quercus</i> sp. | QUERCU | 1 | 0.4% | 0.00 \pm 0.00 | 0.00 \pm 0.00 |
| <i>Robinia pseudoacacia</i> | ROBSPE | 43 | 16.3% | 2.99 \pm 1.12 | 0.10 \pm 0.05 |
| <i>Tilia platyphyllos</i> | TILPLA | 2 | 0.8% | 0.64 \pm 0.23 | 0.00 \pm 0.00 |
| <i>Tilia</i> sp. | TILSP | 4 | 1.5% | 0.34 \pm 0.34 | 0.00 \pm 0.00 |
| TOTAL | | 264 | 100% | 2.37 \pm 0.53 | 0.20 \pm 0.08 |

Table S2 List of the variables assessed in the study. Abbreviations: s: measure from weather station, 7J and 14J: measures collected from the 7 and 14 days prior to sample collection.

| CATEGORY | CODE | DESCRIPTION | UNIT |
|---|----------|---|-----------------|
| DROSOPHILIDAE SPECIES | | | |
| INFESTATION INDICES | FIR | Fruit Infestation Rate = $100 \times$ number of emerged <i>Drosophila</i> individuals from fruit collected from a <i>Viscum album</i> individual / total number of fruit collected from the same <i>Viscum album</i> individual | % |
| | PIR | Plant Infestation Rate = $100 \times$ number of infested <i>Viscum album</i> individuals in a region or month / total number of <i>Viscum album</i> individuals sampled in the same region or month | % |
| MISTLETOE FRUIT CATEGORIES | | | |
| NUMBER | HEAFRUIT | Number of healthy fruit collected on a <i>Viscum album</i> individual | Number |
| | DAMFRUIT | Number of damaged fruit (rotten or with open skin) collected on a <i>Viscum album</i> individual | Number |
| | PLAFRUIT | Sum of healthy and damaged fruit collected on a <i>Viscum album</i> individual | Number |
| | GROFRUIT | Number of fruit collected on the ground below a <i>Viscum album</i> individual | Number |
| | TOTFRUIT | Sum of <i>Viscum album</i> fruit collected on the plant and on the ground | Number |
| PERCENTAGE | %HEALPLA | $100 \times$ HEAFRUIT / PLAFRUIT | % |
| | %DAMAPLA | $100 \times$ DAMFRUIT / PLAFRUIT | % |
| | %HEALTOT | $100 \times$ HEAFRUIT / TOTFRUIT | % |
| | %DAMATOT | $100 \times$ DAMFRUIT / TOTFRUIT | % |
| | %FPLANT | $100 \times$ PLAFRUIT / TOTFRUIT | % |
| | %GROUTOT | $100 \times$ GROFRUIT / TOTFRUIT | % |
| LIFE TRAITS OF MISTLETOE INDIVIDUALS | | | |
| FRUIT TRAITS | MFWIDTH | Mean fruit width (n = 5 fruit) | cm |
| | MFVOL | Mean fruit volume (n = 5 fruit) | cm ³ |
| | MFSURF | Mean fruit skin area (n = 5 fruit) | cm ² |
| LEAVE TRAITS | MLENGTH | Mean leaf length (from the base of the petiole to the top/apex of the blade; n = 5 leaves) | cm |
| | MLWIDTH | Mean leaf width (n = 5 leaves) | cm |
| | MLSURF | Mean leaf area (area = length \times width; n = 5) | cm ² |

| | | | |
|--|--------------|---|---------|
| | | leaves) | |
| INDIVIDUAL MORPHOLGY | LENGTH | Maximum diameter of <i>Viscum album</i> individual | m |
| | WIDTH | Minimum diameter of <i>Viscum album</i> individual | m |
| | INDFRUIT | Total number of fruit present on a sampled <i>Viscum album</i> individual | Number |
| | HEIGHT | Height of <i>Viscum album</i> individual from the ground | m |
| MISTLETOE HOST TREE | | | |
| MISTLETOE HOST TREE | HOSTSPE | <i>Viscum album</i> host species | Species |
| | HHEIGHT | Height of the host tree | m |
| | HLENGTH | Maximum diameter of the host tree canopy | m |
| | HWIDTH | Minimum diameter of the host tree canopy | m |
| | HTRUNK | Circumference of the host tree trunk | cm |
| | HMISTLETOE | Number of <i>Viscum album</i> individuals on the host tree | Number |
| | HMISTLETOE20 | Number of <i>Viscum album</i> individuals in a 20 m radius around the host tree | Number |
| | SUMHMIST20 | Sum of <i>Viscum album</i> individuals on the host tree and in a 20 m radius around the host tree | Number |
| SITE AND LANDSCAPE CHARACTERISTICS | | | |
| LOCAL ENVIRONMENT (in a 5 m radius around the mistletoe host tree) | ALTM | Site altitude | m |
| | SLOM | Site slope | Degree |
| | CTREE | Cover of tree layer (height > 8 m) | % |
| | CSHRUB | Cover of shrub layer (1-8 m) | % |
| | CHERB | Cover of herb layer (< 1 m) | % |
| | HHERBMEAN | Height of herbaceous layer | cm |
| | HLIGN | Height of woody species (shrubs, trees and lianas) | m |
| | COMP | Cover of biowaste composter | % |
| | SOIL | Cover of bare soil | % |
| | DWOOD | Cover of dead wood debris on the ground | % |
| | TLITTER | Depth of leaf litter | cm |
| | LITTER | Cover of leaf litter | % |
| | RIVER | Cover of stream | % |
| | POND | Cover of pond | % |
| | PATH | Cover of (unpaved) pathway | % |

| | | | |
|--|-----------|---|--------|
| | ROAD | Cover of road and paved surface | % |
| | BUILD | Cover of building | % |
| | ORC20 | Cover of orchard area (fruit trees and their associated grassland) | % |
| | FOREST20 | Cover of woodland | % |
| | PASTURE20 | Cover of grazed grassland | % |
| | MOW20 | Cover of mown grassland | % |
| | GRASS20 | Cover of grassland (PASTURE20+MOW20) | % |
| | SWAMP20 | Cover of swamp | % |
| | CROP20 | Cover of conventional agriculture crop | % |
| | VEGGAR20 | Cover of market garden | % |
| | GARDEN20 | Cover of private garden | % |
| | SHRUB | Cover of shrub | % |
| | BUILD20 | Cover of building | % |
| | HEDGE20 | Cover of hedgerow | % |
| | RIVER20 | Cover of river | % |
| | POND20 | Cover of pond | % |
| | WATER20 | Cover of river and other water surface | |
| | POPLARP20 | Cover of poplar plantation | % |
| | GREESP20 | Cover of urban green space (small urban planted herbaceous or shrub strips) | % |
| | PARK20 | Cover of park | % |
| | GGSP20 | Total urban vegetated area (sum of garden, green space and park cover) | % |
| | RP_FC | Fleshy-fruited plant species richness | Number |
| | CROP% | Cover of conventional agriculture crop | % |
| | WATE% | Cover of river and other water surface | % |
| | FORE% | Cover of woodland | % |
| | HETH% | Cover of heathland | % |
| | MOW% | Cover of grassland | % |
| | ROAD% | Cover of road and paved surface | % |
| | URB% | Cover of urban area | % |
| | ORC% | Cover of orchard area (fruit trees and their associated grassland) | % |
| | INDU% | Cover of industrial zone | % |

LOCAL HABITATS
(in a 20 m radius around the mistletoe host tree)

LANDSCAPE COMPOSITION
(from OSO 2022 data basis; cover percentages calculated within the following radii around the mistletoe host tree: 50 m, 100 m, 250 m, 500 m, 750 m, 1000 m, 1250 m, 1500 m, 1750 m, 2000 m, 2500 m and 3000 m)

| METEOROLOGY | | | |
|--|-------------|---|--------|
| <p style="text-align: center;">TEMPERATURE AND PRECIPITATION VARIABLES (from weather stations data; meanings of suffixes added to variable names: 7J = data from the 7 days preceding fruit sampling, 14J = data from the 14 days preceding fruit sampling)</p> | GDDMC | Sum of daily positive temperature (Growing Degree Days) calculated from the mean temperatures of the 7 or 14 days before fruit sampling | °C |
| | NFD | Number of days with negative temperatures (≤ 0 °C) during the 7 or 14 days before fruit sampling | Number |
| | RAIN | Sum of daily precipitation in the 7 or 14 days before the fruit sampling | cm |
| | SNOW | Sum of daily snowfall in the 7 or 14 days before the fruit sampling | cm |
| | MMIN | Mean minimum temperature during the 7 and 14 days before fruit sampling | °C |
| | MMAX | Mean maximum temperature during the 7 days before fruit sampling | °C |
| | MMEANCALC | Calculated mean of daily mean temperatures of the 7 or 14 days before the fruit sampling | °C |
| | MINMIN | Lowest minimum temperature during the 7 or 14 days before fruit sampling | °C |
| | MAXMAX | Highest maximum temperature during the 7 or 14 days before fruit sampling | °C |
| | SUMT_010122 | Sum of daily positive temperature (Growing Degree Days) between 01/01/2022 and the sampling date | °C |
| | RAIN_010122 | Sum of rain precipitation between 01/01/2022 and the sampling date | cm |

Table S3 Weather station information. Geographic area: city of the research laboratory, station city: postcode and the municipality name of the weather station location, Station coordinates: geographic location of the city where the weather station is located, Label city: postcode and municipality name according to Historique-Météo.net, Label city coordinates: geographic location of the label city, Mean distance: mean distance between the weather station and sampled locations (in kilometers). Geographic coordinate system: WGS 84.

| Geographic area | Station city | Station city coordinates | Label city | Label city coordinates | Mean distance (m) |
|-----------------|------------------|--------------------------|----------------|--------------------------|-------------------|
| Amiens | 80260_Flesselles | 50.0 N, 2.25 E | 80600_Doullens | 50.15724 N, 2.34019 E | 16,288 |

| | | | | | |
|------------------|----------------------------------|--------------------|---------------------------------|-----------------------------|--------|
| | 80160_Essertaux | 49.75 N, 2.25 E | 80000_Amiens | 49.894067 N, 2.295753 E | 17,516 |
| | 80890_Condé-Folie | 50.017 N, 2.017 E | 80420_Flixecourt | 50.01465 N, 2.08095 E | 22,404 |
| | 80300_Albert | 50.0 N, 2.65 E | 80300_Albert | 50.00091 N, 2.65096 E | 28,868 |
| | 80140_Doudelainville | 50.0 N, 1.767 E | 80100_Abbeville | 50.105467 N, 1.836833 E | 30,264 |
| | 60130_Angivillers | 49.5 N, 2.5 E | 80500_Montdidier | 49.65 N, 2.56667 E | 29,046 |
| Bordeaux | 33400_Talence | 44.817 N, -0.6 O | 33400_Talence | 44.802614 N, -0.588054 O | 3,520 |
| | 33360_Quinsac | 44.75 N, -0.5 O | 33000_Bordeaux | 44.837789 N, -0.57918 O | 8,853 |
| | 33440_Ambarès-et-Lagrave | 44.983 N, -0.517 O | 33390_Blaye | 45.13333 N, -0.66667 O | 22,444 |
| Caen | 14000_Caen | 49.183 N, -0.35 O | 14000_Caen | 49.182863 N, -0.370679 O | 11,027 |
| | 14170_Saint-Pierre-en-Auge | 49.0 N, 0.0 E | 14170_Saint-Pierre-en-Auge | 49.02022 N, -0.0316086 O | 4,852 |
| | 14860_Amfreville | 49.25 N, -0.248 O | 14150_Ouistreham | 49.276656 N, -0.258658 O | 15,936 |
| | 14430_Danestal | 49.25 N, 0.017 E | 14950_Beaumont-en-Auge | 49.278363 N, 0.111144 E | 27,512 |
| | 14400_Bayeux | 49.277 N, -0.704 O | 14400_Bayeux | 49.276437 N, -0.70314 O | 22,532 |
| | 27270_Saint-Aubin-du-Thenney | 49.017 N, 0.5E | 27300_Bernay | 49.08888 N, 0.59858 E | 30,614 |
| Clermont-Ferrand | 03000_Moulins | 46.567 N, 3.333 E | 03000_Moulins | 46.568059 N, 3.334417 E | 12,255 |
| | 63410_Charbonnières-les-Vieilles | 46.0 N, 3.0 E | 03800_Gannat | 46.10015 N, 3.19886 E | 31,664 |
| | 03500_Louchy-Montfand | 46.317 N, 3.25 E | 03500_Saint-Pourçain-sur-Sioule | 46.30927 N, 3.28787 E | 26,725 |
| | 03320_Le Veudre | 46.75 N, 3.0 E | 58000_Nevers | 46.990896 N, 3.162845 E | 25,782 |
| | 63122_Saint-Gènes-Champanelle | 45.75 N, 3.017 E | 63000_Clermont-Ferrand | 45.777222 N, 3.087025 E | 18,178 |
| | 63120_Courpière | 45.75 N, 3.55 E | 63120_Courpière | 45.75689 N, 3.54216 E | 18,261 |
| | 63740_Gelles | 45.767 N, 2.75 E | 63230_Saint-Ours | 45.817793 N, 2.947995 E | 18,059 |
| | 63320_Courgoul | 45.517 N, 3.033 E | 63450_Saint-Saturnin | 45.660653 N, 3.090363 E | 22,473 |
| | 63500_Le Broc | 45.5 N, 3.25 E | 63500_Issoire | 45.54151 N, 3.248128 E | 25,697 |
| Nice | 04120_Castellane | 43.85 N, 6.517 E | 04120_Castellane | 43.85 N, 6.51667 E | 5,755 |

| | | | | | |
|--------|----------------------------|------------------------------|-----------------------------|------------------------------|--------|
| | 04120_Gorges-du-Verdon | 43.7613593 N, 6.3788372 E | 04120_La-Palud-sur-Verdon | 43.783000 N, 6.333000 E | 20,377 |
| | 04000_Digne-les-Bains | 44.1 N, 6.233 E | 04000_Digne-les-Bains | 44.09252 N, 6.23199 E | 35,130 |
| | 06130_Grasse | 43.667 N, 6.917 E | 06130_Grasse | 43.66667 N, 6.91667 E | 34,072 |
| | 06140_Vence | 43.717 N, 7.117 E | 06140_Vence | 43.72254 N, 7.11183 E | 16,624 |
| | 06250_Mougins | 43.6 N, 7.0 E | 06250_Mougins | 43.6023319 N, 7.006491 E | 18,610 |
| | 06700_Saint-Laurent-du-Var | 43.667 N, 7.183 E | 06700_Saint-Laurent-du-Var | 43.67097 N, 7.17606 E | 13,915 |
| Rennes | 35360_Landujan | 48.25 N, -2.0 O | 22100_Lanvallay | 48.450000 N, -2.033330 O | 20,409 |
| | 35520_Montreuil-le-Gast | 48.25 N, -1.717 O | 35630_Hédé-Bazouges | 48.3 N, -1.8 O | 11,064 |
| | 35340_Ercé-prés-Liffré | 48.25 N, -1.5 O | 35270_Combourg | 48.41267 N, -1.74424 O | 20,780 |
| | 35150_Amanlis | 48.0N, -1.483 O | 35000_Rennes | 48.117266 N, -1.6777926 O | 18,869 |
| Tours | 37190_Azay-le-Rideau | 47.267 N, 0.467 E | 37190_Azay-le-Rideau | 47.26177 N, 0.46574 E | 20,161 |
| | 37400_Amboise | 47.417 N, 0.983 E | 37400_Amboise | 47.413326 N, 0.984407 E | 13,491 |
| | 37190_Cheillé | 47.25 N, 0.483 E | 37000_Tours | 47.394144 N, 0.68484 E | 24,074 |
| | 37310_Sublaines | 47.25 N, 1.0 E | 37150_Château de Chenonceau | 47.3248696 N, 1.0703005 E | 17,622 |
| | 37600_Loches | 47.133 N, 1.0 E | 37600_Loches | 47.128158 N, 0.997664 E | 27,232 |
| | 41120_Candé-sur-Beuvron | 47.5 N, 1.25 E | 41000_Blois | 47.5860921 N, 1.3359475 E | 25,144 |