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Diversity of Thysanoptera species and associated host plants in Southern France

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Abstract

A survey of thrips (*Thysanoptera*) and their host plants was conducted between April 2006 and April 2009 on the campus of INRA Sophia Antipolis in Southern France. It was focused on 1,850 samples in which 11,617 thrips were identified on 108 plant species from 98 genera and 42 families. The majority of thrips collected belonged to the sub-order *Terebrantia* and to the *Thripidae* family. Two other families, *Aeolothripidae* and *Melanthripidae*, amounted to 9% of the total. The six most common thrips species were found on more than 30 plant species. *Thrips tabaci* Lindeman was found on 99 different plant species and was the most abundant species in summer (38%). It disappeared as soon as the temperatures dropped in autumn. It was replaced in winter by *T. major* Uzel (14% of thrips collected). *Frankliniella occidentalis* Pergande, the species that prevails in the region's greenhouses (only 3.2% of thrips collected), was present only with very few individuals in the vegetation outside the adjacent greenhouses. About 54% of the infested plants were herbaceous annuals or biannuals, whereas 46% were woody perennial plants. Few thrips species occurred only on one plant species. The big majority occurred on several plant species simultaneously, or on different plant species in the annual course. Our study shows that Thysanoptera species occur on a wide range of host plants without causing overinfestations in the natural vegetation. However, protected crops in neighbouring greenhouses are easily infested by some of the thrips from the adjacent vegetation

Introduction

Thrips are widely distributed insects of which 1% would be considered as harmful for crops. More than 5,864 thrips species in more than 767 genera belong to the *Thysanoptera* order including two sub-orders (*Terebrantia* and *Tubulifera*) (Mound 2011). The most developped and harmful genera for greenhouse crops, the *Thysanoptera*, belong to the *Thripidae* family (Kirk 1997, Tommasini 2003). Its most harmful genera are *Frankliniella* and *Thrips* species (Mound 2012, Pizzol et al. 2014). Currently, species of *Frankliniella* and *Thrips* are present on all continents (Lewis 1997, Moritz 2002). In France, there are about 350 species of which only twenty have a significant impact as agronomic pests (Reynaud et al. 2001). They may be phytophagous, mycophagous or predators of other arthropods. Phytophagous species, contrary to what can be observed in most biting insects, empty plant cells; they do not feed on sap but they can nonetheless be particularly harmful. Thrips develop well on plants of different species and growth forms. However, data on

the distribution of thrips on plants are scarce (Berzosa 1994, Marullo 2009).

As many thrips are major pests for agriculture, it is important to identify the host plants employed by the thrips for feeding, reproducing and developing in their natural environment. They may enter into greenhouses from the autochtonous natural vegetation, as happens in Southern France where thrips play an important role as pests in greenhouse cultures. In the natural environment, thrips and other insects have population densities regulated by species interactions and community complexity. Certainly some plants are more proliferous than others, linked to the plant's characteristics (Parolin et al. 2012), such as leaf hairiness which is known to influence the presence of thrips in cultures. Very little is known about diversity of the natural plant hosts, and even less about their functional characteristics. Some taxonomic groups are known to be preferred by thrips, e.g. Asteraceae, Fabaceae, Rosaceae and Solanaceae (Ananthakrishnan 1993, Inoue and Sakurai 2007). Data on thrips host plants in literature is generally lacking (Marullo 2009). For instance, to which extent plants can serve as reservoirs in Southern France in the vicinity of Nice, where the study areas were located, is not known to date. Thus, in the present study, we carried out an inventory of thrips species existing and reproducing on naturally occurring plants near the greenhouses of the campus of INRA Sophia-Antipolis. We surveyed all species for three consecutive years in order to understand the potential source of greenhouse pest thrips. The ultimate goal was to develop and strengthen a strategy for effective and optimal protection against thrips, and particularly in rose Integrated Pest Management (IPM; Poncet et al. 2012).

Materials and methods

From April 2006 until April 2009, thrips were collected weekly in the natural grass- and shrublands on the campus of the INRA Sophia-Antipolis (Pizzol et al. 2006; Pizzol et al. 2010) in Southern France (Alpes Maritimes, Lat.: 43 ° 36'45 "N, Long.: 7 ° 04'40" E, Altitude: 100m) where several experimental greenhouses are located. This region has a Mediterranean climate characterized by hot and dry summers and short and temperate winters (Prentice et al. 1992). Thrips were collected on flowers and foliage of ornamental or wild herbaceous and woody plants of all present species.

Plant species were determined to species level by a local botanist. Thrips species were collected with the aid of a rigid support with white paper (A4 format) and using a brush. All adult thrips were collected and placed in 2 ml 'Eppendorf' tubes containing 10% alcohol in order to be identified. This solution allows the body to relax and keeps thrips members flexible (Reynaud et al. 2008). The samples were collected every week from the local flowering woody and herbaceous plants. Each sample in a tube contained one or more species of thrips found on a plant. The samples were identified in Angers and Montpellier by the « Plant Health Laboratory (Laboratoire de la Santé des Végétaux - LSV) » of the « French Agency for Food Safety (Agence Nationale de Sécurité Sanitaire - ANSES) ». Firstly, thrips were observed using a stereomicroscope (LEICA MZ12 with magnification of 8 to 100), then they were placed in lactic acid to be examined under an optical microscope (LEICA DMLB2, with magnification ranging from 50 to 630). When necessary, thrips were slide-mounted in Canada balsam. The species were identified using the keys presented by zur Strassen (2003) for *Terebrantia* (Reynaud et al. 2008) and by Priesner (1964) for *Tubulifera*.

The data of each thrips specimen from April 2006 were entered in an Excel program with twelve variables: year, week, situation (greenhouse, outdoor), host plant, URIH (Unit of Integrated Horticultural Research) reference, LSV (Laboratoire de la Santé des Végétaux) reference, date of sampling, family, genus, species, author, sex and a quantitative variable (the number of thrips). The analysis of all results was performed using PivotTables on the distribution of thrips species present outside the greenhouses from April 2006 to April 2009.

Results

I - Thysanoptera survey

The number of thrips collected outside the rose greenhouses between April 2006 and April 2009 amounted to 11,617 specimens in 1,850 samples. Among these 11,617 adult thrips, we identified 53 species and 23 genera. Four Thysanoptera families were found among the nine known in this order: *Aeolothripidae*, *Melanthripidae, Thripidae* (all belong to the sub-order *Terebrantia*) and *Phlaeothripidae* (to the *Tubulifera* order).

The majority of thrips collected on plants outside belonged to the *Terebrantia* sub-order and, more specifically, to the *Thripidae* family (90% of the total). Two other families belonging to the *Terebrantia* were also recorded: *Aeolothripidae* and *Melanthripidae*

which totalled 9.35%. The *Tubulifera* sub-order contained only one family i.e. the *Phlaeothripidae* which was poorly represented in our study (only 0.58% of the total).

The most common species was *Thrips tabaci* which accounted for 38.23%, followed by *T. major* with 13.99%, *Melanthrips fuscus* 5.78%, *Tenothrips frici* 5.12%, *T. minutissimus* 4.65%, *T. angusticeps* 4.52%, *T. flavus* 4.35%. The exotic *Thysanoptera Frankliniella occidentalis* represented 3.17% of the thrips sampled.

Among thrips identified, some were phytophagous oligophagous (41%), others polyphagous (27%) or generalist predators (15%) and 7% were phytophagous monophagous (Figure 1).

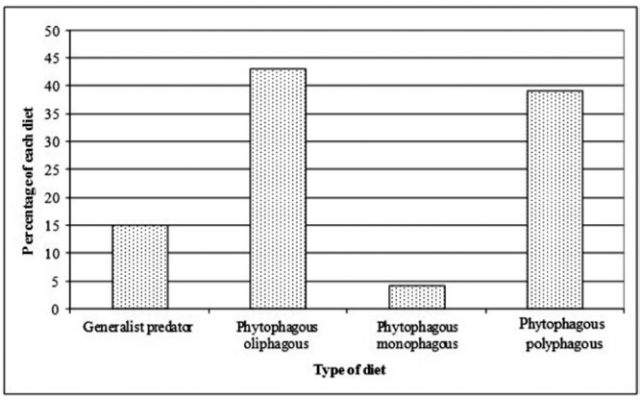

Figure 1 - Percentage of thrips for each type of diet.

II – Plant species present

We found 108 plant species hosting thrips, belonging to 42 families and 98 genera. About 54% of the plants were herbaceous annuals or biannuals, whereas 46% were woody perennial plants. Most species belonged to the Asteraceae family with 18 plant species. Other dominant families were the Fabaceae with 14 plant species and the Rosaceae with 13 plant species.

III - Thrips and host plants

18 thrips species were found only on one plant species throughout the years. Six thrips species had different host plants during the year, but only one at a time, e.g. *Tenotrips ononidis* which in August is hosted on *Convolvulus* sp. and in October on *Heliotropium europaeum*, or *T. brevicornis* which from May to July is hosted on *Centranthus ruber* and in August on *Abelia* sp. and November on *Dittrichia viscosa*, then in flower.

Among the pest species, 6 were found on more than 30 plant species (Appendix I). *T. tabaci* was found on 99 different plants, *T. major* on 54 plants, *F. occidentalis* on 39 plants, *T. flavus* on 38 plants, and *Tenothrips frici* on 34 plant species. These thrips are all of the polyphagous guild. *Aeolothrips tenuicornis*, an optional generalist predator, was found on 32 plants.

IV - Presence of thrips throughout the 3 years

Plant species composition was very similar in the three years study period, with clear seasonalities of the herbaceous species. Thrips species were present throughout the year from January to December, namely *Scirtothrips inermis*, *T. flavus*, *T. hawaiiensis*, *T. major*, *T. tabaci*. *F. occidentalis* was present from February to December.

Discussion

The diversity of thrips and plant species was high throughout the year, with a low degree of specialization. Many plant species hosted many thrips species, with little interannual variations. Our special regard is focused on thrips pest species, as they represent a major problem for agriculture due to damages of plant aerial parts which result in yield loss. This study was focused on the *Thripidae* family to which almost all species of pest thrips (> 90 %) belonged (Moritz et al. 2004). Overall, it includes more than 2,066 species in 296 genera (Mound 2011). Two of them, *Frankliniella* and *Thrips*, those of major economic and agronomic importance, were also dominant in our study. They cause serious damage by feeding directly on many crops, on flowers as well as on buds, fruits or leaves and transmit tospoviruses (Mound 1997). Their presence on the surrounding natural vegetation may be a source for populations of these pests which establish inside the greenhouses and affect the crops.

T. tabaci is a very common cosmopolitan species and polyphagous. It is also the vector of TSWV (Tomato Spotted Wilt Virus) which causes damaging disease in ornamental and vegetable crops (Boonham et al. 2002). However, its reproduction is parthenogenetic, and there is sexual reproduction in some areas of France (Reynaud P., unpublished). In this study, no male was identified. *T. tabaci* is the major species present on the site in Sophia-Antipolis (38% of the samples), where it was detected on 99 of the108 plant species sampled outside. Mound (1997) also confirms the results obtained on increasing numbers of *T. tabaci* which depend on temperature. He discovered that it was rare in the humid tropics but abundant in hot and

dry sites. *T. tabaci* adults can overwinter in alfalfa, clover (Shirck 1951) and weeds (Larentzaki et al. 2007). In our case, it was present throughout the year on eight plants in winter and on 48 plants in summer.

F. occidentalis is native to North America, where the *Frankliniella* genus originated and where it is extremely diversified. It was first discovered in 1983 in a greenhouse in Holland, and has spread since then throughout Europe, including France (since 1987 in Kirk and Terry 2003, Bournier and Bournier 1987). According to Reitz (2009), *F. occidentalis* is highly polyphagous: it can feed on 250 different plants belonging to 60 families (Robb 1989, Tommasini and Maini 1995, Lewis 1997). Marullo (2001) reported this species on many plants (e.g. *Allium cepa*, *Carthamus tinctorius, Fragraria vesca, Brassica oleracea, Lactuca sativa, Capsicum annuum, Lycopersicum esculentum, Beta vulgaris, Daucus carota)* as well as on ornamentals *(e.g. Gladiolus sp., Rosa sp., Dianthus sp., Gerbera sp., Chrysanthemum sp.)* and on fruit trees *(e.g. Vitis sp., Prunus sp., Armeniaca vulgaris, Persica vulgaris, Persica laevis)*. In Israel, *F. occidentalis* was detected on 19 plant species, and it reproduced on numerous of them (Pickett et al. 1988, Rosenheim et al. 1990, Chyzik and Ucko 2002). *F. occidentalis* was present in late February-April and in October-December (Chyzik and Ucko 2002) and the peak density of *F. occidentalis* during March in their study coincided to the flowering peak of cut-flower plants (during spring) and sweet pepper (during autumn). *F. occidentalis* adults live and feed on flowers (Pickett et al. 1988, Rosenheim et al. 1990) and they reproduce more when pollen is present (Hulshof et al. 2003). When flowers are not present to feed on, they choose new leaves as food (Toapanta et al. 1996).

F. occidentalis has a rather opportunistic way of living (Zhang et al. 2007). The high mobility of *F. occidentalis* results in its distribution on all available flowers (Pearsall 2000). According to Loomans (2003), *F. occidentalis* can successfully reproduce outside in Northern Europe and Central Europe during hot summers, but it is not able to survive the winter because it does not sufficiently tolerate cold temperatures. However, mechanisms of intolerance to cold was brought up by some authors (McDonald et al. 1997). On the study site, this species was present outside from February to December on 39 plant species but this represents only 3.17% of the thrips collected. Several hypotheses can be put forward. Knowing that in greenhouses this pest accounts for more than 80% of the thrips present (Pizzol et al. 2012a), it may be that the population of *F. occidentalis* escapes outside from time to time and afterwards they die. Another possible hypothesis is that thrips survive in winter due to the mild conditions in the Mediterranean climate of the study area.

Regarding the other potential pest species, with the exception of *T. tabaci* and *F. occidentalis*, the *Thripidae* identified in this study could be divided into several groups: polyphagous phytophagous (like *Thrips* and *Tenothrips*, *Scirtothrips* and many genera), phytophagous oligophagous or monophagous (*Stenothrips*, *Odontothrips*, *Limothrips*, *Dendrothrips*). Predators were represented by a single species of the *Scolothrips* genus.

Some *Thysanoptera* species, thanks to their polyphagous ability, were present throughout the year, using various food resources depending on the plants available on each season and developped large populations. Most other more specialized *Thripidae* (monophagous or oligophagous) were present in our samples only sporadically because of the phenology of the plants that serve as their exclusive source of food. This distribution for the *Thysanoptera* was illustrated in the work of Müller et al. (2011) on *Lepidoptera*. Müller distinguished two types of strategies in insects, host-plant specialists and host-plant generalists, which follow different models of metacommunities with consequences for community composition and evolution of species.

Specialist insects are closely dependent on their host plants and they will evolve either towards reduced mobility (habitat retention) or to the development of more effective strategies to find a favorable habitat. In all the cases, they tend to be specific to a habitat. Generalist insects have access to various food resources, allowing them to move more easily from one habitat to another. These species show such a profile so some of them evolved to the pest status, as is the case for *T. tabaci* and *F. occidentalis*.

According to Mound (2005), a thrips' host plant is commonly defined as "a plant species on which a thrips species can successfully maintain a population; thus all life stages of a species of thrips must be able to thrive on a plant species in order for it to be designated a host of the thrips species". In our case, the study did not permit to say if the plant species allowed the full thrips development or only hosted some thrips stages. As pointed out by Mound (2013), the presence of large numbers of adult thrips on a plant is not in itself an indication of an insect-plant association. Correct host associations need to assign a name to thrips larvae after identification of the host plant. Unfortunately, detailed descriptions of thrips larvae are often lacking. Some identification keys for second instar larvae are avail-

able, but often include only a limited number of species. The indentification key of Vierbergen et al. (2010) is the most complete for the Western Palaearctic region, but several species of our study are still not included in this work, which was also not available at the time of our study. This is why larvae were not surveyed during this study. Furthermore, definitions of "host-plant" are complicated by situations where a plant species provides an important feeding or behavioral resource, but is not used for breeding (Mound 2013).

The large number of thrips species present on the site may be linked to the diversity of host plants. Indeed, plant species diversity increased the number of possible ecological associations (Sanchez-Monge et al. 2011). Hernández-Ayar et al. (2009) think that the number of captured thrips species is higher when there are weeds and lower when there is only one plant species. This principle has been used in several crops to increase the insect diversity and foster the presence of natural enemies for pests (Schellhorn and Sork 1997).

Main thrips species. Vierbergen (2001) reported the presence of 41 thrips species in a field survey from 1994 to 2000 in the Netherlands. Among the 21 main species found in this study, 12 are also present in the south of France (*Aeolothrips intermedius*, *Melanthrips fuscus*, *Anaphothrips obscurus*, *F. occidentalis*, *Limothrips cerealium*, *T. angusticeps*, *T. fuscipennis*, *T. major*, *T. physapus*, *T. pillichi*, *T. tabaci*, *T. trehernei*). Among the 20 species found once or twice in the Netherlands, only one individual (*Ceratothrips ericae*) was found in Southern France in a rose greenhouse in late September 2006. All other species have not been observed in our sampling.

The *Phlaeothripidae*: Tubulifera feed, with few exceptions, on fungi, or more rarely on vascular plants. Mycophagous species colonize the branches and the bark (Okajima 2006). This lifestyle is probably why the Tubulifera represent only 0.58% of thrips on flowers collected at the Sophia-Antipolis site with only one family the *Phlaeothripidae* represented by two species of the *Halothrips* genus (*Haplothrips andresi* and *Haplothrips subtilissimus)*. These thrips have therefore no direct impact on agricultural production, except perhaps some phytophagous species of the *Haplothrips* genus (present in this study), which feed on plants (Mound 1997).

The Aeolothripidae, representing 3.35% of thrips recorded in Sophia-Antipolis, are facultative predators like *Aeolothrips*. This genus includes six species in our study among the 35 known in Europe including *Aeolothrips intermedius* (zur Strassen 2003). The larvae of this species, according to Bournier et al. (1978), are excellent predators of thrips, mites, whiteflies and psyllids.

The Melanthripidae (5.82% of species) are represented by two genera in Europe, one of which is present in this study: *Melanthrips* (18 species in Europe) is phytophagous, it is frequently present on the white flowers of different host plants. The major species in our study is *Melanthrips fuscus* found on *Brassicaceae,* especially in spring (Marullo and De Grazia 2013).

Exotic thrips species settled in Europe and France

Many exotic thrips settled in Europe and France thanks to plant trade (Vierbergen et al. 2006). This was made easy by the fact that they are small, able to rapidly generate large populations and by their inconspicuous behavior like thigmotactism and egg insertion inside plant tissues (Reynaud 2010). Several species are well established in the greenhouses where they find favorable climatic conditions. Our study confirms that some exotic species form a significant part of the *Thysanoptera* diversity in Southern France. 8.73% of the specimens collected during this study belong to six species called exotic i.e. not originating in the European area. One of them has been reported for the first time in France and Europe: *T. hawaiiensis* (Morgan) (Reynaud et al. 2008) and two are reported for the first time in France: *T. australis* (Bagnall) and *Microcephalothrips abdominalis* (Crawford) (Pizzol et al. 2012b). Other exotic species (*F. occidentalis*, *Pezothrips kellyanus* and *Heliothrips haemorrhoidalis*) were already known in our country. *F. occidentalis* and *T. hawaiiensis* together accounted for over 70% of exotic *Thysanoptera* found in our study. The characteristics of these thrips are summarized in Table 1.

Heliothrips haemorrhoidalis was found on a host plant (*Fragaria sp*.) on August 2008 in the Sophia-Antipolis site. It is present in many plants, e.g. on *Camelia*, *Citrus*, *Pinus* and *Dicksonia* in Southern Italy (Marullo 2009). According to this cited study, this species has been supplanted by *Pezothrips kellyanus* Bagnall; the latter species was also present in our study site most of the year (January, March, May to December) on 13 plant species (perennials and herbaceous or others). *Pezothrips kellyanus* would seem to have supplanted *H. haemorrhoidalis* in Italy.

Table 1: List of exotic thrips species between 2006 and 2009, with their main characteristics of diet (Pizzol et al. 2014), natural range, date of first record in Europe, principal hosts, and percentage of individuals sampled out of total individuals collected.

Species	Diet	Native range	1st recorded in Europe	Hosts	Percentage in relation to total sampling
Frankliniella occidentalis (Pergande, 1895)	phytophagous	North America	1983, Netherlands	polyphagous on flowers and leaves; plants and trees (Populus), plus vector diseases tobacco streak ilarvirus (TSV) and tomato spotted wilt virus (TSWV)	3.17%
Heliothrips haemorrhoidalis (Bouché, 1833)	phytophagous	C & S America	1833, Germany	Polyphagous (citrus, avocados and ornamental plants) in urban , agricultural and modified habitats, rarely forests, mainly greenhouses	0.13%
Microcephalothrips abdominalis (Crawford, 1910)	phytophagous	Tropical, subtropical	1999, Italy	Asteraceae e.g. Bidens formosa (cosmos), chrysanthemum, Helianthus, Pyrethrum, Tagetes, Zinnia	0.01%
Pezothrips kellyanus (Bagnall, 1916)	phytophagous	Cryptogenic	1981, Greece	Citrus	1.97%
Thrips australis (Bagnall, 1915)	phytophagous	Australasia	1930, Cyprus	Eucalyptus, Melaleuca	0.58%
Thrips hawaiiensis (Morgan, 1913)	phytophagous	Asia and Pacific	2006, France	Polyphagous on various crops such as tobacco, rose, coffee, mango, citrus, apple and pear	3.17%

Thrips new for Europe and France

T. australis is currently distributed in several European countries of the Mediterranean: Cyprus, Spain, Greece, Italy, and Portugal (Reynaud 2010). *Thrips australis* was present in Sophia-Antipolis from January to May and October to December on 9 plant species (Appendix I) and represented 0.58% of thrips collected outside.

Scirtothrips inermis (Priesner), a European species, has been recorded here for the first time in France. It seems to have caused damage on citrus fruits and leaves in Spain (Lacasa et al. 1996). *S. inermis* was present in Sophia-Antipolis all the year on 23 plant species (Appendix I) and represented 2.02% of thrips collected outside. It was also present inside the greenhouses (Pizzol et al. 2012a).

In addition, *Microcephalothrips abdominalis* and *T. hawaiiensis*, were seen for the first time during this study and have been reported to the authorities (Pizzol et al. 2012b, Reynaud et al. 2008).

Microcephalothrips abdominalis was mainly present on Asteraceae, including many ornamental species e.g. on *Cosmos*, *Chrysanthemum*, *Helianthus*, *Pyrethrum*, *Tagetes*, *Zinnia*. Its presence has also been reported on Orchids in Thailand (Kajita et al. 1992), in citrus orchards in Florida (Childers and Nakahara 2006) on tea cultures in Japan (Okada and Kudo 1982) and rice in South Korea (Choi et al. 1991). On the study site, *M. abdominalis* represented only 0.01% of thrips collected outside and on a single plant species (*Dittrichia viscosa*) in autumn (Pizzol et al. 2012b).

Thrips hawaiiensis represented 3.17% of the thrips sampled outside in this study i.e. as abundant as *F. occidentalis*. It is present throughout the year from January to December on 22 host plants. This species has been reported on many crops, such as tobacco (Kurosawa *et al*. 1964) and ornamental roses (Woo and Paik 1971). Chen and Lo (1987) considered *T. hawaiiensis* as one of the main thrips pests on vegetable crops in Taiwan.

Conclusions

Our study shows that a big diversity of *Thysanoptera* species was present on a huge range of diverse host plants for a large part of the year, at the campus. As some of the thrips are potentially very harmful, the surrounding vegetation represents a pest reservoir that can infest adjacent protected crops. Within the open grassland vegetation there was no pest dominance which could harm the wild vegetation. For crop raising in adjacent greenhouses, however, even diverse vegetation represents a source of pest input.

To control the pests, phytosanitary treatments against thrips are commonly and systematically made when the situation becomes critical (Liu 2008). Nevertheless, there are great problems linked to the use of insecticides, resistant strains have appeared (Humeres and Morse 2006) and negative effects on human health and non-target organisms are evident (Desneux et al. 2007). Therefore we suggest a good management and regular cutting cycles of the vegetation surrounding the greenhouses in order to help to control the pests. These add to the efficiency of IPM programs against thrips in rose greenhouses or others crops, thus avoiding the frequent application of pesticides.

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Appendix

Appendix I

List of all thrips present on different host plants. Host plants were classified according to the order of each thrips species appearance per month on the sampled plants.

Genus	Species	Period	Plant host for thrips (first observed presence for the month)
Aeolothrips	*collaris*	April	*Senecio sp., Urospermum dalechampii*
		May	*Avena fatua, Urospermum dalechampii*
		June	*Malva sylvestris, Beta vulgaris, Santolina chamaecyparissus, Buddleja sp., Hypericum sp., Viburnum tinus*
		July	*Clematis flammula, Daucus carota, Buddleja sp., Nerium sp., Reseda sp., Hypericum sp., Helianthus annuus*
	ericae	April	*Raphanus raphanistrum, Reseda sp., Prunus padus, Prunus ilicifolia, Sinapis sp., Dorycnium pentaphyllum, Cardaria draba, Cercis siliquastrum*
		May	*Rosa sp., Genista tinctoria, Cytisus scoparius, Reseda sp.*
		June	*Crepis sp., Reseda sp., Lavandula sp., Viburnum sp., Viburnum tinus*
	fasciatus	May	*Urospermum dalechampii*
	gloriosus	March	*Acacia howittii, Hippocrepis sp., Senecio sp.,Viburnum tinus, Olea europaea*
		April	*Prunus padus, Cercis siliquastrum,*
		May	*Olea europaea, Prunus ilicifolia*
		June	*Clematis flammula, Olea europaea*
		July	*Ligustrum ovalifolium*
	intermedius	May	*Centranthus ruber, Genista tinctoria, Malva sylvestris, Prunus ilicifolia*
	melaleucus	April	*Cercis siliquastrum*
		June	*Olea europaea*
	sp.	April	*Cardaria draba*
		May	*Raphanus raphanistrum, Urospermum dalechampii, Sinapis sp, Centranthus ruber, Genista tinctoria, Olea europaea*
		October	*Nerium sp.*
	tenuicornis	March	*Brassica napus, Calendula arvensis*
		April	*Calendula arvensis, Daucus carota, Cardaria draba, Urospermum dalechampii, Reseda sp., Euphorbia sp., Sinapis sp., Senecio sp., Prunus ilicifolia, Medicago sp.*
		May	*Centranthus ruber, Rosa sp., Urospermum dalechampii, Avena fatua, Prunus ilicifolia, Cytisus scoparius, Galactites elegans, Reseda sp., Angelica sylvestris, Pittosporum tobira, Sinapis sp., Raphanus raphanistrum, Santolina chamaecyparissus, Genista tinctoria, Olea europaea, Plantago lanceolata*
		June	*Malva sylvestris, Centranthus ruber, Echium vulgare, Salvia sp., Foeniculum vulgare, Nerium sp., Lavandula sp., Santolina chamaecyparissus, Hypericum sp., Reseda sp., Buddleja sp., Setaria sp., Genista tinctoria, Plantago lanceolata*
		July	*Buddleja sp., Centranthus ruber, Raphanus raphanistrum, Urospermum dalechampii*
Anaphothrips	*obscurus*	August	*Malva sylvestris*
Aptinothrips	*rufus*	May	*Avena fatua, Pittosporum tobira*
Bregmatothrips	*dimorphus*	October	*Senecio sp.*
Dendrothrips	*phyllireae*	September	*Osmanthus fragrans*
		October	*Polygala myrtifolia, Osmanthus fragrans*
Frankliniella	*occidentalis*	February	*Polygala myrtifolia, Senecio sp.*
		March	Pyrus sp., Senecio sp., Polygala myrtifolia
		April	Prunus cerasus, Prunus padus, Prunus ilicifolia, Reseda sp., Medicago sp, Polygala myrtifolia
		May	Cytisus scoparius, Rosa laevigata, Rosa sp., Urospermum dalechampii, Raphanus raphanistrum, Centranthus ruber, Polygala myrtifolia, Sinapis sp., Reseda sp., Malva sylvestris, Fremontodendron californicum, Santolina chamaecyparissus, Olea europaea, Nerium sp.
		June	Avena fatua, Galactites elegans, Nerium sp., Salvia sp., Polygala myrtifolia, Raphanus raphanistrum, Santolina chamaecyparissus, Erodium sp., Rosa sp., Centranthus ruber, Echium vulgare, Euphorbia sp.
		July	Malva sylvestris, Buddleja sp., Abelia sp., Agapanthus sp., Ligustrum ovalifolium , Calendula arvensis, Helianthus annuus, Platycodon grandiflorum
		August	Agapanthus sp., Helianthus annuus, Malva sylvestris, Reseda sp., Polygala myrtifolia, Calendula arvensis, Clematis flammula, Nerium sp., Senecio sp.
		September	*Foeniculum vulgare, Chenopodium album, Dittrichia viscosa, Senecio sp., Reseda sp.*
		October	*Polygala myrtifolia, Dittrichia viscosa, Osmanthus fragrans, Nerium sp., Buddleja sp., Crepis sp.*
		November	*Dittrichia viscosa, Polygala myrtifolia, Euphorbia sp.*
		December	*Polygala myrtifolia, Calendula arvensis*

Genus	Species	Period	Plant host for thrips (first observed presence for the month)
Haplothrips	*andresi*	February	*Senecio sp.*
		April	*Quercus sp., Cardaria draba*
		May	*Olea europaea*
		July	*Ligustrum ovalifolium, Quercus sp.*
		August	*Quercus sp.*
		September	*Quercus sp.*
		October	*Sinapis sp.*
	sp.	February	*Senecio sp.*
		April	*Prunus armeniaca, Prunus padus, Medicago sp., Pyrus sp.*
		May	*Avena fatua, Pittosporum tobira, Reseda sp.*
		June	*Echium vulgare, Olea europaea, Hypericum sp., Ligustrum ovalifolium, Prunus ilicifolia, Plantago lanceolata*
		July	*Raphanus raphanistrum*
		August	*Plantago lanceolata, Quercus sp., Foeniculum vulgare*
		September	*Urospermum dalechampii*
		October	*Reseda sp.*
		November	*Quercus sp.*
	subtilissimus	June	*Lavandula sp., Quercus sp.*
Heliothrips	*haemorrhoidalis*	August	*Fragaria sp.*
Limothrips	*cerealium*	March	*Avena fatua*
		April	*Avena fatua*
		May	*Avena fatua*
		June	*Avena fatua, Quercus sp., Cynoglossum sp., Reseda sp., Beta vulgaris, Echium vulgare, Olea europaea, Rosa sp.*
		July	*Daucus carota*
Melanthrips	*fuscus*	January	*Fumaria sp.*
		February	*Arabidopsis thaliana, Sinapis sp., Acacia dealbata, Taraxacum sp.*
		March	*Crepis sp., Sinapis sp., Raphanus raphanistrum, Brassica napus, Fremontodendron californicum, Euphorbia sp.*
		April	Daucus carota, Rosa sp., Cardaria draba, Sinapis sp., Reseda sp., Euphorbia sp., Avena sativa, Prunus ilicifolia, Calendula arvensis
		May	Raphanus raphanistrum, Sinapis sp., Reseda sp.
		June	Raphanus raphanistrum, Reseda sp.
		August	Nerium sp.
		October	Sinapis sp
	rivnayi	April	Cercis siliquastrum, Pittosporum tobira
Microcephalo-thrips	*abdominalis*	October	Dittrichia viscosa
Microcephalothrips	annulicornis	September	Daucus carota, Foeniculum vulgare
Odontothrips	dorycnii	April	Dorycnium pentaphyllum
		May	Genista tinctoria
		June	Lavandula sp., Genista tinctoria
	karnyi	October	Osmanthus fragrans, Heliotropium europaeum, Sinapis sp.
	loti	May	Nerium sp.
	sp.	May	Prunus ilicifolia
		June	Lavandula sp., Genista tinctoria, Quercus sp.
		July	Genista tinctoria
		October	Nerium sp., Senecio sp., Buddleja sp.
		November	Buddleja sp.
Oxythrips	*ajugae*	February	Senecio sp.
		March	Osmanthus fragrans, Polygala myrtifolia, Prunus armeniaca, Prunus ilicifolia, Senecio sp.
		April	Arbutus sp.
	nobilis	February	Acacia dealbata
Pezothrips	*kellyanus*	January	Osmanthus fragrans
		March	Pyrus sp.
		May	Acacia retinodes, Pittosporum tobira, Prunus ilicifolia, Nerium sp.
		June	Ligustrum ovalifolium
		July	Buddleja sp., Ligustrum ovalifolium, Abelia sp., Nerium sp.
		August	Buddleja sp., Jasminum sambac, Reseda sp., Nerium sp.
		September	Buddleja sp., Nerium sp.
		October	Buddleja sp., Prunus ilicifolia, Osmanthus fragrans, Reseda sp.
		November	Abelia sp., Arbutus sp., Buddleja sp., Osmanthus fragrans, Polygala myrtifolia, Prunus ilicifolia
		December	Osmanthus fragrans

Genus	Species	Period	Plant host for thrips (first observed presence for the month)
Rhipidothrips	*gratiosus*	April	Avena fatua, Avena sativa
Rubiothrips	*vitalbae*	October	Rosa sp.
Scirtothrips	*inermis*	January	Acacia dealbata, Arbutus sp.
		February	Acacia dealbata, Arbutus sp.
		March	Arbutus sp., Prunus ilicifolia, Prunus padus
		April	Prunus ilicifolia
		May	Rosa sp.
		June	Prunus ilicifolia, Reseda sp., Viburnum sp., Viburnum tinus
		July	Euphorbia sp., Viburnum tinus, Verbascum sp., Calendula arvensis
		August	Jasminum sambac, Reseda sp., Solanum nigrum, Prunus ilicifolia
		September	Prunus ilicifolia, Chenopodium album, Reseda sp., Smilax aspera
		October	Polygala myrtifolia, Sinapis sp., Prunus ilicifolia, Reseda sp., Rosa sp., Foeniculum vulgare, Buddleja sp., Salvia sp., Senecio sp.
		November	Polygala myrtifolia, Osmanthus fragrans, Prunus ilicifolia
		December	Acacia retinodes, Senecio sp., Polygala myrtifolia, Prunus ilicifolia
Scolothrips	latipennis	August	Convolvulus sp.
Stenothrips	graminum	April	Daucus carota, Avena fatua, Sinapis sp., Avena sativa
		May	Avena fatua, Cytisus scoparius
Taeniothrips	*inconsequens*	March	Polygala myrtifolia, Pyrus sp.
Tenothrips	*croceicollis*	May	Avena fatua
		July	Heriacum sp, Senecio sp., Crepis sp., Lactuca serriola, Sixalix atropurpurea
		August	Senecio sp., Heriacum sp., Lactuca serriola, Malva sylvestris, Ocimum basilicum, Euphorbia sp., Helianthus annuus, Verbascum sp., Plantago lanceolata, Calendula arvensis, Chondrilla juncea
		September	Andryala integrifolia, Senecio sp., Chondrilla juncea, Clematis flammula, Crepis sp., Foeniculum vulgare, Urospermum dalechampii, Calendula arvensis
		October	Dittrichia viscosa
	discolor	September	Sinapsis sp., Foeniculum vulgare, Uruspernum dalechampii
		October	Bellis perenis
	frici	February	Taraxacum sp.
		March	Prunus padus, Brassica napus, Andryala integrifolia
		April	Urospermum dalechampii, Senecio sp.
		May	Euphorbia sp., Urospermum dalechampii
		June	Crepis sp., Galactites elegans, Reseda sp., Taraxacum sp., Crepis nicaeensis, Euphorbia sp.
		July	Dittrichia viscosa, Senecio sp., Urospermum dalechampii, Crepis nicaeensis, Heriacum sp., Lactuca serriola, Calendula arvensis, Clematis flammula, Helianthus annuus, Plantago lanceolata, Platycodon grandiflorum, Asclepias tuberosa, Buddleja sp., Ligustrum ovalifolium
		August	Calendula arvensis, Heriacum sp., Lactuca serriola, Plantago lanceolata, Platycodon grandiflorum, Sixalix atropurpurea, Malva sylvestris, Ocimum basilicum, Cosmos bipinnatus, Reseda sp., Senecio sp., Verbascum sp., Chondrilla juncea, Clematis flammula
		September	*Andryala integrifolia, Buddleja sp., Senecio sp., Foeniculum vulgare, Chondrilla juncea, Crepis nicaeensis, Sinapis sp., Urospermum dalechampii, Dittrichia viscosa*
		October	*Prunus ilicifolia, Crepis nicaeensis*
	ononidis	August	*Convolvulus sp.*
		October	*Heliotropium europaeum*
	sp.	May	*Genista tinctoria*
		July	*Senecio sp.*
		August	*Foeniculum vulgare, Malva sylvestris*
		September	*Senecio sp., Sinapis sp, Bellis perennis, Calendula arvensis*
Thrips	*alni*	July	*Raphanus raphanistrum*
	angusticeps	January	*Senecio sp., Calendula arvensis*
		February	*Senecio sp., Acacia dealbata, Calendula arvensis, Hippocrepis sp., Taraxacum sp.*
		March	*Senecio sp., Calendula arvensis, Galactites elegans, Rosa sp.*
		April	*Calendula arvensis, Senecio sp.*
		May	*Calendula arvensis*
		August	*Calendula arvensis*
		October	*Senecio sp.*
		November	*Senecio sp., Prunus ilicifolia, Calendula arvensis*
		December	*Calendula arvensis, Senecio sp.*
	australis	January	*Acacia dealbata, Arbutus sp.*

Genus	Species	Period	Plant host for thrips (first observed presence for the month)
		February	*Acacia dealbata, Arbutus sp.*
		March	*Hippocrepis sp., Arbutus sp., Avena fatua*
		April	*Arbutus sp., Spiraea vanhouttei*
		May	*Rosa sp., Acacia retinodes*
		October	*Osmanthus fragrans, Arbutus sp.*
		November	*Buddleja sp.*
		December	*Arbutus sp.*
	brevicornis	May	*Centranthus ruber*
		June	*Centranthus ruber*
		July	*Centranthus ruber*
		August	*Abelia sp.*
		September	*Centranthus ruber*
		October	*Centranthus ruber*
		November	*Dittrichia viscosa*
	flavus	January	*Arbutus sp., Fumaria sp., Acacia dealbata*
		February	*Acacia dealbata, Acacia howittii, Sinapis sp., Arbutus sp.*
		March	*Acacia howittii, Arbutus sp., Prunus padus, Hippocrepis sp., Viburnum tinus, Pyrus sp., Cupressus sp.*
		April	*Arbutus sp., Rosa sp., Reseda sp., Prunus padus, Cistus sp., Malus sp., Spiraea vanhouttei, Cercis siliquastrum, Urospermum dalechampii*
		May	*Dorycnium pentaphyllum, Prunus ilicifolia, Rosa sp., Prunus lusitanica, Rosa laevigata, Malus sp., Acacia retinodes, Actinidia chinensis, Pittosporum tobira, Cytisus scoparius, Nerium sp., Centranthus ruber, Olea europaea*
		June	*Malva sylvestris, Galactites elegans, Rosa sp., Nerium sp.*
		July	*Buddleja sp., Daucus carota, Raphanus raphanistrum*
		August	*Jasminum sambac*
		September	*Prunus ilicifolia, Buddleja sp., Plantago lanceolata*
		October	*Osmanthus fragrans, Rosa sp., Buddleja sp., Smilax aspea, Arbutus sp., Nerium sp.,*
		November	*Arbutus sp., Osmanthus fragrans, Senecio sp.,*
		December	*Arbutus sp., Acacia retinodes, Senecio sp.*
	fuscipennis	January	*Acacia dealbata*
		April	*Spiraea vanhouttei*
	hawaiiensis	January	Acacia dealbata
		March	*Calendula arvensis, Rosa sp., Arbutus sp.*
		April	*Pyrus sp.*
		May	*Rosa sp., Nerium sp.*
		June	*Buddleja sp, Viburnum sp., Albizia julibrissin, Nerium sp., Viburnum tinus*
		July	*Daucus carota, Ligustrum ovalifolium, Albizia julibrissin, Buddleja sp., Nerium sp., Clematis flammula, Viburnum tinus, Abelia sp., Platycodon grandiflorum, Senecio sp., Agapanthus sp.*
		August	*Nerium sp., Albizia julibrissin, Asclepias tuberosa, Abelia sp., Buddleja sp.,*
		September	*Albizia julibrissin, Clematis flammula, Buddleja sp., Nerium sp., Sinapis sp., Dittrichia viscosa*
		October	*Osmanthus fragrans, Buddleja sp., Sinapis sp., Dittrichia viscosa*
		November	*Osmanthus fragrans, Senecio sp.*
		December	*Arbutus sp.*
	major	January	*Acacia dealbata, Arbutus sp.*
		February	*Arabidopsis thaliana, Arbutus sp., Acacia dealbata, Acacia howittii, Polygala myrtifolia, Senecio sp.*
		March	*Acacia howittii, Arbutus sp., Prunus padus, Hippocrepis sp., Viburnum tinus, Rosa sp., Ligustrum ovalifolium, Osmanthus fragrans, Prunus ilicifolia, Pyrus sp., Euphorbia sp., Olea europaea*
		April	*Arbutus sp., Daucus carota, Rosa sp., Acacia retinodes, Prunus cerasus, Prunus padus, Cercis siliquastrum, Malus sp., Spiraea vanhouttei, Prunus ilicifolia, Sinapis sp., Cytisus scoparius, Pittosporum tobira, Pyrus sp.*
		May	*Cytisus scoparius, Prunus lusitanica, Rosa laevigata, Rosa sp., Spiraea vanhouttei, Acacia retinodes, Dorycnium pentaphyllum, Fremontodendron californicum, Prunus ilicifolia, Actinidia chinensis, Angelica sylvestris, Centranthus ruber, Olea europaea, Foeniculum vulgare, Nerium sp.*
		June	*Polygala myrtifolia, Lavandula sp., Olea europaea, Prunus ilicifolia, Sinapis sp., Nerium sp., Rosa sp., Rubus fruticosus, Viburnum sp., Agapanthus sp., Albizia julibrissin, Buddleja sp., Viburnum tinus, Clematis flammula*
		July	*Ligustrum ovalifolium, Malva sylvestris, Albizia julibrissin, Raphanus raphanistrum, Heriacum sp.*
		August	*Abelia sp.*
		September	*Buddleja sp., Cardaria draba, Foeniculum vulgare, Senecio sp., Osmanthus fragrans*
		October	*Buddleja sp., Nerium sp., Osmanthus fragrans, Prunus ilicifolia, Rosa sp., Dittrichia viscosa, Smilax aspea, Arbutus sp., Senecio sp., Bellis perennis, Polygala myrtifolia*

Genus	Species	Period	Plant host for thrips (first observed presence for the month)
		November	*Arbutus sp., Buddleja sp., Osmanthus fragrans, Prunus ilicifolia*
		December	*Arbutus sp., Acacia retinodes, Senecio sp.*
	meridionalis	February	*Acacia howittii*
		March	*Acacia howittii, Senecio sp., Sinapis sp., Arbutus sp., Viburnum tinus, Prunus ilicifolia, Pyrus sp.*
		April	*Arbutus sp., Cardaria draba, Prunus armeniaca, Sinapis sp., Prunus cerasus, Prunus padus, Rosa sp., Cercis siliquastrum, Prunus ilicifolia, Pittosporum tobira*
		May	*Crataegus sp., Calicotome spinosa, Cytisus scoparius, Prunus ilicifolia, Acacia retinodes, Angelica sylvestris, Centranthus ruber, Pittosporum tobira, Prunus lusitanica*
		June	*Lavandula sp., Buddleja sp.*
		July	*Albizia julibrissin*
	minutissimus	March	*Hippocrepis sp., Arbutus sp., Rosa sp., Avena fatua, Prunus ilicifolia, Viburnum tinus, Calendula arvensis, Ligustrum ovalifolium, Osmanthus fragrans, Phillyrea angustifolia, Polygala myrtifolia, Pyrus sp., Euphorbia sp., Galactites elegans, Prunus armeniaca, Prunus padus, Senecio sp., Olea europaea, Cupressus sp.*
		April	*Arbutus sp., Calendula arvensis, Fremontodendron californicum, Phillyrea angustifolia, Prunus ilicifolia, Prunus padus, Rosa sp., Centranthus ruber, Prunus armeniaca, Pyrus sp., Spiraea vanhouttei, Cercis siliquastrum, Quercus sp., Acacia retinodes, Malus sp.*
		May	*Acacia retinodes, Crataegus sp., Rosa laevigata, Malva sylvestris, Olea europaea*
	nigropilosus	May	*Plantago lanceolata*
		July	*Centranthus ruber, Malva sylvestris*
		September	*Senecio sp., Malva sylvestris, Andryala integrifolia*
		October	*Foeniculum vulgare*
	pelikani	July	*Crepis sp., Senecio sp.*
		August	*Heriacum sp., Chondrilla juncea, Senecio sp.*
		September	*Andryala integrifolia, Chondrilla juncea, Crepis sp.*
		October	*Sinapis sp., Dittrichia viscosa*
	physapus	May	*Urospermum dalechampii*
		June	*Hypericum sp.*
		July	*Senecio sp., Daucus carota, Heriacum sp.*
		August	*Senecio sp., Sixalix atropurpurea*
		September	*Crepis sp., Sinapis sp., Andryala integrifolia, Senecio sp., Calendula arvensis*
		November	*Dittrichia viscosa, Senecio sp.*
	pillichi	April	*Rosa sp.*
	sp.	May	*Raphanus raphanistrum*
		July	*Centranthus ruber*
		September	*Osmanthus fragrans*
		October	*Senecio sp.*
		November	*Senecio sp.*
	tabaci	January	*Senecio sp., Calendula arvensis, Fumaria sp., Polygala myrtifolia*
		February	*Arabidopsis thaliana, Polygala myrtifolia, Senecio sp.*
		March	*Senecio sp., Sinapis sp., Viburnum tinus, Calendula arvensis, Olea europaea*
		April	*Calendula arvensis, Daucus carota, Cardaria draba, Sinapis sp., Raphanus raphanistrum, Reseda sp., Prunus cerasus, Prunus padus, Rosa sp., Malus sp., Senecio sp., Cistus sp., Dorycnium pentaphyllum, Acacia retinodes, Cercis siliquastrum, Medicago sp., Polygala myrtifolia, Reseda sp.*
		May	*Centranthus ruber, Cytisus scoparius, Rosa sp., Cardaria draba, Euphorbia sp., Reseda sp., Urospermum dalechampii, Calicotome spinosa, Dorycnium pentaphyllum, Fremontodendron californicum, Genista tinctoria, Prunus ilicifolia, Raphanus raphanistrum, Rosa laevigata, Erodium sp., Galactites elegans, Polygala myrtifolia, Reseda sp., Sinapis sp., Calicotome spinosa, Dorycnium pentaphyllum, Foeniculum vulgare, Malva sylvestris, Prunus lusitanica, Malus sp., Actinidia chinensis, Angelica sylvestris, Euphorbia sp., Nerium sp., Santolina chamaecyparissus, Genista tinctoria, Nerium sp., Olea europaea, Quercus sp.*
		June	*Malva sylvestris, Avena fatua, Bituminaria bituminosa, Centranthus ruber, Crepis sp., Echium vulgare,Galactites elegans, Nerium sp., Polygala myrtifolia, Raphanus raphasnistrum, Salvia sp., Santolina chamaecyparissus, Foeniculum vulgare, Lavandula sp., Erodium sp., Ligustrum ovalifolium, Pelagornium sp., Prunus ilicifolia, Reseda sp., Sinapis sp.,Taraxacum sp., Crepis nicaeensis, Genista tinctoria, Rosa sp., Allium sp., Beta vulgaris, Buddleja sp., Daucus carota, Fumaria sp., Plantago lanceolata, Rubus fruticosus, Setaria sp., Viburnum sp., Agapanthus sp., Albizia julibrissin, Euphorbia sp., Hypericum sp., Viburnum tinus, Abelia sp., Clematis fabula*

Genus	Species	Period	Plant host for thrips (first observed presence for the month)
		July	*Agapanthus sp., Buddleja sp., Centhranthus ruber, Clematis flammula, Daucus carota, Euphorbia sp., Ligustrum ovalifolium, Malva sylvestris, Reseda sp., Urospermum dalechanpii, Abelia sp., Santolina chamaecyparissus, Viburnum tinus, Albizia julibrissin, Foeniculum vulgare, Lavandula sp., Nerium sp., Bituminaria bituminosa, Convolvulus sp., Heliotropium europaeum, Raphanus raphanistrum, Verbascum sp., Heriacum sp., Hypericum sp., Plantago lanceolata, Platycodon grandiflorum, Hedera helix, Asclepias tuberosa, Helianthus annuus, Sixalis atropupurea*
		August	*Daucus carota, Ficus carica, Nerium sp., Agapanthus sp., Albizia julibrissin, Asclepias tuberosa, Buddleja sp., Helianthus annuus, Jasminum sambac, Platycodon grandiflorum, Reseda sp., Abelia sp., Malva sylvestris, Ocimim basilicum, Raphanus raphanistrum, Cosmos bipinnatus, Euphorbia sp., Solanum nigrum, Foeniculum vulgare, Sixalis atropupurea, Clematis flammula, Erigeron acer, Prunus ilicifolia, Senecio sp.*
		September	*Buddleja sp., Centranthus ruber, Chenopodium album, Clematis flammula, Nerium sp., Reseda sp., Foeniculum vulgare, Malva sylvestris, Senecio sp., Chondrilla juncea, Plantago lanceolata, Polygala myrtifolia, Sinapis sp., Cardaria draba, Daucus carota, Andryala integrifolia, Dittrichia viscosa, Bellis perenis, Osmanthus fragrans, Smilax aspea*
		October	*Polygala myrtifolia, Sinapis sp., Bellis perennis, Buddleja sp., Foeniculum vulgare, Nerium sp., Rosa sp., Abelia sp., Centranthus ruber, Dittrichia viscosa, Reseda sp., Cynoglossum sp., Chenopodium album, Osmanthus fragrans, Smilax aspea, Salvia sp., Arbutus sp., Senecio sp., Crepis sp.*
		November	*Dittrichia viscosa, Bellis perennis, Buddleja sp., Foeniculum vulgare, Polygala myrtifolia, Senecio sp., Silene vulgaris, Euphorbia sp.*
		December	*Polygala myrtifolia, Acacia retinodes, Senecio sp., Bellis perennis, Calendula arvensis*
	trehernei	April	*Senecio sp.*
	verbasci	July	*Verbascum sp.*
	vuilleti	July	*Centranthus rubber, Heriacum sp., Sixalix atropurpurea*
		August	*Sixalix atropurpurea*