

## Survey of thrips in Sri Lanka: A checklist of thrips species, their distribution and host plants

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### ABSTRACT

Thrips of Sri Lanka have been poorly studied despite their significance to agriculture and horticulture of the country. A survey of thrips and their host plants was conducted in several parts of Sri Lanka during 2005-2008, with a view to record the species present, their distribution, host plant relationships and damage caused. Over 1,000 plant species comprising crops, ornamental plants, weeds, shrubs, and trees were examined for thrips in 22 study sites, representing a range of habitats in nine districts covering 12 agrochemical regions of the country. Damage in plants due to thrips infestations was documented. This paper presents a list of 72 thrips species in 45 genera recorded during the survey from 324 host plant species in 83 plant families. *Megalurothrips usitatus*, *Thrips palmi*, and *Haplothrips gowdeyi* were the most widely distributed species. The grass infesting *Haplothrips* spp., several species of *Thrips*, *Microcephalothrips abdominalis*, *M. usitatus* and *Scirtothrips dorsalis* are some of the species with a large number of host records. *Thrips simplex* in particular was confined to the Upcountry Wet zone, while *Thrips flavus* was most widespread in this region and was present on almost all the vegetation. The survey identified 24 species of thrips represented in 20 genera that were not recorded previously from Sri Lanka. Majority of the thrips recorded are pest species, cosmopolitan in distribution. The most common damage due to thrips infestations was discolouration, scarring and browning of leaves and flowers, most pronounced in cut flowers. The survey updates the information on the Thysanoptera of Sri Lanka and highlights their importance in agriculture and floriculture.

**Key words:** agriculture, floriculture, damage, pest species, new records

### INTRODUCTION

Thrips (Order Thysanoptera) of the world comprise 5500 species in 750 genera (Moritz *et al.*, 2004). They are more common in warmer tropical parts of the world than in the temperate regions. About 50% of them are fungal feeders, while 40% feed on living tissues of dicotyledonous plants and grasses and the balance exploit primitive plants or are predatory (Morse and Hoddle, 2006). Species infesting higher plants are found on leaves, shoots, flowers, flower buds, axillary buds, young fruits and cones of Conifers (Lewis, 1973). Others inhabit lichens, mosses, ferns, dead tree trunks and leaf litter (Mound, 2004). Those infesting living tissues of plants are sap feeders while flower dwelling species feed on pollen. A few predate on mites, scale insects and other thrips (Mound, 2004).

Thrips play destructive as well as beneficial roles in agriculture. They are plant pests (Lewis, 1973; Morse and Hoddle, 2006) causing scarring

and silvering of leaves, petals and fruits, premature flower fall, pollen depletion, leaf shedding and also leaf deformity. They also form leaf galls (Lewis, 1973; Raman & Ananthakrishnan, 1984). Furthermore, thrips are important vectors of tospoviruses that cause serious crop losses around the world (Mound, 1996; Lewis, 1973). Predatory, species such as *Franklinothrips orizabensis* have been used in the biological control of *Scirtothrips persea* (Hoddle *et al.*, 2004). Thrips are increasingly being recognized as plant pollinators (Mound, 2004) in plants as diverse as oil palm (Syed, 1979) and rainforest trees (Nyree *et al.*, 2004).

The thrips of the Indian subcontinent have been extensively documented by Ananthakrishnan and Sen (1980) and Bhatti (2004a and b). Ananthakrishnan (1980) gives a key to all recorded Indian species of thrips and their host plants. Thrips of Sri Lanka have been poorly studied despite their significance to agriculture and horticulture of the country. The first extensive account of the Order

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Thysanoptera in Sri Lanka is by Schmutz (1913) where a total of 43 species are included. Thereafter, three *Haplothrips* species from Sri Lanka were recorded by Pitkin (1976) with their distribution and host plants. Many years later, some of the fungus feeding thrips of Sri Lanka was discussed in an account of nine genera of thrips from the Oriental region (Mound and Palmer, 1983). More recently, Oda *et al.* (1997) recorded thrips from ornamental plants in Sri Lanka. Wijerathna (1999) compiled a list of 18 species of thrips from 28 crop species, along with many other pests from a wide variety of crops, largely from unpublished records of the Department of Agriculture. The CABI/International crop protection compendium lists 16 species from Sri Lanka that are common pest thrips. A comprehensive list of Thysanoptera of Sri Lanka comprising 78 species in 46 genera was compiled from published literature and museum records, dating from 1913 up to the present survey by Tillekaratne *et al.* (2007).

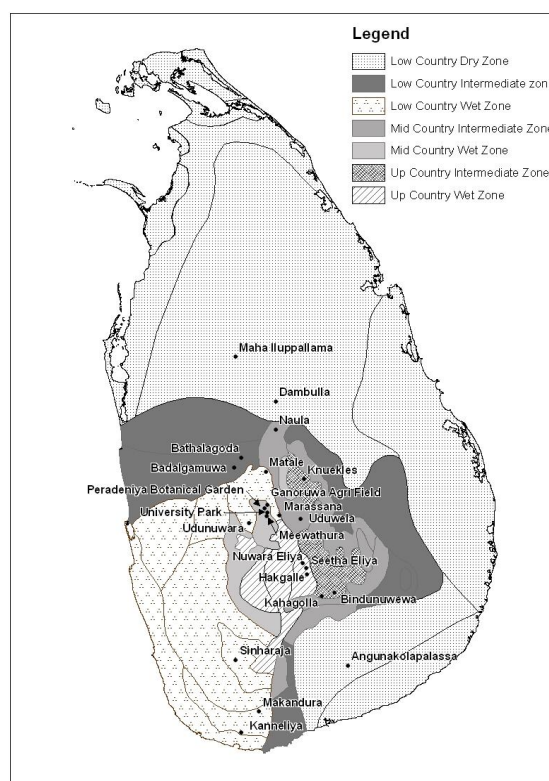
Since the pioneering work of Schmutz in 1913 and later by a few others on selected economic crops, a recent field study has not been conducted on thrips and their host plants in Sri Lanka. As thrips have increasingly become pests of crops, it is important to document the current distribution and host range of thrips as well as

the damage they inflict. Also, it is important to know the status of potential pest species since the early records. The present survey thus updates the information on the Thysanoptera of Sri Lanka and highlights their importance in agriculture and floriculture.

## MATERIALS AND METHODS

### Collection sites

Field collection of thrips was carried out in 22 sites located in nine administrative districts covering four climatic zones and 7 agroecological regions of the country. The selected sites are located at different elevations in the Dry, Wet, Intermediate and Montane Zones of the country. Selection of collection sites was based on accessibility, agroecological regions, proximity to Agricultural Research Stations, vegetation type and habitat type. Financial constraints for travel limited the number of visits to distant sites. The Northern and Eastern Provinces of the country were not included in the survey due to the civil unrest that prevailed in these areas during the study period. The locations of the 22 study sites in relation to the agro ecological regions of the country are shown in Fig. 1.



**Figure 1.** Locations of collection sites in relation to agroecological regions of Sri Lanka.

The 22 collecting sites represented the following habitat categories:

#### ***Agricultural fields (AF)***

Agricultural Research Stations, farmer fields and crop nurseries in Gannoruwa, Mahalluppallama, Sita Eliya, Bandarawela, Makandura, Angunakolapalassa, Bathalagoda, Dambulla, Marassana and Naula.

#### ***Floricultural fields (FF)***

Royal Botanical Gardens at Peradeniya, Hakgala Botanical Gardens, Peradeniya University Park and several cut flower farms in Nuwara Eliya and Bandarawela.

#### ***Natural Forests (NF)***

Knuckles forest reserve, Sinharaja rain forest, Badalgamuwa forest reserve, Kanneliya forest reserve.

#### ***Disturbed Habitats (DH)***

Road sides, foot paths, home gardens, fallow rice fields, weedy patches and grasslands in different collection sites.

#### **Collection of Thrips**

At each collection site, natural and cultivated vegetation (crops, ornamental plants, shrubs and trees) and weeds were checked for thrips. Different plant parts were closely examined for populations of thrips and individuals hand collected using a fine brush in to the collecting fluid; a mixture of alcohol, glycerol and acetic acid (AGA). Thrips on small branches were collected using a beating tray. At the time of collection, location of thrips on the plant and the type of damage observed due to thrips infestation were recorded. Felled tree trunks, freshly cut timber, logs and leaf litter were examined for fungus feeding thrips. Leaf litter samples collected (50 m<sup>2</sup>) were extracted in Berlese funnels.

#### **Identification of thrips**

Thrips were identified using taxonomic keys, digital images and descriptions of Mortiz *et al.* (2001), Moritz *et al.* (2004), Ananthakrishnan & Sen (1980), Palmer (1980), Palmer and Mound (1978). In addition, keys of Wilson (1975) and Pitkin (1976) were used for specific subfamilies and genera. The identity of difficult species and those previously not recorded from Sri Lanka were confirmed by Dr. L.A. Mound, Honorary Research Fellow, CSIRO Entomology, Australia, and Prof. J. S. Bhatti, New Delhi, India.

#### **Identification of host plants of thrips**

Plants infested with thrips and harbouring a population were considered as host plants. Well known common cultivated plants and weeds were identified in the field itself and others through herbarium specimens identified with help from the Department of Botany, University of Peradeniya and the National Herbarium, Peradeniya.

#### **Identification of thrips damage**

In thrips infested plants, different plant parts such as leaves, flowers, flower buds and fruits were closely examined for thrips damage and checked for probable signs of viral infection such as curling, crumpling and leaf discolouration. Leaves of plants with morphologically distinct galls were collected and examined for thrips.

## **RESULTS**

Thrips recorded during the survey are given in an annotated, systematic list (Appendix 1) arranged according to the classification of Mound and Kibby (1998). The distribution of each thrips species is stated in relation to the collection site/agroecological region/climatic zone. Host plants of each thrips species is arranged alphabetically according to genera and species (family). The type of damage in host plants due to thrips infestation is stated under each species. Pest thrips species and species previously not recorded from Sri Lanka are also indicated.

#### **Thrips species recorded**

A total of 72 species of thrips in 45 genera, belonging to 5 subfamilies were recorded during the survey. Of them, 57 were identified to species level, 9 to generic level and 6 to subfamily level. Subfamily Thripinae included the most number of species (34) and genera (18). Subfamily Phlaeothripinae was represented by 16 species in 11 genera making it the second largest subfamily of thrips, followed by subfamily Panchaethripinae that included 12 species in 11 genera. Each of the remaining subfamilies; Dendrothripinae and Idolothripinae included only 2- 4 species. Genus *Thrips* was the most speciose with 13 species, while each of the remaining genera was represented by 1-3 species only.

Among the thrips collected and identified during the survey are 18 genera and 25 species not previously recorded from Sri Lanka, according to the checklist of Tillekratne *et al.*,

(2007). The 18 newly recorded genera are *Astrothrips*, *Elixothrips*, *Oneilliella*, *Ayyaria*, *Arorathrips*, *Ceratothripoides*, *Craspedothrips*, *Dendrothripoides*, *Dichromothrips*, *Ernothrips*, *Rhamphothrips*, *Dolichothrips*, *Gynaikothrips*, *Karnyothrips*, *Membrothrips*, *Praepodothrips* and *Sphingothrips*. The identity of these new genera was confirmed by Prof. J. Bhatti of India and these genera are also known from India. The 25 new species recorded represented a single species each in 18 of the new genera together with *Caliothrips luckmanni*, 4 species in the genus *Thrips* and an unidentified species each in the genera *Gynaikothrips* and *Haplothrips*. The identity of these newly recorded species too was confirmed by Prof. J. S. Bhatti and they are also known from India. No endemic species of thrips were recorded. Of the recorded genera and species of thrips, 42 are cosmopolitan pest species and 5 are potential viral vector species according to Moritz *et al.* (2001). The most common thrips species recorded was *Haplothrips gowdeyi*, found on 44 of the 324 host plant species identified and was present in almost all the collection sites. *Thrips palmi* was the second most common species and was recorded from 43 plant species.

### Distribution of thrips

The 22 collection sites are distributed in the Dry (03 sites), Wet (11 sites), and Intermediate Zones (08 sites) of the country. Hence, the survey included more Wet zone collection sites that resulted in a higher number of thrips species (234 spp.) and thrips infested plant species (in 68 genera) being recorded from the Wet zone (Fig. 2). Although, there was a marked difference in the number of thrips infested plant species in the 3 climatic zones, the number of thrips species infesting these plants did not show a marked difference, but varied from 33 - 48 species in 18-23 genera.

The 22 collection sites came under 7 agroecological regions. Each of these 7 agroecological regions were represented by three or more collection locations except the Low Country Wet Zone (1 location) and Upcountry Intermediate Zone (2 locations). The number of thrips infested plant species and the number of thrips species recorded from each collection site and in each agro ecological region are given in Table 1. The largest number of thrips species (175 spp.) and thrips host species (43 spp.) were recorded from the Mid country Wet zone

In terms of individual collection sites, from Angunakolapellassa, located in the Low Country Dry zone, the largest number of thrips (25 species in 15 genera) and host plants (61 species

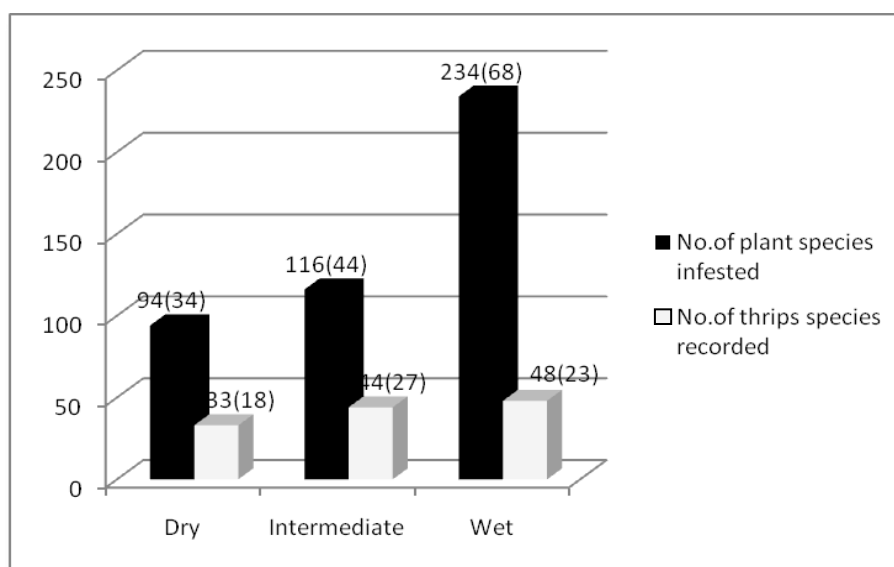
in 26 families) were recorded. Peradeniya University Park located in the Midcountry Wet zone had the second largest collection of thrips infested plant species and thrips species. Kahagolla in the Upcountry Intermediate zone had the third highest number of thrips infested plants and thrips species.

*Thrips flavus* in particular was abundant and widely distributed in the Upcountry Wet zone collection sites; Hakgala, Nuwara Eliya and, Sita Eliya (Fig.3). In this agroecological region almost all flowering plants were infested with this species. In collection sites of other agroecological regions this trend was not observed as shown in Fig.3. Furthermore, *Thrips simplex* in particular was recorded only from the Upcountry Wet zone. In the Dry zone, *Retithrips syriacus* was very common on mature leaves.

Many of the collection sites were agricultural habitats widely distributed in all the climatic zones, agroecological regions and at several elevations. The crops grown in these different agricultural habitats were largely vegetables, a few fruit crops and rice. These economic plant categories included the highest number of thrips infested plant hosts (156 plant species in 50 plant families). Forty five species of thrips in 28 genera infested the agricultural crop species. A similar number of thrips infested plant species (151 spp.) were recorded from disturbed habitats comprising fallow rice fields, home gardens, weedy patches/scrub and road sides; from where 37 thrips species were recorded. From floricultural sites, 26 thrips species were recorded from 75 species of flowers. The natural forest habitats supported the least number of thrips host plant species (51 spp.) that harboured only 26 thrips species.

### Host plant relationships of thrips

Over 1000 plant species were examined for thrips during the study. Thrips were present on 347 plant species. Of them, established populations of thrips species were present only in 324 plant species in 83 families. The other 23 plant species harboured only a few individuals of one or more thrips species. A total of 69 species of thrips were recorded from 324 plant species in 83 plant families. Of the plant families, Poaceae, Asteraceae, Fabaceae, ranked first, second and third, respectively, harbouring the most number of thrips species and genera. Poaceae with 38 species of grasses and Cyperaceae with 5 species of sedges harboured 6 different thrips species. Asteraceae with 38 host plant species harboured 11 different thrips species and Fabaceae with 36 spp. of host plants recorded 16 species of thrips.

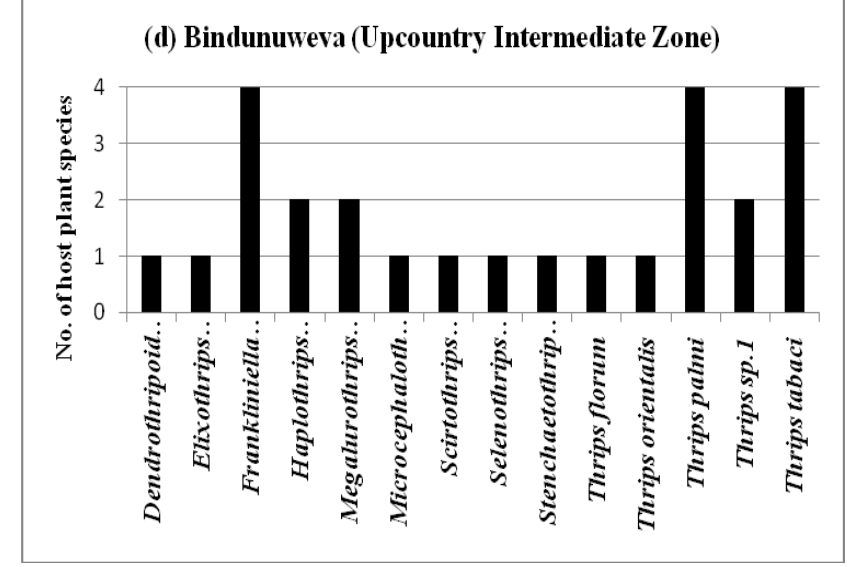
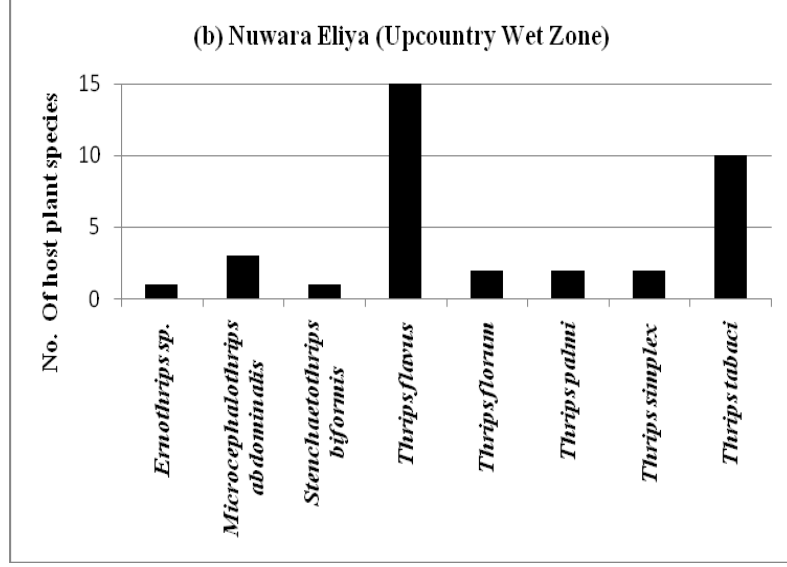
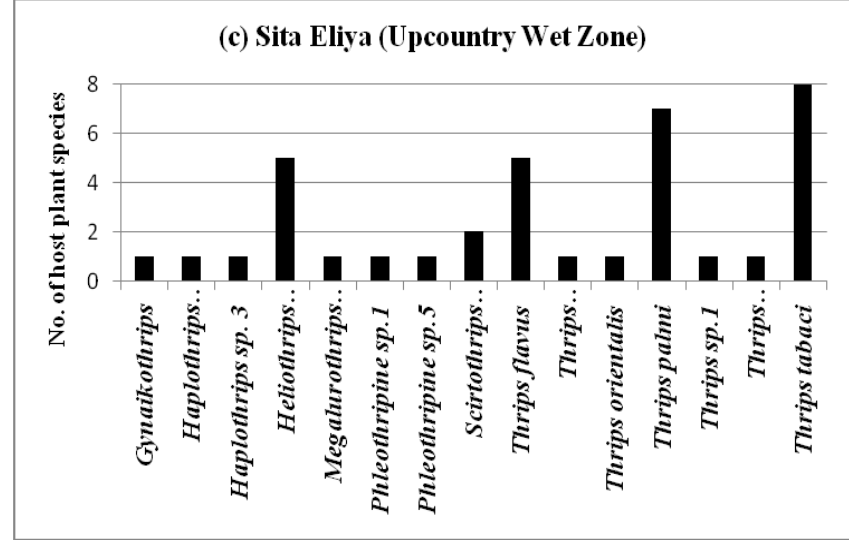
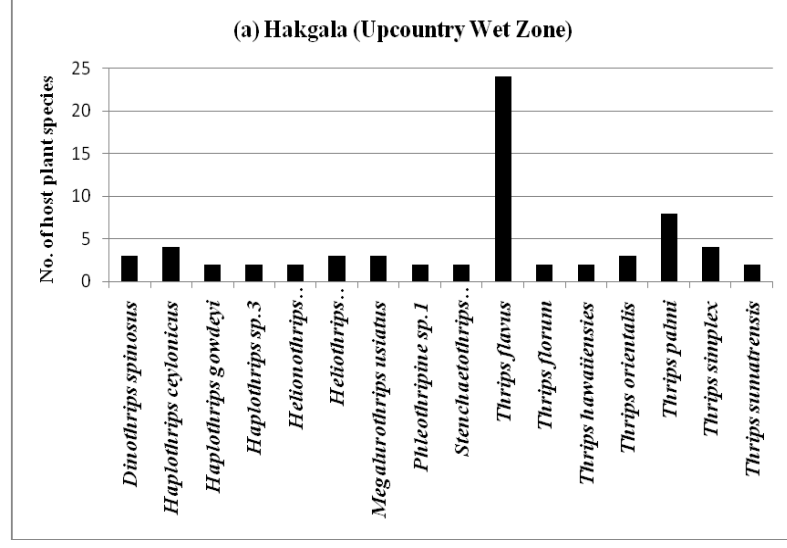


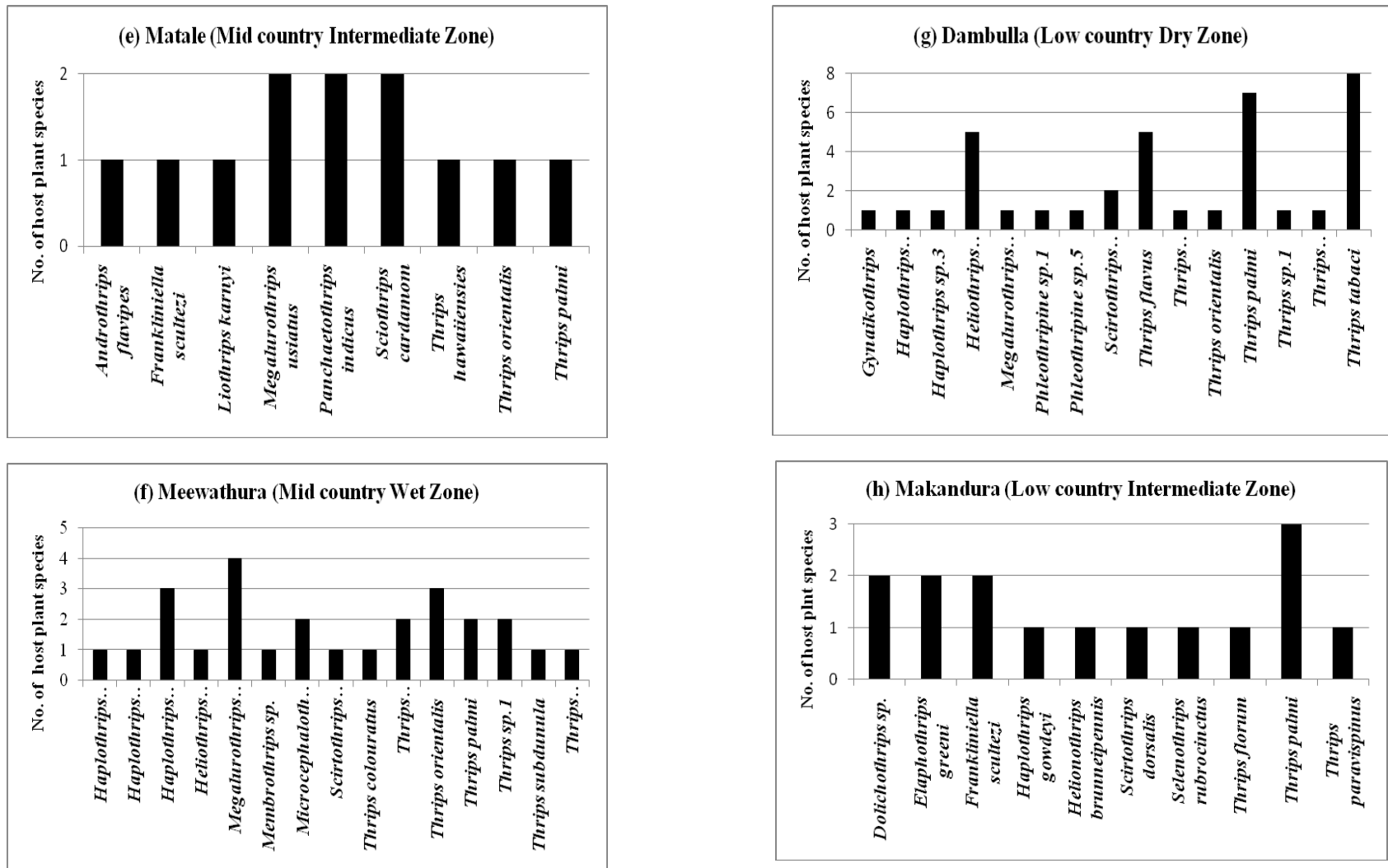
**Figure 2.** Distribution of thrips species and their host plant species in the major climatic zones of Sri Lanka. ( ) No. of genera recorded

**Table 1.** Number of thrips species and their host plants in different collection sites, agroecological regions and habitats.

Collection site & Agroecological region (Habitats)	No. of host species (Families)	No. of Thrips species (Genera)
<b>Low Country Dry Zone</b>	<b>94 (34)</b>	<b>33 (19)</b>
Angunakolapellassa (AF, DH)	61 (26)	26 (15)
Dambulla (AF, DH)	21 (11)	14 (10)
Maha Illuuppallma (AF, DH)	38 (20)	23 (16)
<b>Low Country Intermediate Zone</b>	<b>26 (14)</b>	<b>20 (12)</b>
Badalgamuwa (NF)	01 (01)	01 (01)
Bathalagoda (DH)	13 (05)	10 (07)
Makandura (AF, DH)	12 (08)	11 (08)
<b>Low Country Wet Zone</b>	<b>04 (02)</b>	<b>02 (02)</b>
Kanneliya (NF)	04 (02)	02 (02)
<b>Mid Country Intermediate Zone</b>	<b>48 (21)</b>	<b>22 (12)</b>
Knuckles (NF, AF)	35 (19)	16 (09)
Matale (AF, DH)	11 (08)	12 (10)
Naula (AF, DH)	07 (03)	05 (05)
<b>Mid Country Wet Zone</b>	<b>175 (51)</b>	<b>43 (21)</b>
Gannoruwa (AF)	21 (13)	12 (08)
Marassana (AF, DH)	32 (13)	11 (05)
Meewathura (AF)	20 (10)	15 (07)
Peradeniya Botanical gardens (FF)	40 (24)	21 (13)
Peradeniya University park (FF, DH)	59 (26)	21 (13)
Sinharaja (NF, AF)	21 (12)	13 (09)
Udunuwera (DH)	11 (05)	05 (04)
<b>Up Country Intermediate Zone</b>	<b>58 (24)</b>	<b>26 (17)</b>
Bidunuweva (AF)	16 (08)	14 (10)
Kahagolla (AF, DH)	48 (23)	21 (15)
<b>Up Country Wet Zone</b>	<b>69 (35)</b>	<b>23 (11)</b>
Hakgalle (FF, DH)	39 (24)	16 (08)
Nuwera Eliya (AF, DH, FF)	27 (15)	08 (04)
Sita Eliya (AF, DH, FF)	22 (16)	15 (10)

**AF** - Agricultural fields, **DH** - Disturbed habitats, **NF** - Natural forests, **FF** - Floriculture fields





**Figure 3.** Number of host plant species infested by different thrips species in selected collection sites; (a) Hakgala, (b) Nuwara Eliya, (c) Sita Eliya, (d) Bandarawela, (e) Matale, (f) Meewathura, (g) Dambulla and (h) Makandura.

*Haplothrips ganglbaueri* had the widest host range (49 spp.) present in Poaceae and Cyperaceae and similarly, *Anaphothrips sudanensis* was confined to a few grasses (3 spp.). From Poaceae was also recorded *Arorathrips mexicanus*. Other thrips species specific to certain plant families were: *Megalurothrips usitatus* and *Ayyaria chaetophora* to Fabaceae, *Sphingothrips trachypogon* to Ebenaceae, *Thrips simplex* to Iridaceae and *Microcephalothrips abdominalis* to Asteraceae. Genus *Thrips* had a wide host range infesting diverse families and genera of plants. *Thrips flavus*, *T. florum*, *T. hawaiiensis* and *T. palmi* in particular were recorded from over 40 host plant species and are the most polyphagous thrips species.

Leaf litter samples yielded mostly larval stages of thrips making identification difficult and in several samples none were found. The leaf litter dwelling thrips recorded were fungal feeding *Apelaunothrips* sp. and the predatory *Karnyothrips melaleucus*.

### Thrips damage

Different types of feeding damages were observed in thrips infested plants. Silvering, browning and discolouration of flowers and leaves were the most common types of damage observed. Certain species caused leaf deformity and/or premature flower fall. Thrips responsible for such damage belonged to the genera *Frankliniella* and *Thrips*. *Thrips hawaiiensis* caused premature flower loss. Infestations by *Scirtothrips dorsalis* caused young leaves of plants to curl and turn yellow. Gall formation was not so common in crops, but thrips in the family Phlaeothripidae produced leaf galls, particularly in *Ficus* spp. Feeding by *Gynaikothrips ficorum*, *Gigantothrips tibialis* and *Liothrips karnyi* resulted in leaf galls (Fig. 4). *Androthrips flavipes* infesting *Piper*, is considered a predator of gall inducing thrips. Bronzing in leaves was yet another type of damage observed in thrips infested plants; five species, *Ayyaria chaetophora*, *Dendrothripoides Dendrithrips innoxius*, *Pseudodendrothrips ornatissimus*, *Scirtothrips dorsalis* and *Thrips palmi* were responsible for this damage.



**Figure 4.** Leaf fold damage in *Ficus bengamina* due to infestation by *Gynaikothrips ficorum* (Inset).



## DISCUSSION

The survey represents the very first comprehensive collection of thrips from different habitats and regions in selected locations of Sri Lanka. It also enabled updating previous thrips records and their host plants, since the initial work on thrips in Sri Lanka by Schmutz (1913) and a few studies thereafter. A large number of the newly recorded and previously recorded thrips species being pests of cosmopolitan distribution is of concern. A likely factor that may be responsible for their spread is the cut flower and foliage trade that operates across trans-boundaries, which have become important export commodities in the developing and developed world. The degree to which pest species of thrips are emerging can only be estimated if baseline information is available on existing species in a country. This study attempted to fulfill this task through collections made in selected locations.

The number of thrips species recorded through the survey is relatively small in comparison to the fauna of neighbouring India where 625 species have been reported (Ananthakrishnan and Muraleedharan, 1974). The 24 species recorded for the first time in Sri Lanka also occur in India. Furthermore, of the recorded thrips, 53 species in 41 genera are shared with India. However, *Thrips parvispinus* recorded during this survey is not represented in India (Ananthakrishnan & Sen, 1980; Bhatti, 1990).

Although, the survey documented host plants and localities of the 72 species of thrips, no specific association between them was evident. Hence, no clear pattern of distribution in relation to host plants of the thrips was recognized. It is hoped that this survey would be an impetus for more intensive collections islandwide with the emphasis on agricultural and floricultural areas.

Symptoms of viral infection in thrips infested plants are often difficult to detect, as plants with nutrient deficiencies too tend to show similar symptoms. Therefore, without detailed investigations it is not correct to confirm viral symptoms. Tospoviruses are considered to depend on thrips for their existence in nature. Only 9 (0.2%) of the 5,500 known species of thrips have been shown to be associated with viral diseases (Mound, 1996). During the survey although 5 potential viral vector species were recorded, symptoms of viral disease was not observed.

In the subfamily Phlaeothripinae about 300 species are known to induce galls on nearly 300 angiosperm species (Raman and

Ananthakrishnan, 1984). Galls of four main morphotypes are induced by thrips. They are leaf fold galls, leaf rolled galls, ceratoneon pouch galls, axillary bud galls and convoluted leaf galls (Lewis, 1973, Ananthakrishna & Raman, 1989). Of them, leaf fold galls, leaf rolled galls and convoluted leaf galls were observed in plants (Appendix 1) infested by 5 thrips species in the subfamily Phlaeothripinae. Most thrips induced galls were infested with one or more secondary thrips species. But they are relatively fewer than the gall making thrips. *Androthrips flavipes* recorded on *Piper nigrum* was one such species of predatory thrips of gall forming thrips.

Of the 180 pest thrips of the world (Moritz *et al.*, 2001), 14 were recorded from vegetable crops during the study. Majority of the thrips species infesting vegetables were specific to the crop host rather than to the habitat or location. Leaf curl in chilli was widespread whenever infestations of *Scirtothrips dorsalis* were present as evident from previous work in Sri Lanka by Gunawardena (2002) and the world (Edwards and Dixon, 2005). Host records of thrips and their damage reported from vegetable crops in this study agree well with findings made in other countries (Moritz *et al.*, 2004), inferring the cosmopolitan nature of their distribution in relation to common vegetable crops of the world.

There is a paucity of published information on thrips damage to cut flowers in Sri Lanka. According to Halstead *et al.* (2000) in USA, the major pest thrips of rose, asters and chrysanthemum is *Frankliniella occidentalis*, the Western Flower Thrips. This species had been previously recorded from Sri Lanka on other plant hosts and not from cut flowers. The thrips species on gladiolus and anthuriums are very specific to their host and are found in all parts of the world where these plants are grown. In countries where gerberas are grown, heavy infestations of thrips have been reported (Spiers *et al.*, 2008), while in Sri Lanka the damage appears minimal with only small populations of thrips being recorded. It is important to conduct regular islandwide surveys of thrips to track the spread of thrips species, especially the pest species and new introductions into an island nation across trans-boundaries.

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**Appendix 1.** Systematic list of Thysanoptera<sup>1</sup> recorded during the survey with details of distribution, host records, and damage.

## SUBORDER TEREBRANTIA<sup>2</sup>

### Family Thripidae<sup>3</sup> – Subfamily Panchaetothripinae<sup>4</sup>

1. \*\* †*Astrothrips tumiceps* Karny 1923 – Angunakolapellassa  
*Dacus carota* L. (Apiaceae), *Elusine indica* (L.) Gaertn. (Poaceae).
2. †*Caliothrips indicus* (Bagnall 1913) – Maha-Illuppallama & Peradeniya  
Leaves of grasses (Poaceae).
3. \**Caliothrips luckmanni* Willson 1975 - Angunakolapellassa  
*Achyranthes aspera* L. (Amaranthaceae).  
**Damage:** Brown and white marks on leaves.
4. \*\* †*Elixothrips brevisetis* Bagnall 1919 - Peradeniya  
*Clerodendrum infortunatum* L. (Verbenaceae).
5. *Helionothrips brunneipennis* (Bagnall 1915) – Makandura and Peradeniya  
*Litsea glutinosa* (Lauraceae), *Michelia nilagirica* Zenker (Magnoliaceae), *Neolitsea cassia* (Lauraceae).  
**Damage:** Scarring and browning of leaves and the whole plant becomes severely affected.
6. †*Heliothrips haemorrhoidalis* (Bouché 1833) (Green house thrips) - Gannoruwa, Hakgala, Sita Eliya, Meewathura and Kahagolla  
*Annona muricata* L. (Annonaceae), *Averrhoa carambola* L. (Oxalidaceae), *Elaeocarpus montanus* Thw. (Elaeocarpaceae), *Euodia lunu-ankenda* (Gaertn.) Merr. (Rutaceae), *Glochidion pycnocarpum* (Muell.Arg.) Bedd. (Euphorbiaceae), *Gossypium arboreum* L. (Malvaceae), *Pelargonium graveolens* L'Hérit. (Geraniaceae), *Persea americana* Miller (Lauraceae), *Ternstroemia gymnathera* (Wight & Arn.) Beddome (Theaceae).  
**Damage:** Scaring and browning of leaves and buds.

<sup>1</sup> Thysanoptera, conventionally treated as an insect order, have been considered as superorder (Bhatti 1986, 1988, 1994, 2003) to include two orders Terebrantia and Tubulifera, which have been treated by other authors as suborders of order Thysanoptera.

<sup>2</sup> Since 1979 (Bhatti 1979a, Mound et al. 1980) the Terebrantia had been divided into 7 families: Uzelothripidae, Merothripidae, Aeolothripidae, Stenurothripidae / Adiheterothripidae, Thripidae, Hemithripidae / Fauriellidae, and Heterothripidae, included in 4 superfamilies: Uzelothripidae, Merothripidae, Aeolothripidae, Thripidae (Bhatti 1979a). An eighth family Melanthripidae was added (Bhatti 1990) under Aeolothripidae.  
More recently, the Terebrantia have been classified into 10 superfamilies comprising 28 families (Bhatti 2006).

<sup>3</sup> Following Priesner (1949), the family Thripidae was divided into two subfamilies Thripinae and Panchaetothripinae, until Bhatti (1979b, 1989) recognized four subfamilies under Thripidae. Subsequently (Bhatti 2006) members of Thripidae were classified into 12 different families in 10 superfamilies based essentially on previously unknown structural features.

<sup>4</sup> The genera of Panchaetothripinae in the present list are included in six different families under three superfamilies in Bhatti (2006). Dendrothripidae (Retithripidae: *Retithrips*), Rhipiphorotheipidae (Rhipiphorotheipidae: *Rhipiphorotheips*), Thripidae (Caliothripidae: *Caliothrips*, Heliothripidae: *Elixothrips*, *Helionothrips*, *Heliothrips*, *Oneilliella*, *Selenothrips*, Panchaetothripidae: *Panchaetothrips*, Trypactothripidae: *Astrothrips*, *Trypactothrips*).

7. †***Panchaetothrips indicus* Bagnall 1912** - Matale and Angunakolapellassa  
*Alpinia calcarata* Roscoe (Zingiberaceae), *Curcuma longa* L. (Zingiberaceae), *Elettaria cardamomum* (L.) Maton (Zingiberaceae).  
**Damage:** white streaks and patches on leaves.
8. †***Retithrips syriacus* Mayet 1890 (Castor thrips)**- Angunakolapellassa and Maha- Illuppallama  
*Gossypium arboreum* L. (Malvaceae), *Rosa indica* L. (Rosaceae), *Ricinus communis* L. (Euphorbiaceae), *Tinospora cordifolia* (Wild.) Hook. f. & Thoms. (Menispermaceae), *Terminalia arjuna* (Roxb.) Wight & Arn. (Combretaceae), *Vitis vinifera* L. (Xyridaceae).  
**Damage:** cloudy scarring, browning patches and discolouration in leaves.
9. ***Rhipiphorothrips pullchellus* (Morgan 1913)** - Peradeniya and Sinharaja forest  
*Clerodendrum tomentosum* R.Br. (Verbenaceae), *Clitoria guianensis* var. *guianensis* (Aubl.) Benth. (Fabaceae), *Cissus trilobata* Lam. (Vitaceae), *Lagerstroemia speciosa* (L.) Pers (Lythraceae).
10. †***Selenothrips rubrocinctus* (Giard 1901) -Red banded thrips** - Angunakolapellassa, Maha- Illuppallama, Makandura, Kahagolla and Bindunuwewa  
*Annona reticulata* L. (Annonaceae), *Nephelium lappaceum* L. (Sapindaceae), *Vitis vinifera* L. (Xyridaceae), *Lactuca sativa* L. (Asteraceae).
11. ***Trypactothrips rutherfordi* (Bagnall 1915)** – Peradeniya  
*Nauclea orientalis* (L.) L. (Rubiaceae), *Passiflora edulis* Sims. (Passifloraceae)  
*Michelia champaca* L. (Magnoliaceae).
12. \*\****Oneilliella* sp.** - Peradeniya.  
*Clerodendrum infortunatum* L. (Verbenaceae).

<b>Family Thripidae – Subfamily Dendrothripinae<sup>5</sup></b>
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13. †***Pseudodendrothrips ornatissimus* Schmutz 1913** – All climatic zones  
*Artocarpus heterophyllus* Lam. (Moraceae).  
**Damage:** Brown patches on leaves.
14. †***Dendrothrips sexmaculatus* Bagnall 1916** – Peradeniya  
*Flacourtia jangomas* (Lour.) Rausch. (Flacourtiaceae).

<b>Family Thripidae – Subfamily Thripinae</b>
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15. †***Anaphothrips sudanensis* Trybom 1911** – Bathalagoda, Kahagolla and Maha Illuppallma  
*Eleusine coracana* (L.), *Eleusine indica* (L.) Gaertn. and *Eragostis uniloides* (Retz.) (Poaceae).
16. \*\* †<sup>6</sup>***Arorathrips mexicanus* Crawford 1909** - Dry zone and Intermediate zones  
*Eleusine coracana* (L.) Gaertn. (Poaceae), *Eleusine indica* (L.) Gaertn. (Poaceae), *Sesamum indicum* L. (Pedaliaceae), *Chloris barbata* Sw. (Poaceae), *Dactyloctenium aegyptium* (L.) Willd. (Poaceae), *Hippeastrum puniceum* (Lam.) Kuntze. (Amaryllidaceae), *Coccinia grandis* (L.) J. Voight (Cucurbitaceae).

<sup>5</sup> Included in family Dendrothripidae of superfamily Dendrothripodea in Bhatti (2006).

<sup>6</sup> Included in family Chirothripidae of superfamily Thripodea in Bhatti (2006).

17. \*\* †**Ayyaria chaetophora Karny 1927** - Kahagolla and Angunakolapellassa  
*Arachis hypogaea* L., *Glycine max* (L.) (Merr.), *Phaseolus vulgaris* L. *Vigna radiata* L. (Wilczek), *Vigna unguiculata sesquipedalis* (L.) Verdc. (Fabaceae), *Tagetes erecta* L. (Asteraceae), *Ricinus communis* L. (Euphorbiaceae).
18. \*\* †**Ceratothripoides claratris (Shumsher 1946)** - Angunakolapellassa and Maha Illuppallama.  
*Capsicum annum* L. (Solanaceae), *Coccinia grandis* (L.) J.Voight (Cucurbitaceae), *Solanum trilobatum* L. (Solanaceae), *Solanum macrocarpon* L. (Solanaceae).
19. †**Chaetanaphothrips orchidii Moulton 1907** - Peradeniya and Bandarawela  
*Anthurium andraeanum* Linden (Araceae)  
**Damage:** White streaks on unopened flowers and leaves, discolouration of spathe.
20. †**Chaetanaphothrips signipennis Bagnall 1914** – Angunakolapellassa  
*Musa paradisiaca* L. (Musaceae).
21. \*\* †**Craspedothrips minor (Bagnall 1923)** – Angunakolapellassa, Maha-Illuppallama, Kahagolla and Dambulla  
*Cassia occidentalis* L. (Fabaceae), *Gloriosa superba* L. (Colchicaceae), *Gmelina asiatica* L. (Verbenaceae), *Ricinus communis* L. (Euphorbiaceae).
22. \*\* †<sup>7</sup> **Dendrothripoides innoxius (Karny 1914)** - Angunakolapellassa and Kahagolla  
*Ipomoea batatas* (L.) Lam. and *Ipomoea indica* (Burm.f.) Merr.(Convolvulaceae).  
**Damage:** Bronzing of leaves.
23. \*\***Dichromothrips smithi (Zimmermann 1900)** - Sinharaja forest *Arundinia graminifolia* (D.Don) Hochr (Orchidaceae).
24. \*\***Ernothrips sp.**- Kahagolla and Nuwara Eliya  
*Hedyotis* sp. (Rubiaceae), *Hippeastrum puniceum* (Lam.) Kuntze (Amaryllidaceae).
25. †**Frankliniella schultzei (Trybom 1910)** – (Common blossom thrips) – all climatic zones  
*Abelmoschus esculentus* (L.) Moench Malvaceae), *Andrographis paniculata* (Burm.f.) Wall.ex Nees (Acanthaceae), *Aporosa lindleyana* (Wight)Baill. (Euphorbiaceae), *Arachis hypogaea* L. (Fabaceae), *Capsicum annum* L.(Solanaceae), *Dichrostachys cinerea* (L.) Wight & Arn. (Fabaceae), *Gloriosa superba* L. (Colchicaceae), *Gmelina asiatica* L. (Verbenaceae), *Hibiscus vitifolius* L. (Malvaceae), *Zinnia* sp., (Asteraceae), *Impatiens repens* Moon (Balsaminaceae), *Ipomoea indica* (Burm.f.) Merr. (Convolvulaceae), *Ocimum basilicum* L. (Lamiaceae), *Osbeckia octandra* (L.) DC. (Melastomataceae), *Solanum macrocarpon* L. (Solanaceae), *Solanum violaceum* Ortega.(Solanaceae), *Thunbergia grandiflora* (Roxb.ex Rottler) (Acanthaceae), *Zinnia* sp. (Asteraceae).  
**Damage:** Scarring, browning and discolouration of flowers.
26. †**Frankliniella occidentalis (Pergande 1895) (Western flower thrips)**  
Angunakolapellassa, Bathalagoda, Maha- Illuppallama and Knuckles forest  
*Ageratum conyzoides* L., (Asteraceae), *Eichhornia crassipes* (Mart.) Solms-Laub. (Pontederiaceae), *Nelumbo nucifera* Gaertn. (Nelumbonaceae), *Solanum violaceum* Ortega (Solanaceae).  
**Damage:** Scarring, browning and discolouration of flowers.
27. †**Megalurothrips usitatus (Bagnall 1913)** – All agroecological regions  
*Arachis hypogaea* L. (Fabaceae), *Cajanus cajan* (L.) Millsp.(Fabaceae), *Cassia auriculata* L. (Fabaceae), *Cleome chelidonii* L.f. (Capparaceae), *Crotolaria juncea* L. (Fabaceae), *Crotolaria micans* Link (Fabaceae), *Crotolaria* sp.1 (Fabaceae), *Desmodium heterophyllum* (Willd.)DC. (Fabaceae), *Erythrina variegata* L. (Fabaceae), *Gliricidia sepium* (Jacq.) Walp. (Fabaceae), *Hiptage benghalensis* (L.) Kurz (Malpighiaceae), *Phaseolus lunatus* L. (Fabaceae), *Phaseolus vulgaris* L. (Fabaceae), *Pueraria phaseoloides* (Roxb.)Benth. (Fabaceae), *Sesbania grandiflora*

(L.) Poir. (Fabaceae), *Vigna mungo* (L.) (Fabaceae), *Vigna unguiculata* (L.) Walp. (Fabaceae), *Vigna unguiculata sesquipedalis* (L.) Verdc. (Fabaceae).

**Damage:** Scarring, browning and discolouration of flowers and buds.

**28. †*Microcephalothrips abdominalis* (Crawford 1910) (Composite Thrips)**

All agroecological regions

*Ageratum conyzoides* L., *Bellis perennis* L., *Bellis* sp., *Bidens pilosa* L., *Bidens* sp., *Callistephus chinensis* (L.) Nees, *Chrysanthemum segetum* L., *Coreopsis grandiflora* Hogg ex Sweet, *Cosmos sulphureus* Cav., *Dahlia hortensis*, *Emilia exserta* Fosberg, *Emilia speeseae* Fosberg, *Eregeron sublyratus* DC., *Euandatorium inulifolium* HBK, *Eupatorium odoratum* L., *Gerbera jamesonii* Adlam, *Helianthus annuus* L., *Heliopsis helianthoides* (L.) Sweet, *Mikania cordata* (Burm.) (Asteraceae), *Solidago canadensis* L., *Spilanthes calva* DC, *Spilanthes jabadicensis* A.H.Moore, *Tagetes erecta* L., *Tithonia diversifolia* (Hemsl.) A.Gray, *Tridax procumbens* L., *Wedelia chinensis* (Osbeck) Merr. (Asteraceae).

**Damage:** Scarring, browning and discolouration of flowers.

**29. †<sup>7</sup>*Neohydatothrips samayunkur* Kudô 1995 – (Marigold thrips) Bandarawela**

*Tagetes erecta* L (Asteraceae).

**30. \*\* †*Rhamphothrips pandens* Sakimura 1983 - Knuckles forest, Kahagolla and Maha Illuppallama**

*Cassia occidentalis* L. (Fabaceae), *Clerodendrum tomentosum* R.Br. (Verbenaceae), *Clitoria guianensis* var. *guianensis* (Aubl.) Benth. (Fabaceae), *Hibiscus vitifolius* L. (Malvaceae), *Lagerstroemia speciosa* (L.) Pers (Lythraceae).

**31. †*Sciothrips cardamomi* (Ramakrishna 1935) (Cardamom thrips) - Matale and Knuckles Region**

*Elettaria cardamomum* (L.) Maton (Zingiberaceae).

**Damage:** Streaking and wilting of cardamom leaves.

**32. †*Scirtothrips dorsalis* Hood 1919 (Chilli thrips) – All climatic zones**

*Abelmoschus esculentus* (L.) Moench (Malvaceae), *Amaranthus spinosus* L (Amaranthaceae), *Capsicum frutescens* L. (Solanaceae), *Capsicum annum* L. (Solanaceae), *Citrus limon* (L.) Burm. f. (Rutaceae), *Dacus carota* L. (Apiaceae), *Diplocyclos palmatus* (L.) C. Jeffrey (Cucurbitaceae), *Elettaria cardamomum* (L.) Maton (Zingiberaceae), *Euodia lunu-ankenda* (Gaertn.) Merr. (Rutaceae), *Fragaria vesca* L. (Rosaceae), *Limonia acidissima* L. (Rutaceae), *Mangifera indica* (L.) (Anacardiaceae), *Monodora myristica* (Gaertn.) Dunal (Annonaceae), *Psidium guajava* L. (Myrtaceae), *Punica granatum* L. (Punicaceae), *Rosa indica* L. (Rosaceae), *Solanum tuberosum* L. (Solanaceae), *Spondias cytherea* Sonn. (Anacardiaceae).

**Damage:** Curling of leaves, bronzing and deformity of leaves.

**33. †*Stenchaetothrips biformis* (Bagnall 1913) (Rice thrips)-Bathalagoda, Maha Illuppallma and Knuckles region**

*Oryza sativa* L. (Poaceae).

**Damage:** Streaking of leaves and wilting of seedlings.

**34. †*Thrips coloratus* Schmutz 1913 - Meewathura and Knuckles forest**

*Mangifera indica* (L.) (Anacardiaceae), *Eupatorium odoratum* L. (Asteraceae).

**35. †*Thrips flavus* Schrank 1776 – Wide spread in Upcountry Wet zone**

*Agapanthus umbellatus* L'Hérit. (Agapanthaceae), *Alstroemeria* sp. (Alstroemeriaceae), *Amaryllis belladonna* L. (Liliaceae), *Azalea japonica* Gray (Ericaceae), *Brugmansia suaveolens* (Humb. & Bonpl. Ex Willd.) (Bercht. & Presl.) Solanaceae, *Caliandra surinemensis* Benth. (Fabaceae), *Callicarpa* sp. (Verbenaceae), *Callistephus chinensis* (L.) Nees (Asteraceae), *Canna generalis* L. (Cannaceae), *Cestrum elegans* (Brongn.) Schlecht. (Solanaceae), *Chrysanthemum segetum* L. (Asteraceae), *Clerodendrum serratum* (L.) Moon (Verbenaceae), *Eupatorium* sp. (Asteraceae),

<sup>7</sup> Included in family Sericothripidae of superfamily Thripodea in Bhatti (2006).

*Gerbera* sp. (Asteraceae), *Gladiolus* sp. (Iridaceae), *Hydrangea macrophylla* (Thunb.) Ser. (Hydrangeaceae), *Impatiens hawkeri* Bull. (Balsaminaceae), *Lilium candidum* L. (Liliaceae), *Limonium* sp. (Plumbaginaceae), *Lobularia maritima* (L.) Desv. (Brassicaceae), *Lupinus* sp. (Fabaceae), *Miconia calvenscens* DC. (Melastomataceae), *Monodora myristica* (Gaertn.) Dunal (Annonaceae), *Ornithogalum thyrsoides* Jacq. (Hyacinthaceae), *Petunia x hybrida* (Solanaceae), *Phlox amoena* Sims. (Polemoniaceae), *Pyrus communis* L. (Rosaceae), *Rosa indica* L. (Rosaceae), *Spiraea cantoniensis* Lour. (Rosaceae), *Xerochrysum bracteata* (Vent.) Tzvelev. (Asteraceae), *Zantedeschia aethiopica* (L.) Spreng. (Araceae).

**Damage:** Scarring, browning and discolouration of flowers.

**36. †*Thrips florum* Schmutz 1913 – Wet and Intermediate zones**

*Acacia pennata* (L.) Wild. (Fabaceae), *Aleurites montana* (Lour.) E. Wilson (Euphorbiaceae), *Amherstia nobilis* Wall. (Fabaceae), *Brunfelsia latifolia* Benth. (Solanaceae), *Callistephus chinensis* (L.) Nees (Asteraceae), *Canna generalis* L. (Cannaceae), *Cassia didymobotrya* Fresen. (Fabaceae), *Celosia argentea* L. (Amaranthaceae), *Citrus grandis* (L.) Osbeck. (Rutaceae), *Citrus medica* L. (Rutaceae), *Clerodendrum splendens* G. Don ex James (Verbenaceae), *Coccinia grandis* (L.) J. Voight (Cucurbitaceae), *Coffea arabica* L. (Rubiaceae), *Couroupita surinamensis* Mart. ex O. Berg (Lecythidaceae), *Crotolaria pallida* Ait. (Fabaceae), *Gardenia jasminoides* J. Ellis (Rubiaceae), *Gloriosa superba* L. (Verbenaceae), *Hedyotis fruticosa* L. (Rubiaceae), *Helicteres isora* L. (Sterculiaceae), *Hibiscus rosa-sinensis* L. (Malvaceae), *Hydrangea macrophylla* (Thunb.) Ser. (Hydrangeaceae), *Ipomoea indica* (Burm.f.) Merr. (Convolvulaceae), *Lantana camara* L. (Verbenaceae), *Leea indica* (Burm.f.) Merr. (Leeaceae), *Lilium candidum* L. (Liliaceae), *Lobularia maritima* (L.) Desv. (Brassicaceae), *Ludwigia peruviana* (L.) Hara (Onagraceae), *Moringa oleifera* Lam. (Moringaceae), *Pentas lanceolata coccinea* (Rubiaceae), *Saraca asoca* (Roxb.) Wilde (Fabaceae), *Spathiphyllum* sp. (Araceae), *Spathodea campanulata* Beauv. (Bignoniaceae), *Tabebuia serratifolia* (Vahl) Nicholson, *Tecoma stans* (L.) Kunth (Bignoniaceae), *Thevetia peruviana* (Pers.) Merr. (Apocynaceae), *Urena lobata* L. (Malvaceae).

**37. †*Thrips hawaiiensis* (Morgan 1913) - Wet and Intermediate zones**

*Brunfelsia latifolia* Benth. (Solanaceae), *Camellia sinensis* (L.) Kuntze (Theaceae), *Canna generalis* L. (Cannaceae), *Chrysanthemum segetum* L. (Asteraceae), *Citrus grandis* (L.) Osbeck. (Rutaceae), *Citrus limon* (L.) Burm.f. (Rutaceae), *Citrus medica* L. (Rutaceae), *Citrus megaloxycarpa* var. *pennivesiculata* Lush. (Rutaceae), *Citrus reticulata* Blanco (Rutaceae), *Cleome chelidonii* L.f. (Capparaceae), *Eupatorium* sp. (Asteraceae), *Gardenia jasminoides* J. Ellis (Rubiaceae), *Impatiens balsamina* L. (Balsaminaceae), *Malvaviscus penduliflorus* Mocino. & Sesse. ex DC. (Malvaceae), *Mangifera indica* (L.) (Anacardiaceae), *Melilotus indicus* (L.) All. (Fabaceae), *Muntingia calabura* L. (Tiliaceae), *Musa paradisiaca* L. (Musaceae), *Persea americana* Miller (Lauraceae), *Pseudocalymma alliaceum* (Lam.) Sandwith (Bignoniaceae), *Psidium guajava* L. (Myrtaceae), *Rosa indica* L. (Rosaceae), *Saraca thaipingensis* Prain (Fabaceae), *Saraca asoca* (Roxb.) de Wild (Fabaceae), *Syzigium* sp. (Myrtaceae), *Ocimum tenuiflorum* L. (Lamiaceae).

**Damage:** Scarring, browning and discolouration of flowers.

**38. \**Thrips levatus* Bhatti 1980 – Peradeniya**

*Napoleona imperialis* Pal de Beauv. (Lecythidaceae).

**39. \* †*Thrips orientalis* (Bagnall 1915) - All agroecological regions**

*Carissa carandas* L. (Apocynaceae), *Carissa spinarum* L. (Apocynaceae), *Dichrostachys cinerea* (L.) Wight & Arn. (Fabaceae), *Ervatamia divaricata* (L.) Burkill (Apocynaceae), *Jasminum grandiflorum* L. (Oleaceae), *Jasminum sambac* (L.) Ait. (Oleaceae), *Kopsia fruticosa* (Ker-Gawl.) A. DC. (Apocynaceae), *Phyllanthus emblica* L. (Euphorbiaceae), *Vitex negundo* L. (Verbanaceae).

**40. †*Thrips palmi* Karny 1925 - All agroecological regions**

*Abelmoschus esculentus* (L.) Moench (Malvaceae), *Amaranthus spinosus* L. (Amaranthaceae), *Basilicum polystachyon* (L.) Moench (Lamiaceae), *Bellis* sp. *Callistephus chinensis* (L.) Nees (Asteraceae), *Canvalia ensiformis* (L.) DC. (Fabaceae), *Capsicum annum* L. (Solanaceae), *Capsicum frutescens* L. (Solanaceae), *Celosia argentea* L. (Amaranthaceae),



*Chrysanthemum segetum* L. (Asteraceae), *Coriandrum sativum* L. (Apiaceae), *Cucumis melo* L. (Cucurbitaceae), *Cucumis sativus* L. (Cucurbitaceae), *Cucurbita pepo* L. (Cucurbitaceae), *Dacus carota* L. (Apiaceae), *Eleusine coracana* (L.) (Poaceae), *Fragaria vesca* L. (Rosaceae), *Gerbera jamesonii* Adlam (Asteraceae), *Helianthus annuus* L. (Asteraceae), *Hippeastrum puniceum* (Lam.) Kuntze (Amaryllidaceae), *Ipomoea batatas* (L.) Lam. (Convolvulaceae), *Limonium* sp. (Plumbaginaceae), *Luffa acutangula* (L.) Roxb. (Cucurbitaceae), *Luffa cylindrica* (L.) M. Roemer (Cucurbitaceae), *Momordica charantia* L. (Cucurbitaceae), *Ocimum basilicum* L. (Lamiaceae), *Ocimum tenuiflorum* L. (Lamiaceae), *Phaseolus lunatus* L. (Fabaceae), *Phyllanthus emblica* L. (Euphorbiaceae), *Pteridium* sp. (Dennstaedtiaceae), *Pyrus communis* L. (Rosaceae), *Solanum macrocarpon* L. (Solanaceae), *Solanum mauritianum* Scop. (Solanaceae), *Solanum* sp. (Solanaceae), *Solanum tuberosum* L. (Solanaceae), *Solanum violaceum* Ortega. (Solanaceae), *Stachytarpheta urticaefolia* (Salisb.) Sims (Verbenaceae), *Strobilanthes calycina* Nees (Acanthaceae), *Strobilanthes* sp. (Acanthaceae), *Vigna mungo* (L.) (Fabaceae), *Vigna radiata* L. (Wilczek) (Fabaceae), *Vigna unguiculata* (L.) Walp. (Fabaceae), *Vigna unguiculata sesquipedalis* (L.) Verdc. (Fabaceae), *Zantedeschia aethiopica* (L.) Spreng. (Araceae).

**Damage:** Scarring, browning and discolouration of flowers and leaves.

41. \* †*Thrips parvispinus* (Karny 1922) - Makandura, Marassana and Peradeniya  
*Carica papaya* L. (Caricaceae), *Verbena bonariensis* L. (Verbenaceae).

42. †*Thrips simplex* (Morison 1930) (Gladiolus Thrips) – confined to Upcountry Wet zone  
*Aristea ecklonii* Baker (Iridaceae), *Canna generalis* L. (Cannaceae), *Gladiolus* sp. (Iridaceae), *Watsonia pyramidata* (Iridaceae), *Zantedeschia aethiopica* (L.) Spreng. (Araceae).  
**Damage:** Scarring, browning and discolouration of flowers and leaves in Gladiolus.

43. \* †*Thrips subnudula* (Karny 1926) - All agroecological regions  
*Aerva javanica* (Burm.f.) Juss. ex Schult. (Amaranthaceae), *Calotropis gigantea* (L.) R.Br. (Asclepidaceae), *Cinnamomum verum* J. Presl. (Lauraceae), *Mangifera indica* (L.) (Anacardiaceae), *Mimosa pudica* L. (Fabaceae), *Spondias dulcis* Sol. ex Parkinson. (Anacardiaceae).

44. \* †*Thrips sumatrensis* Priesner 1934 – All agroecological regions  
*Caesalpinia pulcherrima* (L.) Sw. (Fabaceae), *Canna generalis* L. (Cannaceae), *Dahlia hortensis* (Asteraceae), *Dahlia pinnata* Cav. (Asteraceae), *Gliricidia sepium* (Jacq.) Walp. (Fabaceae), *Helianthus annuus* L. (Asteraceae), *Ludwigia decurrens* Walt. (Onagraceae), *Melastoma malabathricum* L. (Melastomataceae), *Samanea saman* (Jacq.) Merr. (Fabaceae), *Sarca asoca* (Roxb.) de Wild (Fabaceae), *Sesamum indicum* L. (Pedaliaceae), *Sesbania grandiflora* (L.) Poir. (Fabaceae), *Tecoma stans* (L.) Kunth (Bignoniaceae), *Urena lobata* L. (Malvaceae), *Zinnia* sp. (Asteraceae).  
**Damage:** Scarring, browning and discolouration of flowers.

45. †*Thrips tabaci* Lindeman 1889 (Onion thrips) - Wet and Intermediate zones  
*Allium cepa* L. (Alliaceae), *Allium ampeloprasum* L. (Alliaceae), *Bellis* sp. (Asteraceae), *Callistephus chinensis* (L.) Nees (Asteraceae), *Chrysanthemum segetum* L. (Asteraceae), *Cleome chelidonii* L.f. (Capparaceae), *Coreopsis grandiflora* Hogg ex Sweet (Asteraceae), *Dianthus caryophyllus* L. (Caryophyllaceae), *Eupatorium* sp. (Asteraceae), *Gypsophila paniculata* L. (Caryophyllaceae), *Hydrangea macrophylla* (Thunb.) Ser. (Hydrangeaceae), *Limonium* sp. (Plumbaginaceae), *Ocimum basilicum* L. (Lamiaceae), *Ocimum tenuiflorum* L. (Lamiaceae), *Spathiphyllum* sp. (Araceae).  
**Damage:** Streaking and spots in leaves of onion and leeks.

46. *Thrips* sp.1- Mid and Upcountry Wet zone and Upcountry Intermediate zone  
*Aleurites montana* (Lour.) E. Wilson (Euphorbiaceae), *Alstonia scholaris* (L.) R.Br. (Apocynaceae), *Bougainvillea spectabilis* Willd. (Nyctaginaceae), *Calotropis gigantea* (L.) R.Br. (Asclepidaceae), *Cinnamomum verum* J. Presl (Lauraceae), *Citrus grandis* (L.) Osbeck. (Rutaceae), *Coffea arabica* L. (Rubiaceae), *Connarus monocarpus* L. (Connaraceae), *Couroupita*

*surinamensis* Mart. ex Berg (Lecythidaceae), *Mangifera indica* (L.) (Anacardiaceae), *Persea americana* Miller (Lauraceae), *Plumbago auriculata* Lam. (Plumbaginaceae), *Saraca thaipingensis* Prain (Fabaceae).

**47. Thripinae sp.1** - Sinharaja forest  
*Schumacheria castaneifolia* Vahl. (Dilleniaceae).

**48. Thripinae sp.5** - Peradeniya  
*Sarca asoca* (Roxb.) de Wild (Fabaceae).

## SUBORDER TUBILIFERA<sup>8</sup>

### Family Phlaeothripidae- Subfamily Idolothripinae

**49. Diaphorothrips unguipes** Karny 1920 - Peradeniya  
Bark of freshly felled trunk of *Mangifera indica* L. (Anacardiaceae).  
Fungus feeding species.

**50. Dinothrips spinosus (Schmutz 1913)** - Peradeniya and Hakgala  
*Albizia* sp. (Fabaceae), *Artocarpus heterophyllus* Lam. (Moraceae), *Ficus exasperata* Vahl. (Moraceae). Fungus feeding species

**51. Elaphrothrips greeni (Bagnall 1914)** - Peradeniya  
Fungus feeding species

**52. Elaphrothrips malayensis (Bagnall 1909)** - Matale and Knuckles forest range  
*Piper nigrum* L. (Piperaceae).  
**Damage:** Leaf galls, Fungus feeding species.

### Family Phlaeothripidae – Subfamily Phlaeothripinae

**53. Androthrips flavipes Schmutz 1913** – Matale  
*Piper nigrum* L. (Piperaceae)  
**Damage:** Leaf galls, a predatory species.

**54. \*\*Apelaunothrips sp.** - Monaragala and Kokagala  
In leaf litter, fungus feeding species.

**55. \*\* Dolichothrips sp.** - Dry, Wet and Intermediate zones  
*Abutilon indicum* (L.) Sweet (Malvaceae), *Averrhoa bilimbi* L. (Oxalidaceae), *Bridelia retusa* (L.) A. Juss. (Euphorbiaceae), *Ficus exasperata* Vahl (Moraceae), *Macaranga peltata* (Roxb.) Muell. Arg., (Euphorbiaceae), *Melastoma malabathricum* L. (Melastomataceae), *Terminalia bellirica* (Gaertn.) Roxb. (Combretaceae).

**56. Gigantothrips tibialis Bagnall 1921** - Knuckles Forest and Matale  
*Ficus benjamina* L. (Moraceae) and *Careya arborea* Roxb. (Lecythidaceae).  
**Damage:** Leaf galls in *F. benjamina*. Scarring, browning and discolouration of leaves in *C. arborea*.

<sup>8</sup> Conventionally, the Tubulifera are classified into a single family Phlaeothripidae, which is divided into two subfamilies, Idolothripinae and Phlaeothripinae, based on the width of maxillary stylets, 5-15 µm in the former and 3-5 µm in the latter. Based on the structure of the wing surface, Bhatti (1991) considers that these two groups are paraphyletic. And 14 families have been included in Tubulifera (Bhatti 1988, 1992, 1995, 1998a-d).

57. \*\* †*Gynaikothrips ficorum* (Marchal 1908) - Mid country Wet zone  
*Ficus benjamina* L. (Moraceae) & *Thunbergia* sp. (Acanthaceae).  
**Damage:** Leaf galls.
58. \**Gynaikothrips* sp. - Sita Eliya.  
*Euodia lunu-ankenda* (Gaertn.) (Rutaceae).  
**Damage:** Leaf fold galls.
59. †*Haplothrips ceylonicus* Schmutz 1913 – Hakgala, Maha Illuppallma and Peradeniya  
*Achyranthus aspera* L. (Amaranthaceae), *Aerva javanica* (Burm.f.) Juss.ex Schult. (Amaranthaceae), *Alternanthera sessilis* (L.) DC. (Amaranthaceae), *Calicarpa* sp. (Verbenaceae), *Carex kyllingia* Endl. (Cyperaceae), *Cymbopogon nardus* (L.) Rendle (Poaceae), *Eleusine coracana* (L.) (Poaceae), *Eupatorium riparium* Regel (Asteraceae), *Hemigraphis alternata* (N.L.Burm.) (Acanthaceae), *Hyptis capitata* Jacq. (Lamiaceae), *Impatiens balsamina* L. (Balsaminaceae), *Laurentia longifolia* (L.) Endl. (Campanulaceae), *Pennisetum polystachion* (L.) Shult (Poaceae), *Petiveria alliacea* L. (Phytolacaceae), *Wendlandia bicuspidate* Wight & Arn. (Rubiaceae).
60. †*Haplothrips ganglbaueri* Schmutz 1913 – All agro ecological regions  
*Ageratum houstonianum* Miller (Asteraceae), *Carex kyllingia* Endl. (Cyperaceae), *Carex leucantha* Arn.ex Boott (Cyperaceae), *Bothriochloa pertusa* (L.) A.Camus (Poaceae), *Brachiaria milliformis* (Poaceae), *Brachiaria* sp. (Poaceae), *Celosia argentea* L (Amaranthaceae), *Celosia* sp.(Amaranthaceae), *Cynodon dactylon* (L.) Pers. (Poaceae), *Cyperus difformis* L. (Cyperaceae), *Cyperus iria* L. (Cyperaceae), *Cyperus pilosus* Vahl (Cyperaceae), *Dactyloctenium aegyptium* (L.) Willd.(Poaceae), *Digitaria ciliaris* (Retz.) Koeler (Poaceae), *Digitaria marginata?* (Poaceae), *Dimeria alata* ?(Poaceae), *Echinichola crusgalli* (L.) P.Baeauv. (Poaceae), *Echinichola colona* (L.) Link (Poaceae), *Eleusine coracana* (L.) Gaertn., *Eleusine indica* (L.) Gaertn. (Poaceae), *Eleusine* sp. (Poaceae), *Eragrostis curvula* (Schrad.) Nees (Poaceae), *Eragrostis diplachnoides* Steud.(Poaceae), *Eragrostis sublyratus* DC. (Asteraceae), *Eragrostis unioides* (Retz.) Nees ex Steud. (Poaceae), *Ischaemum ciliare* Retz. (Poaceae), *Leptochloa chinensis* (L.) Nees (Poaceae), MI 1-Introduced grass (Poaceae), *Oryza sativa* L. (Poaceae), *Panicum maximum* Jacq. (Poaceae), *Eulalia trispicata* (Schult.) Henrard (Poaceae), *Panicum repens* L. (Poaceae), *Panicum* sp. (Poaceae), *Paspalum conjugatum* Berguis (Poaceae), *Pennisetum polystachion* (L.) Shult (Poaceae), *Rhynchospora corymbosa* (L.) Britton (Poaceae), *Sacciolepis indica* L. (Chase) (Poaceae), *Sesamum indicum* L. (Pedaliaceae), *Setaria barbata* (Lam.) Kunth (Poaceae), *Setaria geniculata* auct. non (Wild.) Beauv. (Poaceae), *Setaria palledifusa* (Poaceae), SR 9-Unidentified (Cyperaceae), *Stachytarpheta urticaefolia* (Salisb.) Sims (Verbenaceae), *Symplocos cochinchinensis* ((Lour.) S. Moore (Symplocaceae), *Themeda triandra* Forssk (Poaceae), *Themeda villosa* (Poir.) A. Camus (Poaceae), *Zea mays* L. (Poaceae).
61. †*Haplothrips gowdeyi* (Franklin 1908) - All agro ecological regions  
*Acacia pennata* (L.) Wild. (Fabaceae), *Achyranthes aspera* L. (Amaranthaceae), *Ageratum conyzoides* L. (Asteraceae), *Abelmoschus esculentus* (L.) Moench (Malvaceae), *Amaranthus spinosus* L. (Amaranthaceae), *Asteracantha longifolia* Nees. (Acanthaceae), *Axonopus affinis* Chase (Poaceae), *Axonopus compressus* (Sw.) P.Beauv. (Poaceae), *Basilicum polystachyon* (L.) (Moench) (Lamiaceae), *Bidens pilosus* L. (Asteraceae), *Bidens* sp. (Asteraceae), *Catharanthus roseus* (L.) G. Don (Apocynaceae), *Callicarpa tomentosa* (L.) Murr. (Verbenaceae), *Callistephus chinensis* (L.) Nees (Asteraceae), *Capsicum frutescens* L. (Solanaceae), *Catharanthus roseus* (L.) G. Don (Apocynaceae), *Canna generalis* L. (Cannaceae), *Celosia argentea* L. (Amaranthaceae), *Cipadessa baccifera* (Roth) Miq. (Meliaceae), *Costus speciosus* (Koenig) Smith (Zingiberaceae), *Cestrum elegans* (Brongn.) Schlecht. (Solanaceae), *Dahlia x hortensis* (Asteraceae), *Elephantopus scaber* L. (Asteraceae), *Emilia exserta* Fosberg (Asteraceae), *Emilia zeylanica* C.B.Clarke (Asteraceae), *Erigeron sublyratus* DC. (Asteraceae), *Eupatorium* sp. (Asteraceae), *Euphorbia* sp. (Euphorbiaceae), *Evolvulus alsinoides* (L.) L. (Convolvulaceae), *Gerbera jamesonii* Adlam (Asteraceae), *Gomphrena globosa* L. (Amaranthaceae), *Hedyotis trimenii* Deb & Dutta (Rubiaceae), *Melilotus indicus* (L.) All. (Fabaceae), *Mimosa invisa* Mart. (Fabaceae), *Mangifera indica* (Anacardiaceae), *Mimosa pudica* L. (Fabaceae), *Psidium guajava* L. (Myrtaceae), *Persicaria capitata* (Buch Ham. in D.Don) H. Gross (Polygonaceae), *Phyllanthus*

*deblis* Klein ex Willd (Euphorbiaceae), *Punica granatum* L. (Punicaceae), *Saraca asoca* (Roxb.) de Wild (Fabaceae), *Solidago canadensis* L. (Asteraceae), *Spilanthes iabadicensis* A.H.Moore (Asteraceae), *Stachytarpheta indica* (L.) Vahl (Verbenaceae), *Strobilanthes sexennnis* Nees (Acanthaceae), *Tagetes erecta* L. (Asteraceae), *Themeda tremeula* (Steud.) Hack. (Poaceae), *Tridax procumbens* L. (Asteraceae), *Vernonia cinerea* (L.) Less. (Asteraceae), *Vetiveria zizanioides* (L.) Nash (Poaceae), *Wedelia chinensis* (Osbeck) Merr. (Asteraceae).

**62. *Haplothrips* sp.3** - Mid country and Upcountry

*Amaranthus spinosus* L. (Amaranthaceae), *Canna generalis* L. (Cannaceae), *Cestrum elegans* (Brongn.) Schlecht. (Solanaceae), *Coffea arabica* L. (Rubiaceae), *Cymbopogon nardus* (L.) Rendle (Poaceae), *Mangifera indica* (L.) (Anacardiaceae), *Psidium guajava* L. (Myrtaceae), *Tagetes erecta* L. (Asteraceae).

**63. \*\**Karnyothrips melaleucus* Bagnall 1911** - Peradeniya

Collected from leaf litter, a predatory species.

**64. *Liothrips floridensis* (Watson 1913)** - Peradeniya

*Cinnamomum camphora* (L.) J. Presl (Lauraceae).

**Damage:** Scarring and browning of leaves.

**65. †*Liothrips karnyi* (Bagnall 1914)** - Wet zone

*Piper nigrum* L (Piperaceae).

**Damage:** Leaf galls.

**66. \*\* *Membrothrips* sp.** – Dambulla, Matale, Mahalluppallma, Meewathura and Peradeniya

*Jasminum sambac* (L.) Ait. (Oleaceae), *Tectona grandis* L.f. (Verbenaceae).

**67. \*\* *Praepodothrips* sp.** - Gannoruwa, Marassana and Naula

*Lycopersicon esculentum* Miller (Solanaceae).

**68. \*\* *Sphingothrips trachypogon* (Karny 1923)** - Peradeniya

*Diospyros atrata* (Thw.) Alston, *Diospyros malabarica* (Desr.) Kostel (Ebenaceae).

**Damage:** Scarring and browning of leaves.

**69. *Phlaeothripinae* sp.1** - Peradeniya and Sinharaja forest

*Vateria copallifera* (Retz.) Alston, *Vateria copallifera* (Retz.) Alston (Dipterocarpaceae).

**70. *Phlaeothripinae* sp.2** - Sinharaja forest

*Syzygium alubo* Kosterm (Myrtaceae).

**71. *Phlaeothripinae* sp.3** - Peradeniya

In leaf litter, fungus feeding species.

**72. *Phlaeothripinae* sp.4** - Peradeniya

In leaf litter, fungus feeding species.

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\* Species previously not recorded from Sri Lanka (25 species in 18 genera)

\*\* Genera previously not recorded from Sri Lanka (18 genera)

† Pest thrips species (42) based on Moritz *et al.* (2001)