

## ARTÍCULO ORIGINAL

### Species of *Thrips* (Insecta: Thysanoptera: Thripidae) intercepted on cutflowers from Europe at U.S. ports of entry

Allan H. Smith-Pardo, Ph.D.<sup>1</sup>. and Cheryle O'Donnell, Ph.D.<sup>2</sup>

<sup>1</sup> Entomologist- Area Identifier; National Apoidea Specialist; USDA-APHIS-PPQ ; South San Francisco, CA. allan.h.smith-pardo@aphis.usda.gov

<sup>2</sup> USDA-APHIS-PPQ-National Identification Services; Beltsville, MD. cheryle.a.odonnell@aphis.usda.gov

#### Abstract

We present a list of the species of the genus *Thrips* (Thysanoptera: Thripidae) of quarantine importance to the United States and which have been intercepted in cut flowers (multiple species) imported from Europe. A total of 14 species of quarantine importance were recorded. We provide taxonomic keys for the identification of most of the species along with photographs and diagnostic characters for these species.

**Key words:** Thrips; interceptions; quarantine; trade; diagnostic characters

#### Resumen

Se presenta una lista de las especies del género *Thrips* (Thysanoptera: Thripidae) de importancia cuarentenaria para los Estados Unidos que han sido interceptadas en flores (especies múltiples) importadas de Europa. Se registraron 14 especies en total. Se proveen claves taxonómicas para la identificación de la mayoría de las especies además de fotografías y caracteres diagnósticos para las especies.

**Palabras clave:** Thrips; intercepciones, cuarentena, comercio, caracteres diagnósticos

## Introduction

Thrips are small insects in the diverse order Thysanoptera. The order is divided into two suborders (Tubilifera and Terebrantia), nine extant families with approximately 6000 species and 770 genera (ThripsWiki 2015, Morse & Hoddle 2006). The genus *Thrips* is one of the largest groups (293 species) within the suborder Terebrantia. Most of the species in this genus are plant feeders and three species are known tospovirus vectors (Riley et al. 2011).

Thrips are mobile, small and thigmotactic, living in tight places and close together. Thus, making them difficult to detect in agriculture inspections at ports of entry and easily introduced into new territories through the agriculture trade. Vierbergen (1995) reported that for a period of over 13 years (between 1980 and 1993) 55 species of thrips were recorded as intercepted in the Netherlands associated with commodities from 30 countries.

In this study we report on the interception records of *Thrips* associated with cut flowers imported into the U.S.

from Europe that are of quarantine importance. Furthermore we discuss the diagnostic characters for each species and provide a taxonomic key for the identification of the species of the genus *Thrips* of quarantine significance that have been intercepted from Europe at U.S. ports of entry.

A search of intercepted thrips of the genus *Thrips* associated with fresh cut flowers shipments from Europe was performed using the USDA-PPQ's Agricultural Quarantine Activity Systems (AQAS)-PestID database for the time period January 1<sup>st</sup> of 2000 to September 15<sup>th</sup>, 2015. A query in the PestID database resulted in a total of 4164 interceptions of genus *Thrips* of which 1549 were considered of quarantine significance (reportable) and (2615) as non-reportable. There was a total of 24 *Thrips* species 15 of which were considered to be quarantine significant. However four of these were intercepted only once or twice and these species are not currently associated with the Palearctic region therefore they are not included within this study (Table 1).

**Table 1.** The number of interceptions and species intercepted on commodities imported from Europe.

Species	No. interceptions 2000-2015	Ecozone Distribution
<i>Thrips major</i> Uzel	1173	Palearctic
<i>Thrips</i> sp.*	122	
<i>Thrips flavus</i> Schrank	84	Palearctic, Indomalaya
<i>Thrips angusticeps</i> Uzel	50	Palearctic
<i>Thrips meridionalis</i> (Priesner)	37	Palearctic
<i>Thrips palmi</i> Karny	31	Indomalaya

<i>Thrips italicus</i> Bagnall	26	Palaearctic
<i>Thrips brevicornis</i> Priesner	11	Palaearctic
<i>Thrips annulatus</i> (Karny)	5	(Synonym of <i>T. italicus</i> )
<i>Thrips fulvipes</i> Bagnall	5	Palaearctic
<i>Thrips minutissimus</i> Linnaeus	4	Palaearctic
<i>Thrips gowdeyi</i> (Bagnall)**	2	Afrotropic
<i>Thrips acaciae</i> Trybom**	1	Afrotropic
<i>Thrips florum</i> Schmutz**	1	Afrotropic, Indomalaya, Australasia, Neotropic
<i>Thrips pusillus</i> Bagnall**	1	Afrotropic
<i>Thrips sambuci</i> Uzel	1	Palaearctic

\*Individuals intercepted that were identified to genus level due to life stage or damage.

\*\* Species not included in this key due to low number of interceptions (1 or 2) in 15 years and their distribution does not include Palaearctic region.

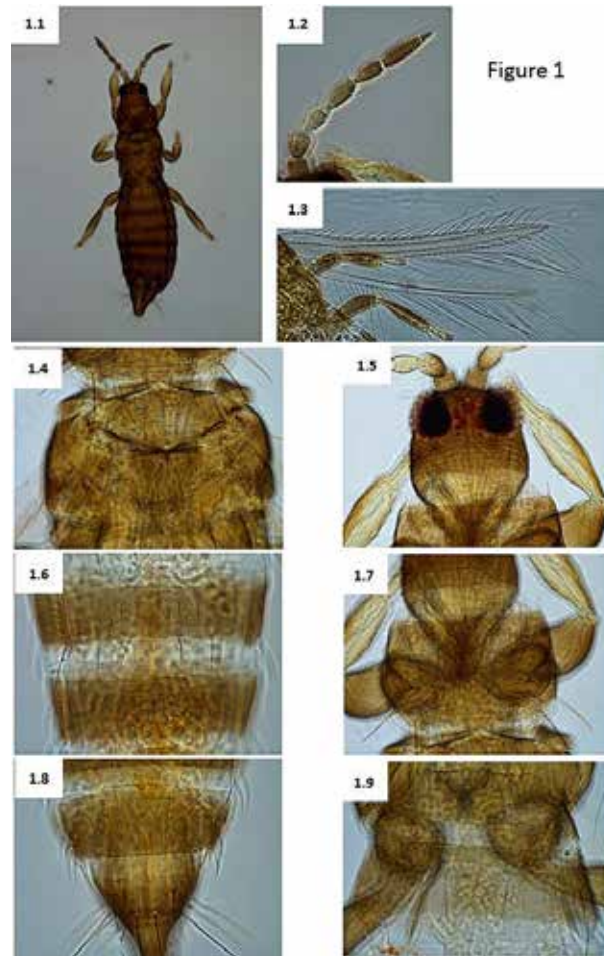
Specimens were examined from the U.S. National History Museum Collection in Beltsville, Maryland and from the Entomological Collection of PPQ's Plant Inspection Station in South San Francisco, California. Here we present a taxonomic key for the identification of adult females of the 14 species of *Thrips* of quarantine significance found associated with fresh cut flowers from Europe.

**Taxonomic key for the identification of quarantine significant species of the genus *Thrips* (Thysanoptera: Thripidae) associated with fresh cut flowers from Europe and intercepted at U. S. ports of entry.**

**Adult females:**

- |   |                        |
|---|------------------------|
| 1. Sternites II to VII with discal setae (Fig.1.6)...   | 2                      |
| 1'. Sternites II to VII without discal setae (Fig.2.6)...   | 5                      |
| 2. Antennae 7 segmented...  | 3                      |
| 2'. Antennae 8 segmented...   | 4                      |
| 3. Pleurotergites III to IV with a single postero-marginal setae; forewing uniformly pale (Fig.1.3)...  | <i>T. angusticeps</i>  |
| 3'. Pleurotergites III to IV with three accessory setae in addition to a single postero-marginal seta; forewing is pale at base and shaded distally to apex (Fig. 8.2)... | <i>T. minutissimus</i> |

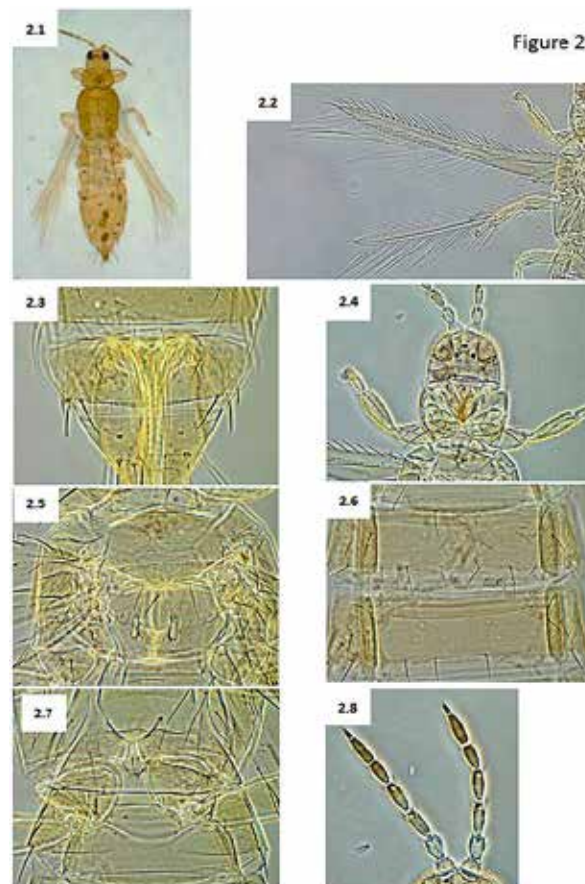
4. Distal half of 1st vein of fore wing with 2-3 setae; forewing pale at base darkly shaded distally to apex (Fig. 7.2)... *T. meridionalis*
- 4'. Distal half of 1st vein of fore wing with five or more setae; forewing pale at base and apex, shaded mid-distally (Fig. 5.3)... *T. italicus*
5. Body integument brown; forewings with pale base and brown distally to apex... 6
- 5'. Body integument yellow; forewings uniformly pale... 8
6. Abdominal pleurotergites III to IV with three accessory setae in addition to a postero-marginal seta; antennal segments I-VII brown (Fig. 4.3)... *T. fulvipes*
- 6'. Pleurotergites III to IV without accessory setae and only with the single postero-marginal seta; antennal segments various in color... 7
7. Antennal segment III and base of IV yellow, segment II, apex of IV, V-VII brown; metanotum without campaniform sensilla; abdominal segment VIII comb with fine long microtrichia laterally lacking medially; forewing first vein with 2-3 discal setae  
*T. major*
- 7'. Antennal segment I-II dark brown, segment III, IV and base of V light brown, apex of IV and segments VI-VII dark brown; metanotum with campaniform sensilla; abdominal segment VIII with short irregular teeth laterally; forewing first vein with 4-5 discal setae and a pale spot at forewing base... *T. sambuci*
8. Tergite II with 3 lateral setae (Fig. 3.7)... 9
- 8'. Tergite II with 4 lateral setae (Fig. 9.7)... *T. palmi*
9. Pronotum with 28-36 discal setae (Fig. 3.3); metanotum with irregular reticulations and without internal markings; without pleurotergal discal setae... *T. flavus*
- 9'. Pronotum with 10-24 discal setae (Fig. 2.4); metanotum with lateral undulating lines anterior and longitudinal reticulations with internal markings mesad (Fig. 2.5); pleurotergal discal setae present ... *T. brevicornis*



**Figure 1.** *Thrips angusticeps* Uzel, 1895. Some of the diagnostic characters. 1.1 habitus, 1.2 antennae, 1.3 wings, 1.4 thorax, 1.5 head, 1.6 sternites IV and V, 1.7 pronotum, 1.8 abdominal segments VIII-IX, 1.9 abdominal segments I-II.

**Diagnosis** (modified from Nickle 2008): Head: longer than wide; genae weakly inflated, convex or subparallel; ocellar seta III closer to and laterad of anterior ocellus; postocular seta i longest, ii and iv shorter than iii, iv, or v; antenna 7-segmented. Thorax: metanotum without sensilla and forewing with 6 setae on distal half of forevein. Abdomen: Tergite II with 3 lateral setae; posteromarginal comb on tergite VIII complete, often in clusters and with short, irregularly-spaced microtrichia; tergite IX with 2 pairs of sensory pores; sternites III-VII with 7-9 accessory setae roughly arranged in a single row; pleurotergites with accessory setae, without microtrichia on sculpture lines. Maculation: body in general brown; antennal segments as follow: I brown, II brown, III yellow, IV yellow to pale brown, V brown, VI brown, VII brown; legs with tarsi yellow, foretibiae yellow to pale brown, mid- and hind tibiae brown, femora brown; and wings with forewings pale brown.

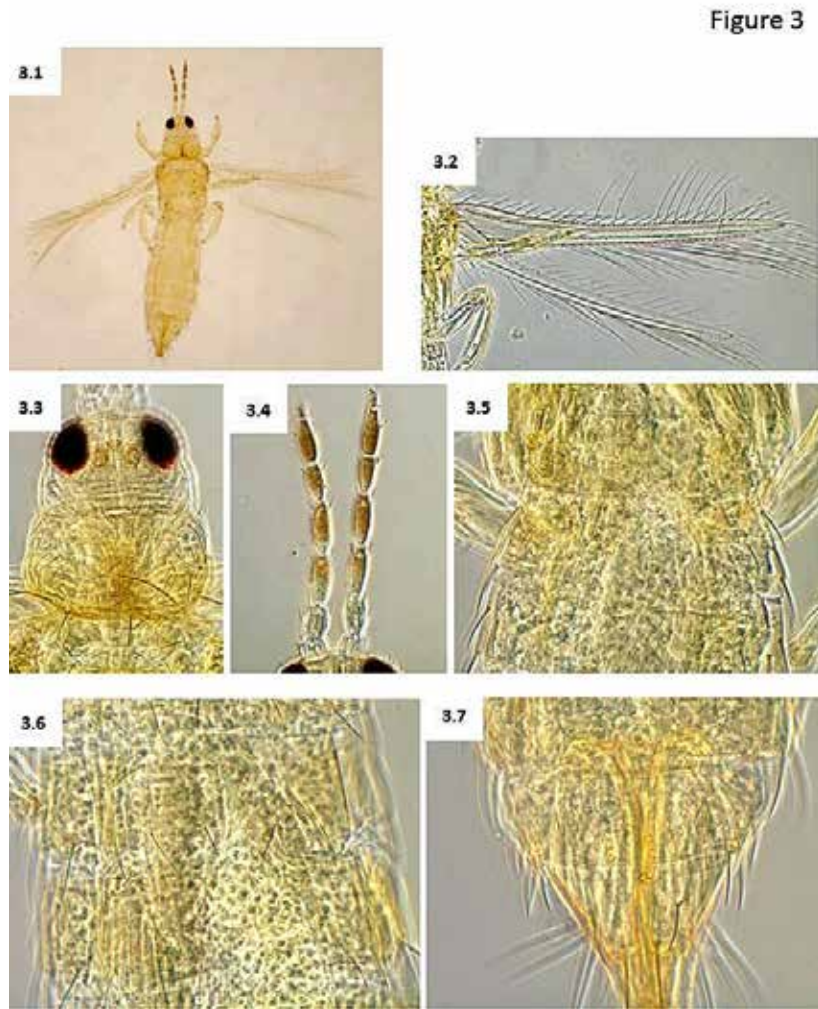
**Interceptions at U.S. ports of entry:** This species has been intercepted 50 times since 2000; of the total interceptions, 47 came from the Netherlands, 2 from Italy and one from France. The species of flowers this species was associated with include: *Allium* spp. (Amaryllidaceae), *Anemone* sp. (Ranunculaceae), *Astrantia* sp. (Apiaceae), *Brodiaea* sp. (Asparagaceae), *Centaurea* sp. (Asteraceae), *Chamaelirium* sp. (Myrtaceae), *Coscosmia* sp. (Iridaceae), *Delphinium* sp. (Ranunculaceae), *Eryngium* sp. (Apiaceae), *Gentiana* sp. (Gentianaceae), *Iris* sp. (Iridaceae), *Matthiola incana* (Brassicaceae), *Narcissus* sp. (Amaryllidaceae), *Paeonia* sp. (Paeoniaceae), *Polygonatum* sp. (Asparagaceae), *Ranunculus* sp. (Ranunculaceae), and *Viburnum* sp. (Adoxaceae).



**Figure 2.** *Thrips brevicornis* Priesner, 1920. Some of the diagnostic characters. 2.1 habitus, 2.2 wings, 2.3 abdominal segments VIII-IX, 2.4 head and pronotum, 2.5 thorax, 2.6 sternites IV-V, 2.7 abdominal segments I-II, 2.8 antennae.

**Diagnosis:** see diagnostic characters on the key to species. Similar to *T. flavus* from which it can be separated by the presence of pleurotergal discal setae (absent on *T. flavus*). According to Mound (in literature) in Europe, *Thrips brevicornis* is monophagous on flowers of *Lonicera* spp.

**Interceptions at U.S. ports of entry:** This species has been intercepted 11 times (10 times on shipments of cut flowers from the Netherlands and one time on fresh cut flowers from Italy) at U.S. ports of entry since 2000. Some of the species of plants it has been associated with include: *Aconitum* sp.; *Ageratum* sp.; *Astrantia* sp.; *Delphinium* sp.; *Genista* sp.; *Gentiana* sp.; *Scabiosa* sp.; *Syringa* sp. and *Veronica* sp.



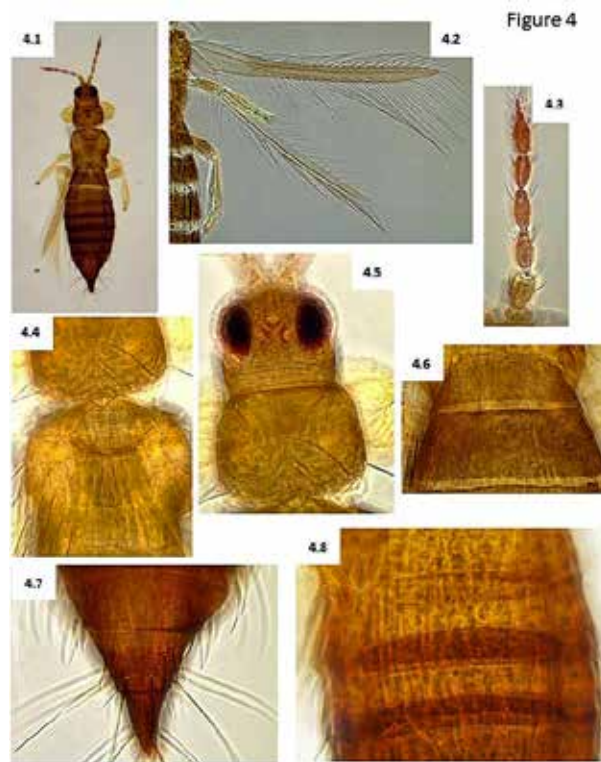
**Figure 3.** *Thrips flavus* Schrank, 1776. Some of the diagnostic characters. 3.1 habitus, 3.2 wings, 3.3 head and pronotum, 3.4 antennae, 3.5 abdominal segments I-II, 3.6 sternites IV-V, 3.7 abdominal segments VIII-IV.

**Diagnosis** (modified from Nickle 2008): Head: longer than wide; genae inflated, convex; ocellar seta III equidistant from anterior and posterior ocellus, situated on edge of ocellar triangle; postocular seta i and iii equal in length twice the length of either postocular setae ii, iv, v, or vi; antenna 7-segmented. Thorax: forewing with 3 setae on forevein; metanotum with 2 sensilla. Abdomen: tergite II with 3 lateral

setae; posteromarginal comb on tergite VIII complete with long regularly-spaced microtrichia, Tergite IX with 2 pairs of sensory pores; sternites III–VII without accessory setae; pleurotergites without accessory setae and with weakly dentate microtrichia on sculpture lines. Maculation: body integument yellow; antennal segments I–IV yellow, segment V yellow to pale brown, VI pale brown, and segment VII brown; legs yellow and forewings clear.

**Interceptions at U.S. ports of entry:** This species has been intercepted 84 times from eight different countries in Europe including Belgium (one interception on *Calluna vulgaris* – Ericaceae -), Czech Republic (one interception on an undetermined flowering plant smuggled in baggage), France (one interception on *Lavandula* sp. flowers, also smuggled in baggage), Italy (41 interceptions), all but two on permit cargo. Most interceptions from Italy were associated with flowers of *Genista* sp. (Fabaceae), but there were also interceptions on *Acacia* sp., *Cytisus* sp., *Mimosa* sp., and *Retama monosperma* (also in the Fabaceae), *Anemone* sp. and *Ranunculus* sp. – (both Ranunculaceae), *Convallaria* sp. (Asparagaceae), *Eucalyptus* sp. (Myrtaceae), *Papaver* sp. (Papaveraceae) and in *Rosa* sp. (Rosaceae)], the Netherlands [35 interceptions in over twenty genera of flowering plants that included *Convallaria* sp. and *Ornithogalum* sp. (Asparagaceae); *Cotinus* sp. (Anacardiaceae); *Cynara* sp. and *Dahlia* sp. (Asteraceae); *Cytisus* sp., *Genista* sp and *Mimosa* sp. (Fabaceae); *Dianthus* sp. (Caryophyllaceae), *Eryngium* sp. (Apiaceae); *Gentiana* sp. (Gentianaceae); *Hydrangea* sp. (Hydrangeaceae); *Leonotis* sp. (Lamiaceae); *Leucospermum* sp. (Proteaceae); *Lysimachia* sp. (Primulaceae); *Paeonia* sp. (Paeoniaceae); *Ranunculus* sp. (Ranunculaceae); *Symphoricarpos* sp. (Caprifoliaceae); *Veronica* sp. (Plantaginaceae), *Viburnum* sp. (Adoxaceae)], Portugal (one interception on an undertermined plant smuggled in baggage), Ukraine (two interceptions on *Chrysanthemum* plants smuggled in baggage), and the United Kingdom (two interception on roses – *Rosa* sp.- smuggled on baggage).

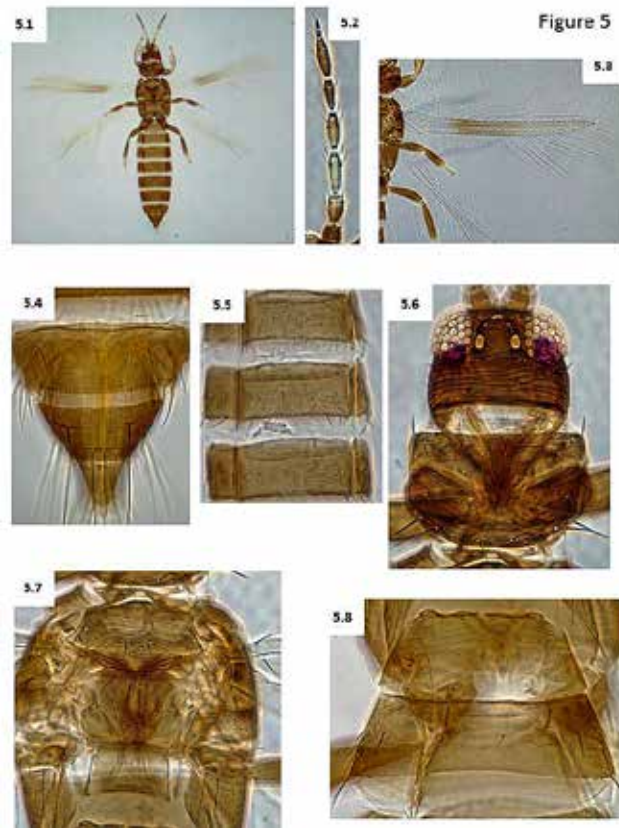




**Figure 4.** *Thrips fulvipes* Bagnall, 1923. Some of the diagnostic characters. 4.1 habitus, 4.2 wings, 4.3 antennae, 4.4 thorax, 4.5 head and pronotum, 4.6 abdominal segment I-II, 4.7 abdominal segments VIII-X, 4.8 sternites IV-V.

**Diagnosis** (modified from Nickle 2008): Head: longer than wide, genae weakly inflated, convex; ocellar seta III located slightly laterad, behind anterior ocellus and outside of ocellar triangle; postocular seta i, iii, and iv equal in length. Antenna 7-segmented. Thorax: metanotum without sensilla; forewing with 3 setae on forevein. Abdomen: tergite II with 3 lateral setae; tergite VIII with posteromarginal comb complete and made out of long regularly-spaced microtrichia; tergite IX with 2 pairs of sensory pores. Sternites III–VII without accessory setae. Pleurotergites without accessory setae and without microtrichia on sculpture lines. Maculation: body integument pale brown to brown; antennal segments: I brown, II brown, III yellow, IV yellow, V pale brown, VI brown, VII brown; legs: tarsi yellow, fore tibiae yellow, mid- and hind tibiae brown, femora brown; wings with forewings basally clear but with distally pale brown.

**Interceptions at U.S. ports of entry:** This species has been intercepted only six times since 2000 (there were also six interceptions the year previous to the period studied here -1999-); of all these interceptions all but one came from the Netherlands (the one interception from outside Netherlands came on cut flowers from Tahiti and may be a mistake). The hosts to which this species was associated included *Hydrangea* sp. (Hydrangeaceae), *Nerine* sp. (Amaryllidaceae), and *Celosia* sp. (Amaranthaceae).

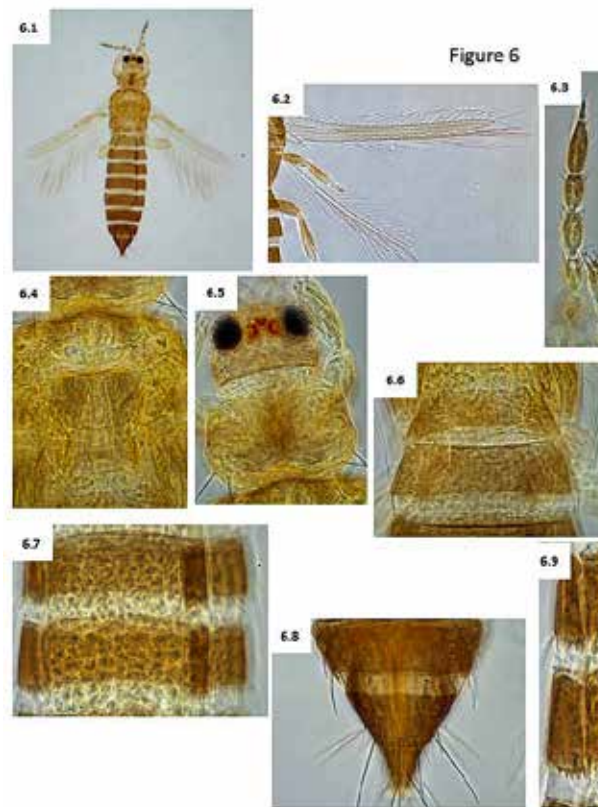


**Figure 5.** *Thrips italicus* (Bagnall, 1926). Some of the diagnostic characters. 5.1 habitus, 5.2 antennae, 5.3 wings, 5.4 abdominal segments VIII-X, 5.5 sternites III-V, 5.6 head and Pronotum, 5.7 thorax, 5.8 abdominal segments I-II.

**Diagnosis** (modified from Nickle 2008): Head: as long as wide, genae not inflated, expanding posteriorly from behind compound eyes; antenna 8-segmented. ocellar seta III laterad of and slightly behind anterior ocellus, located outside of ocellar triangle; postocular setae i and iii longest, ii and iv shortest, only one third the length of i, iv. Thorax: metanotum with two sensilla; forewing with eight setae on distal half of forevein. Abdomen: tergite II with four lateral setae; posteromarginal comb on tergite VIII complete, with medium-sized regularly-spaced microtrichia; tergite IX with two pairs of sensory pores; sternites with a single row of 8–12 accessory setae; pleurotergites without accessory setae and with dentate microtrichia on sculpture lines. Maculation: body integument brown; antennal segments all brown; legs with tarsi yellow, foretibiae yellow, mid- and hind tibiae brown, femora brown; basal fourth forewings clear while next 3/4ths pale brown.

**Interceptions at U.S. ports of entry:** This species has been intercepted 21 times at U.S. ports of entry since 2000. Most interceptions (19) originated in two countries: Italy (13) and the Netherlands (6), the remaining two interceptions correspond to one

interception from France (on permitted cut flowers of *Matthiola* sp. – Brassicaceae-) and one from Albania (on smuggled cut flowers of *Acacia* sp. –Fabaceae- found on a passenger's baggage). The host for the interceptions from Italy were *Anemone* sp. (Ranunculaceae), *Cytisus* sp. (Fabaceae), *Lathyrus* sp. (Fabaceae), *Genista* sp. (Fabaceae, the most common with 6 interceptions) and *Papaver* sp. (Papaveraceae) whereas in the Netherlands the most common host was *Ranunculus* sp. (Ranunculaceae, 2 interceptions), in addition to *Amaranthus* sp. (Amaranthaceae), *Paeonia* sp. (Paeoniaceae), and *Genista* sp. (Fabaceae).

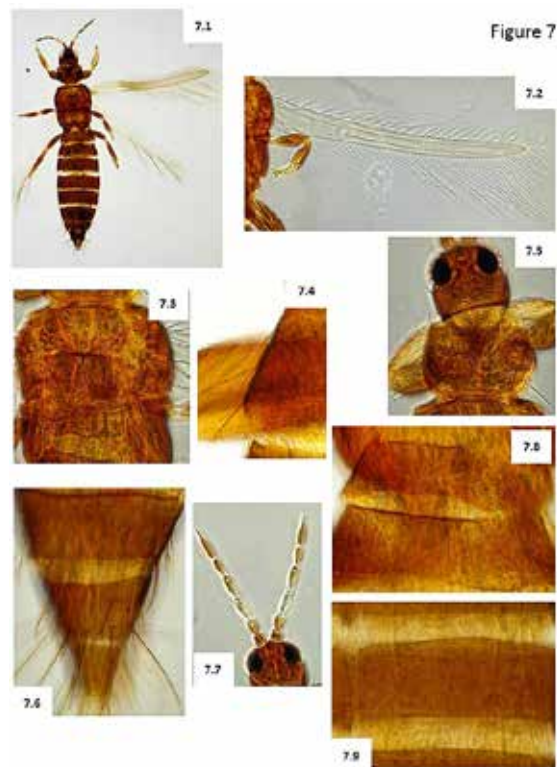


**Figure 6.** *Thrips major* Uzel, 1895. Some of the diagnostic characters. 6.1 habitus, 6.2 wings, 6.3 antennae, 6.4 thorax, 6.5 head and pronotum, 6.6 abdominal segments I-II, 6.7 sternites IV-V, 6.8 abdominal segments VII-X, 6.9 pleurotergites II-III.

**Diagnosis** (modified from Nickle 2008): Head: head as long as wide, genae inflated, convex; ocellar seta III laterad of and slightly behind anterior ocellus, located well outside of ocellar triangle; postocular setae i and iii longest, ii shortest antenna 7-segmented. Thorax: metanotum with two sensilla; forewing with three setae on distal half of forevein. Abdomen: tergite II with three lateral setae; tergite VIII with posteromarginal comb incomplete and with short irregularly-spaced lateral microtrichia only; tergite IX with two pairs of sensory pores; sternites without accessory setae; pleurotergites without accessory setae and with dentate microtrichia on sculpture lines. Maculation: body integument yellow to brown; antennal segments brown except for segment III

which is yellow; legs mostly yellow, except for femora pale brown; forewings clear to yellow.

**Interceptions at U.S. ports of entry:** This species has been one of the most intercepted species of *Thrips* of quarantine importance and associated with fresh cut flowers from Europe. Since 2000 the species *T. major* has been intercepted more than 1170 times from 15 countries in Europe (Albania, Belgium, Bulgaria, Croatia, France, Germany, Italy, Latvia, Lithuania, Netherlands, Norway, Portugal, Romania, Spain and the United Kingdom), of which 994 interceptions originated in the Netherlands. The hosts to which this species has been associated include more than 118 genera of hosts in more than 30 families of plants.

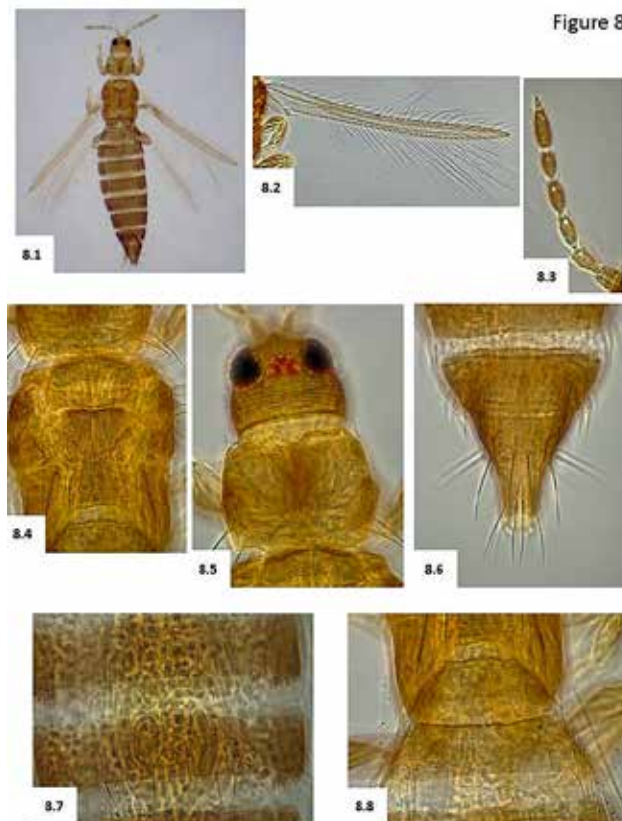


**Figure 7.** *Thrips meridionalis* (Priesner). Some of the diagnostic characters. 7.1 habitus, 7.2 wings, 7.3 thorax, 7.4 accessory setae abdominal on segment II, 7.5 head and pronotum, 7.6 abdominal segments VIII-X, 7.7 antennae, 7.8 abdominal segments I-II, 7.9 sternites IV-V.

**Diagnosis** (modified from Nickle 2008): Head: as long as wide, genae weakly inflated, expanding posteriorly from behind compound eyes; ocellar seta III long, nearly equidistant from anterior to posterior ocellus and located on edge of ocellar triangle; postocular seta i longest, ii and iv shortest, less than one fourth the length of setae I, setae iii, v, and vi subequal in length. Antenna 8-segmented. Thorax: metanotum with 2 sensilla; forewing with 3 setae on distal half of forevein. Abdomen: tergite II with three

lateral setae; tergite VIII with posteromarginal comb complete and formed by long, regularly-spaced microtrichia; tergite IX with two pairs of sensory pores; sternites III–VII with two rows of between 6 and 9 accessory setae in each row; pleurotergites with accessory setae and ciliate microtrichia on sculpture lines. Maculation: body integument brown; antenna mostly brown except for segment III yellow and half brown; legs with tarsi yellow to pale brown and femora brown; forewings basal one fourth clear and the distal three fourths pale brown.

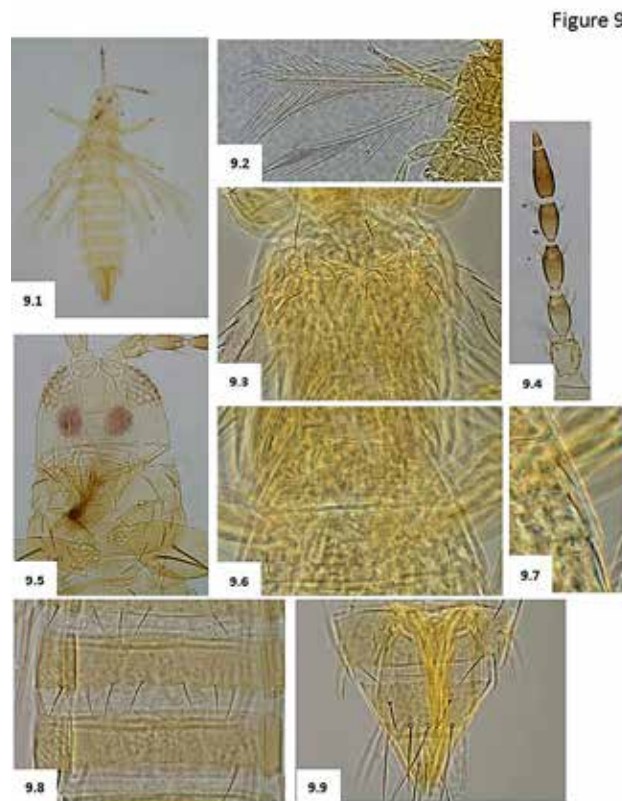
**Interceptions at U.S. ports of entry:** This species has been intercepted 37 times since 2000 from four countries in Europe: Netherlands [27 times on *Aconitum* sp.(Ranunculaceae), *Allium* sp. (Amaryllidaceae), *Angelica* sp. (Apiaceae), *Astilbe* sp. (Saxifragaceae), *Consolida ajacis* (Ranunculaceae), *Cynara* sp. (Asteraceae), *Cytisus* sp. (Fabaceae), *Dahlia* sp. (Asteraceae), *Delphinium* sp. (Ranunculaceae), *Genista* sp. (Fabaceae), *Leucospermum* sp. (Proteaceae), *Paeonia* sp. (Paeoniaceae), *Phlox* sp. (Polemoniaceae), *Rudbeckia* sp. (Asteraceae), *Scabiosa* sp. (Caprifoliaceae), and *Tulipa* sp. (Liliaceae)], Italy (eight times on *Genista* sp. and *Lathyrus* sp. both in the Fabaceae), France (one time on *Lathyrus* sp. –Fabaceae-) and Portugal (one time on *Leucospermum* sp.).



**Figure 8.** *Thrips minutissimus* Linnaeus, 1761. Some of the diagnostic characters. 8.1 habitus, 8.2 wings, 8.3 antennae, 8.4 thorax, 8.5 head and pronotum, 8.6 abdominal segments VIII-X, 8.7 sternites IV-V, 8.8 abdominal segments I-II.

**Diagnosis** (modified from Dyadechko, 1977): Head: transverse and antennae long with 6<sup>th</sup> segment the longest. Thorax: prothorax transverse; costal veins of forewings with 26 setae, upper vein with 7 to 11 basal setae and 8-9 distal setae. Abdomen: tergite VIII with complete comb. Maculation: body integument mostly brownish yellow or orange yellow, head and apex of abdomen darker; antennal segments I-III yellowish; legs with femora gray, mid and hind tibiae grayish yellow with apex lighter, tarsi yellow; forewings yellowish gray and lighter or brownish at their bases.

**Interceptions at U.S. ports of entry:** This species has been intercepted four times since 2000, of those three interceptions were on cut flowers of *Ornithogalum* sp. (Asparagaceae) from France and one time from Germany on *Chrysanthemum* sp. (Asteraceae).

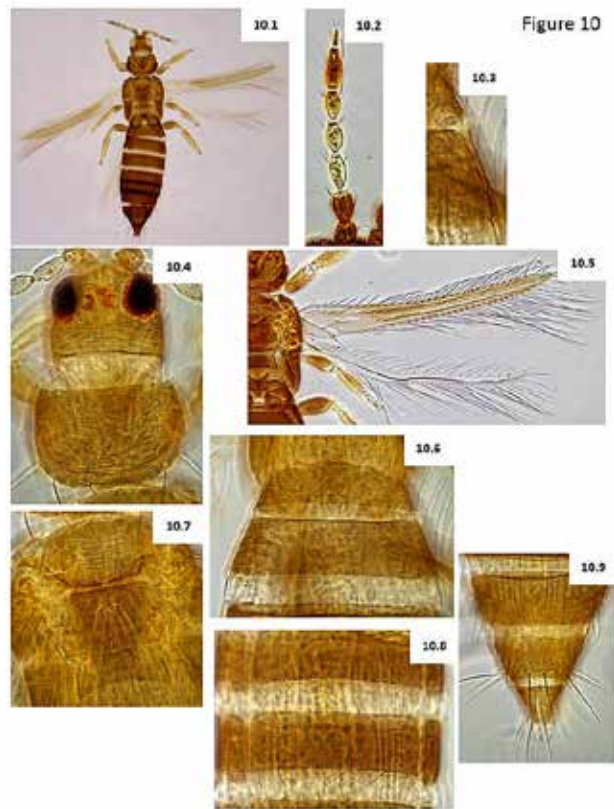


**Figure 9.** *Thrips palmi* Karny, 1925. 9. Some of the diagnostic characters. 9.1 habitus, 9.2 wings, 9.3 thorax, 9.4 antennae, 9.5 head and pronotum, 9.6 abdominal segments I-II, 9.7 accessory setae on abdominal segment II, 9.8 sternites IV-V, 9.9 abdominal segments VIII-X.

**Diagnosis** (modified from Nickle 2008): Head: head broader than long, genae inflated; ocellar seta III laterad of anterior ocellus; antenna 7-segmented. Thorax: metanotum with two sensilla; forewings with 3 three (although sometimes two or four) setae on distal half of forevein. Abdomen: tergite II with four lateral setae; pleurotergites

without accessory setae, with small microtrichia on sculpture lines, pleurotergite II with a single postero-marginal setae; posteromarginal comb on tergite VIII complete, with closely spaced microtrichia, tergite IX with one pair of sensory pores; sternites without accessory setae. Maculation: body integument bright pale yellow; coloration of antennal segments as follows: I-II yellow, III-IV basally yellowish brown and distally brown, V-VII brown; legs yellow; forewings yellow.

**Interceptions at U.S. ports of entry:** This species has been intercepted 23 times since the year 2000, with all the interceptions for Europe coming from the Netherlands on permitted cargo of fresh cut flowers, except for one interception on an undetermined flower smuggled in baggage. The hosts in which *T. palmi* was intercepted from Netherlands include: *Acacia* sp. (Fabaceae), *Aconitum* sp. (Ranunculaceae), *Amaranthus* sp. (Amaranthaceae), *Astilbe* sp. (Saxifragaceae), *Craspedia* sp. (Asteraceae), *Cytisus* sp. (Fabaceae), *Dendrobium* sp. (Orchidiaceae), *Freesia* sp. (Iridaceae), *Genista* sp. (Fabaceae), *Gentiana* sp. (Gentianaceae), *Gerbera* sp. (Asteraceae), *Monarda* sp. (Lamiaceae) and *Scabiosa* sp. (Caprifoliaceae).



**Figure 10.** *Thrips sambuci* Heeger, 1854. Some of the diagnostic characters. 10.1 habitus, 10.2 antennae, 10.3 accessory setae on abdominal segment II, 10.4 head and pronotum, 10.5 wings, 10.6 abdominal segments I-II, 10.7 thorax, 10.8 sternites IV-V, 10.9 abdominal segments VIII-X.

**Diagnosis** (modified from Dyadechko 1977): similar to *T. fuscipennis*. Head: transverse. Thorax: prothorax transverse with two or three pairs of postmarginal setae; costal vein of forewings with 24-25 setae, upper vein with 7-8 basal setae and 3 setae distally, lower vein with 11-12 setae. Abdomen: tergites. Maculation: body integument dark brown; antennae dark brown with segments III, IV and V dark yellow or grayish yellow; legs with femora dark brown, tibiae yellowish towards apex and tarsi all yellowish; wings grayish brown.

**Interceptions at U.S. ports of entry:** This species has been intercepted only once in the port of Boston on cut flowers of *Astilbe* sp. (Saxifragaceae) from the Netherlands.

#### **Acknowledgements**

We would like to thank our colleagues at USDA-PPQ in particular to Dr. Greg Evans for his comments and to Arthur Berlowitz for his continuous support in the work of AHSP. Our gratitude also to Dr. Sergio Orduz for his invitation to participate in the bulletin with this contribution. This is a contribution of the USDA-APHIS-PPQ National Identification Services and Field Operations.

#### **Literature cited.**

Bagnall RS. 1923. A contribution towards a knowledge of the British Thysanoptera, with descriptions of new species. *Entomologist's Monthly Magazine* 59: 56-60.

Dyadechko NP. 1977. Thrips or fringe-winged insects (Thysanoptera) of the European part of the USSR. (English translation by R.S. Chakravarthy, Edited

by V. S. Kothekar for the United States Department of Agriculture). Amerind Publishing, New Delhi, India. 344p.

Izzo TJ, Pinet SMJ, Mound LA. 2002. *Aulacothrips dictyotus* (Heterothripidae), the first ectoparasitic thrips (Thysanoptera). *Florida Entomologist* 85: 281-283.

Morse JG, Hoddle MS. 2006. Invasion biology of thrips. *Annual Review of Entomology* 51: 67-89.

Mound LA. 1997. Biological diversity of Thrips. In: Lewis, T. (ed): *Thrips as crop pests*. CABI, Wallingford, U.K. Pp 197-215.

Mound LA, Teulon DA. 1995. Thysanoptera as phytophagous opportunists. In: Parker B.L, Skinner M, Lewis T. *Thrips Biology and management*. Plenum, New York. Pp 3-19.

Nickle DA. 2003. A checklist of commonly intercepted thrips (Thysanoptera) from Europe, the Mediterranean, and Africa at U.S. ports-of-entry (1983-1999). Part I. Key to genera. *Proceedings of the Entomological Society of Washington* 105: 80-99.

Nickle DA. 2004. Commonly intercepted thrips (Thysanoptera) from Europe, the Mediterranean, and Africa at U.S. ports of entry (1983-1999). Part II. *Frankliniella* Karny and *Iridothrips* Priesner (Thripidae). *Proceeding of the Entomological Society of Washington* 106: 438-452.

Nickle DA. 2008. Commonly intercepted thrips at U.S. ports of entry from Africa, Europe, and the Mediterranean:



III. The genus *Thrips* Linnaeus, 1758 (Thysanoptera: Thripidae). Proceedings of the Entomological Society of Washington 110(1): 165-185.

Palmer JM. 1990. Identification of the common thrips of Tropical Africa. Tropical Pest Management 36(1): 27-49.

Riley DG., Joseph S V, Srinivasan R, Diffie S. 2011. *Thrips* vectors of Tospoviruses. Journal of Intergrated Pest Management 1(2):1-10.

ThripsWiki contributors. ThripsWiki. Revision: 10 June 2015, retrieved: 23 September 2015. Available at [http://thrips.info/w/index.php?title=Main\\_Page&oldid=42839](http://thrips.info/w/index.php?title=Main_Page&oldid=42839). Page Version ID: 42839

Vierbergen G. 1995. International movement, detection, and quarantine of Thysanoptera pests. In: Parker B.L, Skinner M & T. Lewis. Thrips Biology and management. Plenum, New York. Pp 119-132.

