



---

## THYSANOPTERA RECORDED FROM CALIFORNIA, U.S.A.: A CHECKLIST

Authors: Hoddle, Mark S., Mound, Laurence A., and Nakahara, Sueo

Source: Florida Entomologist, 87(3) : 317-323

Published By: Florida Entomological Society

URL: [https://doi.org/10.1653/0015-4040\(2004\)087\[0317:TRFCUA\]2.0.CO;2](https://doi.org/10.1653/0015-4040(2004)087[0317:TRFCUA]2.0.CO;2)

---

The BioOne Digital Library (<https://bioone.org/>) provides worldwide distribution for more than 580 journals and eBooks from BioOne's community of over 150 nonprofit societies, research institutions, and university presses in the biological, ecological, and environmental sciences. The BioOne Digital Library encompasses the flagship aggregation BioOne Complete (<https://bioone.org/subscribe>), the BioOne Complete Archive (<https://bioone.org/archive>), and the BioOne eBooks program offerings ESA eBook Collection (<https://bioone.org/esa-ebooks>) and CSIRO Publishing BioSelect Collection (<https://bioone.org/csiro-ebooks>).

## THYSANOPTERA RECORDED FROM CALIFORNIA, U.S.A.: A CHECKLIST

MARK S. HODDLE<sup>1</sup>, LAURENCE A. MOUND<sup>2</sup> AND SUEO NAKAHARA<sup>3</sup><sup>1</sup>Department of Entomology, University of California, Riverside, CA 92521, U.S.A.<sup>2</sup>Honorary Research Fellow, CSIRO Entomology, GPO Box 1700, Canberra, ACT 2601, Australia and Scientific Associate, The Natural History Museum, London<sup>3</sup>Systematic Entomology Laboratory, USDA, Agricultural Research Service, Beltsville, MD 20705-2350, U.S.A.

## ABSTRACT

In California U.S.A., 238 named species of the insect Order Thysanoptera, in 87 genera and eight families, are listed as having been found in this state. Inspection of museum collections indicates many undescribed species of thrips exist. Little is known of the host plants of native California thrips species, due to imprecise collecting methods such as sweep netting swaths of mixed vegetation. At least 40 (~17%) of the listed species in California are introduced from other parts of the world. Two terebrantian families (Adiheterothripidae and Fauriellidae), and one genus (*Orothrips*) in a third terebrantian family (Aeolothripidae), have a remarkably disjunct distribution between California and the European Mediterranean region.

## RESUMEN

En el estado de California EEUU, estan listadas 238 especies descritas en el orden de insectos Thysanoptera, pertenecientes a 87 géneros y ocho familias, apuntadas de haber sido encontrada en este estado. Una revisión de las colecciones en los museos indica que existe más especies de trips no descritas. Las plantas hospederas de las especies de trips nativas de California son poco conocidas, debido a los métodos imprecisos de recolectar, tal como pasar una red sobre vegetación mezclada. Por lo menos 40 (~17%) de las especies mencionadas en California son introducidas de otras partes del mundo. Dos familias terebrantianas (Adiheterothripidae y Fauriellidae), y un género (*Orothrips*) en una tercer familia terebrantiana (Aeolothripidae), tienen una distribución desarticulada entre California y la región mediterránea europea.

The foundation publication concerning Thysanoptera diversity was by Heinrich Uzel from Bohemia in 1895. Uzel's (1895) publication was followed by Dudley Moulton's (1907) first paper on Californian thrips at the start of his long career in agriculture in this State. Moulton's taxonomic studies culminated 61 years later in a posthumous publication (Arnaud & Lee 1973). Stanley Bailey, at the University of California, Davis, published extensively on thrips between 1937 and 1968, and encouraged contributions from two students, H. E. Cott (1956) and A. G. Gentile (Gentile & Bailey 1968). Although primarily involved in pest control, Bailey produced several valuable bibliographic treatments concerning the publications of other North American thrips workers. Tokuwo Kono was employed at the California Department of Food and Agriculture in Sacramento to study thrips, aphids and mites. Kono prepared a large slide collection of thrips and published an introduction to the more common species (Kono & Papp 1977). In contrast, William Ewart, a Professor at the University of California, Riverside developed an extensive knowledge of thrips together with a beautifully prepared collection of slide-mounted specimens and library. Unfortunately, Ewart's published contribution on Thysanoptera was negligible.

Given this extensive and prolonged investment of expertise in the study of Thysanoptera in California, it is surprising that as many as 12 new species of Thysanoptera have been described from California in the past 10 years, particularly since the authors involved carried out no new field studies but merely described taxa available in museum collections. It seems that earlier Californian workers lacked the opportunity, or the passion, for the extensive field studies that are so evident in the work of J. D. Hood at Cornell University (Ithaca, New York, U.S.A.). Certainly, the technical expertise of Hood in preparing microscope slides of thrips was rarely matched. The slides of Moulton and Bailey are often inadequate for critical study of structural details. This lack of technical expertise, together with the lack of devotion to field biology, is presumably the origin of the very high synonymy rate of some early workers on this group of insects. Moulton, for example, published 510 species-group names for thrips from around the world, but 178 of these (35%) are now considered synonyms.

The two most recent revisionary studies of the Californian thrips fauna, Bailey (1957) on the Terebrantia and Cott (1956) on the Tubulifera, are now totally inadequate due to the generic classification that they used having been greatly

changed in recent years, and many species now being placed in synonymy. Moreover, neither publication gives any indication of the extraordinary biological interest in these insects, the remarkable biogeographical distributions, the host plant associations, or the seasonality of various species. Both papers are essentially "descriptive taxonomy" in the most pedestrian sense, concerned with statements of fact with no attempt to convey the fascination of the biological diversity exhibited by this group of insects.

The checklist provided here is intended to lay the foundations for a modern approach to the study of California Thysanoptera. The insect fauna of this state is diverse, as is the range of ecosystems that thrips inhabit. But the lack of adequate field surveys for thrips in different ecosystems and at appropriate times of year results in it being impossible to gauge how accurately this list reflects the native and exotic thrips fauna. Despite this, the substantial number of sorted but unidentified species in the Ewart Collection at the University of California at Riverside suggests that the Thysanoptera of California is considerably richer than the following list might suggest.

#### HOST PLANT RELATIONSHIPS

The host plant relationships of Californian thrips are poorly known, many species being known from too few specimens for any serious information to be available on their host plants and seasonality. Three of the species of *Dactuliothrips* and both species of *Orothrips* are known from the flowers of *Ceanothus* (Rhamnaceae), but whether these species breed in (or even only in) these flowers is unclear. In many species of thrips, even wingless adults may be transported readily by winds, and adults can be taken commonly from plants on which they are not able to breed. Many of the "host plants" recorded in the published literature cannot be relied upon as indicating that a thrips species can reproduce on a particular plant, let alone that it is dependent on that plant species to maintain its populations. It is essential to find and recognize the larvae of thrips species, and to collect repetitively at different localities, in order to establish the biological dependence of such insects on particular plant species.

Two genera listed below, *Aeolothrips* and *Lepothrips*, involve species that are presumed to be predatory, but it seems unlikely that so many closely related predatory species should co-exist in this area. If these species prove to be both valid and obligate predators, then niche apportionment among them will be an interesting field for study. However, it seems likely that at least some of the *Aeolothrips* species are actually phytophagous, and probably facultative predators with some level of host-specificity.

#### BIOGEOGRAPHIC RELATIONSHIPS

The thrips fauna of the southwestern U.S.A. includes taxa with distributions that are remarkably disjunct. *Orothrips* in the Aeolothripidae is known from three species; one from European Mediterranean countries and two from California. The Adiheterothripidae includes three genera, one from the eastern Mediterranean to India and two from California. The Fauriellidae includes four genera, one Mediterranean, one Californian, and two from southeastern Africa. At least 17% of the species in this checklist appear to be non-native to California, and most of the native species appear to be found in the southern and eastern areas of the state. However, the available locality information and "host plant" records for collected species are not adequate to make any broad generalizations concerning the thrips fauna of California.

#### THRIPS COLLECTIONS IN CALIFORNIA

Several of the most important reference collections of world Thysanoptera are housed within California research institutes. One of the smallest collections, but in terms of the quality of slide-mounted material, the most useful, is the Ewart Collection at the University of California at Riverside. The Ewart Collection has approximately 450 named species and many flagged and group-organized but unnamed species from California. The Moulton Collection at the Californian Academy of Sciences, San Francisco, is particularly rich, with type material of 640 species and over 25,000 slides. The Bailey Collection at the University of California at Davis includes representatives of almost 750 named species. The Cott Collection at the University of California at Berkeley has about 170 species. Finally, the collection at the California Department of Food and Agriculture, Sacramento California, largely developed by Kono, has about 630 species.

#### CHECKLIST

Although based largely on published literature, this list includes a considerable number of previously unpublished State records, derived primarily from the Ewart Collection at the University of California at Riverside, but also from the United States Museum of Natural History collections, held at USDA, Beltsville, Maryland. Some of the literature records seem likely to involve misidentifications, particularly that of *Oxythrips quercicola*, and some of the museum records are based on few and old specimens, eg. *Frankliniella tritici* and *Fr. williamsi*. Other problems for future work include the currently unsatisfactory distinctions among several genera of leaf-feeding phlaeothripine species, e.g., *Liothrips*, *Rhynchothrips*

and *Pseudophilothrips*. The objective of this list is to provide a starting point for further work.

Within the Order Thysanoptera, two suborders are recognized, Terebrantia and Tubulifera, and both of these major groups are well represented in California. The Terebrantia includes eight families worldwide, of which only the monotypic, tropical, Uzelothripidae has not been found in California. The Tubulifera includes a single large family, the Phlaeothripidae, with two subfamilies, the Idolothripinae and Phlaeothripinae, both of which are represented in California.

In the checklist below, an asterisk (\*) indicates species that presumably are not native to California. The original generic combination, when this differs from the current one, is indicated in square brackets [ ] after a species entry.

#### Merothripidae

This family of three genera, with about 15 fungus-feeding species that live on dead twigs and in leaf-duff, is found mainly in the Neotropics.

- Merothrips* Hood, 1912: 132  
*floridensis* Watson, 1927: 60  
*morgani* Hood, 1912: 132

#### Melanthripidae

The four genera now placed in this family until recently were considered to be members of the Aeolothripidae. They are found in the northern and southern hemisphere temperate regions, and include a total of about 65 flower-feeding species.

- Ankothrips* Crawford, 1909: 100  
*aequalis* Moulton, 1926: 20  
*gracilis* Moulton, 1926: 19  
*notabilis* Bailey, 1940: 101  
*robustus* Crawford, 1909: 100  
*yuccae* Moulton, 1926: 119

- Melanthrips* Haliday, 1836: 450  
*digitus* Bailey, 1954: 79

#### Adiheterothripidae

The three genera in this family have a remarkably disjunct distribution, one with four species breeding in the flowers of date palms in western Asia, and the two listed here from California.

- Heratythrips* Mound & Marullo, 1998: 88  
*sauli* Mound & Marullo, 1998: 89

- Oligothrips* Moulton, 1933: 139  
*oreios* Moulton, 1933: 139

#### Fauriellidae

Four genera and five species are placed in this family, one Mediterranean with two species, and

two from southeastern Africa together with the one listed here.

- Parrellathrips* Mound & Marullo, 1998: 83  
*ullmani* Mound & Marullo, 1998: 85

#### Heterothripidae

The four genera and 70 species recognized in this family are all from the New World. These species are almost all flower-feeding, 65 of them being placed in *Heterothrips*, but one Brazilian species that is placed in a monobasic genus is ectoparasitic on an homopteran.

- Heterothrips* Hood, 1908: 361  
*pectinifer* Hood, 1915: 5  
*prospoidis* Crawford, 1943: 93  
*salicis* Shull, 1909: 220  
*vitifloridus* Bailey & Cott, 1954: 616

#### Aeolothripidae

Most of the 190 species in this family of about 23 genera are found in the temperate areas of the northern and southern hemispheres, although most of the genera are from tropical countries. The tropical species, in genera such as *Franklinothrips* and *Stomatothrips*, are mainly obligate predators of other arthropods, whereas most of the temperate area species in the genus *Aeolothrips* are flower-living facultative predators.

- Aeolothrips* Haliday, 1836: 451  
*albicinctus* Haliday, 1836: 451  
*auricestus* Treherne, 1919: 184  
*brevicauda* Hood, 1935: 105  
*brunneipictus* Bailey, 1951: 53  
*clarus* Bailey, 1951: 53  
*\*collaris* Priesner, 1919: 119  
*crucifer* Hood, 1935: 104  
*duwali* Moulton, 1927: 186  
*\*ericae* Bagnall, 1920: 60  
*fasciatus* (Linnaeus), 1758: 266 [*Thrips*]  
*fuscus* Watson, 1931: 340  
*hartleyi* Moulton, 1927: 185  
*hesperus* Bailey, 1951: 58  
*kuwanaii* Moulton, 1907: 47  
*\*melaleucus* (Haliday), 1852: 1117 [*Coleothrips*]  
*metacrucifer* Bailey, 1951: 61  
*montanus* Bailey, 1951: 62  
*nasturtii* Jones, 1921: 2  
*nitidus* Moulton, 1946: 59  
*occidentalis* Bailey, 1951: 63  
*terrestris* Bailey, 1951: 64  
*vittipennis* Hood, 1912: 129

- Dactuliothrips* Moulton, 1931: 173  
*boharti* Bailey, 1937: 122  
*diversus* Bailey, 1939: 170  
*spinus* Moulton, 1931: 174  
*xerophilus* Bailey, 1937: 122

*Erythrothrips* Moulton, 1911: 34  
*arizonae* Moulton, 1911: 21  
*fasciculatus* Moulton, 1929: 224  
*keeni* Moulton, 1929: 226

*Franklinothrips* Back, 1912: 75  
*orizabensis* Johansen, 1974: 249  
*vespiformis* Crawford, 1909: 109

*Orothrips* Moulton, 1907: 45  
*kelloggii* Moulton, 1907: 43  
*yosemetii* Moulton, 1911: 13

*Rhipidothrips* Uzel, 1895: 66  
 \**brunneus* Williams, 1913: 216  
 \**gratiosus* Uzel, 1895: 46

*Stomatothrips* Hood, 1912: 63  
*flavus* Hood, 1912: 64

#### Thripidae

More than 2000 species in 290 genera are placed in this family worldwide. Most of them are phytophagous on higher plants, with a few species on ferns. A few species are obligate predators (e.g., *Scolothrips sexmaculatus*), but some polyphagous pest thrips can behave as facultative predators (e.g., *Frankliniella occidentalis*). Four subfamilies within the Thripidae are currently recognized worldwide, and each of these is represented in California.

#### Thripidae—Panchaetothripinae

Wilson (1975) provided an account of the members of this subfamily that is now considered to include 125 species in 35 genera. The name *Hercothrips* occurs in earlier literature in California, but this is a synonym of *Caliothrips*.

*Caliothrips* Daniel, 1904: 296  
*fasciatus* (Pergande), 1895: 391 [*Heliiothrips*]  
*marginipennis* (Hood), 1912: 136 [*Heliiothrips*]  
 (= *bromi* Moulton, 1927: 31 [*Heliiothrips*])  
*phaseoli* (Hood), 1912: 113 [*Heliiothrips*]

*Heliiothrips* Haliday, 1836: 443  
 \**haemorrhoidalis* (Bouche) 1833: 42 [*Thrips*]

*Hercinothrips* Bagnall, 1932: 506  
 \**femoralis* (Reuter), 1891: 166 [*Heliiothrips*]

*Monilothrips* Moulton, 1929: 93  
 \**kempi* Moulton, 1929: 94

*Parthenothrips* Uzel, 1895: 170  
 \**dracaenae* (Heeger), 1854: 365 [*Heliiothrips*]

#### Thripidae—Dendrothripinae

More than 90 species, in 10 genera, are recognized worldwide in this subfamily. All of the spe-

cies live on young leaves, and they are usually small and jump when disturbed.

*Asprothrips* Crawford, 1938: 109  
 \**seminigricornis* (Girault), 1926: 2 [*Euthrips*]

*Dendrothrips* Uzel, 1895: 159  
 \**ornatus* (Jablonowski), 1894: 93 [*Thrips*]

*Leucothrips* Reuter, 1904: 107  
*furcatus* Hood, 1931: 153  
 \**nigripennis* Reuter, 1904: 108  
*piercei* (Morgan), 1913: 19 [*Microthrips*]

#### Thripidae—Sericothripinae

This subfamily includes worldwide at least 90 species in 10 genera. Most of these genera are subdivisions of the genus *Sericothrips* that have been recognized relatively recently. Moreover, in contrast to earlier authors, the genus *Scirtothrips* is not considered now to be related to *Sericothrips*. The species are all phytophagous in flowers and on leaves.

*Neohydatothrips* John, 1929: 33  
*albus* (Jones), 1912: 6 [*Sericothrips*]  
*catenatus* (Hood), 1957: 51 [*Sericothrips*]  
*collaris* (Hood), 1936: 91 [*Sericothrips*]  
*chrysothamni* (Hood), 1936: 85 [*Sericothrips*]  
*moultoni* (Jones), 1912: 7 [*Sericothrips*]  
*opuntiae* (Hood), 1936: 88 [*Sericothrips*]  
*setosus* (Hood), 1927: 135 [*Sericothrips*]  
*variabilis* (Beach), 1896: 220 [*Thrips*]

#### Thripidae—Thripinae

This is a large group of over 1700 species in 235 genera, although almost 50% of these genera remain monotypic. The species exhibit a wide range of biologies, and most of the pest thrips are included in this subfamily.

*Anaphothrips* Uzel, 1895: 142  
 \**obscurus* (Muller), 1776: 96 [*Thrips*]

*Apterothrips* Bagnall, 1908: 185  
*apteris* (Daniel), 1904: 295 [*Sericothrips*]  
 (= *stanfordi* Moulton 1907: 43 [*Sericothrips*])  
*secticornis* Trybom, 1896: 620 [*Thrips*]

*Aptinothrips* Haliday, 1836: 445  
 \**rufus* (Haliday), 1836: 445 [*Thrips*]  
 \**stylifer* Trybom, 1894: 43

*Arorathrips* Bhatti, 1990: 194  
*mexicanus* (Crawford), 1909: 114 [*Chirothrips*]  
*spiniceps* (Hood), 1915: 12 [*Chirothrips*]

*Arpediothrips* Hood, 1927: 197  
*mojave* Hood, 1927: 198

*Baileyothrips* Kono & O'Neill, 1964: 1  
*arizonensis* (Morgan), 1913: 12 [*Anaphothrips*]  
 (= *minutus* Moulton: 1929, 127 [*Anaphothrips*])

- Bregmatothrips* Hood, 1912: 66  
*venustus* Hood, 1912: 67  
 (=sonorensis Stannard, 1956: 71)
- Chaetanaphothrips* Priesner, 1926: 204  
 \*orchidii (Moulton), 1907: 52 [*Euthrips*]
- Chilothrips* Hood, 1916: 119  
*occidentalis* Stannard, 1973: 110  
*pini* Hood, 1916: 120  
*rotrameli* Stannard, 1973: 114
- Chirothrips* Haliday, 1936: 444  
 \*aculeatus Bagnall, 1927: 567  
*falsus* Priesner, 1925: 312  
 \*manicatus (Haliday), 1836: 444 [*Thrips*]  
*patruelis* Hood, 1940: 550  
*secalis* Moulton, 1936: 173  
*simplex* Hood, 1927: 128
- Drepanothrips* Uzel, 1895: 213  
 \*reuteri Uzel, 1895: 213
- Echinothrips* Moulton, 1911: 37  
*americanus* Morgan, 1913: 14
- Ewartithrips* Nakahara, 1996: 233  
*californicus* Nakahara, 1996: 236  
*dispar* Nakahara, 1996: 239  
*ehrhornii* (Moulton), 1907: 52 [*Euthrips*]  
*flavidus* Nakahara, 1996: 244  
*longirostrum* (Jones), 1912: 10 [*Euthrips*]  
*salviae* Nakahara, 1996: 248
- Frankliniella* Karny, 1910: 46  
*davidsoni* Sakimura & O'Neill, 1979  
*deserticola* Sakimura & O'Neill, 1979  
*ewarti* Sakimura & O'Neill, 1979  
*fusca* (Hinds), 1902: 154 [*Euthrips*]  
*fuscicauda* Hood, 1927: 197  
*gossypiana* Hood, 1936: 68  
*insignis* Moulton, 1936: 170  
*insularis* (Franklin), 1908: 715 [*Euthrips*]  
*minuta* (Moulton), 1907: 56 [*Euthrips*]  
*occidentalis* (Pergande), 1895: 393 [*Euthrips*]  
 (=conspicua Moulton, 1935: 173)  
*tenuicornis* (Uzel), 1895: 99 [*Physopus*]  
*tritici* (Fitch), 1855: 385 [*Euthrips*]  
*tuttlei* Sakimura & O'Neill, 1979: 30  
*williamsi* Hood, 1915: 19  
*yuccae* Moulton, 1936: 171
- Kurtomathrips* Moulton, 1927: 187  
*morrilli* Moulton, 1927: 188
- Limothrips* Haliday, 1836: 444  
 \*angulicornis Jablonowski, 1894: 45  
 \*cerealium (Haliday), 1836: 445 [*Thrips*]
- Microcephalothrips* Bagnall, 1926: 113  
 \*abdominalis (Crawford), 1910: 157 [*Thrips*]
- Mycterothrips* Trybom, 1910: 158  
*albus* (Moulton), 1911: 39 [*Euthrips*]  
 (=corni Moulton, 1927: 34 [*Rhopalandrothrips*])
- (=albipennis Moulton, 1929: 129 [*Taeniothrips*])  
*aureus* (Moulton), 1946: 59 [*Taeniothrips*]
- Odontanaphothrips* Moulton, 1926: 24  
*tricolor* (Moulton), 1911: 17 [*Anaphothrips*]
- Odontothrips* Amyot & Serville, 1843: 642  
 \*loti (Haliday), 1852: 1108 [*Thrips*]
- Oxythrips* Uzel, 1895: 133  
 \*quercicola Bagnall, 1926: 282
- Plesiothrips* Hood, 1915: 129  
*perplexus* (Beach), 1897: 217 [*Sericothrips*]
- Proscirtothrips* Karny, 1921: 237  
*zeae* (Moulton), 1911: 28 [*Anaphothrips*]  
 (=longipennis Crawford, 1910: 150  
 [*Anapho thrips*])
- Prosoponaphothrips* Moulton, 1926: 22  
*reticulatus* (Moulton), 1907: 50 [*Sericothrips*]
- Pseudanaphothrips* Karny, 1921: 242  
 \*achaetus (Bagnall), 1916: 398 [*Pseudothrips*]
- Psilothrips* Hood, 1927: 198  
*pardalotus* Hood, 1927: 198  
*priesneri* (Moulton), 1926: 123 [*Anaphothrips*]
- Scirtothrips* Shull, 1909: 222  
*aceri* Moulton, 1926: 122  
*albus* (Jones), 1912: 15 [*Anaphothrips*]  
*citri* (Moulton), 1909: 119 [*Euthrips*]  
*ewarti* Bailey, 1964: 341  
 \*inermis Priesner, 1933: 186  
 \*longipennis (Bagnall), 1909: 173 [*Euthrips*]  
 \*perseae Nakahara, 1997: 189  
*solaris*, Bailey, 1964: 344  
*tehachapi* Bailey, 1964: 345
- Scolothrips* Hinds, 1902: 157  
 \*longicornis Priesner, 1926: 239  
*pallidus* (Beach), 1896: 226 [*Thrips*]  
*sexmaculatus* (Pergande), 1890: 539 [*Thrips*]
- Taeniothrips* Amyot & Serville, 1843: 644  
 \*inconsequens (Uzel), 1895: 117 [*Physopus*]  
*orionis* Treherne, 1924: 86
- Tenothrips* Bhatti, 1967: 18  
 \*frici (Uzel), 1895: 126 [*Physopus*]
- Thrips* Linnaeus, 1758: 457  
*albogilvus* Nakahara, 1994: 28  
 \*australis (Bagnall), 1915: 592 [*Isoneurothrips*]  
*brevipilosus* Moulton, 1927: 194  
*graminae* Moulton, 1936: 106  
 \*hawaiiensis (Morgan), 1913: 3 [*Euthrips*]  
*helvolus* Nakahara, 1994: 67  
*heraclei* Moulton, 1926: 25  
*konoii* Nakahara, 1994: 77  
*madronii* Moulton, 1907: 57  
*magnus* Moulton, 1911: 36  
 \*nigropilosus Uzel, 1895: 198  
*paramadronii* Nakahara, 1994: 97

- pruni* Nakahara, 1994: 105  
*sierrensis* Gentile & Bailey, 1968: 45  
 \**simplex* (Morison), 1930: 12 [*Physothrips*]  
 \**tabaci* Lindeman, 1888: 61  
 \**trehernei* Priesner, 1927: 356  
 (= *hukkineni* Priesner, 1937: 108)  
 \**vulgatissimus* Haliday, 1836: 447  
 (= *lemanis* Treherne, 1924: 87)

*Toxonothrips* Moulton, 1927: 30  
*gramineae* Moulton, 1927: 30

*Trichromothrips* Priesner, 1930: 9  
 \**cyperaceae* (Bianchi), 1945: 283 [*Taeniothrips*]  
 \**xanthius* (Williams), 1917: 59 [*Physothrips*]

*Xerothrips* Nakahara, 1996: 209  
*dissimilis* Nakahara, 1996: 210

#### Phlaeothripidae

This is the only family recognized in the Tubulifera and includes more than 3200 species worldwide, primarily in the warmer parts of the world. Two subfamilies are recognized, and both are well represented in California.

#### Phlaeothripidae—Idolothripinae

The smaller of the two subfamilies includes at least 700 species in about 80 genera, mainly in tropical countries. All of these species feed by imbibing whole fungal spores, as is evident from their gut contents. The larger species can be particularly common on dead leaves that remain hanging on broken branches, but many smaller species live on the ground in leaf duff.

- Allothrips* Hood, 1908: 372  
*aureus* Stannard, 1955: 155
- Bactrothrips* Karny, 1912: 131  
*hesperus* (Moulton), 1907: 65 [*Megalothrips*]
- Bolothrips* Priesner, 1926: 90  
*rachiphilus* Cott, 1956: 181
- Compsothrips* Reuter, 1901: 214  
*hookeri* (Hood), 1916: 64 [*Oedaleothrips*]  
*jacksoni* (Hood), 1925: 137 [*Oedaleothrips*]  
*tristis* (Cott), 1956: 186 [*Oedaleothrips*]  
*yosemitae* (Moulton), 1929: 135 [*Formicothrips*]
- Cryptothrips* Uzel, 1895: 228  
*carbonarius* Hood, 1908: 376  
*rectangularis* Hood, 1908: 307  
*sordidatus* Hood, 1927: 199
- Megalothrips* Uzel, 1895: 224  
*piticornis* Hood, 1927: 204
- Megathrips* Targioni-Tozzetti, 1881: 124  
*timidus* Cott, 1956: 177
- Priesneriella* Hood, 1927: 198  
*citricauda* Hood, 1927: 199

#### Phlaeothripidae—Phlaeothripinae

Worldwide, more than 2500 species in 350 genera are placed in this subfamily, although 50% of these genera remain monotypic. Probably about half of the species are fungus-feeding on dead wood or in leaf duff. However, species of a few genera live in flowers, and a large number of tropical species are leaf-feeding, some inducing galls.

*Acanthothrips* Uzel, 1895: 259  
*albivittatus* Hood, 1908: 374  
*argentifer* (Cott), 1956: 141 [*Notothrips*]  
*nodicornis* (Reuter), 1880: 16 [*Phloeothrips*]

*Adraneothrips* Hood, 1925: 54  
*ephippium* Stannard, 1956: 24  
*faustus* Stannard, 1956: 21  
*saturatus* Cott, 1956: 82  
*vacuus* Stannard, 1956: 23

*Amynothrips* O'Neill, 1968: 175  
 \**andersoni* O'Neill, 1968: 179

*Bagnalliella* Karny, 1920: 41  
*desertae* Hood, 1927: 201  
*mojave* Hood, 1927: 200  
*yuccae* (Hinds), 1902: 194 [*Cephalothrips*]

*Cephalothrips* Uzel, 1895: 244  
*hesperus* Hood, 1941: 197  
 \**monilicornis* (Reuter), 1880: 21 [*Phloeothrips*]

*Goniothrips* Hood, 1927: 202  
*denticornis* Hood, 1927: 202

*Gynaikothrips* Zimmermann, 1900: 13  
 \**ficorum* Marchal, 1908: 252 [*Phloeothrips*]

*Haplothrips* Amyot & Serville, 1843: 640  
*halophilus* Hood, 1915: 29  
 \**leucanthemi* (Schrank), 1781: 298 [*Thrips*]  
 (= *niger* Osborn, 1883: 154 [*Phloeothrips*])  
*malifloris* Hood, 1916: 121  
 \**robustus* Bagnall, 1918: 209  
*ruber* (Moulton), 1911: 42 [*Trichothrips*]  
 \**verbasci* (Osborn), 1897: 228 [*Phloeothrips*]

*Hoplandrothrips* Hood, 1912: 145  
*armiger* (Jones), 1912: 23 [*Phloeothrips*]  
*costano* Hood, 1942: 567  
*lissonotus* Hood, 1942: 561  
*salicacearum* Hood, 1942: 564

*Hoplothrips* Amyot & Serville, 1843: 640  
*baileyi* Cott, 1956: 40

*Karnyothrips* Watson, 1923: 23  
*flavipes* (Jones), 1912: 18 [*Anthothrips*]  
*longiceps* (Hood), 1908: 364 [*Zygothrips*]

*Leptothrips* Hood, 1909: 249  
*distalis* (Hood), 1925: 103 [*Haplothrips*]  
*fasciculatus* (Crawford), 1909: 105 [*Phyllothrips*]  
*heliomanes* Hood, 1927: 202  
*larreae* Hood, 1939: 207

*mali* (Fitch), 1855: 807 [*Phloeothrips*]  
*oribates* Hood, 1939: 205  
*purpuratus* (Hood), 1925: 101 [*Haplothrips*]

*Liothrips* Uzel, 1895: 261 (= *Rhynchothrips*)  
*brevitubus* Kono, 1964: 4  
*corni* Moulton, 1926: 124  
*cunctans* (Cott), 1956: 68 [*Rhynchothrips*]  
*dumosa* (Moulton), 1907: 3 [*Trichothrips*]  
*eremicus* Cott, 1956: 60  
*gaviotae* (Moulton), 1929: 132 [*Haplothrips*]  
*ilex* (Moulton), 1907: 62 [*Trichothrips*]  
*invisus* (Cott), 1956: 65 [*Rhynchothrips*]  
*lepidus* Cott, 1956: 62  
*monoensis* Kono, 1964: 6  
*\*vaneeckei* Priesner, 1920: 211  
*varicornis* Hood, 1912: 74  
*xanthocerus* Hood, 1927: 203

*Macrophthalmothrips* Karny, 1922: 34  
*\*argus* (Karny), 1920: 38 [*Ophthalmothrips*]

*Neurothrips* Hood, 1924: 315  
*apache* Hood, 1957: 58  
*magnafemoralis* (Hinds), 1902: 199 [*Acanthothrips*]

*Phlaeothrips* Haliday, 1836: 442  
*karnyi* Hood, 1914: 20 [*Trichothrips*]  
*\*coriaceus* Haliday, 1836: 442

*Plectrothrips* Hood, 1908: 370  
*crocatus* Cott, 1956: 80

*Poecilothrips* Uzel, 1895: 264  
*\*albopictus* Uzel, 1895: 264  
*dens* (Moulton), 1907: 60 [*Trichothrips*]

*Scopaeothrips* Hood, 1912: 70 (= *Rhopalothrips*)  
*bicolor* (Hood), 1912: 72 [*Rhopalothrips*]

*Stephanothrips* Trybom, 1912: 42  
*bradleyi* Hood, 1927: 204

*Stictothrips* Hood, 1925: 295  
*maculatus* (Hood), 1909: 250 [*Phloeothrips*]

*Trachythrips* Hood, 1930: 317  
*astutus* Cott, 1956: 196

## ACKNOWLEDGMENTS

We thank Cheryl Barr, Essig Museum, University of California at Berkeley, for access to the Cott Collection. Ray Gill, California Department of Food and Agriculture, Sacramento California, allowed unlimited access to the Kono collection. The California Avocado Commission and Avocado Brainstorming Committee provided some financial assistance for this project.

## REFERENCES CITED

- ARNAUD, P. H., AND V. F. LEE. 1973. Types of Thysanoptera in the collection of the California Academy of Sciences. Occasional Papers of the California Academy of Sciences 105: 1-138.
- BAILEY, S. F. 1957. The Thrips of California. Part I: Suborder Terebrantia. Bulletin of the California Insect Survey 4 (5): 143-220.
- COTT, H. E. 1956. Systematics of the Suborder Tubulifera (Thysanoptera) in California. University of California Publications in Entomology 13: 1-216.
- GENTILE, A. G., AND S. F. BAILEY. 1968. A Revision of the Genus *Thrips* Linnaeus in the World with a Catalogue of the World Species (Thysanoptera: Thripidae). University of California, Berkeley, Publications in Entomology 51: 1-95.
- KONO, T., AND C. S. PAPP. 1977. Handbook of Agricultural Pests. Aphids, Thrips, Mites, Snails and Slugs. California Department of Food and Agriculture, Division of Plant Industry, Laboratory Services—Entomology. 205 pp.
- MOULTON, D. 1907. A contribution to our knowledge of the Thysanoptera of California, Technical series, USDA Bureau of Entomology 12/III: 39-68.
- UZEL, H. 1895. Monographie der Ordnung Thysanoptera. 472 pp. Konigratz.