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Authors: Childers, Carl C., Beshear, Ramona J., Frantz, Galen, and Nelms, Marlon

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A REVIEW OF THRIPS SPECIES BITING MAN INCLUDING RECORDS IN FLORIDA AND GEORGIA BETWEEN 1986-1997

CARL C. CHILDERS¹, RAMONA J. BESHEAR², GALEN FRANTZ³ AND MARLON NELMS⁴

¹University of Florida, IFAS, Department of Entomology and Nematology CREC
700 Experiment Station Road, Lake Alfred, FL 33850

²University of Georgia, Experiment Station, Griffin, GA 30223-1731

³1415 Greenwood Ave., Lehigh Acres, FL 33972-1625

⁴Metropolitan Dade County Public Works Dept., Mosquito Control Division, 8901 N.W. 58th St., Miami, FL 33178

ABSTRACT

Two species of thrips (*Frankliniella tritici* and *Limothrips cerealium*) were reported biting people in Georgia during 1986 and 1990. *Frankliniella bispinosa* was the only thrips species documented biting people in Florida between 1986 and 1997. This species occurs in great abundance throughout Florida and is a recognized plant pest on numerous crops. Because of the tremendous numbers of *F. bispinosa* that are produced on dozens of different cultivated and weed host plants during the spring months, this species can become a serious nuisance problem. *Frankliniella bispinosa* will bite people and produce variable reactions from slight irritation to formation of a rash with associated intense itching that can last for several days. The problem usually is seasonal and associated with maximum seasonal increase in *F. bispinosa* populations and favorable environmental conditions that can occur anytime between February and April in central and south Florida. Colored sticky-trap tests in Florida demonstrated the strong attraction of both white and blue colors to *F. bispinosa*. People wearing white or blue colored clothing tend to be more at risk of being bitten by this thrips pest.

Key Words: Thysanoptera, Thripidae, Phlaeothripidae, nuisance insects, biting insects

RESUMEN

Dos especies de trips (*Frankliniella tritici* y *Limothrips cerealium*) son reportadas picando personas en Georgia durante 1986 y 1990. *Frankliniella bispinosa* es la única especie de trips conocida que pica personas en la Florida entre 1986 y 1997. Esta especie ocurre en abundancia en toda la Florida y es reconocida como plaga en numerosos cultivos. Debido al gran número de *F. bispinosa* que se reproducen en docenas de plantas cultivadas y malezas diferentes durante los meses de la primavera, esta especie puede llegar a ser un problema fastidioso y serio. *Frankliniella bispinosa* produce reacciones en las personas que pica, desde una irritación ligera hasta un sarpullido asociado con una picazón intensa que puede durar varios días. El problema usualmente es estacional y en asocio con el aumento máximo por período en la población de *F. bispinosa*, y con condiciones ambientales favorables que ocurren entre febrero y abril en la parte central y sur de Florida. En pruebas utilizando trampas pegajosas con color en Florida, *F. bispinosa* demostró una atracción fuerte al color blanco y azul. Personas llevando ropa de color blanco o azul son más propensas al riesgo de ser picadas por esta plaga de trips.

Insects in the Order Thysanoptera, commonly known as "thrips" have a wide variety of niches and include phytophagous (several are serious economic pests), fungivorous, and predacious species (Lewis 1997). Most adults have two pairs of developed wings and are capable of flying. Several out of 5500 species disperse aerially (Lewis 1973). Because of their small size, rapid movement, and usually light color, thrips are often over-looked by most people except when causing damage to flowers, leaves, or fruits of various agricultural or sylvan crops. An infrequently reported problem directly affecting people occurs when thrips become a nuisance by traveling in large swarms and land-

ing on clothing and exposed parts of their heads, necks, and arms.

Some confusion has lingered in recent years with the idea that thrips have rasping-sucking mouthparts (Davidson & Peairs 1966; Pfadt 1985). All thrips have piercing-sucking mouthparts that consist of a single mandibular stylet and two opposable and interlocking maxillary stylets (Heming 1978; Chisholm & Lewis 1984; Hunter & Ullman 1992). The mandibular stylet lacks an opening or food channel and is used principally to punch a hole in the substrate followed by insertion of the paired, tongue-in-grooved maxillary stylets (Heming 1978). The stylets are

housed within the mouthcone situated just anterior of the first pair of legs. Thrips feeding stages include adults of both sexes and two instars.

Adult and larval thrips can bite people (Bailey 1936) and cause welts and rashes or other dermal reactions (Lewis 1973). When thrips bite people the stylets are apparently used to pierce a person's skin and extract fluids (Johnson 1925; Hood 1927; Bailey 1936). Irritation by thrips to people likely results from the rapid extension and retraction of the insect's maxillary stylets singly or together. Subsequent skin penetration and release of thrips saliva could ensue. The right maxillary stylet tip is larger and slightly broader than that of the left, at least in *Frankliniella bispinosa* (Morgan) (Childers & Achor 1991a). Thus, rapid extension and retraction of the paired stylets can result in different stylet pathways, some of which could penetrate a person's exposed skin. The maxillary stylets provide for both excretion of saliva and uptake of partially digested food or liquid.

Although past instances of thrips biting people and other nuisance problems have been reported in publications from several countries including the United States, more recent reports from Florida and Georgia have not been published. It is helpful to educate people to the fact that some thrips species can bite humans. Such biting does not result in any known disease transmission but skin irritations are known to occur. In some cases, it is possible that thrips biting people could be confused with mosquitoes or biting midges such as *Culicoides* species (no-see-ums). The objectives of this paper are to review the documented reports of thrips biting humans and to further document incidences of specific thrips species biting people in Florida and Georgia between 1986 and 1997. Symptoms and effects to humans associated with thrips irritation and biting are presented.

Review of Documented Cases of Thrips Biting People

One of the earliest instances of thrips being a nuisance to people was reported by Curtis (1883). He observed a species of black thrips causing skin irritation during hot weather but did not mention that humans were bitten. This report was similar to Korting (1930), who discussed swarms of *Limothrips* sp in Europe, and the insects subsequently crawled around on people's skin and produced unpleasant itching sensations (localized inflammations) from bites. The author concluded that these thrips were probing to obtain moisture. *Limothrips cerealium* Haliday produced an itching sensation and inflammation of the nose and ears of people in grain fields near Kiel, Germany during July and August (Bailey 1936).

Karyothrips flavipes (Jones), a predacious species was observed feeding on human blood on two occasions in Trinidad (Hood 1927). The insect became distended and reddish in color while feed-

ing. The bites caused local raised lesions about 6 mm in diameter with a surrounding blotched area of 19 mm by 13 mm. According to Bailey (1936) second instars of both *Thrips tabaci* Lindeman and *Frankliniella moultoni* Hood (= *F. occidentalis* Pergande; S. Nakahara, pers. comm. 2005) are capable of piercing human skin and sucking blood. This results in a pinkish dotted area being formed at the site of the bite. There was slight itching with no associated swelling at the location of the bites. Other predacious thrips species such as *Scolothrips sexmaculatus* (Pergande), *Leptothrips mali* (Fitch), *Aeolothrips fasciatus* (L.), and *A. kuwanii* Moulton were less likely to bite man and cause inflammation.

Heliothrips indicus Bagnall (= *Caliothrips indicus* (Bagnall) (S. Nakahara, pers. comm. 2005) was reported to bite man on several instances at Khartoum in Sudan during October 15, 1924 (Johnston 1925). According to the author, the bite was sharp and painful causing severe irritation followed by localized inflammation. Blood corpuscles were not found in the digestive tract of the thrips, and Johnston concluded that the thrips were merely seeking moisture. He also suggested that the irritation from the stylet penetration was caused by the insect's saliva.

According to Lewis (1973), thrips occasionally irritate people out of doors and can be a minor nuisance inside buildings. Attacks on people outside usually occurred in hot, sultry weather when large numbers of migrating thrips alighted on their bare skin. The itching and pricking sensations produced by the thrips were believed to be caused by their attempts to obtain water from the moist surface of human skin, or perhaps they were attracted to volatile compounds in perspiration. In laboratory studies, Holtman (1963) found that *Limothrips cerealium* and *Haplothrips aculeatus* (Fabricius) were attracted to capronic and lactic acids in human perspiration. People developed rashes on their faces from bites by *Thrips imaginis* Bagnall in Melbourne, Australia (Bailey 1936). The author suggested that saliva was injected into the skin punctures during probing. Denmark (1967) reported that the bites of *Gynaikothrips ficorum* (Marchal) occasionally could be quite annoying to people in Florida. This thrips species is commonly found on various *Ficus* species. Southcott (1986) reported several thrips species biting people in Australia. *Frankliniella shultzei* (Trybom) was recorded biting at dusk in the Adelaide vicinity during the summer months of January and February. A small stinging bite left a small red area about one mm in diameter that lasted for about one h. Multiple bites from a single *F. shultzei* were documented as it moved around Southcott's forearm at dusk. Bites by *Haplothrips varius* Hood did not result in a rash. However, this species was attracted to white clothing hung outside to dry in the Adelaide vicinity during early

September. The thrips remained on the white clothing when gathered and on the following day caused irritation to wearers. This species was active for about two weeks and was a widespread nuisance problem throughout the city. Also in the Adelaide area, several members of a family were bitten by *Thrips imaginis* during December 1976 and January 1977, which resulted in skin lesions with small weals and surrounding erythema associated with intense itching that lasted a few days.

Four species of thrips were reported to bite people by Lewis (1973) and included: *Gynaikothrips uzeli* (Zimmerman) (= *G. ficorum* Marchal, S. Nakahara, pers. comm. 2005) in Algeria (Senevet 1922), *Caliothrips indicus* Bagnall in Sudan (Johnson 1925), *Thrips imaginis* in Australia (Evans 1932), and *Limothrips* sp. in Europe (Korting 1930; Bailey 1936). Heming (pers. comm. 1992) reported four species of thrips biting man: *Aeolothrips fasciatus* (L.), *Limothrips denticornis* Haliday, *Frankliniella tritici* (Fitch), and *Haplothrips leucanthemi* (Schrank) and legions of unidentified Thripidae causing symptoms similar to those recorded by Lewis (1973).

Cases in Florida and Georgia

Records were obtained that included the dates, locations, and frequencies of various thrips species biting people between 1986 and 1993 in Florida and Georgia. Characterization of human reactions to thrips bites and environmental conditions were also recorded whenever possible. We collected thrips that were biting people and placed them into 70-80% ethanol or AGA and returned them to the laboratory for slide-mounting in Hoyer's medium (Krantz 1978). Slides were oven-cured for about two weeks at 42-45°C and identified to species.

In Georgia, three *Frankliniella tritici* and one *Limothrips cerealium* were biting workers on May 14, 1990 in the outside areas of a poultry house surrounded by a wheat field in Shady Dale, Jasper County, Georgia. Two female *F. tritici* were biting people on May 21, 1986 in Pickens County. Both instances were observed and confirmed by one of the authors (RJB). This species has been an infrequent nuisance to people, especially those wearing white clothing, in north central Georgia during outdoor activities, such as picnics or cookouts.

In Florida, *F. bispinosa* that bit people were collected by the authors on numerous occasions. One female *F. bispinosa* was collected while biting a woman who was sitting on a porch on May 13, 1992 in Auburndale, Polk County, Florida (CCC). This woman had been complaining of insects biting her and others during the day in her yard between November and May for each of the previous three years.

Vegetable field scouts in Naples and Immokalee, both in Collier County, Florida, were observed

being bitten by thrips by one of the authors (GF). He collected and identified 40 *F. bispinosa* biting them on February 18 and 19, 1992 during regular work activities in the field. Other collections of thrips were taken from the sides of white vehicles. A total of 431 *F. bispinosa*, one *F. occidentalis* and one *Microcephalothrips abdominalis* (Crawford) were identified from these collections taken between January 10 and December 31, 1991.

Thrips were reported biting two people on their ears, arms, and necks while in a blueberry planting on April 17, 1991, in the Waldo vicinity in Alachua County, Florida. The thrips appeared to be attracted to the blue colors on one person's shirt and cap. *Frankliniella bispinosa* is known to be abundant in Florida blueberry blocks (H. Denmark, pers. comm. 1992). Denmark also reported problems with *F. bispinosa* biting people between 1953 and 1967 in Gainesville, Florida. Numerous *F. bispinosa* that had entered the building through unscreened open windows were collected by Denmark on the fifth floor. This period of time coincided with flowering of live oak *Quercus virginiana* Miller during February and March. Windows were open because the building was not air-conditioned and the thrips became a serious nuisance each year during that time. People complained of being bitten by this thrips on the exposed skin of their arms and necks.

Another problem occurred in the Deland vicinity of Volusia County, Florida during February and March when thrips became a nuisance problem by biting people while outside (CCC). One woman was very susceptible to the bites, which resulted in the development of a skin rash along with intense itching that lasted for a few days.

Employees with the Dade County Mosquito Control Division in Miami, Florida began complaining of insects biting them, primarily around their necks and heads, or infesting their hair during March, 1991. The problem was first noticed on February 27, 1991 (MN). Thrips were abundant and aggregated around the white buildings, out of the wind. Eight to 10 thrips were observed per square foot on the white surfaces of trucks or buildings on March 5 and 6, 1991. Thrips were not present on surfaces of black truck bed-liners, yellow forklift vehicles, brown pants or red lawn tractors. Numerous thrips were observed on white buildings, trucks, and shirts of employees. Thrips were abundant and biting people between 10 AM and 2:30 PM. Weather conditions were clear, sunny and 28°C. Thrips were sampled from both people and white surfaces of trucks and buildings and placed in 80% ethanol (MN, CCC). Sixty thrips were sub-sampled from these collections and consisted of 59 *F. bispinosa* females and one male (CCC).

In two instances, *F. bispinosa* was a nuisance during the morning hours (8-12 AM) on March 21, 1997 in a citrus orchard in Lake Alfred, Florida. Numerous *F. bispinosa* were observed biting the

forearms of one entomology technician as well as covering the white shirt she was wearing. After 1 PM, she returned to the same area with no subsequent attacks. On May 9, 1997, this same person was repeatedly bitten again by *F. bispinosa* on her arms at 11 AM in a citrus orchard in Auburndale. Her white shirt was covered with thrips. She returned to the same location within the orchard between 1 and 2 PM without any subsequent problems with thrips.

SUMMARY

Two species of thrips (*Frankliniella tritici* and *Limothrips cerealium*) were reported biting people in Georgia during 1986 and 1990. *Frankliniella bispinosa* was the only thrips species documented biting people in Florida between 1986 and 1997. This species occurs in great abundance throughout Florida and is a recognized plant pest on numerous crops (Childers et al. 1990; Childers & Achor 1991b; Childers et al. 1994; Childers & Brecht 1996; Childers 1997; Childers et al. 1998; Childers et al., unpublished data). Because of the tremendous numbers of *F. bispinosa* that are produced on dozens of different cultivated and weed host plants during the spring months, this species can become a serious nuisance problem and will bite people and produce variable reactions from slight irritation to formation of a rash with intense itching that can last for several days. The problem usually is seasonal and associated with maximum seasonal increase in *F. bispinosa* populations and favorable environmental conditions that can occur between February and April in central and south Florida. Colored sticky-trap tests in Florida demonstrated the strong attraction of both white and blue colors to *F. bispinosa* (Childers & Brecht 1996), and people wearing white or blue colored clothing tend to be more at risk of being bitten by this thrips pest.

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