

SOME APHIDS OF IMPORTANCE TO THE SOUTHEASTERN
UNITED STATES (HOMOPTERA: APHIDIDAE)

MANYA B. STOETZEL

Systematic Entomology Laboratory
Agricultural Research Service
U.S. Department of Agriculture
Beltsville, MD 20705

ABSTRACT

Despite their importance as pests of ornamentals and crops and as transmitters of plant viruses, aphids have been poorly studied and collected throughout the United States. Lists are available for only 31 of the 50 states; and of those lists, only 3 have been published since 1970. In the southeastern United States, published lists exist for only Louisiana and North Carolina. Of the aphids discussed, *Acyrtosiphon kondoi* Shinji, *Aphis nerii* Boyer de Fonscolombe, *Brachycorynella asparagi* (Mordvilko), *Idiopterus nephrolepidis* Davis, *Myzus varians* Davidson, and *Toxoptera aurantii* (Boyer de Fonscolombe) are reported to occur in some southeastern states and may occur throughout the area. *Toxoptera citricida* (Kirkaldy) and *Pterochloroides persicae* (Cholodkovsky) represent species not known to occur in the United States but which have the potential of becoming serious pests if introduced. For each species there are sections on distribution in the southeastern United States, hosts, taxonomic characteristics of apterous and alate viviparae, and general information.

RESUMEN

A pesar de su importancia como plagas de plantas ornamentales y de cultivos, y como transmisores de virus, los áfidos han sido pobremente estudiados y coleccionados en los Estados Unidos. Solamente hay listas de 31 de los 50 estados, y de esas listas, solo 3 se han publicado a partir de 1970. En el sudeste de los Estados Unidos, solo existen listas publicadas de Louisiana y de Carolina del Norte. De los áfidos que se discuten, *Acyrtosiphon kondoi* Shinji, *Aphis merii* Boyer de Fonscolombe, *Brachycorynella asparagi* (Mordvilko), *Idiopterus nephrolepidis* Davis, *Myzus varians* Davidson, y *Toxoptera aurantii* (Boyer de Fonscolombe), se reporta que ocurren en algunos estados del sudeste y que pudieran ocurrir en todo el área. *Toxoptera citricida* (Kirkaldy) y *Pterochloroides persicae* (Cholodkovsky) representan especies que no son conocidas en los Estados Unidos pero que tienen el potencial de convertirse en serias plagas si se introdujeran. Para cada especie hay secciones sobre su distribución en el sudeste de los Estados Unidos, hospederos, características taxonómicas de vivíparos ápteros y alados, e información general.

Despite the importance of aphids as pests of ornamentals and crops and as transmitters of plant viruses, the family has been poorly studied and collected throughout the United States. Smith & Parron (1978) reported that 1,380 species in 277 genera occurred in the United States. However, lists are available for only 31 of the 50 states. All but 3 of these lists of aphids occurring in various states or regions were published before 1970 and are considerably out-of-date. In 1970, Leonard and Bissell published a list of the aphids of Washington, DC, Maryland, and Virginia. In 1974, Leonard published a list of the aphids of Oregon. In 1983, Knowlton published a list of the aphids of Utah.

For the purpose of this paper, the southeastern United States contains the states of Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South

Carolina, and Tennessee. A major difficulty in assessing the distribution of any category of aphids in the southeastern United States is our lack of knowledge of what aphids are represented in the region. Our knowledge of the aphids in the southeastern United States is less than that for any of the other geographical regions in the United States.

In the southeastern United States, published lists exist for only Louisiana and North Carolina. In 1938, Elliott published a list of 37 aphid species found in Louisiana. Boudreaux continued Elliott's study of aphids and in 1951 published a list containing 121 aphid names.

In Wray's 1967 publication on the insects of North Carolina, 46 aphid names were listed. In the 1978 publication by Smith and Parron on the aphids of North America, approximately 300 species were listed as occurring in North Carolina. Smith and Parron have in preparation a manuscript on the aphids of North Carolina, and it contains approximately 390 species and 5 subspecies in 122 genera (C. F. Smith, personal communication).

In the USDA, Beltsville, MD, correspondence files, there is in the archived files of Mortimer D. Leonard an unpublished listing of Florida aphids. The list contains 109 aphid names associated with 325 plant names.

All aphids are plant feeders and are potential pests because they suck sap from the plants, because they transmit plant viruses, or because plant owners find their presence offensive. As with many insects, interest in aphids focuses on those species that are pests. Much of our knowledge of the movement and ultimate distribution of aphids results from the reports made on pest species.

Of the aphids discussed, *Acyrtosiphon kondoi* Shinji, *Aphis nerii* Boyer de Fonscolombe, *Brachycorynella asparagi* (Mordvilko), *Idiopterus nephrolepidis* Davis, *Myzus varians* Davidson, and *Toxoptera aurantii* (Boyer de Fonscolombe) are reported to occur in some southeastern states and may occur throughout the area. These species were chosen because they are still dispersing within the southeastern United States, because they are species that continue to go undetected, or because they can be misidentified easily. *Toxoptera citricida* (Kirkaldy) and *Pterochloroides persicae* (Cholodkovsky) represent two of the many species not known to occur in the United States but which have the potential of becoming serious pests if introduced. These last two species are included here because they are expanding their ranges. For each species there are sections on distribution in the southeastern United States, hosts, taxonomic characteristics of apterous and alate viviparae, and general information.

Acyrtosiphon kondoi Shinji

DISTRIBUTION IN SOUTHEASTERN US. Arkansas, Georgia, Louisiana, and North Carolina.

HOSTS. Within the family Leguminosae, found mainly on *Medicago*, *Melilotus*, and *Trifolium* but also on *Astragalus*, *Dorycnium*, *Lens*, and *Lotus*.

TAXONOMIC CHARACTERISTICS. *Apterous vivipara*: In life bluish green. Small to medium aphids (1.8-2.9 mm). Antennae 6-segmented, base of antennal segment VI approximately equal to length of hind tarsal II; 1-2 secondary sensoria on antennal segment III near base. Cornicles long, pale to slightly dusky. Cauda elongate with 3 (rarely 4) pairs of lateral setae and 1-2 preapical setae, pale.

Alate vivipara: In life bluish green with a dark brown thorax. Small to medium aphids (1.5-2.8 mm). Antennae 6-segmented, base of antennal segment VI approximately equal to length of hind tarsal segment II; 6-11 secondary sensoria on antennal segment III and usually confined to basal half of segment. Cornicles long, pale to slightly dusky. Cauda elongate with 3 (rarely 4) pairs of lateral setae and 1-2 preapical setae, pale.

DISCUSSION. *Acyrtosiphon kondoi*, the blue alfalfa aphid, probably originated in Asia. It was collected in Arizona, California, Idaho, Nevada, and Utah in 1975, in Kansas and New Mexico in 1976, in Nebraska, Oklahoma, Oregon, and Wyoming in 1977, in Texas and Washington in 1978, in Missouri in 1979, in Georgia, Kentucky, and Louisiana in 1983, in Arkansas and North Carolina in 1985, and in Iowa in 1989. This aphid has become established as a pest of alfalfa throughout most of the alfalfa-growing regions of the United States. It is known to be an early and late season pest in alfalfa fields. Reports of "unusually early" problems with *Acyrtosiphon pisum* (Harris), the pea aphid, in alfalfa fields probably are erroneous reports of damage by *A. kondoi*. The shorter base of antennal segment VI and the stouter, fewer caudal setae will separate *A. kondoi* from *A. pisum* whose antennae are banded at the segmental junctions.

Aphis nerii Boyer de Fonscolombe

DISTRIBUTION IN SOUTHEASTERN US. Florida, Georgia, Louisiana, and Mississippi.

HOSTS. Found mainly on plants in the Asclepiadaceae especially *Asclepias* spp., and Apocyanaceae, especially *Nerium oleander*.

TAXONOMIC CHARACTERISTICS. *Apterous vivipara*: In life with aposematic coloration of bright yellow or yellowish-orange body with black cornicles and cauda and usually black antennae and legs. Small to medium aphids (1.5-2.6 mm), rounded. Antennae 6-segmented; no secondary sensoria on antennal segment III. Cornicles long, black. Cauda elongate, with 3 pairs of lateral setae and 4-5 preapical setae, black. Legs and antennae long, black.

Alate vivipara: In life with aposematic coloration of bright yellow or yellowish-orange body with black cornicles and cauda and usually black antennae and legs. Small to medium aphids (1.5-2.6 mm), rounded. Antennae 6-segmented; secondary sensoria 6-13 on antennal segment III and 0-5 on IV. Cornicles long, black. Cauda elongate, with 3 pairs of lateral setae and 4-5 preapical setae, black. Legs and antennae long, black.

DISCUSSION. Accepting that *Myzus persicae* (Sulzer), the green peach aphid, is the most common of all the aphids now distributed throughout the southeastern US, then the second most commonly found aphid is probably *Aphis nerii*, the oleander aphid, because of the widespread occurrence of oleander (*Nerium oleander*) and milkweeds (*Asclepias* spp.) in the region.

Brachycorynella asparagi (Mordvilko)

DISTRIBUTION IN SOUTHEASTERN US. Alabama, Georgia, North Carolina, and South Carolina.

HOSTS. Found on several species of *Asparagus*: *densiflorus* (Kunth) Jessop cv. Sprengeri, *officinalis* (L.), and *setaceus* (Kunth) Jessop.

TAXONOMIC CHARACTERISTICS. *Apterous vivipara*: In life green or grey-green and often covered with mealy wax. Small aphids (1.2-1.7 mm), convex or oval, elongate. Antennae 6-segmented, unguis less than twice length of base of antennal segment VI; no secondary sensoria on antennal segment III. Cornicles short and truncate, porelike, about as long as wide, pale. Cauda elongate, with 3-4 pairs of lateral setae and 1 preapical seta, pale to almost white. Legs and antennae rather short and held close to body.

Alate vivipara: In life green and sometimes covered with mealy wax. Small aphids (1.2-1.7 mm), convex, elongate. Antennae 6-segmented, unguis less than twice length of base of antennal segment VI; 7-10 secondary sensoria, varying in size with the smallest half the size of the largest, on antennal segment III. Cornicles short and truncate,

porelike, about as long as wide, pale. Cauda elongate, usually with 3-4 pairs of lateral setae and 1 preapical seta, pale to almost white.

DISCUSSION. *Brachycorynella asparagi*, the asparagus aphid, originated in eastern Europe and is not really tropical in origin but is included here to call attention to its probable presence throughout the southeastern United States. This aphid was collected first in 1969 in the United States in New York and New Jersey on plants of *Asparagus officinalis*. By the end of 1973, *B. asparagi* had been collected in most of the states along the eastern seaboard from Massachusetts south to North Carolina. This aphid was collected in pan traps in Illinois in 1977 and on asparagus in Missouri and Washington in 1979, in Alabama, Georgia, Indiana, and Michigan in 1980, in Idaho, Ohio, Oklahoma, and Oregon in 1981, in California and North Dakota in 1984, and in South Carolina in 1985. The aphid can probably be found on asparagus in every state, but it remains undetected because the characteristic distortion of terminals called a "witch's broom" occurs on the vegetative growth long after the gardener has quit cutting spears.

Idiopterus nephrolepidis Davis

DISTRIBUTION IN SOUTHEASTERN US. Florida and North Carolina.

HOSTS. Found in greenhouses on various kinds of ferns, especially *Adiantum* spp.

TAXONOMIC CHARACTERISTICS. *Apterous vivipara*: In life body dull black with dorsal setae pale; eyes red; and antennae and legs almost a colorless white. Small aphids (1.0-1.5 mm), pyriform. Antennae 6-segmented, beyond basal segments colorless with dark apices; 1-5 secondary sensoria on antennal segment III. Cornicles elongate, cylindrical and rugose, basal half black and apical half white. Cauda short, acuminate, with 2 pairs of lateral setae and 1 dorsal preapical seta, black. Legs almost colorless with tarsi dusky.

Alate vivipara: In life body dull black with dorsal setae pale; eyes red; antennae and legs almost a colorless white. Small aphids (1.3-1.7 mm). Antennae 6-segmented, beyond basal segments colorless with dark apices; secondary sensoria 7-14 in a line on antennal segment III, 0-5 in a line on IV, rarely 1-2 on V. Body with several short, capitate hairs on each dorsal abdominal segment. Cornicles elongate, cylindrical and rugose, basal half black and apical half white. Cauda short, acuminate, with 2 pairs of lateral setae and 1 dorsal preapical seta, black. Legs almost colorless with tarsi dusky. Wing veins black, and bordered; radial sector touches media.

DISCUSSION. Neotropical in origin, *I. nephrolepidis* can be quite common on ferns in the greenhouse, yet it often goes undetected despite the fact that it prefers young fronds and heavy populations cause the fronds to turn brown. This aphid probably occurs in greenhouses throughout the southeastern United States but remains the least collected tropical aphid in this and other areas.

Myzus varians Davidson

DISTRIBUTION IN SOUTHEASTERN US. Florida and North Carolina.

HOSTS. *Clematis* spp. in the United States. Primary host is *Prunus persica* in Asia, but it is not known to occur on peach in the United States.

TAXONOMIC CHARACTERISTICS. *Apterous vivipara*: In life yellow with antennae with black bands on apical portion of all segments; apical portion of cornicles black. Small aphids (1.3-1.8 mm). Antennae 6-segmented; no secondary sensoria on antennal segment III. Cornicles long and rugose; apical, black portion approximately equal to length of hind tarsal II. Cauda elongate, with 3-4 pairs of lateral setae, dusky. Legs with tarsi dusky.

Alate vivipara: In life yellow with antennae and cornicles dusky. Small aphids (1.3-1.7 mm). Antennae 6-segmented; 8-16 secondary sensoria in a line on antennal segment III. Cornicles long and rugose, dusky. Cauda elongate, with 3-4 pairs of lateral setae, pale to dusky. Legs with tarsi dusky. Abdomen with dusky dorsal patch on segments III-V.

DISCUSSION. *Myzus varians* was first described from specimens collected on *Clematis* in California in 1911 (Davidson 1912), but the aphid is probably Asian in origin. It was collected in Florida in 1969. Smith & Parron (1978) reported it from North Carolina. In 1989, specimens collected on *Clematis* in Maryland were brought to me for identification; and I subsequently collected it on this host in two other locations in Maryland. While there are slides of *M. varians* collected on peach in California and on *Prunus* sp. in Hawaii, the species is not reported to be a pest of peach in the United States.

This aphid is probably more widely distributed throughout the United States, but it goes undetected because homeowners ignore the curled leaves of their *Clematis* vines. Because of its similarity to the ubiquitous *Myzus persicae* (Sulzer), it probably has been collected but misidentified as that species. The longer and less clavate cornicles, that have dark tips in the apterae and are dusky in the alatae, and the distinctively banded antennae of the apterae easily separate *M. varians* from *M. persicae*.

Toxoptera aurantii (Boyer de Fonscolombe)

DISTRIBUTION IN SOUTHEASTERN US. Florida, Louisiana, and North Carolina.

HOSTS. Has been reported on a wide range of host plants. It occurs on various genera in the Rutaceae and is the best known of the *Citrus* aphids. It is also a pest of cacao, coffee, gardenia, magnolia, tea, etc.

TAXONOMIC CHARACTERISTICS. *Apterous vivipara*: In life shiny, brownish-black or black. Small aphids (1.1-2.0 mm), oval. Antennae 6-segmented; no secondary sensoria on antennal segment III; segments white with black apical bands on all segments. Cornicles elongate, black. Cauda elongate, with 9-26 setae, black.

Alate vivipara: In life shiny, brownish-black or black. Small aphids (1.1-2.0 mm), oval. Antennae 6-segmented; secondary sensoria 2-8 on antennal segment III and none on IV; segments white with black apical bands on all segments. Cornicles elongate, black. Cauda elongate, with 8-16 setae, black. Forewing with a black pterostigma and usually a once-branched media.

DISCUSSION. *Toxoptera aurantii*, the black citrus aphid, probably originated in New Zealand. All species in this genus are unique in having a stridulatory apparatus. When ridges on the venter of the abdomen are rubbed with conical setae on the hind tibiae, a sound is produced. This species is distributed throughout the tropics and subtropics and is known in the United States from Florida, Louisiana, Texas, and California north as far as Maryland, New York, and Oregon. It is a vector of several plant viruses including *Citrus tristeza virus*. This species can be confused with *Toxoptera citricida* (Kirkaldy), but the banded antennae of *T. aurantii*, the dark antennal segment III of the alatae of *T. citricida*, and the differences in the number of caudal setae will separate the two.

Toxoptera citricida (Kirkaldy)

DISTRIBUTION IN SOUTHEASTERN US. Not known to occur in the United States. The species has a high potential of being introduced into the United States and is included here because it occurs in South America and because of the trade in rutaceous fruits between South and North America.

HOSTS. Limited largely to Rutaceae, especially *Citrus*.

TAXONOMIC CHARACTERISTICS. *Apterous vivipara*: In life shiny, dark brown or black. Small to medium aphids (1.5-2.8 mm), oval. Antennae 6-segmented; no secondary sensoria on antennal segment III; segments not banded, but may get progressively darker toward the tip of the unguis. Cornicles elongate, black. Cauda elongate, with 19-54 setae, black.

Alate vivipara: In life shiny, brownish-black or black. Small to medium aphids (1.1-2.6 mm), oval. Antennae 6-segmented; secondary sensoria 7-20 on antennal segment III and 0-4 on IV; segment III completely dark, other segments may have apical bands. Cornicles elongate, black. Cauda elongate, with 21-40 setae, black. Forewing with a pale pterostigma and usually a twice-branched media.

DISCUSSION. *Toxoptera citricida*, the brown citrus aphid, was originally described from specimens collected in Hawaii, and the aphid is not known to occur in North America. However, there is real danger that it may extend its range into Central and North America. It is largely restricted to hosts in the Rutaceae, and its distribution is more limited than that of *T. aurantii*. This species is the principal vector of *Citrus tristeza* virus and other citrus viruses. All species in this genus are unique in having a stridulatory apparatus. When ridges on the venter of the abdomen are rubbed with conical setae on the hind tibiae, a sound is produced. Alatae are easily identified because the third antennal segment is black and the cauda has 21-40 setae. Apterae have 19-54 setae on the cauda, and their antennae get gradually darker towards the last two segments.

Pterochloroides persicae (Cholodkovsky)

DISTRIBUTION IN SOUTHEASTERN US. Not known to occur in the United States. The species has a high potential of being introduced into the United States and is included here because it has been moving across northern Africa and because of the trade in citrus between the Mediterranean countries and North America.

HOSTS. Various species of *Prunus*, especially *armeniaca* L. and *persica* (L.) Batsch., but also *amygdalus* Batsch., *cerasus* L., *domestica* L., *spinosa* L. Known also from *Citrus*, *Cydonia vulgaris* Pers., and *Malus pumila* Mill.

TAXONOMIC CHARACTERISTICS. *Apterous vivipara*: In life shiny, dark brown or black with some white coloration; ventral surface silvery white. Medium to very large aphids (2.7-4.5 mm), oval. Antennae 6-segmented, short; usually no secondary sensoria on antennal segment III but some specimens may have 4-7, 1-3 on segment IV. Cornicles large, truncated hairy cones, dusky. Cauda rounded, not well developed. Dorsum of abdomen with a double row of large, spinal tubercles.

Alate vivipara: In life shiny, dark brown or black with some white coloration. Medium to large aphids (2.7-3.6 mm), oval. Antennae 6-segmented, short; 10-14 secondary sensoria on antennal segment III, 1-5 on antennal segment IV. Cornicles large, truncated hairy cones, dusky. Cauda rounded, not well developed. Dorsum of abdomen with a double row of large, spinal tubercles. Wings with large pigmented areas along veins.

DISCUSSION. *Pterochloroides persicae*, the "clouded peach bark aphid," is probably Asian in origin. It is known from the Mediterranean area, the Middle East, and Asia and has extended its range into Europe and northern Africa. It is a pest of various species of *Prunus* (almond, apple, apricot, peach, etc.), and has been reported to occur on *Citrus*. Large populations can cause fruit to fall prematurely or not to develop at all. The aphids are tended by ants and produce copious amounts of honeydew which serve as a substrate for sooty molds.

We know that aphids move by dispersion or migration. Various quarantine programs try to check aphid movement from one region to another; however, with the increase

in world commerce, this control effort is becoming more and more difficult. It is virtually impossible to prevent the introduction of aphids carried by air currents into an area with favorable environmental conditions and an abundance of host plants. Such was the case in 1986 when *Diuraphis noxia* (Mordvilko), the Russian wheat aphid, was detected in Texas (Stoetzel 1987). This aphid probably traveled by air currents from Mexico into Texas and subsequently into those areas in the western half of the United States where humidity is low.

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