

NOTES ON *APHROPHORA SALICIS* DE GEER  
IN AMERICA.<sup>1</sup>

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This common European Cercopid (*Aphrophora salicis* De Geer) was first discovered in the United States by Dr. Harold Morrison, who collected specimens in the Arnold Arboretum on various species of willow (*Salix petiolaris*, *S. nigra*, etc.) in July, 1921 and submitted them to Dr. Herbert Osborn, who identified them as above.

According to Lallemand<sup>2</sup> this species is widespread in Europe. According to Oshanin<sup>3</sup> it ranges from Hispania to "Sidemi bei Vladivostok" and from Suecia to Turkestan. This species was originally described by De Geer<sup>4</sup> as a variety of *Cicada spumaria*. It has been discussed by nearly all the European writers on the Homoptera from that time on. So far as we can discover, however, none of these writers give any notes on the life history. Therefore, since this species seems not to have been recorded before from North America and since it may prove to be of economic importance, we think it advisable to record our notes on distribution and our fragmentary notes on life history. The notes on life history were made chiefly during the summers of 1923 and 1924 and since these observations did not begin until after the middle of June and closed in late September, they are necessarily incomplete.

So far as our observations go the eggs are laid in the terminal twigs of willow, usually quite near the tips. (Fig. 8). The eggs are forced into the wood and frequently there are a number of egg punctures close together. These egg punc-

<sup>1</sup>Contributions from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 310.

<sup>2</sup>Lallemand, V. Homoptera Fam. Cercopidae, Genera Insectorum, Fac. 143. p. 62, 1912.

<sup>3</sup>Oshanin, B. Verzeichnis der palæarktischen Hemipteren. p. 28, 1908.

<sup>4</sup>De Geer, C. Mémoires pour servir a l'histoire des insectes, 3. p. 180, 1773.

tures contained two eggs although many contained but a single egg. These egg punctures are frequently so closely crowded that it is impossible to determine to which puncture an egg belongs. The anterior end of the egg usually lies near the surface of the twig with the ventral side of the developing embryo toward the outside of the twig.

The eggs (Fig. 4) are elongate, sharply pointed at the anterior end, bluntly pointed at the posterior end and greatly flattened. The egg is embedded in a whitish substance which usually adheres to the egg at the anterior end and to the wood at the posterior end. The color is pearly white when first laid with the anterior ventral border brown. As the embryo develops the egg turns darker and the anterior ventral border becomes dark brown, with the pinkish eye spots showing distinctly. The surface is smooth. The length varies from 1.6—1.9 mm., greatest width 0.35—0.40 mm., greatest depth from 0.60—0.65 mm.

The nymphs apparently hatch early in May. By early June they are all in the third instar and by mid June in the fourth instar.

The nymphs of the third instar (Fig. 5) measure about 6—6.5 mm. in length. The head, thorax, legs, wing pads and anal segments are brown; the rest of the abdomen creamy white; eyes reddish brown; head large; frons inflated; antennæ with nine segments.

Nymphs of the fourth instar (Fig. 6) measure from 7.5—8 mm. in length. Nearly uniform pale yellow in color. Eyes reddish brown; wing pads well developed.

The nymphs have the habit of clustering together and forming large masses of spittle. (Figs. 2 and 3). These masses are more abundant on the terminal twigs and the water sprouts at the base of the tree than anywhere else. The spittle is secreted in large quantities and frequently runs down the branches to the trunk and then to the ground. Where the nymphs become abundant the liquid frequently drops from the trees in large drops, causing inconvenience to the people sitting under the infested trees. When the nymphs are full grown and ready to moult to adults they have the habit of crawling out on the under surfaces of the leaves where they form smaller spherical masses of

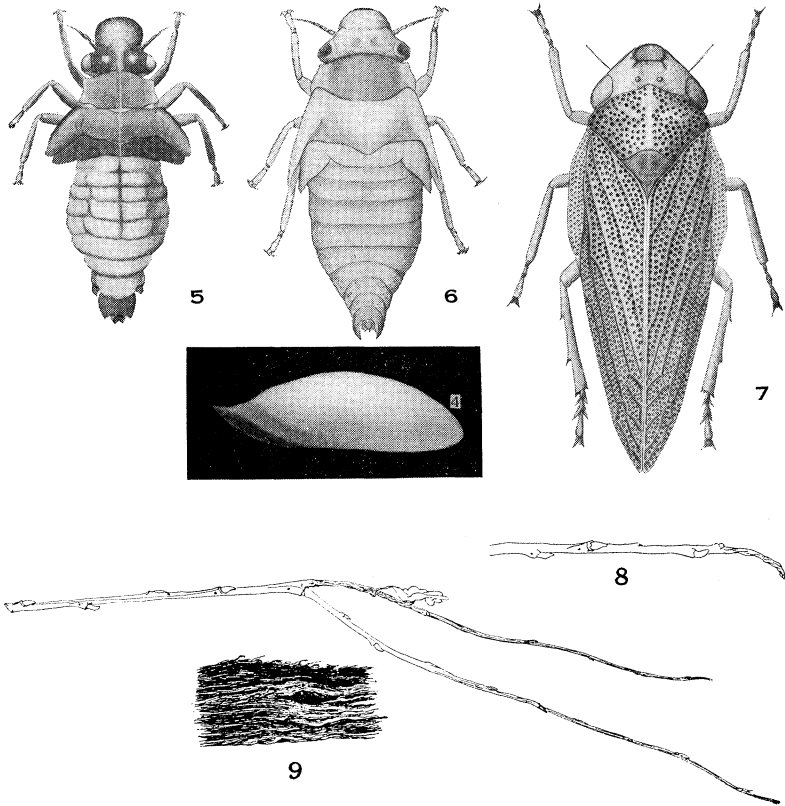


Fig. 1. 4, Egg of willow spittle bug, X 25; 5, Third instar nymph, X 8; 6, Fourth instar nymph, X 8; 7, Adult, X 8; 8, Terminal portion of willow twig killed by egg punctures; 9, Egg-laying puncture enlarged.

spittle, a single individual to a mass. (Fig. 1.) The froth dries somewhat, forming an arched vault in which the nymph transforms to an adult. The young adult remains in the vault until the skin becomes hard

The first adults (Fig. 7) were observed in late June and were common during July and August. Only a very few adults were still alive in late September when our observation ceased. After emerging the adults commence to feed and egg laying, according to our notes, begins in mid July.

This species may be distinguished from our native eastern *Aphrophoras* by its uniform yellowish color, with the prothorax, scutellum and elytra closely and uniformly punctate with small black punctures, each set with a fine golden yellow hair. Length, including wings, 10.5 to 11.0 mm.

Vertex twice as broad as median length; the anterior margins forming a right angle; median length one-half greater than length at eye; median carina well elevated; tylus more than twice as broad as long, uniformly punctate. Frons flat. Pronotum not elevated posteriorly; punctate spots fine anteriorly, coarser posteriorly; median carina distinct.

Genitalia: female, last ventral segment nearly twice as long as penultimate, convex, with the posterior margin roundly concave; ovipositor barely exceeding the pygofer. Male, eighth ventral segment twice as broad as long, anterior and posterior borders parallel; genital plates longer than broad at base; the ninth segment with lateral recurved hooks.

General color yellowish brown without conspicuous markings; numerous black punctures dorsally; the edge of the tylus bordered with black; eyes dark brown; tip of rostrum, claws and tibial and tarsal spines black; abdomen blackish, the segments bordered with brown and the genitalia brown.

Known in the United States from Arnold Arboretum, Boston, and from Mystic Lakes, Medford, Massachusetts.

So far as observed there was no injury from the feeding of the nymphs or adults. The only injury was caused by the egg laying of the adults. These punctures are sometimes placed several inches from the tips of branches and the

entire terminal portion of the twig dies. This is apt to be of considerable importance on young trees that are used for ornamental purposes.

A survey of the willows in the Arboretum showed that this species infests 53 named species and varieties of *Salix*. Almost every plant in the collection was infested. The infestation varied somewhat in severity among the various plants, but this variation could not be attributed to any varietal difference. It was usually worse on the young plants. The geographical distribution of the origin of these plants is as follows:

25 species and varieties native to Europe:

11 species and varieties native to Europe and Northern Asia.

8 species and varieties native to China.

3 species and varieties native to Asia.

3 species and varieties native to Japan.

3 species and varieties native to North America.

The chances are that this species will attack all of our native species of *Salix* and all the introduced ornamental species and that eventually it will become distributed throughout the country wherever willows are grown, unless measures for its control are undertaken now when it is limited to a small area in Eastern Massachusetts.

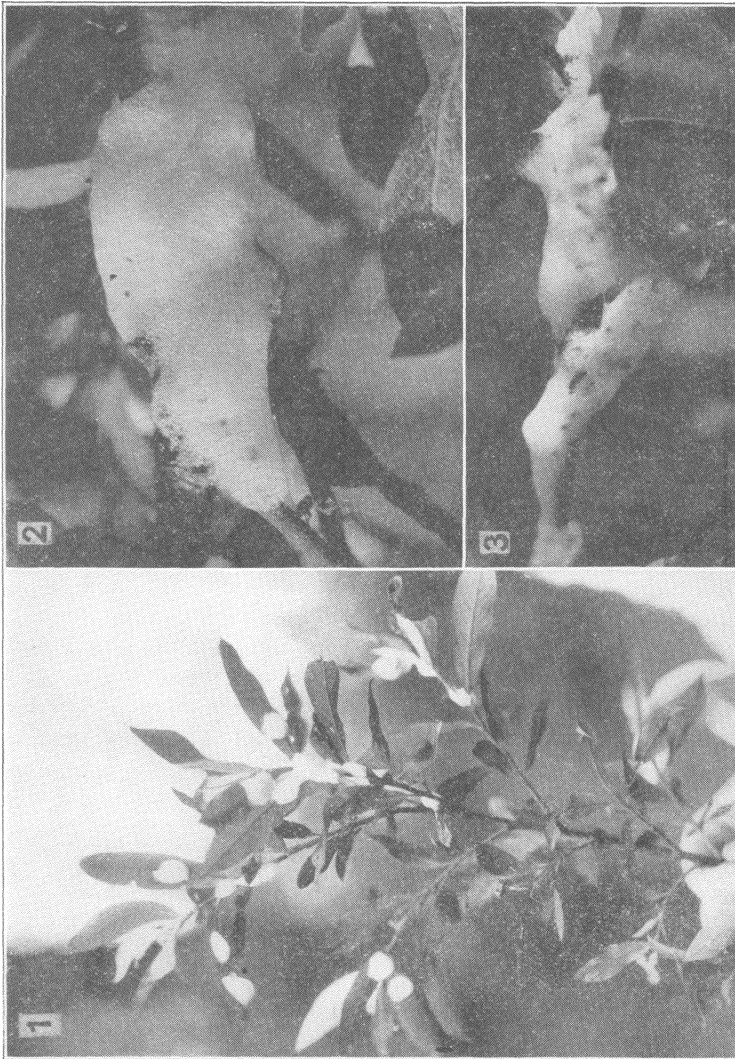
Preliminary observations indicate that this spittle bug may be controlled by hydrated lime dust containing 4 to 6 per cent of nicotine sulphate applied to the spittle masses.

#### DESCRIPTION OF PLATE I.

Figure 1, Twig of willow tree showing mature nymphs in individual masses of spittle.

Figure 2, Large mass of spittle containing many nymphs.

Figure 3, Same as Figure 2, not so much enlarged.



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