Transmission of Corn Stunt Mycoplasma by the Leafhopper Baldulus tripsaci

Robert R. Granados and Robert F. Whitcomb

Associate Virologist, Boyce Thompson Institute for Plant Research, Yonkers, New York 10701; and Research Entomologist, Entomology Research Division, ARS, USDA, Beltsville, Maryland 20705, respectively.

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ABSTRACT

Corn stunt mycoplasma (CSM) was transmitted by a newly described leafhopper species, *Baldulus tripsaci*. The leafhopper was moderately efficient in the transmission of CSM, and may be used experimentally in routine research. *Baldulus tripsaci* may eventually be implicated as a vector of CSM in the field. Phytopathology 61:240-241.

Additional key words: Homoptera:Cicadellidae.

Baldulus tripsaci Kramer & Whitcomb is a newly described leafhopper species found in the eastern USA (6). The leafhopper apparently has a high host specificity, as it has been found only on eastern gamagrass, *Tripsacum dactyloides* L. Gamagrass and corn, *Zea mays* L., are known to be closely related (8), and *Z. mays* is an excellent host plant for *Dalbulus maidis* and *Dalbulus elimatus,* two important leafhopper vectors of corn stunt (7, 9). Furthermore, *T. dactyloides* was recently found to be an alternate host for *D. maidis* (10). On the basis of the close relationship between the *Dalbulus* vectors and *B. tripsaci* and their host plants, Kramer & Whitcomb (6) suggested that *B. tripsaci* might eventually be implicated as a vector of the corn stunt agent. This note reports the transmission of the corn stunt agent by *B. tripsaci* under laboratory conditions.

Prior to 1968, the corn stunt disease was believed to be caused by a viral agent (7), but recent studies (2, 5) suggested that the disease might be caused by a mycoplasmalike organism, while subsequent experiments (1) have provided evidence that the corn stunt disease is caused by a mycoplasmal agent which can be maintained for long periods in cell-free media. Accordingly, the term "corn stunt mycoplasma" (CSM) will be used when referring to the causal agent of corn stunt.

The Louisiana strain of corn stunt was used in all tests. Procedures were the same as described earlier (3). Although *B. tripsaci* has not been collected from corn in the field, it was readily reared on corn plants (cv. Golden Cross Bantam) under laboratory conditions, and the colony was maintained solely on corn for 8 months.

In the first experiment, second and third instar nymphs of *B. tripsaci* were placed on diseased corn for a 2-day acquisition access feeding period. The insects were then transferred to a healthy corn plant for 7 days and subsequently tested for infectivity. The insects were divided into five groups of 20, and each group was transferred at different intervals to healthy corn seedlings. All groups transmitted CSM between 10 to 14 days after first exposure to diseased corn (Table 1). Control insects from stock colonies, tested in two groups of 15 individuals each, were noninfective.

In a second experiment, second and third instar nymphs were fed for 1 week on diseased corn. The insects were then placed on a healthy corn plant for 18 days. Afterward, 66 insects were individually tested for infectivity on corn seedlings during a 2-day inoculation access period. Thirty-nine of 66 plants exposed to single insects (59%) became infected with CSM. Twenty-five *B. tripsaci* from stock colonies were also tested singly and were noninfective. *B. tripsaci* is the fifth described leafhopper vector of CSM. This species appears to be a less efficient vector than either *Dalbulus* species, but more efficient than *Graminella nigrifrons* (Forbes) and *Deltocephalus sonorus* (Ball) under laboratory conditions (3, 4).

This new vector has been collected only in Maryland and Alabama, but may eventually prove to have a much wider distribution (6). *Tripsacum dactyloides* is a conspicuous but rare grass in most sections of the country, which may account for the late discovery of *B. tripsaci.* On its host grass, it occurs in very high numbers. Gamagrass is slow growing in the spring, but hardy in the fall. No adult *B. tripsaci* could be found in March, April, or May, so the species must overwinter in the egg stage. Adults brought from the field in October laid eggs which required more than the usual 2-week period before hatching, suggesting a diapause mechanism. In the laboratory, eggs are deposited beneath the epidermis, frequently in the central depression of the leaf. The first generation of adults appears in early June, and since the generation time in our greenhouses was about 1 month, there are probably four generations/year in the field. Accordingly, highest populations were observed in early October. In the laboratory, corn or gamagrass copiously exudes phloem material through the feeding punctures left by the leafhoppers.

Although *B. tripsaci* appears to prefer gamagrass in nature, it also survives and breeds on corn plants under laboratory conditions. It is a sufficiently good

TABLE. 1. Transmission of corn stunt mycoplasma to *Zea mays* plants by *Baldulus tripsaci* following an acquisition access feeding period of 2 days at 25 ± 1 C

Group no.	Transmission record (days from start of test)[a]						
	9	14	18	22	25	30	39
1	−20	+16	+15	+12	+12	+2	−1
2	−20	+20	+16	+14	+ 7	+3	
3	−20	+ 9	+ 4	+ 4	+ 4	−2	
4	−20	+20	+11	+ 3	− 3	−1	
5	−20	+20	+17	+13	+ 7	−3	−1

[a] + = diseased plant; − = healthy plant; numbers = the number of live leafhoppers.

vector to be useful experimentally in routine research. *B. tripsaci* may eventually be implicated as a vector of CSM in the field. Since gamagrass is also a host plant for *D. maidis,* the possible role of gamagrass as a reservoir of disease agents transmissible to corn by these leafhoppers should be investigated.

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