

Occurrence of a Leafhopper-Transmitted Disease of Soybeans in Louisiana

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ABSTRACT

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A disease that caused severe bud proliferation and delayed maturity of soybeans (*Glycine max*) was found in Louisiana. The disease was found to be transmitted by the leafhopper *Scaphytopius acutus*. Pleomorphic membrane-bound bodies were observed in ultrathin sections of diseased tissue, indicating the disease may be caused by a mycoplasma. The disease is referred to as soybean bud proliferation.

For the past several years, we have observed a disease that appears to be very common on soybeans (*Glycine max* (L.) Merr.) in Louisiana. A systematic survey on the impact of this disease on soybean production has not been made, but fields with as many as 10% of the plants showing symptoms have been observed. The disease, which has caused severe bud proliferation and delayed maturity of soybeans, was initially considered to be caused by tobacco ringspot virus (TRSV). Although originally called "Q"

(4), the disease is referred to herein as soybean bud proliferation (SBP). We report the transmission and possible cause of SBP. A somewhat similar disease of soybeans has been found in Colombia (2).

MATERIALS AND METHODS

Soybean plants with symptoms of SBP were collected from commercial plantings. Plants were assayed for TRSV, tobacco streak virus, bean pod mottle virus, and soybean mosaic virus by serologically specific electron microscopy (1). Attempts were made to transmit the disease to soybeans and other herbaceous indicator plants by sap-inoculation techniques. Leafhoppers (*Scaphytopius acutus*

(Say)) were collected from fields where the disease was prevalent and placed on soybean seedlings in the greenhouse. Leafhoppers reared on these plants were subsequently transferred to healthy seedlings. Plants were allowed to grow to maturity and observed for symptoms. Access and incubation times and the minimum number of leafhoppers required for transmission were not determined.

Samples from nodes of healthy soybean plants grown in the greenhouse and plants with symptoms of SBP from field collections and leafhopper transmission tests were prepared for ultrastructural examination (3). The tissue was fixed in glutaraldehyde, postfixed in osmium tetroxide, and embedded in Epon. Sections were stained with uranyl acetate and lead citrate.

RESULTS AND DISCUSSION

Symptoms observed on plants expressing SBP (Fig. 1) were similar to those described for TRSV infections on soybeans (4). There was proliferation of adventitious buds. Pods were severely underdeveloped and many had single



Fig. 1. Node of a soybean plant, from a commercial planting, showing symptoms of soybean bud proliferation.

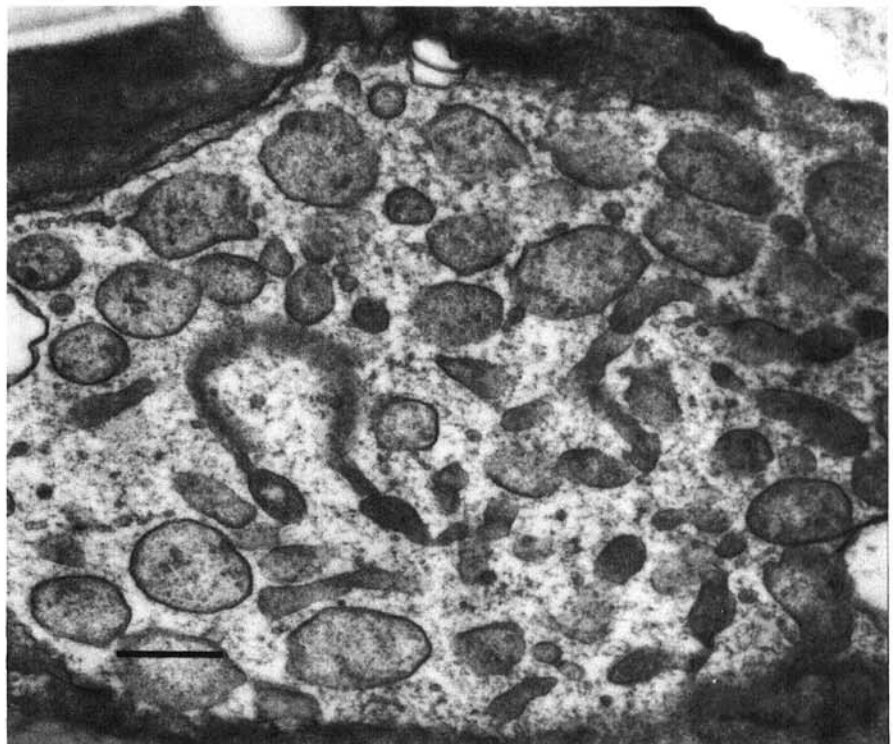


Fig. 2. Electron micrograph showing pleomorphic membrane-bound bodies in a sieve element of a soybean plant, infected by exposure to *S. acutus* in the greenhouse, with soybean bud proliferation. Scale bar = 0.5 μ m.

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seeds. Maturity was delayed; consequently, diseased plants remained green at harvest. Foliar symptoms on young plants and terminal bud blight associated with TRSV infections on soybeans were not observed on plants with SBP. There were no symptoms on plants with SBP until the onset of flowering. Foliar symptoms reported on soybeans with a disease transmitted by *S. fuliginosus* (Osborn) in Colombia (2) were not observed on plants with SBP.

Efforts to associate a sap-transmissible virus with SBP were not successful, and contrary to previous statements (2,4), there is no evidence to indicate that SBP is seed-transmitted. Soybean seedlings

exposed to *S. acutus* collected from fields where the disease was prevalent developed symptoms of SBP. *S. acutus* reared on infected plants in the greenhouse also transmitted SBP when transferred to healthy seedlings. Consistent with observations made on field plants, the first symptoms of bud proliferation on infected plants in the greenhouse appeared at the onset of flowering. Pleomorphic membrane-bound bodies were observed in ultrathin sections from diseased plants collected from the field and from leafhopper transmission tests (Fig. 2) but not from healthy plants. These results indicate SBP may be caused by a mycoplasma.

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