

Distribution of the Soybean Cyst Nematode, *Heterodera glycines*, in the United States and Canada: 1954 to 2014

Gregory L. Tylka and Christopher C. Marett, Department of Plant Pathology and Microbiology, Iowa State University, Ames 50011

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The soybean cyst nematode, *Heterodera glycines* Ichinohe, is considered the most damaging pathogen of soybean (*Glycine max* (L.) Merr.) in the United States and Canada (6). This nematode also causes considerable yield loss in many other soybean-producing countries in the world. *Heterodera glycines* was first discovered in the United States in New Hanover County, North Carolina in 1954 (5) and is believed to have been introduced from Asia (3). In 1987, the nematode was discovered in Kent County, Ontario (1). At various times since these initial discoveries, maps were created of the counties in the United States and Canada that were known to be infested with the nematode.

Recently, nematologists, plant pathologists, and state plant regulatory officials in the soybean-producing areas of the United States and Canada were surveyed to update the map of the known distribution of *H. glycines*. This recently updated map and those from selected previous years are shown in Fig. 1.

Currently, *H. glycines* has been found in every soybean-producing state in the United States except New York and West Virginia. Since the last update of the map in 2008 (*map not shown*), *H. glycines* was discovered for the first time in 57 counties in 13 states, namely Kansas, Kentucky, Maryland, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota, Virginia, and Wisconsin. In Canada, *H. glycines* was discovered for the first time in Victoria County, Ontario and St. Anicet, Quebec in 2009 and 2013, respectively (2). To date, the nematode has not been reported in the soybean-producing provinces of Manitoba and Prince Edward Island, Canada.

While recreating maps from past years in a digital format, instances were discovered where counties were designated as infested with *H. glycines* in early years, then not indicated as infested in maps in later years, then designated as infested with *H. glycines* in maps in more recent years. Most of the people who provided the information and the records used to create the older maps are no longer available, so it was not possible to investigate these inconsistencies. In the maps presented herein, once a county was designated as infested with *H. glycines* in a map for a particular year, it remained designated as infested for all successive years, with three exceptions where it was obvious that the infested designation for a county was a spurious, one-time occurrence.

Soybean cyst nematode can reduce soybean yields without causing aboveground symptoms (4). Consequently, *H. glycines* infestations may be present in more counties than are shown in the 2014 map in Fig. 1. Also, soybeans are no longer produced in many counties in which *H. glycines* was found in previous years in the southern United States (Fig. 2). Although the nematode can survive in soil in the absence of a host crop for a decade or more (3), the nematode likely is no longer present in counties in the current map where soybeans have not been grown for numerous years. We cannot be certain that the nematode is not present in such counties, however, because *H. glycines* can reproduce on weed hosts (3).

Download supplemental material at Plant Health Progress

- An animated GIF illustrating the spread of soybean cyst nematode from 1954 to 2014.
- High-resolution soybean cyst nematode distribution maps for 1957, 1973, 1980, 1990, 2001, and 2014.

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Considering the areas in the United States where soybeans are currently grown and the known distribution of the pathogen, *H. glycines* has the potential to continue to spread considerably, especially in Kansas, Nebraska, New York, North Dakota, Pennsylvania, South Dakota, and Virginia. Also, there is potential for the nematode to spread to more counties in the Canadian provinces of Ontario and Quebec, as well as into the soybean-producing areas of Manitoba and Prince Edward Island.

Corresponding author: Gregory L. Tylka. Email: gtylka@iastate.edu

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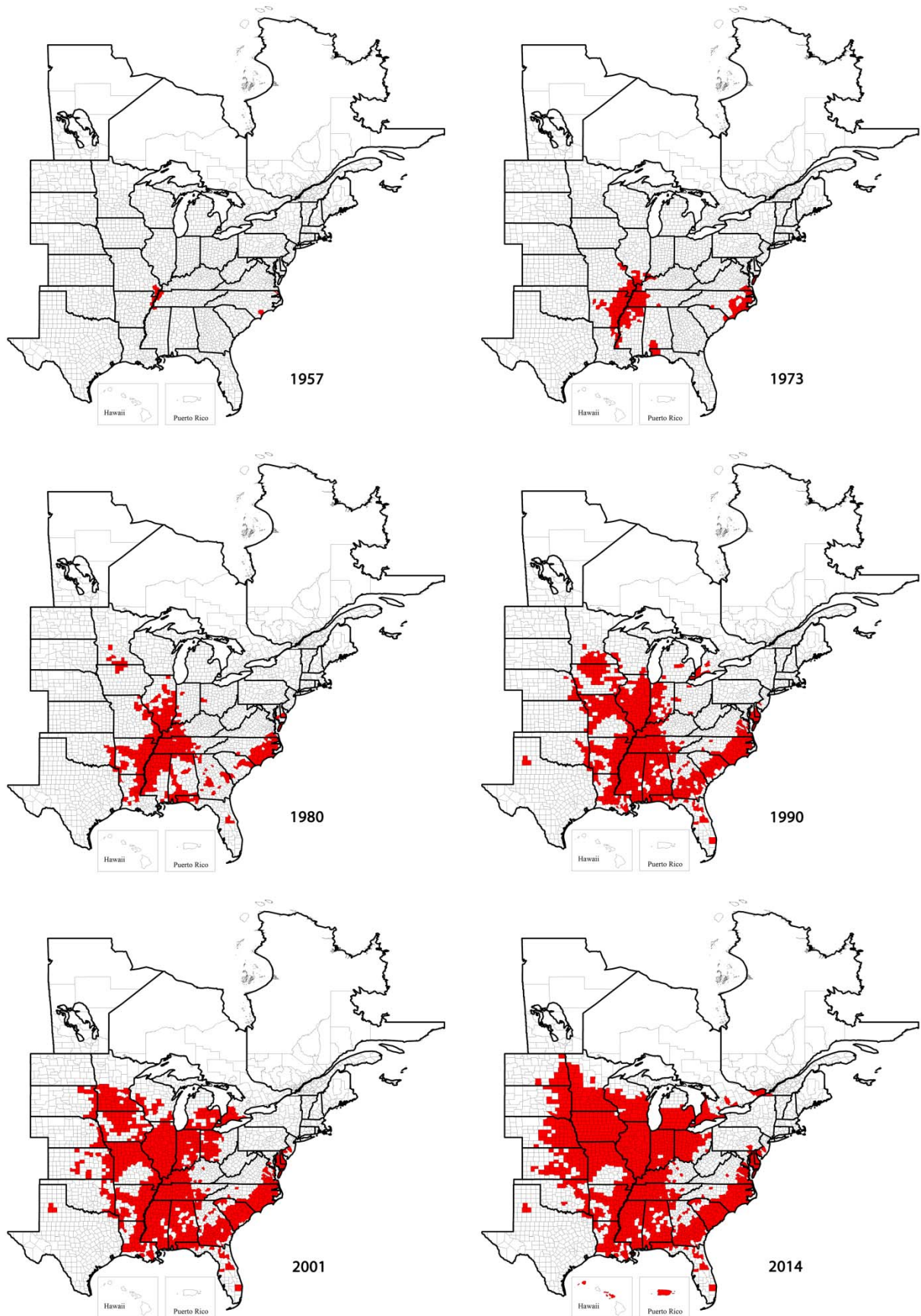


FIGURE 1

Known distribution of the soybean cyst nematode, *Heterodera glycines*, in counties in the United States and Canada in selected years from 1957 to 2014. Known infested counties are indicated in red. Maps © 2014, C.C. Marett and G.L. Tylka, Iowa State University.

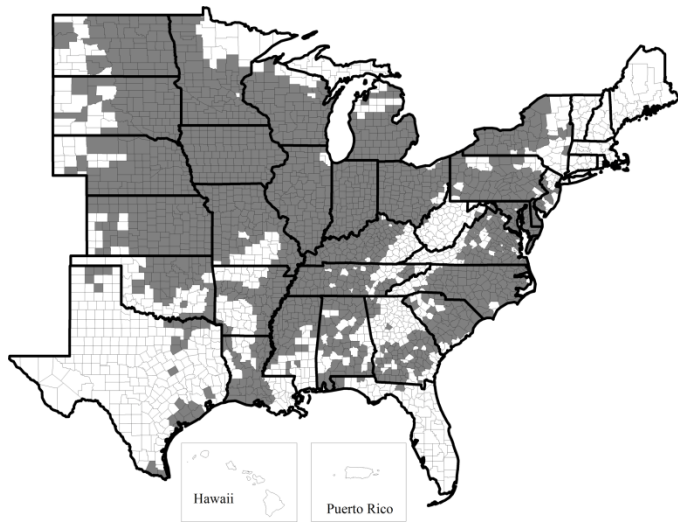


FIGURE 2

Soybean-producing counties (in gray) in the United States from 2008-2013 (source: United States Department of Agriculture National Agricultural Statistics Service). Map © 2014, C.C. Marett and G.L. Tylka, Iowa State University.

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