

Japanese apple rust confirmed in Eastern United States in 2009

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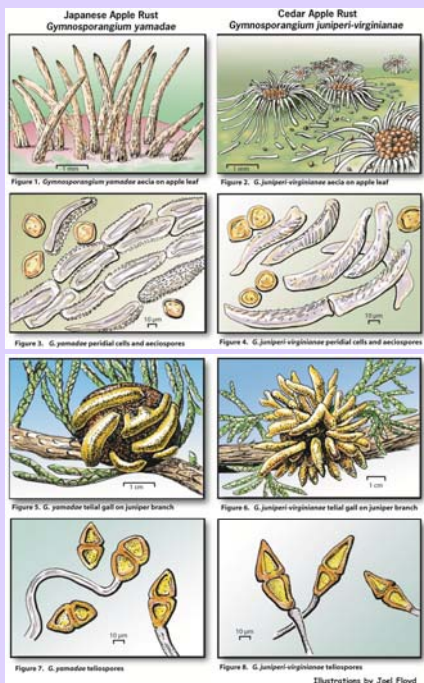
ABSTRACT Following a report in April 2009 of the presence of *Gymnosporangium yamadae* in Delaware, University of Delaware, State and USDA officials met to confirm the find. Japanese apple rust had been reported on crabapple by a USDA/ARS researcher in 2004 and 2008 from Wilmington, DE. *G. yamadae* is the causal pathogen, known from Asia with an aecial state on domestic *Malus* spp. and the telial state on *Juniperus chinensis*. Personnel from UD, DE Dept of Agriculture and USDA/APHIS/PPQ visited the Wilmington site and surrounding juniper species were noted. Telia were found on May 7, 2009 on ornamental *J. chinensis* near the original crabapples, and confirmed to be *G. yamadae*, the first report of the telial stage in North America. In July, crabapple leaves with upper leaf spots and lower leaf aecia were collected, and identified as the aecial stage of *G. yamadae*. Leaves of *M. domestica* on the UD farm were confirmed to have Japanese apple rust on Aug 4, 2009, the first report on domestic apple in the U.S. A pest alert was developed to distribute to NPND diagnosticians and the National Plant Board, with descriptions of *G. yamadae*. Specimens submitted to the National Mycologist indicated widespread incidence in the Northeast, including MD, ME, NH, NJ, NY, PA, and RI. Japanese apple rust may have previously gone unnoticed due to similarity to cedar apple rust (*Gymnosporangium juniperi-virginiana*), but efforts are underway to determine establishment and impact.

Distinguishing Infections Caused by *Gymnosporangium yamadae*

Timeline:

- 2004 – USDA/ARS Researcher finds crabapple infected with aecial stage of *Gymnosporangium* in Wilmington, DE. Japanese apple rust is known to occur in China, Korea, and Japan.
- 2008 – USDA/ARS researcher returns to find infected crabapple with aecial stage of rust. Morphological and molecular ID of *G. yamadae* confirmed at NIS at SMML lab in Beltsville (Yun et al, 2009)
- April 2009 – Plant Disease note published that alerts officials in Delaware as to detection of *G. yamadae* in Delaware. Visit to site made by UD Diagnostician, Delaware Department of Agriculture (DDA) and USDA/APHIS/PPQ SPHD. Surrounding juniper species examined and no signs of the rust found.
- May 7, 2009 – UD Diagnostician and DDA return to site and find telial stage on *J. chinensis*. Identification confirmed as *G. yamadae* by National Mycologist.
- July 13, 2009 – USDA/APHIS/PPQ site visit to observe leaf spots on crabapple with aecial stage of *Gymnosporangium yamadae*
- Aug 4, 2009 – Aecial stage of *G. yamadae* confirmed on domestic apple in Newark, DE
- Aug 6, 2009 – Pest Alert for Japanese Apple Rust released and distributed to NPND and National Plant Board. In the following weeks, *G. yamadae* was confirmed in several Eastern states, including CT, MD, ME, NH, NJ, NY, PA, and RI
- Sept 25, 2009 – Apple fruit from Delaware infected *M. domestica* tree examined and found free of fruit infections.

Reference: Yun HY, Minnis AM, Rossman AY, 2009. Plant Disease 93:430.



An alternate host, *Juniperus chinensis*, with water soaked galls of *G. yamadae* in early May 09



Gall characteristic of the telial state of *G. yamadae* on *Juniperus chinensis*.

Impact of Japanese Apple Rust in the U.S.: USDA/APHIS is working with the states to determine the distribution and impact of the presence of *Gymnosporangium yamadae*. Any future course of action will be communicated through the State Plant Regulatory Official (SPRO) or USDA/APHIS/PPQ State Plant Health Director (SPHD) in your state.

Symptoms of Japanese Apple Rust on Crabapple and Apple:



Symptoms of *G. yamadae* infection on upper and lower surface of *Malus toringo* leaves.



Symptoms of *G. yamadae* on upper and lower surface of *Malus domestica*. Note the red reaction is not always produced.



Close up of aecia on lower surface of crabapple



Close up of aecia on lower surface of *Malus domestica*



Close up of aecia on *Malus toringo*



Close up of aecia on *Malus domestica*

All photos by Nancy Gregory, University of Delaware

