First report of Fusarium proliferatum causing garlic clove rot in France

Christel Leyronas, Paul L. Chretien, Claire Troulet, Magali Duffaud, François Villeneuve, Cindy E. Morris, Hélène Hunyadi

About the cover for December 2018

ISSN: 0191-2917
e-ISSN: 1943-7692

plant disease

Editor-in-Chief: Alison E. Robertson
Published by The American Phytopathological Society

December 2018, Volume 102, Number 12
Page 2658
https://doi.org/10.1094/PDIS-06-18-0962-PDN

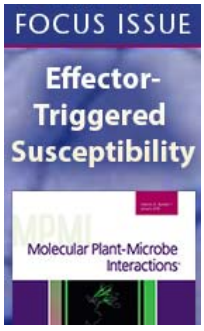
DISEASE NOTES

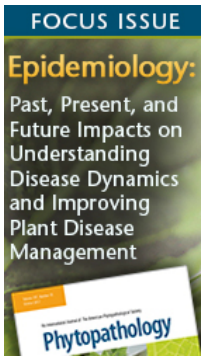
First Report of *Fusarium proliferatum* Causing Garlic Clove Rot in France

C. Leyronas,† **P. L. Chrétien**, **C. Troulet**, and **M. Duffaud**, Pathologie Végétale, INRA, 84140, Montfavet, France; **F. Villeneuve**, Ctifl, Centre opérationnel de Lanxade, 24130 Prigonrieux, France; **C. E. Morris**, Pathologie Végétale, INRA, 84140, Montfavet, France; and **H. Hunyadi**, Prosemail, 69008 Lyon, France.

Article History

Issue Date: 16 Nov 2018
Published: 23 Oct 2018
First Look: 24 Jul 2018
Accepted: 20 Jul 2018





Garlic (*Allium sativum* L.) is an essential ingredient of French gastronomy. Yearly, about 20,000 metric tons of garlic for consumption and 4,000 metric tons of garlic seeds are produced in France with strict quality criteria. However, tan lesions have been observed in the past few years on cloves during the dry storage period, especially on pink garlic. The first symptoms generally appear 2 months after harvest. Externally, the bulbs are free from symptoms. But when opened, cloves may appear softened and brown. When clove tissues are completely covered by tan lesions, they may become covered with white mycelium. Yearly, the disease causes 10% crop loss of pink garlic on average, thereby inducing significant economic losses. In January 2017, nine bulbs were collected from three varieties of pink garlic (varieties of the Cledor and Flavor garlic types, without flower stalks), in the major garlic-producing regions of southern France. These bulbs were produced in the field and were stored in wooden crates for 6 months before being analyzed. Diseased cloves were peeled and then surface disinfested with 70% alcohol for 30 s and rinsed in three successive baths of sterile water. Internal symptomatic tissues were then removed (5 × 5 mm pieces) and placed on potato dextrose agar and incubated at 21°C. In total, 10 cultures were obtained and were single-spore purified. The colonies were white to light pink with aerial mycelium and sometimes with violet pigment underneath. Microscopic observations showed hyaline and septate hyphae, slightly curved macroconidia with two to three septa measuring 17.5 to 30 × 3.7 to 7.5 µm (23.2 × 5.7 on average), and nonseptate microconidia measuring 7.5 to 12.5 × 2.5 to 5.0 µm, (9.7 × 4.3 on average) (n = 25). No chlamydospores were observed. These morphological characteristics were consistent with the description of *Fusarium* species in general (Leslie and Summerell 2006), but molecular analyses were needed to confirm exact species identity. The strains were further identified by polymerase chain reaction and sequencing. First, *Fusarium proliferatum*-specific primers Fp3-F and Fp4-R were used (Jurado et al. 2006). For all the strains, a 240-bp amplicon was obtained as expected. To confirm the identity of strains, two different primer sets, ITS1/ITS4 and EF1/EF2, were used. Primers ITS1/ITS4 (White et al. 1990) resulted in a 600-bp amplicon. BLASTn analyses showed

100% similarity with MH055399.1 (*F. proliferatum* isolate DSM 106835). Primers EF1/EF2 (O'Donnell et al. 1998) resulted in a 650-bp amplicon (GenBank accession no. MH628463) that was 99% similar to the sequence KX215078.1 (*F. proliferatum* isolate G3-1) in GenBank. Pathogenicity tests were conducted by soaking cloves (pink cultivars) in a suspension of 10^6 spores/ml for 24 h. Ten cloves were inoculated with each of the 10 strains previously isolated. Controls were soaked in sterile water. All cloves were incubated in the dark at 23°C at 100% relative humidity. After 4 days of incubation, characteristic symptoms (tan lesions and white mycelium) developed on cloves for all strains tested. No symptoms appeared on control cloves. The fungus was reisolated from symptomatic cloves and was identified as *F. proliferatum*. *F. proliferatum* has been reported previously in several European countries (Palmero et al. 2010; Stankovic et al. 2007; Tonti et al. 2012). To our knowledge, this is the first report of *F. proliferatum* causing rot of garlic in France.

References:

Section: **Choose**

Jurado, M., et al. 2006. Syst. Appl. Microbiol. 29:681. https://doi.org/10.1016/j.syapm.2006.01.014 [Crossref] [ISI] Open URL [Google Scholar]

Leslie, J. F., and **Summerell, B. A.** 2006. Page 224 in: The *Fusarium* Laboratory Manual. Blackwell, Oxford, UK. https://doi.org/10.1002/9780470278376 [Crossref] Open URL [Google Scholar]

O'Donnell, K., et al. 1998. PNAS 95:2044. https://doi.org/10.1073/pnas.95.5.2044 [Crossref] [ISI] Open URL [Google Scholar]

Palmero, D., et al. 2010. Plant Dis. 94:277. https://doi.org/10.1094/PDIS-94-2-0277C [Abstract] [ISI] Open URL [Google Scholar]

Stankovic, S., et al. 2007. Eur. J. Plant Pathol. 118:165. https://doi.org/10.1007/s10658-007-9126-8ISTEX [Crossref] [ISI] Open URL [Google Scholar]

Tonti, S., et al. 2012. J. Phytopathol. 160:761. https://doi.org/10.1111/jph.12018ISTEX [Crossref] [ISI] Open URL [Google Scholar]

White, T. J., et al. 1990. Page 315 in: PCR Protocols: A Guide to Methods and Applications. Academic Press, San Diego, CA. [Crossref] Open URL [Google Scholar]

Citation