

Botrytis rot of stored garlic

Cause

B. aclada Fresen.
B. porri Buckw.

Occurrence

Botrytis on garlic is reported from Europe, Scandinavia, S. America, N. America, Australia and New Zealand. In Oregon, *B. aclada* (= *B. allii*) occurs only west of the Cascades.

Symptoms

Species of the fungus *Botrytis* cause neck rot or gray mold disease. Symptoms may appear in the field or in storage.



Botrytis porri on garlic head. Note the gray mold and the dark, convoluted sclerotia.
Photo by Melodie Putnam

In the field, symptoms are seen as stunted plants with dead or dying outer leaves. The infection develops at soil level in the stem (neck). Initially the affected tissues look water soaked which later become dry, brown, and necrotic. Black sclerotia may be seen around the rotting neck. Sclerotia are hardened fungal structures resistant to the environment which allow the fungus to survive the winter.

In storage, a gray mold can be seen on the surface of the bulbs or between the scales. Black sclerotia cluster around the neck and between the scales. On individual cloves, there may be extensive watersoaking extending beyond the obviously moldy area.

Disease Cycle

Botrytis persists as sclerotia in the soil or on dead plant material. Moist, cool weather favors germination of the sclerotia, which produce tiny mushroom-like structures that release thousands of spores. These spores are carried by wind to garlic in the field, where they may initiate new infections. In the field, spores produced on infected tissues are likely to be more important in disease spread during the growing season. Excessive irrigation or rain is highly favorable to the disease. The major point of entry of the infection is through the neck tissue or through wounds in the garlic bulbs. Infection may also be transferred through the basal plate of the bulbs.



Botrytis porri on garlic clove. Note the watersoaked tissue surrounding the central moldy area.
Photo by Melodie Putnam



Botrytis porri on garlic clove. Affected tissues will eventually dry and wither if kept under low humidity conditions.
Photo by Melodie Putnam

Management

- Store in cold (less than 40 F), ventilated conditions with low humidity.
- Minimize damage to bulbs, especially by mechanical injury at harvest.
- Avoid late season nitrogen fertilizer, which delays maturity and may lengthen curing time.
- Avoid late season irrigation.
- Harvest only when mature; remove necks only when the plants are well cured.

References

- Bottcher, H. & K. Pohle, 1993. Die Entwicklung der Verschiedenen Fäuleerreger während des Langfristigen Lagerns von Knoblauch (*Allium sativum* L.). Arch. Phytopath. Pflanz. 28:203-214
- Bottcher, H. & K. Pohle 1991. Untersuchungen zum Auftreten von Fäuleerscheinungen in Knoblauchzwiebeln (*Allium sativum* L.) in der Nacherntephase. Arch. Phytopathol. Pflanz. 27:445-457
- Cedeño, L., C. Carrero, K. Quintero & P. Segoiva 2003. *Botrytis porri*, causante de pudrición en el cuello del ajo en Mérida, Venezuela. Interciencia, 28:273-275
- Persley, D.M., R. O'Brien, & J.R. Syme (eds) 1989. Vegetable crops; a disease management guide. Department of Primary Industries, Queensland Government, Brisbane, 75pp.
- Pscheidt, J. W., and C. M. Ocamb. Senior Editors. 2010. Pacific Northwest Plant Disease Management Handbook. Oregon State Extension Service. 686 pp.
- Schwartz, H.F. & Krishna Mohan, 2006. Compendium of onion and garlic diseases and pests, 2nd Ed. APS Press
- Staats, M., P. van Baarlen, & J.A.L. van Kan. 2005. Molecular phylogeny of the plant pathogenic genus *Botrytis* and the evolution of host specificity. Mol. Biol. Evol. 22:333-346.
- Tian, S.P. & P. Bertolini 1995. Effects of low temperature on mycelial growth and spore germination of *Botrytis allii* in culture and on its pathogenicity to stored garlic bulbs. Plant Pathology 44:1008-1015
- UC IPM Online, Statewide Integrated Pest Management Program
<http://www.ipm.ucdavis.edu?PMG/r584101111.html>
- WSU Profiles. Crop Profile for garlic in Washington.
<http://www.tricity.wsu.edu/~cdaniels/profiles/Garlic.pdf>



Garlic head totally decayed by *Botrytis* (left) compared with healthy head.
Photo by Melodie Putnam