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Lily Basal Rot

Easter lily popularity as a greenhouse crop has declined over the years, but there are still thousands of Easter lilies produced in greenhouses each spring. Easter lilies are not an easy crop, and a grower must be very regimented in their production approach so that they will be heavily budded or flowering by the ship date.

Most growers today purchase case-cooled bulbs from their suppliers to ease their workload. When you purchase a case-cooled product you assume that the bulbs have been treated appropriately and that the crop will flower successfully and on time. In order to ensure that Easter lilies flower on time, growers often use “insurance” lighting to guarantee that the vernalization needs of the crop have been met. When Easter lily bulbs have not received at least six weeks or 1000 hours of cooling the forcing time or days to flower can increase significantly. Most growers use a forcing schedule of about 110 days with bulbs that have been case-cooled for six weeks. If inadequate case cooling has occurred and no insurance lighting has been utilized, it may take up to 86 additional days for Easter lilies to flower which pushes their bloom time well-past the anticipated Easter shipping date.

Easter lilies are susceptible to a few pest and disease issues,

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but the most serious issue observed in many greenhouses is Lily basal rot which is caused by the fungus *Fusarium oxysporum* f. sp. *lilii*.

The fungus that causes basal rot of lily bulbs is long-lived and can survive outdoors in production fields for many years. Lily bulbs grown in fields with a history of *Fusarium oxysporum* f. sp. *lilii* can become infected and may inadvertently spread the pathogen to adjacent uninfected lily bulbs when bulbs are in close proximity to each other (like in case cooling).

As per the Pacific Northwest Plant Disease Management Handbook regarding lily basal rot, initial infection occurs just behind the root cap. As the disease progresses a severe root rot occurs along with the destruction of the basal plate. A chocolate or bluish gray colored rot that extends from the basal plate into the scales is observed. Bulbs where the disease has shown significant progression will fall apart upon digging in the field when the scales detach from the basal plate.

Above ground symptoms of lily basal rot include stunting, premature yellowing of the foliage and senescence. Flower buds also may fail to open or may appear wilted. In one local greenhouse, Easter lily bulbs infected with lily basal rot were very stunted in appearance and appeared to be declining despite the grower's prompt interventions with chemical fungicides and his use of bio-fungicides immediately after planting.

Cultural control methods promoted by the authors of the Pacific Plant Handbook suggest that upon receiving lily bulbs that all bulbs that have a chocolate-colored rot at the base of the scales be discarded immediately. Elevated fertility (high nitrogen) can cause an exacerbation of



Figure 1: Stunted Easter Lily with compromised root system. Photo by Thomas G. Ford, Penn State Extension.



Figure 2: Basal root rot on Easter Lily bulb. Photo by Thomas G. Ford, Penn State Extension.

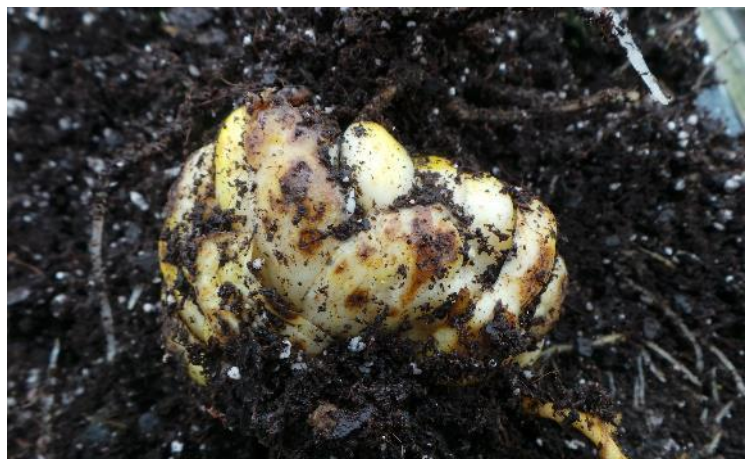


Figure 3: Chocolate brown lesions on bud scales that may be indicative of Easter Lily basal root rot. Photo by Thomas G. Ford, Penn State Extension.



Figure 4: Stunted Easter Lily with symptoms of basal root rot. Photo by Dr. Sara May, Plant Disease Clinic Director, The Pennsylvania State University



Figure 5: Bulb mite found in Easter Lily Bulb tissues. Photo by Dr. Sara May, Plant Disease Clinic Director, The Pennsylvania State University

of this disease so low nitrogen fertilizers should be utilized with lilies in both greenhouse and field production settings.

Many plant pathologists/horticulturists recommend that lily bulbs be soaked in an appropriately labeled fungicide mixture prior to planting. Some commercial fungicide formulations containing either chlorothalonil or thiophanate methyl are currently labeled for this specific use. If you are going to soak bulbs in a fungicide solution, please make sure that all label recommendations are followed and that all applicable Worker Protection Standards (WPS) are adhered to as well.

Bulb mites are frequently considered a secondary pest of lily bulbs, but active infestations in Easter lily bulbs can cause plants to become quite stunted. Other observed symptoms of infestation can include yellowing leaves, poor or no development of flower stalks and flower abortion. Bulb mites feed on the scales and outer plant tissues of the bulb. Wounds created by bulb mite feeding can provide an entrance point for pathogens like *Fusarium oxysporum* f. sp. *lilii* and other soil borne diseases. Unfortunately, there are no miticides currently registered for controlling bulb mites at this time. A predatory mite, *Hypoopsis aculeifer* has been used as a biocontrol in some countries to suppress bulb mite populations in lilies. Unfortunately, this biocontrol agent can be cannibalistic which can reduce its efficacy against bulb mites both in the field and in protected culture systems.

For additional information on greenhouse crop production please contact Tom Ford at tgf2@psu.edu .

References

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