e-GRO Alert

Ornamentals

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Downy mildew on Hellebores

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Hellebores, also known as Lenten rose (Helleborus species and hybrids), have become increasingly popular due to their early blooming time and the development of new cultivars with a variety of flower and foliage colors. An increase in popularity means there are more plants grown in nurseries, which also means there is a potential for more disease problems.

On a recent nursery visit, I saw hellebores with both foliar nematode and downy mildew symptoms (Figure 1). Foliar nematode (*Aphelenchoides fragariae*) has been an issue for hellebores and other herbaceous perennials. Foliar nematodes cause angular (vein-delimited) spots on leaves that often range in color from light to dark purple or brown. In Figure 1, the leaf of the hellebore plant in the foreground shows dark purple, angular leaf spotting that is due to foliar nematode infestation. The leaves in the background of Figure 1 show mottling and purplish spotting concentrated on the mid vein. These symptoms were not due to foliar nematode but instead were caused by downy mildew infection. I wrote about foliar nematodes in ornamental plants several years ago, so I am not covering it here. You can find information on foliar nematodes at the e-GRO Alert "Foliar nematode: Angular leaf spots can be confusing to diagnose" (https://www.e-gro.org/pdf/2020_905.pdf). For this current alert, I am concentrating on downy mildew infection of hellebores.

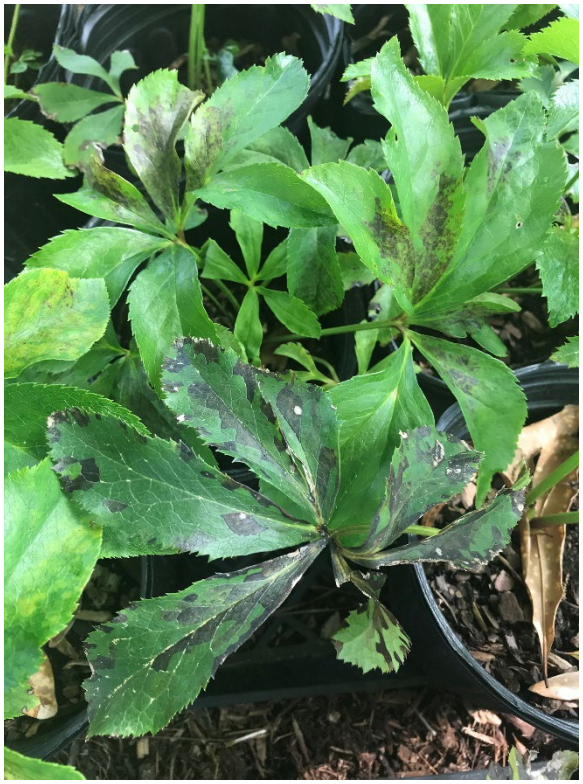

Figure 1: Downy mildew symptoms (upper leaves in image) and foliar nematode symptoms on the bottom leaf. (Image by Jean Williams-Woodward)

Downy mildew on hellebores, caused by the oomycete pathogen, *Peronospora pulveracea* is not new. It was first reported in California in 2008 (Warfield et al., 2009 [https://doi.org/10.1094/PDIS-93-3-0319C]). However, it was seen and noted in previous years by extension plant pathologists and university plant diagnostic laboratories, including myself in Georgia, for several years prior to this first report.

Symptoms of downy mildew on hellebores can range from purple to black speckling and blotches (Figure 2) to more angular, vein-delimited leaf spotting (Figure 4) that can look a lot like foliar nematode infection. The underside of leaves will develop a light brown to grayish-purple sporulation characteristic of a downy mildew. Leaves will become necrotic with time and length of infection. New, young growth can become distorted and be decreased in size. Flowers can be infected as well and show brown spotting of the petals.

Downy mildew is a systemic disease, which can develop rapidly and be difficult to manage. It is an increasing concern for nurseries that utilize division of plants for propagation as the downy mildew pathogen is propagated along with the plant. Since it is systemic, it will come back every year reducing plant health and spreading to other surrounding hellebores.

For producers, infected plants should be removed to reduce disease spread and survival of the pathogen within the nursery. Downy mildew is caused by an oomycete “water mold” pathogen. Keeping the foliage as dry as possible and avoiding sprinkler irrigation can reduce splashing of downy mildew sporangia to adjacent plants. Fungicides can help reduce spread to healthy plants, but they will not cure already infected plants. There are no fungicides specifically labeled for *Helleborus*. There are products labeled broadly for downy mildew management on herbaceous perennials; however, producers must test for possible phytotoxicity on hellebores prior to use on the entire crop. Products labeled for downy mildew management include mefenoxam (Subdue Maxx), fluopicolide (Adorn), dimethomorph (Stature SC), cyazofamid (Segway), fenamidone (FenStop), oxathiapiprolin (Segovis), mandipropamid (Micora), mancozeb (Protect DF), azoxystrobin (Heritage, Mural), pyraclostrobin (Pageant), phosphorous acid and fosetyl-Al (Aliette). Applications should be at two-week intervals for preventative management and one-week intervals if disease is present. Rotate chemistries (different FRAC numerical groups) to reduce fungicide resistance development, which is very common with downy mildew pathogens. Use all products according to labeled rates and directions.

Note: *The mention of specific active ingredients and/or trade names does not constitute an endorsement or recommendation of, nor discrimination against similar products not mentioned. ALWAYS READ PRODUCT LABELS AND USE THEM AS DIRECTED ON THE LABEL.*

Figure 2: Blotchy, dark purplish leaf spotting across almost the entire hellebore leaf due to downy mildew infection, caused by *Peronospora pulveracea*. (Image by Jean Williams-Woodward)

Figure 3: Grayish, raised sporulation of the downy mildew pathogen, *Peronospora pulveracea*, on the backside of a hellebore leaf directly opposite the blotchy purplish leaf spotting seen in in Figure 2. (Image by Jean Williams-Woodward)

Figure 4: Purplish, vein-delimited leaf spotting due to downy mildew infection. Symptom pattern can resemble leaf spotting caused by foliar nematode. (Image by Jean Williams-Woodward)

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