

Matthew A. Tancos<sup>1</sup>, Natalie M. West<sup>2</sup>, and Jennifer E. Andreas<sup>3</sup>

<sup>1</sup>USDA ARS Foreign Disease-Weed Science Research, <sup>2</sup>USDA ARS Pest Management Research, <sup>3</sup>Washington State University Extension

*Ramularia crupinae*  
Common crupina leaf blight

*Ramularia crupinae* is the only biological control agent approved in the USA for release against common crupina.

CLASSIFICATION

| RANKING | SCIENTIFIC NAME                                    | COMMON NAME                |
|---------|--|----------------------------|
| Kingdom | Fungi  | Fungus                     |
| Phylum  | Ascomycota   | Sac fungi                  |
| Class   | Dothideomycetes                                    |                            |
| Order   | Capnodiales  | Sooty mold fungi           |
| Family  | Mycosphaerellaceae                                 |                            |
| Genus   | <i>Ramularia</i>                                   |                            |
| Species | <i>Ramularia crupinae</i> Dianese, Hasan & Sobhian | Common crupina leaf blight |

DESCRIPTION AND LIFE CYCLE

This fungus overwinters in debris from infected plant parts or on cotyledons of young seedlings as light to dark brown lesions that are irregular to round in shape (Fig. 1a). Under moist, warm conditions, substomatal stroma develop, mostly from the upper leaf surface. These produce conidiophores, asexual reproductive structures that in turn produce conidia. The conidia are released by wind or rain and are carried to healthy plants. When temperatures are conducive, and if there is sufficient moisture in the form of rain or dew, the spores germinate and form appressoria, which are specialized cells that are used by plant pathogens to infect host plants. Following these infections, the next generation of conidia are produced and spread to new plants.

DAMAGE

Western populations of common crupina consist of two different varieties, var. *brachypappa* and var. *vulgaris*. As demonstrated in greenhouse studies, all growing stages of both varieties are susceptible to *R. crupinae* infection. Infected plants have stunted growth, reduced root biomass, and decreased seed production. Severe infections can kill plants (Fig. 1c).



**Figure 1.** Common crupina (a) rosette leaves and (b,c) stem leaves with lesions after being infected with *Ramularia crupinae*; infected plants display (c) stunted growth, reduced seed production, and sometimes death (a–c: Matthew Tancos, USDA ARS Foreign Disease-Weed Science Research)

FIELD IDENTIFICATION

Both the stems and leaves of common crupina plants infected with *Ramularia crupinae* may be sparsely or densely covered in brown lesions (Fig. 1). No other, similar fungi are known to infect common crupina in North America.

PREFERRED HABITAT

*Ramularia crupinae* is not yet confirmed established in North America. In its native range, France, it thrives in areas where rain or dew periods are sufficiently long for conidia to germinate and form appressoria.

HISTORY AND CURRENT STATUS

*Ramularia crupinae* has only been identified in France. It was

released in Idaho and Oregon, USA beginning in the spring of 2023, but it is too soon following its release to confirm field establishment.

**As of 2024, *Ramularia crupinae* can only be redistributed for research purposes and only with a permit granted by the USDA Animal and Plant Health Inspection Service.**

## NONTARGET EFFECTS

None reported

## REFERENCES

- Bruckart III, W.L., F.M. Eskandari, and D.K. Berner. 2014. Characterization and evaluation of *Ramularia crupinae*, a candidate for biological control, and of its host, two varieties of *Crupina vulgaris* in the United States. *Biological Control* 71: 40–48.
- Dianese, J.C., S. Hasan, and R. Sobhian. 1996. *Ramularia crupinae* sp. nov., a leaf pathogen of *Crupina vulgaris* (Asteraceae). *Fitopatologia Brasileira* 21(1): 115–119.
- Hasan, S., R. Sobhian, and L. Knutson. 1999. Preliminary studies on *Ramularia crupinae* sp. nov. as a potential biological control agent for common crupina (*Crupina vulgaris*) in the USA. *Annals of Applied Biology* 135(2): 489–494.
- Tancos, M.A., Fulcher, M.R., 2024. Genomic features of the host-specific fungal biocontrol agent *Ramularia crupinae* approved for the management of the federally noxious weed *Crupina vulgaris*. *PhytoFrontiers™* 4(3), 282–288. <https://doi.org/10.1094/PHYTOFR-10-23-0138-SC>

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## SUGGESTED CITATION

Tancos, M.A., N.M. West, and J.E. Andreas. 2024. Common *Crupina* Biocontrol Agents: History and Ecology in North America. In: R.L. Winston, Ed. *Biological Control of Weeds in North America*. North American Invasive Species Management Association, Milwaukee, WI. NAISMA-BCW-2024-41-COMMON CRUPINA-A.

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