HISTORY AND ECOLOGY IN NORTH AMERICA

Matthew A. Tancos[1], Natalie M. West[2], and Jennifer E. Andreas[3]
[1]USDA ARS Foreign Disease-Weed Science Research, [2]USDA ARS Pest Management Research, [3]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	*Ramularia*	
Species	*Ramularia crupinae* 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**).

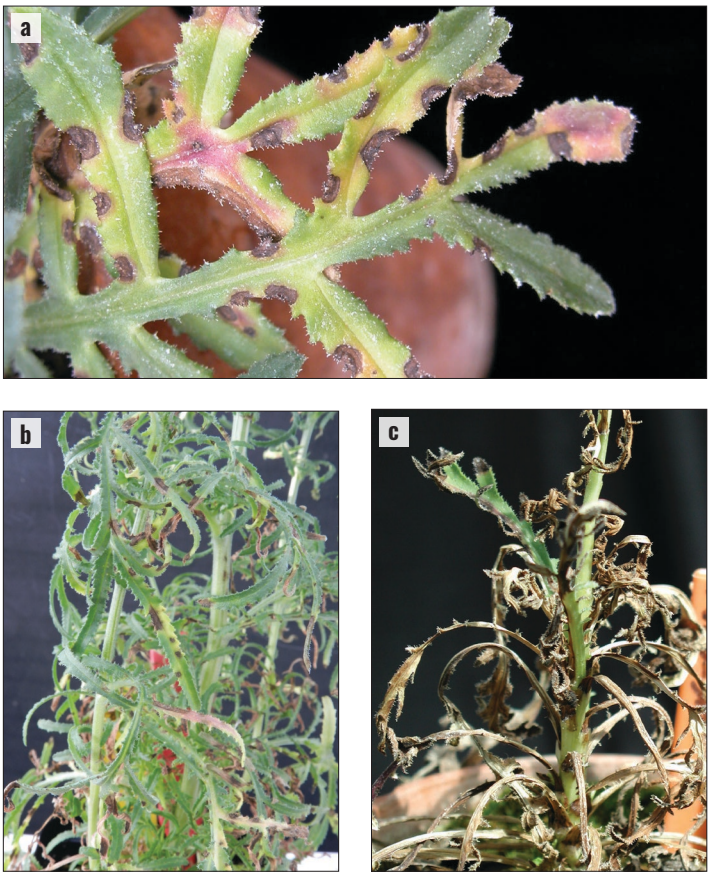

Figure 1. Common crupina (a) rosette leaves and (b,c) stem leaves with lesions after being infected with *Ramularia crupinae*; infected plants display (c) stunted growth, reduced seed production, and sometimes death (a–c: Matthew Tancos, USDA ARS Foreign Disease-Weed Science Research)

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

ACKNOWLEDGMENTS

The authors thank two anonymous reviewers for providing helpful comments on earlier versions of this publication. This fact sheet was produced by the North American Invasive Species Management Association (NAISMA) with financial support from USDA Forest Service. The layout was designed by Rachel Winston, MIA Consulting.

NAISMA is a network of professionals challenged by invasive species: land managers, water resource managers, state, regional, and federal agency directors and staff, researchers, and nonprofit organizations. NAISMAs members are a diverse group of individuals and organizations who are involved in implementing invasive species management programs at all scales. Our mission is to support, promote, and empower invasive species prevention and management in North America. Our vision is to have North America's lands and waters protected from invasive species. NAISMAs programs aim to provide the support, training, and standards needed by the professional invasive species management community.

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.