USDA Animal and Plant Health Inspection Service
U.S. DEPARTMENT OF AGRICULTURE

New Pest Response Guidelines

Heliococcus summervillei

Pasture mealybug

Pasture mealybug with associated reddening of the host grass.

Photo by Stephen Biles, Texas A&M AgriLife Extension Service.

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Introduction

Plant Protection and Quarantine (PPQ) develops New Pest Response Guidelines (NPRGs) in preparation for potential pest introductions. This document is based on the best information available at the time of development and may not reflect the latest state of knowledge at the time the pest is detected. In addition, the PPQ response must be tailored to the specific circumstances of each pest introduction event, which cannot be predicted. Therefore, this document provides only general guidelines that can be used as a basis for developing a situation-specific response plan at the time a new pest is detected.

Program managers of Federal emergency response or domestic pest control programs must ensure that their programs comply with all Federal Acts and Executive Orders pertaining to the environment, as applicable. Refer to the Environmental Compliance section in Appendix A for details.

Chapter

2

Pest Overview

Key Information

- *Heliococcus summervillei*, the pasture mealybug, is a small, sap-sucking insect that is covered in white waxy powder. Pasture mealybug infestations, even at low densities, contribute to pasture dieback, where grasses show yellowing or reddening of leaves, stunted growth, root decline, and eventual death. The widespread loss of pastures can result in significant impacts to ranchers and dairy farmers.
- Pasture mealybug may contribute to yellow canopy syndrome in sugarcane, but its exact role is unknown.
- Pasture mealybugs are typically active during warmer months of spring to fall and are most easily detected following rainfall. There are around three generations per year. They overwinter underground or in cryptic locations during cool/dry periods when grasses are not actively growing. Females and juveniles may overwinter as much as 3 ft underground.
- Visual surveys should target grass blades and stems, the base of hosts at the soil surface, and areas under debris such as cow patties. Mealybugs may concentrate in pastures with thick unmanaged grass, along fence-lines, within ungrazed patches, and in roadside grasses.
- Pasture mealybugs are naturally dispersed by wind, but may also spread through water or on vehicles/equipment, clothing, livestock, or be associated with host materials such as ornamental grasses or turf.
- Once symptoms of infestation have been observed and pasture mealybug has been confirmed, successful eradication is unlikely due to their cryptic nature and ability to disperse or reinfest managed areas. However, some control measures can provide population management, reducing damage.

Taxonomy

Scientific Name

- *Heliococcus summervillei* Brookes

Taxonomic Position

- Arthropoda : Insecta : Hemiptera : Pseudococcidae

Synonym

- *Novonilacoccus oryzae* Ghosh & Ghose

Common Names

- Pasture mealybug
- Paspalum mealybug

Pest Background

Distribution and Impact

The pasture mealybug is present in Australia, India, and Pakistan (García Morales et al., 2016). Most research and impacts due to pasture mealybug infestations have been reported from Australia. In 1998, it was recorded in New Caledonia (an island group about the size of New Jersey), where its impacts resembled Australia's infestations with significant pasture dieback (Brinon et al., 2004). Within a few years, the mealybug population sharply declined and is now presumed extinct on the island. The exact cause for the rapid decline is not understood. In the western hemisphere, it was detected in Barbados in 2020 (IPPC Report, 2020), Mexico in 2025 (Aca-Martinez et al., 2025), and southeastern Texas (Biles et al., 2025) and Louisiana (Blanchard, 2026) in 2025. We have not confirmed its presence in Puerto Rico that was based on an indirect report from 2019 (Hauxwell, 2022b).

Infestations of this mealybug cause pasture dieback, including unhealthy growth and death of grasses (Hauxwell, 2022b). The widespread loss of pastures can also result in significant impacts to grazing industries, including beef, dairy, and sheep (Buck et al., 2025). Most of the available literature focuses on impacts and associated losses in Australia, where it was introduced and first reported on *Paspalum* in 1926 (Brookes, 1978). In the United States, damage is reported in pastures (Biles et al., 2025). Also in the United States, yellowing and yield losses are reported in sugarcane, though the specific role of pasture mealybug is not known (Blanchard, 2026).

Biology and Ecology

Pasture mealybugs are active during warmer months, especially following rainfall (Boschma et al., 2024). We are uncertain whether this activity results directly from the rain, or if it is due to the resulting growth of the grasses. We were unable to find information about the amount of rainfall required to instigate mealybug

activity, though it appears “significant” rainfall, especially after dry conditions, may cause increased population growth. Around three generations occur per year, with populations peaking during late summer to fall (Boschma et al., 2024). Females have on average 250 offspring (Summerville, 1928). Pasture mealybugs tend to reside on leaves as well as along the soil surface and among plant roots (Boschma et al., 2024). During cooler or drier periods, pasture mealybugs seek refuge below-ground or underneath objects such as logs, cow patties, or dense grass thatch (Boschma et al., 2024). During these periods, pasture mealybug nymphs suck sap from grass roots as much as 3 ft underground (Boschma et al., 2024). Adults do not feed (Biles et al., 2025). Mealybugs will re-emerge when environmental conditions are favorable and susceptible grass leaves are actively growing (Boschma et al., 2024). In warmer areas with high rainfall, mealybug populations can be detected on or near the soil surface year-round (Baker et al., 2024; Boschma et al., 2024). The literature reports both sexual and asexual reproduction, but it is hypothesized that asexual reproduction typically only occurs when females overwinter (Hauxwell, 2022b).

Hosts

The host range for pasture mealybugs is variable, both in the species affected and the susceptibility of hosts in space and time. Some grasses are reported to be more tolerant of mealybug infestations and resulting dieback, and susceptibility varies significantly among species, varieties, and cultivars (Hauxwell, 2022b; Hauxwell, 2022c; MLA, 2023). However, determining which species are susceptible or tolerant is very difficult. Recent research in Australia has found that grass species that are typically considered highly susceptible may show variable impacts across years and among closely located sites (Future Beef, 2024). For example:

- Numerous reports in Australia indicate Johnson grass (*Sorghum halepense*) as non-susceptible to pasture mealybug (Hauxwell, 2022b; Hauxwell and McNicholl, 2018; MLA, 2021). However, in the United States, pasture mealybug infestations are associated with damage in this host (Biles et al., 2025).
- Bahia grass (*Paspalum notatum*) is damaged in the United States (Biles et al., 2025); reports from Australia state it is both “less” susceptible (MLA, 2021) and “highly” susceptible (MLA, 2023).
- Similarly, observations show Bermudagrass (*Cynodon dactylon*) is damaged in the United States (Biles et al., 2025), but we found no other evidence that it is a host elsewhere in the world.

Broadleaf plants, including forage legumes like alfalfa, are reported in Australia as unaffected (Buck et al., 2025; Hauxwell, 2022b; Hauxwell, 2022c; Hernandez-

Europa, 2023). However, the variation in hosts and impacts as noted above adds considerable uncertainty to the extent of potential hosts that pasture mealybug could affect in the United States.

The United States (Louisiana) (Blanchard, 2026), Australia (Xu et al., 2024), Mexico (Aca-Martinez et al., 2025), and Pakistan (Brookes, 1978) report pasture mealybug on sugarcane (*Saccharum officinarum*). Infested fields in Louisiana were described as severely stressed, with widespread yellowing across the field (Blanchard, 2026). Sugarcane yield losses estimated at 50 percent (Kerns and Biles, 2026) were reported there (Blanchard, 2026)., However, the specific role pasture mealybug played in these losses is unknown. This detection followed reports of the insect on sugarcane in Mexico where damage or symptoms were not described (Aca-Martinez et al., 2025). Pasture mealybug may have some association with yellow canopy syndrome in sugarcane, but the biotic and abiotic dynamics are not understood (Blanchard, 2026; Xu et al., 2024).

We found reports of pasture mealybug occurring on rice (*Oryza sativa*) in India (as junior synonym *Novonilacoccus oryzae*) (Ghosh, 1979; Ghosh and Ghose, 1987; Williams, 2004), but we found no additional information on potential damage or evidence of more recent infestations in this crop. The host status and potential impacts in rice are unknown.

We do not have enough information to conclude the susceptibility of summer grasses to infestation of pasture mealybug in the United States, and the host range is likely wider than what is documented. Texas researchers report “damage” in both pastures and turf grasses on Bermudagrass, Bahia grass, Johnsongrass, hay grazer (sorghum-sudangrass), several bluestem species, and St. Augustine turfgrass (Biles et al., 2025), but we do not have specific information on these species nor the extent of damage.

Table 1 lists host plants that are widely distributed, commercially important, or native/naturalized in the United States, and therefore represent the best opportunity for surveyors to delimit or detect pasture mealybug establishment and spread in rangeland environments. In contrast, the hosts listed in Appendix C include species that have limited documented infestation, occur only minimally or are absent within the United States, or have little economic value.

Table 2-1. Confirmed natural hosts of pasture mealybug.

Host name	Distribution in the U.S.	Host status within the U.S.	Additional notes & references
Axonopus compressus (=*Paspalum compressum*), Carpet grass	Native in AL, FL, GA, LA, SC, TX, GU, PR, USVI (NRCS, 2025).	Cultivated as lawn and forage grass, may be weedy (FNA, 1993+).	(Brinon et al., 2004)
Bothriochloa bladhii, Australian bluestem	Introduced in CO, FL, HI, KS, LA, MO, NE, NM, OH, OK, TX, GU (NRCS, 2025).	Cultivated as forage grass (FNA, 1993+).	Moderately susceptible (MLA, 2023). (Hauxwell, 2022c)
Cenchrus ciliaris (=*Pennisetum ciliare*), Buffel grass (incl. American, Biloella, Gayndah)	Introduced in AZ, CA, FL, HI, LA, MO, NM, NY, OK, TX, GU, PR, USVI (NRCS, 2025).	Historically cultivated as a rangeland grass (FNA, 1993+); however, because of wildfire risk, habitat loss, and control costs this is typically considered a noxious weed in much of its introduced range (NPS, 2019).	"American buffel is widely reported to be more susceptible than Gayndah buffel, and Biloela to be less susceptible than both" (Hauxwell, 2022c).
Chloris gayana, Rhodesgrass	Introduced in AZ, CA, FL, HI, IL, LA, ME, MA, MS, NC, TX, VA, USVI (NRCS, 2025).	Cultivated in southwest U.S. (FNA, 1993+) and FL as a warm-season perennial forage (Vendramini et al., 2023).	Low susceptibility (MLA, 2023). (Hauxwell, 2022c)
Cynodon dactylon, Bermudagrass	Widespread (NRCS, 2025).	Cultivated for fodder, forage and lawn/turf (NRCS, 2006).	Damaged by pasture mealybug in TX (Biles et al., 2025).
Cyperus rotundus, Nut grass (sedge)	Introduced in AL, AZ, AR, CA, DE, DC, FL, GA, HI, KY, LA, MD, MN, MS, MO, NJ, NY, NC, OK, OR, PA, SC, TN, TX, VA, GU, PR, USVI (NRCS, 2025).	"The world's worst weed" (Urbatsch, 2006).	(Hauxwell, 2022c)
Digitaria eriantha, Pangola grass	Introduced in AZ, CA, FL, HI, NM, GU, PR (NRCS, 2025).	Cultivated as a high-quality forage (FNA, 1993+), but also naturalized in pastures, roadsides, and disturbed sites (Cook et al., 2020).	Highly susceptible (MLA, 2023). (Hauxwell, 2022c)
Heteropogon contortus, Black spear grass	Native in AZ, CA, FL, HI, NM, TX, PR, USVI (NRCS, 2025).	Cultivated as forage grass (FNA, 1993+), but is weedy in some parts of the U.S. (Cook et al., 2020).	(Hauxwell, 2022c)
Lolium rigidum, Annual ryegrass	Introduced in AZ, CA, LA, MS, MO, OR, TX (NRCS, 2025).	Occasionally cultivated as forage, but often present in U.S. fields as a weedy species (FNA, 1993+).	(Hauxwell, 2022c)
Megathyrsus maximus (=*Urochloa maxima*; *Panicum maximum*), Guinea grass	Introduced in AL, AZ, CA, FL, GA, HI, LA, OK, TX, GU, PR, USVI (NRCS, 2025).	Cultivated as a high-yield pasture, hay, silage (FNA, 1993+), but also an invasive species contributing to fire risk in HI and elsewhere (Ellsworth et al., 2014).	Low susceptibility of Gatton panic; high susceptibility of Green panic (Hauxwell, 2022c).

Host name	Distribution in the U.S.	Host status within the U.S.	Additional notes & references
Melinis repens, Red Natal grass	Introduced in AZ, CA, FL, GA, HI, LA, MD, NM, NC, TX, GU, PR, USVI (NRCS, 2025).	Historically introduced as a forage, now considered an invasive fire-prone weed (FNA, 1993+).	(Hauxwell, 2022c)
Oryza sativa, Rice	Cultivated in AL, AR, CA, GA, IL, LA, MS, MO, NC, OK, SC, TN, TX, GU, PR, USVI (NRCS, 2025).	A major field crop.	We found no information on the susceptibility or potential damage in rice. Reports on rice are of junior synonym *Novonilacoccus oryzae* (Ghosh and Ghose, 1987), and we found no more recent reports.
Paspalum dilatatum, Dallis grass	Introduced across the southern half of the US, including HI and PR (NRCS, 2025).	Sometimes used as a summer forage for livestock, but more often considered weedy (FNA, 1993+).	Highly susceptible (MLA, 2023). (Hauxwell, 2022c)
Paspalum notatum, Bahia grass	Introduced and widespread in AL, AR, CA, FL, GA, HI, IL, LA, MS, NJ, NC, OK, SC, TN, TX, VA, PR, USVI (NRCS, 2025).	Cultivated for forage, turf, and erosion control (FNA, 1993+).	Highly susceptible (MLA, 2023). (Hauxwell, 2022c)
Saccharum officinarum, Sugarcane	Cultivated in LA, FL (FNA, 1993+).	A major crop.	Unknown susceptibility or level of damage. (Hauxwell, 2022c)
Sorghum halepense, Johnsongrass	Widespread (NRCS, 2025).	Sometimes used as a summer forage for livestock, but also considered weedy (FNA, 1993+).	Damaged by pasture mealybug in TX (Biles et al., 2025).
Stenotaphrum secundatum, Buffalo turf grass	AL, CA, FL, GA, HI, LA, MO, MS, NC, NM, OK, SC, TN, TX, PR, USVI (FNA, 1993+).	Widely cultivated warm-season turfgrass (FNA, 1993+), heavily used for lawns, landscaping, and sod production (Cook et al., 2020).	(Hauxwell, 2022c)

Dispersal

Human-Assisted Spread

Pasture mealybugs tend to cling to things passing through an infested field such as vehicles and equipment, clothing, and livestock, facilitating long distance dispersal (Hauxwell and McNicholl, 2018).

Figure 2-1. Human-assisted spread. Pant legs and farm equipment covered with pasture mealybug after leaving an infested field. Photos by Danielle Sekula and Corrie Bowen, Texas A&M AgriLife Extension Service.

Pasture mealybug may also be spread with infested host materials, such as potted grasses or sod (Hauxwell and McNicholl, 2018). While infested hay may contribute to its spread (Biles, 2025; MLA, 2021), pasture mealybug is not associated with dead host plants. Movement with hay is likely similar to other hitchhiking strategies, where it is picked up as humans move hay from an infested field.

Natural Dispersal

Wind is the primary natural dispersal mechanism for all life stages of pasture mealybugs (Boschma et al., 2024). Water runoff from infested pastures and along drainage lines may also disperse pasture mealybug populations (Boschma et al., 2024). Juvenile mealybugs move underground or on the soil surface in search of food, and adults move within the soil profile in response to changes in moisture (MLA, 2021). Ants may carry them across and into the soil (Hauxwell and McNicholl, 2018).

Figure 2-2. Wind dispersal. Equipment causing air-borne pasture mealybug populations. Photo by Shannon Deforest, Texas A&M AgriLife Extension Service.

Chapter

3

Pest Identification

Species ID/Diagnostic

Morphological

Adults

Adult female pasture mealybugs are white or pink, up to 5 mm long and can be seen with the naked eye (Boschma et al., 2024). Older mealybugs may have fine hair, as long as their body is wide and extending in all directions (Biles et al., 2025). Adult males are winged and less than 1 mm long (Boschma et al., 2024), making them difficult to see without a hand lens (Baker et al., 2024).

Nymphs

Juveniles are as small as 0.2 mm long, and difficult to see without a hand lens (Boschma et al., 2024).

***Figure* 3-1.** Adult female pasture mealybug surrounded by nymphs. Photo by Stephen Biles, Texas A&M AgriLife Extension Service.

Pupae

Pupae are small, elongated, pink, and found in the crown of the plant (Hauxwell, 2022b). Only males pupate (Hauxwell, 2022b).

Similar Species

Within the United States, there are many genera of grass-associated mealybugs that superficially resemble pasture mealybugs morphologically and behaviorally that may complicate field-level identification. Some of the more common and relevant mealybugs include:

- Rhodesgrass mealybug (*Antonina graminis*), an invasive species from Asia that is now widespread across the southern U.S., was first detected in Texas in 1942. This species affects grasses in pastures and turfgrass systems (Wolverton and Joseph, 2025), and the damage it causes is easily confused with pasture mealybug (Biles et al., 2025; Hauxwell and McNicholl, 2018). An observer with a hand lens in the field could possibly differentiate rhodesgrass mealybugs from pasture mealybugs. A key field screening technique is the observation of shorter anal filaments on pasture mealybug; whereas, rhodesgrass mealybugs have long anal filaments (Kerns and Biles, 2026). On close examination, pasture mealybug bodies are more elongated and adults have legs; rhodesgrass mealybugs have more rounded bodies and do not have legs.

***Figure* 3-2.** Rhodesgrass mealybug. Photo by Shimat Joseph (Hudson and Joseph, 2025).

- Sugarcane mealybug (*Saccharicoccus sacchari*) primarily feeds on grasses and is present in most sugarcane fields in Louisiana (LSU AgCenter, 2001). Sugarcane mealybug and pasture mealybug can infest the same sugarcane field (Xu et al., 2024). Both mealybug species feed on sugarcane roots below ground (Xu et al., 2024). However, above ground sugarcane mealybug feeds exclusively on stems, often beneath the leaf sheath, and pasture mealybug feeds exclusively on leaves, typically on the back of the leaf blade (Xu et al., 2024). Identification requires slide mounting and the use of identification keys.

***Figure* 3-3.** Sugarcane mealybugs (*S. sacchari*) underneath the leaf sheath of a sugarcane stem. Online photo accessed 3/12/2026 from https://katyayanikrishidirect.com/blogs/news/battle-against-sugarcane-mealybug-comprehensive-management-strategies-for-farmers (Katyayani Krishi Direct, 2023).

- *Trionymus* spp.- widely distributed across the U.S. and very common on grasses, often found at the base of stems and roots.
- *Dysmicoccus* spp.- broadly present across the southern and temperate U.S., some species occur in grassy habitats and can resemble pasture mealybugs depending on wax coverage and body shape.
- *Rhizoecus* spp.- root mealybugs are widespread across the U.S., including northern states. They occur in soil, so a surveyor could confuse species of this genus with pasture mealybug if they are sampling turf or pasture grass roots.

- *Pseudococcus* spp.- Not all are grass specialists, but some occur on monocots and have similar morphology without slide-mount ID.

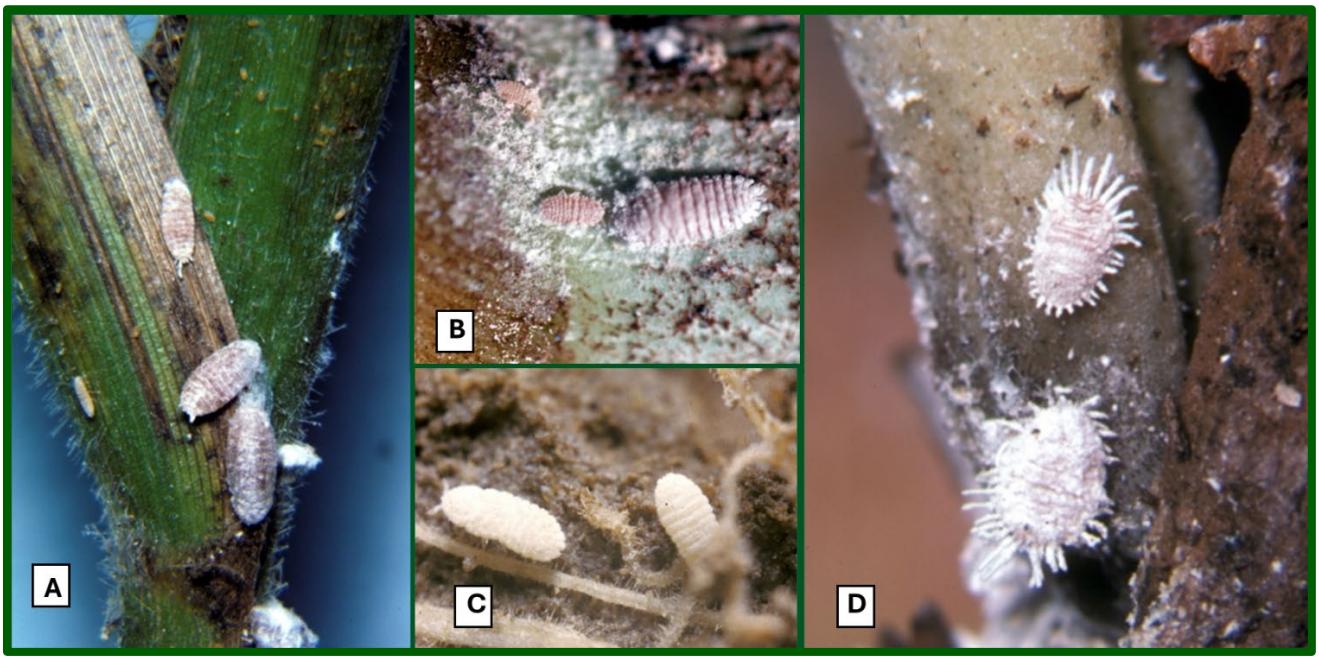

***Figure* 3-4.** *Trionymus frontalis* on giant wildrye host, **B.** *Dysmicoccus boninsis* on sugarcane, **C.** *Rhizoecus kondonis*, **D.** *Pseudococcus* spp. Photo credits to the USDA's Agricultural Research Service, National Collection of Scale Insects. All photographs are from the United States.

Signs and Symptoms

Pasture mealybug causes pasture dieback (Hauxwell, 2022b), but host susceptibility, environmental conditions and pasture management practices affect the prevalence and severity of impacts (Boschma et al., 2024). Juvenile mealybugs suck sap from leaves and roots causing damage (Baker et al., 2024). Symptoms of pasture dieback include yellow, red or purple discoloration of the leaves (Hauxwell, 2022b), and varies among grass species (Baker et al., 2024). Discoloration begins at the tip of the oldest leaves and moves along the leaf blade (Baker et al., 2024). Most of the leaves will eventually discolor, and plant growth will become stunted or stop (Baker et al., 2024). Affected plants will have fewer leaves, tillers (new shoots) and feeder roots, and ultimately die during the growing season (Baker et al., 2024).

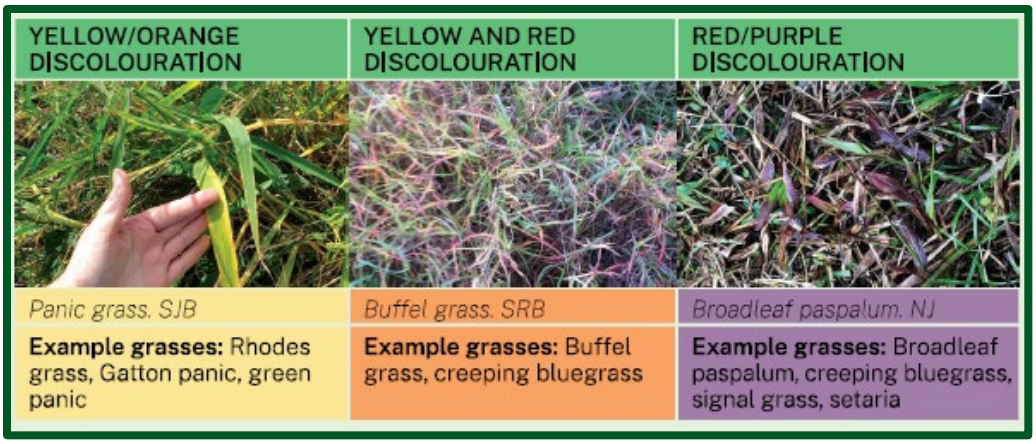

***Figure* 3-5.** Leaf discoloration as observed in different grass species (Baker et al., 2024; copyright State of New South Wales through Department of Primary Industries and Regional Development 2024).

***Figure* 3-6.** Patch of pasture dieback in Queensland (Baker et al., 2024; copyright State of New South Wales through Department of Primary Industries and Regional Development 2024).

***Figure* 3-7.** A severe case of pasture dieback associated with pasture mealybug in TX. Photo by Stephen Biles, Texas A&M AgriLife Extension Service.

Pasture dieback begins in patches of about 50 sq. ft in the field, and rapidly grows to large areas, significantly reducing pasture productivity (Baker et al., 2024; Hauxwell and McNicholl, 2018). Symptoms may appear 2 to 3 weeks following a rainfall event during warmer months, and the affected areas will expand quickly (Baker et al., 2024). Symptoms of dieback may stop at a fence line where pasture management or species composition changes (Baker et al., 2024). Spread may also occur along roads, rivers, and creeks (Hauxwell and McNicholl, 2018). Weeds invade areas where grasses have died (Baker et al., 2024).

Pasture dieback prevalence and severity is greater in areas with high grass biomass of highly susceptible grass species that are actively growing during periods of hot and humid conditions (Baker et al., 2024). Unmanaged grasses, such as those along fence lines, ungrazed patches, and road sides where the grasses are long and thick are likely to support larger populations (Biles et al., 2025). The prevalence and severity will decrease in cool or dry conditions when grass is not growing, and when legumes or predatory insects are present (Baker et al., 2024). Symptoms of pasture dieback associated with infestations of pasture mealybug are similar to other pasture disorders, so accurate diagnosis is necessary for effective management (Baker et al., 2024).

Ground pearls (e.g., *Margarodes australis*) are frequently found with pasture mealybug in areas of pasture dieback, but may also be present in areas of dieback where there are no pasture mealybugs (Young, 2023). Adults emerge in warmer

weather of spring and summer (Young, 2023) and appear similar to some mealybugs, but without a waxy coating (MLA, 2021). However, they will only be found underground and do not closely resemble pasture mealybug with careful examination.

***Figure* 3-8.** Various life stages of ground pearls (*Margarodes* spp.) (Camerino, 2018). Photo credit to University of Florida.

Other plant pests that may be present in pastures include aphids, leafhoppers, thrips, and spider mites. However, most of these will affect both grasses and broadleaf species, and plant death rarely occurs (Baker et al., 2024). Fall armyworm (*Spodoptera frugiperda*) can cause pasture disorders similar to pasture dieback, but there is no leaf discoloration and mature plants may recover from infestation (Baker et al., 2024). Nematodes can also affect pastures, but the size of the affected area does not rapidly increase following rainfall (Baker et al., 2024). Various diseases may also cause symptoms similar to pasture dieback, but are frequently host specific, and the affected areas are not likely to rapidly increase following rainfall in warmer months (Baker et al., 2024). Other environmental disorders affecting pastures include pasture rundown/nitrogen deficiency, cold temperatures and frost, other nutrient and soil constraints, herbicide damage, and general poor land condition (Baker et al., 2024).

Sugarcane fields where pasture mealybug has been detected may exhibit yellow canopy syndrome (Blanchard, 2026; Xu et al., 2024), or damage was not specified (Aca-Martinez et al., 2025). The role that pasture mealybug plays in symptomatic sugarcane or yield loss is not known (Xu et al., 2024).

***Figure* 3-9.** Pasture mealybug was detected in this field of sugarcane with yellow canopy syndrome (Blanchard, 2026). The role of pasture mealybug in symptom development is unknown. Photo credit to Blake Wilson, LSU AgCenter entomologist.

***Figure* 3-10.** Pasture mealybug colony on a sugarcane leaf (Blanchard, 2026). Photo credit to Blake Wilson, LSU AgCenter entomologist.

Chapter

4

Survey

Introduction

Delimitation surveys can determine the extent of the infested area after confirmation of a detection. Since each survey location has different characteristics and agency resources are unknown until a response begins, PPQ develops situation-specific surveys after pests are detected. To prepare response teams for survey, we provide survey considerations below.

Survey Considerations

Damage due to pasture mealybug populations may not be the same between pastures or year to year. Surveys are likely the easiest along transportation corridors or other areas of unmanaged grass, but may also occur in pastures, turf/yards, nurseries, and sugarcane. Pasture mealybugs overwinter underground and are only detectable during warm/humid months in most places where it could establish. Accurate identification of the cause of dieback seen in grasses can be difficult. Due to their small size and cryptic nature, early detection surveys in geographic regions where pasture mealybug has not been confirmed are unlikely to be effective. Surveys should focus on delimitating the infested area after symptoms arise and the species is confirmed. Survey for pasture mealybugs in areas adjacent to a confirmed detection and continue outwards in the region. Mealybugs will not be detectable on grasses that are suspected to be dead due to infestations, so surveys should focus on symptomatic or actively growing grasses within 10 ft surrounding the dead/senescent grass. Surveying may require on-the-ground assessments for access and site suitability as well as permissions from property owners.

Timing of Surveys

Surveys should only take place during warm/humid months when the mealybugs are above-ground and active. Detection of females is difficult during cooler/drier periods because they overwinter underground (Hauxwell, 2022b). In the spring, look for small juveniles on leaves and stems when grass begins to grow (Biles, 2025). After confirmation of pasture mealybug in an area, surveys are most

effective during periods of active grass growth following rainy periods (Baker et al., 2024). At this time, it is unclear whether rain causes the mealybug to become more active directly or if it is a result of fresh grass growth.

Detection and Site Selection

Pastures and Roadsides

Detection of pasture mealybug is most likely to occur through routine pasture pest scouting programs, though standardized protocols do not exist (Biles et al., 2025). Visual surveys within the grass can focus on field areas where grasses are unmanaged. This includes fence lines, ungrazed patches, and road sides where the grasses are long and thick (Biles et al., 2025). Winged males are sometimes detected as swarms in early summer (Boschma et al., 2024). Conduct a Visual Survey and collect samples for identification (Appendix B: Sampling).

YouTube videos demonstrating detection of early symptoms and techniques for detection of pasture mealybug in infested grass are available through these links from Meat & Livestock Australia (2023) and FutureBeef Australia (2025).

***Figure* 4-1.** Pasture mealybug on grass. Photo by Stephen Biles, Texas A&M AgriLife Extension Service.

Sugarcane

Sugarcane production fields may exhibit yellow canopy syndrome (Blanchard, 2026), but the specific role and prevalence of pasture mealybug in this host is

unclear (Xu et al., 2024), and it may or may not be found in symptomatic fields. For example, in the first detection of pasture mealybug in sugarcane in Australia, Xu et al. (2024) found that another sugarcane mealybug, *Saccharicoccus sacchari,* was significantly more abundant and was more consistently detected than pasture mealybug. However, above ground, sugarcane mealybug feeds exclusively on stems, often beneath the leaf sheath, and pasture mealybug feeds exclusively on leaves, typically on the back of the leaf blade (Xu et al., 2024). Detection in sugarcane will likely require specific timing based on the mealybug's biology and appearance of symptoms, and screening of mealybug species but may be aided by producers' routine scouting practices. Accordingly, public outreach efforts are likely beneficial.

Nurseries/Greenhouses

Pasture mealybug has also been detected in ornamental grasses, including in nurseries. Detection of pasture mealybug in nurseries will benefit from public outreach efforts to educate growers on the identification of this species from other mealybugs found in nurseries.

Turf

Pasture mealybug also affects grasses that are found in turf such as front yards or other landscaped areas. Infestations of pasture mealybug cause symptoms similar to a wide range of other biotic and abiotic factors (see Similar Species above). Detection surveys in these systems may not be an effective use of resources, but could be a survey target for areas where specific movement from infested fields to yards is likely (see Delimitation Considerations below).

Survey Techniques for Delimitation

Delimitation Considerations

Determining the extent of the distribution of pasture mealybug is difficult due to similarities in symptoms to other biotic and abiotic stressors as well as difficulty in species identification. After confirmation in an area, consider the potential pathways that could spread infestations. For example:

- Has sharing of equipment among pastures occurred? If so, consider inspecting those pastures for new populations.
- Has livestock moved among pastures? If so, consider inspecting those additional pastures for new populations.
- Have people moved from an infested pasture to other places, without cleaning their clothing? If so, consider inspecting other grassy areas such as homeowner front yards where pasture mealybug may have been brushed off and established new populations.
- Have detections occurred along a major roadway? If so, consider the use

of “windshield surveys,” as described below.

Note that while careful surveys and identification of pasture mealybug in symptomatic grasses may estimate the distribution in a region, we do not have enough information to conclude the extent of surveys necessary to determine the edges of the infestation. Public outreach is likely to be beneficial in determining new regions for species detection and confirmation.

Visual Survey

Conduct a visual survey by searching for plants with symptoms of infestation (see Signs and Symptoms and MLA 2023 or FutureBeef AU).

Surveyors can observe pasture mealybugs in or on the soil, leaf litter and debris, and roots or leaves of host plants (Hauxwell and McNicholl, 2018). Emerging adults are visible with the naked eye, but very careful examination with a hand lens (20 or 30 times magnification) is required for detection of juveniles (Hauxwell and McNicholl, 2018). They may be found either in large groups or individually on leaves (Biles et al., 2025). Swarms of winged males may be observed in early summer (Boschma et al., 2024).

Pasture mealybugs will not be present on dead grasses or those that are not actively growing, but may be found in nearby grasses that appear healthy (Hauxwell and McNicholl, 2018). Grasses that are turning red or yellow, but not yet dead, are most likely to have larger active populations of pasture mealybug feeding on them (as described within FutureBeef AU). Monitor and record locations and progressing symptoms of suspect infestations for additional plant health decline (Biles et al., 2025). Reddened or yellowed grasses may be right next to healthy green legumes (as described within FutureBeef AU). Gently push affected grasses over to expose the undersides of the leaves and inspect for mealybugs (as described within FutureBeef AU).

***Figure* 4-2.** A still frame from a video of a surveyor showing how to detect pasture mealybug on host grasses in Australia (FutureBeef.com.AU www.youtube.com/@FutureBeefAu).

Pasture dieback sometimes concentrates in areas with a long, thick grass such as ungrazed areas along roadsides or fenced areas, or underneath fence lines or trees, where grasses can build up over time (MLA, 2021).

***Figure* 4-3.** A still frame from a video of a surveyor showing how to detect pasture mealybug on host grasses in Australia (FutureBeef.com.AU www.youtube.com/@FutureBeefAu).

Windshield Surveys

A "windshield survey" is a rapid visual assessment conducted from a vehicle to identify and map areas of suspected pest damage based on visible symptoms (e.g., pasture browning, thinning, or dieback). Surveyors drive predetermined routes in regions where official confirmation of pasture mealybug has occurred and record the location and approximate size of damaged patches to estimate the extent of impact across a landscape. Windshield surveys can help delineate the distribution of suspected pasture mealybug-associated pest presence; however, on-site collection of an official specimen for identification is required. They can **not** be used to indicate absence of the mealybug. For road safety's sake, this may require two surveyors.

Do not use windshield surveys to report the presence of pasture mealybug in a new area/county unless an official species confirmation has occurred in the area beforehand

Contracting companies hired to maintain grasses along roadsides can move pasture mealybug on their equipment. Windshield surveys may be used in estimating the extent of pasture mealybug's distribution in a large area, if symptoms of pasture mealybug in un-mowed grasses along roadsides are observed, *and* there is official confirmation of the presence of the species in the area/adjacent areas. In these circumstances ONLY, continue along major

roadways where symptoms are observed, noting the location and distance. Recently mowed grasses may not appear symptomatic, but fencelines set back from the road, where grasses grow long and thick, may maintain pasture mealybug populations.

Stop and confirm that pasture mealybug is present in symptomatic grasses at regular intervals along the road. **When entering a new county, collect a sample for official species confirmation** (Appendix B: Sampling).

***Figure* 4-4.** Impacts of pasture mealybug infestation along a roadside. Photo by Stephen Biles, Texas A&M AgriLife Extension Service.

Outreach Program for Pasture mealybug

Developing outreach campaigns as a supplement for surveys may help detect pasture mealybug more effectively over a large area (Hopkins et al., 2022). Further, sugarcane producers and nursery managers may be the most effective resources for determining the potential presence of pasture mealybug in these systems. Outreach may be organized and carried out by state extension services and should operate side-by-side with surveys by PPQ staff. This campaign should target surveyed and at-risk areas in the vicinity. It should encourage growers and consumers in the region to proactively inspect their crops/turf/pastures and report infestations (see Signs and Symptoms) to the proper authorities. Questioning growers in at risk areas about potential symptoms observed in recent growing seasons may help focus detection efforts. Photographs of pasture mealybug on plants submitted to local extension agents, state inspectors, CAPS coordinators,

and/or PPQ staff will help surveyors map new detections and areas for further study. Monitoring community science websites (e.g., iNaturalist.org) for photographs of pasture mealybug may also result in additional detections.

Chapter 5

Eradication and Control Options

Overview

PPQ decision-makers can use this information after a detection to assess the suitability of potential actions to eradicate or contain pasture mealybug.

Eradication Options

Control of pasture mealybug can be challenging, and complete eradication is unlikely to be successful (Buck et al., 2025). There are no known methods to completely prevent pasture dieback when the pasture mealybug is present, susceptible grass species are present, and hot, humid environmental conditions are conducive to population buildup (Buck et al., 2025).

Control Options

Host Availability

The most effective long-term management strategy is replacing the pasture with tolerant grass species and perennial legumes (Buck et al., 2025; QPRP, 2024). When pastures have been affected by dieback, re-seeding with diverse grass mixtures containing legumes and other less susceptible grass species will help with population management (DAF, 2024). Grass species that are less susceptible to population buildups of pasture mealybugs will minimize pasture dieback (Biles et al., 2025). Additional research is needed to determine the least susceptible grass species in the United States, and the factors contributing to dieback.

Using break crops, such as an annual forage or grain crop, for one or two years may minimize populations prior to planting tolerant grasses and legumes (QPRP, 2024).

Insecticides

Insecticides are not recommended for use on large areas (Boschma et al., 2024), but may provide some population management to reduce spread in small patches through the spring (Hauxwell, 2022b). The systemic insecticides imidacloprid and spirotetramat have been used for this purpose in Australia (Hauxwell, 2022a).

Chlorpyrifos, carbaryl, diazinon, malathion and methomyl have historically been registered for use in Australia (Boschma et al., 2021). While they have been mentioned for use in small patches, specific information on the efficacy of these insecticides is not available (Boschma et al., 2024). On a larger scale, insecticides are expensive, grazing withholding periods are needed, applications across extensive pastureland is impractical, multiple sprays are needed, and there are negative impacts on non-target pests (Buck et al., 2025; QPRP, 2024). Insecticides can also be difficult to effectively apply and efficacy is limited since mealybugs are dispersed by wind and therefore are likely to reinfest managed areas (Boschma et al., 2024).

New information may be available soon, as researchers are working to identify effective insecticides and protocols for minimizing damage in Texas (Biles et al., 2025).

Sanitary Measures

Reduce spread of pasture mealybugs by managing presence on machinery or clothing. Pressure wash farm equipment used in infested fields before use in other fields (Biles et al., 2025). Sweeping farm equipment with a broom may also reduce spread (Biles et al., 2025). Ensure clothing and other materials moving out of infested fields are cleaned (Biles et al., 2025) such as by using rubbing alcohol sprays, washing clothing, stem treatment or hot water immersion (Middleton and Diepenbrock, 2022), brushing or lint rolling clothing, or by using disposable clothing.

Cultural Controls

To decrease the impact of pasture mealybug, strengthen plants through appropriate fertilizer use (Buck et al., 2025; QPRP, 2024). Phosphorus fertilization may improve root growth and plant recovery, increasing the tolerance to presence of pasture mealybug (Biles et al., 2025). Avoid nitrogen fertilization as it can exacerbate pasture mealybug impacts (Biles et al., 2025).

Reduce areas of long and thick growing grasses by grazing or cutting the pasture (Biles et al., 2025). Timing management such as cutting dead vegetation to target mating adults and early instars during late spring and summer increases effectiveness (Hauxwell, 2022b). Early harvest in areas of known pasture mealybug establishment can preserve hay quality (Biles et al., 2025).

Integrated Pest Management to Reduce Impacts

Effective population management for pasture mealybug is most likely achieved through an integrated pest management approach, incorporating multiple options already discussed. The Queensland Pasture Resilience Program was developed in part to provide guidance for managing pasture dieback in Australia (Queensland

Pasture Resilience Program, 2024). In 2024, they developed a fact sheet that provides guidance for management strategies after detection of pasture mealybug in both small and large areas (DAF, 2024). Depending on the situation, sufficient mitigation to reduce potential losses may require more than one management strategy (DAF, 2024). Key management strategies in this fact sheet include:

1. **Manage for recovery:** Controlling weeds can allow pasture seedlings to regenerate in recovering areas. In addition, controlling grazing pressure can allow the pasture to strengthen and recover.
2. **Improve the pasture:** Pasture improvement can include sowing perennial legumes and tolerant grass species and renovating the pasture through cultivation. Judicious use of fertilizers can further strengthen grass health to help combat pasture dieback.
3. **Sow a break crop:** Planting annual forage or grain crops to break the mealybug population growth for 1 or 2 years before returning to a perennial pasture that would include legumes and tolerant grass species.
4. **Treat pasture mealybug:** Insecticides may be effective in small patches to reduce spread of pasture mealybug. Burning pastures has had variable results, but may help in overall pasture management.

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Appendix

A

Environmental Compliance

Introduction

Use Appendix A as a guide to environmental regulations pertinent to pasture mealybug.

Overview

Program managers of Federal emergency response or domestic pest control programs must ensure that their programs comply with all Federal Acts and Executive Orders pertaining to the environment, as applicable. Two primary Federal Acts, the National Environmental Policy Act (NEPA) and the Endangered Species Act (ESA), often require the development of significant documentation before program actions may commence. APHIS, Policy and Program Development, Environmental and Risk Analysis Services (ERAS) is available to provide guidance to program managers and prepare drafts of applicable environmental documentation. PPQ's Compliance and Environmental Coordination program assists ERAS in development of documents and implements environmental monitoring. Program leadership is strongly advised to consult with ERAS and/or the Compliance and Environmental Coordination program early in the development of a program to conduct a preliminary review of applicable environmental statutes and ensure timely compliance.

Environmental monitoring of APHIS pest control activities may be required as part of compliance with environmental statutes, as requested by program managers, or as suggested to address concerns with controversial activities. Monitoring may be conducted with regards to worker exposure, pesticide quality assurance and control, off-site chemical deposition, or program efficacy. Different tools and techniques are used depending on the monitoring goals and control techniques used in the program. Staff from the environmental compliance team (ECT) will work with the program manager to develop an environmental monitoring plan, conduct training to implement the plan, provide day-to-day guidance on monitoring, and provide an interpretive report of monitoring activities.

The following is a list of pertinent laws and Executive Orders:

National Environmental Policy Act (NEPA) – NEPA requires all Federal agencies to examine whether their actions may significantly affect the quality of the human environment. The purpose of NEPA is to inform the decision-maker prior to taking action and to inform the public of the decision. Actions that are excluded from this examination, actions that normally require an Environmental Assessment, and actions that normally require Environmental Impact Statements are codified in APHIS' NEPA Implementing Procedures located in 7 CFR 372.5.

The three types of NEPA documentation are:

1. **Categorical Exclusion**

   Categorical exclusions are classes of actions that do not have a significant effect on the quality of the human environment and for which neither an environmental assessment (EA) nor an environmental impact statement (EIS) is required. Generally, the means through which adverse environmental impacts may be avoided or minimized have actually been built into the actions themselves (see 7 CFR 372.5(c)).

2. **Environmental Assessment (EA)**

   An EA is a public document that succinctly presents information and analysis for the decision-maker of the proposed action. An EA can lead to the preparation of an environmental impact statement (EIS), a finding of no significant impact (FONSI), or the abandonment of a proposed action.

3. **Environmental Impact Statement (EIS)**

   In the event that a major Federal action may significantly affect the quality of the human environment (adverse or beneficial), or, the proposed action may result in public controversy, an EIS is prepared.

Endangered Species Act (ESA) – This statute requires that programs consider their potential effects on federally protected species. The ESA requires programs to identify protected species and their habitat in or near program areas and documentation of how adverse effects to these species will be avoided. The documentation may require review and approval by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service before program activities can begin. Knowingly violating this law can lead to criminal charges against individual staff members and program managers.

Migratory Bird Treaty Act – This statute requires that programs avoid harm to over 800 endemic bird species, eggs, and their nests. In some cases, permits may be available to capture birds, which require coordination with the U.S. Fish and Wildlife Service.

Clean Water Act – This statute requires various permits for work in wetlands and for potential discharges of program chemicals into water. This may require coordination with the Environmental Protection Agency, individual states, and the U.S. Army Corps of Engineers. Such permits would be required even if the pesticide label allows for direct application to water.

Tribal Consultation – This Executive Order requires formal government to government communication if a program might have substantial direct effects on any federally-recognized Indian Nation. This process is often incorrectly included as part of the NEPA process, but it must be completed prior to general public involvement under NEPA. Staff should be cognizant of the conflict that could arise when proposed federal actions intersect with tribal sovereignty. Tribal consultation is designed to identify and avoid such potential conflict.

National Historic Preservation Act – This statute requires programs to consider potential impacts on historic properties (such as buildings and archaeological sites) and requires coordination with local State Historic Preservation Offices. Documentation under this Act involves inventorying the project area for historic properties and determining what effects, if any, the project may have on them. This process may require public involvement and comment prior to the start of program activities.

Coastal Zone Management Act – This statute requires coordination with states where programs may impact Coastal Zone Management Plans. Federal activities that may affect coastal resources are evaluated through a process called “federal consistency.” This process allows the public, local governments, Tribes, and state agencies an opportunity to review the federal action. The federal consistency process is administered individually by states with Coastal Zone Management Plans.

Protection of Children –This Executive Order requires federal agencies to identify, assess, and address environmental health risks and safety risks that may disproportionately affect children. If such a risk is identified, then measures must be described and implemented to minimize such risks.

Appendix

B

Sampling

Laboratory Identification and Sample Submission Guidance

Prior to beginning any survey, submitters should determine the appropriate screening and diagnostic resources available. Contact the Preliminary Identification National Policy Manager (NPM)/National Operations Manager (NOM) https://caps.ceris.purdue.edu/domestic-identifiers/. Preliminary sample capacity may limit the scope of survey activity so please confirm availability when planning a response.

Insect Collection

There are other mealybug species present in the United States that may infest pasture and turf grasses or sugarcane (Similar Species), so screening of suspect pasture mealybugs is important. Like other mealybugs, identification will require a professional entomologist, and field identification is unlikely to be definitive.

Hand lens inspection may be able to differentiate rhodesgrass mealybugs from pasture mealybugs for collectors with experience. A key field screening technique is the observation of shorter anal filaments on pasture mealybug, where rhodesgrass mealybugs have long anal filaments (Kerns and Biles, 2026). On close examination, pasture mealybug adults have legs, but rhodesgrass mealybugs do not. Pasture mealybug body shape will also be more elongated; rhodesgrass mealybugs are more rounded.

When collecting insects in sugarcane, sugarcane mealybug may be differentiated from pasture mealybug based on where on the plant it is found. Sugarcane mealybug and pasture mealybug can infest the same sugarcane field, and both feed on roots below ground (Xu et al., 2024). However, above ground, sugarcane mealybug feeds exclusively on stems, often beneath the leaf sheath, and pasture mealybug feeds exclusively on leaves, typically on the back of the leaf blade (Xu et al., 2024).

If pasture mealybugs are suspected, collect and submit specimens for identification. Include information such as observed impacts, GPS coordinates, and host system (e.g., pasture, roadside, lawn, nursery).

As sap-sucking insects, mealybugs are best submitted with portions of the host plant where they were found. Juveniles are the most difficult to identify; focus on collection of medium and large adult specimens. If possible, include multiple individuals of suspect pasture mealybug in the same submission, but try to ensure different species are not included. Collect infested plant pieces into a vial with alcohol. Plant fragments for submission should not be bent or forced into the submission vial, to ensure ease of removal without damaging the specimens. If rapid identification is required, consider submitting infested plant parts in sealed plastic bags.

Sample Submission

If a suspected positive pest is identified, contact your State Plant Health Director (SPHD)/State Plant Regulatory Official (SPRO) and follow PPQ submission guidelines: https://www.aphis.usda.gov/plant-pests-diseases/official-confirmation-preliminary-id.

Appendix

C

Additional Hosts

Heliococcus summervillei hosts

The hosts listed below represent grass species that either have low economic value, a limited distribution in the United States, or are reported primarily from outside the United States.

Table C 1. *Heliococcus summervillei* hosts.

Host name	Distribution in the U.S.	Status within the U.S.	Additional notes & references
Bothriochloa insculpta, Creeping bluegrass and var. Bisset bluegrass	No information found.	No information found.	Highly susceptible (MLA, 2023).
Brachiaria decumbens (=*Urochloa decumbens*), Signal grass	Introduced in PR (NRCS, 2025) and HI (Bishop Museum, n.d.).	Pasture grass in tropical environments but considered a weedy invader in natural areas (Thomas et al., 2018).	"…A host, but appears to be highly tolerant with low numbers of mealybugs and few symptoms" (Hauxwell, 2022b). Low tolerance (MLA, 2023).
Brachiaria ruziziensis (=*Urochloa brizantha*), Signal grass	Introduced in PR, TX (FNA, 1993+), and HI (Bishop Museum, n.d.).	Pasture grass in tropical environments, occasionally considered weedy (Kono et al., 2022).	Tolerant (MLA, 2023). (Brinon et al., 2004)
Cenchrus clandestinus (=*Pennisetum clandestinum*), Kikuyu grass	Introduced in CA, HI, PR (NRCS, 2025).	Escaped cultivation and is now weedy in many agricultural and landscape systems (UCIPM, 2025).	Highly susceptible (MLA, 2023). (Hauxwell, 2022c)
Dichanthium sericeum, Queensland bluegrass	Introduced in FL, HI, MS, TX (NRCS, 2025).	Minor, localized forage value in some warm-climate pastures (Cook et al., 2020).	Highly susceptible (MLA, 2023). (Hauxwell, 2022c)
Digitaria didactyla, Blue couch	Unlikely presence within the U.S. (NRCS, 2025).	Widely introduced for pasture grazing, turf purposes, and ground cover (Cook et al., 2020).	(Hauxwell, 2022c)
Digitaria milanjiana, Crabgrass	Introduced in FL, TX (NRCS, 2025).	Minor forage grass but with some weedy behavior in disturbed areas (Weakley and Southeastern Flora Team, 2026).	Moderately susceptible (MLA, 2023). (Brinon et al., 2004)
Melinis minutiflora, Molasses grass	Introduced in FL, HI, GU, PR (NRCS, 2025).	Introduced historically as a forage, now considered an invasive fire-promoting weed (Cook et al., 2020).	(Hauxwell, 2022c)

Host name	Distribution in the U.S.	Status within the U.S.	Additional notes & references
Ochthochloa compressa (= *Panicum compressum*) wire grass	No information found.	No information found.	(Brinon et al., 2004)
Panicum coloratum, Kleingrass	Introduced in NM, TX, HI.	Cultivated (FNA, 1993+)	Moderately susceptible (MLA, 2023).
Paspalum mandiocanum, Broad-leaved paspalum	Introduced to HI.	A weed that has been used as a pasture grass and ground cover (Anon., 2016).	Highly susceptible (MLA, 2023). (Hauxwell, 2022c)
Setaria sphacelata (=*Setaria splendida*), Setaria	No information found.	Used as a forage grass in other countries.	(Hauxwell, 2022c)
Themeda triandra, Kangaroo grass	Introduced in TX (NRCS, 2025).	Pastoral importance in Africa and Australia.	(Hauxwell, 2022c)
Urochloa mosambicensis, Sabi grass	Introduced in TX, PR (FNA, 1993+).	An important pasture grass in many countries, not widespread in the U.S. (Cook et al., 2020).	Highly susceptible (MLA, 2023). (Brinon et al., 2004)
Urochloa oligotricha, Signal grass incl. two research varieties	No information found.	Pastoral importance in Africa.	Highly susceptible (Hauxwell, 2022c).

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