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New Spittlebug on Pasture Grasses in Hawaii Two-lined Spittlebug, *Prosapia bicincta* (Say)

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Figure 1. Adult Two-lined spittlebug (*Prosapia bicincta*)

Update:

Last September, I shared information with you regarding a potentially new pasture pest that was later positively identified as the Two-lined Spittlebug (*Prosapia bicincta*), see Figure 1. This spittlebug had not been recorded in Hawaii until the specimens were collected in September of last year. It is not clear how or when they were introduced to Hawaii, possibly through some ornamental plants or grasses. The specimens were collected from a ranch in Kona, and at least one other ranch in the Kona area reported heavy damage and loss of pasture because of this pest, and possibly in concert with armyworm and grass webworm infestations last summer and early fall.

Recently, Glen Fukumoto and I, along with Rob Curtiss from the HDOA-Plant Pest Control Branch scouted the mauka pastures of the ranch in Kona that had been affected by both the spittlebug and armyworm/grass webworm last year. One purpose of the pasture scout was to survey the damage caused by the pests and to develop strategies for recovery of the forages. Additionally, we scouted for signs of the pests to see if they were still present and to what extent.

The purpose of this email is to share with you what we observed and some concerns on what could potentially become a major threat to the industry. Additionally, I want to provide you with some tools to identify the two-lined spittlebug along with some information and possible management practices for the control of this pest.

Pasture Damage:

The areas surveyed were primarily Kikuyu/pangola grass pastures between the 2,000 and 4,000 ft. elevations of mauka Kona. The extent of the damage was alarming. Approximately 2,000 acres on the ranch had been severely affected to the point that the Kikuyu (*Pennisetum clandestinum*) and pangola (*Digitaria eriantha*) grasses that formally dominated these pastures was completely dead over very large expanses with only sporadic and isolated areas where recovery was occurring. The pastures are now dominated by Pamakani (*Eupatorium adenophorum*), wild blackberry (*Rubus* spp.), fireweed (*Senecio madagascariensis*), Hilo grass (*Paspalum conjugatum*), several other minor grasses of low forage quality, and other weeds (see Figure 2). We also observed the loss of once vigorous pangola grass pasture in adjacent properties outside of the ranch that showed similar patterns of damage and weed infestations.



Figure 2. The condition of Mauka Kona pasture in March of 2017 showing infestation of weeds including pamakani, wild blackberry, fireweed and others following an infestation of Two-lined Spittlebug and army worm and grass webworm in the summer and fall of 2016. Image by Glen Fukumoto.

Two-lined Spittlebug:

The Two-lined spittlebug (*Prosapia bicincta*) is a native spittlebug of the southeastern United States that can be a pest of ornamentals and warm-season turf grasses in that region. Adult two-lined spittlebugs resemble robust, black leafhoppers with two red stripes traversing the forewings which

are held over the back of the body (see attached picture). Nymphs resemble the adults, but are smaller and lack wings, are yellow, white or orange in color, with red eyes and brown heads. The nymphs reside in “spittle masses” (Figure 3), that appear as a white, frothy mass. These spittle masses protect the nymphs from desiccation and predators. The masses are found at the base of the grass plants near the soil line, or even under rocks (Figure 4).

In their native range, the eggs overwinter in grass stems, behind the leaf sheath, in plant debris and other protected areas. The nymphs hatch in the spring and begin feeding at the basal (base or crown of plant at soil surface) portion of the plant where humidity is high and temperatures are cooler. The nymphs may penetrate even deeper into the grass turf as temperatures increase and the humidity declines. This makes them difficult to find when scouting the pasture for them. The nymphs feed for about one month before becoming an adult, which begin laying eggs after about two weeks. The entire lifecycle, from hatch to egg laying adult takes about two months. In the southeast, there are at least two generations per year.

It is not known if this same lifecycle will be observed in Hawaii. Because of our milder climate it is thought that the spittlebug may not need to overwinter, but instead may continue to cycle new generations throughout the year; albeit perhaps at a slower rate during the cooler months.

Reports from the various southeastern states indicate that the two-lined spittlebug can be particularly damaging to turf grasses, even to the point of killing the turf. The spittlebug nymphs damage the grass because they feed by sucking the fluids (nutrients) from the plant at the or near the plant crown along the soil surface. They must suck enough fluids to form the protective spittle mass. The spittlebug nymphs use a needle-like mouth part to penetrate the plant dermis and suck the fluids out. The removal of the plant fluids leads to weakened, stressed grass plants that turn yellow or even brown. Severe infestations can kill the grass. The adults also feed, but most reports seem to focus on the nymphs as causing the most severe damage.

In our survey, we found adults and several spittle masses with nymphs present indicating that a population is still present from last fall. Also present were armyworm (see Management of



Figure 3. Spittle mass with nymph present, appears yellow.



Figure 4. Spittle mass at the soil surface, which was found after turning over a rock. Images by Glen Fukumoto.

Caterpillar Pests in Hawai'i Pastures, PRM-12, <https://www.ctahr.hawaii.edu/oc/freepubs/pdf/PRM-12.pdf>). The fact that these pests were observed indicates that there is a potential for a large outbreak and significant loss of pasture this year. While, currently, the spittlebug seems to be isolated to the Kona area, the potential for it to move to other locations on the island are very high. If the spittlebug were to be introduced and become established in the Waimea/Kohala area it could devastate the livestock industry given the severity of the damage observed on Kikuyu and pangola grass pastures in the Kona area.

Because of the potential impact of this grass pest it is important that you **be alert** to the condition of your pastures, **be observant** to the various insects you observe while in your pastures, **and report** any sightings of adult two-lined spittlebugs, or spittle masses observed.

Management Practices:

As in most cases, management of spittlebug pests will require an integrated approach utilizing a variety of measures each evaluated and implemented where they will be the most cost effective. The most obvious control measure is the use of pesticides. Most of the recommendations for pesticide control methods come from the turf grass industry in the southeast USA. In Hawaii, Carbaryl (Sevin 4F) is labeled for use on pastures in Hawaii for armyworm and may be effective against two-lined spittlebug. However, keep in mind that the application of pesticides over large geographical expanses can be expensive and likely is not feasible without government cost-share or assistance programs.

The manipulation of grazing intensity and timing may be an effective tool to help reduce the overall impact of the pests. The biology of the nymphs seems to indicate that they do not tolerate hot, dry conditions. This has two implications: First, they are likely to more readily attack sod forming grasses, like Kikuyu and pangola grass, than bunch type grasses like Guinea grass (*Panicum maximum*) or napier grass (*Pennisetum purpureum*) as the sod forming grasses provide a better survival habitat for the eggs and nymphs. This is particularly worrisome given that nearly 70% of the beef cattle industry in Hawaii is dependent on Kikuyu and pangola grass pastures. Secondly, during an infestation, short duration, intense, and frequently repeated grazing bouts over a two to four-month period, with the focus on keeping the grass relatively short (4 to 5-inch stubble height) may help reduce the overall population of the spittlebug by reducing suitable habitat for eggs and nymph survival. These intense grazing bouts would need to be followed up with sufficient rest of the pasture to allow the forages to recover vigor. During both the periods of infestation and rest, integrated weed management efforts (chemical, mechanical, biological, and cultural weed control practices) should be considered to reduce weed infestation of the stressed pasture and to allow for the desirable forages to have the best opportunity for recovery following the infestation. If the infestation was severe enough to kill the desirable forages, revegetation efforts may be necessary to reclaim the pasture for grazing.

For non-infested pastures, adjacent to infested areas, intensive grazing to a 4-5 inch stubble height is recommended to reduce the potential for spread of spittlebugs. This grazing practice will need to be maintained for as long as the infestation is present in the adjacent pasture. As with intensively grazed infested pastures, an appropriate rest period will be necessary to allow for the grasses to recover vigor.

Pastures should be scouted monthly for signs of spittlebug. These would include observation of adults, spittle masses, and/or nymphs. Adults can be readily observed hopping through the grass. Observation of the spittle masses is more difficult. They will most readily be found near or at the soil surface attached to the basal portion of the grass plant, or under rocks, logs, or other debris. If possible, collect samples and take them to your local Cooperative Extension Office or the Plant Pest Control Office.

Summary:

The two-lined spittlebug was recently positively identified in Hawaii. So far it appears to be located only in the Kona area of the Island of Hawaii where it has caused severe damage to mauka kikuyu and pangola pasture lands. A recent (March 2017) survey of these pastures revealed that recovery of these grasses following infestations in the summer and fall of 2016 has been slow to non-existent allowing for the establishment of several noxious weeds including pamakani, wild blackberry and fireweed.

The ecology of the two-lined spittlebug suggests that careful grazing management may help reduce the severity of an infestation and reduce the potential for the pest to move into new pastures. Recommended grazing practices include frequent, short duration, intense grazing bouts that keep the forage stubble height or grass mat at 4-5 inches. This will remove choice habitat for the eggs and nymphs and reduce survival. This grazing practice should be maintained for up to 4 months and followed by an appropriate rest interval to allow for the forages to recover vigor. Integrated weed management practices should be utilized during and after the intense grazing to provide the best opportunity for the grasses to recover following the infestation.

The two-lined spittlebug poses a significant threat to the Hawaii Beef Cattle Industry in the state because of its apparent preference for sod-forming grasses like kikuyu and pangola grass that supports nearly 70% of the beef cattle production in the state. To help reduce the potential impact of the pest on the industry: **Be alert** to the condition of your pastures, **be observant** to the various insects you observe while in your pastures, **and report** any sightings of adult two lined spittlebugs, or spittle masses.

Who to Contact:

If you have any questions, concerns, or have observed two-line spittlebug in your area please contact us.

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