



Twoline Spittlebug: A Pasture Pest in Paradise

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Twoline Spittlebug (*Prosapia bicincta*)

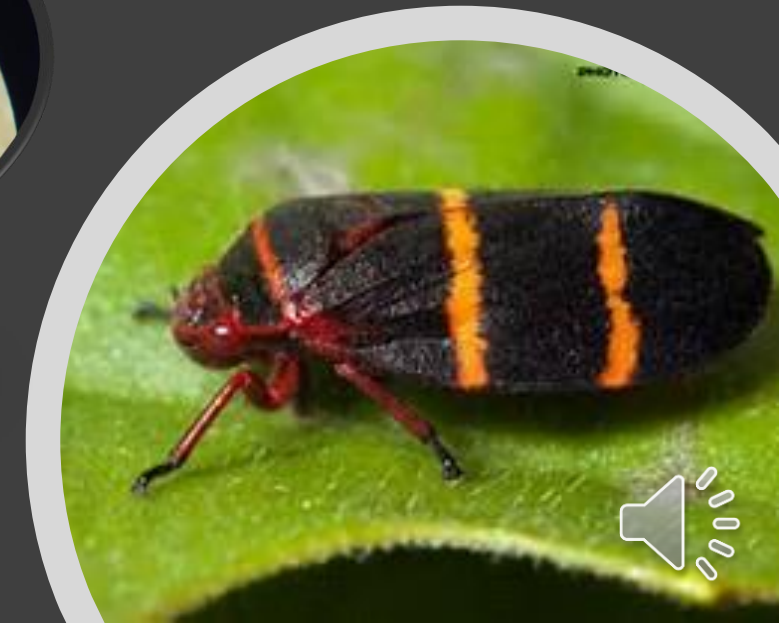
- First recoded in Kona area pastures in the summer 2016
- Not clear how or when it arrived in Hawaii
- Likely has been present for some time, but now affecting areas where more attention is paid to the condition of the grasses
- The TLSB is native to the South East U.S. where it has long been recognized as a pest of pastures and grass-turf.
- Twoline Spittlebug is a major economic threat to the Hawaii's pasture-based Livestock industry





Two Lined Spittle Bug (*Prosapia bicincta*)

- Adults resemble leaf-hoppers with two horizontal orange/red strips traversing their black wings. Their heads, abdomen, and legs are a deep red color
- Nymphs are smaller, lack wings, have yellow, white or orange bodies with red eyes and brown heads. They also have two orange patches on either side of their abdomen.





Two Lined Spittle Bug (*Prosapia bicincta*)

- Nymphs reside in “spittle masses” found at the base of grass plants near the soil line or even under rocks
- In native range, eggs overwinter (diapause) in grass stems, behind leaf sheath, in plant debris and other protected areas
- Hatching nymphs feed at the basal portion of the plant where humidity is high, and temperatures are moderated and cooler.
- Nymphs become adults after about 50 days and begin laying eggs after two weeks as an adult. Complete life cycle is about 76 days.





Both Stages can inflict damage to grasses:

Nymphs

- Water Stress
- Decreased productivity
- Don't kill the grass directly

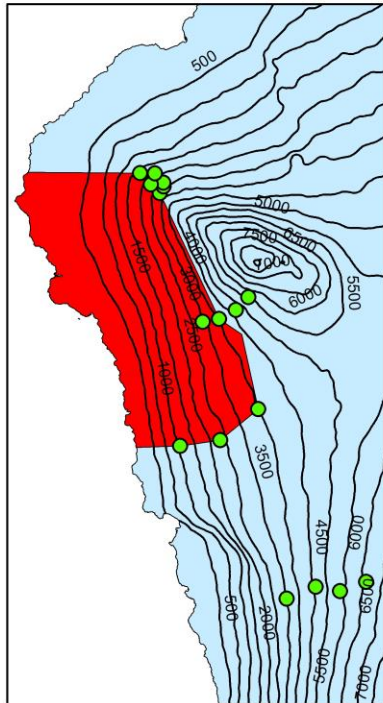
Adults

- Phytotoxemia – inject amylase into plant as they feed which interferes with photosynthesis/Carbohydrate translocation and storage
- Decreased Nutritional value, Palatability, and Plant Productivity
- Can result in plant death
- Promotes establishment of weeds

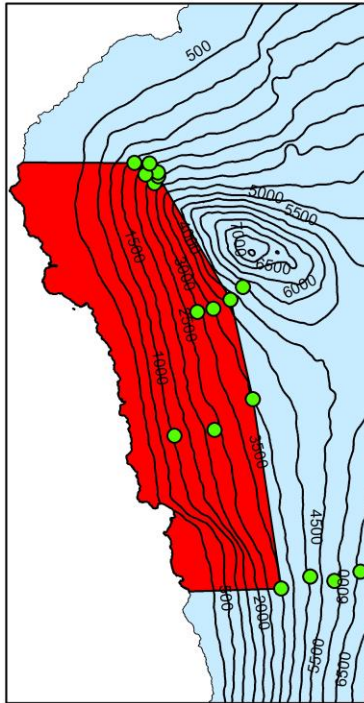




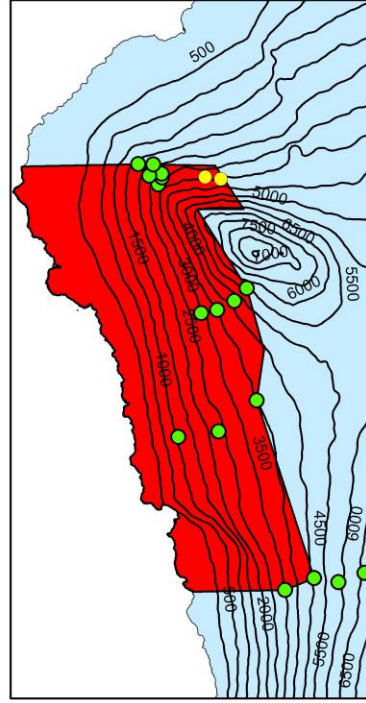
Acreage of Infected Area



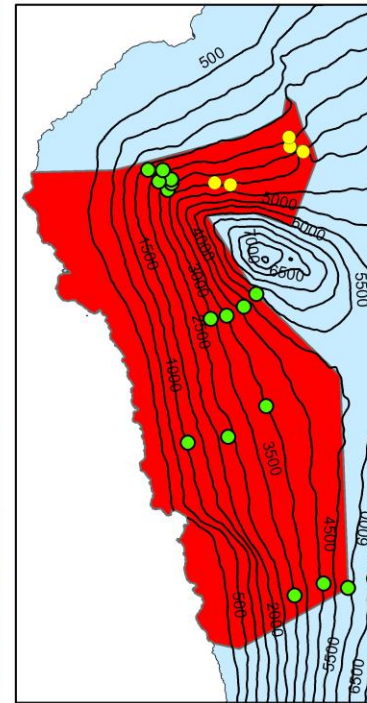
2017: 69,441 acres



2018: 125,900 acres



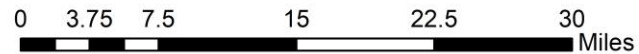
2019: 142,468 acres



2020: 176,124 acres

Legend

- TLSB Infected Area
- Ranch Survey Transects
- TLSB Found at Pu'u Wa'awa'a
- Elevation (ft)



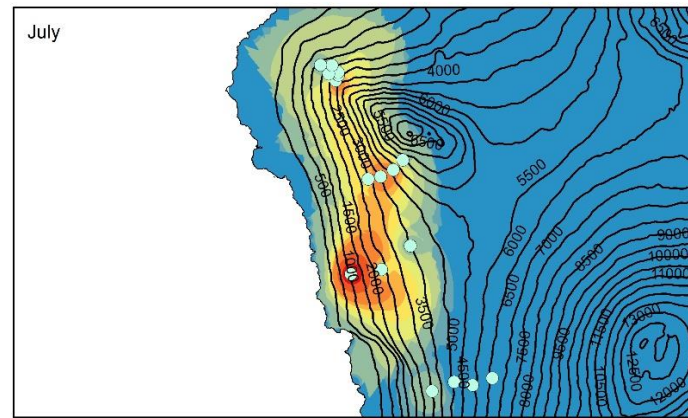
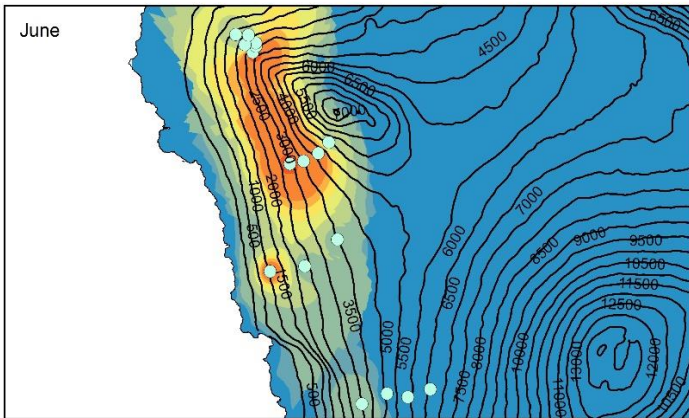
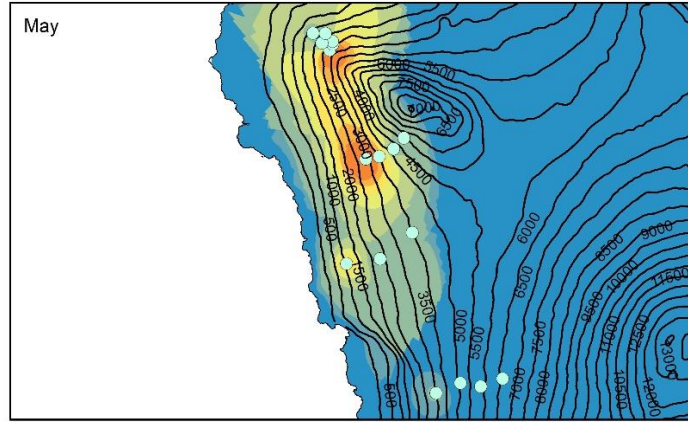
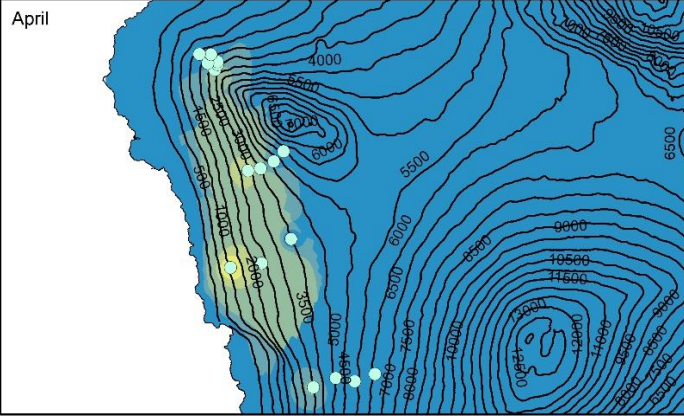
The Two Line Spittlebug project is supported by grants through the Hawaii Dept. of Agriculture, Contract No. 65973; Hawaii Dept. of Land and Natural Resources, Hawaii Invasive Species Council Contract No. C81112; and Hawaii County Office of Research and Development via the Big Island Resource Conservation and Development Council Contract No. C006362.

For more information, please contact Dr. Mark S. Thorne, Extension Specialist in Pasture and Range: thornem@hawaii.edu or (808) 887-6183

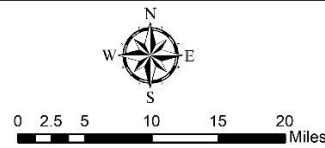
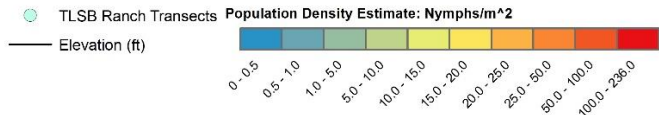




TLSB Nymph Density 2018-2019



Legend



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Monthly monitoring of TLSB nymph densities and plant cover along established transects has revealed key information on the population dynamics, habitat selection, and potential ecological and economical impact of TLSB





June 2018



January 2019



Figure 5. Progression of a TLSB infestation from initial attack (left, June 2018) on healthy range grasses involving a small patch to all visible range infested (right, January 2019) with dieback of grasses and increasing weed infestation. Applications of pesticides and intensive grazing in the early stage of an infestation may reduce the degree of TLSB damage observed on the right.





Kikuyu grass pasture,
3,500 ft elevation, August
26, 2019

Stages of Twoline
Spittlebug outbreak:

- a) Healthy Kikuyu grass
– low TLSB
population
- b) Small patch (red
arrow) – initial attack
–medium population
- c) Widespread damage –
large population



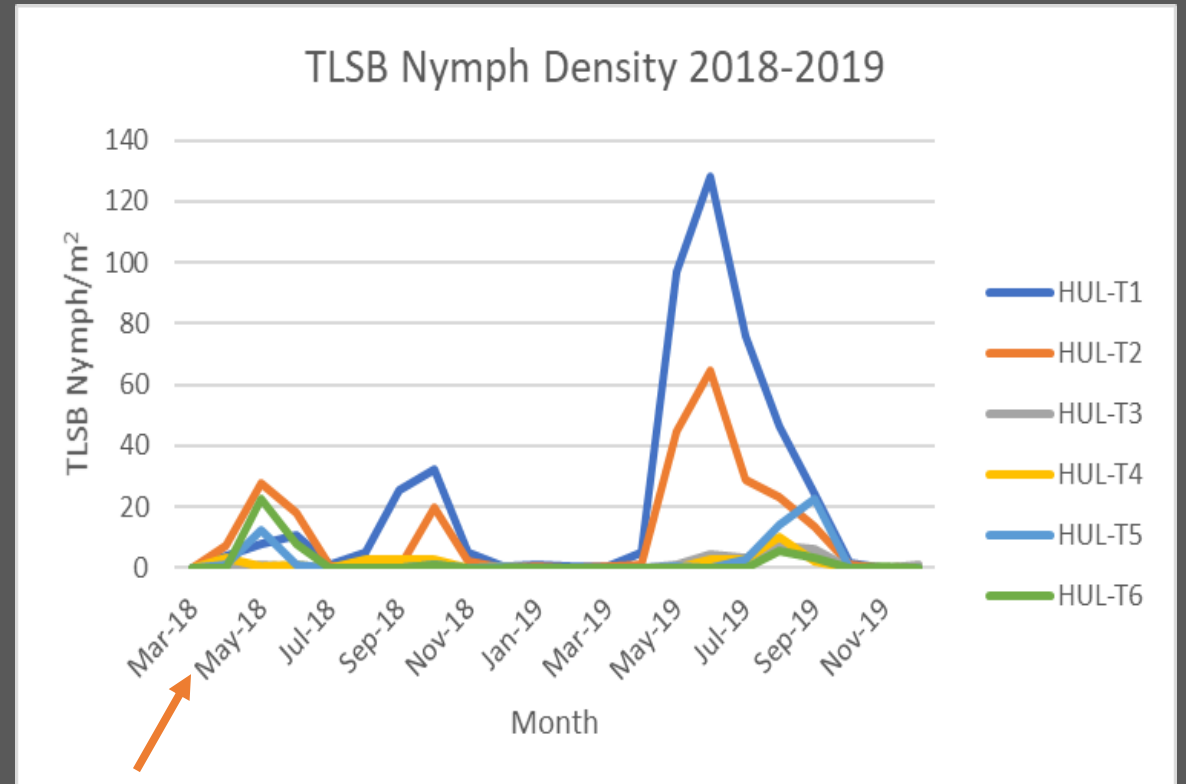


May 2018



Plant Cover:

- 85% grass (Kikuyu, pangola, Yorkshire fog)
- 10% white clover
- 5% fireweed and other plants



TLSB nymphs first detected at HUL-T1 in May



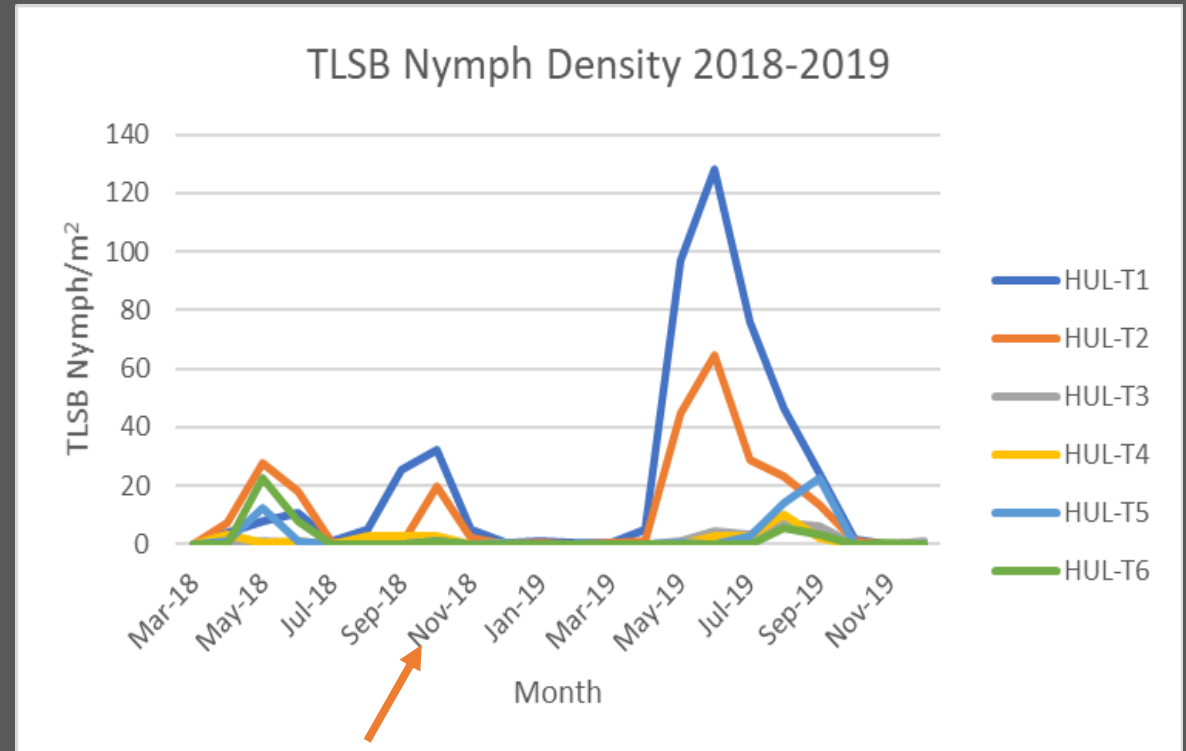


November 2018



Plant Cover:

- 80% grass (Kikuyu, pangola, Yorkshire fog)
- 10% white clover
- 10% fireweed and other plants/weeds



Between May and November TLSB nymph populations peak in June (10 nymphs/m²) and again in October (35 nymphs m²)

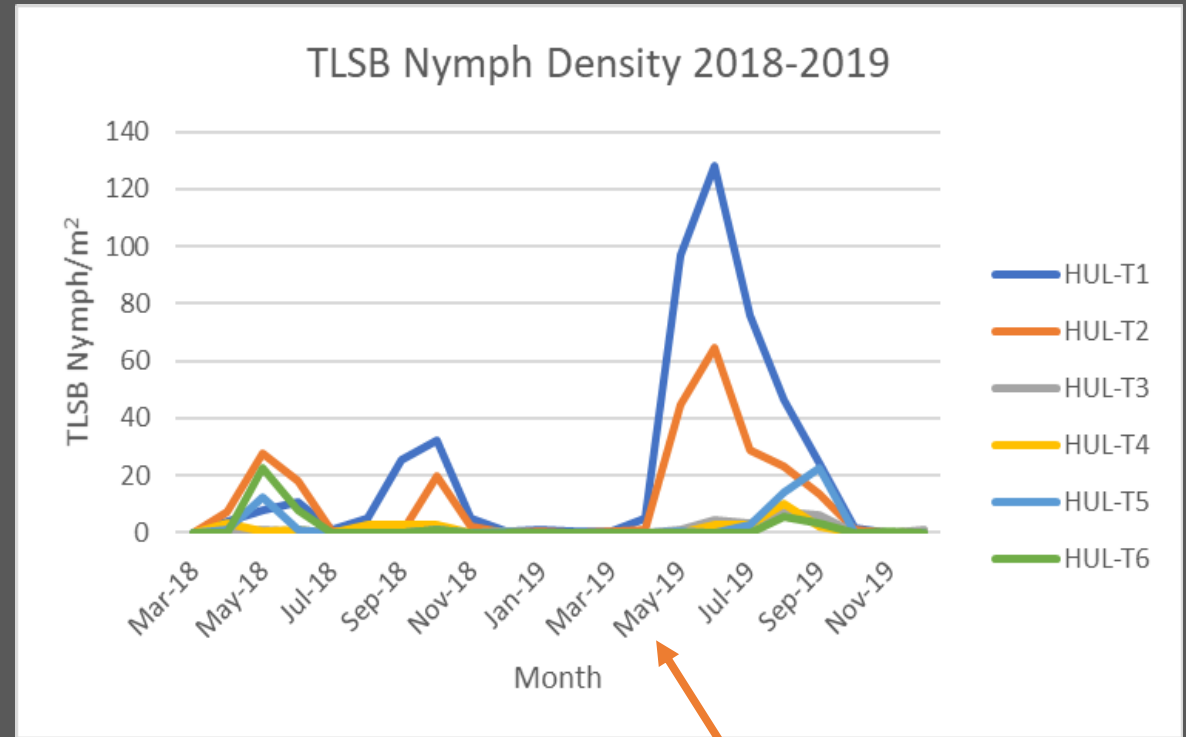




Plant Cover:

- 75% grass (Kikuyu, pangola, Yorkshire fog)
- 15% white clover
- 10% fireweed and other plants/weeds

May 2019



TLSB activity starts later in 2019 (April) than in 2018 (March). TLSB nymph density at HUL-T1 was 97 nymphs/m² in May, but would peak in June at 129 nymphs/m². Nymph densities declined to 76, 46, and 2 per m² from July to October.

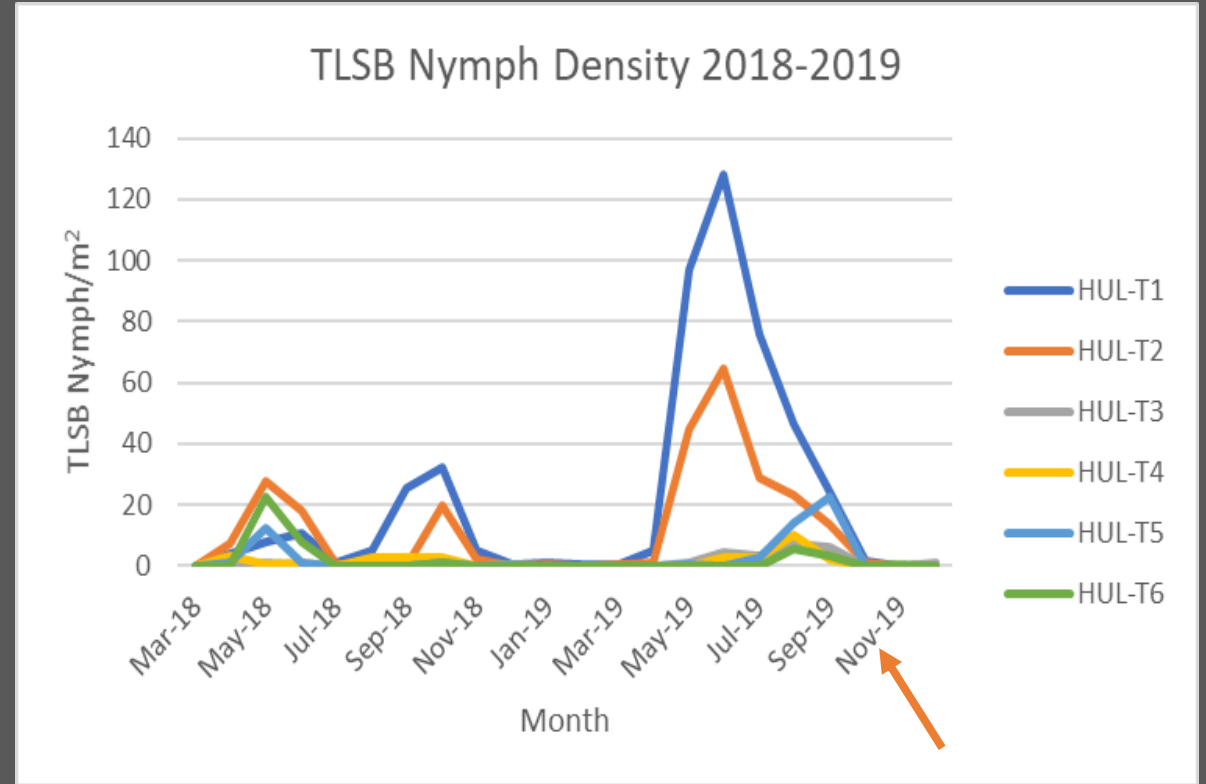




Plant Cover:

- 2% grass (fountain grass, redtop, others)
- 5% white clover
- 93% fireweed and other plants/weeds

November 2019



TLSB Nymph densities declined from 76 to 2 per m² between July and October. November TLSB activity was zero. Diapause started approximately one month later than in 2018.





November 2018

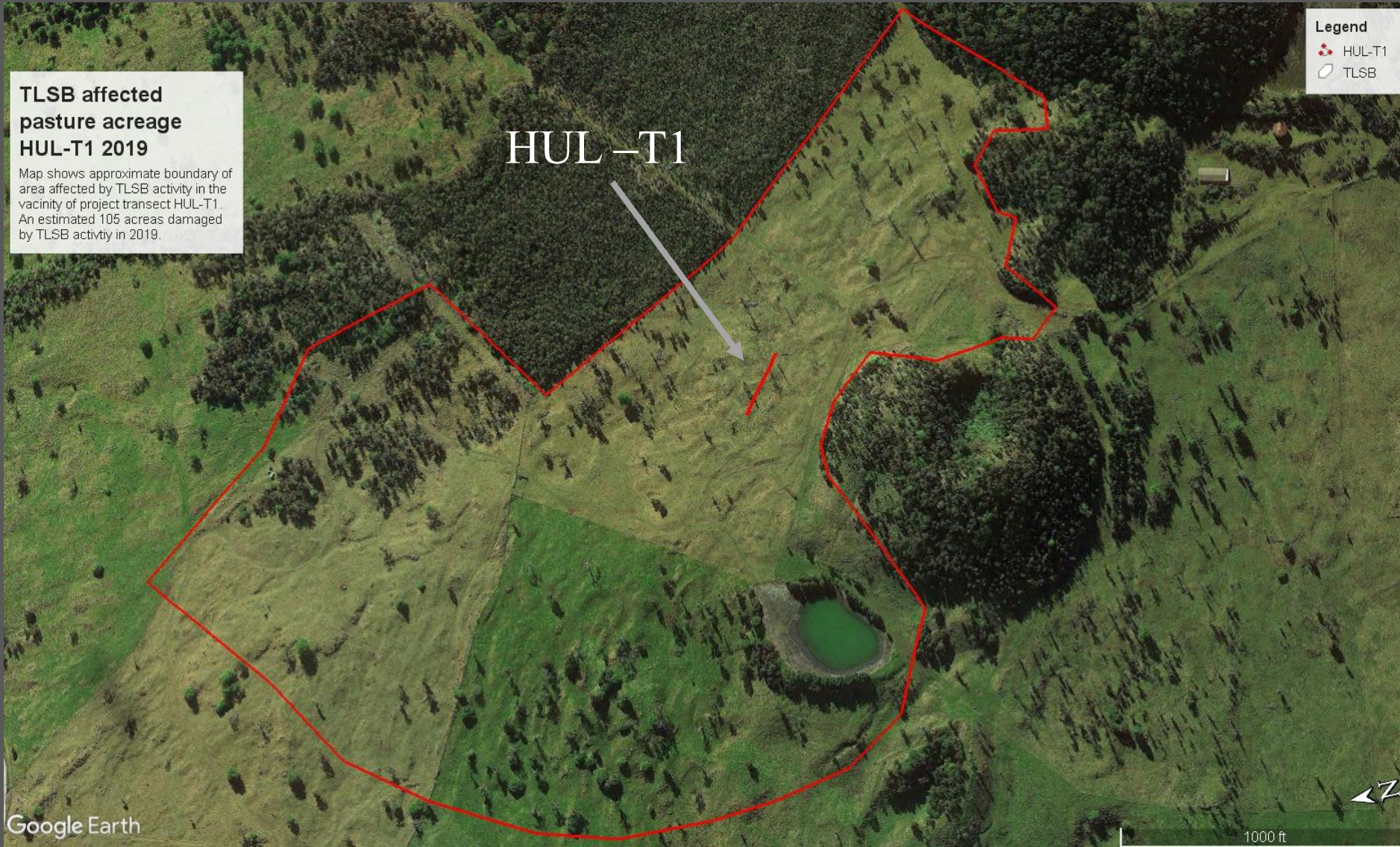


November 2019



In the space of one year, TLSB activity reduced a highly productive pasture dominated by high quality forages including Kikuyu and pangola grass and clover that made up 90% of the vegetative cover, to a fireweed dominated landscape with no forage value for livestock grazing.





Approximate boundary of pasture acreage (105) damaged by 2019 TLSB activity in the vicinity of HUL-T1. TLSB activity resulted in a 100% loss in grazable forage equating to a loss of approximately 420 AUMs of grazing for ranch (35 cow/calf pairs for one year) – annually loss \approx \$14,000 +





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What is being done?

- CTAHR and HDOA Collaboration began in 2017
- Developed a multi-year work plan
 - Estimated total cost of \$1.28 million over five years if fully funded
 - Work Plan Objectives:
 1. Rancher Awareness and Education Campaign
 2. Survey, Detection and Rapid Response
 3. Development of Integrated Pest Management Strategies
 4. Biological Control Agent Exploration
 5. Research TLSB Biology and Ecology in Hawaii
 - Funding sources
 - HDOA – 2017-2021 (\$973,000)
 - Hawaii County R&D – 2017-2019 (\$25,000)
 - Hawaii Invasive Species Council – 2017- 2018 (\$50,000)
 - USDA-NIFA Proposal (planned for FY 2021)





Two Lined Spittle Bug (*Prosapia bicincta*)

- Management Practices
 - Integrated approach utilizing several measures including pesticides, grazing management, and other strategies such as fertilization, seeding new grasses, introduction of biocontrol
 - At the present moment the only real tool available is grazing management
- Grazing Management Recommendations
 - Short duration, intense and frequently repeated grazing bouts over a 2 – 4-month period with a focus to keep the grass short (4-5-inch stubble height).
 - Followed by sufficient rest of the pasture to allow for forages to recover vigor
 - Integrated weed management practices (chemical, mechanical, biological, and cultural weed control strategies) should be implemented to reduce weed infestations of stressed pastures.
 - Graze intensely in infested areas and adjacent, non-infested areas to reduce the spread of the bug.





Two Lined Spittle Bug (*Prosapia bicincta*)

- **For homeowners**
- Reduce watering as this will help dry out the underlying soil-bed reducing the suitability of the habitat of nymph survival.
- Lawn should be kept short as this will reduce nymph and adult habitat. Reducing adult feeding sites can have significant impacts on reducing feeding damage.
- Non-restricted use pesticides can be used to spot treat observed nymph infestations or where adult activity has resulted in dead patches of grass in the lawn.





Summary:

TLNB poses a significant economic and ecological risk to Hawaii

- Threatens the sustainability of the livestock industry and the various ecosystem services derived from the states ranch lands and State Food Security
- Poses a significant ecological challenge to the management and conservation of land resources
- Large outbreaks result in a 100% loss in desirable forage grasses that:
 - provide feed for livestock
 - suppress weeds
 - prevent erosion
 - slows water runoff





Summary:

TLSB is expanding its range on the Big Island at about 35,000 acres/year

- At this rate it will cover all the important ranchlands on the Big Island within in the next ten years
- However, accidental introduction through human activity could shorten this time span
- Recommendations
 - State urgently adopt an aggressive program to combat TLSB
 - Vigorous inspection and control of the movement of plant materials within Hawaii County and between counties
 - Pesticide application/assistance program to strategically spray initial infestations.
 - Seed purchase assistance program to reseed damaged ranchlands





Thank You



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