Sampling herbivorous insects: protocol

Though a lower priority than the damage data, these data will permit us to pilot some more mechanistic questions about the distribution of herbivory (e.g. spatial aggregation of herbivores). So far, observers have been recording as much herbivore data as they can via a quick visual survey; however, this may not be feasible for all observers or systems.

For all plants, record the number of leaf mines and galls on the entire plant.
If there are too many to count individually, please estimate (for example, by counting the number present on some module of the plant (e.g. a branch) and multiply by the number of modules).

A) To sample other insects or not? *Please use these questions to decide.*

1) Are we comfortable distinguishing the following 5 groups of herbivore: *grasshoppers/crickets*; *eruciform larvae* (= 'caterpillar-like' larvae, generally moth/butterfly caterpillars, sawfly larvae, or beetle larvae - but not syrphid fly larvae); *aphids*; *leafhoppers*; *whiteflies/mealybugs/scale insects*? If no, prioritize another herbivory survey. If yes, then:
2) Are we confident that we can visually detect the herbivores on the selected plant species (consider complexity of plant structure)? If no, prioritize another herbivory survey*. If yes, then:
    - *If you have the ability to sample herbivores in another way (e.g. a beat-sheet) and feel excited about this, feel free - but be judicious of added time required to sort through a loaded beat-sheet!
3) Could we do another HerbVar survey with the time required to visually search for / collect herbivore data? If yes, prioritize another herbivory survey. If no - please collect herbivore data :-)

B) Collecting herbivore data.

1) In an effort to standardize the insect data, we have made 5 groupings to use for tallying herbivores. This is to avoid counting insects that may be predatory, rather than herbivorous (e.g. "true bugs"). Please prioritize counting herbivores into these categories.
2) If you have more intimate knowledge of herbivores on plants (e.g. can distinguish an herbivorous from predatory true bug), please add columns for these other insects.
    - Suggestions: herbivorous Hemiptera, herbivorous Coleoptera (e.g. Chrysomelid adults)

Quick-guide

Some families of insects (e.g. Hemipterans, Coleopterans) include predatory, herbivorous, and omnivorous species - and it can be challenging to tell the two groups apart. Other groups are more certain to be herbivores. Use this visual guide to identify insects from these six groups.

1) Grasshoppers / crickets / katydids

✓

✗

Praying mantis; leafhopper

2) Caterpillar-like (larval forms ONLY)

✓

Lepidopteran caterpillars; sawfly larvae; herbivorous beetle larvae

✗

Syrphid fly larva;; predatory beetle larva

3) Hoppers (leaf / tree / plant-hoppers, cicadas)

✓

✗

4) Aphids

✓

✗



5) Whiteflies, mealybugs, scale insects