ANNUAL TREE MORTALITY SURVEY_ ForestGEO-SCBI

At the SCBI large plot, a blue re-bar located in the SW corner gives the quadrat names. Locate the rebar and orientate yourself. Locate trees within quadrat. Coordinates (x, y) are given in reference to a 20x20m square.

Tree data (pre-existing data)

Codes 2013: refers to stem conditions given in 2013 (last core census): **A**: alternate pom (point of measurement), **B**: stem broken above breast height, **C**: dead above 1.3m, **F**: Incorporated into fence, **G**: ID to Genus certain, **I**: stem irregular where measured, **J**: Bent, **L**: leaning stem, **M**: multiple stems, **main**; main stem, **P**: prostrate stem, **S**: secondary stem, **V**: Vine, **X**: stem broken below 1.3 m. Dead codes: **DS**: Dead, stem standing, **DC**: Dead, stem fallen, **DT**: Only tag found, **DN**: No plant nor tag found.

DBH (mm): Diameter at breast height in millimeters. Given for all trees as last core census.

Live status in previous mortality census: A (Alive), DS, DC, DN, and PD. PD: "previously dead": tree found dead during a previous census. If the tree is found alive, change status and write in comments. If DN, try to relocate the tree again and indicate the FAD.

New status: use A, AU, DC, DS. There shouldn't be a DN; you need to find all trees in the list. AU is used for trees that are alive but noticeably unhealthy (e.g. fallen and uprooted but not yet dead).

PROCEDURE

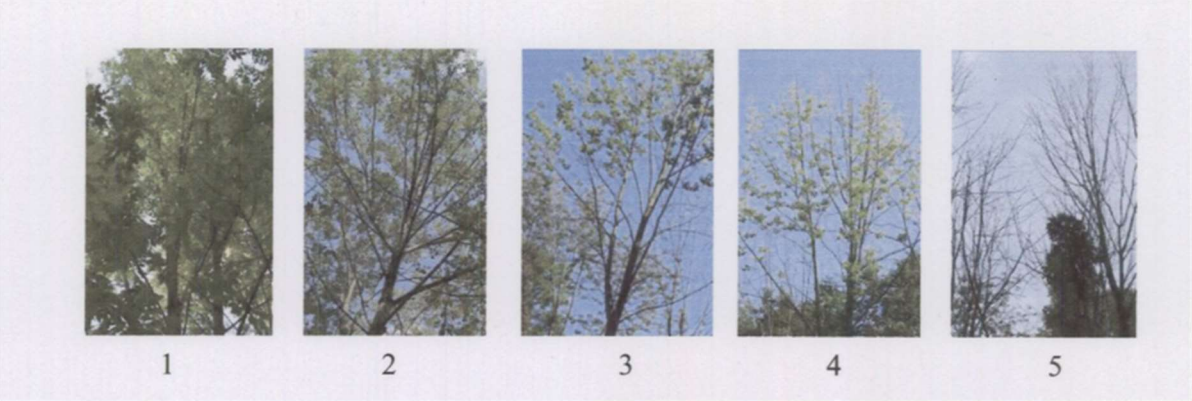
1. Locate all stems on datasheet and classify as "A", "AU", "DC", or "DS".
2. If the status is "AU", record FADs in order of importance.
3. If a stem is dead:
    - **Pictures:** Take a picture of every dead tree found. Take tag picture first then make 2-3 pics of main FADS. Make close-ups if any insect or insect galleries are found.
    - Measure **DBH** (mm). If stem has fallen, measure it later using the big caliper.
    - Take 1 **core**, aiming to hit the center: only at breast height and for the following species: ceca, amar, cofl, ploc, prav, rops, saal, and all Quercus. Save these in straws for future analyses. Label each straw with tag #, species, and date.
    - Record **Percentage of crown** still intact:
      1 = only 0-25% of the crown is intact (almost gone)
      2 = 26-50% of the crown is intact
      3 = 51-75% of the crown is intact
      4 = 76-100% of the crown is intact (none or few branches lost)
    - Record **Crown Position:**
      Dominant (**D**): Crown extends above the general level of the canopy receiving full sunlight.
      Codominant (**CD**): Crown forms main level of canopy, tree receives full sunlight from above.
      Intermediate (**I**): Shorter trees with smaller crowns, receive little light from above and none from sides.
      Suppressed (**S**): Crown below canopy, small crown receives no direct light.
      Open grown (**OG**): Crown on open areas of the stand.
    - **Liana load.**
      0 = lianas absent
      1 = up to 25% of the tree crown covered by lianas
      2 = 26–50% liana cover
      3 = 51–75% liana cover
      4 = 76–100% liana cover.
    - Record **FAD** (Factors associated with death) in order of importance.

To scrutinize the FAD's look at "*Guide to Identify Tree Diseases at the SCBI-CTFS Forest-GEO Plot*".

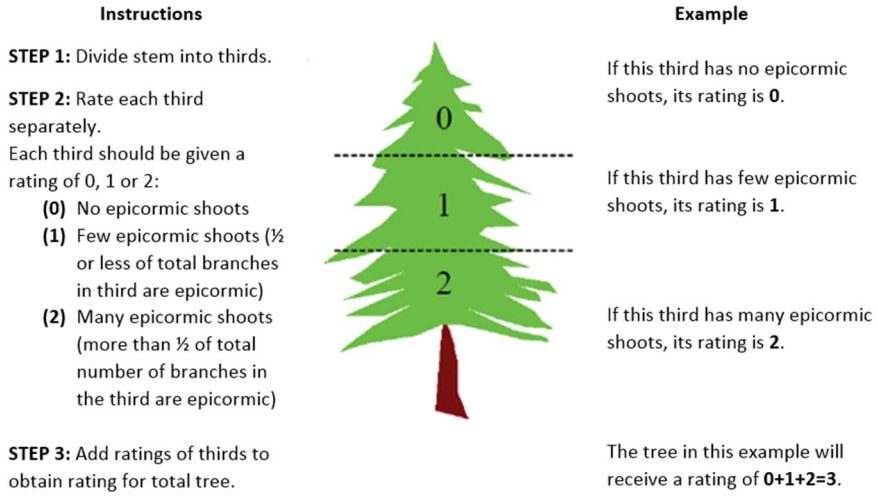
FAD Categories:	*Biological agents*
U= Unable to determine cause of death	**AN**= Animal damage (specify animal if possible)
	BB=Bark beetles present, beetle galleries.
Mechanical damage	**I=** Insect infection (e.g. EAB, other)
	DF= Complete defoliation / Smith/Flower 2013 rating for AU
B= Broken stem (note cause, indicate level on tree)	**F**= Fungi visible (give names if known)
CR= Crushed by other tree or tree parts	**K**= Canker or swelling present (cause by fungi)
UP= Uprooted tree (root bole exposed)	**LF**= Leaf damage (look for leaf spots, blotch, etc.)
S= Slope failure (evident landslide even if small)	**R**= Rotting stem.
L= Lightning (tree splitting, straight scars from above)	**R1**= Root damage
Fi= Fire (stem charred, fire scars on bark)	**R2**= Armillaria root disease

4. For *Fraxinus* species and trees code chvi: All trees ≥1 cm will be visited during a mortality survey.
   - Record **crown position** (D, CD, I, S or OG. see above)
   - Estimate **crown thinning** via visual assessment per Smith/Flower 2013:

     1 = healthy tree with no symptoms of decline, no defoliation
     2 = slight reduction in leaf density (thinning), yet all top branches exposed to sunlight have leaves
     3 = thinning canopy and some top branches exposed to sunlight are defoliated (<50% dieback)
     4 = >50% defoliation/dieback
     5 = Dead tree with no leaves in canopy (excluding epicormic sprouting)



   - **Epicormic shoots**: Use the 6-class dwarf mistletoe rating system (Hawksworth 1977) to evaluate epicormic growth



- Record **EABF** (EAB Factors)
  VB = Vertical bark splitting
  SS = Stump sprouts
  AS = Ash snap of the branches/limbs
  W = Bark blonding from woodpecker predation. In comment section, write percentage estimate.
  DE = D-shaped exit hole presence
    a. Count visible D-shaped exit holes around the circumference of the tree in an area about half of a meter long at breast height and record this for every ash tree.