All you ever wanted to know about Forest Tent Caterpillars and much more…

Naja Kraus
NYSDEC
Division of Lands & Forests
Forest Health & Protection

Range

- Forest Tent Caterpillar (*Malacosoma disstria* Hübner) is a native insect
- Found in hardwood forests throughout North America
- Abundant in eastern North America

M. disstria

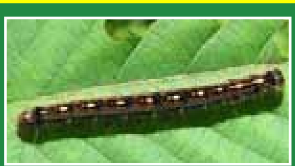
Host trees

(preferred food)

- Hosts vary by region
- In NY- sugar maple, aspen, cherry, apple, oaks, birch, ash, alder, elm, basswood…
- Not hosts- red maple, sycamore & conifers
- Canada & Western U.S. - trembling aspen
- Southern U.S.- water tupelo

Life History

- One generation per year
- Larvae do not construct “tents”

Life stage		Length of time per individual	Time of year
Larva (Caterpillar)		~ 5-6 weeks	Early spring – June
Pupa (Cocoon)		~ 3 weeks	June
Adult (Moth)		~ 5 days	July
Egg (Egg mass)		~ 10 months	July - early spring

Forest tent caterpillar life cycle

Larvae

Larvae emerge in spring!

Pupae

Pupate in protected area

Adults

Spend less than 1 week as a moth

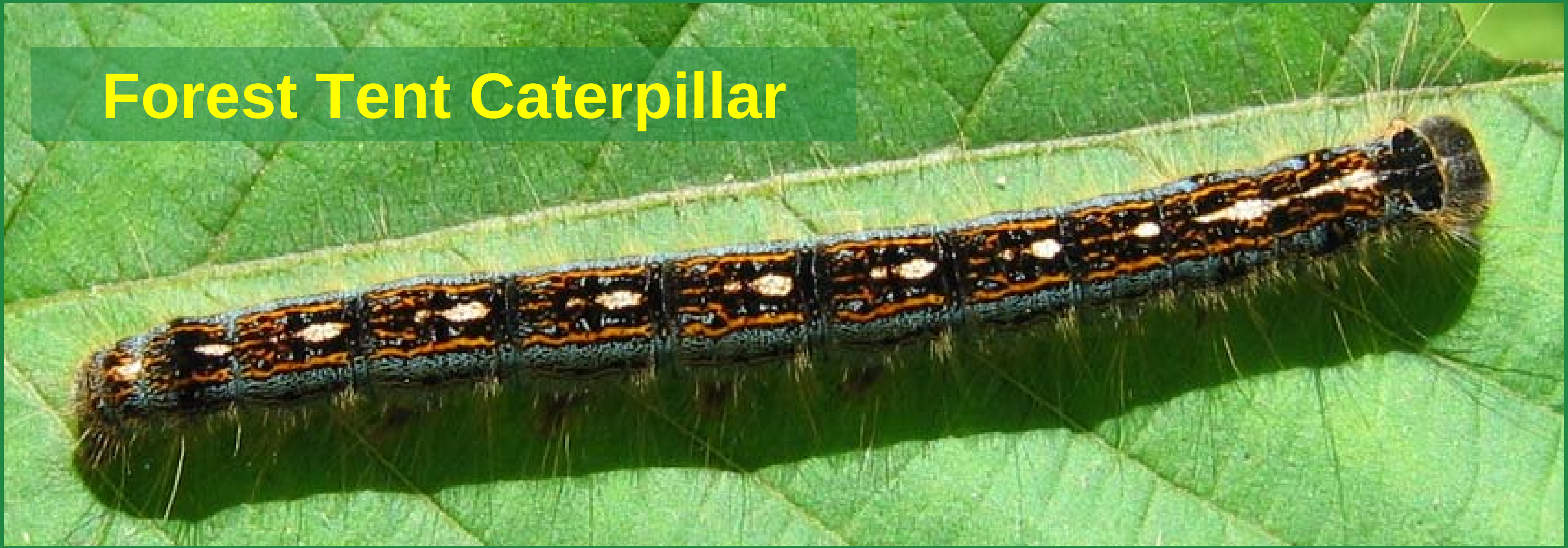
Eggs

Overwinter in this stage

Larvae congregate in “clumps” not “tents”

Forest tent caterpillar

Eastern tent caterpillar


Forest Tent Caterpillar


Eastern Tent Caterpillar

Larvae

- Hatch near time of bud break
- Feed through May & June for 5-6 weeks
  - 1st feed on growing flower & leaf buds in host tree crown
  - Next feed on foliage, usually one branch at a time
- Fifth instars responsible for most of the defoliation
- Gregarious in early instars
  - use silk to form a trail, rest & molt on silken mats
- FTC only tent caterpillars to use nomadic foraging strategy – often move to new & distant locations

Pupae (Cocoon)

- Larvae pupate in June
- Solitary cocoons of pale yellow silk
- Pupate in folded leaves or protected areas
- 24 hours for caterpillar to construct cocoon
- Adults emerge ~3 weeks later

Adults (Moth)

- Moths emerge in July
- Live ~5 days, adult stage lasts ~2 weeks
- Mate, locate hosts & lay eggs
- Females secrete pheromone within ½ hour of emergence
- Males use odor and visual cues to find females
- All eggs oviposited in one batch
  - Size of egg mass correlated with size of female
- Strongly attracted to light

Eggs


Old egg mass


New egg mass

- ~ ½ inch long for healthy egg mass
- ~ 150 eggs per egg mass
- Covered with spumaline
- Deposited on small twigs <8mm (avg. 5-8mm) of host trees (sugar maple, aspen, oak, cherry…)
- Most deposited in upper ⅓ or ¼ of tree crown
- Embryos develop within 3 weeks to fully formed pharate larvae & overwinter in this stage

NEW
egg
mass

dark
brown
& shiny

OLD
egg
mass

lighter,
almost
whitish
& dull

Outbreaks in NY

- Tend to occur at 10 year intervals (varying severity)
- Outbreaks typically last 3 years
  - may last between 2-9 years
- Heavy defoliation rarely occurs more than 2 years at a given site
- Prior Outbreaks: 1887, 1896-1901, 1923-1924, 1935-1940, 1951-1955, 1980-1982, 1991-1993

Effects of Defoliation

- Light defoliation (<30%) has little effect on tree health
- Moderate defoliation (31-50%) causes loss of foliage, caterpillars may be a nuisance, little mortality expected
- Heavy defoliation (>50%) may cause tree mortality to hemlock, pine and spruce. Deciduous trees can usually withstand one year of heavy defoliation.

Defoliation & Mortality?

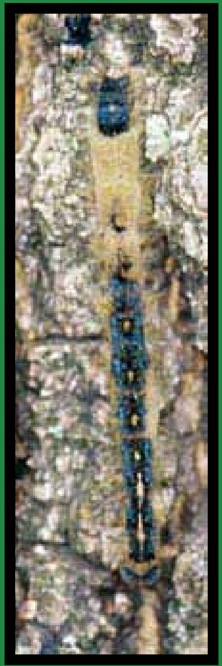
- Repeated defoliation can result in twig & branch dieback and occasional tree mortality
- FTC does not typically cause mortality to host trees
- Mortality can occur when concurrent with other disturbances
  - drought
  - shallow soils
  - late season defoliation…

Additional Effects of Defoliation

- Trees defoliated early in the season often flush a new, smaller set of leaves in July (this uses stored food reserves)
- Defoliated trees often have decreased wood production and food storage
- In sugar maples, sap flow & sugar content may decrease in the year following defoliation
- Stressed trees often emit pheromones that attract more pests (i.e borers, bark beetles)

Natural Factors Contributing to Outbreak Collapse

- Low spring temperatures
- Adverse weather conditions
- Starvation of larva
- Disease/Pathogens
  - Nuclear Polyhedrosis Virus (NPV)
  - *Entomopthera* fungi
- Pupal parasitoids
  - Sarcophagid flies



Management/Control Options

- Do nothing as trees usually survive defoliation

- Option for large areas with expected heavy defoliation or repeat defoliation
  - Aerial spraying of *Bacillus thurengiensis (B.t.)* during mid-May to early June depending on weather conditions & time of hatch

- Options for small areas or individual trees
  - Place barriers on trees
  - Remove egg masses before they hatch
  - Remove larvae when congregated
  - Apply *B.t.* to weakened trees