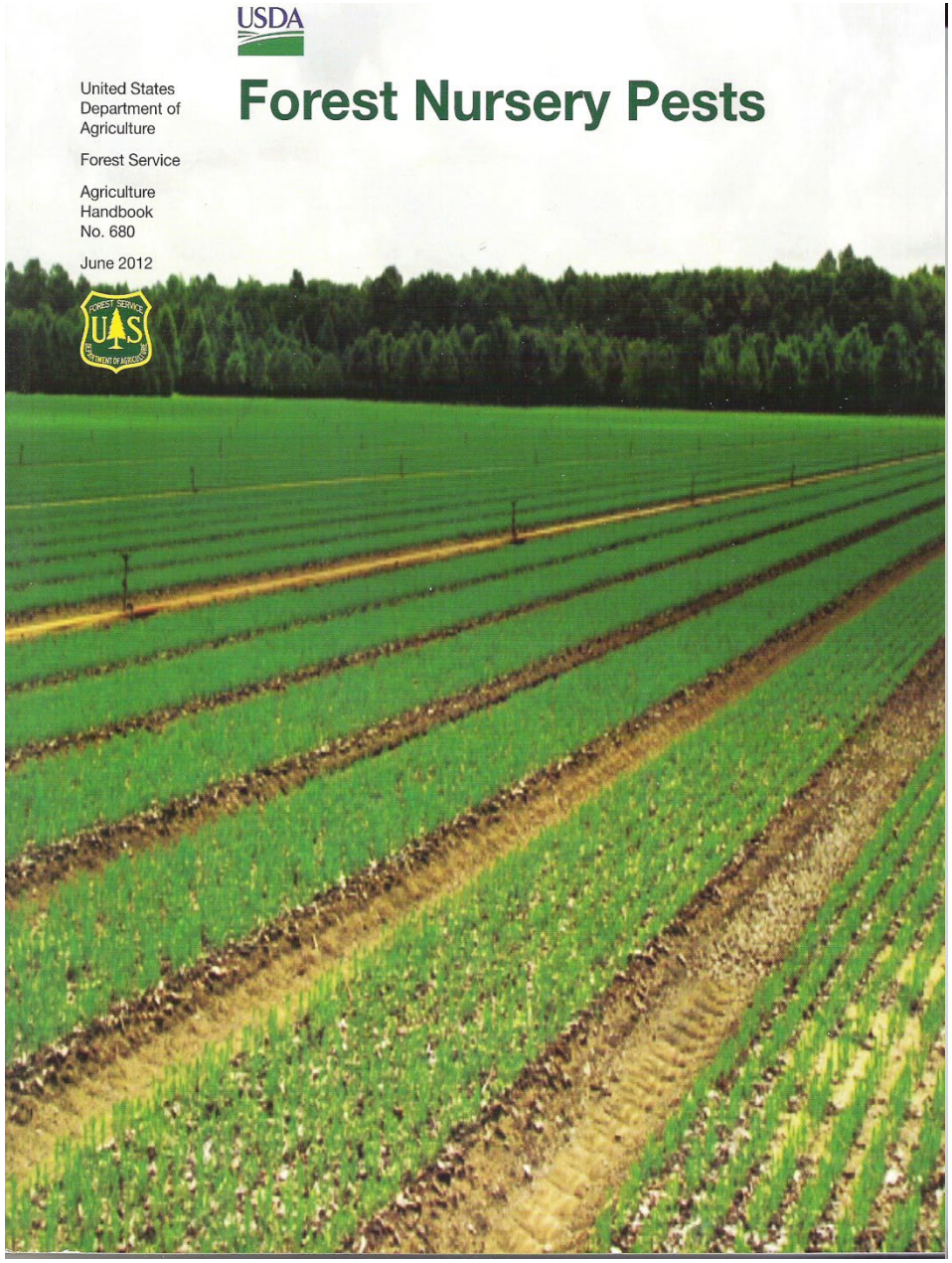


Reference

Forest Nursery Pests

USDA Forest Service Ag Handbook 680

Nursery Insect Pests

- Leaf/foliage feeders or sap suckers
- Damage seedlings by feeding on roots, stem, shoot and buds
- Causes seedling mortality, reduces seedling grade, culls

Major Nursery Insect Pests

Tarnish Plant Bug
Lygus linecolaris

- Attacks a wide variety of economically important herbaceous plants, vegetable crops, commercial flower plants, fruit trees, and nursery stock.

- Lygus bugs occur in all Canadian provinces, the continental United States and most of Mexico.

- Approximately 50% of loblolly pine seedlings in one southern forest nursery was damaged by Lygus bugs (South 1986)

Tarnish Plant Bug – Lygus Bug

Tarnish Plant Bug

- The insects over winters as adults in dead weeds, leaf litter, under tree bark, nursery margins, ditch banks, and road rights-of-way.

- Insects become active in early spring and feed on newly developing buds and shoots. Most nursery damage occurs from mid-April to late June.

- Oviposition is restricted to composite host plants (non-conifers) where eggs are deposited at the base of the leaf blade.

Tarnish Plant Bug

- After 7-10 days, yellowish-green nymphs emerge and begin feeding. The life cycle is completed in three to four weeks.
- There are two to three generations per year.
- At least 385 host plants have been recorded for *Lygus with most* in the Rosidae and Asteridae families.
- The insect also attacks pine seedlings which are severely damaged.

Tarnish Plant Bug

- Adults and nymphs of *Lygus* feed by sucking plant juices and inject into the plant a watery saliva to aid in the breakdown of plant tissues.

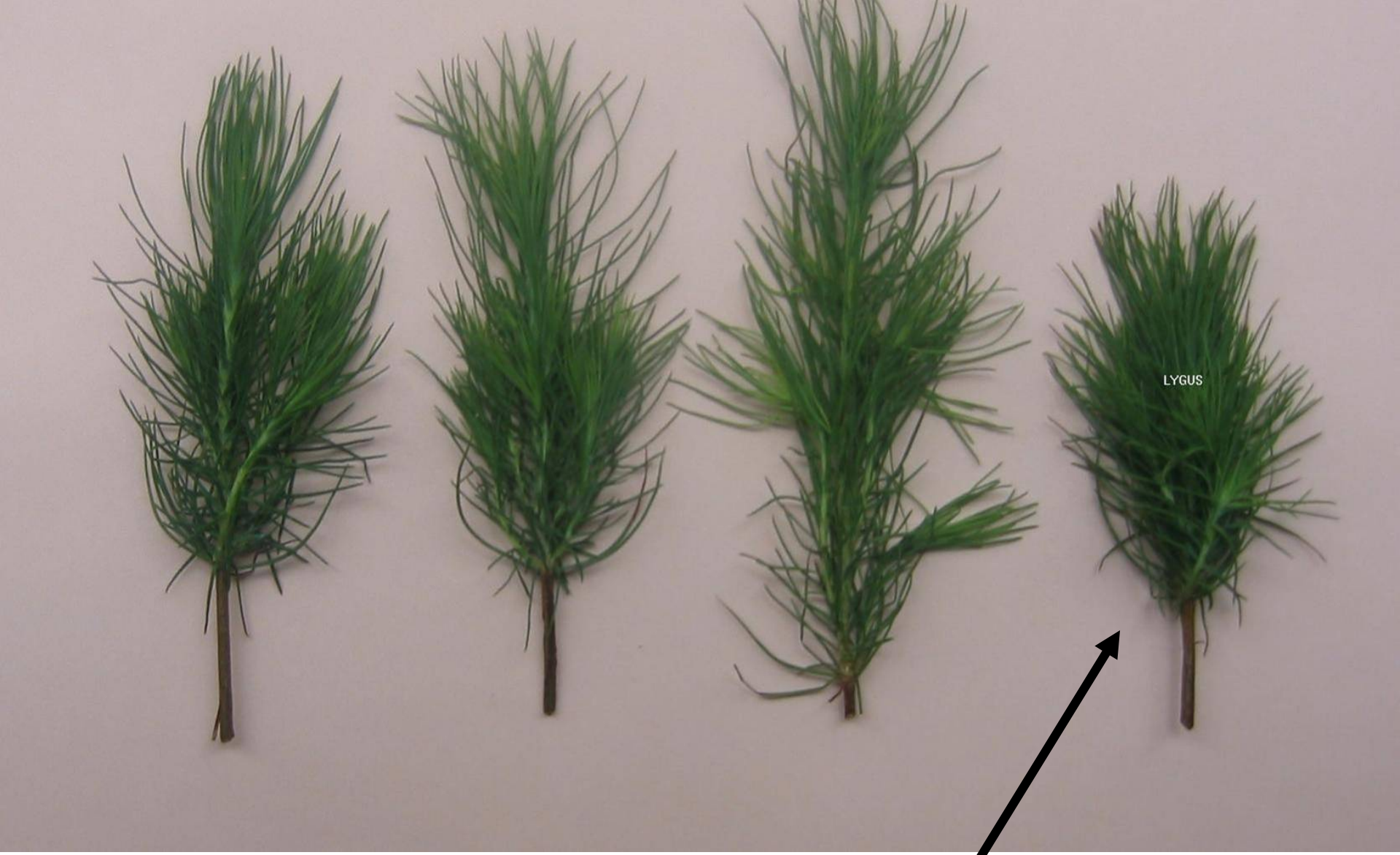
- The feeding causes terminal growth to be distorted thereby reducing plant growth. Damaged by *Lygus* feeding has been called "crazy cotton", "stop-back", "bush- head", "bushy-top."

- Symptoms appear within a few weeks after feeding and apical dominance is lost and weak multiple leaders appear.

Tarnish Plant Bug

- In conifer seedlings, terminal needles are thicker and shorter and the tip is often curled
- The removal of preferred host plants from edges of nurseries and overwintering sites will help to reduce the damages caused by *Lygus*.
- Weed hosts include butterweed, fleabane, goldenrod, vetch, dock, and dog fennel.
- Several insecticides (ai = permethrin) are available to control populations of *Lygus.*

Insecticide treated bed **Non-treated bed**



“Bushy-Top” symptoms of Lygus bug feeding damage

Major Nursery Insect Pests

Lesser Cornstalk Borer
Elasmopalgus lignosellus

- Found throughout the southern US
- Larva feed upon the seedling stem; mortality, secondary pathogens enter

Lesser Cornstalk Borer

- Look for wounds just below to just above the ground level.
- Bark may be completely or partially removed.
- Partially girdled seedlings may have a gall/swelling on stem.
- Seedlings turn chlorotic, orange, and die; remain standing upright or tip over.

Lesser Cornstalk Borer

- Larva less than an inch in length.
- Pale green with brown bands/stripes.
- May produce silk tunnels in soil.
- Wriggle furiously when handled.
- Rare to find the larva.
- Adult moths, more commonly observed.
- Moth-like in color, fly erratically above seedlings, about an inch in length.

Lesser cornstalk borer larva

Lesser cornstalk borer adult

Lesser Cornstalk Borer

- Insect has 2-4 generations per year.
- Late summer, all life stages are present.
- Adult moths emerge from the soil in late spring, mate and female deposits eggs at base of seedlings.
- Eggs hatch within 7 days and larva feed on lower stem, or subterranean roots.
- Larva feed 3 wks, pupate in soil, emerge, mate lay eggs.
- Over winter as both larva and pupae in soil.

Lesser Cornstalk Borer

- Cover crops, sandy soils and drought favor LCB activity.
- Insect prefers corn, but it also feeds on beans, cowpeas, crabgrass, Johnson grass, peas, peanuts, sorghum, soybeans, and wheat.
- Cultivation promotes, rather than retards, injury by insect. Damage is less under no-tillage cropping systems which is attributed to increased soil moisture and the presence of decaying organic matter.
- Insecticides available to use against LCB; chlorpyrifos

Regeneration Weevils

Pales weevil
(*Hylobius pales*)

Pitch eating weevil
(*Pachylobius picivorus*)

Pales Weevil - Found throughout S.E.

Weevil Biology

- Adults attracted to fresh resin odor and they invade recently cut over areas and eggs laid in pine stump roots.
- Eggs hatch in 5-10 days and the larvae feed on inner bark of dead roots - not a problem.
- Weevils pupate in chip cocoons and adults fly to new seedlings feed on tender bark of pine branches.
- Newly planted seedlings = girdle stem and kill
- 2 generations/yr but adults present year round in south.

Pales Weevil Damage

Pales Weevil Damage

Why is timing important?

- Weevils attracted to cut timber areas & lay eggs at base of stumps. They reproduce in large numbers.
- Immediate replanting means you are putting the seedlings (500/acre) into a “sea” of weevils.
- Waiting one year allows the insects time to disperse from the area.

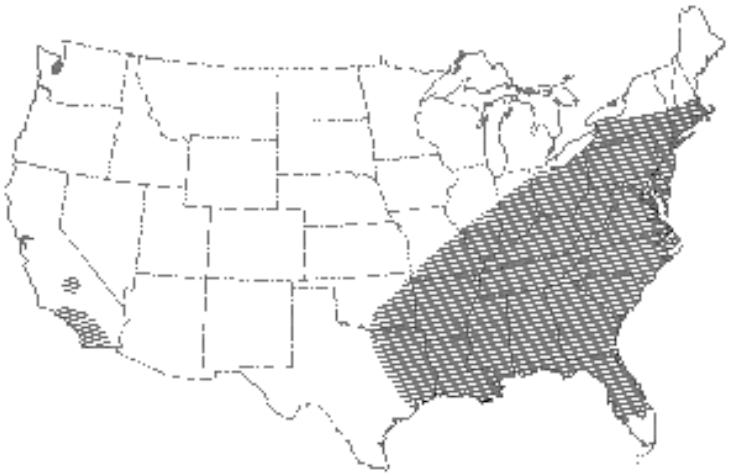
Weevil Management

- Cultural - alter replanting times, typically 9-15 months after harvesting.

- Chemical - Insecticides (Pounce - permethrin)
  - Prior to lifting
  - At time of packing
  - In the field (spot)
  - PTM treatments in nursery or field(fiprinol)

Pine Tip Moth

- Most damaging to pine plantations and to wild pine seedlings in open areas.
- In the South and Southeast, the favored hosts are loblolly and shortleaf pine. Pitch, Virginia



Pine Tip Moth

- Pine tip moth injures the growing shoots of young pines.
- The larva bores into and feeds on inner tissues of the buds and shoots.
- Such feeding severs the conductive tissue and causes death of the shoot
- Shoot injury occurs primarily in the first 5 years and decreases as the tree reaches about 10 feet (3 m) in height and the crown closes.

Pine Tip Moth

- Insect overwinters as a pupa within damaged shoots of the host trees.
- On warm days, as early as February in the South, adult moths emerge, mate, and lay eggs on the current season's shoots and conelets (orchard problem).
- Eggs may take as long as 30 days to hatch if cool weather follows egg laying in the spring; later in the summer, eggs hatch in only 5 to 10 days.
- Newly hatched larvae feed on the surface of new growth and cause shallow injuries, or they may bore into the needle fascicles.
- Later the larvae move to the shoot tips (destroys cones).

Minor Nursery Insect Pests

- White Grubs
  - *Phyllophaga* spp.

- 100 different species and other genera of white grubs include: *Diplotaxis, Dichelonyx, Serica, & Cotalpa*

White Grubs: Symptoms

- Seedling foliage turns brown, seedling roots cut off, 3-5 mm gouges in larger roots, tap root severed, smaller roots missing.
- Appears in newly established nurseries, 2-3 yr post fumigation and in outplanting areas with sod.
- Found throughout eastern United States

White Grubs: Identification

- Grubs always “C” shaped
- Found in soil near roots
- Roots appear sparse or have chewed upon look

White Grubs: Identification

- Adults large brown or black beetles
- May beetles, June bugs, Green June Beetles, Japanese beetles

White Grubs: Life Cycle

- Adults strongly attracted to lights & often found in pools of water.
- Nocturnal feeders on hardwoods, especially oaks and can defoliate stands of oaks.

White Grubs: Life Cycle

3-yr, sometimes only 2-yr in southern US

- Eggs laid in summer in soil near seedlings
- Larvae feed on roots until fall, then burrow deep in soil, hibernate in the soil.
- Spring, move back up to feed on roots.
- Cycle repeated two more years,
- Larvae grow bigger each year, cause increasing damage.

White Grubs: Life Cycle

- Larvae complete growth third spring.
- Pupate in soil for a few weeks.
- Adults emerge from pupal case but remain in soil until next spring.
- Fly to oaks, feed, mate, return to seedlings to lay eggs for next generation of white grubs.

White Grubs: Damage

- Very injurious to seedlings.
- Damage worst within a few 100 yards of *Quercus* sp.
- Adults do not fly far from food to lay eggs.
- 1 larva/sq. ft. causes serious damage.

White Grubs: Damage

- After fumigation (or seedling establishment) damage is minimal first year.
- Becomes more serious 2nd year.
- Very severe third year as larvae grow larger and eat more each year.
- Normally beds must be treated every 3 yr.

White Grubs: Management

Keep adult food plants such as *Quercus sp* away from Nursery. Beetles are lazy and poor fliers.

Insecticides

- Fumigate beds with MBr/Chl before sowing
- Granular and soil drench insecticides effective
- Dipping of seedlings in insecticide reduces damage after outplanting - high risk sites such as agricultural fields.

White Grubs: Management

- Fumigate every 3-4 yrs
- Spot treat with Discus
  - (Imidacloprid + Cyfluthrin)

Mole Cricket

Mole Cricket

- Southern pest, virtually all of Florida, the southern half of Alabama.
- Not a problem in cold nursery climates.
- Mole cricket inactive until soil reaches 60 F.
- Feed at night, in upper 1 inch of soil.

Mole Cricket: Damage
-Two Types-

Southern Mole Cricket: Tunneling disrupts roots, uproots seedlings, but does not feed on roots

Tawney Mole Cricket: Feeds on roots, damage can be serious. Common in Florida, rarer as move north.

Mole cricket damage in nursery bed

Mole Cricket: Biology

- Adults over-winter in deep soil burrows.
- Move up in soil profile when temperatures are right & feed.
- Adults lay eggs in soil chambers that hatch in June.
- Pupate in soil for a few weeks.
- Two peaks of feeding activity.
- First in March/April when overwintering adults begin feeding.
- Second in Sept/Oct when the new generation of nymphs feed and the adults continue to feed.
- Second peak most damaging.
- There is only one generation per year.

Mole Cricket: Management

Insecticides

- 1st peak of activity- Control optional due to low numbers. Usually when it is observed.
- 2nd Peak – Use Orthene, Dursban (chlorpyrifos products)
- Biological control. Parasitic wasps and nematodes available

Cutworms

Several species of Noctuidae

- Distributed all over U.S. with the most damaging in Lake States and south.
- High populations can destroy 1000s of seedlings in a few weeks.
- Damage symptoms include cut off needles and seedlings clipped at soil level.
- Chemical sprays and fumigation are effective chlorpyrifos, Asana, Discus

Figure 49-1—Cutworm damage on young conifer seedlings. Note clipped needles.

Figure 49-2—Dingy cutworm larva (left) and pupa.

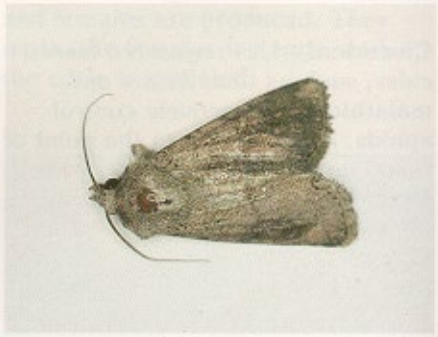


Figure 49-3—Dingy cutworm adult.

Summary for Insecticides

- The use of Asana® as the primary tool against Lygus is a good choice.
- The use of chlorpyrifos as the primary tool against Lesser corn stalk borer is ok but this is a poor choice for Lygus.
- Permethrin prior to lifting for Pale Weevil.
- Use Discus® for white grubs, cut worms and mole crickets.

Nursery Insects

"I wouldn't do that, bartender. ... Unless, of course, you think you're fast enough."