

NAME _____
CLUB _____

4-H 249

THE FLORIDA 4H

FOREST ECOLOGY PROGRAM

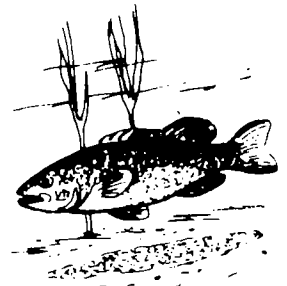
UNIT 4. COMMON FOREST INSECTS AND DISEASES



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The Florida 4-H
Forest Ecology Project
Member's Manual
Unit #4

COMMON FLORIDA FOREST
INSECTS AND DISEASES

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Why study forest insects and diseases?

Let's review for just a moment the other units of the 4-H Forest Ecology Series.

Unit #1 was Introduction to Forest Ecology. Here we learned that ecology is simply nature study, the study of living things and their environment. We learned of producers (green plants), consumers (animals), and decomposers (mostly non-green plants that must break down organic matter to obtain their food). Decay organisms are another name for these.

Most forest diseases are decay organisms or decomposers. They do great damage to single yard trees and to whole forests. We should know the common ones of Florida if only to know what our favorite shade tree is suffering from.

Unit #2, Common Plants of Florida, gave us basic information on native trees, shrubs, vines, flowers, and grasses we pass every day but don't know the names of. In this unit we'll discuss only insects and diseases of common forest and shade trees.

Unit #3 was about Common Forest Wildlife, mostly larger animals. But our 15,000 native insects are also animals, and forest insects destroy great quantities of valuable timber and shade trees each year. Perhaps if you learn them you can save a tree that belongs to you!

What to do -- step by step

1. Read over this manual.
2. Learn the common insects and diseases of trees in Florida.
3. Try to locate as many as possible and make a collection of your own or for your club.
4. Collect a specimen of a forest insect or disease and give a talk on it at a 4-H meeting.
5. If you are interested, study for and enter the State 4-H Forest Ecology Contest held at Perry, Florida, during the annual Florida Forest Festival. (See the unit on rules and information for details.)
6. Complete the questions in the records section.
7. Move on to Unit #5, Florida Forest Ecosystems.

FOREST INSECTS AND DISEASES

Forest insects and diseases are a major part of the ecology of any forest. The cycle of weakened trees being attacked, dying, falling down and decaying, or being salvaged for wood products is a never ending one.

Before studying this portion of the Forest Ecology Contest, obtain a copy of State Department of Agriculture Bulletin No. 196, Insects, Diseases, and other Problems of Florida's Trees.

This excellent publication gives information together with colored pictures of all common forest insects and diseases. Obtain actual specimens for study where possible.

The specimens to be identified at the Florida 4-H Forest Ecology Contest will be taken from those listed below.

Forest Insects

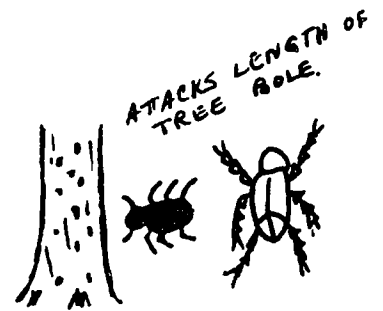
Pine Engraver Beetles (Ips spp.)

Host - all pines

Damage - trees killed by girdling of beetles and larvae.

Habits and life history - Insect very common. Beetles active year around in warm weather. Beetles and larvae tunnel between bark and wood. Overwinter as larvae, pupae, and adults in inner bark.

Means of recognizing injury and insect - Few trees in scattered areas affected. Crowns turn yellow green to brown. Pitch tubes along trunk. Beetle tunnels straight or star-shaped. Beetles black or brown, length varies from 1/8" for small species to 1/4" for large species; end of body is scooped out, rough.



Turpentine Beetles (Black sp., *Dendroctonus terebrans*, Oliv.) (Red sp., *D. valens*, Lec.)

Host - pine and spruce

Damage - trees are injured at base by adults and larvae and often death follows.

Habits and life history - Common in fresh stumps. Attack injured trees. May kill large healthy trees if beetles are numerous. Adults and larvae tunnel out large patches between bark and wood.

Means of recognizing injury and insect - Large tubes and pitch masses at base of trees. Crowns of dying trees turn yellow green to brown. Common species black; other reddish brown. About 1/4" long.



Ambrosia Beetles (Several general sp. as Platypus sp., Xyleborus sp.)

Host - hardwoods

Damage - pin-holes and stain in green logs and lumber. Holes in over-mature lining trees.

Habits and life history - Beetles most active in summer and early fall. Beetles bore into wood of trees or green logs and lumber; deposit eggs in tunnels. Larvae do little boring.

Means of recognizing injury and insect - Tubular columns and piles of white grass. Beetles 1/8" to 1/4" long. Holes 1/32" to 1/16" in diameter.

BORING DUST AT
BASE OF DYING
TREES



Twig Girdler (Oncideres cingulata)

Host - many trees, but mostly hickory, pecan, persimmon

Damage - Twigs cut off. Usually don't kill trees.

Habits and life history - Adult female lays eggs in trees in twigs and branches. Then she girdles the twig so it falls. Larvae hatch and feed on thin twig bark.



TWIGS GNAWED
OFF AND FALL
TO GROUND

Pales Weevil (Hylobius pales, Hbst.)

Pitch-eating Weevil (Pachylobius picivorus, Germar)

Host - all pines

Damage - Stripping of bark from stem of young saplings by beetles. Seedlings killed.

Habits and life history - Beetles hibernate beneath litter. Are active March to October; cause heaviest damage May - July.

Attracted to cutting areas, burned timber, etc. Breed in stumps, roots, and logs.

Means of recognizing injury and insect - Snout beetles dark brown to black; about 1/4" to 1/2" long. Larvae white, legless, 1/2" long.



Pine Webworm (Tetralopha robustella, Zell.)

Host - pine

Damage - Feeding on buds and young needles of seedlings; growth stunted.

Habits and life history - Caterpillar lives within masses of webbing and frass at terminals and pupate there or in the soil.

Means of recognizing injury and insect - Mass of webbing and frass at terminal shoot contain the caterpillar which is about 1" long and brownish. Adult is small moth.



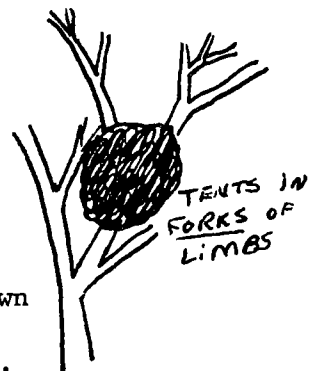
Eastern Tent Caterpillar (Malacosoma americanum F.)

Host - Apple, cherry (related species), other hardwoods

Damage - Defoliation may be severe, sometimes complete in stand.

Habits and life history - Habits and life history similar to above. Large tents formed in forks of limbs used as larval shelter. Larvae leave tent to feed.

Means of recognizing injury and insect - Large web tent, caterpillars 1 1/2" long, reddish-brown, long haired, white line down back, blue and brown spots along sides. Adults buff-colored moths, 2 oblique white lines on upper wings, wingspread 1 1/2".



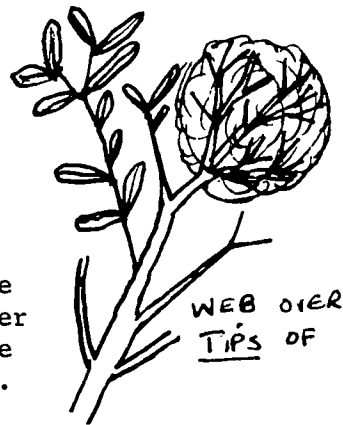
Fall Webworm (*Hyphantria cunea* Drury)

Host - Hardwoods, common pecan, and persimmon

Damage - Defoliation

Habits and life history - Caterpillar in web noticeable in late July and in August. Webs cover large areas of foliage. Enter top soil in August; hibernate as pupae. Moths emerge in late June or early July. There are two generations in deep south.

Means of recognizing injury and insect - Caterpillars 1 1/4" long, greenish-yellow with dark stripe down back and yellow ones on sides; many light colored hairs. Moths white, wing-spread 1 1/4".



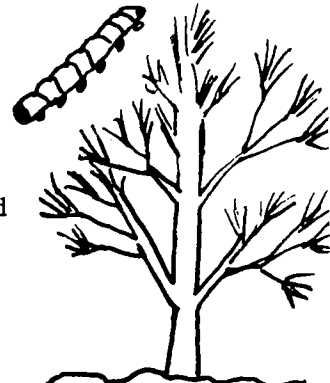
WEB OVER
TIPS OF

Nantucket Pine Tip Moth (*Rhyacionia frustrana*, Comst.)

Host - Loblolly, shortleaf, Virginia

Damage - Buds and twigs of small trees killed; trees stunted and deformed. Infestation is most severe under poor growing conditions.

Habits and life history - Small caterpillars mine in terminal needles, buds, and twigs. From 2 - 4 generations in a year. Adult moths emerge in March, June, July, and September.



ATTACKS TIP TIPS

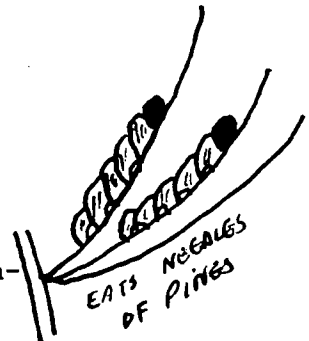
Red-headed Pine Sawfly (*Neodiprion lecontei*, Fitch)

Host - Pine

Damage - Defoliation of young pines. Retards growth but seldom kills trees.

Habits and life history - Larvae feed in groups on new and old needles. There are 2 or more broods in a season. Insect hibernates in cocoon in soil. Adult lays eggs in slits in needles.

Means of recognizing injury and insect - Larvae about 1" long, body cream color with several rows of black spots; head reddish-brown. Adult is small 4-winged "fly", seldom observed.



EATS NEEDLES
OF PINES

Coneworms (*Dioryctria* spp.)

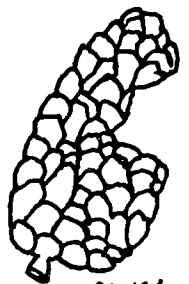
Host - All pines

Damage - Cones and shoots bored; tree trunks may be infested.

Most damage is cone loss in seed orchards.

Habits and life history - Habits vary with species. Larvae bore in host tissue. One to several generations a year. Overwinter as larvae.

Means of recognizing injury and insect - Frass pellets on or in host tissue; may be mixed with resin on surface or enclosed by resin-silk "blister". Larval galleries distinct. Larvae 5/8 x 3/4" long; moths vary in color, zigzag band on front wings.



CONES
ATTACKED

Gall Insects (Cynipidae)

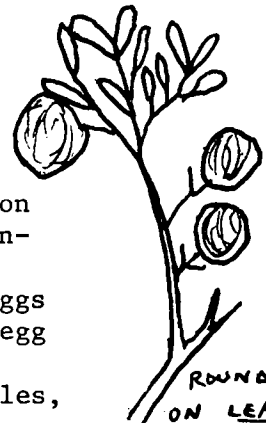
Host - All hardwoods, but mostly oaks

Damage - Trees seldom killed. Gall abundant at some seasons on individual trees -- usually near forest edges. Galls are unsightly but not very damaging to tree.

Habits and life history - Small wasp-like insects lay their eggs on tender plant tissue. Galls develop rapidly with insect egg and larvae in the center. Larvae hatch into wasps.

Other gall insects - Many aphids, psyllas, fleas, moths, beetles, etc., also produce galls on a variety of plants. The exact process by which galls form the characteristic shape is not known.

Control - No chemical control recommended



ROUND BALLS ON LEAVES, TWIGGS, STEMS

Carpenter Worm (Prionoxystus robiniae)

Host - Many hardwoods, mostly oaks

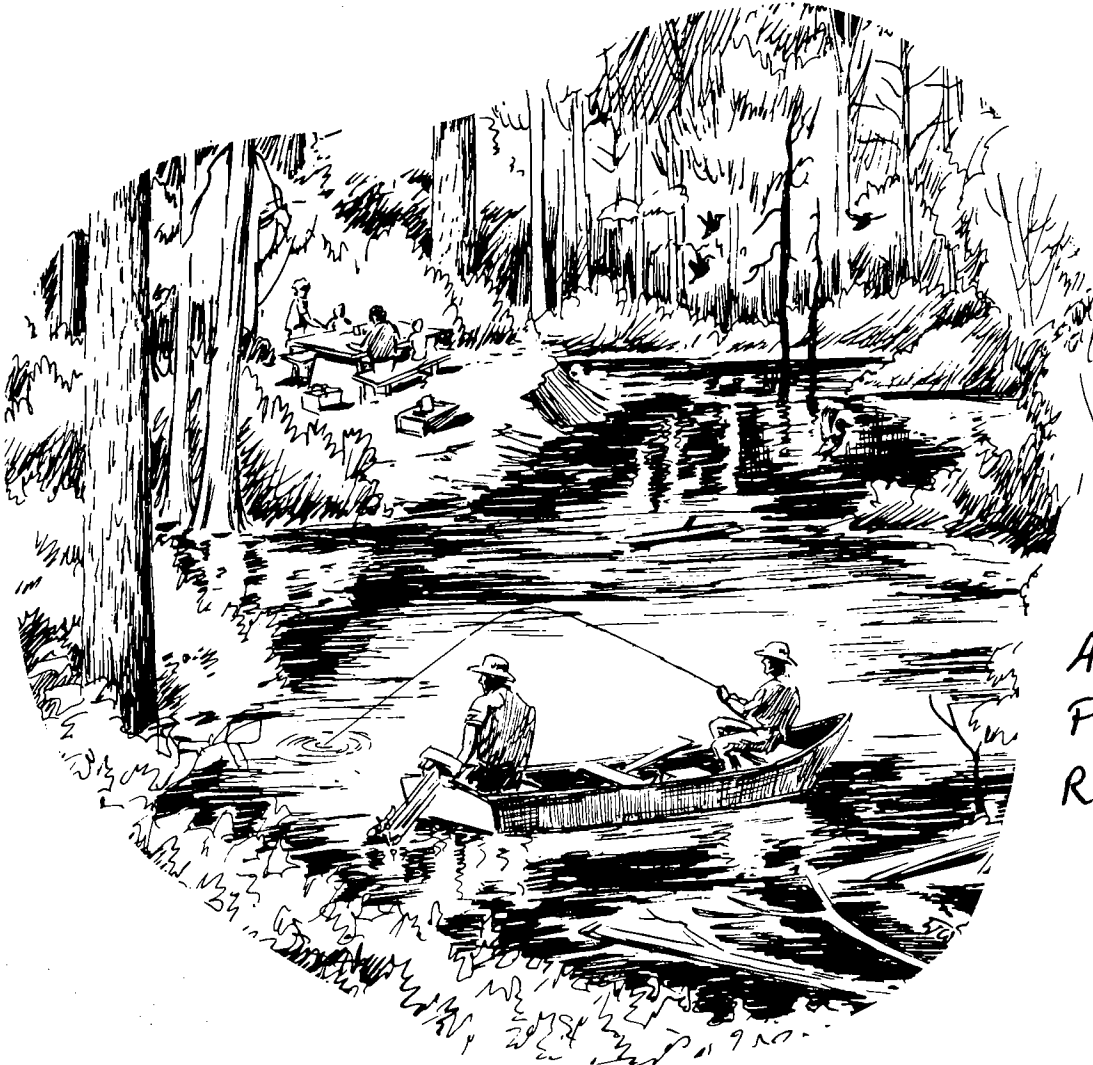
Importance - Eggs laid on tree trunks. Larvae bore into tree trunk. Boring dust and sap flow from entry holes.

Description of insect - Adult female - greyish brown moth with a 3" wingspread. Larvae when mature are 2-3 inches long, greenish white.

Control - No chemical control recommended



OOZING HOLES IN TRUNKS OF OAKS



A FOREST PROVIDES RECREATION

FOREST DISEASES

Annosus Root Rot (*Fomes annosus*)

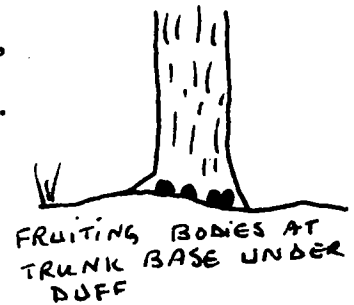
Tree species - pines, mainly slash, loblolly and white pines, but occasionally on longleaf, shortleaf, and other species

Symptoms - Trees die singly or in groups following thinnings.

Fungus infects stumps and spreads to nearby trees. Common in slash and white pine plantations following thinnings.

Living trees with root rot are often windthrown.

Control - Borax applied to freshly cut stumps has been suggested as a treatment for reducing infection in thinned plantations. Also, thinning during the hottest 3 or 4 months of the year seems to reduce stump infection.



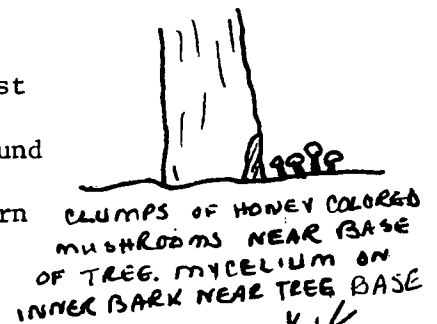
Mushroom Root Rot (*Clitocybe tabescens*)

Importance - Serious fungus disease of many shade and forest trees

Description - Root rotting fungus. Mushrooms produced around tree base in summer. In bunches with light tan caps.

Signs of attack - Mushrooms near trunk base. Tree tops turn brown and die.

Control - Fumigate soil around valuable shade trees.

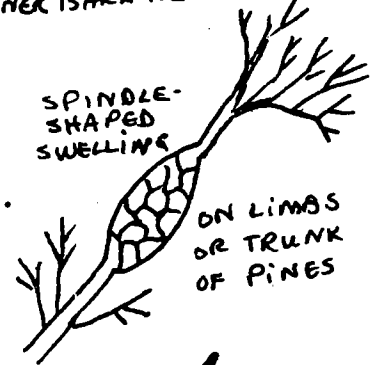


Fusiform Rust (*Cronartium fusiforme*)

Tree species - loblolly, slash, and longleaf pines

Symptoms - Spindle-shaped swellings on stem and branches; orange spores produced in spring, alternate stage on oak leaves. In nurseries, the seedlings have round or spindle-shaped swellings at base of stem after one season of growth.

Control - No direct control; plant disease-free seedlings. Spray nursery beds at weekly intervals from emergence to June with Fermate or Zerlate plus 0.5 pints Santomerse per 100 gallons of spray; cull all seedlings with basal swellings to prevent carrying disease to plantations.

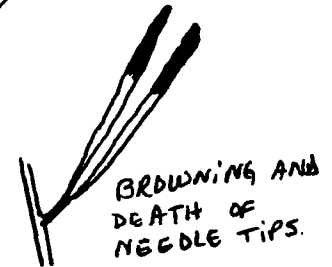


Needle Cast (Several fungi)

Tree species - pine, all species

Symptoms - Browning and premature shedding of older needles, giving crown a thin, tufted appearance.

Control - None needed; no evidence that needle cast causes serious injury to forest stands.

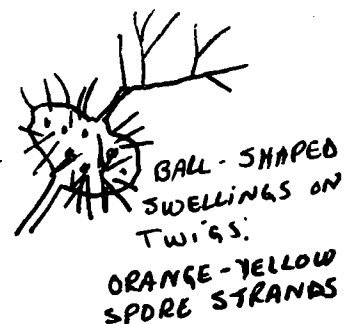


Cedar Apple Rust (*Cymnosporangium juniperi-virginianae*)

Tree species - red cedar

Symptoms - Ball-shaped brown swellings on twigs, which exude reddish-brown jellylike spore horns in wet weather in spring; alternate host apple.

Control - None required for state on cedar; sometimes necessary to remove cedar to control rust on apples.



tips of twigs die.

Juniper Blight (*Phomopsis juniperovora*)

(Mostly in forest tree nurseries)

Tree species - red cedar and cypress species

Symptoms - Browning of foliage caused by stem infections; small black fruiting bodies appear on dead leaves and stem; infected seedlings usually die.

Control - Keep foliage sprayed with Special Semesan, using 1 lb. per 100 gallon of spray; avoid overhead watering; remove and destroy diseased plants.



Leaf Blister (*Taphrina caerulescens*)

Tree species - Oaks

Symptoms - Leaves in spring develop yellowish raised spots; these later turn brown. In epidemic years affected trees are conspicuous because of brown distorted foliage.

Control - None for forest trees. For shade trees spray just before the buds burst in the spring with 4-450 Bordeaux Mixture. Manzate, Orthocide 406. Tri-Basic Copper Sulphate or Microgel. Summer sprays are of no value in controlling the disease since infections take place just as the new leaves come out of the buds.



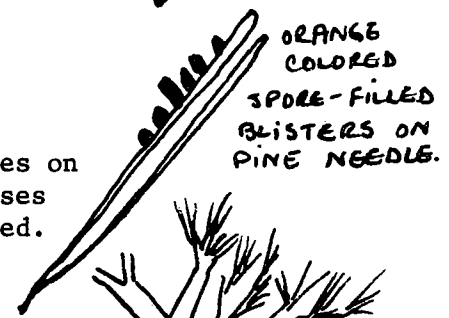
Blisters on water oak leaf.

Pine Needle Rust (*Coleosporium* spp.)

Tree species - pines, 2 and 3 needle species

Symptoms - Small orange-colored blisters filled with spores on needles in spring; usually on lower needles; rarely causes serious injury; alternate stage on goldenrod and ironweed.

Control - None



ORANGE COLORED SPORE-FILLED BLISTERS ON PINE NEEDLE.

Pitch Canker (*Fusarium lateritium*, f. *pini*)

Tree species - pines: shortleaf, slash, longleaf, Virginia

Symptoms - Cankers on stem and branches accompanied by heavy resin flow; presence of dead tops or branches.

Control - None



PITCH SOAKED TERMINAL BUDS AND UPPER PORTION OF PINES

Eastern Gall Rust (*Cronartium quercium*)

Tree species - pines: Virginia, shortleaf, pitch

Symptoms - Round swellings on trunk and branches often covered with orange-colored blisters in spring; alternate stage on oak leaves.

Control - None needed.



ROUND GALLS ON SAND PINE

Heart Rot -- Red Ring Rot (*Fomes pini*)

Importance - Attacks many mature pines of all species -- commonly called red heart.

Description - Fruiting bodies on trunks of older pines.

Heartwood of felled trees rotten or trees hollow. Spores enter tree through dead branch stubs.

Control - No control practiced



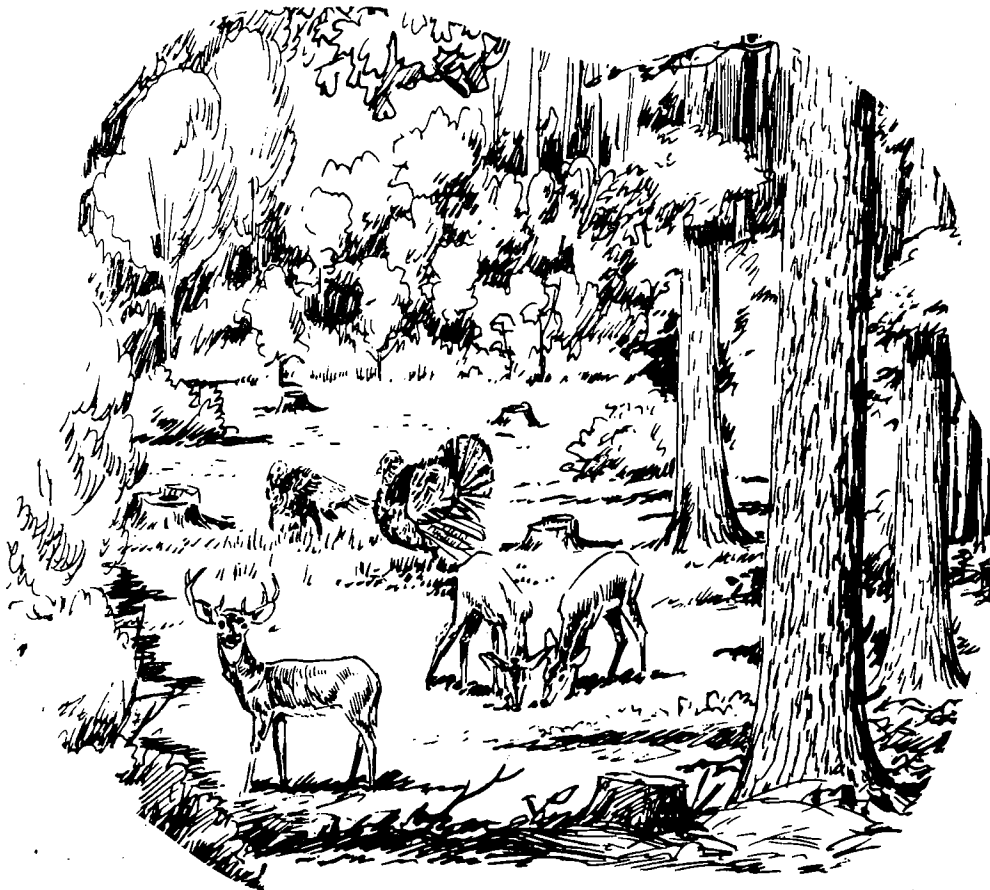
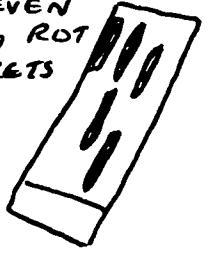
CONKS ON TRUNKS OF OLDER PINES

Pecky Cypress

A serious pest of cypress trees in Florida. The disease is active in living trees -- decay stops when the tree dies or is cut.

Description - Conks on trunk small and "shelf-like". But disease usually not noted until tree is cut. Boards cut of pecky cypress have good sale as cypress paneling, but there is a great economic loss from damage to cypress lumber for high value products such as boat and water tank siding, etc. No control.

UNEVEN
LONG ROT
POCKETS



Sources of information

Consult your local 4-H leader. Your local Division of Forestry County Forester can help you obtain publications on forest insects and disease. He can also help you collect and identify specimens in the field. Industry foresters can also be of great help.

The best publication is Insects, Diseases, and other Problems of Florida Trees, Bulletin 196, June, 1971, available from the State Department of Agriculture and Consumer Service.

I N F O R M A T I O N

MEMBER'S NAME _____ AGE _____

PARENTS OR GUARDIAN'S NAME _____

MAILING ADDRESS: STREET OR BOX NUMBER _____

CITY _____ STATE _____ ZIP _____

NAME OF YOUR CLUB _____ COUNTY _____

NAME OF YOUR SCHOOL _____ GRADE IN SCHOOL _____

YEARS YOU HAVE BEEN IN CLUB WORK _____ IN THIS PROJECT _____

NAME OF COUNTY OR HOME DEMONSTRATION AGENT _____

NAME OF YOUR LOCAL CLUB LEADER _____

Florida Cooperative Extension Service
Institute of Food and Agricultural Sciences
University of Florida, Gainesville

RECORD SECTION - FOREST INSECTS

Match up the correct description (lettered) with the name of the correct forest insect (numbered)

<u>Description</u>	Correct Number
A. Larvae boring in trunk wood of oak tree	_____
B. Long-horned beetle that lays eggs in twigs then girdles them	_____
C. Weevil that eats cambium of young pine	_____
D. Worm (moth larvae) that makes brown web-mass near tip of young pines	_____
E. Colony of caterpillars whose web nest covers outer branches of hardwoods	_____
F. Colony of caterpillars whose web is formed on tree crotch	_____
G. Larvae boring in twig-tip of pines	_____
H. Striped caterpillars eating pine needles	_____
I. Worm living in green pine cone or fusiform gall	_____
J. Small beetles making "shot holes" in dry wood	_____
K. Beetle causing boring dust at base of dying pine	_____
L. Small wasp-like insect causing swellings on oak leaves and twigs	_____
M. Beetle attacking lower trunk of living pines	_____
N. Beetles attacking total trunk of living pines	_____

Insects

1. Pine Engraver Beetles (Ips sp.)
2. Turpentine Beetle
3. Ambrosia Beetle
4. Twig Girdler
5. Pales Weevil or Pitch Eating Weevil
6. Pine Web Worm
7. Eastern Tent Caterpillar
8. Fall Web Worm
9. Nantuckett Pine Tip Moth
10. Red-headed Pine Sawfly (or other sp.)
11. Pine Cone Worm
12. Powder Post Beetles
13. Gall Insect
14. Carpenter Worm

RECORD SECTION - FOREST DISEASES

Match up the correct description (lettered) with the name of the correct forest insect (numbered)

<u>Description</u>	<u>Correct Number</u>
A. Strange gall with orange spores on red cedar	___
B. Growing stems of young pines "bleed gum"	___
C. Pine needles look like fire burned them	___
D. Fusiform gall on slash pine branch	___
E. Round gall on sand pine branch	___
F. Fallen tree with roots rotted	___
G. Tree with heart wood decayed	___
H. Cypress board with patches of decay	___
I. Cedar branches appear brown and dying	___
J. Water oak leaves have raised blisters	___
K. Healthy tree dies for no reason	___
L. Pine needles have rows of orange spores	___

Diseases

1. Annosus Root Rot
2. Mushroom Root Rot
3. Fusiform Gall Rust
4. Needle Cast
5. Cedar Apple Rust
6. Juniper Blight
7. Oak Leaf Blister
8. Pine Needle Rust
9. Pitch Canker
10. Eastern Gall Rust
11. Heart Rot (Red Ring Rot)
12. Pecky Cypress



This five unit series with Leader's Guide was published at a cost of \$297.07, or 11.9 cents per copy, to be used in the educational programs in Florida's 4-H Clubs.

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
(Acts of May 8 and June 30, 1914)
Cooperative Extension Service, IFAS, University of Florida
and United States Department of Agriculture, Cooperating
K. R. Tefertiller, Director