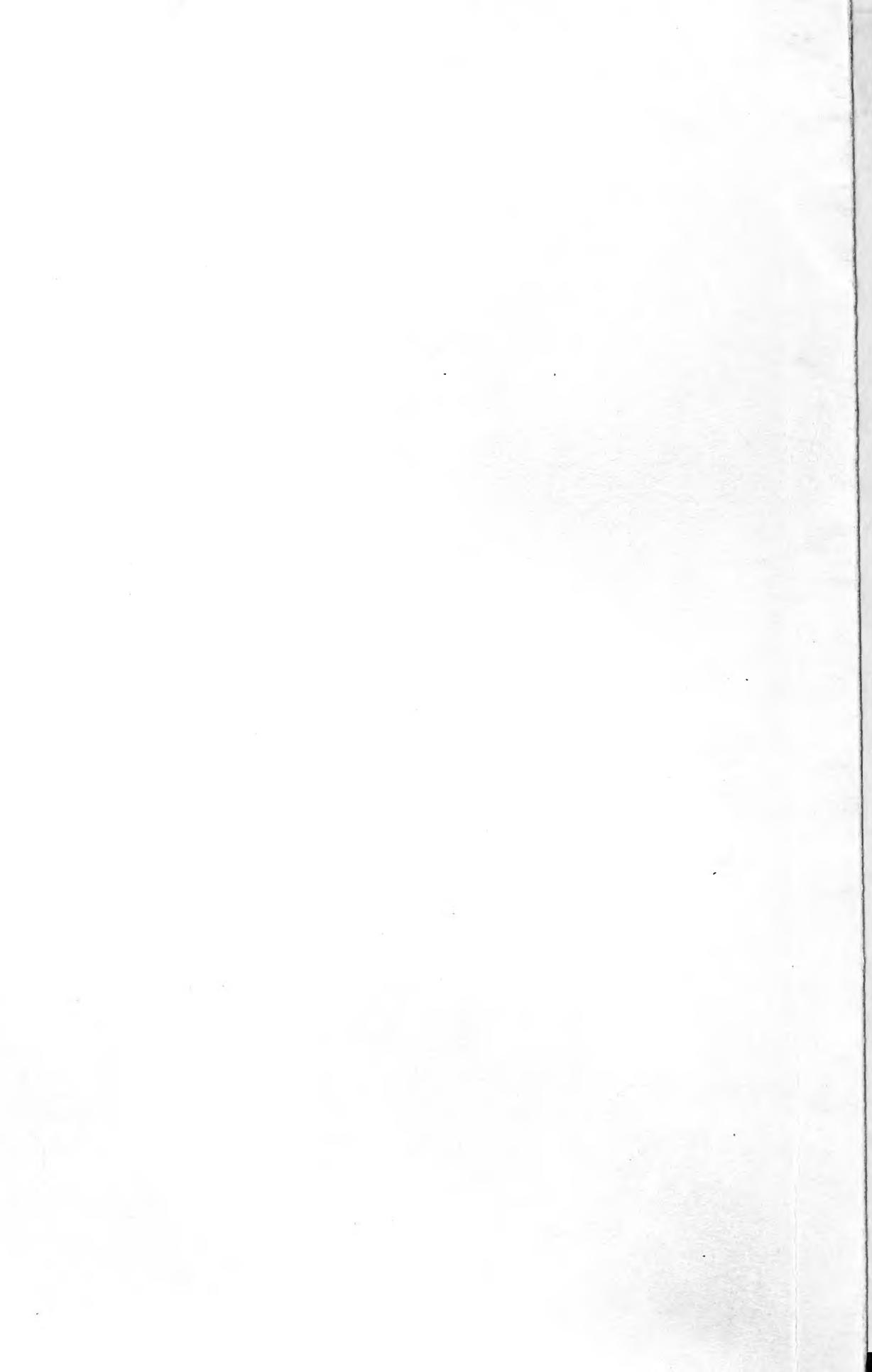


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FOREST INSECT CONDITIONS
IN THE
CENTRAL ROCKY MOUNTAINS

1956

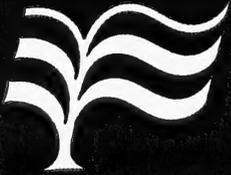
ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

Raymond Price, Director

Fort Collins, Colorado

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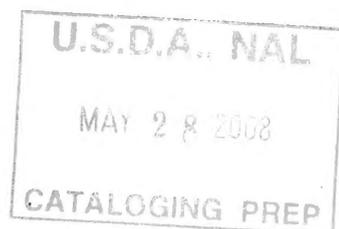
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F O R E S T I N S E C T C O N D I T I O N S
in the
C E N T R A L R O C K Y M O U N T A I N S
-- 1956 --

by

H. Eugene Ostmark



ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

Forest Insect and Disease Laboratory

Fort Collins, Colorado

The station maintains headquarters at Fort Collins
in cooperation with Colorado State University

Cover: Galleries of Black Hills beetle in ponderosa pine bark.
(U. S. Forest Service photo, by T. E. Hinds)

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INTRODUCTION

This report gives the status of forest insect activity in Colorado, Wyoming, South Dakota, Nebraska, and Kansas during 1956, as determined by surveys and ground observations of populations of the more important insects.

The overall downward trend of losses by insects reported for 1955^{1/} was interrupted by apparent increases in Douglas-fir beetle and mountain pine beetle activities. Otherwise, with a few exceptions, the major pests, including the Engelmann spruce beetle and the Black Hills beetle, continued their downward trend.

Continuation of operational surveys by National Forest Resource Management has given the Fort Collins Forest Insect and Disease Laboratory of the Rocky Mountain Forest and Range Experiment Station opportunities to follow up all the detection reports of forest insects.

This division of surveys has been of mutual benefit. The responsibilities of specific surveys are definite and separate, but the jobs of survey planning and training are done jointly. The two groups use similar techniques and are aware of each other's seasonal program and progress.

Developments on surveys during 1955 and 1956 suggest that, barring unprecedented insect activities, it will be possible through the laboratory's detection and appraisal surveys program to recognize each potential outbreak in time to prepare for control and thus keep it at a relatively low level. Continued improvement of survey techniques will aid in predicting outbreaks and in actually forestalling their occurrences.

^{1/} Ostmark, H. E., and Wilford, B. H. Forest Insect Conditions in the Central Rocky Mountains, 1955. U. S. Forest Serv. Rocky Mountain Forest and Range Expt. Sta., Sta. Paper 22, 13 pp., illus. June 1956. (Processed)

BARK BEETLES

Engelmann Spruce Beetle (Dendroctonus engelmanni Hopk.)

Hosts. -- Engelmann spruce, blue spruce, and rarely, lodgepole pine.

Status. -- Spruce beetle populations continued the downward trend begun in 1955. A combination of logging, chemical control, and natural-control factors reduced several areas epidemic in 1955 to an endemic state. Natural control alone (chiefly woodpeckers) decreased populations in other areas.

A small epidemic in standing trees exists on the Rio Grande National Forest, where the infestation is aggravated by a blowdown in the fall of 1956. It is slated for control in 1957.

Of major concern are the continuing populations in cull logs and blowdowns. Several logging areas examined in 1956 showed rather high beetle counts in cull material. These areas will be kept under surveillance until they no longer remain sources of infection to standing trees.

On the Uncompahgre-San Juan area, logging and a general mopup of culls, blowdowns, and some standing trees are bringing the outbreak under control. Of a predicted 25,000 infested trees for direct chemical control in 1956, only 677 needed to be treated. One area of infestation (approximately 6,000 trees) west of Groundhog Mountain may need to be controlled by a combination of logging and chemical application in 1957. Natural control during the winter of 1956-57, however, may kill many of the beetles.

Surveys continued in the extensive blowdown on the San Juan National Forest. Preliminary results of this survey show that the trees blown down in the fall of 1954 have remained highly susceptible host material (fig. 1). Although the 1956 flight more than doubled the total number of egg galleries found during the 1955 survey, population counts remained low; Most of the trees probably will not be attractive to beetles in the 1957 flight. The blowdown, however, continues to be a major hazard. One area of severe damage and beetle-population increase is considered for definite action. An access road for spruce-timber salvage and chemical treatment in the East Florida drainage is under construction.

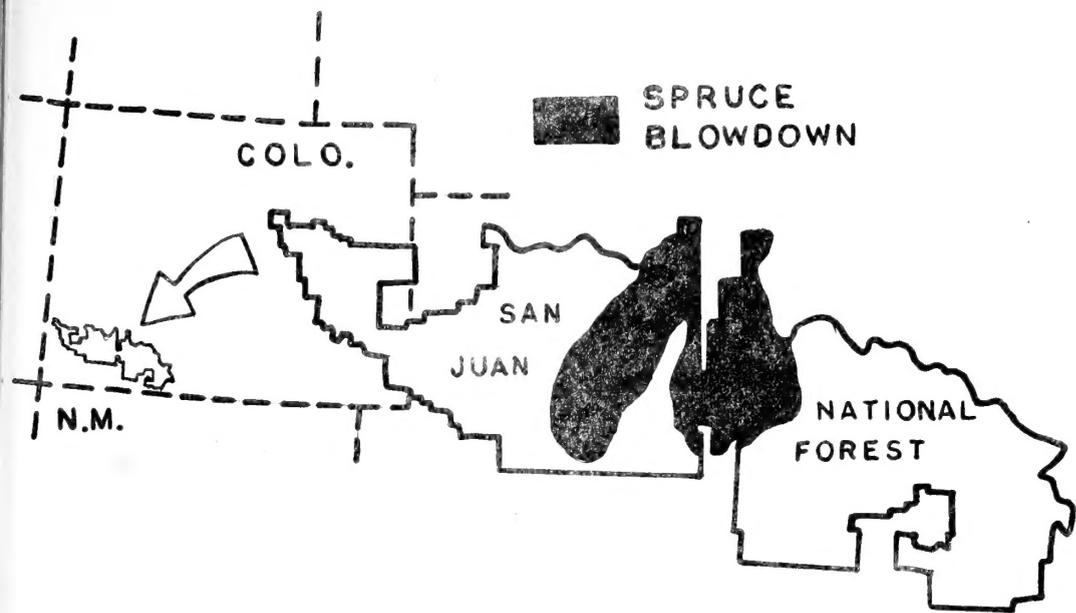


Figure 1. -- The spruce blowdown on the San Juan National Forest, Fall, 1954.

Although no major outbreaks exist, the Engelmann spruce beetle remains the most serious threat to the vast stands of overmature spruce in Colorado.

Control. -- There are four means of control: (1) chemical, (2) logging, (3) trap tree, and (4) biological.

Black Hills Beetle
(Dendroctonus ponderosae Hopk.)

Host. -- Ponderosa pine.

Status. -- Except for a few "hot spots," the Black Hills beetle populations are gradually waning to endemic levels throughout the region. Control has been chiefly on a maintenance basis, that is, logging or treating infested trees as they are found. In general, the ponderosa pine stands are accessible. Control by logging and chemical treatment during the past several years has kept the Black Hills beetle from reaching epidemic levels (fig. 2).

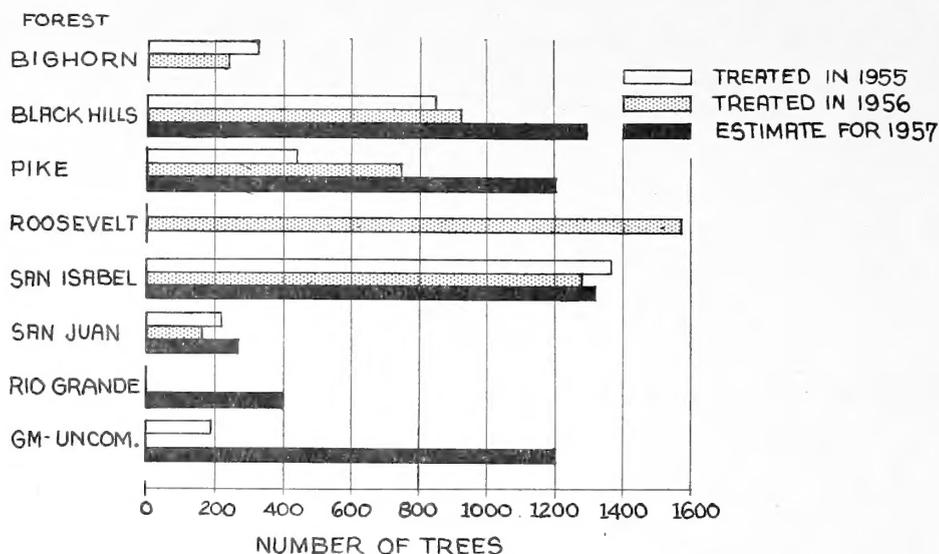


Figure 2. --Black Hills beetle control in national forests.

There are exceptions, however. Surveys reveal 1,200 infested ponderosa pine in Naturita Canyon on the Grand Mesa-Uncompahgre National Forest. About 2,000 ponderosa pines of esthetic and watershed values need treating near Bailey, Colorado, on the Pike National Forest. Populations of the Black Hills beetle are higher on the San Isabel National Forest than those observed during the last 4 years.

Control. -- Both ethylene dibromide emulsion (EDB) and orthodichlorobenzene in oil (ortho) have proved effective in control when applied to the bark of infested trees.

Douglas-fir Beetle (Dendroctonus pseudotsugae Hopk.)

Host. -- Douglas-fir.

Status. -- The Douglas-fir beetle presents a steadily increasing problem. This bark beetle has become one of the most destructive forest insects in the central Rocky Mountain region. Only the scarcity of extensive, high-quality stands of Douglas-fir kept this insect from receiving more attention.

Increasing Douglas-fir beetle activity in high-use recreational and crucial watershed areas has necessitated the scheduling of two

chemical-control pilot operations for the spring of 1957. These involve two infestations on the Pike National Forest totaling approximately 1,288 trees. Results from a pilot-control operation carried out during 1956 are encouraging. Elsewhere, inaccessible stands, low-quality trees, and limited experience with a control method have unduly permitted Douglas-fir mortality to continue(fig. 3).

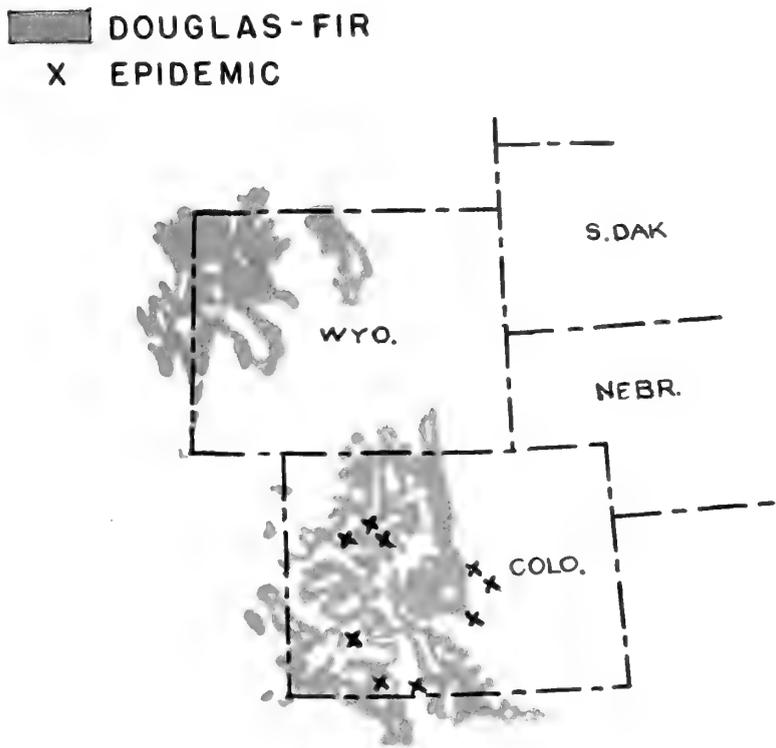


Figure 3. --Main centers of Douglas-fir beetle epidemics.

Control. -- A pilot-control test on a relatively small outbreak of Douglas-fir beetle in a stand of young Douglas-fir on the White River National Forest was completed in late summer of 1956. EDB was applied as an emulsion to the bark of standing, infested trees and, under the circumstances, gave adequate beetle control.

Mountain Pine Beetle
(Dendroctonus monticolae Hopk.)

Hosts. -- Lodgepole, limber pine.

Status. -- The mountain pine beetle was the most serious forest insect pest in northern Wyoming in 1956. Several outbreaks developed in lodgepole pine along the North Fork of the Shoshone River, bordering, for approximately 10 miles, a well-traveled highway into Yellowstone National Park. Approximately 8,000 trees are infested. So far this epidemic is confined to the river bottoms. Control is being considered to prevent a spread up the inaccessible canyon walls.

An increase in the infestation of mountain pine beetle in limber pine on the South Fork of the Shoshone River is endangering adjacent lodgepole, usually the favored host. An estimated 700 trees are infested.

Control. -- The mountain pine beetle can be controlled by applications of EDB emulsions or oil solution of EDB or ortho.

Western Balsam Bark Beetle
(Dryocetes confusus Sw.)
and
Fir Engraver
(Scolytus ventralis Lec.)

Hosts. -- All true firs.

Status. -- These two bark beetles (fig. 4) continued to take their toll of fir throughout the extensive spruce-fir type. Many single trees and small groups were killed. The low commercial value of fir and the lack of intensive epidemics makes control impractical.

Control. -- EDB emulsion will penetrate the bark and kill the insects beneath.

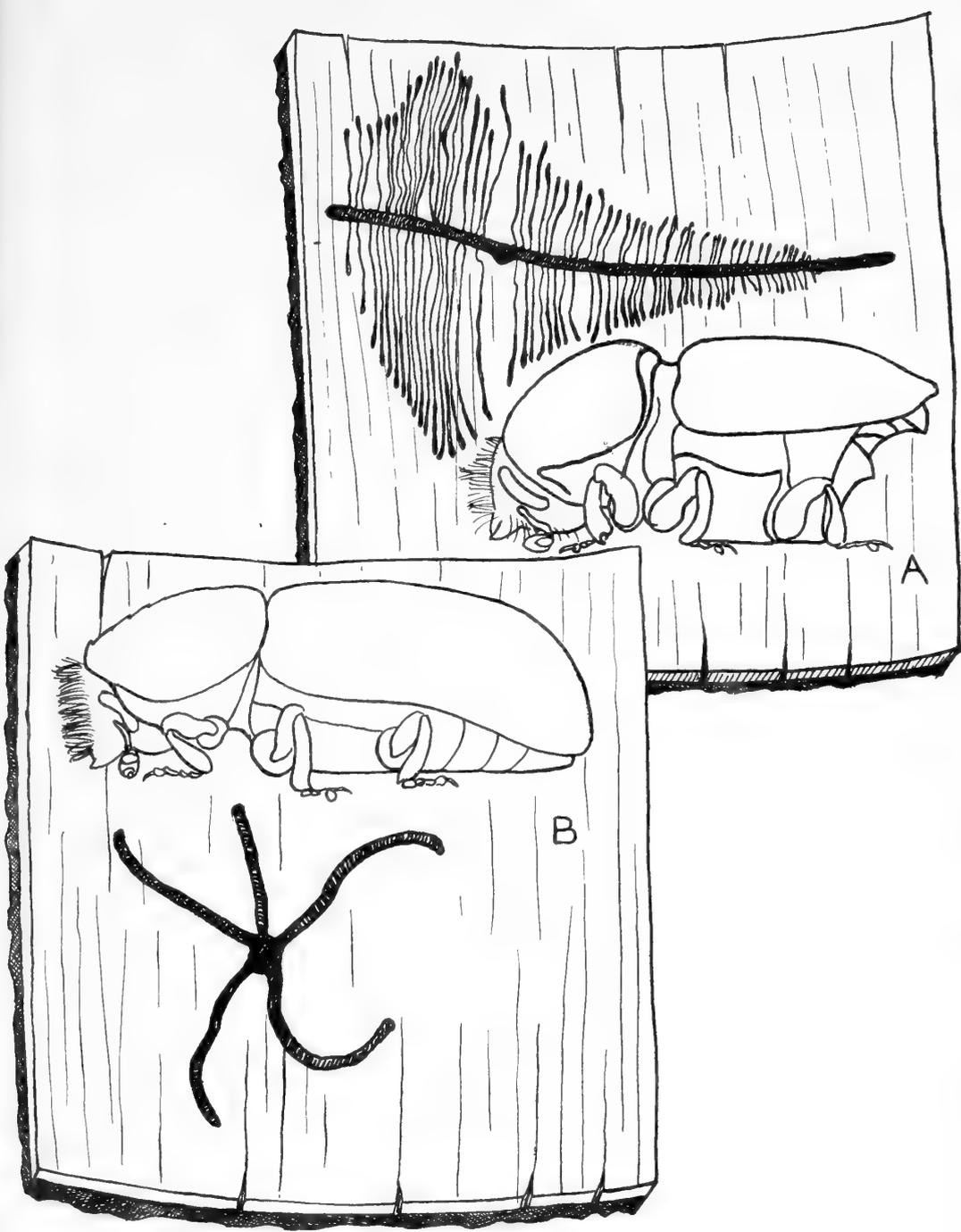


Figure 4. --A. Fir engraver, Scolytus ventralis Lec., adult and gallery.

B. Western balsam bark beetle, Dryocetes confusus Sw., adult and gallery.

Red Turpentine Beetle
(Dendroctonus valens Lec.)

Host. -- Ponderosa pine.

Status. -- The red turpentine beetle usually breeds in the bases of weakened trees and green stumps. Progeny may attack normal trees in the vicinity.

The only report of increasing activity in 1956 came from the Cucharas Valley on the San Isabel National Forest, where red turpentine beetles were attacking ponderosa pine.

Control. -- Methods worthy of trial are: (1) Cut out attacking beetles from bases of trees, and (2) apply 2-percent DDT spray on bark of valuable trees as a preventive.

Engraver Beetles
(Ips spp.)

Hosts. -- Conifers.

Status. -- Ips spp. are common secondary insects in dead and weakened trees and in freshly cut logs and slash. Sporadically they are of major importance. They often attack living trees when the termination of logging in an area deprives them of their favored food source.

Ips oregoni Eichh. and Ips ponderosae Sw. are abundant in the Black Forest in Colorado, where they are associated with drought-weakened ponderosa pine. Other bark beetles, including Pityophthorus spp. that work in the twigs also hastened the death of the drought-weakened trees.

Ips lecontei Sw. is abundant on drought-weakened pinyon in the canyons west of Denver. When the trees are weakened they provide acceptable breeding places for this Ips. As trees dry out, they become less acceptable; often the existing Ips broods die as a result of desiccation.

Ips pilifrons Sw. attacks windthrown and felled Engelmann spruce trees and logging slash. In one blowdown area on the San Juan National Forest, I. pilifrons reduced the threat of an Engelmann spruce beetle increase by filling up the available bark area on the down trees.

Control. --Seldom is chemical control practical. Methods used for other bark beetles will kill Ips.

Hemlock Engraver
(Scolytus tsugae Sw.)

Host. --Douglas-fir.

Status. -- Scolytus tsugae Sw. was very destructive to pole-sized Douglas-fir on the Shoshone National Forest in Wyoming in 1956. The infected trees are along the entrance road to Yellowstone National Park and present a serious esthetic loss. Apparently the trees were weakened by several successive years of drought before the attack by this insect.

Control. --Since the insect breeds in limbs of larger Douglas-fir as well as in the boles of young trees, there is no practical control method.

WOOD BORERS

Black-Horned Pine Borer
(Callidium antennatum var. hesperum Casey.)

Host. -- Ponderosa pine.

Status. -- During 1956, several reports of black-horned pine borer injury to stacked, waney-edged lumber were received from South Dakota. Samples showed ponderosa pine riddled with the larval tunnels of this species.

Control. -- The best control is prevention. Removal and disposal of bark from logs or lumber to be stored will prevent oviposition. However, once eggs are laid and have hatched and the larvae have begun feeding within the wood, the lumber must be kiln dried or treated with a fumigant. If not treated, the adult beetles may emerge after the infested lumber has been used for construction.

Banded Ash Borer
(Neoclytus caprea (Say))

Host. --Walnut.

Status. --Severely riddled pieces of walnut were sent to the laboratory from western Colorado for identification. The injury contained some live adult beetles. These were identified as the banded ash borer, the first specimens the laboratory has received.

Poplar and Willow Borer
(Chryptorhynchus lapathi (L.))

Host. --Willow.

Status. -- This weevil is still active in willow in the Black Hills of South Dakota. It may be one of the primary causes of the extensive mortality of willow in that area.

Horntails
(Sirex spp.)

Host. --Engelmann spruce.

Status. -- These insects are fairly common in spruce and pine forests, where they oviposit on cut logs and bases of wounded trees. The larvae are wood borers. Recently, several requests for identification have been forwarded to the laboratory.

DEFOLIATORS

Great Basin Tent Caterpillar
(Malacosoma fragile Stch.)

Hosts. -- Aspen, poplar, willow, bitterbrush, other deciduous trees and shrubs.

Status. -- For about 7 years this insect (fig. 5) has been a nuisance in the aspen stands of southern Colorado. The recreational value of several high-use summer home and camping areas has been reduced by the hordes of caterpillars, which litter the ground and contaminate drinking water. Repeated defoliation has critically weakened many trees on several important watersheds.

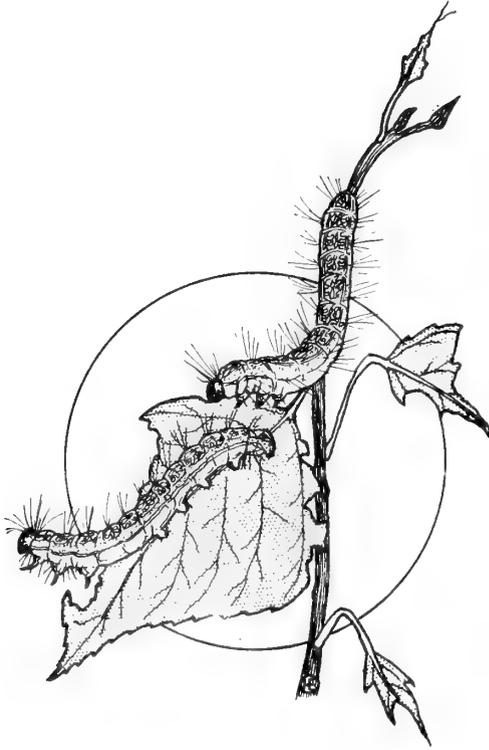


Figure 5. --Great Basin tent caterpillar, Malacosoma fragile Stretch.

A recently completed survey of egg masses showed a gradual to abrupt decrease in caterpillar populations throughout most of the epidemic area. A notable exception was in the heavily used Cucharas campground area on the San Isabel National Forest (sprayed in 1955 with DDT). Plans to aerial spray these 1,600 acres in 1957 with DDT are contemplated. The low populations of caterpillars in areas neighboring the sprayed blocks may increase the effectiveness of a 1957 spray program, since the number of invading moths probably will be few.

Control. --DDT applied by airplane or mist blower is an effective means of control. The extensiveness of this epidemic and the general lessening of caterpillar populations as determined by annual counts of egg masses eliminate the need for major control projects.

When important recreational areas are heavily infested, annual control is justified. An example of such an area is the Cucharas Camps on the San Isabel National Forest, which was

sprayed by air in 1955. A caterpillar-free season followed. However, moths from surrounding unsprayed areas invaded the Cucharas Camps during the flight period and in 1956 the area was again heavily infested. The area will be resprayed in 1957.

Spruce Budworm
(Choristoneura fumiferana (Clem.))

Hosts. -- Douglas-fir, true firs, spruce.

Status. -- The spruce budworm is increasing in the spruce-fir type in southern Colorado, particularly on the Rio Grande and the San Juan National Forests. It has not yet caused tree mortality but its presence represents a potentially dangerous situation. No control is planned for 1957.

Control. -- DDT applied by airplane gives good control.

Douglas-fir Tussock Moth
(Hemerocampa pseudotsugata McD.)

Hosts. -- Douglas-fir, spruce.

Status. -- At several isolated places in the vicinity of Colorado Springs and Denver, Colorado, this insect has been found seriously defoliating ornamental blue spruce and Douglas-fir.

Control. -- These outbreaks can be controlled with DDT.

Tiger Moth
(Halisidota ingens Hy. Edw.)

This moth is common on pinyon at Mesa Verde National Park.

Pinyon Sawfly
(Neodiprion sp.)

The pinyon sawfly was present in low numbers at Mesa Verde National Park, where it was sprayed with DDT in early spring. There are about 640 acres of high endemic conditions at the Colorado National Monument.

MERISTEM (TERMINAL) FEEDERS

Western Pine Tip Moth (Rhyacionia frustrana bushnelli (Busck))

Host. --Ponderosa pine.

Status. --Each year the laboratory receives samples of tip moth injury. In 1956, the samples were all from nurserymen.

Engelmann Spruce Weevil (Pissodes engelmanni Hopk.)

Host. --Engelmann spruce.

Status. --The first report in several years of serious injury to nursery stock by this weevil was reported in 1956. Some of the 4- to 5-foot Engelmann spruce were infested. The trees were valuable enough to warrant hand picking and burning of infested shoots as a means of control.

SUCKING INSECTS

Pinyon Needle Scale (Matsucoccus acalyptus Herb.)

Host. --Pinyon.

Status. --This scale is most serious in high-use recreational areas of Mesa Verde National Park. In other areas, including Colorado National Monument, it is serious but static.

Cooley Spruce Gall Aphid (Chermes cooleyi Gill.)

Hosts. --Blue spruce, Douglas-fir.

Status. --The Cooley spruce gall aphid continues to be a pest of ornamental blue spruce on which the conelike galls are considered unsightly. Douglas-fir is the alternate host.

SEED INSECTS

Pinyon Cone Beetle (Conophorus edulis Hopk.)

Host. --Pinyon.

Status. -- For several years the pinyon cone beetle has destroyed almost the entire crop of pinyon seeds in areas such as the Great Sand Dunes National Monument, where pinyon constitutes the main tree species. No practical means of control is known.

SUMMARY OF FOREST INSECT CONDITIONS - 1956

<u>Insect</u>	<u>Hosts</u>	<u>Importance</u> ^{1/}	<u>Trend</u>
BARK BEETLES:			
Engelmann spruce beetle	Engelmann spruce	Major	Decreasing
Black Hills beetle	Ponderosa pine	Major	Decreasing ^{2/}
Douglas-fir beetle	Douglas-fir	Major	Increasing
Mountain pine beetle	Lodgepole, limber pine	Major	Increasing
Western balsam bark beetle	Firs	Major locally	Static
Fir engraver	Firs	Major locally	Static
Red turpentine beetle	Pines	Minor	Static
Engraver beetles (<u>Ips</u> spp.)	Conifers	Minor	Varying
WOOD BORERS:			
Black-horned pine borer	Ponderosa pine; Douglas-fir	Major locally	Static
Banded ash borer	Walnut; ash	Minor	Static
Poplar and willow borer	Willow	Major locally	Increasing
Horntails	Conifers	Minor	Static
DEFOLIATORS:			
Great Basin tent caterpillar	Aspen	Major	Decreasing
Spruce budworm	Fir; spruce	Major	Increasing
Douglas-fir tussock moth	Spruce	Minor	Static
MERISTEM (TERMINAL) FEEDERS:			
Western pine tip moth	Ponderosa pine	Major locally	Static
Engelmann spruce weevil	Engelmann spruce	Minor	Static
SUCKING INSECTS:			
Pinyon needle scale	Pinyon	Minor	Static
Cooley spruce gall aphid	Spruce; Douglas-fir	Minor	Static
SEED INSECTS:			
Pinyon cone beetle	Pinyon	Minor	Static

^{1/} Importance is rated by local and regional values of the host.

^{2/} Except in several locations (see page 4).

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