FILBERT
Insect Pests
Contents

Ambrosia Beetle .................................................. 4
Apple Mealybug ................................................... 4
Filbert Aphid ....................................................... 5
Filbert Bud Mite ................................................... 6
Filbert Leafroller .................................................. 7
Polyphemus Moth .................................................. 8
Filbertworm .......................................................... 9
Omniverous Leaf Tier ........................................... 12
Filbert Nut Weevil ............................................... 13
Small Gray Leaf Weevil ........................................ 14
Tree Crickets ....................................................... 14
Tingids ............................................................... 15
Eye-Spotted Bud Moth .......................................... 16
Apply Pesticides Thoroughly--at the Right Time

Insect control is becoming increasingly important in the growing of filberts in Oregon. Insect pests destroy nuts, devitalize trees, reduce nut yield and quality. It is helpful if growers can recognize insect pests which are injurious to filberts.

To control many of the pests it is important to apply sprays or dusts at the right time. Notices for control of filbert moth and filbert leaf roller are sent to growers by county agents. Those who wish to receive these notices should request their county agents to include their names on the mailing lists.

Thorough application of insecticides is especially important in the control of filbert insect pests since filberts are difficult to spray or dust because of their dense foliage. Dusts should be applied when there is no wind. Early morning is a good time to apply dusts, but many growers have found that dust can be applied successfully at night.

About 8 gallons of spray are required to cover thoroughly a medium sized filbert tree, using the bulk method of spraying, with a hand spray gun and high pressure sprayer. Spray recommendations in this bulletin are based on the bulk method—pounds of insecticide per 100 gallons of water. With air-carrier sprayers somewhat less liquid per acre can be used, but approximately the same amount of insecticide per acre is required. Tractor speeds should not exceed 2 miles per hour while spraying.

Use Pesticides Safely

Parathion is suggested for the control of several insect pests of filberts. It is a highly toxic insecticide. Growers who plan to use parathion should follow the manufacturer’s directions.

When using any pesticide follow these precautions:

- Read the label carefully.
- Follow instructions on the label.
- Store out of reach of children.
- Dispose of containers safely.
Ambrosia Beetle  
*Anisandrus pyri*

![Ambrosia Beetle](image)

**Description and damage**

This small, black beetle, often referred to as shot-hole borer, sometimes attacks filberts. The injury is recognized by the small shot-hole entrances of the beetles. This insect belongs to the group known as Ambrosia beetles, the larvae of which feed on a fungus which the beetles plant in the tunnels. The fungus grows only in trees that have a sour sap condition. There are several causes of sour sap such as winter injury, drought, lack of drainage, etc.

Adult beetles are active during March, April, and May. They make burrows into the limbs or trunks of trees. Eggs are laid on the sides of these burrows and also on cross tunnels.

**Control**

Since beetles attack only trees that are in a sour sap condition, every possible means should be used to revitalize the trees. Heavily infested limbs and trees should be pruned and burned. Slightly infested portions may be treated with a wash prepared by adding 1 pound of 50% wettable DDT powder in 5 gallons of water. The wash can be most easily applied with a large paint brush. Treating a number of trees or large portions of them is best done by spray. Use 2 pounds of 50% wettable DDT powder per 100 gallons of water.

The wash or the spray will kill the adult beetles. Apply when the beetles are observed to be active during the spring months.

---

**Apple Mealybug**  
*Phenacoccus aceris*

**Description and damage**

This insect, apparently native to Europe, was first observed on Oregon filberts in 1951. The apple mealybug has been confined to a restricted area in northern Marion County, a limited area in western Polk County, and in 1957 was found in an orchard in northwestern Linn County.

In Oregon this insect has only been found on filberts. In North America it has been reported on apple, cherry, currant, hazelnut, and filbert. The insect feeds by sucking plant juices. It secretes a honeydew-like material which is a good media for the growth of black sooty fungus. The young feed on the leaves and tender twigs. Although serious damage has not been observed, it could be anticipated that heavy infestations might result in premature dropping of leaves and cause small twigs to die.

Although not yet widespread, this
insect may become one of greater economic importance in future years.

**Life history**

Eggs are laid by overwintering females during May. The eggs are found in masses, each containing about 500 or more eggs. In June the young start emerging from the eggs and crawl to young twigs and leaves where they feed. In the fall the nymphs migrate to the larger limbs where they spend the winter.

**Control**

Control has been necessary in only a few instances. Indications are that parathion and malathion as recommended for the control of aphids are also effective against the nymphs of the apple mealybug. These sprays or dusts should be applied in June when the young nymphs are migrating to the leaves and twigs.

Canadian entomologists report a 4% dormant oil spray has given satisfactory control of this pest. To avoid injury to trees oil sprays should be applied before buds open.

**Filbert Aphid**

*Myzocallis coryli*

**Description and damage**

Immature aphids are of a light green color. Mature or winged forms are darker. They feed by sucking plant juices. Honeydew, which aphids secrete, may contribute to leaf scorch. Lead arsenate dusts or sprays as applied for the control of filbert moth may, in the presence of honeydew, further accentuate leaf scorch and cause premature dropping of leaves. Leaf drop interferes with harvesting. Although it has not been proved experimentally, there are indications that feeding of aphids contributes to a reduction in the size and the quality of nuts.

**Life history**

Aphids appear in early spring when leaves begin to unfold, and are present throughout the summer.

**Control**

Filbert aphids may be controlled by application of malathion at the rate of 2 pounds of the 25% wettable powder or 1 pint 57% emulsion concentrate per 100 gallons of water; or parathion at the rate of 1 pound of the 25% wettable powder per 100 gallons of water. Nicotine sulfate at the rate of 1 pint of the 40% concentrate to 100 gallons of water is also effective at temperatures above 70° F. If growers prefer dusts, a 5% malathion dust, a 1% parathion dust, or a 4% nicotine dust may be used. Aphids are frequently held in check or heavy infestations reduced by the activity of insect predators such as lady bird beetles, syrphid fly larvae, and lacewings. Malathion and parathion have an adverse effect on predators. Nicotine is less harmful to beneficial insects,
**Description and damage**

Because of the microscopic size of this pest it is most easily recognized by the damage it causes. The mite is almost a transparent white, extremely small, and cannot be seen with the naked eye. Damage is most severe to the loose budded varieties such as Daviana, Royal, Fitzgerald, and Nonpariel. The mite damages female flowers as well as leaf buds. Mites also attack catkins of Barcelona, but have not been observed on the catkins of the pollinizers. The catkins become deformed when fed upon but this damage is usually not of economic significance. Damage caused to the female flower buds is similar to that of the leaf buds. The buds swell into typical big buds and deformed red flowers are produced at the base of the galls. Sometimes the flowers dry up prematurely and big buds are not produced. Infested flowers do not produce fruit. Catkins, when attacked by the mite, are distorted, becoming very rigid and brittle, and produce little or no pollen.

**Life history**

Observations indicate the mite is well distributed throughout the nut growing areas of Oregon. It is commonly found on wild hazel. The complete life history of the mite is not known. It has been observed that the mite lives freely upon the leaves during April, May, and June. As soon as the new growth is produced, they migrate to and enter the newly formed buds. Mites remain in these buds until the following spring.

**Control**

Satisfactory control measures have not been developed. Partial control has been obtained by the application of lime sulfur at the rate of 10 gallons of lime sulfur to 100 gallons of water applied in the early spring. Applications have been made after pollination has taken place, but before the leaf buds were open. These applications have given approximately 70% reduction in the number of distorted buds.
**Filbert Leafroller**

*Archips rosana*

**Description**

Adult moths have a wingspread of about three-fourths of an inch. They generally are of a buff color with darker irregular linear markings on the wings. The first pair of wings tends to be somewhat rectangular in shape. The larvae when mature are approximately three-fourths of an inch long, light green to darkish-green in color, with a dark head.

**Damage**

The most noticeable injury caused by the insect is the rolling of the leaves by the larvae. The most serious damage, however, is to the young fruit buds. These are often severely damaged or cut off entirely. Heavy infestations of leaf rollers can cause a serious reduction in the crop.

**Life history**

The insect overwinters in the egg stage. Eggs are laid in silvery masses, having the appearance of overlapping fish scales. Egg masses will be found on limbs and trunks of filbert trees. These masses are somewhat irregular in shape, but usually one-fourth of an inch in diameter. Each mass contains about 50 eggs. The eggs hatch in the spring, usually during the middle to the latter part of April at about the time the young developing leaves are the size of a silver quarter. Larvae feed on the leaves and buds for a period of 3 to 4 weeks, often protecting themselves within the rolled leaves.

The filbert leafroller has been a pest of concern to Oregon filbert growers since 1949, although an occasional specimen was observed during the two preceding years. The insect has been reported from British Columbia as a pest of minor importance on various fruits, particularly apple. It has been found in eastern Canada and eastern United States. It also is present in a number of European countries as a pest of tree fruits, small fruits, hops, and ornamentals.
leaves. This is particularly true as the larvae reach maturity. Larvae pupate within the rolled leaves and emerge as moths during the latter part of June and July.

Control
The filbert leafroller can be controlled by applications of sprays or dust to kill the young larvae soon after they have hatched from the eggs. During the past 8 years, spray notices for the control of this pest have varied from April 13 to May 5. The insecticide TDE, also known as DDD, has been the most effective material for the control of the filbert leafroller. It may be applied as a spray by adding 2 pounds 50% wettable powder to 100 gallons of water or as a 5% dust at a rate of 40 pounds per acre. DDT also has been used successfully at these same rates. It is less effective than the TDE, particularly when the larvae are protected within the rolled leaves. If DDT is used, application must be made soon after the young larvae are hatched and before they have an opportunity to protect themselves within the rolled leaves.

Polyphemus Moth

Telea polyphemus

Description and damage
The polyphemus moth is the largest moth occurring in Oregon. It is tan in color with an eye spot on each wing and has a wingspread of more than 5 inches. Mature caterpillars are about 3 inches long. They are pale green with pale yellow lines on each side. There are a number of short tubercles on each segment with bright red spots at the base of each tubercle.

Life History
The winter is passed in the pupal stage. The adults emerge in the spring and lay large, flat, brown eggs on the leaves of the host plant. The larvae mature in the late summer. There is but one generation a year. The caterpillars feed on a wide variety of host plants including oak, alder, apple, cherry, hazel, and filbert. Serious damage to filberts has been observed only on young trees, which are often defoliated by these caterpillars.

Control
Where control is necessary the use of lead arsenate as recommended for the filbert moth is suggested.
Filbertworm
Melissopus latiferreanus

Description
Adult moths have a wingspread of about one-half inch. Gray is usually the dominant color although some moths have a distinct reddish tinge; others appear almost black. The most distinct features are two golden bands across each forewing, one near the middle, the other along the outer edge.

When full grown, the larva, or filbertworm, is about one-half inch long and dirty white in color except for the brown head.

Damage
Soon after it hatches from the egg, the young larva enters the nut. Feeding within the nut destroys the kernel.

The direct damage to the nuts is not the only loss inflicted on the growers of filberts by this insect. A greater loss is the cost involved in separating the wormy nuts from the clean ones in processing plants.

The exit hole made by the larva when it leaves the nut offers easy access for stored-product pests, such as the Indian meal moth and Mediterranean flour moth.

Life history
The filbertworm is a native insect pest that has adapted itself to filberts. Its native hosts are known to include acorns, oak galls made by small wasp-like insects belonging to the family Cynipidae, wild hazelnuts, and chinkapin.

Larvae have been found in a few instances in overripe, hard cherries and ripening prunes. This insect is a pest of Persian (English) walnuts in California. In Oregon it has been found in some seedling walnuts, but has been found only in limited numbers in the major commercial varieties of walnuts in this area.

An occasional infested filbert was found as early as 1917. In Oregon, filbert moths were first found doing damage of economic importance to filberts in 1929. In a survey made in 1930 the insect was found throughout the filbert growing areas of the state. In 1929 most of the filberts infested were Davianas. By 1937 most of the infested filberts were found to be Barcelona, the principal commercial variety. At the present all varieties appear equally susceptible.

Larvae overwinter in silken cocoons. These cocoons may be found in the soil and leaves and debris on the ground. Most of the worms will be found in the top inch or two of soil. However, in loose soil, they may be found to a depth of several inches. They also are found in sacks in which filberts are handled, and in cracks of packing sheds or dryers. Some larvae spend the winter in the filberts. A few pupate within the nuts, but few of these emerge as moths. In the soil pupation begins late in May and by the
end of June most of the larvae have changed to pupae. Adult moths begin to emerge during July. The date the first moths appear varies with the season. During an 11-year period, 1947 through 1957, the first moth emergence varied from July 3 to July 25.

Moth emergence continues for several weeks. A few moths do not emerge until the end of August or the first days in September. A few larvae developing from eggs laid by the earliest emerging moths complete their development, leave the nut, pupate upon entering the soil, and emerge as moths the same season, about the time nut harvest begins. This partial second brood has not been large enough to cause appreciable damage.

The location of the overwintering cocoon has some effect on the time of pupation and the emergence of the adult. Adults emerge earliest from those cocoons located in soil, directly exposed to sunlight. Emergence is later from those cocoons in partially shaded and those in densely shaded soil. It appears that the position of the overwintering cocoon is the most important factor in accounting for the extended period of emergence.

Mating takes place soon after emergence, and egg laying may begin the following day if weather conditions are favorable. Moths are active only on warm, sunny days, and egg laying takes place during the hottest part of the day. Eggs are laid singly on the leaves, usually on the upper surface. An occasional egg may be laid on the exposed portion of the nut. The eggs are flattened, milky-white discs about one-fifteenth of an inch in diameter. Under ordinary weather conditions they hatch in 8 or 9 days.

The newly hatched larva moves to the underside of the leaf where some feeding is done. The young larva is active, moving about until it finds a nut. When a nut is located, entrance is made between the shell of the nut and the husk. When a point is reached where the husk is tight against the nut shell, it begins to bore into the soft tissue of the husk next to the shell. When the basal scar is reached, the larva tunnels about until the micropyle is located. The micropyle is in the center of the basal scar and is much softer than the rest of the shell. Entrance is made through the micropyle.

Frequently the larva perishes before entering the nut. Occasionally a larva failing to enter one nut will migrate to another. This occurs most frequently when two or more nuts are in a cluster.

On entering the nut the larva begins to feed on the kernel. It may tunnel into the center of the kernel or excavate an irregular cavity in the side. The larvae are voracious feeders and many are full grown within 15 days.

Filbertworm damage

Nuts showing entrance through micropyle and exit through micropyle and side
after entering the nut. Some of the larvae leave the nut immediately on reaching maturity. Others, although full grown, remain in the nut until after the harvest.

When the filbertworm first became a pest of filberts in Oregon, more than 90% of the larvae escaped from the nut by enlarging the entrance hole at the micropyle. Now that the filbertworm has become an established pest of filberts, and has stronger mandibles, the larva is capable of leaving the nut at any point.

Parasites usually are not an important factor in the control of the filbertworm. The egg parasite, *Trichogramma evanescens* (Westw.), appears to be the most important natural enemy of the filbert moth. During some seasons 15% of the filbert moth eggs are destroyed by this parasite.

In Oregon the principal native hosts of the filbertworm are acorns and insect galls on oaks. It was probably from these sources that the first filberts became infested. This insect is now so well established in filberts that the proximity of oaks seems to have little bearing on infestations in the filbert orchard.

**Control suggestions**

Insecticides may be applied in either spray or dust form. Many growers prefer to dust for the control of filbertworm. Whatever the method of application, it is important that the job be done thoroughly. It is particularly important that dust be applied when there is no wind. The best time to apply dust is at night or in the early morning.

**Dust program**

40% lead arsenate dust.

Apply the dust at the rate of 40 pounds per acre.

**Spray program**

Lead arsenate 3 pounds plus spreader to 100 gallons water.

The first spray or dust application should be made within a few days after moth emergence. County extension agents inform growers when moths are first observed. Not all moths emerge at the same time. Of late years, moth emergence has been extended. The extended period of emergence requires that two applications of insecticides be made to insure control. Usually the second application is made about 3 weeks after the first.

A number of insecticides have been tested for the control of the filbertworm. None has been superior to lead arsenate. Attempts to kill the larvae in the soil by treating the soil with insecticides have been unsuccessful.

Surface application of DDT at the rate of two pounds actual DDT per acre have been helpful in cleaning up heavily infested orchards. The application is made when the first moths emerge. Moths coming in contact with the DDT are killed. Lead arsenate is applied to trees following the DDT application to the soil surface.

Because of their dense foliage filberts are difficult to dust or spray. Care should be exercised to cover all parts of the tree with the dust, and sprays should be applied to the point of run-off.

Orchard sanitation practices are an aid to the control program. Screening windows and doors of packing sheds and dryers adjacent to orchards will prevent moths from escaping. Larvae sometimes leave nuts which are being transported in bags and overwinter in cocoons spun in the seams. It is desirable to store bags in moth-tight rooms or containers.
Omnivorous Leaf Tier  
*Cnephasia longana*

**Description and damage**

The omnivorous leaf tier occasionally has been observed doing considerable damage to the buds and leaves of young filberts. This most frequently occurs in those orchards which have a leguminous cover crop. The young larvae work on the vetch or cover crop and leave it when the cover crop is plowed under, attacking filbert leaves. It has been observed to be a serious pest only on the young filberts.

Adult moths have a wingspread of about three-fourths of an inch. The male has an even, grayish-yellow color while the female is grayish, mottled with brown spots. The full-grown larva is about one-half of an inch in length and grayish-yellow in color. It has two light stripes and a darker central stripe on the back.

Eggs are laid during July on the bark of trees or other rough surfaces. The eggs soon hatch into small larvae. They spin small silken cocoons in which to overwinter.

In early spring, beginning about the first of March, these young larvae are carried to suitable hosts on silken threads by air currents. These minute larvae mine the leaves of low growing plants such as clover, vetch, and plantain. On emerging from the leaf mines they migrate to flowers and tender tips of many kinds of plants.

**Control**

This insect may be controlled by applications of DDT or methoxychlor. Use a 5% dust or 2 pounds of 50% wettable powder per 100 gallons of water.

---

Scale Insects

Two species of scale insects have been found attacking filberts in Oregon. These are *Lecanium corni* and *Lecanium excrescens*. *Lecanium corni*, known as the brown apricot scale, is the most common and often the most destructive of the Lecanium scales. It attacks a great many kinds of trees and shrubs including filbert and wild hazel. *Lecanium excrescens* is the largest scale occurring in Oregon. It is globular in shape and is a third of an inch in diameter. It is brown in color and more or less covered with a white powdery substance. It is not a native
insect and presumably originated in one of the Asiatic countries. *Lecanium excrescens* does not appear to be as widespread as *Lecanium corni*.

**Life history**

*Lecanium corni* is almost hemispherical in shape and a shiny brown color, a little more than one-eighth of an inch in diameter. The winter is passed in a half-grown condition. Maturity is reached early in May. Eggs occur in great numbers during May and June. They are found beneath the parent scales. Eggs hatch through July and early August, and there is but one generation a year. Young crawlers hatching from these eggs move to leaves where they feed by sucking plant juices. In late summer they move back to the twigs where they spend the winter.

**Control**

Parasites are important in holding scale insects under control. Occasionally in some orchards applied control measures are necessary. A 4% dormant oil applied in the dormant season before buds open has given effective control of the scale. The crawler stage of the scale may also be controlled by applications of parathion or malathion during July. Parathion at the rate of 1 pound of 25% wettable powder per 100 gallons of water; or malathion at the rate of 2 pounds of 25% wettable powder or 1 pint 57% emulsion concentrate per 100 gallons of water have been effective.

---

**Filbert Nut Weevil**

*Curculio uniformis*

**Description and damage**

Nut weevil has in a few instances been found doing damage to filberts. Serious damage has not been observed in recent years. Adults are about one-fourth of an inch long and brownish-yellow in color. The beak is long, slender, and curved toward the body. It is longer than the head and thorax combined. The legless larvae are white with brown heads.

The normal host of this species is acorns. The adult weevil drills holes through the shell of the acorn and deposits one or more eggs in the hole. As many as five larvae have been observed in a single acorn. Adults are present in July and August. The larvae mature about the time the acorns begin to drop. They usually remain in the acorns during winter. They leave the nuts and enter the soil in early spring. Pupation occurs in July. There is but one generation a year.

**Control**

Control measures have not been developed for this insect and during recent years no control has been needed.
Small Gray Leaf Weevil
Thricolepis inornata

Description and damage
This is a small dark gray weevil about three-sixteenths of an inch in length and partially covered with white scales. The normal food of the weevil appears to be various species of oak, but many other hosts including filberts are attacked. Serious damage has only been observed on young trees. The unfolding buds are seriously injured as well as the leaves. Most severe damage has been observed on those filbert plantings which are near oaks.

Control
Lead arsenate as recommended for the control of filbert moth has been suggested in the control of this insect.

Tree Crickets

Description and damage
Two species of tree crickets, Oecanthus niveus and Oecanthus nigricornis, have been found on filberts. The adult crickets are usually pale yellow or brown in color. Occasionally the adults of Oecanthus nigricornis are almost black. The young are nearly white. Both the nymphs and adults are predaceous, feeding on scales, aphids, and other insects. At times, however, they feed on leaves and flowers of various plants. Often fruits, especially peaches, are badly scarred by tree crickets.

Life history
Adult tree crickets imbed their eggs in the tender young twigs. On young filbert orchards this occasionally causes some damage. A scarred condition of filbert nuts somewhat resembling tree cricket injury to peaches has been noticed. The condition has been observed in varying degrees since 1930.
Scarring of the nuts, although it has not caused substantial losses, has been increasing somewhat. The scarred condition of the nuts causes them to be reduced in grade.

**Control**

No control measures have been developed. If tree crickets are abundant, parathion or malathion as used for the control of scale insects is suggested.

**Tingids**

**Description and damage**

Two species of tingids (lacebugs), namely the western willow tingid, *Corythucha salicata*, and the choke cherry tingid, *Corythucha padi*, have been found doing damage to filberts. The former is occasionally a serious pest of apples in western Oregon.

*Corythucha padi* was originally described from choke cherry. It is found commonly on wild hazelnut and on alder. It has been observed on filberts in several parts of the Willamette Valley. Adult bugs are easily recognized by the flat lacelike appearance of their wings. They usually occur on undersides of leaves and feed by sucking plant juices. Very little of the life history of these insects is known.

**Control**

These insects can be controlled quite satisfactorily by the use of parathion at the rate of 1 pound of 25% wettable powder per 100 gallons of water; or malathion at the rate of 2 pounds of 25% wettable powder or 1 pint 57% emulsion concentrate in 100 gallons of water.
Eye-Spotted Bud Moth

*Spilonota ocellana*

**Description and damage**

The eye-spotted bud moth is an important orchard pest in the United States. It has occasionally been observed causing damage to young filbert orchards. Adults are somewhat smaller than the filbert moth, grayish-white with a cream white band across both wings. Larvae are chocolate brown with shiny black heads and about one-half inch long when mature. Occasionally the larvae damage leaves and buds in the spring.

**Control**

This pest can be controlled by the use of parathion or malathion as suggested for control of the filbert aphid.

This bulletin was prepared by B. G. Thompson, professor emeritus of entomology, and R. W. Every, Extension entomologist, Oregon State College.

Your County Extension Office can help with local disease and insect control recommendations for filberts and other crops.