

CONTROL OF PESTS ON SHADE AND ORNAMENTAL TREES--1955

G. D. JONES and H. E. SCOTT

Entomology

* Numbers in parentheses refer to dilutions shown on last page of this section.

TREES	PEST	CONTROL
EVERGREEN (Arbovitae, Red Cedars, etc.)	Bagworm	Hand pick and burn "bags" in late fall or winter. Spray with arsenate of lead (3) when the first worms appear. If the infestation is well established, increased dosage may be necessary. Frequently two applications are required at a two week interval for complete control.
	Red spider or Spider Mite	Sulphurs have been used with good success or liquid lime sulphur (7) as a dormant spray may be used or aramite (1).
ASH	Twig girdler	Gather and burn all fallen twigs. Spray trees in an infested area during June in North Carolina to control the adults. Lead arsenate (3) has apparently given good control.
	Borers	Remove and burn infested branches during the winter. Any new wounds made by the entering larvae may be painted with a mixture of paradichlorobenzene 1 pound and cottonseed oil 2 quarts. Heat the oil and stir until all crystals are dissolved. Do not paint a band around the tree or damage may result. If the borers are large and well established in the tree, carbon disulphide (12) may be injected into the tunnels and the opening sealed with putty or modeling clay. Some control with DDT (2) or BHC (8) sprays have been obtained when applied at the time moths are flying. In N. C. this is probably during the months of April and May.
	Oyster Shell Scale	Dormant liquid lime sulphur (7) or dormant oil (6) sprays.
BOX ELDER	Box Elder bug	Sprays containing 1% lindane, (approx. 1 to 1½ T., 20% emulsifiable conc. per gal.) have given good control of this pest, which frequently appears in annoying numbers and may invade houses. Nicotine sulphate, pyrethrum and sabadilla have also been used. Apparently, these bugs are attracted to the box elder seed. Therefore, if male trees only are planted, you are seldom bothered with these insects.
CATALPA	Sphinx Caterpillar	DDT (2) sprays and dusts may be used. Lead arsenate (3) is also satisfactory. Rotenone-bearing insecticides such as derris are also effective.
CEDAR (Deodar)	Deodar Weevil	There is no recommended chemical control. DDT (2) sprays applied when the beetles are active gives some control of a closely related species. The beetles are present in the fall of the year. Sept. and Oct. in N. C. Lime sulphur sprays are said to be repellent.
	Bagworms	See Evergreen
DOGWOOD	Twig borer	Remove girdled twigs and burn them. Be sure to cut several inches below the injury.
	Borer	A mixture of 1 pound of paradichlorobenzene crystals and 2 quarts of cottonseed oil when applied to the parts of the tree attacked give good control. Spraying the tree trunks with DDT (2) when the moths are flying may also be of benefit in the control of this pest. The moths emerge in April and May in N. C. BHC (8) sprays may be effective also.
	Club Gall	There is no complete control for this pest. Spraying at weekly intervals for at least 5-6 weeks with 4 pounds of rosin-residue emulsion plus 4 pounds of cube powder in 100 gallons of water may be helpful. This spray should be applied beginning about mid-April. Remove and burn galls.

Control of Pests on Shade and Ornamental Trees—1955—(continued)

TREES	PEST	CONTROL	
ELM	Elm Leaf Beetle	DDT (2) sprays or dusts or use lead arsenate (3) plus 1 pound of fish oil soap or linseed oil to 100 gallons of water. Spray when first beetles or damage appears, which is during April in North Carolina. Two sprays at a two to three week interval may be necessary for complete control.	
	Borers	Dig out the borer with a chisel or pocket knife or inject a fumigant (12) into the tunnel and plug the opening with soft clay, putty or plasticene or kill in the tunnel by inserting a wire probe. BHC sprays (8) may be helpful.	
	Bark Beetle	See Hickory.	
	Scales — Oyster Shell and other species.	See Ash.	
	Twig Girdler	See Ash.	
HICKORY	Aphids — Leaf-gall making and several others.	The best over-all control of aphids is a solution made up of: Nicotine sulphate (40%), 1 pint; white laundry soap or fish oil soap, 3-4 pounds; water, 100 gallons. Where aphids winter over on trees in the egg stage, a dormant oil (6) or dormant liquid lime sulphur (7) spray may be used.	
	Tent Caterpillars	Cut off infested branches where possible. Spray, using DDT (2) or lead arsenate (3) when the worms are small and the webs are flimsy.	
	Walnut Caterpillar	See Walnut	
	Twig Girdler	See Ashe	
	Borers	See Elm	
HOLLY	Bark Beetles (Several Species)	Cut and destroy heavily infested trees. Spray adjacent trees with BHC (8) to prevent establishment of the pests.	
	Holly leaf miner	Pick off and burn infested leaves. DDT (2) or lead arsenate (3) may give satisfactory control when applied before the eggs hatch. Flies usually emerge during early April in North Carolina.	
	LOCUST (Black)	Borers—several species of beetles and larvae of carpenter worm and leopard moth. Leaf miner	Dig out or inject fumigant as for the elm borer. Spray tree trunks with BHC (8) when the adult beetles are flying from early August through Sept. Lead arsenate (3) or DDT (2) sprays are suggested for control of this pest. These sprays should be applied during late April in North Carolina.
	LOCUST (Honey)	Mimosa webworms	During first week of June apply a spray containing: Lead arsenate, 4 lbs.; linseed oil, 1 pint; nicotine sulphate (40%), 1 quart; water, 100 gallons, OR DDT (2) sprays.
	MAGNOLIA	Scale	DDT (2) or malathion (11) applied when the "crawlers" are present gives good control. Nicotine sulphate (4) sprays are also effective against this stage of the pest. Since oils injure some species of magnolias, care must be taken if dormant sprays (6) are applied.
MAPLES	Aphids (several species)	See aphid control under Elm.	
	Scale (several species)	See Oaks.	
	Borers (several species)	See borers in Elm.	
	Caterpillars	See Oaks	
MIMOSA	Mimosa webworm	See honey Locust.	
OAKS	Leaf eating caterpillars	Sprays covering the leaf surfaces with lead arsenate (3) or DDT (2) or malathion (11) at the time caterpillars first show up before they can do too much damage.	
	Borers (Carpenter worms, leopard moth, etc.)	Prune out and burn severely infested branches. Open hole through bark and inject fumigant (12). Weakened trees are often most subject to attack. If possible correct primary cause weakening tree. Fertilize and water tree to restore vigor. BHC spray (8) may be found helpful.	
	Scales	Best control is a dormant oil (6) spray applied during dormant season of February through March. Other sprays which may be used are nicotine sulphate and white oil (5) or winter strength lime sulphur (7). Summer oil spray, (9) not as effective as dormant sprays.	

Control of Pests on Shade and Ornamental Trees—1955—(continued)

TREES	PEST	CONTROL
OAKS	Blotch oak leaf miner	Rake leaves in fall and burn. Spray leaves with nicotine sulphate (4) at the time mines begin to appear.
	Flat-headed borers	Usually only attack weakened trees. Badly infested trees should be cut down and burned before spring. Increase vigor of remaining oaks by fertilizing and watering. Correct if possible, original cause of tree being weakened. Spray foliage of oaks with DDT (2) as soon as leaves are fully grown in the spring. BHC spray (8) on trunks of remaining oaks.
	Pin Oak Saw Fly	Spray under surface of leaves with lead arsenate (3) or DDT (2) when larvae first appear.
PECAN	Fall Webworm	Spray using DDT (2) or lead arsenate (3).
	Walnut caterpillar	See Walnut
	Twig Girdler	See Hickory
	Pecan weevil Nut casebearer	Grow non-susceptible varieties. DDT (2) spray and dust. Lead arsenate (3) may cause damage if used under North Carolina conditions.
PINES (all pines)	Pine needle scale	Lime sulphur (7) spray during dormant season. Spray with malathion (11) or white oil plus nicotine (5) mixture during spring when young scales are in the "crawler" stage.
	Saw flies	Spray with lead arsenate (3) or DDT (2) as soon as larvae appear. On small infestations or small trees larvae may be picked off by hand and destroyed.
	Pine tip moth	On small trees pick off and burn infested twigs. Spray with DDT (2) at time moths are in flight. Several sprays a month apart may have to be applied beginning about the middle of March.
	Pitch mass borer	Remove pitch as soon as it appears. Cut out tunnels around edges of bark with knife or chisel until larvae is found and destroyed.
	Bark beetles	If pine needles have turned brown, beetles have usually already left tree and pine is dead. Very light attacks may be controlled by spraying with BHC (8). With exception of turpentine beetle control is most difficult and once foliage turns yellow it would be best to remove infested tree and kill brood in tree by burning or spraying with BHC (8). Remaining adjacent pines should have trunk thoroughly sprayed with BHC (8) and original conditions causing weakening of trees should be corrected if possible. Fertilize and water to increase vigor of remaining trees.
PINES (white)	White pine twig droop or pine needle louse	Spray with nicotine sulphate (4) in early summer, when tiny lice are observed on needles and twigs.
	Pine bark louse or aphid	Spray with nicotine sulphate (4). A strong stream of water from a hose can often wash the majority of these off the trees. Repeat whenever insects begin to increase in numbers. Malathion (11) may also be used.
SYCAMORE or PLANE TREE	Lace Bug	Spray lower leaf surfaces with DDT (2) lindane (10) or malathion (11) in spring soon after leaves are fully grown. In mid-summer spray lower leaf surfaces with nicotine sulphate-summer oil mixture (5).
WALNUT	Lace Bug	See Sycamore
	Walnut caterpillar	Spray in June and July and again in latter part of August and September when caterpillars first appear with lead arsenate (3) or DDT (2).

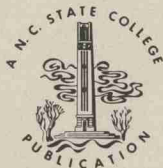
SPRAY AND DUST DILUTION CHART

MATERIAL	T: Tablespoon			t: teaspoon
	For 100 Gallons	For 2½ Gallons	For 1 Gallon	% Concentration for Dusts
1. Aramite 15% W.P.	2 lb.	3 T	1½ T	
2. DDT 50% W.P.	2 lb.	3 T	1½ T	5
3. Lead Arsenate	4 lb.	7 T	3 T	20
4. Nicotine sulphate 40%	1 pt.	3 t	1½ t	
Emul. white laundry or fish oil soap	3 lb.	1½ oz.	½ oz.	
5. Nicotine sulphate 40%	1 pt.	3 t	1½ t	
Emul. summer oil	2 qt.	10 t	4 t	
6. Dormant oil	3 gal.	1¼ cups	8 T	Dormant spray
7. Liquid lime sulphur	8 gal.	3 cups	1 cup	Dormant spray
8. BHC (10-12% Gamma) WP	32 lb.	1 lb.	1/8 lb.	Bark spray
9. Summer oil	1 gal.	½ cup	3 T	
10. Lindane	2 lb.	3 T	1½ T	1
11. Malathion	2 lb.	3 T	1½ T	5

12. **Borers in wood of trunk, branches and large roots.** Some borers work underneath the bark for a time before they bore a tunnel into the wood. Entrance holes through the bark may often be detected by bleeding, boring dust or discolored spots in the bark. Open up the hole through the bark with a chisel and trace borer along under bark until grub or larvae is found and destroyed, or tunnel turns and goes directly into the wood. Inject about a tablespoonful of carbon disulphide, carbon tetrachloride, or some other standard grain fumigant into borers tunnel with pressure type oil can. Benzene hexachloride put up in the form of a paste in a tube for borer control may be squirted into the hole in the place of a fumigant if so desired. Holes should then be closed up with putty or some similar material. Water and fertilizer trees attacked by borers to aid in recovery. Wounds in the trees should be "shaped up" and painted with tree wound dressing. BHC (8) on the trunk and larger branches may help control borers.

13. CAUTIONS

Oils sprays of any type are reported to cause damage to the following trees: Japanese and sugar maples, magnolias, walnut, beech, butternut, yellow wood, true firs, douglas fir, yews, hemlock, hickory, cryptomeria and retinospora. Lead arsenate treatments may cause damage to pecan trees in humid climates. Aramite may damage dogwoods. BHC solutions may damage redbuds.



Published By
THE NORTH CAROLINA AGRICULTURAL EXTENSION SERVICE

North Carolina State College of Agriculture and Engineering of the University of North Carolina and the U. S. Department of Agriculture, Cooperating, State College Station, Raleigh, N. C., D. S. Weaver, Director. Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914.



ORNAMENTAL SHRUB PEST CONTROL

Published By

THE NORTH CAROLINA AGRICULTURAL EXTENSION SERVICE

North Carolina State College of Agriculture and Engineering of the University of North Carolina and the U. S. Department of Agriculture, Cooperating. State College Station, Raleigh, N. C., D. S. Weaver, Director. Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914.

ORNAMENTAL SHRUB PEST CONTROL

H. E. SCOTT
Extension Entomologist

SHRUB	PESTS	CONTROL
AZALEA	Lace Bugs	Nicotine sulphate 40% plus soap at a rate of 1 teaspoonful of nicotine sulphate and 1 cubic inch of white laundry soap to 1 gallon of water, or use 1 cup of white oil emulsion plus 4 teaspoonfuls of nicotine sulphate to 3 gallons of water. It is easier to control these pests in the nymphal than the adult stage. Lindane may also be used.
	Mealy Bugs	Spray, using 1 cup of white-oil emulsion plus 4 teaspoonfuls of nicotine sulphate 40% to 3 gallons of water. Two or three sprays are usually needed for good control.
	Red Spiders or Spider Mites	The same treatment as used for mealy bugs is effective. Dusting sulphur may be used very effectively when temperatures are from 65-90° F. If applied when temperatures are too low the pests are not killed; if applied when temperatures are too hot plant damage may occur. Aramite or DN dusts may also be used. Follow manufacturers directions.
	Scale Insects	These pests are controlled by the same white oil emulsion-nicotine sulphate spray used to control mealy bugs.
BOXWOOD	European or Giant Hornet	DDT, chlordane and lindane containing sprays or dusts, apparently give good control when applied in the areas frequented. Derris and lead arsenate sprays may be effective. If the nest is in a confined area a fumigant may be used.
	Leaf Miner	Spray with DDT when the new growth begins. Use ¼ pound of 50% DDT wettable powder to 12 gallons of water. DDT emulsions have been used where the wettable powder residues were considered unsightly. Lindane has also been reported to give good control.
	Oyster Shell Scale	Use 7½ pounds of 40% DN per 100 gallons of water. This material may stain paint, clothes, etc. Dormant liquid lime sulphur at a rate of 11 gallons per 100 gallons of water also gives good control.
CAMELLIA	Red Spiders or Spider Mite	Spray when temperatures are between 60 and 90° F. with 1¼ cups of white-oil emulsion in 3 gallons of water. Do not use on new growth.
	Tea Scale	Same as for spider mites. Two or three applications at weekly intervals are usually necessary for good control.
EUONYMOUS	Euonymous Scales	Remove and burn as much heavily infested wood as possible. Use a dormant oil spray.
GARDENIA	Aphids	Same control as for mealy bugs on Azaleas. Malathion and lindane sprays and dusts are said to give good control of aphids. Nicotine sulphate may also be used.
	Mealy Bugs Soft Brown Scale	See Azaleas. See Azaleas.

SHRUB	PESTS	CONTROL
	Whiteflies	Use 5 tablespoonfuls of 50% DDT wettable powder in 3 gallons of water or 1 cup white-oil emulsion plus 4 teaspoonfuls of 40% nicotine sulphate to 3 gallons of water or pyrethrum and derris containing sprays.
HOLLY	Holly Leaf Miner Mealy Bugs	Pick off infested leaves in winter and burn them. DDT sprays containing 4 pounds of 50% wettable powder per 100 gallons of water will give control if at least two applications are made, one about April 15 and a second 2 weeks later. See Azaleas.
HYDRANGEA	Hydrangea Leaf Tier	Destroy leaves that are tied together. Spray or dust using DDT as for Juniper Webworm.
JAPANESE QUINCE	San Jose Scale Japanese Beetle	Liquid lime sulphur as a dormant spray gives good control. Use 1 gallon of liquid lime sulphur to 8 gallons of water in spring before buds burst. Dormant oil sprays give good control also. DDT, lead arsenate and pyrethrum sprays and dusts give good control of the adults. DDT and lead arsenate are best since they have residual action. Pyrethrum may be used on fruits and vegetables almost ready for harvest. The grubs in the soil can be controlled with DDT, lead arsenate, or chlordane. Lead arsenate is used at a rate of 450 pounds per acre or DDT at 25-50 pounds actual per acre, or chlordane 10-20 pounds actual per acre.
JUNIPER	Juniper Scale Juniper Webworm	Sprays containing oil may injure if directions are not closely followed. Superior dormant oil sprays give good control. These are usually used at a rate of 2-3 gallons per 100 gallons of water. Summer sprays containing parathion, summer oil, and summer oil plus nicotine, if applied when the "crawlers" are present will keep an infestation checked. Dormant liquid lime sulphur sprays may be safer. Use 8 gallons per 100 gallons of water. This spray may stain woodwork, bricks, walks, etc. Spray once or twice in the spring with DDT. Using 2 pounds of the 50% wettable powder to 100 gallons of water. DDT dusts may also be used.
MAGNOLIA	Magnolia Scale	Dormant oil sprays give good control of this pest. Some species of magnolia are susceptible to oil injury.
MOCK ORANGE	Aphids	Nicotine sulphate sprays or dusts give good control. Also DDT at a rate of 2 pounds of the 50% wettable powder in 100 gallons of water. Malathion also gives good control of this pest.
PRIVET	Aphids Lilac Leaf Miner	See Gardenia. Pick off and burn infested leaves, while the "worms" are still in the mines. Spray with as much pressure as possible (up to 500 pounds) using ½ cup lead arsenate powder, 2 tablespoons nicotine sulphate 40%, ½ cup summer oil and 5 gallons of water. Two applications may be necessary. Begin when the first injury is noted.

SHRUB	PESTS	CONTROL
	Thrips	DDT sprays give good control of these pests. DDT-sulphur dusts are also effective. Nicotine sulphate and lindane sprays and dusts may also be used.
	Whiteflies	See Gardenia.
	White Peach Scale	Two applications of dormant oil (3%) two weeks apart give good control.
PYRACANTHA	Lace Bugs Scales	See Azaleas. See Azaleas.
RHODODENDRON	Lace Bug Borer	See Azaleas. Cut off and burn infested areas. Nicotine or lindane paste for borer control in new holes may be helpful.
ROSE	Aphids	Sprays containing nicotine sulphate or malathion give good control.
	Japanese Beetle	See Japanese Quince.
	Rose Chafer	DDT dusts or sprays give good control.
	Rose Leaf Beetle	DDT dusts and sprays give good control.
	Rose Leaf Hopper	Dust or spray the underside of the foliage with DDT.
	Rose Midge	Cut and burn infested tips. Dust foliage with DDT or lindane every 5-7 days for 5 or 6 dustings to control the adults emerging from the soil.
	Rose Scale	Remove as much old infested wood as possible. Spray during the dormant season with a white-oil emulsion containing $\frac{1}{2}$ cup of the concentrate to 1 gallon of water. Lime sulphur as a dormant spray is also effective but stains fences, houses, etc.
	Rose Slugs	DDT containing dusts or sprays are very effective in the control of this insect.
	Rose Stem Borers	Applications of DDT at weekly intervals while the adults are present, are said to give considerable control.
	Spider Mites	Clean up all trash and leaves in the early spring. Dust frequently with sulphur or 1% rotenone. If the infestation still increases use a miticide such as aramite or malathion. Two applications one week apart are usually required for good control.
	Thrips	See Privet.
SPIREA	Aphids	See Gardenia.
VIBURNUM	Snowball Aphid	Control of this species is difficult. Dormant oils reduce the egg population. This, followed by repeated applications of nicotine sulphate and soap give good control. Where possible use aphid resisting varieties.
WISTERIA	Fall Webworm	If only a few webs are noted on the ends of the twigs or branches they may be removed and burned. Lead arsenate, DDT, etc., give good control when applied as a spray or a dust.
YEW	Mealy Bugs Black Vine Weevil	See Azaleas. Treat, when the first beetles or weevils are noted on the plants, with 10% DDT dust. Lead arsenate sprays are also effective. Soil treatment using chlordane, lead arsenate, DDT or aldrin may be helpful.