

OREGON AGRICULTURAL COLLEGE AND EXPERIMENT STATION**Insecticides for the Gardener**

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It is not our purpose to give here an extended discussion of sprays and spraying, but rather to give a few methods for controlling insects of the garden.

Destructive insects secure their food either by eating portions of plants, etc., or by sucking the juice therefrom. The first general group are controlled by food poisons taken into the stomach, the second by contact or external insecticides.

INTERNAL INSECTICIDES.

These are divided into two groups, and may be called wet and dry sprays.

Arsenicals: The wet sprays consist of Arsenicals applied with water or Lime-Sulfur as a distributing agent.

About the only one in use at the present time is Arsenate of Lead, which, when properly made and unadulterated, is efficient and does not burn the foliage, as sometimes does Paris Green. For ordinary use Arsenate of Lead two pounds to fifty gallons of water is effective. At times it is necessary to use five pounds of Arsenate of Lead to fifty gallons of water, as some insects do not readily succumb to a small amount of the poison.

The dry sprays are applied in the powdered form, and there are a number on the market, including several brands of powdered Arsenate of Lead. Paris Green and Arsenate of Lead, when pure, are as efficient as any, although at the present time the Paris Green is more in use than is the powdered Arsenate of Lead. Paris Green applied to plants in an unadulterated condition may seriously burn the foliage. To obviate this it may be diluted as follows:

Paris Green, 1 lb.

Air slaked lime, fine road dust or wheat flour, 20-25 lbs.

This may be applied with a dust gun or can be sifted onto the plants by means of a gunny sack or perforated can.

Hellebore: In a powdered form and fresh is of value for poisoning such insects as are injurious to small fruits or vegetables which are nearly ready for market, and on which it is undesirable to use Arsenical posions. Dust over the plants when plants are moist with dew.

Poisoned Baits: In addition to the above sprays, poisoned baits are desirable for destroying grasshoppers, cutworms, and a few other insects. Such baits are most effective if used early in Spring, just before the crops to be protected have come up. Poisoned slices of potato or some similar vegetable treated with a strong solution of Arsenate of Lead or Paris Green are used to poison sow-bugs and wireworms.

A poisoned bran mash may be made after the following formula and is useful for destroying cutworms, wireworms, etc.:

White Arsenic, 1 lb.

Brown sugar, $\frac{1}{2}$ lb.

Bran, 6 lbs.

Mix the ingredients thoroughly, then add enough water to make a wet mash. A spoonful should be placed at the base of each tree or vine. For cutworms a still better bait may be prepared by mixing thoroughly Paris Green, bran, and middlings as follows:

Paris Green, 1 lb.

Middlings, 15 lbs.

Bran, 15 lbs.

This may be sown broadcast upon the vegetation, about the borders of cultivated fields, or gardens; or by use of a seed drill it may be sown along the rows of plants to be protected. So used it has been found especially valuable for destroying cutworms in the onion fields.

EXTERNAL OR CONTACT INSECTICIDES.

There may be any number of efficient contact insecticides, but the tobacco compounds and kerosene emulsion, as outlined below, are inferior to none in their killing properties.

Black-Leaf, or Black-Leaf 40, are commercial tobacco compounds made by the Kentucky Tobacco Product Company, of Louisville, Ky. Most dealers in insecticide materials handle these sprays. Printed directions for use are given on each can.

Kerosene Emulsion: This is usually prepared as a stock solution and then diluted to the required strength for spraying. The necessary materials are as follows:

Hard soap, $\frac{1}{2}$ lb.

Water, 1 gal.

Kerosene, 2 gals.

The soap should be dissolved in boiling water, and when thoroughly dissolved the containing vessel should be removed from the fire and the kerosene added. The mixture should then be thoroughly agitated until it is creamy white. This is best done by a hand pump, forcing the mixture through the hose and back into the container. This then forms three gallons of stock solution which can be diluted to the required strength by adding given amounts of water. To get the amount of any given percentage, divide the percentage into 200 and then subtract three from the answer; and we have the amount of water necessary to add to each three gallons of stock solution for that per cent.

Example: We desire a 15%, 20%, and 7% solution.

$200 \div 15 = 13 \frac{1}{3} - 3 = 10 \frac{1}{3}$ gallons of water to be added to three gallons of stock solution to get a 15% solution.

$200 \div 20 = 10 - 3 = 7$ gallons of water to be added to three gallons of stock solution to get a 20% solution.

$200 \div 7 = 28 \frac{1}{2} - 3 = 25 \frac{1}{2}$ gallons of water to be added to three gallons of stock solution to get a 7% solution.

Carbolic Acid Emulsion: Carbolic acid emulsion is used to destroy eggs and young maggots which infest radishes, onions, and similar garden crops; and occasionally for other insects:

Crude carbolic acid, 1 pt.

Hard soap, 1 lb.

Water, 1 gal.

Dissolve the soap in boiling water; add the acid and churn as for kerosene emulsion. Use one part of emulsion to thirty parts of water. Apply to the surface of the ground about the plants.

WHEN TO SPRAY AND WHAT TO USE.

Aphids or Plant Lice: Cucumber aphid, cabbage aphid, lettuce aphid, strawberry aphid, rose aphid, etc.

Plant lice often become very troublesome in the garden on various plants, and some of them are extremely hard to control. Black Leaf, Black Leaf 40, or Kerosene Emulsion applied at any time when the aphids become troublesome or before the leaves curl are effective.

Cabbage and Cauliflower: For worms use Paris Green or Arsenate of Lead. For Aphis see Aphids.

Cucumber: For striped cucumber beetle, dust the plants with Paris Green or spray with Arsenate of Lead. Plant some early squashes for trap plants and when the beetles are feeding on them dust heavily with Paris Green. For Aphis see Aphids.

Currants: For worms on the leaves spray with Arsenate of Lead. For fruit worms, destroy infested fruit and allow the poultry the run of the bushes when infested fruit is falling. For Aphis apply aphid spray when leaves are just coming out.

Gooseberry: Same as currant.

Muskmellon: For striped cucumber beetle, see cucumber.

Onion: For cut worms use Bran-Arsenic mash or Paris Green dry bait.

Pea: For Aphis apply Black-Leaf or Kerosene Emulsion at the time the plant lice are present.

Potato: For flea-beetles, spray with Arsenate of Lead three pounds to fifty gallons of Bordeaux mixture or Lime-Sulfur Summer strength whenever they appear, and repeat at intervals of two or three weeks if necessary.

Radishes: For root maggots, spray with Carbolic Acid Emulsion as soon as the young radishes appear above the ground.

Raspberry: For cane maggots, cut out the infested cane and burn.

Rose: For aphid and leaf hoppers spray with Black-Leaf or kerosene emulsion.

Strawberry: For crown miner and root borer destroy infested plants before May 1st. For leaf rollers burn tops just as soon as possible after the crop has been gathered. In addition to this it is recommended that the foliage be sprayed thoroughly with Arsenate of Lead about the middle of April. This should be repeated in about two weeks. For cut worms use bran-Arsenic mash or Paris Green dry bait.

Sugar Beets: For flea-beetles see potato.

Tomato: For flea-beetles see potato. Spray aphids with Black-Leaf or kerosene emulsion.

Violets: For red spiders or aphid use Black-Leaf or kerosene emulsion. In the case of the red spider the spray must be made to reach the under side of the leaves.

Lime-Sulfur Summer strength may be used to advantage, but some times burns the foliage.

Watermellons: See muskmellon.