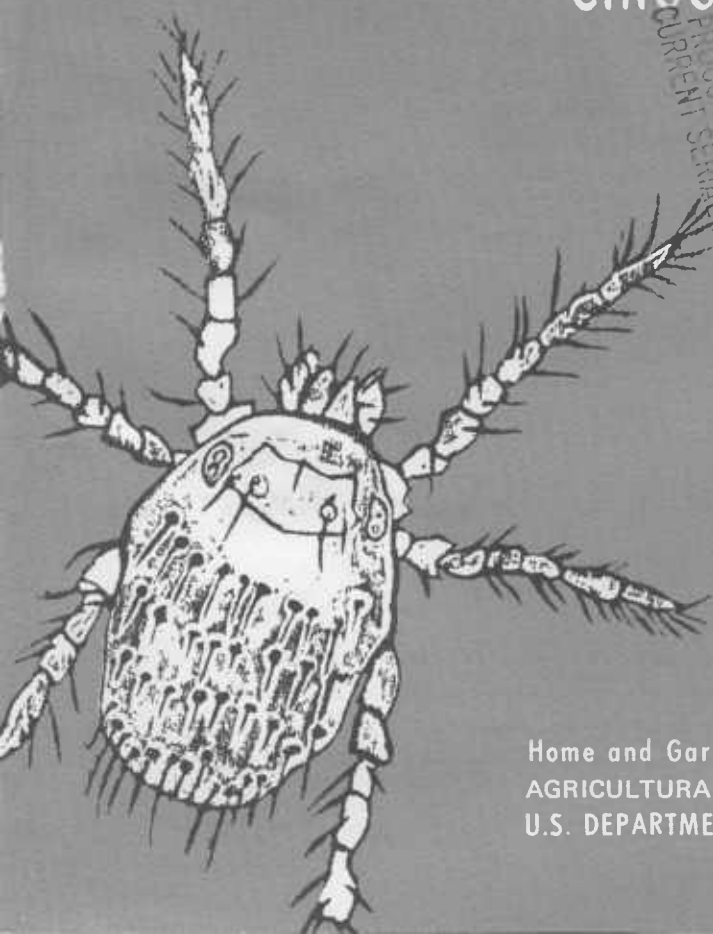


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CONTROLLING CHIGGERS



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Home and Garden Bulletin No. 137
AGRICULTURAL RESEARCH SERVICE
U.S. DEPARTMENT OF AGRICULTURE

Prepared by
Southern Region
Agricultural Research Service



Use Pesticides Safely
FOLLOW THE LABEL
U.S. DEPARTMENT OF AGRICULTURE

This bulletin supersedes Leaflet 403, "Chiggers: How To Fight Them."

Washington, D.C.

Revised April 1976

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402
Price 35 cents; 25% discount allowed on orders of 100 or more to one address

Stock No. 001-000-03506-1/Catalog No. A 1.77:137/3

There is a minimum charge of \$1.00 for each mail order

CONTROLLING CHIGGERS

Chiggers, sometimes called red bugs, make up a family of mites. Five species found in the United States commonly attack man.¹

Chigger bites cause intense itching and small, reddish welts on the skin. You may notice these symptoms in the summer after working in the garden, walking in the woods or fields, picking berries, or mowing the lawn. The symptoms may be your only way of knowing that you have been in an infested place, because chiggers are so small that most persons cannot see them without a magnifying glass.

Chiggers are found throughout the continental United States.

You can use a repellent to prevent attacks by chiggers if you go in an area known to be infested. If you get in an infested area without knowing it, you can reduce itching by bathing and by applying an antiseptic and a local anesthetic to the welts. You can get rid of an infestation by spraying or dusting the infested area with an insecticide.

DEVELOPMENT

Adult chiggers pass the winter in protected places and become active in the spring. A few days after the

females become active they lay eggs in sheltered places. These eggs hatch into the first generation of the year.

The young chigger is known as a larva. It is the troublemaker. It is a parasite—feeds on man and animals. The larva transforms to a nymph, and the nymph to an adult. Neither the nymph nor the adult is a parasite.

Chiggers raised experimentally complete the life cycle—from egg to egg—in about 50 days.

In southern Florida and southern Texas, chiggers may be present throughout the year. In other States, the chigger season begins in May, June, or July and lasts until September or the first frost.

APPEARANCE

In the larval stage chiggers are orange yellow or light red. They are less than $\frac{1}{150}$ inch in diameter. The bodies are hairy. A larva has three pairs of legs. Its mouth parts include two pairs of grasping palps, which are provided with forked claws.

The nymphs and adults have four pairs of legs. The bodies are hairy, about $\frac{1}{20}$ inch long, and usually a brilliant red. There is a marked constriction in the front part of the bodies.

¹ *Eutrombicula* species.

FEEDING HABITS

Young chiggers attach themselves to the skin of people or to the skin of domestic animals, wild animals (including reptiles), poultry, and birds.

Before settling down to feed, chiggers scurry around for a suitable location. The preferred locations on people are those parts of the body where clothing fits tightly over the skin, or where the flesh is thin, tender, or wrinkled.

Like ticks, they attach themselves by inserting their mouth parts in the skin—frequently in hair follicles or pores. They inject a fluid into the skin; the fluid dissolves the tissues; the chiggers suck up the liquefied tissue.

When they attach themselves to

animals, they become engorged in about 4 days. Then they drop off and change to nymphs.

Nymphs and the adults feed on insect eggs, small insects, and organisms found on or near woody decaying substances.

EFFECTS OF ATTACK

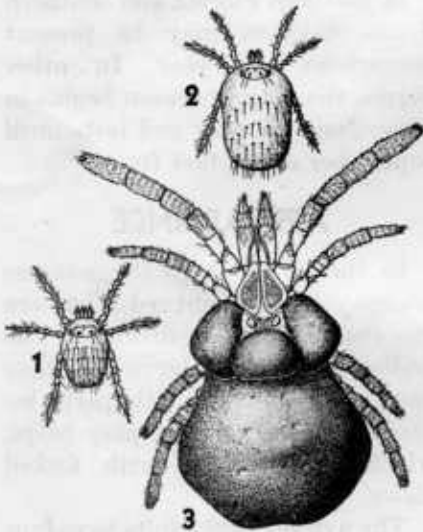
The fluid injected into the skin by the chiggers causes reddish welts to appear. It also causes swelling, itching, and (in some persons) fever. Chigger bites have a more severe effect on some persons than on others. Persons who are exposed repeatedly may develop immunity to the bites.

A chigger attached in a pore or at the base of a hair may be so enveloped in swollen skin that it appears to be burrowing into the skin. This fact sometimes leads persons to believe, mistakenly, that chiggers embed themselves in the skin, or that welts contain chiggers.

Any welts, swelling, itching, or fever will develop within 24 hours after the attack. Itching may be intense and, if nothing is done to relieve it, may continue a week or longer. Scratching a bite may break the skin and result in infection.

Chiggers attacking in large numbers can cause serious injury to poultry. They sometimes cause the death of young chickens.

Chiggers are not known to transmit any disease in this country. In some parts of the world, particularly in parts of the Far East, they transmit scrub typhus, a serious disease similar to spotted fever. In this country spotted fever is transmitted by ticks.



A Species of Chigger (*Eutrombicula batotus*)

1. Unengorged larva
2. Engorged larva
3. Adult

From Michener. Ann. Ent. Soc. Amer. 1946

INFESTED PLACES

Chiggers are most often found in low, damp places where vegetation is rank—for example, berry patches, orchards, woodlands, and margins of lakes and streams. But some species are adapted to living in drier places where vegetation is low, and heavy infestations may be found in lawns, golf courses, and parks.

You cannot tell by looking at a place whether it is infested. Chiggers may be numerous in a place one year, and scarce or absent another year; and they occur in some places only for short periods.

USING REPELLENTS

Before going into a place where chiggers may be, protect yourself against them by using a repellent.

Several highly effective repellents are available. They do more than repel. Chiggers that attempt to crawl over clothing or skin areas treated with the materials are killed.

Repellents can be used to obtain either temporary or long-lasting protection. Used the first way, they are effective several hours; the other way, several days.

Temporary Protection

The following repellents are effective against chiggers—deet (diethyltoluamide), dimethyl phthalate, dimethyl carbate, and ethyl hexanediol. They are also effective against mosquitoes and some other insects. Go to a drugstore, hardware store, or any other store where insecticides are sold. Ask for any one of the



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Applying repellent to socks and cuffs of trousers for protection against chiggers.

repellents by name. You may be offered a product that contains two or more of the repellents. Such a product is acceptable. The repellents are effective individually or in combination.

Apply the repellent to clothing by rubbing it on, by applying it directly from the bottle, or by spraying it on. Some kinds of rayon and some other manmade fabrics may be harmed by the repellent; nylon, cotton, and wool will not be harmed.

Apply the repellent lightly, with the fingers, to the arms or legs if they are not covered by clothing.

Treat socks or stockings after you put them on. Apply a ring of repellent just above your shoe tops. Treat all the way around the upper

edges of the hose. Cotton and wool socks absorb repellent better than other materials and are preferred for wearing in chigger-infested places.

In treating other clothing, apply the repellent along the edges of all openings, inside and outside. Besides treating openings that are buttoned, zippered, or otherwise fastened, treat such openings as the following:

In trousers and slacks.—Cuffs and waistband.

In shirts and blouses.—Cuffs (or armholes) and neckband.

In skirts.—Hem and waistband.

In dresses.—Neckline and skirt hem; cuffs, sleeve hems, or armholes.

To rub a repellent on clothing, pour about a dozen drops in the palm of one hand, rub the hands together, then rub lightly the parts of the clothing to be treated.

To apply it directly from the bottle, press the bottle opening against the clothing and move it over the parts to be treated.

To spray a repellent on clothing, use an ordinary hand sprayer—the kind used in homes for applying fly sprays.

Do not saturate the cloth with repellent. If a garment is moist with repellent along all openings—inside and outside—it has been adequately treated.

If the infested place is one in which the vegetation is low, if you intend merely to walk in it, and if you are wearing trousers or slacks, you need only apply repellent to the cuffs of the trousers or slacks and to socks or stockings.

Long-Lasting Protection

Long-lasting protection against chiggers is needed chiefly by men who work regularly in infested areas and by others—such as campers, hikers, and hunters—who may be in such areas several days at a time.

The protection is obtained by impregnating clothing with a diluted repellent or by spraying an undiluted repellent on the clothing.

Buy 50-percent deet, or full-strength dimethyl phthalate or benzyl benzoate.

Impregnating the clothing

Two fluid ounces of repellent are needed to treat an ordinary set of work clothes—shirt, trousers (or overalls), and socks.

Prepare a solution by adding the repellent to 3 pints of any dry-cleaning fluid. After all parts of the garments have been saturated with the solution, let the cleaning fluid evaporate.

Prepare an emulsion as follows: (1) Put $\frac{3}{4}$ ounce of soap powder (but not synthetic detergent) or thinly sliced soap in 1 quart of water and stir until the water is soapy. (2) Take one cupful of the soapy water, add 2 ounces of the repellent, and stir vigorously. (3) Pour this into the rest of the soapy water and stir vigorously.

Place the clothes in a container and slowly pour on the emulsion. Work the clothes around in the liquid. Wet them uniformly but do not let them soak. Wring them and hang them out to dry.

Deet or dimethyl phthalate gives protection for at least a week, un-

less washed out of the clothing. Laundering washes out the repellent; a heavy rain may do so. Repellent in trousers and socks is washed out if the wearer wades through water. Re-treat the clothing after each laundering.

Benzyl benzoate is effective longer than deet or dimethyl phthalate, and it washes out less readily. It gives protection even after clothing has been laundered twice. Clothing that has been laundered twice since being treated should be re-treated.

In addition to providing complete protection against chiggers, either of these treatments gives considerable protection against ticks.

Spraying the clothing

In spraying to obtain long-lasting protection, you apply the repellent to the entire garment—not just to the openings. Using a hand sprayer, apply a mist of full-strength dimethyl phthalate or benzyl benzoate on the outside of the clothing and on your shoes and socks; continue until the clothing is slightly moist, but not wet. Do not apply more than 2 ounces of repellent to a set of work clothes. Let the clothes dry for several hours before wearing them. Deet is available at 12 to 15 percent in pressurized spray cans. Follow directions on the labels.

It is easier to spray clothes than to put them through the impregnation treatment, but it is difficult to apply the spray uniformly. Also, sprayed-on repellent loses its effectiveness a few days sooner than repellent applied by impregnation, and it is washed out more easily.

REDUCING THE ITCHING

If you get in a chigger-infested place without the protection of a repellent, attack is almost certain. You may not know that you have been attacked until welts appear on the body and itching begins.

Take a bath as soon as possible. Apply a thick lather, then rinse it off. Do this several times. The bath kills most, or all, of the attached chiggers, and any others that may not yet be attached.

Next, apply a dab of antiseptic to each of the welts. This will kill any chiggers not killed by the bath, and it aids in preventing infection.

Destroying the chiggers reduces the itching, but does not stop it. The fluid injected by the chiggers causes the itching. No practicable way to remove it has been found, and no treatment is known that will give permanent relief from the itching.

To get temporary relief, apply a local anesthetic. The following formula has been found helpful:

Benzocaine,² 5 percent.
Methyl salicylate, 2 percent.
Salicylic acid, 0.5 percent.
Ethyl alcohol, 73 percent.
Water, 19.5 percent.

Take the formula to your druggist for compounding. Apply the material to each welt with a piece of cotton. One treatment gives relief for an hour or longer. Repeat the treatment as often as necessary.

Some persons who have had experience with chiggers can detect an attack without the evidence of

² Proprietary ointments containing benzocaine are also useful.



Applying insecticide with a rotary hand duster.

N 15364

welts and itching. They feel the slight irritation that is produced when the chiggers begin to attach, and they know what is causing it. They may feel the movement of chiggers as they crawl on the body seeking a place to attach.

If you become aware of sensations that cause you to suspect the presence of chiggers, examine the skin. Look carefully at the bases of hairs. You may not be able to see the chiggers, but you may be able to see small reddish spots where they are attaching.

The more quickly you detect the chiggers, the better results you will get from the soapy bath. If you can take the bath within an hour after

the chiggers get on you, it will probably kill most of them before they attach.

USING INSECTICIDES

You can wipe out a chigger infestation by applying an insecticide spray or dust in the infested area. Apply the spray or dust to grass, logs (and the ground around them), and ground litter. Apply it around bushes and high weeds.

The recommended insecticides are toxaphene, lindane and diazinon. They can be purchased in insecticide supply stores, and are generally available in the form of emulsifiable concentrates, wettable powders, and

dusts. Select any one of the insecticides, and decide in what form you wish to buy it.

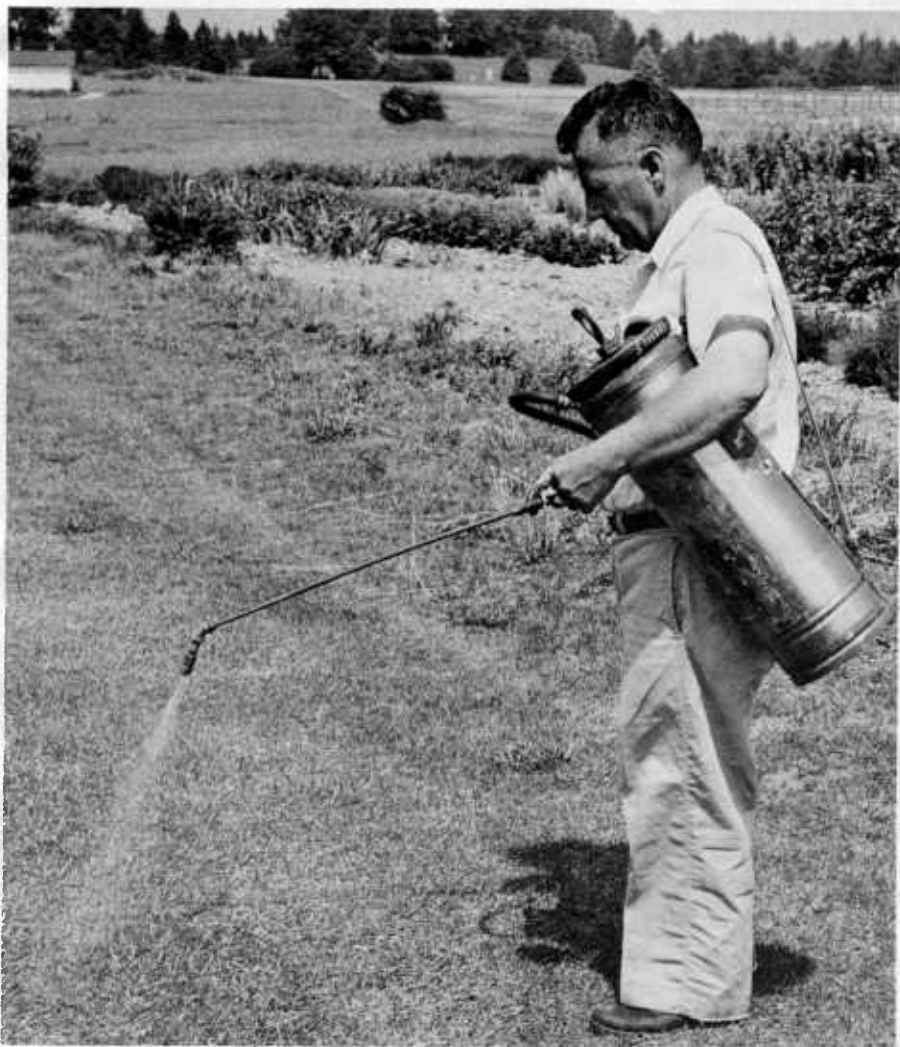
An emulsifiable concentrate or wettable powder is mixed with water to make a spray. A dust is ready to use when purchased.

An emulsion spray, prepared by mixing an emulsifiable concentrate

with water, usually gives better results than a wettable-powder spray or a dust.

Locating the Chiggers

Before you start applying an insecticide, have a clear idea of where the chiggers are. If the area is a large one, such as a picnic ground,



Applying insecticide with a garden-type compressed-air sprayer.

N 15362

a golf course, or a large lawn, it may be advisable to make a simple survey. The chiggers may be concentrated in a few spots within the area. Treating the trouble spots is quicker and less expensive than treating the whole area, and less likely to damage wildlife.

Place a piece of black cardboard edgewise on the ground. Observe it for a few minutes. If chiggers are present, they will climb to the top edge and congregate there. Make the test in about a dozen spots over the area. Pick out spots that have different kinds of cover, such as solid growths of grass, tufts of grass, dead leaves, and decaying twigs. Remember, you are chigger hunting; you should be protected by a repellent.

Unless the entire area is infested, treat only the parts in which control is especially desired, such as grass around picnic tables or lawn chairs.

Sprays

Emulsifiable concentrates and wettable powders contain various percentages of insecticide. The percentages shown in the accompanying chart are those most commonly found in retail products.

To prepare a spray, mix one of the products with water in the proportion indicated in the chart. Apply the finished spray as follows, but do not treat areas where livestock feed or graze:

Small areas.—To treat a lawn, campsite, or other small area, use a cylindrical compressed-air sprayer or a knapsack sprayer. Apply 2½ to 3 quarts per 1,000 square feet (25 to 35 gallons per acre).

Federal and State regulations require that registration numbers must be shown on the container of a pesticide. Use only pesticides that carry this designation. Read and follow all the directions on the label.

Normally USDA publications, that contain suggestions for the use of pesticides, are revised at 2-year intervals. If your copy is more than 2 years old, contact your Cooperative State Extension Service to determine the latest pesticide recommendations.

The pesticides mentioned in this publication were federally registered for the use indicated as of the time of the issuance of the publication. Because the registration of a pesticide may be changed before using a pesticide that you have had in your possession for some time you may wish to check with your local agricultural authorities to determine the registration status of the pesticide.

Large areas.—To treat a park, golf course, or other large area, use a power sprayer. To get uniform coverage, apply twice as much spray material as you would with a small sprayer, but do not double the amount of insecticide. Double the amount of spray material by adding water.

Apply 50 to 70 gallons per acre.

An emulsion spray prepared and applied according to these recommendations is effective 4 to 8 weeks; a wettable-powder spray, 2 to 6 weeks. A spray is considered effective for a stated period if few or no

HOW TO PREPARE SPRAYS FOR CHIGGER CONTROL

FORMS IN WHICH INSECTICIDES MAY BE PURCHASED	AMOUNT OF PURCHASED PRODUCT TO MIX WITH—	
	5 gallons of water	100 gallons of water
TOXAPHENE ¹		
Emulsifiable concentrate:		
40 percent	2 cups	2½ gallons.
50 percent	1¾ cups	2 gallons.
65 percent	1¼ cups	1½ gallons.
Wettable powder:		
25 percent	1½ pounds	32 pounds.
42 percent	1 pound	20 pounds.
LINDANE		
Emulsifiable concentrate:		
20 percent	1 cup	1¼ gallons.
25 percent	¾ cup	1 gallon.
Wettable powder:		
25 percent	6.4 ounces	8 pounds.
DIAZINON ²		
Emulsifiable concentrate:		
48 percent (4 lb/gal)	2.7 fl. oz.	40 fl. oz.
Wettable powder:		
50 percent	8 ounces	10 pounds.

¹ Use of chlordane has been suspended by EPA.

² The amounts listed are based on calculations from diazinon label's for the use of chigger control, at an application rate of 3 quarts per 1,000 square feet. These amounts should be verified.

active chiggers can be found in the treated area during that period.

Dusts

Apply 5-percent toxaphene dust at the rate of 40 to 50 pounds per acre (1 to 1¼ pounds per 1,000 square feet), or 1-percent lindane dust at the rate of 50 pounds per acre

(1¼ pounds per 1,000 square feet). A dust treatment is effective 1 to 4 weeks.

Dusts can be applied with any equipment that is used for dusting plants. A rotary hand duster is excellent for treating small areas. A power duster is better for large areas. Do not treat areas where livestock feed or graze.

PRECAUTIONS

Repellents

Keep repellents away from your eyes and mouth.

Do not treat underwear with a repellent. Treated underwear may irritate the skin.

Do not apply a repellent to stock-

ings or other clothing that contains rayon. Repellents are damaging to some kinds of rayon and to some other manmade fibers, nylon is not damaged.

Do not let repellents touch painted surfaces or objects made of plastic materials, such as fountain pens, fishing rods, watch crystals, or frames of eyeglasses.

The user is responsible for the proper use and storage of pesticides. Pesticides used improperly can be injurious to man, animals, and plants. Store pesticides in original containers under lock and key—out of the reach of children and animals—and away from food and feed, seed, other plant materials, and fertilizer. Follow the directions and heed all precautions on labels.