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United States Department of Agriculture,

BUREAU OF ENTOMOLOGY,

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THE ROSE-CHAFER.

(Macroductylus subspinosus Fab.)

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GENERAL APPEARANCE AND METHOD OF WORK.

At about the time of the blossoming of the grapevine and the garden rose a long-legged beetle of a light yellowish-brown color, called the rose-

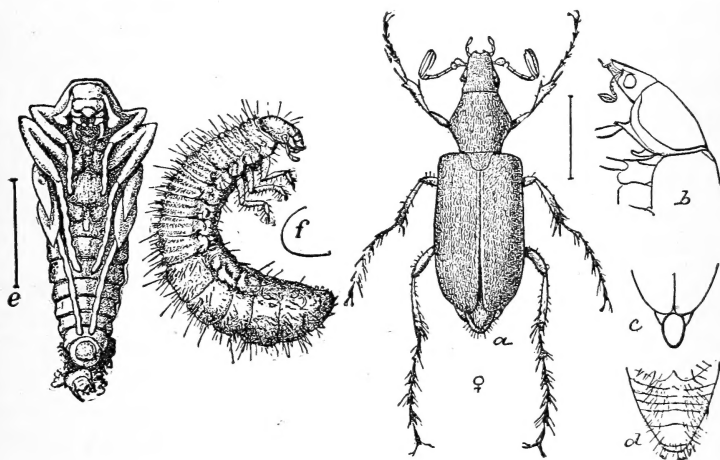


FIG. 1.—Rose-chaffer (*Macroductylus subspinosus*): a, Female beetle; b, anterior part of male; c, pygidium of male; d, abdomen of male; e, larva; f, pupa. All enlarged. (From Riley.)

chafer or "rose-bug," makes its appearance in certain sections of the country, and strips the vines and bushes of blossoms and foliage. This beetle is about one-third of an inch in length and may be recognized by comparison with the accompanying illustration (fig. 1, a).

These insects appear suddenly and in vast swarms, in certain years, usually toward the middle of June in the northern States and about two weeks earlier in their southern range, and overrun vineyard and orchard, nursery and garden. In about a month or six weeks from the time of their first arrival, generally after they have done a vast amount of damage, the beetles disappear as suddenly as they came.

DISTRIBUTION, FOOD PLANTS, AND RAVAGES.

The rose-chaffer occurs in the North, from Canada and Maine southward to Virginia and Tennessee, and westward to Oklahoma and

Colorado, being practically restricted to the Upper Austral life zone, except in a few localities, notably in New England, where it has invaded the Transition zone. It is particularly injurious in the States of Massachusetts, Rhode Island, Delaware, and Ohio, and has been reported as very destructive in portions of New York, Maryland, Virginia, Illinois, Indiana, Kansas, Nebraska, southern Michigan, and Vermont. Light, sandy regions are greatly preferred by the insects as breeding grounds, and clay lands, unless near sandy soil, are seldom troubled with them.

According to Harris, the rose-chafer, for some time after it was first noticed, confined its ravages to the blossoms of the rose. There is a record, however, of its having been destructive to grapes as early as 1810. In later years it has extended its range of food plants, until now it is nearly omnivorous. The grapevine and the rose especially suffer from its depredations, but it is almost equally destructive to the apple, pear, cherry, peach, plum, and other fruit, shade, and forest trees. In times of great abundance these insects completely destroy flowers and other ornamental plants of many sorts, even attacking corn, wheat, and grasses, berries, peas, beans, and nearly all garden fruits and vegetables. Almost anything green is relished.

The beetles do not confine their ravages to any particular portion of a plant, but consume blossoms, leaves, fruit, and all alike. In their attacks upon the grape they first devour the blossoms, then the leaves, which they completely strip, leaving only a thin network, and later the young berries are eaten. Whole vineyards and orchards are often devastated, and the fruit crop of large sections of country destroyed. It is no uncommon sight to see every young apple on a tree completely covered and obscured from view by a sprawling, struggling mass of beetles.

Since the late eighties the rose-chafer has been particularly injurious in the grape-growing region of southern New Jersey, and has been the subject of extensive research and experiment by Dr. J. B. Smith, entomologist of the New Jersey Agricultural Experiment Station, who has added much to our knowledge of the pest.

NATURAL HISTORY AND HABITS.

The rose-chafer, as already stated, appears early in June, the date varying somewhat according to locality and season, and mates and begins feeding soon after emerging from the ground. For from four to six weeks after their appearance the beetles continue feeding, almost constantly paired. The female deposits her eggs singly, from twenty-four to thirty-six in number, a few inches beneath the surface of the earth, and in about two or three weeks' time they hatch and the young larvæ or grubs begin feeding on such tender rootlets, preferably of grass, as are in reach. In autumn they have reached maturity and present the appearance shown in the illustration at *f*. They are yellowish white

in color, with a pale brown head. Late in autumn they descend lower into the earth, beyond the reach of frost, each grub forming a little earthen cell in which it passes the winter, and ascending in the early spring. Later in the spring, in April or early May, they transform to pupæ, and in from two to four weeks afterwards the beetles emerge, dig their way out of the ground, and renew their destructive work. A single generation of the species is produced in a year, and about three weeks is the average duration of life for an individual insect.

REMEDIES.

The rose-chafer is one of our most difficult insect enemies to combat successfully. Almost every method that has ever been employed against other insects has been tried against the rose-chafer, and much has been written on this head, but a thoroughly successful remedy is yet to be discovered for the insects when they appear in excessive numbers. Every year or two some agricultural writer comes to the front with a new and successful remedy, but when tested on a large scale, in a badly infested vineyard or orchard, these remedies are not found satisfactory.

The difficulty is that any application that may be made is unsuccessful unless applied almost continually. The arsenicals will kill the beetle, but are of little value when the insects are abundant, because of the slow action of the poison. The blossoms are entirely destroyed before it takes effect, and the dead are constantly being recruited by others that come from the ground or fly from neighboring places. Every beetle on a plant might be destroyed one day, but on the day following the plant would be completely covered again. It is difficult to spray an entire garden or vineyard so that every bud and blossom will be coated with the poison. It is possible that a heavy application of arsenate of lead, say 5 to 6 pounds to 50 gallons of water or Bordeaux mixture, will largely protect the vines, and this plan should be tested by vineyardists confronted with this pest. Very thorough applications should be made upon first signs of the insects and repeated as necessary.

The various compounds of copper, lime, kerosene, and pyrethrum, hot water, and other vaunted "sure" remedies have failed to come up to expectations when subjected to a rigid test. Some substances, pyrethrum for example, stupefy the insects for a short time, but in a few minutes they recover and are soon feeding again. Hot water is not effective because of the impossibility of applying it in a spray or jet at a sufficiently high temperature to kill the insects.

Decoctions of tobacco and quassia, hellebore, alum, kainit, and a number of proprietary remedies that have been tried have no apparent effect on the rose-chafer.

The old-fashioned remedy of hand-picking is of service when the beetles infest rosebushes or other low-growing plants. They may also

be jarred from trees and bushes onto sheets saturated with kerosene, but these methods are tedious and must be practiced daily in early morning or toward sundown to be effective. A number of useful mechanical appliances formed on the plan of a funnel or inverted umbrella, with a bag or can containing kerosene at the bottom, have been devised for the collection of the beetles as they are jarred from the plants.

Choice plants may be securely protected by a covering of netting, and when the process of bagging the grapes may profitably be employed, this method should be followed. Bagging, as is well known, is a preventive of rot, and in addition, grapes so protected produce fruit of superior appearance and quality.

Small orchards, gardens, or vineyards may be protected, at least from the first arriving hordes of the chafers, by planting about them early-flowering plants that particularly attract the beetles. Spiræas, deutzias, andromeda, magnolias, blackberries, and white roses are especially useful as counter attractives. The beetles swarm on the flowers of these plants in preference to many varieties of grape and other fruits, and when thus massed in great numbers, their destruction by the use of collectors or other mechanical means is greatly facilitated.

In addition to the use of any of the methods described above, injury to vineyards may be appreciably lessened by preventing the breeding of the insects upon or in the immediate vicinity of the vineyard. All ground which might serve as a breeding place and which it is possible so to treat, should be plowed and harrowed early in May or saturated with a 10 per cent kerosene-soap emulsion for the destruction of the larvæ and pupæ. The least possible amount of light sandy soil should be left in sod, only the heaviest land being used for grass. It is well also to stimulate the vines by the use of kainit and other fertilizers.

Whatever practice of a remedial nature is undertaken, whether collecting or spraying, it should be begun at the first onset of the beetles and continued until their disappearance. Nor should work be confined entirely to such useful plants as it is desired to preserve. Many weeds and wild plants, notably the ox-eye daisy and sumac, are special favorites of this species, and when practicable, the beetles should be destroyed on them, to prevent their spreading to cultivated land.

If persistent and combined effort on the part of the fruit growers of a limited region were made against this insect, its numbers might, in a few seasons, be so diminished as to secure practical immunity from injury for several years.

Approved:

JAMES WILSON,
Secretary of Agriculture.

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