Ohio Agricultural Experiment Station.

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WOOSTER, OHIO, FEBRUARY, 1900.

THE GRAPE-CANE GALL MAKER AND ITS ENEMIES.

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BULLETIN

OF THE

Ohio Agricultural Experiment Station.

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THE GRAPE-CANE GALLMAKER AND ITS ENEMIES.

(*Ampeloglypter sesostris.*)

PLATE XX.

Ord. COLEOPTERA. Fam. CURCULIONIDÆ.

BY F. M. WEBSTER.

There has for many years occurred on the cultivated grape vines, in the western states, a small, reddish-brown curculio, that when abundant must work considerable injury which may remain unnoticed by the grape grower, and the author thereof escape detection, on account of its close resemblance in color to that of the vine. Although the Concord variety of grape appears to be especially attractive for this pest, I am not aware that it restricts its depredations to this variety. A similar insect, of a shining black color, attacks the Virginia Creeper, (*Ampelopsis quinquefolia*) and both of these pests are allied to the plum curculio.

The insect under consideration is a small curculio, shown in the accompanying Plate XX, at *a*, as seen from above, and at *b*, as seen from one side. The larva, or grub, is shown at *c*, the pupa at *d*, a section of vine showing galls at *e*, a parasitic fly at *f*, the case from which this fly emerged at *g*, a second parasite on the gallmaker at *h*, and a probable parasite on the fly *f*, at *i*. The natural size of these insects is shown by the line below or at the side of each figure.

The attack of this insect on the vines begins, probably, not far from the first of June, in northern Ohio, as the adults (*a*, *b*,) did not crawl out from among the mass of leaves, collected May 6th and brought to the insectary, until the 23rd of the same month, and Mr. Mally, who visited the vineyard of Mr. Lockwood, near Gypsum, where all of our observations were made, found larvæ, (*c*) in the galls on June 24, some of these being of considerable size. The eggs are deposited by the females, presumably after the usual manner with the curculio, viz., by burrowing out a hole, in this case in the young growth of vine, and then changing their position they lay their egg at the mouth of the cavity and then again reverse their position and push it into place with the snout.

This is probably done in northern Ohio, largely at least, during the fore part of June when the new growth is 8 or 10 inches long, as the young shoots, which have started May 10, have not reached sufficient growth much earlier, and the greater abundance of galls, in the earliest growth, indicate that the adults improve the first opportunity to place their eggs as soon as a proper place is offered them to do so. The egg hatches to a minute, footless, white, cylindrical grub with a yellowish head and darker jaws. When full grown this is a little over one-fourth of an inch long, larger toward the head, as will be seen at *c*, in the plate. The puncturing of the vine by the mother insect in forming a place in which to lay her egg, and the feeding of the young grubs therein cause galls, as shown at *e*, in the plate.

The galls are not conspicuous at first but later become enlarged and the lips of the openings which, if inhabited, never heal over after the eggs are deposited, generally have a reddish color. I strongly suspect that these openings are kept from entirely healing over by the larva, partly in order to afford an avenue for the disposal of excreta, but also, and perhaps more likely, for the exit of the adult after it has developed. This is more especially probable, as, in the case of nearly all burrowing larvæ of this sort, this provision is made before transformation, otherwise the fully developed insect would find its cradle a prison from which there was no possible escape. Of course, the slits healed up later, or after the insects had made their escape. Also, this was found to be the case when the larva had evidently died before reaching maturity. Within the grape canes the larva would burrow along in the center and often made its way a considerable distance from the opening, though whether there was any selection in the matter of direction, whether up or down, could not be determined; but in any case it would be necessary for some avenue of escape to be provided, as the adult, by reason of its peculiar facial development, could not well work its way out. That full development takes place in the canes cannot be doubted, as I have found therein all stages, with the adult beetles in the act of crawling out of the galls.

Years ago, both Walsh and Riley, in Illinois and Missouri, described this insect as passing the winter in the galls, in the larval or grub stage, the fully developed insects appearing in June or early July of the following year. If this were true, ordinary spring pruning would serve to destroy the larger portion of these grubs every spring, provided, of course, that the prunings were burned. In northern Ohio this condition of affairs is impossible. On May 6th, 1898, a lot of fallen leaves that had collected along an osage orange hedge bordering a vineyard, were brought to the insectary and placed in a breeding cage. Under a temperature of probably 70 to 80 degrees Fah., the fully developed beetles began to crawl out from among the mass of leaves May 23rd, about the time

PLATE XX.

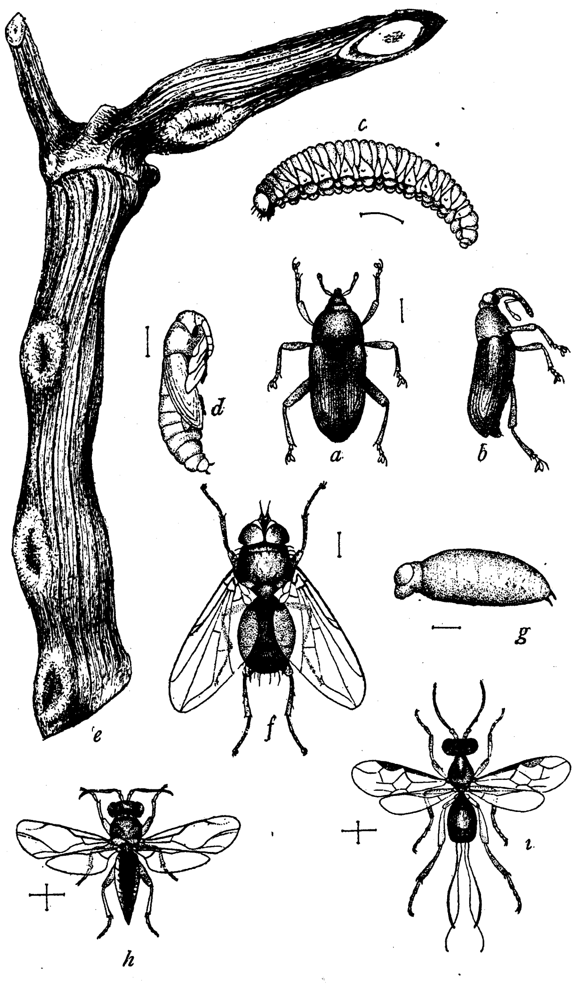

Plate illustrating Grape-cane Gall-maker and its enemies. *a*, adult from above; *b*, side view of same; *c*, larva or grub; *d*, pupa of gall-maker. *e*, section of vine showing galls; *f*, fly whose maggot probably destroys the grub of the gall-maker; *g*, case from which fly emerged; *h*, second parasite; *i*, a probable parasite on the fly, *f*. Natural size indicated by short lines below or at side of figure. All original.

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the young growth is usually a few inches long in the vineyard, and continued to appear for several days thereafter. No grape vines were growing in this cage. So the pest in this case could not have passed the winter as a grub in the canes. June 24th my assistant visited the vineyard from which the leaves came and found a large number of galls (*e*) in the new growth and these contained larvæ (*c*) of considerable size. August 11th I found all stages of the insect in the galls; some of the adults were making their way out. September 15th I could find only a single individual after long and patient search, and this was a pupa, evidently belated, as it was in a gall on the later growth of vine. Early in November, a careful examination did not reveal a single individual in the galls, but one lone adult was found among the fallen leaves. A lot of leaves gathered in the same locality January 20th, 1899, and like the other lot placed in the insectary, did not furnish a single adult. This may indicate that the beetles seek the matted grass in autumn, and in spring go to the vineyards and secrete themselves among the fallen leaves, until the young growth of vine has become of sufficient length to offer room in which to deposit their eggs. We have a parallel case in the plum curculio, as an extensive plum grower in New York informs me that, in his orchard, not located near woods, the fruit is always attacked earliest and most seriously along a side bordering a roadside with thick, matted grass, and this seems to be true of this species also.

Recapitulating, then, we have the following life cycle for northern Ohio, near Lake Erie: — The eggs, deposited in late May or June, hatch to the larvæ or grubs, which feed in the canes, forming galls, and developing to adults, which abandon the vines during late summer, passing the winter among fallen leaves or matted grass, but appearing in spring, when the new growth has made sufficient advance to offer young wood enough for oviposition purposes.

NATURAL ENEMIES.

The small Hymenopterous parasite (*Catolaccus tylodermae*) *h*, is also known to attack and destroy another species of curculio (*Tyloderma foveolatum*) which burrows in the stems of the Evening Primrose (*Oenothera biennis*) both plant and curculio being common all over the west. For this reason we may look for considerable aid in keeping the grape infesting insect in check. The small fly, *f*, must also destroy a large number of the larvæ or grubs. This fly is known to be also parasitic on the Hazel-nut weevil and others of the curculio group. Though its services are of much value to the grape grower, its usefulness is doubtless much reduced by its own enemy (*Calyptus tibiator*), *h*, which must certainly destroy many of them. With these four species of insects, preying upon and destroying each other, and all of this going on within the canes of a grape vine, we get some idea of the inter-relations of insects, as well as of the very little that the most of us really observe of their struggle for existence

PREVENTIVE MEASURES.

As the Concord variety of grape seems to be the choice of this insect, it will probably be well to place this variety away from the margin as far as possible, when planting out the vineyard. In the light of additional knowledge, as contained in the foregoing, it will be seen that cutting off and burning the infested portions of the vines during winter or early spring, as has been previously recommended, will avail nothing, as the insect is at that time safely esconsed among fallen leaves or matted grass. The burning of all fallen leaves or other rubbish in the vicinity of vineyards, during fall or winter, is therefore recommended, as well as the keeping of all grass grounds closely cropped, in order to destroy the hibernating adults or force them to take up their winter quarters in more distant localities. It may be possible to shake the beetles into some sort of a receptacle, held underneath to catch them as they fall, but when the grape vines are trellised on wires, this will hardly be found practical. Something might also be accomplished in the way of killing the beetles while these are preparing to oviposit, by the application of arsenical poisons, which, for convenience, may be combined with Bordeaux mixture.

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