

I also quote the following clipping from the Cedar Vale (Chautauqua Co.) *Star*:

INFECTING CHINCH-BUGS.—There is no longer any need of having our crops destroyed by chinch-bugs. A remedy that is sure as death and costs nothing, has been discovered and is used in this country with complete success. Mr. M. F. Mattocks, living a mile and a half east of Wauneta, on the H. P. Moser farm, is entitled to the credit of demonstrating in this part, the efficiency of the remedy. He was about to lose his corn crop by the bugs that were swarming into it from the stubble. He sent to Chancellor F. H. Snow, of the State University at Lawrence, and from him received a box containing a half-dozen diseased bugs. With them he exterminated a forty acre field full of the pests. They have died by the millions, in fact, they have about all died from the infection of those six bugs. A little circular of instructions, which he followed out, came with them. The six bugs were placed in a bottle with three or four hundred from the field, and were left together thirty-six hours and then turned loose, both the living ones and the dead, in the field. Devastation followed, and Mr. Mattocks will be troubled no more with chinch-bugs this year. If your crop is in danger you can save it by the same means of getting the diseased bugs in your field. It will cost you nothing and is a dead sure remedy. He has been sending dead and infected bugs to others in the country and to Prof. Snow, whose supply was running down.

I personally visited Mr. Mattocks's farm and verified the above statements. The difficulty of obtaining enough live bugs to experiment with in the laboratory led to the sending out of the following advertisement, which was sent out to twenty prominent papers with requests for its publication:

WANTED! CHINCH-BUGS!

Prof. F. H. Snow, of the University of Kansas, is in great need of some live and healthy chinch-bugs with which to carry on his experiments in chinch-bug infection. Anyone who will send a small lot of bugs to Prof. Snow, University of Kansas, Lawrence, Kansas, will confer a favor on the investigator, and, it is hoped, on the farmers of Kansas.

This request for live bugs was given wide circulation and resulted in keeping the laboratory fairly well supplied with material for experiment.

Before the close of the season of 1890, it became evident that there were at least three diseases at work in our infection jars, the "white fungus" (*Entomophthora* or *Empusa*), a bacterial disease (*Micrococcus*), and a fungus considered by Dr. Roland Thaxter to be *Isaria* or perhaps more properly *Trichoderma*.

The following report which describes the bugs as "collecting in clusters" points to the bacterial disease as the cause of destruction:

PIQUA, Woodson Co., Kansas, 7th December, 1890.

DEAR SIR.—Since writing you from Humboldt, Ks., the 6th inst., I have made the happy discovery that the germs of contagious diseases sent me were vital. On Sunday last upon examination of the millet field I found millions of dead bugs. They were collected in clusters. My idea is that dampness facilitates the spread of the contagion. The first distribution of diseased bugs two days after I received the package by mail apparently produced no results. A part of them were retained in the infection jar (quart Mason fruit jar); half a pint of bugs were collected from the field; three days later a foul stench was found to emanate from the jar, and a part of the bugs in it were dead. On July 3rd I took advantage of the cool damp evening and took a few buckets of cold water and sprinkled the edge of the millet and distributed more infected bugs. On the 6th I found millions of dead bugs. I think the night and sprinkling the millet caused the disease to spread. We have had no rain in this neighborhood since June 17th, if I remember correctly. The depredations of chinch-bugs are always more serious in dry, hot weather. You have conferred a lasting benefit on the farming interests of the United States, the value of which cannot be estimated in dollars and cents. It was estimated that during one of the visitation years of this insect the damage in the Mississippi valley amounted to ten millions of dollars. I have no doubt that by a proper manipulation of the contagious disease in the hands of intelligent persons it will prove an effective remedy. I think the contagion should be introduced among them early to prevent the migration of the young brood. In my case I received it too late. Early sown millet presents a favorable place to infect the bugs, as they seem to collect in the shade and die. Hoping that when the next Legislature meets an appreciative public will suitably reward you for your beneficent discovery, I am gratefully yours, J. W. G. McCORMICK.

The field experiments were apparently equally successful in the months of July, August and September. The following August field-report is inserted as a fair sample of the manner in which the farmers themselves regard these experiments:

FLORENCE, Marion Co., Kansas, November 1st, 1890

DEAR SIR.—On the 20th of August (I think it was) I wrote to you to send me some infected chinch bugs, and on the 30th of the same month you sent me a small lot of infected bugs, I suppose about thirty in all. I then put with these about twenty times as many healthy ones and kept them forty-eight hours, and then deposited them in and through my field—I have about 55 acres under cultivation.