PRESIDENTIAL ADDRESS

Japanese Beetle Control in Indiana

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It has been the custom of the President of the Indiana Academy of Science to spend an assigned portion of time on the reading of a paper, which is devoted to some particular phase of knowledge he has gained through the medium of observation or study. During the past 25 years it has been my good fortune to serve as chief of one of the offices of the state government, I have had an opportunity to serve—and I hope to learn—something about the intricate workings of a state office, and in the meantime, have become acquainted with the general public's reactions to such an office and to the person in charge.

The subject of my talk is the Japanese Beetle. I shall try, in some detail, to show what success we have had in the past seven years in controlling this pest, which is considered one of the worst with which America has had to contend. I shall also touch briefly upon the campaign against the European corn borer of some twelve years ago, which was not a success. I hope that it may be possible for me to bring out what I consider the basic reasons for the success of one project and the failure of the other.

Suppose we dispose of the European corn borer first, because I fear it will not be disposed of in any other way.

A campaign of eradication was started against the European corn borer by the federal government in 1927 and the war correspondents never received such glaring headlines as the copy desks of the papers used on the stories about the European corn borer. Day after day the battle raged and the farmers were called upon for new efforts in the fight against this invader. We were almost successful in our cleanup campaign in Indiana, but when it became apparent to the farmers that this was a battle of an army of more leaders than there were worms, they refused to battle the worms. But by this time they were trained fighters and they turned on their leaders. If we could have kept them after the corn borer with the same enthusiasm that they expended on us, the corn borer problem might have been solved. I believed then, and still believe that the over-emphasized publicity on the corn borer at that time was largely responsible for the unsatisfactory results of this program.

During the third year of the European corn borer control work the farmers of Indiana demanded that the federal government cease their eradication program. At that time the corn borer had been almost exterminated. Complete extermination might not have been entirely possible, but the federal restrictions would have kept it under control to a point that it could not have caused much injury.

Our survey of European corn borer in 1940 reveals the fact that it is present in sufficient numbers to cause marked damage in several

counties. The heaviest infestation was found in Wells County; the average number in that county is three and one-third borers per stalk. Allen, Adams, Blackford and Jay counties show more than two borers per stalk, and from this on down our survey reveals less than two-tenths of a per cent per stalk in some of the counties that were surveyed this summer. Should we have a season favorable to the increase of borers next year, we will have many farmers in the five heaviest infested counties with 25 to 50 per cent injury to their corn crop.

The public, always interested in the function of its government, expects to be told what is being done in a state public office. However, they never lose sight of the fact that it is the tax money that is being spent and naturally resent the official in charge being given too much publicity for spending. The official who can keep his balance and walks the line between oblivion and adulation has gone a long way to being classed as a success.

The Division of Entomology of the Department of Conservation has many duties specified in our law. One of the principal of these duties is to attempt to eradicate or control any new insect pest or plant disease that may be found in our state. I believe that the most serious insect pest that has invaded our borders to date is the Japanese beetle. It is about this beetle that I shall tell of the progress so far, in our control program against it, and, why I believe we have met with such satisfactory results. Before taking up the record of this pest in Indiana, a short summary of its entry into the United States and its record of alarming increase and spread will explain why we believe that the money and effort spent on its control in Indiana has been justified. We firmly believe that these efforts should be continued as long as the cost of the work does not exceed 2 or 3 per cent of the losses caused by the insect in the states now heavily infested.

During the summer of 1916 two nursery inspectors of the New Jersey Department of Agriculture collected several beetles with which they were not familiar. These beetles were found in a nursery at Riverton, New Jersey, and were later identified by E. A. Schwartz, of the Bureau of Entomology at Washington, D. C., as a species common to Japan, named *Popillia japonica*. Although an intensive search was made in and around the nursery during the summer, only about a dozen beetles could be found that year. All the evidence now available leads to the belief that these beetles were brought in as grubs in shipments of either Azaleas or Japanese iris from Japan to the nursery in Riverton in 1912. If they came in on plants imported in 1912, they were either slow in becoming established, or the search for the beetles was not very intense, or, possibly, was made too late in the season. We must remember that comparatively nothing was known of the habits of this insect the year it was found.

An intensive survey of 1917 disclosed the fact that the beetles infested an area of 2.7 square miles in the vicinity of the nursery at Riverton. The surveys of 1918 showed that the beetles covered an area of 6.7 square miles, and in 1919 the area covered had increased to 48.3 square miles, and in the center of the area that year the beetles could be found

in abundance. In 1920 the infested area included 92 square miles and the beetles crossed the Delaware River and had infested 11 square miles in Pennsylvania. The year 1922 showed 773 square miles infested and in 1923 the area had increased to 2,442 square miles. This is a numerical history of the beetle's ravaging progress in the State of New Jersey and it told us in Indiana what we could expect from this pest when it came here. There was never any doubt but that our state would eventually have the Japanese beetle. I have given the record of the progress of this pest for seven years because we first found this insect in Indiana seven years ago. Later on I wish to compare our infestations with this early record in New Jersey and Pennsylvania.

It is true that all this infested area in New Jersey and Pennsylvania had been quarantined and inspectors were placed on all roads to examine all vehicles to see that beetles were not carried on produce or flowers leaving the area. Research work was started in an effort to find a control that would be practical. After 1923 the beetle infestation increased rapidly in numbers and in areas, and each year the major amount of work that was done for control on these outlying infestations was to include the area in the quarantine zone.

The State Entomologist's Office in Indiana never did believe that enough effort on control work had been made on the fringe of this expanding area of infestation in the eastern states. Our office thought then, and our efforts in Indiana have since proved, that if these outlying infestations had been cleaned as fast as they were found, it would not have been necessary to take many of the large areas into the quarantine zone which showed only a slight infestation. The quarantine lines should have been held closer to the heavier infestation; this would have greatly retarded the spread. However, the cost of a control program, such as the Japanese beetle project, is handled on a fifty-fifty basis between the states infested and the federal government. The states never had available money for such a control program and always had to wait until their legislature met and appropriated funds. This always proved too late to do effective work; the money should have been appropriated and made available *if* and *when* the insect was found in any section of any state.

Realizing that Indiana could not escape an invasion of this pest, in 1926 we asked for and the legislature granted to us, the right to use money from a special fund, if the presence of the Japanese beetle should be found in Indiana. So, six years previous to the appearance of the Japanese beetle in our State we were ready with plans and money to start our control program. This special fund was created for the control of the European corn borer. The legislature specified that the money could only be used for the eradication of the European corn borer and the Japanese beetle, if its presence should be discovered in the State. Later, the legislature included Dutch elm disease because this disease had been found in Marion County. That session of the legislature added a clause to our appropriation, stating that the funds allocated could now be used for the control or eradication of any new insect pest or plant disease which might appear in the state.

We fervently hope that an appropriation of this kind will be made each legislative year, and if the necessity for its use does not materialize, that the money will not be spent for any purpose other than that for which it was allocated.

I have given a brief history of the Japanese beetle in its early years and explained why and how we had funds to start work on the control of this pest when it was found in Indianapolis in 1934. Probably the first Japanese beetle was found in Indianapolis in 1933, but no one in the State Entomologist's Office saw it.

During the year of 1933 we had a telephone call from a woman in Indianapolis saying she had seen a girl who had found a Japanese beetle, and that she had asked the girl to take it to our office for positive identification. This woman said she had formerly lived in the east and had seen millions of these beetles. We had no way of locating the girl because the woman had not asked for her address. The girl failed to bring the beetle to the office, but we credited the woman's story sufficiently to ask the Bureau of Entomology at Washington, D. C., to send beetle traps into Indianapolis to determine if we had an infestation of this pest. The presence of the 800 traps which were placed in the city that year proved that we did.

The beetles were first discovered in Indianapolis in an area at 30th and Meridian streets and at Willard Park on East Washington street. Only 17 beetles were found in 1934, and because we had money available through appropriation, control work was started that fall. One thousand pounds of arsenate of lead was applied to each acre of ground within 300 feet of any trap in which a beetle was found. That season we had to treat 40 acres, using 40,000 pounds of arsenate of lead. Due to the finding of this infested area in Indianapolis, we thought it advisable to place traps in all the large cities of the state.

In 1935 traps were placed in Indianapolis, South Bend, Fort Wayne, Richmond, Jeffersonville, New Albany and Evansville. No beetles were trapped except in Indianapolis, where a new area near South and Delaware streets was found infested. In the area at 30th and Meridian streets, and this new area, a total of 59 beetles were found. The infested zone at South and Delaware streets has been harder to eradicate than the area at 30th and Meridian. We believe we are constantly receiving beetles in this place from produce cars which are unloaded at South and Delaware, so we are continuing the treatments each year in that district, if beetles are found beyond the limit of the area that has previously been treated. So far we have been able to hold the number of beetles in this area to a minimum.

In 1936 thirty beetles were found in Indianapolis in two areas; 5 beetles were found in Fort Wayne and 2 beetles in South Bend. In 1937 only 12 beetles were found in Indianapolis, 18 in Fort Wayne, 43 in Logansport, and one was found in Elkhart. In 1938 ten beetles were found in Indianapolis, 20 in Fort Wayne, 8 in South Bend, 9 in Logansport, 2 in Elkhart and one in East Chicago. In 1939, seventy-six beetles were found in Indianapolis, 109 in Fort Wayne, 98 in Logansport, 4 in Elkhart,

3 in Bluffton, 2 in Warsaw, 21 in Whiting, 1 in Muncie and 1 in Richmond. We found during that year that we did not have enough money available to purchase the 200,000 pounds of arsenate of lead necessary to treat the 200 acres which were infested in the state.

About 25 acres in Christian Park in Indianapolis needed the arsenate of lead treatment, so I went to the city council and asked them for $2,500 to purchase the material for the work in that vicinity. They kindly and understandingly granted this request. I shall always feel grateful for the unquestioning assistance the council gave me, for without this material help, our program for that year could not have been completed.

In 1940 we found 52 beetles in Fort Wayne, 12 in South Bend, 13 in Logansport, 76 in Elkhart, 7 in Richmond, 59 in Warsaw, 4 in Whiting, 2 in New Castle and 164 in Indianapolis.

The increase of numbers of Japanese beetles found in Indianapolis in 1940 is largely due to a new area found below South street between Illinois and West streets. Here we discovered an infested area that covered close to 20 acres. This location is a trucking center and it again proves that such places must be carefully checked every two or three years.

An area of twenty acres near Christian Park will have to be treated this year. We believe that the beetles found here came from a railroad yard south of the Park. This year we trapped them on the vacant ground between the railroad and the Park.

May I emphasize the fact that we believe we can cope with these infestations if we discover them in time. There is always the lurking fear that we may find an area in which the beetles have been established a number of years and that this problem may necessitate the expenditure of more money than we have available. We have tried to anticipate this emergency by covering the state thoroughly with the beetle traps.

With the finding of 389 beetles in Indiana this year we must treat 200 acres of ground with arsenate of lead. These figures do not indicate that we cannot eradicate an infestation wherever we find it. It can and is being done. However, the area of heavy infestation to the east of us is coming closer to Indiana and each year we are finding more new areas of infestation. Just how many years we can continue this control work will depend on whether the legislature will appropriate sufficient funds to take care of this ever increasing number of new infestations. They have, in the past given us what we asked for. We have been very careful to hold our expenditures to a minimum and believe we can prove the money has been wisely spent.

Indiana is not the only state which is making an effort to stop the spread of the Japanese beetle. Kentucky, Michigan, Illinois and Missouri are doing the same type of control work as Indiana and accomplishing equally as good results. However, they have not had as many points of infestation as we have. Ohio did not have funds allocated for this work and when the beetles were found in that state they had to delay the control work waiting for an appropriation. As a result, the eastern section of that state is now under federal quarantine. Ohio is making a concerted effort to hold this pest from the western part of their state

and we are hoping they can and will continue to keep the barrier to the east of Indiana.

May I point out that this area in the central states is the only area that has ever made a real effort to check this insect. It has been customary to fold hands and say, What can we do? then decide to do nothing. It is and has been the opinion of the regulatory officials of the central states that what has been done here could and should have been done in the eastern states long before we had to start on the control program in this area.

As I have previously stated, this state program of control and eradication is done on a cooperative basis with the state and federal government; each bearing 50 percent of the cost. However, this basis does not seem fair when the central states are actually putting into effect a barrier zone which holds the Japanese beetle infestation from the states west of the Mississippi river. I believe the federal government should assume a larger share of the expense. If they would be willing to do this, the Japanese beetle could probably be prevented from passing beyond this barrier zone for many years. If isolated infestations should appear west of the Mississippi river, they could be treated as we have demonstrated feasible, and those states could easily hold the beetles to a minimum for at least another ten years.

For seven years in Indiana we have been able to continue our control program against the Japanese beetle because we had the available money which was appropriated for this work and we were not forced to wait a year or two before starting the needed control. This money was available because our office did not make each insect outbreak in our state a major catastrophe and demand funds for control work which normally should be done by the individual. Likewise, we do not use special funds for any purpose other than that for which they are allocated. Regardless of what the emergency might be, we will not violate any agreement made with the legislature.

I should like to make a special point in reference to a state official receiving an excess amount of publicity when dispensing with public funds. The public usually has only the information given out by the official and many doubts may sometimes creep into the public mind as to the real need of the work if the official appears too prominently in the notices. It is true that publicity is necessary, but you will find that if your program is an honest and sincere one, you cannot keep it away from the public.

I hope I have succeeded in making it clear to you that our failure to carry through to success the program of the control and eradication of the European corn borer, was largely due, as I have previously stated, to the over-emphasized publicity given to it. The headlines of the European corn borer publicity each day grew more lurid and direful than the ones appearing the previous day. This continued until there was a growing conviction in the State Entomologist's Office that all this unwarranted publicity was tending only to cause doubts in the minds of the farmers and the public in general that the corn borer program was a sincere and necessary one. Then to convince the doubting public that this

over-emphasized program was progressing normally, new stories with bigger and more arresting headlines were thought to be necessary. These flagrant headlines eventually appeared, but finally proved the medium through which the corn borer control program was defeated.

When the Japanese beetle was found in Indiana, there was no special publicity agency in Washington, D. C., to disseminate the Japanese beetle news for this state. All the publicity for this program affecting Indiana came from the Office of the State Entomologist. We avoided over-emphasis on all outgoing publicity for this control program and gave out only the information as to the names of the various towns in which the beetle traps were to be placed. When the trapping season in the Japanese beetle control program was completed, we always released a short story as to how many towns and in what area of these towns the beetles were found.

In the eastern states the research officials were finding natural controls for the Japanese beetle. The most promising of these parasitic controls seem to be two diseases of the larvae. We have given these natural controls no publicity in Indiana, because wherever they are known, the general public feels that all other methods of control work should be abandoned. There must always be a heavy infestation to establish these diseases so we hope it may be many years before Indiana will be in a position to introduce these methods of control.

If through the use of moderation in publicity of the Japanese beetle control program, we can convince the people that the work is being efficiently done and that we are having as much or more success than was promised seven years ago, I believe we can be assured of their continued and unquestioning support.

As it is, the papers and the general public have accepted the quiet fact that we are launched upon a program that requires much time. They believe we are sincere in our knowledge that this control program is vitally necessary and that we are going to do this work as inexpensively and efficiently as is possible.