Figure 1

Aerial Fungicide Applications?

by **LEE RECORD,** Director, USGA Green Section, Mid-Continent Region

During the summer of 1971, Len Hazlett, Superintendent of The Country Club, Cleveland, Ohio, asked about using a helicopter for applying fungicides on fairways. "Why not?" I replied! This caught Len off guard, and then with a big grin and a sparkle in his eyes, he said, "Who told you?" No one had told me, but knowing Len Hazlett, there had to be a reason for his question. "Why did you do it?" I asked.

"We started it this spring," Len began, "because it was too wet to spray on the ground and because of the time factor in applying the fungicide. Charlie Tadge, Superintendent of the Mayfield Country Club, sprayed his fairways by helicopter. I asked him to send the pilot over so that I could discuss the possibility of spraying our fairways. I have used him twice this spring."

During May of 1972, Len again asked if I would use a helicopter to apply fungicides. "Okay," I said, "let's hear the story."

The following story Len told me while he showed movies of the helicopter spraying his fairways at The Country Club. Place yourself in front of the screen and picture a helicopter (figures 1, 2, 3 and 4) coming at you; you have a front seat!

Len: I'm using one pound of TGF and three pounds of iron sulphate per acre. We had trouble at first pumping this mixture from his 300-gallon tank into the helicopter. I suggested they take the screen out of the tank and spray, but the pilot was concerned about plugging his nozzles on the Ag Master boom he was using. We checked the size of his nozzle screens and they were a little larger than the ones still in the tank. He had a 200-mesh screen. So I said, okay, let's take them out and try it. We did, and didn't have any trouble.

The pilot this spring would only carry 25 gallons of material per application. He was up and down more times, and by doing this he lost track of his position; I was already out on the golf course trying to point out to him where he should be going. He went over one fairway three times; you know that is not right. You can't rely on someone like that.

Lee: The pilot who sprayed for you last year; how many gallons did he carry per application?

Len: Fifty gallons per application. This pilot wasn't as satisfactory as the one last year, because he would only go up and down one fairway. You know, if we are applying five gallons per acre, he should have completed one fairway and continued on to another. I haven't five acres in any one of my fairways.

Lee: Was he going up and down the side of each fairway, or just going down one side?

Len: On some fairways it looked like he would go up and back down and was empty and ready to go back to refill, because he would start down another fairway and no spray would appear.

He was getting at least five gallons of material per acre, and sometimes he might have been putting down a little more. Here he is

Figure 2

Figure 3

coming in high and is dropping down at the same time he is going down the fairway; this is hole 6. Look at the crosswind he had at this time of the morning. I took a picture of the flag, so you would have some idea of the strength of the wind. Here he is coming back again. He is now over the fourth fairway. Look when he turns the machine on; he is 30 to 40 feet in the air!

Now he is coming up the fairway and he runs out of material. He goes back down the fairway thinking he is still spraying. Here he comes back; the second time over the same fairway. He turns the helicopter around right in front of the green. Now he is going back down again and still there has been nothing put down in front of the green.

Lee: Why didn't you have him spray the fairway and around the green and back down the opposite side of the fairway?

Len: I only wanted him to spray fairways. When I caught up to him, I asked him what was the problem. One of his reasons was that his electrically operated release of the chemical was not working properly. I said, I can't depend on you; this is not good coverage.

Lee: Suppose you had this pilot come back to your course as well as the other golf courses in the area two or three times in the spring; he might get used to what you want and I think you would then have something.

Len: What we need is a radio so we could communicate with the pilot directly. I could talk to him and point out the areas he missed. You must make sure the job is done properly.

I was talking to Dr. Howard Potter at Michigan State University, and he told me that no boom on a helicopter should exceed half the width of the rotor prop. The boom on this helicopter is 35 feet and sprays a swath of 60 feet when flying 10 feet above the fairway. Each boom on the side of the helicopter shouldn't extend beyond half the length of the rotor prop. Dr. Potter said the reason for this was because that was the best spray pattern.

Lee: Doesn't the vortex force this material right into the plant?

Len: It does. It atomizes the water droplets there and forces it down in; but, as I pointed out, I was standing close enough to a fairway and the spray didn't touch me or my glasses, and I had areas where there were 30 to 40 grass blades that weren't covered. If you had disease, it could develop there as well as anywhere else. The only protection you have is where the spray actually hits. Perhaps the water was so atomized that I couldn't see it. This is a possibility.

Let's look at the film I took last year. See the spray pattern here? It is fantastic. I put more faith in the helicopter spraying last year with the former pilot than I did this spring with the new pilot.

Lee: Okay, but there was not as much wind that day.

Len: That's right, plus the fact that you can see by the amount of spray coming out of the boom that there is a considerably greater gallonage per acre here than what I had this spring.

Lee: Is last year's pilot flying slower than the pilot this spring?

Len: No, I don't believe he is. I think the ground speed is about 30 to 35 miles per hour, and he is staying about 10 feet off the ground. The pilot this spring was staying about 25 feet off the ground in some instances.

Lee: How long, Len, did it take to spray the course?

Len: It takes about 45 minutes to an hour. Closer, I would say, to an hour.

Lee: And the rest of the time is just down time for filling up his machine?

Len: That's right. But I think what we need is

Figure 4

to have closer communication with the pilot, not to confuse him with a lot of talk, but to tell him that he didn't hit the fairway, etc. Now here is an example of the spray not going on. He saw his spray pattern and there is just a little bit coming out of the machine. He didn't realize it wasn't coming out, because he is forward of the spray boom. He assumed that the fairway was sprayed. Now, had I had radio communication with him, I could have told him this.

Lee: Why don't you use a little more material at a slower rate, so he can do a more thorough job?

Len: I would buy that. In my opinion, that would be the optimum in spraying fairways with a helicopter. You get a little more gallonage applied and do not try to cover such a great area.

Lee: Len, did you have any *Helminthosporium spp.* show up within a week or so after this application?

Len: No, I had it prior to this application. You know, Lee, I can't blame the pilot for being a little leery. There are many holes surrounded by trees 60 to 80 feet in height; when you are flying five to six feet off the ground and you must come up to the approach of a green, then shut the spray off, you need a lot of lifting power to get that helicopter up out of there vertically. Otherwise, you must be able to stop the machine and swing it around and come right back out on the fairway.

Lee: If the pilot hasn't enough material in his tank to run out over a green or to start back up the fairway, he has wasted time here.

Len: That is true. That means he will have to load up and come in with a full load and hit that same area again, and his feeling is that he is not too anxious to come back with 50 gallons of material in those tight corners. The pilot told me he had to have fresh air over the rotor blades at all times. When he is dropping down, he is not drawing fresh air over the blades; he is letting the air slide past the blades. Sometimes in the operation of a helicopter I think these pilots are a little uneasy about it. I believe the more open a golf course, the better your chances of successful helicopter spraying.

I can't see that aerial spraying can be anything but great. If your ground speed is right, you don't exceed the limits of the boom; I don't think you could go wrong.

Lee: You do believe then that there is a future in helicopter spraying?

Len: Only under those circumstances.

Lee: What about the superintendents in the greater Cleveland area, will they eventually use more helicopters for fungicide applications?

Len: I don't believe there are enough superintendents at the present time ready to spend $250 per application. I don't feel there has been that much demand for spray work on fairways in the Cleveland district. Superintendents are suffering through diseased fairways, but until they are forced to really go out and cure the disease, are they going to have helicopter spraying.

Lee: You have always used the helicopter in the spring for *Helminthosporium* control, primarily when the ground has been too wet to get out on the course and use a regular spray tank.

Len: That's right. I think this would be the thing that would necessitate helicopter spraying. Other than that, I don't believe there would be a great advantage to it.

Lee: Would you use it for brown patch or dollar spot control in the summer?

Len: No, I don't think so, only because fairway conditions in the summer generally will hold a spray tank. We are going into broadcast type spraying equipment, which doesn't require large booms. I can use a single jet nozzle that will put out 10 gallons a minute and will cover

a fairway 25 to 30 feet wide. I used two trucksters with 100 gallon spray tanks last summer, and got the job done in 6 hours.

Lee: You're talking about two trucksters in six hours where many superintendents have only one truckster and one 100-gallon spray tank to use, or one spray applicator and that's it. What kind of cost are you talking about in relation to manpower versus aerial application?

Len: Take six hours per man, that's 12 hours. Take an average of $2 per hour and you are talking 12 hours. That's $24 for an application by two men. If you go into overtime, which may or may not be necessary; let's say time and a half on overtime, you are talking $36 per application, plus the $200 for chemicals. You should also consider that you are using 40 gallons of water per acre, which has been the optimum amount of water per chemical application.

Lee: What about the helicopter application and not using any of your people, only supplying the material. You would now have two men that are free to do other jobs at a period of the year when you are short of help, and although they are doing the spraying job in six hours using two trucksters, or 12 hours for one truckster, at many courses it may take a day and a half to get the job done, depending upon the terrain, breakdowns, golfers, etc. Have you compensated for this amount of time saving labor?

Len: I don't believe you can justify the $250 in time saving.

Lee: Would you use the helicopter for any other pesticide applications?

Len: I would not use a helicopter for herbicide application at any time of the year, but I would consider using it for insecticides, depending upon what the problem may be. We may have an opportunity to do a lot of gnat spraying, or perhaps spraying for black flies, mosquitoes or insects of this nature.

Lee: Would you suggest that other superintendents throughout the country give aerial fungicide applications a chance?

Len: Definitely. I think every superintendent should try it at least once to get the sensation of seeing a helicopter apply the material and to evaluate the coverage over the country; to see if everyone is getting uniform coverage, getting any degree of control, getting satisfaction, and to see how everyone basically earmarks this type of application for the future; we should pool this information.

Lee: Are you planning to use a helicopter for spraying in the future?

Len: We may, I'm not sure.

Lee: It would probably depend upon weather and if you could get your equipment out on the course to spray.

Len: If we are stymied, have a rapid disease infection come in and need fast coverage, it is possible I'll use helicopter spraying again.

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After listening to Len's story, I talked with Charlie Tadge, Superintendent of the Mayfield Country Club, Cleveland, Ohio, to hear his comments; they are as follows:

"I went into the helicopter spraying program because of my labor situation in early spring. I have a small crew at this time and I couldn't have the men tied up spraying when trying to bring the course out of the winter, getting ready for spring play. It wasn't the fact that it was cheaper; as a matter of fact, it cost a little more, and I couldn't go out and hire another man at this time. Last year, I used the helicopter and was pleased with the results. This year, I have already used the helicopter twice for *Helminthosporium* control, and plan on using the service twice more in late summer when I normally have dollar spot problems.

"The pilot is new this year, as you know, but I am satisfied with his performance. I found from experience, when you tell a pilot not to spray greens, he shuts his spray off too soon when approaching the green and you have a large area that is not treated. I'd rather put the extra material on the greens instead of having everything up against the greens.

"I did use the helicopter once last year for mosquito control. The pilot covered our wooded area and the local area around the course. This was done at night.

"With all the regulations the Occupational Safety and Health Act is coming up with, I may just use the helicopter more and more. Why not place a little responsibility on the custom applicator and let him comply with the pesticide laws? This would certainly relieve some pressure from my shoulders.

"The only restrictions I could see against using the helicopter would be local ordinances against helicopters flying low or not being able to land in a city, or just having local residents excited. Last year they wouldn't allow Santa Claus to land at a local shopping center. This was out of the township where our course is located, so I'm not too concerned about restrictions at this time. I intend to continue to use aerial fungicide applications when I feel they are necessary."

Len and Charlie are very progressive superintendents. They continue to strive forward in improving their turf management programs.

Without question, we need to investigate aerial pesticide applications for golf courses in more depth, and we need to exchange more ideas on the subject.