Are You A Rational Superintendent?

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The question posed in the title of this article at first blush seems like a personal affront. Even the mere fact I would have to ask if you're rational must mean there is some part of me that thinks you're irrational. However, I'm speaking not in terms of personality or temperament but rather if you're rational in an economic sense. In particular, are you rational when it comes to scheduling fungicide applications to optimize disease control? The simple answer is that most superintendents are not, and there is a clear explanation for why that is.

Several scientific papers have come out in recent years investigating the manner in which agricultural managers make decisions about their production methods; everything from why certain cultural practices are not adopted to developing risk management strategies as it relates to yield loss to how fungicide applications are scheduled (McRoberts et al., 2011; Hughes et al., 2013; te Beest et al., 2013). Each of these papers talks about the rational decision maker, which they define as someone who seeks to maximize profit 'and that this single objective explains the choices they make' (McRoberts et al., 2011).

Most of the concepts discussed in these papers relate to agriculture and focus on the economic choices made related to the cost of pesticides versus the impact that diseases have on yield. Though we don't work in terms of yield, many of the aspects discussed have consequences for golf course superintendents. There are a lot of theoretical equations included in these papers, but their basic conclusion is that the most economically rational manager would apply the minimum amount of pesticide to obtain the maximum amount of yield (ie profit). This seems pretty straightforward, why apply more pesticide than you need to? But in reality it's actually impossible because you can't forecast with complete certainty when or if disease will occur, and hence can't precisely determine when pesticide applications will provide the greatest profit.

The lack of certainty about when diseases will develop results in two types of managers; those that are risk-averse and those that are risk-tolerant. As the name suggests, the risk-averse manager will look to minimize risks whenever possible. With regards to disease control, this means they will often apply fungicides on a strict calendar-based method with little regard for the environmental conditions. The risk-averse manager will spend more on fungicides, but will lower the 'risk' that a severe disease outbreak will occur.

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The risk-tolerant manager, on the other hand, will often apply fewer but hopefully more timely fungicide applications. They accept that their ability to forecast disease is imperfect, which could result in significant disease outbreaks. When they forecast disease correctly, they will often save money relative to the risk-averse manager due to fewer fungicide applications. However, when they forecast incorrectly the costs of recovery from disease or lost rounds of play may significantly outweigh the initial savings obtained from less pesticide used.

Most managers, both in turf and agriculture, are risk-averse and prefer the increased degree of certainty that comes with more fungicide usage. While they may spend more money than is required to control disease, they at least reduce the uncertainty (i.e. risk) that comes with trying to forecast precisely when disease will develop. This technically makes the vast majority of golf course superintendents irrational in an economic sense (because they are spending more than the absolute minimum to control disease), but it allows for more effective planning and more certain costs from year to year. In short, think of the fungicides you apply as 'insurance' against unforeseen disease outbreaks. Higher quality insurance will cost more upfront and in the absence of anything going wrong, but when something does go wrong having quality insurance can often save significant sums of money relative to a lower quality insurance plan.

So can golf course superintendents become more rational? That would depend on the ability to more precisely pinpoint when disease outbreaks will occur so that fungicides will only be applied as needed. Disease forecasting for most turf diseases has historically been pretty abysmal, but there have been some more accurate forecasting tools developed in recent years. This summer we intend to research just how accurate those forecasting tools can be, how they can be implemented at your course, and how truly 'rational' they can make you. Well, at least from an economic point of view.

Literature cited

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