

plots in which dew was not removed. However, in 2010, the same propiconazole treatment provided five additional days to reach the threshold. The discrepancy between 2009 and 2010 may have been due to an increased rate of dollar spot development early in the 2009 test, limiting the beneficial effects of repeated dew removal episodes.

Factors to consider in dew removal programs

Disease suppression is only one reason to remove dew from fairways. In fact, it's likely most superintendents use this practice more for improving playing conditions (reduction in surface wetness) and dispersal of grass clippings and earthworm castings, than for disease suppression.

Working with a local superintendent who practices dew removal, we estimated it takes two low-wage (\$8.50/hour) summer employees approximately 1 hour to remove dew from 18 fairways with a weighted hose attached to two golf carts. Assuming this is done four times per week (on non-mow days) for 8 weeks in late summer, the labor cost is \$544 and fuel cost is about \$48. Figuring the price of a weighted hose at about \$900, then the approximate cost of dew removal is \$1,500.

If you can't afford to remove dew all season or daily, think about doing it strategically on misty days in late summer when dew hangs onto grass blades for most of the morning and when heavy dew covers leaf surfaces on calm, cloudy days. There is no guarantee this practice will pay for itself through a reduction in fungicide use, but it's likely you will have less dollar spot and improved playing conditions.

The threshold level used for dollar spot fungicide applications will probably be a factor in the success of dew removal programs. A high threshold will likely show stronger differences in disease development between areas where dew is removed and where it is not removed, and it may allow a greater number of days between fungicide applications. However, damage may be unacceptable to golfers, and may result in an increase in pathogen levels, which necessitate greater fungicide use later in the season. Lower threshold levels would likely provide fewer

days of dollar spot suppression when fungicides are used in conjunction with dew removal. However, disease epidemics would be less damaging, and subsequent fungicide applications may require lower rates because of reduced pathogen levels.

The benefits of reduced dollar spot and improved fungicide performance associated with dew removal will also depend on the thoroughness of the dew removal method. The reduction in dollar spot from dew removal in our study may have been partially influenced by the removal method. Use of reel mower units with reels disengaged provides effective removal of leaf moisture and is probably more effective at suppressing dollar spot than the more common method of dragging a hose over dew-covered turf. Other researchers reported that removal of dew by rolling or mowing was significantly better at displacing leaf moisture compared to a surfactant, dragging a hose or syringing. However, all dew removal methods significantly reduce dollar spot compared to situations where dew is not removed.

Is dew removal worth the effort?

Whether the cost of dew removal programs can offset savings associated with fewer fungicide applications depends on the fungicide, mowing frequency, nature of the disease epidemic, threshold level and possibly the dew removal method. Although results of this study do not provide enough information to establish a definite economic benefit from dew removal practices, they do suggest that dollar spot severity can be reduced when daily dew removal is practiced on fungicide-treated turf. Results also confirm findings of previous studies that no detrimental effects on fungicide efficacy are associated with increasing mowing frequency.

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