**Yield Effects of Crop Diseases**

Whilst the severity of disease may be an important measure in its own right for many field experiments, disease is primarily a concern due to its effect on yield in crop plants. As such, a number of attempts have been made to use disease severity measurements to inform crop models. Such models generally make a distinction between radiation interception efficiency (RIE) and radiation use efficiency (RUE). The most obvious effect of foliar crop diseases is a decrease in RIE due to the loss of photosynthetically active tissue either from necrosis, early senescence, or (in severe infections) from reduction in leaf formation. The impact of infection on RIE is not generally even throughout the plant, with infection of upper leaves having a disproportionate effect. As such, the vertical position of disease within a crop must be accounted for. Similarly, infection can also reduce RUE. A proportion of this reduction can be attributed to a reduction in green leaf area due to necrosis, but it has been recognised for a number of years that reductions in photosynthetic capacity due to infection can extend beyond visibly damaged regions. Bastianns introduced the concept of the virtual lesion to reflect this effect, with a single parameter (β) representing the ratio between the virtual and visible lesion size. This concept has subsequently been used to examine the physiological effects of disease symptoms in a number of crop pathosystems. The incorporation of alternative phenotyping methodologies for crop diseases is an area that has received little attention, but it seems likely that the identification of stress responses or defence biomarkers has the potential to offer useful parameters into such growth models in conjunction with disease symptoms. Similarly, molecular methods for quantifying multiple microbial infections in field trials may allow earlier indications of likely yield costs associated with infection.