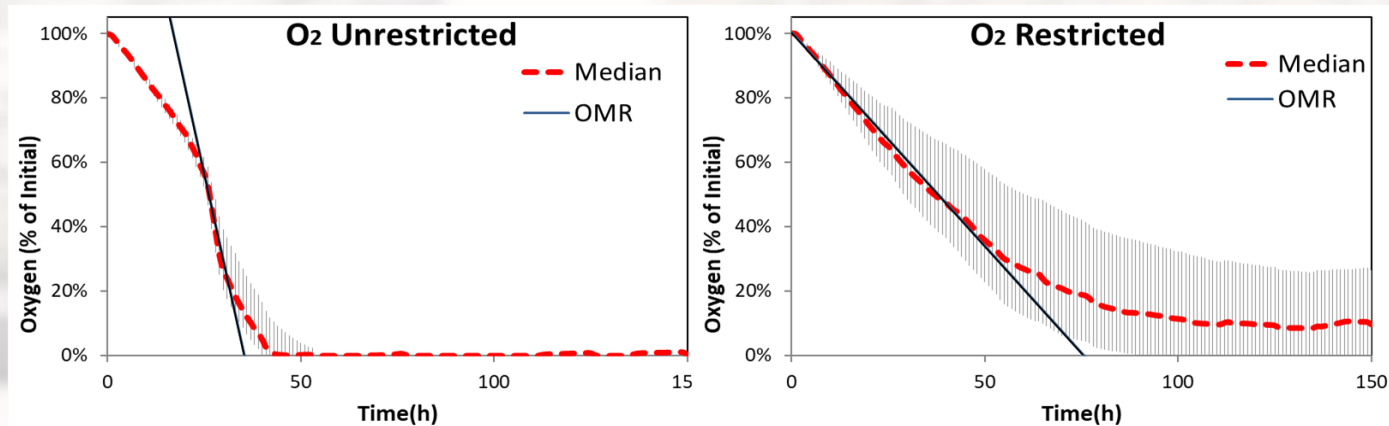


# Seed Respiration Analyser (SRA)

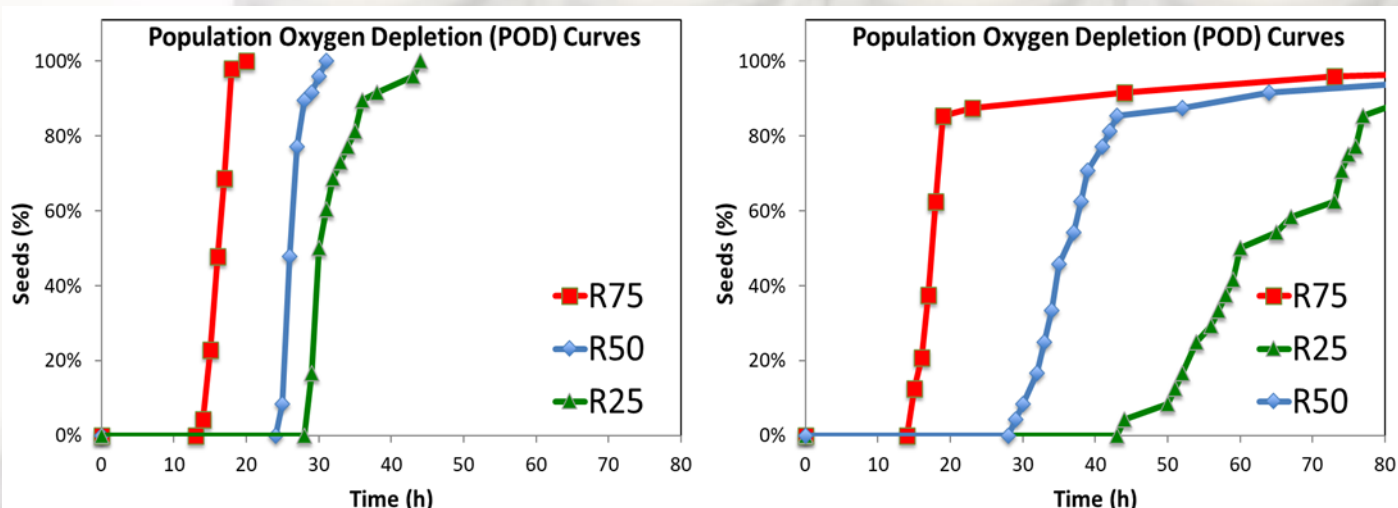
## Evaluation of simulated field conditions

The SRA can support traditional seed testing, providing data unavailable through traditional means. Germination under field conditions can differ significantly from germination under standard germination conditions. Wet soil conditions can deprive seeds from oxygen resulting in delayed or heterogenous germination. With SRA, these conditions can be simulated and analysed on single seed level.



**Figure 1. Oxygen consumption (median  $\pm$ SEM) of a large number of individual seeds in normal (left) and wet, O<sub>2</sub>-restricted conditions.** Oxygen availability to seeds imbibed in wet substrates can be limited. Figure 1 shows the average seed respiration response of a primed seed batch in normal and wet conditions. The difference in OMR shows the difference in Oxygen Metabolism Rate between the batches. Vertical lines across the median indicate the standard error of the mean. When O<sub>2</sub> availability is restricted, homogeneity decreases (SEM increases) and germination time increases. With the SRA field conditions, like soil moisture conditions and soil temperature, can be simulated to get a better understanding of germination in less than ideal conditions.

### 'SRA can assist in evaluation of the effects of soil conditions'



**Figure 2. Population Oxygen Depletion Analysis of the data from Figure 1 for normal (left) and wet, O<sub>2</sub>-restricted conditions (right).**

The figure above shows the more advanced Population Oxygen Depletion analysis (Bello and Bradford, Seed Science Research (2016) 26, 199–221), applied to the data from figure 1 for wet (O<sub>2</sub> restricted) and control seeds. Percentage of seeds crossing a threshold (e.g. R75 threshold meaning 75% of initial oxygen remaining) is shown on the vertical axis. Steep vertical straight lines indicate high homogeneity. The smaller time difference between R75 and R25 curves for control seeds as compared to O<sub>2</sub> restricted seeds suggests higher metabolic activity for the control seeds. The time for the R75 curves to start is equal for both conditions and suggests the same initiation of the germination process.

The MS Excel-based POD Analysis software is freely available and 100% compatible with SRA.