



LemnaTec High-Content Screening

CEREAL NIR-PHENOTYPING

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Near Infrared Imaging (NIR)

Near infrared (NIR) or short-wave IR-imaging (SW-IR) can be used, for example, to get detailed information on the watering status of plant leaves and their reaction to limited water availability or external drought (e. g. during growth or storage periods). The following image shows how a representative of cereals (in this case wheat) generally dries down over time, changing the NIR-absorption of the leaves in the NIR-absorption band between 1,450 and 1,600 nm.

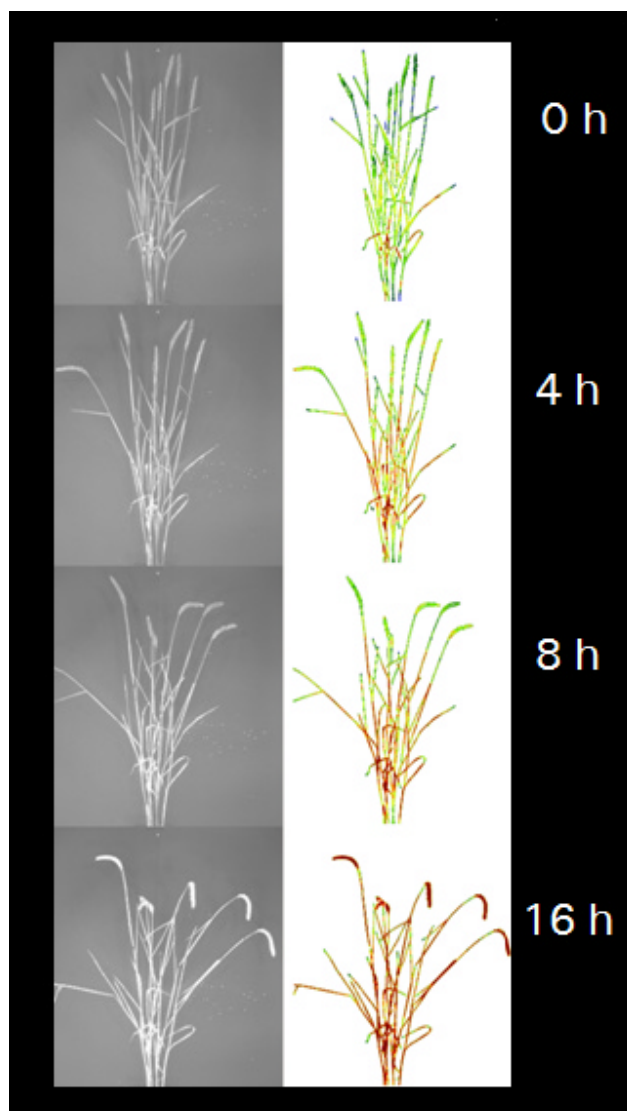


Figure 1: A bunch of wheat dries down in warm ambient conditions. NIR-imaging shows a strong increase in reflectance as the water in the leaves is extremely reduced. Blue/green false colours represent high water content, while yellow/red colours symbolise low water content (high reflectance).

This wheat test with its fast reaction to drought is just one application example of NIR-imaging; in this case it is used to quantify the water dynamics in plants.

Similar tests can of course be carried out with various plants, even in pots, to assess their reactions to water stress under drought conditions.

The diagram below shows the quantitative data, expressed as false colour classes, of several absorption ranges.

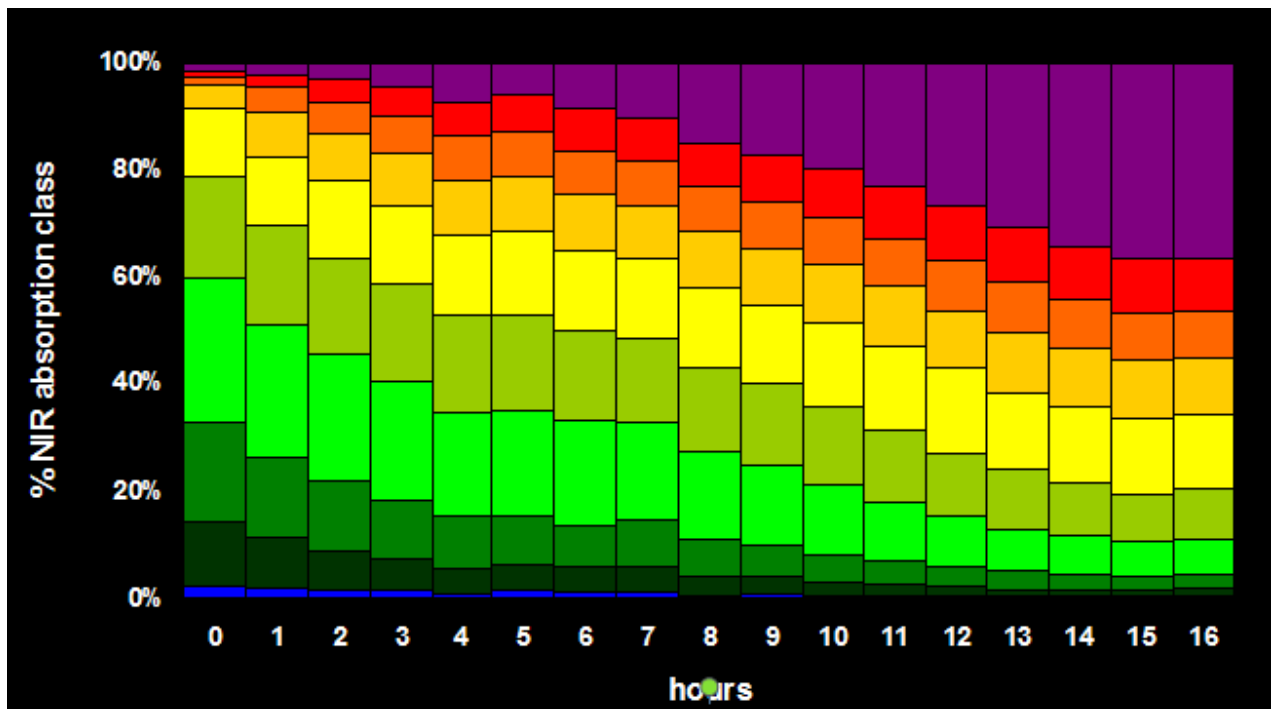


Fig. 2: The drying dynamics of a wheat plant over a 12 hour period. Blue/green false colours represent high water content, while yellow/red/violet colours symbolise low water content (high reflection).

Figure 2 shows how non-destructive imaging generates high-content data on water loss dynamics. The sensitivity of the technology is clearly revealed by the fact that within the first few hours significant changes towards drying down are already depicted as major shifts between the colour classes.

Conclusion

The LemnaTec Scanalyzer is a comprehensive phenotyping platform highly suitable to quantify morphological traits e. g. of cereals like wheat – and in fact any other plant – over the whole length of an entire life cycle.

The example above provides only a first impression of the unlimited capabilities of the system concerning the quantitative characterisation of water dynamics in vegetables and other plants. All results based on biologically relevant parameters that are generated in this way will be reproducible.

Moreover, the LemnaTec systems can be customised for various applications, depending on individual research requirements.

For further information please contact

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