



## About Syngenta

Syngenta is one of the worlds leading agricultural companies, who's ambition is to help safely feed the world whilst reducing harm to the planet. The placement is in Syngenta's Crop Protection side, which focuses on protecting crops from both abiotic and biotic stress through the production of pesticides and PGRs.

## Student Role

As a placement student, your role is to aid the field trialists throughout the year carry out their research. It involves helping to:

- Prepare the trial site by marking it out
- Spray maintenance and/or R&D chemicals using handheld applicators
- Carrying out assessments and collect data
- Harvesting samples via a plot combine harvester

Though the placement is based in Cambridge, you are expected to travel to both the Western and Northern trials to assist the trialists there too. Workload is seasonal as it reflects the farming year, so you must be flexible throughout.

## Learning on the job

This job is ideal for anyone with an interest in agriculture, plant pathology, plant biochemistry or just generally likes working outdoors (whether its hot or cold).

As a student you become qualified with your PA1 and PA6, as well as having the option to either visit the R&D site at Jealott's Hill or take part in BASIS training.

Aside from this, there is always on the job learning, witnessing it first-hand out in the field. Such as identifying different crops and the fungal diseases infecting them, cereal growth stages and weed ID, plus much more.

For example, this Winter Barley at a Doncaster trial site has been infected with both Net Blotch and Brown Rust. The pathogens responsible for these diseases are *Pyrenophora teres* and *Puccinia hordei* respectively. The later of which is a basidiomycete fungus with a macrocyclic, heteroecious life cycle – its secondary host being Barberry<sup>1</sup>.



## Field Trials

Real-life experiments which represent the last stage in the pesticide screening cascade from lab to field, before approval to the market. In general, they will test a compound in the real agronomical, climatic environment.

Like any lab experiment, a trial will typically consist of:

- A hypothesis
- An independent variable (new or existing compound)
- Dependent variables (measurement of stress, grain yield, plant growth etc)
- A control + different treatments
- 4 repeats

The main difference is that trials focus on agricultural research and take place in farmers' fields. The drone image below shows Syngenta's Innovation Centre (2022) at Rougham, East Anglia, and demonstrates what trials generally look like.



## Example: Yellow Rust (YR) Trial (Non-chemical)

### Aim

To investigate how susceptibility to Yellow Rust Disease differs between different winter wheat varieties/cultivars. Looking at which varieties are most susceptible and when the rust infects.

### Yellow Rust (YR)

A disease caused by basidiomycete fungus *Puccinia Striiformis f. sp. Tritici*. The pathogen has a macrocyclic life cycle and spreads spores via wind dispersal. It infects plants using appressoria to form haustoria internally and live biotrophically within wheat<sup>2</sup>. The rusty appearance of it is caused by urediniospores extruding from pustules on the leaf surface. Affects of the disease include yield loss through reduced grain quality and quantity.



Figure 1 Guide to Yellow Rust Assessments. Numbers represent leaf cover percentage.

### Method

10 different winter wheat varieties were grown in a trial, each with 4 repeats plots. All varieties were treated the same throughout. A non-YR-targeting pesticide program was followed for maintenance purposes. The trial was drilled in October and was assessed to monitor growth stages and disease presence. Assessments were done on a monthly basis until Spring, when they then turned fortnightly. Growth stages of the crop were determined by BBCH staging and disease assessments measured the percentage of the top (flag) leaf that is covered by YR pustules, assessment guide seen in Figure 1.

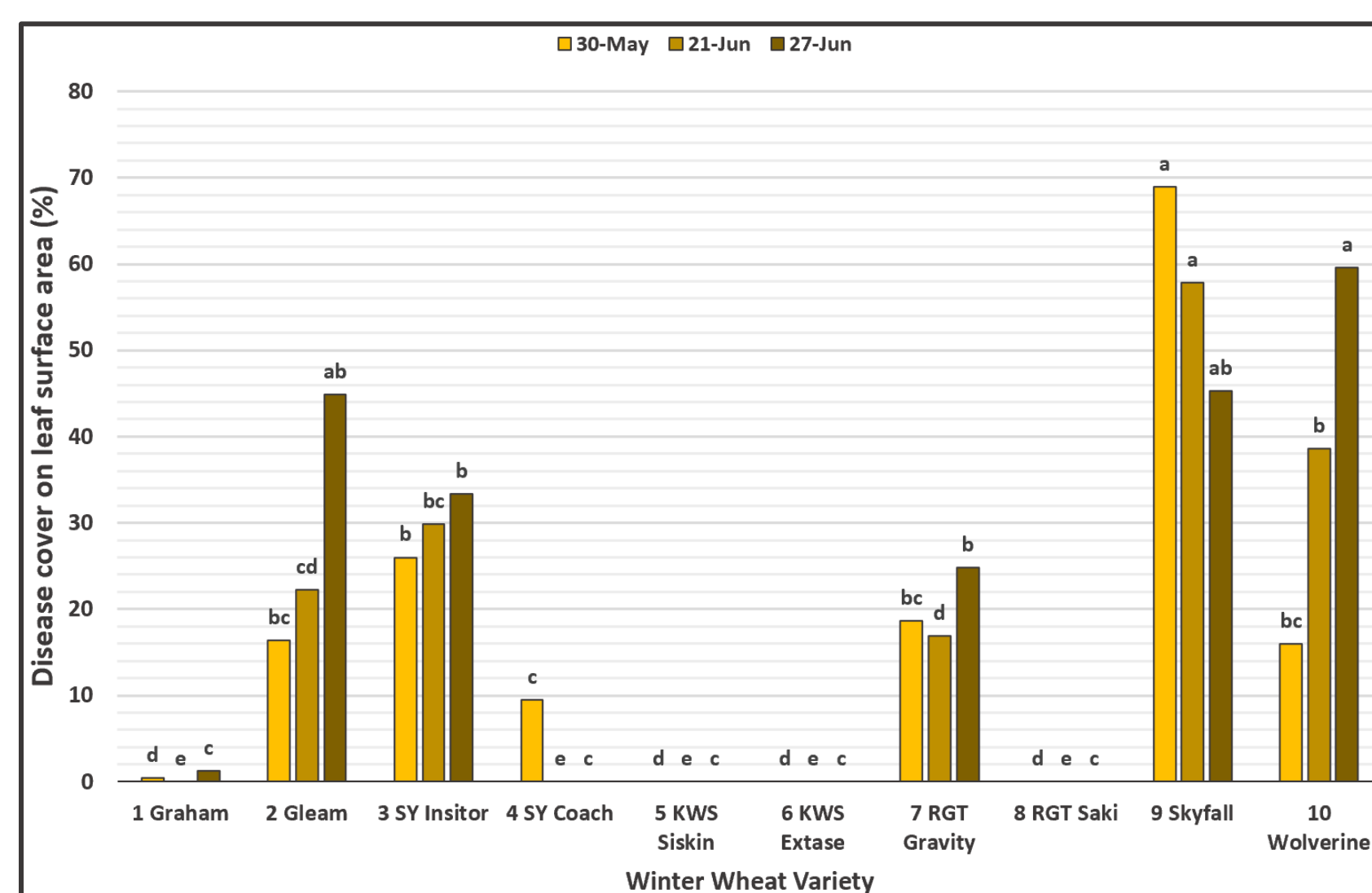


Figure 2 Bar Chart showing Disease Assessment scores (%).

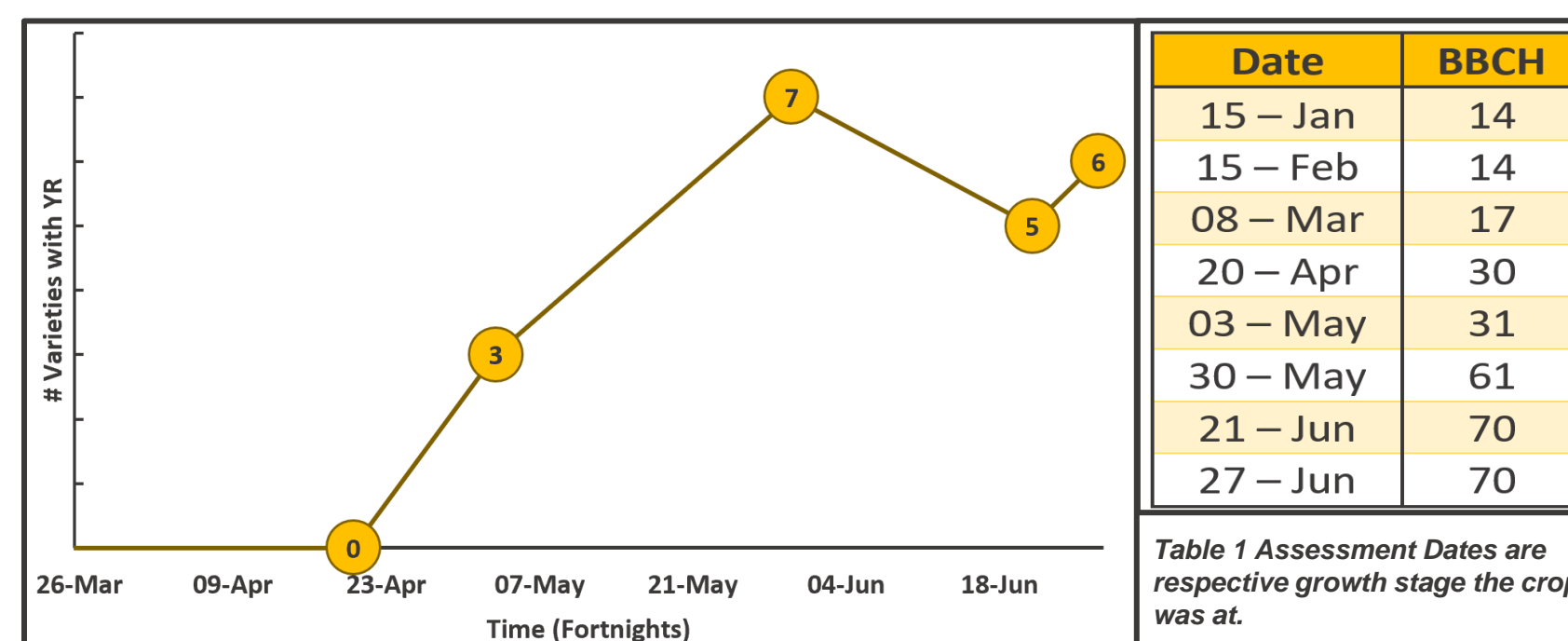


Figure 3 Line Graph displaying YR infection Timing.

### Results

As seen in Figure 2, Skyfall was the most susceptible variety to YR, significantly more so than others. Many varieties showed varying susceptibilities to YR, except a few which showed none. These included KWS Siskin, KWS Extase and RGT Saki.

Figure 3 shows that YR did not begin to infect the wheat until the end of April, when the crop was entering growth stages BBCH30 onwards. This is when plants become adults.

### References

<sup>1</sup>Cevik, V., Brown, N., 2021. Plant Symbiosis and Pathology, BB20032: Biology, University of Bath. Unpublished.  
<sup>2</sup>Chen, W., Wellings, C., Chen, X., Kang, Z., Liu, T., 2014. Wheat stripe (yellow) rust caused by *Puccinia striiformis* f. sp. *Tritici*. *Molecular Plant Pathology*, 15(5), pp. 433-446.