



Assessment of eyespot on wheat

Method/protocol submitted by:

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Objectives of the method/protocol:

To estimate the attacks of eyespot on wheat at the field scale. Two assessments are realised: one on young plants and one at the adult stage.

Brief description of the method/protocol:

This protocol presents scoring methods to assess eyespot development in field experiments on wheat at two different growth stages.

Pathogens causing the disease

Coexistence of 2 species:

- Teleomorph pathogen: *Occulimacula yallundae*
Anamorph pathogen: *Helgardia herpotrichoides*
- Teleomorph pathogen: *Occulimacula acuformis*
Anamorph pathogen: *Helgardia acuformis*

Possible uses of this method/protocol:

Breeding of wheat varieties – evaluation of the level of resistance in homologation tests.

Method/protocol:

- Observation unit
 - On young plants:
The observation on young plants is carried out in plastic tunnel. The seeds are sown in 0,5 m long rows (30 seeds/row). The distance between the rows is 0,2 m.
 - On adult plants:
The observation is carried out in micro-plots designed for varietal selection (approximately 90 seeds/1,50 m-long row).
The 1 m long middle-part of each plot is delimited with a string and will be used for assessments.
A variety susceptible to eyespot (for example Soissons) is sown between each row to reduce effects of neighbourhood and homogenize the contamination of the trial.
- Observation period and frequency
 - On young plants:
The observation period on young plants depends on the development of the disease: less than two attacked leaf sheathes on resistant varieties, three or four attacked leaf sheathes on susceptible varieties.
 - On adult plants:

The observation on adult plants is carried out between the end of booting and the end of milk stage (about 100 degree-days after flowering). The observation period depends on the earliness of the varieties.

If the observation is realised too late, saprophytes can develop and make the estimation of necroses due to eyespot more difficult.

o Disease assessment

o On young plants:

Uproot the plants without damaging the sheathes. Wash them. Check the sheathes from the outer one until the inner one where the stroma of the fungus is clearly visible (deepest level of symptoms).

Count the number of attacked sheathes per plant.

o On adult plants:

Uproot the plants without damaging the crown. 50 plants give a good representation of the plot.

Cut the plants at a 25-cm height with scissors.

Wash the stems and remove the leaves. Only the stem is scored.

Cut the stem at the level of the biggest eyespot necrosis.

Estimate the percentage of section necrosed by eyespot and assign each stem to one of the severity classes presented below.

Classes can be defined thanks to attacks on resistant and susceptible control plants. They can also be defined *a priori*, for instance 6 classes:

1 = no necrosis

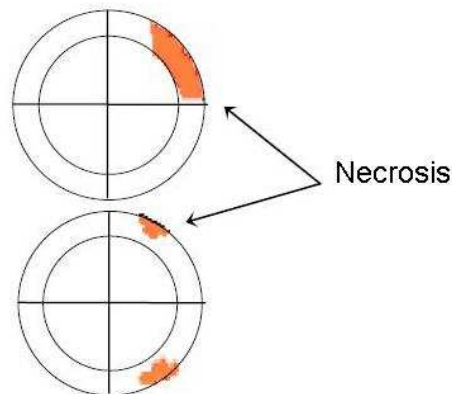
2 = percentage of necrosed section < 25%

3 = 25% < percentage of necrosed section < 50%

4 = 50% < percentage of necrosed section < 75%

5 = 75% < percentage of necrosed section < 100%

6 = percentage of necrosed section = 100%



Example of stems of class 2

The average percentage of necrosed section is calculated thanks to the distribution of the plants observed into the different severity classes:

Average percentage of necrosed section = $(12,5 \times \text{number of stems of the class 2} + 37,5 \times \text{number of stems of the class 3} + 62,5 \times \text{number of stems of the class 4} + 87,5 \times \text{number of stems of the class 5} + 100 \times \text{number of stems of the class 6}) / \text{number of observed stems}$.



Advantages/disadvantages of the method/protocol:

The scoring can vary between observers, be careful to take this effect into account. Each observer should score one complete block. If this is not possible, in the case of two observers per block, each observer should score half of the stems of each plot.

The duration of the scoring of a whole essay should not exceed one week, since eyespot can evolve rapidly after flowering: genotypes scored at intervals superior to 5 days cannot be compared. If it is not possible to realise the whole scoring in one week, the stems can be uprooted and kept in a cold room at 5°C and in the darkness during 4 days at the most, or in a freezer at -20°C during several months.

References or examples of studies carried out by using this method/protocol:

Anne Lécuyer, Maxime Trottet (2005). Évaluation de la résistance du blé au piétin-verse in Le cahier des techniques de l'INRA, numéro spécial Méthodes d'appréciation du comportement variétal vis-à-vis des bioagresseurs, p.83-88.